AD-A143 593 NEEDS ASSESSMENT TO DEFINE THE TRAINING REQUIREMENTS 1/7
FOR A BASIC SKILLS E..(U) RCA SERVICE CO CHERRY HILL NJ
APR 84 DABT60-81-C-0017

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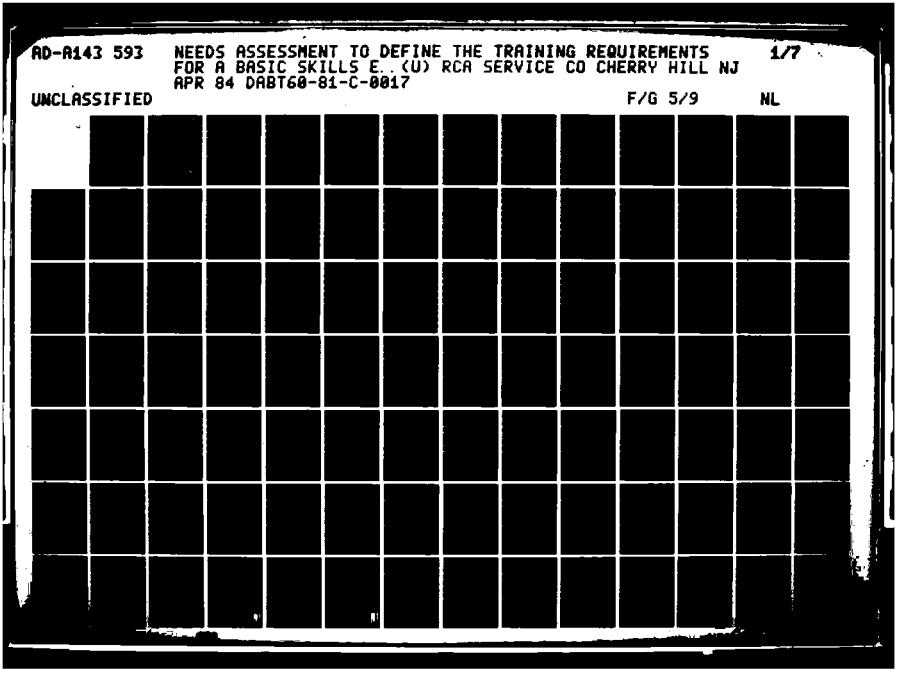

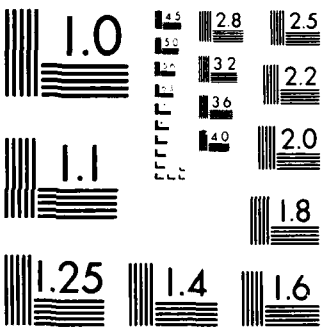

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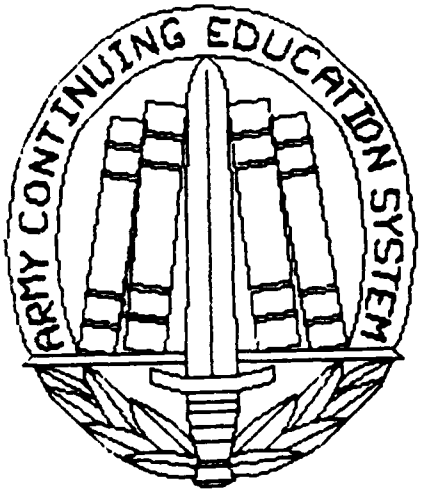
AD-A143 593

(10)

NEEDS ASSESSMENT TO DEFINE THE TRAINING REQUIREMENTS FOR A BASIC SKILLS EDUCATION PROGRAM (BSEP) CURRICULUM DEVELOPMENT

OPERATIONAL SUMMARY REPORT

Submitted By
RCA Service Company
Cherry Hill, NJ
Reference Contract
DABT 60-81-C-0017



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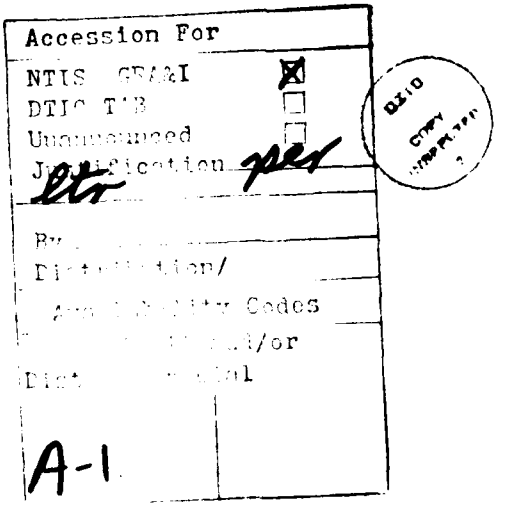
OPERATIONAL SUMMARY REPORT

Contract DABT60-81-C-0017 (CDRL A004)

Prepared By:

RCA Service Company



Revised April 1984

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Requirement of Report

The requirement for development of this operational summary is stated in CDRL Sequence Number A004, Attachment 1 to Modification P00006 of Contract DABT60-81-C-0017. For the purposes of orientation this requirement is restated below:

> "(1) Operational Summary. Information in this part shall be presented for the analysis effort in the aggregate and for location and/or MOS grouping. Included will be: discussion of usability of ETAP and operational elaborations; discussion of interview, write-up, and substantiation procedures; discussion of verification and instructional review processes; discussion of taxonomy development and use, plus inclusion of the compelte taxonomy in use at the completion of the analysis effort; discussion of full analysis elaboration; listing of pertinent operational details, such as dates, time factors per yask, and an average analysis time for each MOS, and SME/instructional utilization; and inclusion of subtask index."

Format of Report

In addition to ~~the Requirements section included above~~, the report contains the following sections: Descriptive Statistical Summary, Extended Task Analysis Procedures (ETAP), Taxonomy, Data Processing, Subtasks, MOS Summaries, and Taxonomy Summaries.

Descriptive Statistical Summary

Work on the task analysis effort covered the timeframe of 8 June 1981 to 31 December 1982. Summary descriptive statistics are available to demonstrate magnitude of effort and rate of progress. The summary statistics are presented as follows:

1. Attachment A provides information on the MOS included in the effort, plus analysis and instructional review locations. Ninety-four (94) MOS were included. For the purposes of this report common tasks are handled as a "separate MOS." In most instances analysis and instructional review was performed at the same location. In instances where AIT was conducted at a location other than the proponent school (where analysis was conducted), instructional review was performed at the location of AIT. Common tasks were analyzed at the proponent school. Two (2) replicate analyses were performed for each common task in accordance with the following guideline: Each common task was analyzed (original or replicate) at a combat arms, combat support, and combat service support location.

2. One way to gain a prospective on the magnitude of effort is to look at the buildup of analysts across locations as the effort continued. Such information is presented at Attachment B. Locations in operation ranged from five (5) in June 1981, to eighteen (18) in July 1982, to two (2) in November 1982. Correspondingly the total number of analysts ranged from eleven (11) in June 1981, to thirty-three (33) in June 1982, to three (3) in December 1982.

3. For the analysis effort rate of progress was often viewed on an MOS-by-MOS basis as expressed by arithmetic average (mean) per task. A more composite look at rate of progress can be shown by viewing progress on a location-by-location basis in terms of range, median, and mean. Such data are shown at Attachment C. The data were computed as follows for all locations having two (2) or more MOS:

   a. Range = Highest average time per task (MOS-by-MOS basis) minus lowest average time per task (MOS-by-MOS basis).

   b. Median = 50% percentile from a high to low rank ordering of average time per task (MOS-by-MOS basis).

   c. Mean - Arithmetic average of average time per task (MOS-by-MOS basis).

   Factors included in the average time per task were: original analysis, write-up (substantiation), verification, instructional review, and analysis planning.

4. A more detailed look at rate of progress can be gained by looking at tasks completed monthly on an MOS-by-MOS basis at the various locations. Such data are shown at Attachment D. The cumulative tasks submitted for input; following analysis, write-up (substantiation), verification and instructional review, is shown on a monthly basis. In most instances the work of a single analyst is reflected in the progress.

5. Throughout the analysis effort progress was shown monthly in the Letter Progress Reports. As a summary indicator of magnitude and rate of progress, the final report has been provided at Attachment E.

Extended Task Analysis Procedures (ETAP)

The Extended Task Analysis Procedures (ETAP) were provided as Government Furnished Materials (GFM) to serve as a guideline for the task analysis effort. Initially, and throughout the analysis period, various issues arose concerning use of the ETAP. The major issues and a discussion of each is presented below.

1. The ETAP was (is) presented as a methodology for use with any task requiring analysis. It does not provide guidance as to how to plan for or schedule a large scale analysis effort at a particular location or across several locations. To supplement the ETAP, the following factors were considered in an evolving approach to analysis planning.

   a. Since the ETAP proceeds through a series of interviews required for original analysis, verification, and instructional review, an important aspect of analysis planning is to explain these processes and develop a workable schedule so resource requirements can be met.

b. Work location is also an important consideration in analysis planning. A work location which was close to required GFM (Technical Manuals, Field Manuals, Supply Bulletins, Regulations, Directives, etc.) and to training areas was preferred to separate interview facilities.

c. Verification that the most recent GFM (Soldier's Manual or Task List) was available as a source of tasks.

d. Review and sequencing of tasks for analysis. Analysis can proceed most efficiently when tasks are sequenced. Factors important to sequencing include: content similarity, complexity, special resource requirements, sharing with other MOS, and likelihood for subtask and cross-reference utilization. (Subtasks and cross-referencing are discussed below in separate sections on Data Processing and Subtasks.)

2. The ETAP originally described the extent of the analysis required in terms of "the lowest ability soldier." This description appeared unworkable and was replaced with three (3) descriptions for "entry-level soldier." These descriptions proved more workable, but still did not provide full guidance concerning extent of analysis. Concurrent with the above was a continuing discussion concerning expression of analysis results in terms of procedures (Steps 3 and 4 of the ETAP) or knowledges (Step 10 of the ETAP). The following guidelines emerged from the two (2) considerations noted:

   a. As much data as possible should be expressed in terms of Steps 3 and 4 of the ETAP, with Step 10 reserved for prerequisite competencies.

   b. Analysis should be extended to the point where a novice could be expected to perform, as judged by an analyst.

3. Job aids were an integral part of many of the major steps of the ETAP as originally presented. The focus, originally was on whether a job aid provided information for task performance and on analyzing the skills needed to use the job aid. Eventually, since prerequisite competencies were developed for use of job aids, the focus was in terms of resources (available, but not required for task performance) and intrinsic job aids (required for task performance).

4. The ETAP originally provided extensive guidance for conducting original analysis interviews and much briefer mention of the verification and instructional review processes. Verification evolved as a rather straightforward process in which a second SME reviewed the write-up of the results of the original analysis interviews. It was an analyst responsibility to reconcile any differences. In a limited number of instances two sets of results were reported. Instructional review procedures were not as straightforward. The main concern in instructional review was establishing reasonable criteria as to whether a skill was taught or not taught. In addition to an interview

situation, criteria considered were: mention in the POI, stated in a lesson plan, contained on a test, required mastery on a test. A secondary concern was obtaining resources to do the review for BSEP II tasks. Consequently, instructional review data are not available for BSEP II tasks.

5. The ETAP as originally presented did not provide alternate procedures which could be used with shared or common tasks. To accommodate the situation, replicate analysis procedures were developed. Replicate analysis required that a task undergo original analysis and then be subjected to verification at subsequent analysis situations. These subsequent verifications could result in no changes, minor change, or major changes.

6. The ETAP provided very little guidance concerning data recording formats. Three basic formats were developed and are presented at Attachment F.

7. Other major concerns about the ETAP, and analysis in general, included identification of prerequisite competencies, the development and use of a taxonomy, and data handling via data processing results. These concerns are discussed in separate sections below.

Four basic formats for expression of analysis results were developed as part of the effort. Examples of each are at Attachment G. The first example is referred to as "old format." Derivation of the knowledge analysis form is explained in the section on taxonomy development. The second example is referred to as "new format". The third example, using TPA-X forms, was an experimental approach to recording transfer analysis results. The final example was used only at Ft. Sam Houston.

To provide guidance in reviewing and using analysis results, an explanation has been developed for all entries on analysis reports. This explanation is provided at Attachment H.

Most analysis results produced by enactment of the ETAP and other procedures were submitted to a review and finalization process. Guidance used during this process is provided at Attachment I. Selected MOS at Ft. Eustis (57H, 61C, 67G, 67T, 68B, 68D, 68F, 68H, 68J) and MOS 91B at Ft. Sam Houston were finalized based results of an exhaustive review accomplished by school representatives at the time of analysis. Also, no review comments were received for MOS 24C at Ft. Bliss and MOS 19E at Ft. Knox.

Taxonomy

As noted above, issues developed during analysis concerning full expression of analysis results and identification of skills not taught through the instructional review process. Also at issue was the need to develop and utilize a taxonomy, as described in GFM associated with the ETAP, and the need to differentiate between field analysis responsibilities and extended analysis (home office) responsibilities. Relevant actions taken in this area included the following:

1. Field analysis was initiated without the benefit of a taxonomy. The initial version of the data recording form (see Attachment F) provided for recording of information from Step 10 of the ETAP and for recording instructional review (IR) information. Also, the knowledge analysis form (KA) was developed to differentiate extended analysis (home office) responsibilities from field analysis responsibilities (see Example 1 of Attachment G).

2. As field analysis and extended analysis progressed the need for a taxonomy became apparent. It was perceived that a taxonomy would assist in the following areas:

   a. Serve as a communication device across the complete project.

   b. Increase reliability of skill identification for both field analysts and home office reviewers.

   c. Initiate input for test development.

   d. Assist in the identification and description of prerequisite competencies.

   e. Lead to efficiencies in recording analysis information.

3. Based on a review of relevant GFM and project definitions, issues addressed during the initial portions of analysis, results of initial analysis at field locations, and consultations with the COR, initial taxonomy categories were identified and defined. This information was provided to analysts as part of the data recording form. This level of taxonomy development is shown as Item 1 at Attachment J. The categories provided a gross coding scheme that could be used with results from Step 10 of the ETAP.

4. Using results from the ETAP and follow-on discussions with analysts and the COR, the first expansion of the taxonomy was fielded with fifteen (15) categories and ninety-three (93) subcategories. Analysts continued to record the results of Step 10 of the ETAP and to code the statements in accordance with the taxonomy. Reviewers at the home office also used the taxonomy when developing the KA form. A copy of the expanded taxonomy is shown as Item 2 at Attachment J.

5. The final version of the taxonomy is shown as Item 3 at Attachment J. It contains thirty-six (36) categories and two hundred (200) subcategories. Motor skills are also included in this elaborated taxonomy. When the elaborated taxonomy was used both analysts and home office reviewers coded directly onto the data recording forms (see Example 2 at Attachment G).

6. All analysis reporting was in terms of the codes from the elaborated taxonomy. An explanation of coding conversion is provided as item 4 at Attachment J.

Data Processing and Subtasks

As noted above data processing and identification and utilization of subtasks, were integral to operationalizing the ETAP across various analysis locations. Data processing equipment entered into the analysis operation in the following manner:

1. Home office and field locations were linked in a conversational MEMO system so directions, information, and guidance could be shared.

2. Subtask index and subtask text (as described below) were made available to analysts following verification that subtask usage was appropriate.

3. Analysis results were entered into the system and all analysis and summary reports were machine generated. A complete description of analysis-related reports produced via data processing is provided at Attachment K.

Conceptually, it was anticipated that various levels of redundancy would occur in the analysis effort. The levels of redundancy were as follows:

1. Complete task duplication. This situation was handled via replicate analysis procedures as described above.

2. Repetition of prerequisite competencies. This situation was handled via development of the data recording forms and taxonomy as described above.

3. Repetition of portions of task analysis results across two or more tasks. This situation was handled via conventional cross-referencing techniques and through utilization of subtasks. The subtask effort is described below.

Subtasks were focused on for two purposes in the analysis effort. First, due to the large number of MOS under analysis and similarity across MOS and CMF, it was reasonable to expect redundancy across tasks for portions of task analysis results. Second, (this holds true if the first statement is true) the amount of time needed for analysis could be reduced. The following factors were important in the subtask effort:

1. Clear definitions and guidelines were needed for subtasks. Such definitions and guidelines were developed and used by both home office personnel and field analysts.

2. Responsibility for identification of subtasks needed to be specified. The initial effort was undertaken by home office personnel. The ongoing effort was assumed by field analysts.

3. Information needed to be readily available so analysts could assess the likelihood of the availability of subtasks. For this purpose the subtask index was developed and updated biweekly.

4. Full text of subtasks needed to be available so analysts could judge usability and include in analysis results. Availability was provided via mail and the data processing system.

5. Technical accuracy (as to applicability) needed to be maintained. The analysts were responsible to ensure that SME verified the applicability of subtasks.

In retrospect the subtask effort was only minimally productive. Main contributing causes to this situation were as follows:

1. Specificity of analysis results. It appears as if there is a continuum of specificity of analysis results -- at one end expression is so general that it is practically worthless and at the other end it is highly detailed, specific, and elaborated. The current effort was more toward the "end" of detail and specification. Thus, portions of analysis results were generally unusable, without minor to major adjustments, across tasks.

2. Data recording conventions. To make full utilization of a subtask concept, it appears that cross-referencing must be prohibited by directive. There is a strong tendency for analysts to prefer use of cross-referencing techniques.

Two (2) subtask products were produced on the current effort. The first, a rather comprehensive index of prospective subtasks is provided at Attachment L. The second, a list of subtasks actually processed and used is provided at Attachment M.

MOS Summaries

In a previous section general statements were made concerning the usability of the ETAP. These statements reflect project-wide issues and home office areas of influence. However, on a day-to-day basis each analysis location was responsible for its own work effort. To a large extent each location coped with and solved its own problems within broad guidelines provided by the home office. In an effort to capture the "flavor" of daily operations and to provide a record of major problems and accomplishments, analysts were asked to provide MOS summaries. These summaries, with only minor spelling and copy edit changes, are provided at Attachment N.

Taxonomy Summaries

As noted in the section on the ETAP, collecting instructional review information presented conceptual and BSEP II logistical concerns. Consequently, using available resources, interviews were conducted to attempt to identify which prerequisite competencies were instructed and which were not instructed for BSEP I tasks. The results of the effort are presented at Attachment O. Prior to using the results additional verification is recommended.

ATTACHMENT A

MOS and Location Listing

MOS #	MOS Title	Analysis Location	1 Instructional Review Location
000	Common Soldier's Tasks	2	3
05B	Radio Operator	Ft. Gordon	Ft. Gordon
05C	Radio Teletype Operator	Ft. Gordon	Ft. Gordon
05G	Signal Security Specialist	Ft. Devens	Ft. Devens
11B	Infantryman	Ft. Benning	Ft. Benning
11C	Indirect Fire Infantryman	Ft. Benning	Ft. Benning
11H	Heavy Antiarmor Weapons Crewman	Ft. Benning	Ft. Benning
11M	Fighting Vehicle Infantryman	Ft. Benning	Ft. Benning
12B	Combat Engineer	Ft. Belvoir	Ft. Leonard Wood
13B	Cannon Crewman	Ft. Sill	Ft. Sill
13E	Cannon Fire Direction Specialist	Ft. Sill	Ft. Sill
13F	Fire Support Specialist	Ft. Sill	Ft. Sill
15D	Lance Missile Crew Member	Ft. Sill	Ft. Sill
15E	Pershing Missile Crew Member	Ft. Sill	Ft. Sill
16D	HAWK Missile Crew Member	Ft. Bliss	Ft. Bliss
16E	HAWK Fire Control Crew Member	Ft. Bliss	Ft. Bliss
16H	ADA Operations and Intelligence Assistance	Ft. Bliss	Ft. Bliss
16P	ADA Short Range Missile Crewman	Ft. Bliss	Ft. Bliss
17B	Field Artillery Radar Crew Member	Ft. Sill	Ft. Sill
17C	Field Artillery Target Acquisition Specialist	Ft. Sill	Ft. Sill
17K	Ground Surveillance Radar Crewman	Ft. Huachuca	Ft. Huachuca
19D	Cavalry Scout	Ft. Knox	Ft. Knox
19E	M48-M60A1/A3 Armor Crewman	Ft. Knox	Ft. Knox
24C	Improved HAWK Firing Section Mechanic	Ft. Bliss	Ft. Bliss
24H	Improved HAWK Fire Control Repairer	Redstone Arsenal	Redstone Arsenal
26L	Tactical Microwave Systems Repairer	Ft. Gordon	Ft. Gordon
26Q	Tactical Satellite/Microwave Systems Operator	Ft. Gordon	Ft. Gordon
27E	Tow/Dragon Repairer	Redstone Arsenal	Redstone Arsenal
31J	Teletypewriter Repairer	Ft. Gordon	Ft. Gordon
31M	Multichannel Communications Equipment Operator	Ft. Gordon	Ft. Gordon
31N	Tactical Circuit Controller	Ft. Gordon	Ft. Gordon
31V	Tactical Communications Systems Operator/Mechanic	Ft. Sill	Ft. Sill
32D	Station Technical Controller	Ft. Gordon	Ft. Gordon
32K	Fixed Station Radio Repairer	Ft. Gordon	Ft. Gordon

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MOS #	MOS Title	Analysis Location	1 Instructional Review Location
33S	EW/Intercept Equipment Repairer	Ft. Devens	Ft. Devens
35K	Avionic Mechanic	Ft. Gordon	Ft. Gordon
36C	Wire Systems Installer/Operator	Ft. Gordon	Ft. Gordon
36K	Tactical Wire Operations Specialist	Ft. Gordon	Ft. Gordon
43E	Parachute Rigger	Ft. Lee	Ft. Lee
43M	Fabric Repair Specialist	Ft. Lee	Ft. Lee
44B	Metal Worker	Aberdeen Proving Ground	Aberdeen Proving Ground
44E	Machinist	Aberdeen Proving Ground	Aberdeen Proving Ground
45B	Small Arms Repairer	Aberdeen Proving Ground	Aberdeen Proving Ground
45K	Tank Turret Repairer	Aberdeen Proving Ground	Aberdeen Proving Ground
52C	Utilities Equipment Repairer	Ft. Belvoir	Ft. Belvoir
52D	Power Generation Equipment Repairer	Ft. Belvoir	Ft. Belvoir
54E	Chemical Operations Specialist	Ft. McClellan	Ft. McClellan
55B	Ammunition Specialist	Redstone Arsenal	Redstone Arsenal
55D	Explosive Ordnance Disposal Specialist	Redstone Arsenal	Redstone Arsenal
57E	Laundry and Bath Specialist	Ft. Lee	Ft. Lee
57H	Terminal Operations Coordinator	Ft. Eustis	Ft. Eustis
61B	Watercraft Operator	Ft. Eustis	Ft. Eustis
61C	Watercraft Engineer	Ft. Eustis	Ft. Eustis
62B	Construction Equipment Repairer	Ft. Leonard Wood	Ft. Leonard Wood
62E	Heavy Construction Equipment Operator	Ft. Belvoir	Ft. Belvoir
63G	Fuel and Electrical Systems Repairer	Aberdeen Proving Ground	Aberdeen Proving Ground
63H	Track Vehicle Repairer	Aberdeen Proving Ground	Aberdeen Proving Ground
63N	M60A1/A3 Tank System Mechanic	Ft. Knox	Ft. Knox
63W	Wheel Vehicle Repairer	Aberdeen Proving Ground	Aberdeen Proving Ground
64C	Motor Transport Operator	4	4
67G	Airplane Repairer	Ft. Eustis	Ft. Eustis
67N	Utility Helicopter Repairer	Ft. Eustis	Ft. Rucker
67T	Tactical Transport Helicopter Repairer	Ft. Eustis	Ft. Eustis
67U	Medium Helicopter Repairer	Ft. Eustis	Ft. Eustis
67V	Observation/Scout Helicopter Repairer	Ft. Eustis	Ft. Rucker
67Y	Attack Helicopter Repairer	Ft. Eustis	Ft. Eustis
68B	Aircraft Powerplant Repairer	Ft. Eustis	Ft. Eustis
68D	Aircraft Powertrain Repairer	Ft. Eustis	Ft. Eustis
68F	Aircraft Electrician	Ft. Eustis	Ft. Eustis
68G	Aircraft Structural Repairer	Ft. Eustis	Ft. Eustis

MOS #	MOS Title	Analysis Location	Instructional Review Location [1]
68H	Aircraft Pneudraulics Repairer	Ft. Eustis	5
68J	Aircraft Fire Control Repairer	Ft. Eustis	Ft. Eustis
68M	Aircraft Weapon Systems Repairer	Ft. Eustis	Ft. Eustis
71D	Legal Clerk	Ft. Harrison	Ft. Harrison
71L	Administrative Specialist	Ft. Harrison	Ft. Jackson
71M	Chapel Activities Specialist	Ft. Monmouth	Ft. Monmouth
71P	Flight Operations Coordinator	Ft. Rucker	Ft. Rucker
71Q	Journalist	Ft. Harrison	Ft. Harrison
72E	Telecommunications Center Operator	Ft. Gordon	Ft. Gordon
74D	Computer/Machine Operator	Ft. Harrison	Ft. Harrison
74F	Programmer/Analyst	Ft. Harrison	6
75B	Personnel Administration Specialist	Ft. Harrison	Ft. Harrison
76C	Equipment Records and Parts Specialist	Ft. Lee	Ft. Lee
76P	Materiel Control and Accounting Specialist	Ft. Lee	Ft. Lee
76V	Materiel Storage and Handling Specialist	Ft. Lee	Ft. Lee
76W	Petroleum Supply Specialist	Ft. Lee	Ft. Lee
76X	Subsistence Supply Specialist	Ft. Lee	Ft. Lee
76Y	Unit Supply Specialist	Ft. Lee	Ft. Lee
82C	Field Artillery Surveyor	Ft. Sill	Ft. Sill
91B	Medical Specialist	Ft. Sam Houston	Ft. Sam Houston
93J	ATC Radar Controller	Ft. Rucker	Ft. Rucker
94B	Food Service Specialist	Ft. Lee	Ft. Lee
95B	Military Police	Ft. McClellan	Ft. McClellan
95C	Correctional Specialist	Ft. McClellan	Ft. McClellan
96B	Intelligence Analyst	Ft. Huachuca	Ft. Huachuca

NOTES

1. Instructional review was performed for IET and skill level-2 resident trained tasks.
2. Performed at proponent schools: Ft. Knox, Ft. McClellan, Ft. Eustis, Ft. Sam Houston, Ft. Benning, Ft. Bliss, Ft. Belvoir, and Ft. Gordon.
3. Instructional reviewed performed for original analysis only.
4. Analysis performed at Ft. Leonard Wood and Ft. Eustis, instructional review performed at Ft. Leonard Wood
5. Performed by Government personnel at Chanute Air Force Base.
6. Performed at both Ft. Harrison and Ft. Lee.

ATTACHMENT B

Analysis Per Location and Date

Location (X = Operation)

Date	Aberdeen	Belvoir	Benning	Bliss	Devens	Eustis	Gordon	Harrison	Sam Houston	Huachuca	Knox	Lee	McClellan	Monmouth	Redstone Arsenal	Rucker	Sill	Leonard Wood	Total Number of Analyst
June 1981	X			X		X	X	X											11
July 1981	X			X		X	X	X				X					X		13
August 1981	X			X		X	X	X				X					X		14
September 1981	X			X		X	X	X			X	X					X		14
October 1981	X		X	X		X	X	X			X	X	X	X	X	X	X		24
November 1981	X	X	X	X		X	X	X		X	X	X	X	X	X	X	X		28
December 1981	X	X	X	X		X	X	X		X	X	X	X	X	X	X	X		28
January 1982	X	X	X	X	X	X	X	X			X	X	X	X	X	X	X	X	28
February 1982	X	X	X	X	X	X	X	X			X	X	X	X	X	X	X	X	28
March 1982	X	X	X	X	X	X	X	X	X		X	X	X		X		X	X	29
April 1982	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	32
May 1982	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	33
June 1982	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	33
July 1982	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	29
August 1982		X	X	X		X	X	X	X			X	X		X	X	X	X	24
September 1982		X	X			X	X	X	X			X	X		X				15
October 1982			X			X			X				X		X				14
November 1982						X			X										5
December 1982						X			X										3

ATTACHMENT C

Analysis Results Summary

ANALYSIS RESULTS

		RANGE	MEDIAN	MEAN
ABERDEEN	(446)	28.6	6.5	9.5
BELVOIR	(213)	6.3	8.0	9.0
BENNING	(554)	27.6	7.3	11.7
BLISS	(539)	13.5	9.4	8.9
DEVENS	(80)	8.8	11.3	11.3
EUSTIS	(1,325)	19.9	8.8	9.4
GORDON	(840)	17.5	9.6	10.3
HARRISON	(233)	15.8	12.4	12.9
SAM HOUSTON	(121)	–	–	6.4
HUACHUCA	(107)	4.7	6.1	6.0
KNOX	(437)	2.6	4.3	3.8
LEE	(575)	7.5	6.4	7.2
McCLELLAN	(420)	1.7	5.7	5.7
MONMOUTH	(90)	–	–	7.7
REDSTONE	(335)	11.0	14.4	14.3
RUCKER	(133)	4.7	4.6	4.6
SILL	(843)	2.9	4.1	4.3
LEONARD WOOD	(188)	4.7	5.9	5.9
SUMMARY	7479*	26.1	6.9	8.3

*COMMON TASKS = 89 PLUS 178 REPLICATES

ATTACHMENT D

Cumulative Number of Tasks Analyzed/MOS/Month

Cumulative Number of Tasks Analyzed

MOS	June 81	July 81	Aug 81	Sept 81	Oct 81	Nov 81	Dec 81	Jan 82	Feb 82	Mar 82	Apr 82	May 82	June 82	July 82	Aug 82	Sept 82	Oct 82	Nov 82	Dec 82
44B	10	29	75	84		85	(4) 84		85		86								
44E				16	33	57	61												
45B							9	21	49	77	95								
45K										14			45						
63C						4	10	18	27	32	35	38	40	46					
63H						20	36	41	48	49	52	53							
63W		5	23	42	61	(1) 60			(6) 59		60								
12B													43	48					
52C													18	34	60				
52D							5	16	34	43	56	66							
29E															6	39			
27B						11		19	29	41	43	(10) 19	29	40	50	52	88	118	
11C													8	18	37	54	102	162	
71L															34	84	92	110	
13F																64	101	159	

Cumulative Number of Tasks Analyzed

MOS	June 81	July 81	Aug 81	Sept 81	Oct 81	Nov 81	Dec 81	Jan 82	Feb 82	Mar 82	Apr 82	May 82	June 82	July 82	Aug 82	Sept 82	Oct 82	Nov 82	Dec 82
16D	10	49	55				56							67					
16E	10	35	46	67	84	117	120				126			137		138			
16H												10	45	76	98				
16P									11	17	19								
24C				10	12	54	75	92	129	164	213		215	217					
95G			1							35	38	44							
33S													15	36					
57H																	2	25	103
61B	8	18	34	87	104	(2) 93													
61C														13	20	21		(16) 20	84
67G												18		36	39	46	59	76	93
67N									7	16	29	65	79	80					
67T																		2	52
67U		3	11	27	37	51	56	89	114										
67V										11	28	37	50	73					

Cumulative Number of Tasks Analyzed

MOS	June 81	July 81	Aug 81	Sept 81	Oct 81	Nov 81	Dec 81	Jan 82	Feb 82	Mar 82	Apr 82	May 82	June 82	July 82	Aug 82	Sept 82	Oct 82	Nov 82	Dec 82
67Y									45	64	80	84							
68B												15		36		42	71	102	116
68D															18	32	40	49	
68F																		23	38
68C	10	16	28	49					56			(11) 55							
68H															10			33	34
68J					10	15		19	23	36	43	49	56	(15) 55		65	79	107	151
68M								6	9	17	24	31	41	42			82	99	106
05B	9	39	63			(3) 55	(5) 54					(12) 53							
05C		20	37	74		75			(7) 61	63		(13) 61							
26L	3	13	29																
26Q	3	13	51	73		83	85					(14) 80	83	(16) 81	83				
31J									3	7	13	17	27	32	35	36			
31M	3	11	13			17	33	59	82										
31R	2								(8) 1					8	36	56	72	86	

Cumulative Number of Tasks Analyzed

MOS	June 81	July 81	Aug 81	Sept 81	Oct 81	Nov 81	Dec 81	Jan 82	Feb 82	Mar 82	Apr 82	May 82	June 82	July 82	Aug 82	Sept 82	Oct 82	Nov 82	Dec 82
52D			1										46						
52H	1													14	27	33	37	40	
35K					11	36	46	49	56					57		58			
36C			1	2	8	41	51	79	110	127	138								
36K		6	13							34	(9) 24	52	76						
72E			2	3									41	52					
71D	3	6	48									53							
71L	3	16	21						41										
71Q					21	25						31		33					
74D									9	18	27	33							
74F												4		6	9	15			
75B			33	50	51				53										
91B											10	15	46	72	86	99	100	109	121
17K									14			19	41	66					
96B						10	38							41					

Cumulative Number of Tasks Analyzed

MOS	June 81	July 81	Aug 81	Sept 81	Oct 81	Nov 81	Dec 81	Jan 82	Feb 82	Mar 82	Apr 82	May 82	June 82	July 82	Aug 82	Sept 82	Oct 82	Nov 82	Dec 82
19D				12	36				44	57	83	93	96	170					
19E				12	44	64	70	84	104	112	126		128	148					
63N							13	15	17	35	46	80	119						
43E											20		69	70					
43M			8	28		37			40										
57E						42													
76C										41									
76P															46	121			
76V									9	25	60								
76W									59										
76X							31												
76Y											15		44						
94S									67										
94E														9	62	138			
95B						4	6		14		18	24	27	33	54	121	153	1[illegible]	

Cumulative Number of Tasks Analyzed

	June 81	July 81	Aug 81	Sept 81	Oct 81	Nov 81	Dec 81	Jan 82	Feb 82	Mar 82	Apr 82	May 82	June 82	July 82	Aug 82	Sept 82	Oct 82	Nov 82	Dec 82
[illegible]C													3	12	41	65	79	94	
[illegible]M						38	65		74	87	88			90					
[illegible]m												4		12	30	73			
[illegible]E						1			9	22	24				27	65			
[illegible]E						6	23	41	54	84	86			87					
[illegible]L													7	32	51	69	91	110	
[illegible]P														70					
[illegible]J									21		26	(15) 24	25		63				
13B									43	56	86		87			114			
13E					41	85	110		112				114		125				
13F				22	47										82				
15D					53									54	84				
15E												15	59	105	124				
17B												5	30	84					
17C										1	39	60							

Cumulative Number of Tasks Analyzed

Navy	June 81	July 81	Aug 81	Sept 81	Oct 81	Nov 81	Dec 81	Jan 82	Feb 82	Mar 82	Apr 82	May 82	June 82	July 82	Aug 82	Sept 82	Oct 82	Nov 82	Dec 82
[illegible]	2												32	97					
82C										3	33	58	73						
[illegible]									6	30	54	84	103	127	143	161			
[illegible]										20	29								
[illegible]							6	11	18	25	32	45	62	75	81		83	87	
[illegible] Replicates														96	131		139	175	

Notes:

(1) Based on Task List (TL)/Soldier's Manual (SM) task count change.

(2) Based on TL/SM task count change.

(3) Based on change in replicate analysis procedure.

(4) Based on TL/SM task count change.

(5) Based on change in replicate analysis procedure.

(6) Based on TL/SM task count change.

(7) Based on change in replicate analysis procedure.

(8) Based on change in replicate analysis procedure.

(9) Based on change in replicate analysis procedure.

(10) Based on removal of common task from MOS task count.

(11) Based on TL/SM task count change.

(12) Based on TL/SM task count change.

(13) Based on change in replicate analysis procedure.

(14) Based on change in replicate analysis procedure.

(15) Based on TL/SM task count change.

(16) Based on TL/SM task count change.

ATTACHMENT E

Final Status Report

TASK STATUS

MOS	ANALYSIS START DATE	TOTAL TASKS	*AVG TIME PER TASK
*Aberdeen Proving Ground		446	
44B	8 Jun 81	86	3.1
44E	14 Sep 81	61	7.0
45B	11 Dec 81	95	6.3
45K	25 Jan 82	45	4.8
63G	19 Oct 81	46	31.7
63H	2 Nov 81	53	6.0
63W	8 Jun 81	60	7.9
*Ft. Belvoir		213	
12B	15 Apr 82	48	7.4
52C	6 May 82	60	6.8
52D	23 Nov 81	66	13.1
62E	9 Aug 82	39	8.7
*Ft. Benning		554	
11B	13 Oct 81	118	29.9
11C	7 Jun 82	167	11.4
11H	30 Jul 82	110	3.3
11M	20 Sep 82	159	2.3
*Ft. Bliss		539	
16D	8 Jun 81	67	8.7
16E	8 Jun 81	138	5.8
16H	23 Mar 82	98	9.4
16P	23 Nov 81	19	17.0
24C	14 Sep 81	217	3.5
*Ft. Devens		80	
05G	18 Jan 82	44	6.9
33S	17 Mar 82	36	15.7
*Ft. Eustis		1325	
57H	2 Aug 82	103	5.3
61B	8 Jun 81	93	5.1
61C	14 Jun 82	84	7.3

TASK STATUS (cont)

MOS	ANALYSIS START DATE	TOTAL TASKS	*AVG TIME PER TASK
Ft. Eustis (cont)			
67G	19 Apr 82	93	11.3
67N	9 Dec 81	80	10.6
67T	27 Sep 82	52	6.2
67U	29 Jun 81	114	8.2
67V	25 Jan 82	73	8.0
67Y	7 Dec 81	84	8.4
68B	19 Apr 82	116	7.9
68D	21 Jun 82	49	9.7
68F	8 Sep 82	38	9.5
68G	8 Jun 81	55	9.6
68H	19 Jul 82	34	9.8
68J	5 Oct 81	151	8.3
68M	1 Feb 82	106	25.0
*Ft. Gordon		840	
05B	8 Jun 81	53	6.2
05C	17 Aug 81	61	4.0
26L	8 Jun 81	29	11.8
26Q	17 Aug 81	83	4.8
31J	18 Jan 82	36	21.5
31M	2 Nov 81	82	4.8
31N	14 Jun 82	86	8.9
32D	18 Jan 82	46	15.6
32H	7 Jun 82	40	16.7
35K	14 Sep 81	58	10.2
36C	5 Oct 81	138	10.1
36K	28 Feb 82	76	6.6
72E	16 Feb 82	52	13.0
*Ft. Benjamin Harrison		233	
71D	8 Jun 81	53	13.0
71L	8 Jun 81	41	12.4
71Q	18 Sep 81	33	12.4
74D	25 Jan 82	38	5.7
74F	24 May 82	15	21.5
75B	7 Aug 81	53	12.4
*Ft. Sam Houston		121	
91B	31Mar 82	121	6.4

TASK STATUS (cont)

MOS	ANALYSIS START DATE	TOTAL TASKS	*AVG TIME PER TASK
*Ft. Huachuca		107	
17K	17 Apr 82	66	8.5
96B	9 Nov 81	41	3.8
*Ft. Knox		437	
19D	8 Sep 81	170	3.0
19E	8 Sep 81	148	3.0
63N	2 Nov 81	119	5.5
*Ft. Lee		575	
43E	8 Apr 82	70	5.9
43M	27 Jul 81	40	9.3
57E	7 Sep 81	42	9.8
76C	8 Feb 82	41	6.3
76P	7 Jun 82	121	10.5
76V	25 Jan 82	60	5.8
76W	8 Jan 82	59	3.0
76X	23 Nov 81	31	6.5
76Y	29 Mar 82	44	10.4
94B	1 Dec 81	67	4.5
*Ft. McClellan		420	
54E	3 May 82	138	4.8
95B	26 Oct 81	188	5.8
95C	21 Jun 82	94	6.5
*Ft. Monmouth		90	
71M	15 Oct 81	90	7.7
*Redstone Arsenal		335	
24H	6 May 82	73	19.7
27E	26 Oct 81	65	16.5
55B	26 Oct 81	87	8.7
55D	31 Mar 82	110	12.4

TASK STATUS (cont)

MOS	ANALYSIS START DATE	TOTAL TASKS	*AVG TIME PER TASK
*Ft. Rucker		133	
71P	22 Jun 82	70	2.2
93J	13 Oct 81	63	6.9
*Ft. Sill		843	
13B	4 Jan 82	114	3.1
13E	17 Sep 81	125	4.5
13F	6 Jul 81	82	3.1
15D	20 Aug 81	84	4.4
15E	29 Mar 82	124	5.1
17B	20 May 82	84	5.8
17C	22 Mar 82	60	4.4
31V	7 Jun 82	97	2.9
82C	22 Mar 82	73	5.5
*Ft. Leonard Wood		188	
62B	2 Feb 82	161	8.2
64C	15 Mar 82	27	3.5
*Common Tasks (Analyzed at Proponent School)			
000		89	
000 Replicates		178	
95		7746	8.5

*Time per task includes planning, interview, verification, instructor review and write-up as reported on analysis time sheets

ATTACHMENT F

Data Recording Forms

TASK ANALY[illegible] DATA SUMMARY [illegible]

TASK NO:	SOURCE: DATE:	ANALYSIS LOCATION:

TASK SYNOPSIS:

MAJOR EQUIPMENT AND TEST EQUIPMENT ITEMS:

ANALYST:	SME:	SME:	INST.
DATE COMPLETED:	DATE:	DATE:	DATE:

COMMENTS:

Level 1 Summary:

1A:

1B:

1C:

1D:

1E:

1F:

1G:

1H:

1I:

1J

ASK NO. _____ Page ___ of ___

TASK ANALYSI ATA SUMMARY 2

evel 1

evel	level	level
	A	A
		B
		C
		D
	B	A
		B
		C
		D
	C	A
		B
		C
		D
	D	A
		B
		C
		D
	E	A
		B
		C

TASK NO. _____ TASK ANALYSIS DATA SUMMARY (3) Page _____ of _____

Level	Knowledges	
	A	
	B	
	C	
	D	
	E	
	A	
	B	
	C	
	D	
	E	
	A	
	B	
	C	
	D	
	E	
	A	
	B	
	C	
	D	
	E	

TASK PERFORMANCE ANALYSIS

MOS

PAGE 1 OF _____

Task No. _____

Statement _____

Soldier's Manual, Publication Date

Location _____

Analyst _____

Date Started: _____

Date Completed: _____

Total Hours: _____

SME _____ Date _____

SME _____ Date _____

Inst. _____ Date: _____

Task Synopsis _____

Major Equipment and Test Equipment Items: _____

Comments: _____

MAJOR STEPS

I. _____

II. _____

III. _____

IV. _____

V. _____

VI. _____

VII. _____

VIII. _____

IX. _____

X. _____

TASK = _____ . _____ . _____ PAGE ___ OF ___

KA	JA	IR	TASK PERFORMANCE ANALYSIS	JOB AID RESOURCE TITLE, = , PAGES

TASK = _____ . _____ . _____ PAGE _____ OF _____

KNOWLEDGE ANALYSIS

Category	Category Numbers	Procedure Location	IR	Statement
READING				
1 Procedural Directions				
2 Process				
3 Locator				
4 Specifications				
5 Terminology				
6 Recognition				
7 Safety				
MATHEMATICS				
8 Numeration/ Place Value				
9. Addition, Subtraction				
10 Multiplication/ Division				
11 Geometry				
12. Algebra				
13 Trigonometry				
WRITING				
14 Composition				
15. Spelling				
ADDITIONAL				
16 Equipment Use				
17 Motor Skill				
18 Other				

CATEGORY DEFINITIONS

CATEGORY		
READING:		
1.	Procedural Directions	To obtain information from a highly-detailed, step-by-step description in order to accomplish a specific task activity
2.	Process	Applying information presented in a job aid, where reading is required in combination with the use of graphics, maps, exploded view diagrams and schematics in order to perform a sub-task activity.
3.	Locator	Using written aids (Tables of Contents, Appendixes, Indexes, Dictionaries, Directories...) in order to locate more detailed sub-task related information.
4.	Specifications	Using tables, graphs, charts, or written text to determine a fact, standard, tolerance, or rule to which a sub-task procedure must conform.
5.	Terminology	Recognizing and applying task-specific vocabulary, jargon and abbreviations used in the job environment.
6.	Recognition	Identifying, within sub-tasks, distinctions to be made regarding symbols sizes, shapes, colors and sounds.
7.	Safety	Observing rules and precautions that must be exercised during sub-task activities in order to prevent injury to self or equipment.
MATHEMATICS:		
8.	Numeration/ Place Value	Those activities requiring numbering, counting, or reading numbers (on a gauge, on a rule, and on scale divisions). Includes recognizing numbers in various forms: whole fractions, decimals, and percents.
9.	Addition/ Subtraction	Solving problems which require the use of addition and subtraction facts. Using symbols + or -, positive and negative.
10.	Multiplication/ Division	Solving problems using multiplication and division to arrive at a correct product or quotient.
11.	Geometry	That area having to do with measurement and relationships of points, lines, angles and figures. Using ruler, yardstick, meter divisions, identifying and constructing figures (plane and solid); solving mapping and trajectory computations.
12.	Algebra	Statement of relations, utilizing letters and other symbols to represent specific sets of numbers and values.
13.	Trigonometry	Mathematics dealing with the relations between the sides and angles of plane or spherical triangles and the calculations based on those relations.
WRITING		
14.	Composition	Applying proper English skills, appropriate grammar, vocabulary and style, to the completion of a written sub-task activity.
15.	Spelling	The writing of letters in words in accordance with an acceptable form found in a dictionary, thesaurus, or word list specific to sub-task performance.
ADDITIONAL		
16.	Equipment Use	Applying a conscious mental activity to the execution of a physical task or sub-task.
17.	Motor Skill	Employing an exclusively physical act in the performance of a sub-task identified within the procedure.
18.	Other	

TASK PERFORMANCE ANALYSIS

MOS

PAGE 1 OF _____

Task No.: _____

Statement: _____

Soldier's Manual, Publication Date:

Location: _____

Analyst: _____

Date Started: _____

Date Completed: _____

Total Hours: _____

SME: _____ Date: _____

SME: _____ Date: _____

Inst. _____ Date: _____

Task Synopsis: _____

Major Equipment Items: _____

Test Equipment Items: _____

Comments: _____

MAJOR STEPS

I. _____

II. _____

III. _____

IV. _____

V. _____

VI. _____

VII. _____

VIII. _____

IX. _____

X. _____

TPA 1

TASK # _____ - _____ - _____ PAGE ____ OF ____

KA	JA	IR	TASK PERFORMANCE ANALYSIS	JOB AID RESOURCE TITLE, # , PAGES

TASK #

PAGE ____ OF ____

KNOWLEDGE ANALYSIS	TASK PERFORMANCE ANALYSIS	JA	NOT TAUGHT

TASK # _____ PAGE ___ OF ___

LOCATION	N.T.	KNOWLEDGE STATEMENTS

Task _____ _____ _____ page____of_____

MOTOR SKILLS

46. Functions

_____ a. Multi-Limb Coordination – coordinate gross movements requiring use of larger skeletal muscles for strength

_____ b. Manual Dexterity – make skillful, controlled arm, hand movements in manipulating large objects under speed conditions

_____ c. Control Precision – highly controlled, precise muscular adjustments, operating controls by hand, arm or foot movements. Speed and accuracy

_____ d. Response Orientation – select appropriate response, each pattern of signals requires a different choice of controls and direction of movement. High speed and accuracy

_____ e. Reaction Time – speed with which an individual is able to respond to an auditory or visual stimulus

_____ f. Rate Control – make continuous anticipatory motor adjustments relative to changes in speed of a moving target. Pursuit and tracking

_____ g. Finger Dexterity – skillful, controlled manipulations of small objects, primarily finger movements

_____ h. Arm-Hand Steadiness – make precise arm-hand positioning movements where strength and speed are minimized

_____ i. Wrist-Finger Speed – make rapid, precise turning, tapping, tripping, aligning motions in response to auditory or visual stimuli

Other: _____

_____

_____

46. Operations

_____ a. Operate equipment or be a crew member engaged in manually lifting or moving objects

_____ b. Uses hand tools considered to be common. Determines sizes and selection. Pliers, screwdrivers, hand drills. . . Simple mechanical operations, mainly remove and replace

_____ c. Install, relocate and remove

_____ d. Adjust, repair, maintain mechanical, electrical, hydraulic systems or subsystems. Disassemble and assemble, using hand tools

_____ e. Testing equipment used in the production, transmission, distribution, and utilization of energy sources

_____ f. Cutting, bending, trimming, welding, riveting, etc. to force, shape or fabricate materials

_____ g. Operator checks and services in response to a variety of external stimuli (sounds and sights)

_____ h. Possess the physical ability to perform in combat or police actions

_____ i. Clerical duties. maintaining records, operating office machines, processing data using electronic machines

_____ j. Perform acts requiring skill and care of injured or infirmed persons

Other: _____

_____

_____

ATTACHMENT G

Examples of ETAP Results

Example 1: "Old Format"
Example 2: "New Format"
Example 3: TPA-X
Example 4: Ft. Sam Houston

Example 1: "Old Format"

CONTRACT NO. DAB160-81-C 0017 DATE PRINTED:
COMPLETE EXTENDED TASK ANALYSIS PROCEDURES RESULTS 02/25/83
TPA-1

MOS: 96B INTELLIGENCE ANALYST
TASK NUMBER: 301-336-2504 BSEP II ANALYSIS SITE: HAUC
PREPARE LIST OF MAP REQUIREMENTS
FOR AN OPERATION

MANUAL: FM 34-96B 1/2 (APRIL 1980)
DATE STARTED: 151281 DATE COMPLETED: 211281 HOURS: 2
ORIGINAL ANALYSIS: 151281 VERIFICATION: 171281 INSTRUCTIONAL REVIEW: 211281

- - - - - - - - - - - - - - - TASK SYNOPSIS - - - - - - - - - - - - - - -
DETERMINE MAPS NEEDED FOR A PARTICULAR UNIT OR MISSION.

- - - - - - - - - - - - - - - EQUIPMENT - - - - - - - - - - - - - - -
GIVEN UNIT MISSION, CURRENT MAP INDEX, AREA OF OPERATIONS, AREA OF INTEREST.

- - - - - - - - - - - - - - - COMMENTS NO ERRATA - - - - - - - - - - - - - - -
THIS IS RARELY DONE BY A 96B. IT IS BASICALLY DETERMINING WHAT MAPS ARE NEEDED FOR A UNIT MISSION. LOCAL SOP DICTATES WHO AND HOW MAPS ARE ACTUALLY OBTAINED. SOME 96B WILL DO THIS.

- - - - - - - - - - - - - - - - MAJOR STEPS - - - - - - - - - - - - - - - -
1. DETERMINE MAPS NEEDED.

- - - - - - - - - - - - MOTOR SKILLS NOT ANALYZED - - - - - - - - - - - -

45A MULTI-LIMB COORDINATION
45B MANUAL DEXTERITY
45C CONTROL PRECISION
45D RESPONSE ORIENTATION
45E REACTION TIME
45F RATE CONTROL
45G FINGER DEXTERITY
45H ARM-HAND STEADINESS
45I [illegible] FINGER SPEED
45 _____

46A OPERATE EQUIPMENT - MANUALLY LIFT
46B USE HAND TOOLS - DETERMINE SIZE
46C INSTALL, RELOCATE AND REMOVE
46D MAINTAIN SUBSYSTEMS W/HAND TOOLS
46E USE TEST EQUIPMENT
46F FORGE, SHAPE, FABRICATE MATERIALS
46G CHECKS AND SERVICES
46H PERFORM COMBAT OR POLICE ACTIONS
46I PERFORM CLERICAL DUTIES
46J CARE FOR THE INJURED OR INFIRM
46 _____

STEP NUMBER	J	I	D	STEP STATEMENT
1.			<	DETERMINE MAPS NEEDED.
1.A.			<	DETERMINE THE AREA OF MAP COVERAGE.
1.A.1.				OBTAIN AREA TO BE COVERED FROM SUPERVISOR.
1.A.2.				OR LOCATE THE AREA OF OPERATIONS ON GENERAL PLANNING OR OTHER LARGE AREA MAP.
1.B.			<	DETERMINE THE TYPE OF MAP NEEDED.
1.B.1.		$	<	DETERMINE WHAT THE MAP WILL BE USED FOR FROM THE UNIT MISSION.
1.B.2.			<	DETERMINE TYPE OF MAP & SCALE.
1.B.2.A.				FIND THE MAP USED UNDER FM 34-96B, TASK 301-336-2504, STEP 1.C (TACTICAL, FOR EXAMPLE).
1.B.2.B.				READ THE MAP SCALE MOST COMMONLY USED NEXT TO IT'S USE.
1.C.			<	SELECT & OBTAIN MAPS REQUIRED FOR AN OPERATION.
1.C.1.		$		FIND THE AREA TO BE COVERED ON THE CURRECT MAP INDEX.
1.C.2.		$		LIST IDENTIFYING INFORMATION FOR EACH MAP NEEDED FROM INDEX.
1.C.2.A.				INCLUDE SERIES NUMBER.
1.C.2.B.				INCLUDE SHEET NUMBER.
1.C.2.C.				INCLUDE THE MAP SCALE.
1.C.2.D.				INCLUDE THE QUANTITY NEEDED.
1.C.2.E.				INCLUDE THE EDITION NUMBER IF KNOWN, IF NOT KNOWN REQUEST THE MOST RECENT EDITION.
1.C.3.				SUBMIT LIST OF REQUIRED MAPS TO SUPERVISOR (END OF TASK).

STATEMENT	CATEGORY	STEP NUMBER	IR
FIND LOCATIONS ON MAP	25	1.A.	
READ UNIT MISSION	25	1.B.	$
DETERMINE MAP TYPE FROM UNIT MISSION	25	1.B.	$
DETERMINE WHAT MAP SCALE TO USE	25	1.B.	
DETERMINE WHAT MAP SCALE TO USE	28	1.B.	
USE MAP INDEX	25	1.C.	$
USE MAP INDEX	27	1.C.	$
USE MAP INDEX	28	1.C.	$
OBTAIN IDENTIFYING INFORMATION FROM MAP INDEX	25	1.C.	$
OBTAIN IDENTIFYING INFORMATION FROM MAP INDEX	27	1.C.	$
OBTAIN IDENTIFYING INFORMATION FROM MAP INDEX	28	1.C.	$
PREPARE LIST OF MAP TO PRESENT TO SUPERVISOR	36	1.C.	$

STATEMENT	CATEGORY	STEP NUMBER
READ UNIT MISSION STATEMENT TO DETERMINE WHICH OF THE 8 TYPES OF MAPS WILL BE REQUIRED; MAP TYPES LISTED IN FM 34-96B PAGE 2-259	28B	1.B
SELECT AND OBTAIN MAPS REQUIRED FOR AN OPERATION: FIND THE GEOGRAPHICAL AREA TO BE COVERED ON THE CURRENT MAP INDEX	27C	1.C
SUBMIT LIST OF REQUIRED MAPS TO SUPERVISOR	28C	1.C
LIST IDENTIFYING INFORMATION FOR EACH MAP NEEDED: SERIES AND SHEET NUMBERS MAP SCALE; QUANTITY NEEDED; EDITION NUMBER	32E	1.C

Example 2: "New Format"

CONTRACT NO. DAB760 81-C-0017 DATE PRINTED:
COMPLETE EXTENDED TASK ANALYSIS PROCEDURES RESULTS 03/01/83
TPA-1

MOS: 31V TACTICAL COMMUNICATIONS SYSTEMS OPERATOR/MECHANIC
TASK NUMBER: 113-587-3074 BSLP I ANALYSIS SITE: SILL
EVALUATE THE OPERATION OF RADIO SETS AN/VRC-53/64

MANUAL: FM 11-31V 1/2 (OCTOBER 1981)
DATE STARTED: 090682 DATE COMPLETED: 100682 HOURS: 3
ORIGINAL ANALYSIS: 090682 VERIFICATION: 110682 INSTRUCTIONAL REVIEW: 110682

- - - - - - - - - - - - - - - TASK SYNOPSIS - - - - - - - - - - - - - - -

- - - - - - - - - - - - - - - - EQUIPMENT - - - - - - - - - - - - - - - -
RADIO SET AN/VRC 53/64, DA FORM 2404, TEST SET, RADIO FREQUENCY POWER AN/URM-182 (WATT METER), DISTANT OPERATIONAL COMPATIBLE RADIO SET

- - - - - - - - - - - - - - - COMMENTS NO ERRATA - - - - - - - - - - - - - - -
SEE COMMENTS ATTACHED

- - - - - - - - - - - - - - - - MAJOR STEPS - - - - - - - - - - - - - - - -
1. PERFORM INITIAL ADJUSTMENTS
2. VERIFY INSTALLATION
3. PRESET CONTROLS
4. INSTALL AN/URM-182 (WATT METER)
5. PERFORM EQUIPMENT PERFORMANCE CHECK (EPC)
6. REPORT RESULTS

- - - - - - - - - - - - - - - MOTOR SKILLS NOT ANALYZED - - - - - - - - - - - - - - -

45A MULTI-LIMB COORDINATION
45B MANUAL DEXTERITY
45C CONTROL PRECISION
45D RESPONSE ORIENTATION
45E REACTION TIME
45F [illegible] CONTROL
45G FINGER DEXTERITY
45H [illegible]
45I [illegible]
45

46A OPERATE EQUIPMENT - MANUALLY LIFT
46B USE HAND TOOLS - DETERMINE SIZE
46C INSTALL, RELOCATE AND REMOVE
46D MAINTAIN SUBSYSTEMS W/HAND TOOLS
46E USE TEST EQUIPMENT
46F FORGE, SHAPE, FABRICATE MATERIALS
46G CHECKS AND [illegible]
46H PERFORM COMBAT OR POLICE ACTIONS
46I PERFORM CLERICAL DUTIES
46J CARE FOR THE INJURED OR INFIRM
46

CONTRACT NO. DABI60-81-C-0017

ATTACHMENT TO IPA-1 OF
MOS: 31V TASK NUMBER: 113-587-3074

COMMENTS
NO REFERENCE IS MADE WITHIN THIS ANALYSIS TO RESOURCE MATERIAL (IM'S, ETC) BECAUSE NONE ARE INDICATED FOR TASK 113-587-3074 IN FM 11-31V 1/2. ACCORDING TO SME, THIS IS BECAUSE THE INFORMATION AS WRITTEN FOR THIS TASK, HAS BEEN CULLED BY TECHNICAL WRITERS DIRECTLY FROM "HANDOUT" INFORMATION ORGANIZED BY SME HIMSELF-WHICH HE HAD CULLED FROM WHAT HE REFERS TO AS CONFUSING AND INACCURATE TECHNICAL MANUALS.
* TASK TITLE IN FM 11-31V 1/2 SPECIFIES "RADIO SET" (SINGULAR); BUT AN/VRC 53/64 STANDS FOR AN/VRC-53 OR AN/VRC-54. THIS ERROR STANDS CORRECTED IN THIS TASK PERFORMANCE ANALYSIS.

STEP NUMBER	PREREQUISITE COMPETENCIES	J I D	STEP STATEMENT
1.			PERFORM INITIAL ADJUSTMENTS.
1.A.	26B 41E 06A		SET AMPLIFIER-POWER SUPPLY (AM-2060) POWER SWITCH TO "OFF" BY FLIPPING SWITCH DOWNWARD.
1.A.1.	29B		LOCATE SWITCH AT LOWER LEFT-HAND CORNER OF FRONT PANEL.
1.B.	41E 26B 11B		TURN RECEIVER-TRANSMITTER (RT) 505/841 FUNCTION SWITCH TO "OFF", BY TURNING FULLY COUNTERCLOCKWISE.
1.B.1.	29B		LOCATE SWITCH AT LOWER RIGHT-HAND CORNER ON FRONT PANEL.
1.C.			START VEHICLE ENGINE.
1.C.1	40A		INSURE RADIO SET IS TURNED OFF BEFORE STARTING ENGINE.
2.			VERIFY INSTALLATION.
2.A.	41C 26D		CHECK ALL CABLE CONNECTIONS ON AM-2060 AND ON RT.
2.B.	41C		CHECK PLACEMENT OF AM-2060 ON MOUNT.
2.B.1.	06A		LOOSEN MOUNT CLAMPS.
2.B.1.A	06A 11B		TURN THUMBSCREWS COUNTERCLOCKWISE.
2.B.2.	06B		PUSH AM-2060 AS FAR BACK AS IT WILL GO ON MOUNT MT-1029.
2.B.2.A.	40A		INSURE MOUNT CLAMPS ENGAGE WITH AM-2060.
2.B.3	06A		TIGHTEN MOUNT CLAMPS.
2.B.3.A.	06A 11B		TURN THUMBSCREWS CLOCKWISE.
2.C.	41C		CHECK PLACEMENT OF RT ON AM-2060.
2.C.1	06A		LOOSEN AM-2060 CLAMPS.
2.C.1.A	06A 11B		TURN THUMBSCREWS COUNTERCLOCKWISE.
2.C.2.	06B		PUSH RT AS FAR BACK AS IT WILL GO ON AM-2060.
2.C.3.	06A		TIGHTEN AM-2060 CLAMPS.
2.C.3.A.	06A 11B		TURN THUMBSCREWS CLOCKWISE.
3.			PRESET CONTROLS.
3.A.	26A		PRESET AM-2060 (VEHICULAR CONFIGURATIONS ONLY).
3.A.1	06A 11B 41E		SET SPEAKER SWITCH TO "OFF", BY FLIPPING DOWNWARD.
3.A.1.A.	29B		LOCATED IMMEDIATELY ABOVE POWER SWITCH AT LOWER LEFT-HAND CORNER.
3.A.2.	41C		CHECK FREQUENCY BAND INDICATOR KNOB SETTING.
3.A.2.A.	29B		LOCATE FREQUENCY BAND INDICATOR KNOB ON BOTTOM OF MX-6707 (ANTENNA MATCHING UNIT).
3.A.2.A.1.	41G		IF UTILIZING MX-2799 ANTENNA MATCHING UNIT #, PRESETTING IS REQUIRED.
3.B.	26A		PRESET RT UNIT (ALL CONFIGURATIONS).
3.B.1	06A 11B		TURN VOLUME ONLY FULLY CLOCKWISE.
3.B.1.A	29B		LOCATE CONTROL ON LOWER RIGHT-HAND SIDE, IMMEDIATELY ABOVE FUNCTION SWITCH.
3.B.2.	05I		TUNE TO A FREQUENCY OTHER THAN A NET FREQUENCY.
3.B.2.A	21F		USE MEGACYCLE (MC) AND KILOCYCLE (KC) TUNING KNOBS IAW TASK 113 574-2061, STEPS 2.B.1-2.

TASK PERFORMANCE ANALYSIS

STEP NUMBER	PREREQUISITE COMPETENCIES	J I D	STEP STATEMENT
*			INSTALL AN/URM-182 (WATT METER) IAW TASK 113-574-2041, STEP 1.
5.			PERFORM EQUIPMENT PERFORMANCE CHECK (EPC).
5.A.	41C		CHECK AM-2060 POWER INPUT.
5.A.1.	06A 11B 41E		SET POWER SWITCH TO "ON", BY FLIPPING UPWARD
5.A.1.A.	29B		LOCATE SWITCH AT LOWER LEFT-HAND CORNER ON FRONT PANEL.
5.A.1.A.1.	41F		OBSERVE WHETHER POWER SWITCH REMAINS SET TO "ON".
5.A.1.A.2.	41F		OBSERVE WHETHER RT IS TURNED OFF.
5.A.1.A.2.A.	41F		IF RT REMAINS ON, LISTEN FOR RUSHING NOISE.
5.A.1.A.2.B.	41F		IF RT IS TURNED OFF, RUSHING NOISE IS ABSENT.
5.B.	41C		CHECK MATCHING UNIT CONTROL.
5.B.1.	05F 06A 05I		TURN AM-2060 ANTENNA FREQUENCY CONTROL TO ANY OTHER SETTING, AND THEN TURN IT TO CORRESPOND WITH DIAL FREQUENCY SETTING.
5.B.1.A.	41F		LISTEN FOR SWITCHING SOUND FROM ANTENNA MATCHING UNIT.
5.B.1.A.1.	05F 06A 05I		IF UTILIZING MX-6707 ANTENNA MATCHING UNIT, INSURE FREQUENCY BAND INDICATOR KNOB SETTING (LOCATED ON BOTTOM OF ANTENNA MATCHING UNIT) CORRESPONDS WITH SETTING ON ANTENNA FREQUENCY CONTROL (LOCATED AT UPPER LEFT HAND CORNER ON FRONT PANEL OF AM-2060).
5.C.	41C		CHECK RT POWER UNIT.
5.C.1.	06A 41E		TURN RT FUNCTION SWITCH (SPRING-LOADED) TO "LITE" AND HOLD AT THIS POSITION.
5.C.1.A.	41F		OBSERVE WHETHER RT DIAL LAMP LIGHTS.
5.C.1.A.1.	41G		RECORD AN ABNORMAL INDICATION ON DA FORM 2404.
5.D.	41C		CHECK AUDIO OUTPUT, USING AUDIO ACCESSORY.
5.D.1.	06A 41E		TURN RT FUNCTION SWITCH TO "ON".
5.D.1.A.	41F		LISTEN OVER AUDIO ACCESSORY FOR LOUD RUSHING NOISE.
5.D.1.A.1.	41G 32B		RECORD AN ABNORMAL INDICATION ON DA FORM 2404.
5.D.2.	06A 41E 26A		TURN RT VOLUME CONTROL TO MIDPOINT (5).
5.D.2.A.	06A 11B		TURN COUNTERCLOCKWISE.
5.D.2.B.	41F		LISTEN OVER AUDIO ACCESSORY FOR DECREASE IN LOUDNESS OF RUSHING NOISE.
5.D.2.B.1.	41G 32B		RECORD AN ABNORMAL INDICATION ON DA FORM 2404.
5.E.	41C		CHECK AUDIO OUTPUT FROM AM-2060 SPEAKER
5.E.1.	06A 11B 41E		SET SPEAKER SWITCH TO "ON", BY FLIPPING UPWARD.
5.E.1.A.	41F		LISTEN AT SPEAKER FOR RUSHING NOISE.
5.E.1.A.1.	41G 32B		IF RUSHING NOISE IS NOT HEARD, RECORD THIS ABNORMAL INDICATION ON DA FORM 2404.
5.E.1.A.2.	06A 11B 41G		IF RUSHING NOISE IS HEARD, FLIP SPEAKER SWITCH DOWNWARD TO "OFF".
5.F.	41C 26B		CHECK SQUELCH CONTROL.
5.F.1.	06A 41E		TURN RT FUNCTION SWITCH TO "SQUELCH".

STEP NUMBER	PREREQUISITE COMPETENCIES	J I D	STEP STATEMENT
5.F.1.A.	06A 11B		TURN CLOCKWISE.
5.F.1.A.1.	41G		LISTEN OVER AUDIO ACCESSORY FOR ELIMINATION OF RUSHING NOISE.
5.F.1.A.1.A.	41G 32B		RECORD AN ABNORMAL INDICATION ON DA FORM 2404.
5.F.2.	06A 41E		TURN RT FUNCTION SWITCH TO "ON".
5.F.2.A.	06A 11B		TURN COUNTERCLOCKWISE.
5.F.2.A.1.	41G		LISTEN OVER AUDIO ACCESSORY FOR RETURN OF RUSHING NOISE.
5.F.2.A.1.A.	41G 32B		RECORD AN ABNORMAL INDICATION ON DA FORM 2404.
5.G.	41C		CHECK ANTENNA MATCHING UNIT CONTROL.
5.G.1.			IF UTILIZING MX-2799 ANTENNA MATCHING UNIT, FREQUENCY BAND INDICATOR KNOB SETTING NEED NOT BE SAME AS ANTENNA FREQUENCY CONTROL SETTING. 41G
5.G.2.	41G 05I		IF UTILIZING MX-6707 ANTENNA MATCHING UNIT, FREQUENCY BAND INDICATOR KNOB SETTING MUST BE SAME AS ANTENNA FREQUENCY CONTROL SETTING.
5.G.2.A.	05F		TURN AM-2060 ANTENNA FREQUENCY CONTROL TO CORRESPOND WITH RT TEST FREQUENCY.
5.G.2.A.1.	41F		LISTEN FOR SWITCHING SOUND FROM ANTENNA MATCHING UNIT WHEN AM-2060 ANTENNA FREQUENCY CONTROL IS TURNED.
5.G.2.A.1.A.	41G 32B		RECORD ANY ABNORMAL INDICATION ON DA FORM 2404.
5.H.	41C		CHECK RECEPTION.
5.H.1	05I		TUNE RT TO RECEIVE TEST FREQUENCY
5.H.1.A.			USE MC AND KC TUNING KNOBS IAW TASK 113-574-2061, STEPS 2.B.1-2.
5.H.1.A.1.	41F		LISTEN OVER AUDIO ACCESSORY FOR RUSHING NOISE TO QUIET.
5.H.1.A.2.	41F		LISTEN OVER AUDIO ACCESSORY FOR A CLEAR VOICE SIGNAL.
5.H.1.A.2.A.	41G 32B		RECORD AN ABNORMAL INDICATION ON DA FORM 2404.
5.H.2.	06A 41E		TURN RT FUNCTION SWITCH TO "SQUELCH".
5.H.2.A.	06A 11B		TURN SWITCH CLOCKWISE.
5.H.2.A.1	41F		LISTEN OVER AUDIO ACCESSORY FOR A CLEAR VOICE SIGNAL.
5.H.2.A.1.A.	41G 32B		RECORD AN ABNORMAL INDICATION ON DA FORM 2404.
5.I.	41C		CHECK RT KEYING.
5.I.1.	05I		TUNE RT OFF, RECEIVE TEST FREQUENCY.
5.I.1.A.	01F		USE KILOCYCLE (KC) CONTROL ONLY.
5.I.2.	06A 41E		TURN RT FUNCTION SWITCH TO "ON"
5.I.2.A.	06A 11B		TURN SWITCH COUNTERCLOCKWISE
5.I.3.	41E		PRESS AND RELEASE "PUSH-TO-TALK" SWITCH SEVERAL TIMES.
5.I.3.A.	41F		LISTEN FOR RT RELAYS TO CLICK AND FOR RUSHING NOISE TO BECOME QUIET, WITH "PUSH-TO-TALK" SWITCH PRESSED.
5.I.3.A.1.	41G 32B		RECORD AN ABNORMAL INDICATION ON DA FORM 2404.
5.H.3.B.	41F		LISTEN FOR RT RELAYS TO CLICK AND FOR RETURN OF RUSHING NOISE, WITH "PUSH-TO-TALK" SWITCH RELEASED
5.H.3.B.1.	41G 32B		RECORD AN ABNORMAL INDICATION ON DA FORM 2404
5.J	41C		CHECK MUTING OVER AM-2060 SPEAKER.
5.J.1	06A 41E		SET AM-2060 SPEAKER SWITCH TO "ON".
5.J.1.A	06A 11B		FLIP SWITCH UPWARD

STEP NUMBER	PREREQUISITE COMPETENCIES	J I D	STEP STATEMENT
5.J.2.			PRESS AND RELEASE "PUSH-TO-TALK" SWITCH SEVERAL TIMES IAW STEPS 5.I.3.A-B.
5.J.2.A.	41F		LISTEN OVER AUDIO ACCESSORY FOR RUSHING NOISE TO BECOME QUIETED.
5.J.2.A.1.	41G 32B		RECORD AN ABNORMAL INDICATION ON DA FORM 2404.
5.J.2.B.	06B		HOLD MICROPHONE IN FRONT OF AM-2060 SPEAKER WHILE PRESSING AND RELEASING "PUSH-TO-TALK" SWITCH.
5.J.2.B.1.	40A 26B		INSURE NO AUDIO FEEDBACK (SQUEAL) IS HEARD.
5.J.2.B.1.A.	41G 32B		RECORD AN ABNORMAL INDICATION ON DA FORM 2404.
5.K.			EVALUATE RT RADIO FREQUENCY (RF) OUTPUT SYSTEM AND ANALYZE RESULTS IAW TASK 113-574-2061, STEPS 2-3.
5.K.1.	41C		CHECK ANTENNA MATCHING UNIT CONTROL WHILE PERFORMING EVALUATION.
5.K.1.A.	05I		CHECK ANTENNA MATCHING UNIT MX 6707 FREQUENCY BAND INDICATOR KNOB SETTING CORRESPONDS WITH EACH SETTING OF AM-2060 FREQUENCY BAND CONTROL.
5.K.1.A.1.	32B		RECORD AN ABNORMAL INDICATION ON DA FORM 2404.
5.L.			CHECK TRANSMIT FREQUENCY ACCURACY.
5.L.1.	05I		TUNE AMPLIFIER-POWER SUPPLY AM-2060 TO NET FREQUENCY OF TRANSMIT TEST STATION.
5.L.1.A.			USE ANTENNA FREQUENCY CONTROL AND SET FREQUENCY TO CORRESPOND TO FREQUENCY SHOWN ON "REC-TRANS FREQUENCY" DIAL ON RT.
5.L.2.	01F		TUNE RT TO NET FREQUENCY OF TRANSMIT TEST STATION.
5.L.2.A.			USE MC AND KC TUNING KNOBS IAW TASK 113-574-2061, STEP 2.B.1-2.
5.L.3.	26B		KEY RT, BY PRESSING "PUSH-TO-TALK" SWITCH.
5.L.3.A.	26A		INITIATE RADIO CHECK BY SPEAKING INTO MICROPHONE.
5.L.3.A.1.	41G		LISTEN FOR RESPONSE FROM NET OPERATOR.
5.L.3.A.1.A.	32B		RECORD AN ABNORMAL INDICATION ON DA FORM 2404.
5.M.	26B		CHECK VOICE MODULATION AND SIDETONE.
5.M.1.	41G		PERFORM IAW STEP 5.L.3 AND ALSO LISTEN FOR VOICE SIDETONE.
5.N.	26D		CHECK 150HZ GENERATION AND MODULATION.
5.N.1.			INITIATE ANOTHER NET CONTROL STATION CALL ("NCS CALL").
5.N.1.A.			ASK NCS OPERATOR TO CHANGE TO SQUELCH MODE.
5.N.1.A.1.	04C		WAIT A FEW SECONDS FOR NCS OPERATOR TO COMPLY.
5.N.1.A.1.A.	06A 41E		TURN TRANSMIT TEST STATION'S FUNCTION SWITCH TO "SQUELCH".
5.N.2.			PERFORM IAW STEP 5.L.3, AND ALSO LISTEN FOR VOICE SIDETONE.
5.N.2.A.	41F		IF TRANSMIT TEST STATION IS WITHIN AUDIO RANGE, VOICE SIDETONE SHOULD BE HEARD COMING FROM TEST STATION, AND AS "PUSH-TO-TALK" SWITCH IS RELEASED, A SHORT BURST OF RUSHING NOISE SHOULD BE HEARD.
5.N.2.A.1.	41G 32B		RECORD AN ABNORMAL INDICATION ON DA FORM 2404.
5.O.	25C		PERFORM DISTANCE CHECK.
5.O.1.	02G 37D		ESTABLISH COMMUNICATIONS WITH ANOTHER RADIO SET (OR STATION) SITUATED WITHIN PLANNING RANGE (APPROXIMATELY 3 TO 5 MILES).

STEP NUMBER	PREREQUISITE COMPETENCIES	J I D	STEP STATEMENT
5.P.	41C 26A		CHECK RT SHUTDOWN.
5.P.1.	06A 41E		TURN RT FUNCTION SWITCH FIRST TO "ON", AND THEN TO "OFF".
5.P.1.A.	06A 11B		TURN FULLY COUNTERCLOCKWISE.
5.P.1.A.1.	41F		OBSERVE WHETHER RT HAS STOPPED OPERATING, BY LISTENING FOR RUSHING NOISE (WHILE IN "ON") AND THEN SILENCE (WHILE IN "OFF").
5.P.1.A.1.A.	41G 32B		RECORD AN ABNORMAL INDICATION ON DA FORM 2404.
5.Q.	41C		CHECK AMPLIFIER-POWER SUPPLY AM-2060 SHUTDOWN.
5.Q.1.	06A 41E		SET AM-2060 POWER SWITCH TO "OFF".
5.Q.1.A.	06A 11B		FLIP SWITCH DOWNWARD.
5.Q.2.	41E 06B		TURN ANTENNA FREQUENCY CONTROL TO ANOTHER SETTING, AND THEN RETURN TO ORIGINAL SETTING.
5.Q.2.A.	41F		LISTEN AND INSURE NO SWITCHING NOISE IS HEARD COMING FROM ANTENNA MATCHING UNIT.
5.Q.2.A.1.	41G 32B		RECORD AN ABNORMAL INDICATION ON DA FORM 2404.
6.			REPORT RESULTS.
6.A.	32D 32B		USE DA FORM 2404.
6.A.1.	32A		IF NO ABNORMAL INDICATIONS WERE RECORDED THROUGHOUT EVALUATION, ENTER "SATISFACTORY" AS LAST ENTRY ON FORM.
6.A.2.	32A		IF ABNORMAL INDICATIONS WERE RECORDED AT ANY POINT DURING EVALUATION, ENTER "UNSATISFACTORY" AS LAST ENTRY ON FORM.
6.B.	37A		GIVE DA FORM 2404 TO SUPERVISOR (END OF TASK).

Example 3: TPA-X

CONTRACT NO. DAB160-81-C-0017
COMPLETE EXTENDED TASK ANALYSIS PROCEDURES RESULTS

DATE PRINTED:
02/25/83
TPA-1

MOS: 71Q JOURNALIST
TASK NUMBER: 214-176-1401 BSEP I ANALYSIS SITE: HARR
CONDUCT A NEWS/FEATURE INTERVIEW

MANUAL: FM 45-71Q 1/2 (OCTOBER 1979)
DATE STARTED: 250681 DATE COMPLETED: 060781 HOURS: .45
ORIGINAL ANALYSIS: 290681 VERIFICATION: 020981 INSTRUCTIONAL REVIEW: 140981

TASK SYNOPSIS

JOURNALIST PREPARES FOR AND CONDUCTS AN INTERVIEW WHICH WILL SERVE AS BASIS FOR NEWS/FEATURE STORY.

EQUIPMENT

NOTE PAD, PENCIL, TAPE RECORDER WITH ACCESSORIES (OPTIONAL), STANDARD REFERENCES (DICTIONARY, ENCYCLOPEDIAS, ETC)

COMMENTS ERRATA

LEVEL 1 WOULD BE UNLIKELY TO DO AN INTERIEW IN THIS MUCH DEPTH OR WITH SO MUCH DETAILED PLANNING/BACKGROUND RESEARCH.

MAJOR STEPS

1. ANALYZE WHAT IS NEEDED TO FULFILL ASSIGNMENT.
2. COMPOSE WELL-ROUNDED SET OF QUESTIONS TO ELICIT NEEDED INFORMATION.
3. SELECT INTERVIEWEE.
4. REFINE QUESTIONS TO FIT SELECTED INTERVIEWEE.
5. DEAL WITH PHYSICAL ASPECTS RELATED TO PENDING INTERIEW.
6. CONDUCT INTERVIEW
7. PERFORM FOLLOW-UP CHORES.

MOTOR SKILLS NOT ANALYZED

45A MULTI-LIMB COORDINATION
45B MANUAL DEXTERITY
45C CONTROL PRECISION
45D RESPONSE ORIENTATION
45E REACTION TIME
45F RATE CONTROL
45G FINGER DEXTERITY
45H ARM AND STEADINESS
45I WRIST FINGER SPEED
45

46A OPERATE EQUIPMENT - MANUALLY LIFT
46B USE HAND TOOLS - DETERMINE SIZE
46C INSTALL, RELOCATE AND REMOVE
46D MAINTAIN SUBSYSTEMS W/HAND TOOLS
46E USE TEST EQUIPMENT
46F FORCE, SHAPE, FABRICATE MATERIALS
46G CHECKS AND SERVICES
46H PERFORM COMBAT OR POLICE ACTIONS
46I PERFORM CLERICAL DUTIES
46J CARE FOR THE INJURED OR INFIRM
46

STEP NUMBER	J	I	D	STEP STATEMENT
1.				ANALYZE WHAT IS NEEDED TO FULFILL ASSIGNMENT.
1.A.			<	IF INTERVIEW IS IMPROMPTU, I.E., CONDITIONS PRECLUDE ADVANCE PLANNING, GO TO STEP 5.
1.B.			<	DECIDE DIRECTION/GOAL OF STORY TO BE WRITTEN.
1.B.1.			<	CONSIDER CONSTRAINTS IMPOSED BY ASSIGNMENT.
1.B.1.A.			<	CONSIDER TIME CONSTRAINTS.
1.B.1.B.			<	CONSIDER LIMITS IMPLIED BY STATED TOPIC.
1.B.1.B.1.			<	IF STATEMENT SEEMS VAGUE, SEEK CLARIFICATION FROM ASSIGNER.
1.B.1.B.2.				ANALYZE IMPLIED LIMITS ON SUBJECT MATTER, TREATMENT OF MATERIAL, AND CHOICE OF POTENTIAL INTERVIEWEES.
1.B.1.C.		$	<	CONSIDER ALLOTTED SPACE LIMITS FOR FINISHED STORY.
1.B.2.			<	CONSIDER CONSTRAINTS IMPOSED BY WORKING CONDITIONS.
1.B.3.			<	CONSIDER PERSONAL KNOWLEDGE OF TOPIC AND POTENTIAL INTERVIEWEES.
1.B.4.			<	CONSIDER POSSIBLE APPROACHES TO STORY.
1.B.4.A.				GENERATE APPROACHES TO STORY.
1.B.4.B.				EVALUATE APPROACHES GENERATED.
1.B.5.			<	SELECT APPROACH.
1.C.				RESEARCH ASSIGNMENT.
1.C.1.				SEARCH STANDARD REFERENCES (DICTIONARIES, ALMANACS, THESAURUS, ETC.) FOR RELEVANT INFORMATION.
1.C.1.A.				IDENTIFY KEY WORDS/PHRASES IN STATED TOPIC.
1.C.1.B.				IDENTIFY RELATED WORDS/PHRASES.
1.C.1.C.				USE IDENTIFIED WORDS/PHRASES TO ACCESS RELEVANT INFORMATION IN STANDARD REFERENCES.
1.C.1.D.				READ MATERIALS LOCATED.
1.C.1.E.				TAKE NOTES OF USEFUL INFORMATION.
1.C.1.F.				ANNOTATE NOTES TO ALLOW READY REFERENCE TO SOURCE.
1.C.2.				SEARCH OFFICE MORGUE/LIBRARY FOR RELATED MATERIAL (SEE TASK 214-176-1419).
1.C.2.A.				READ MATERIALS.
1.C.2.B.				TAKE NOTES OF USEFUL INFORMATION.
1.C.2.C.				ANNOTATE NOTES FOR READY REFERENCE TO SOURCE.
1.C.3.				REVIEW MATERIAL GATHERED.
1.C.3.A.				ORGANIZE MATERIAL.
1.C.3.B.				LIST FROM DATA ALREADY COLLECTED ADDITIONAL LIKELY INFORMATION SOURCES.
1.C.4.				EXPLORE ADDITIONAL SOURCES IAW STEP 1.C.2.
1.C.5.			<	IF SUFFICIENT BACKGROUND MATERIAL HAS NOT BEEN FOUND, GO BACK TO STEP 1.C, AND INVESTIGATE LEADS OVERLOOKED EARLIER.
1.C.6.			<	IF SUFFICIENT BACKGROUND MATERIAL HAS NOT BEEN FOUND AND AVAILABLE TIME OR INGENUITY HAVE BEEN EXHAUSTED, GO TO STEP 2.
2.				COMPOSE WELL-ROUNDED SET OF QUESTIONS.
2.A.				COMPOSE QUESTIONS OF VARIOUS TYPES.

STEP NUMBER	J	I	D	STEP STATEMENT
2.B.				REVIEW QUESTIONS TO ASSURE THAT ALL IMPORTANT, ANTICIPATED ASPECTS OF TOPIC HAVE BEEN CONSIDERED.
2.B.1.				EXAMINE/READ AT ONE SITTING QUESTIONS ALREADY PREPARED.
2.B.2.				ASK SELF: "WHAT HAVE I LEFT OUT?".
2.C.				COMPOSE QUESTIONS IAW STEP 2.A, TO COVER DETECTED GAPS.
3.			<	SELECT INTERVIEWEE.
3.A.			<	DETERMINE NUMBER OF INTERVIEWEES NEEDED/DESIRED.
3.A.1.				REVIEW ASSIGNMENT CONSTRAINTS (STEP 1.B) IN LIGHT OF INFORMATION ACQUIRED BY BACKGROUND RESEARCH (STEP 1.C).
3.A.2.				MAKE TENTATIVE DECISION OF NUMBER NEEDED/DESIRED.
3.B.				LIST POTENTIAL INTERVIEWEES.
3.C.				ASSIGN ORDER OF PREFERENCE/DESIRABILITY TO POTENTIAL INTERVIEWEES.
3.C.1.			<	CONSIDER EACH, APPLYING CRITERIA SUCH AS NEWSWORTHINESS, EXPERTISE, AUTHORITY, AVAILABILITY, PROXIMITY, WILLINGNESS, TIME CONSTRAINTS, EXPECTED YIELD IN RELATION TO CONTACT TIME REQUIRED.
3.C.2.				ORDER GROUPS/INDIVIDUALS ACCORDING TO PERCEIVED FIT TO STEP 3.C.1 CRITERIA.
3.D.				MAKE TENTATIVE SELECTION OF INTERVIEWEE(S).
3.E.				PROBE ACQUAINTANCES/COLLEAGUES OF SELECTEE(S) INFORMALLY FOR ADDITIONAL BACKGROUND.
3.E.1.				INFORM CONTACT OF OWN IDENTITY, AFFILIATION, AND PURPOSE OF CONTACT.
3.E.2.				ASSURE PERSON NO QUOTES/ATTRIBUTIONS FROM CONVERSATION WILL APPEAR IN STORY WITHOUT EXPRESS PERMISSION.
3.E.3.				ASSURE PERSON OF STRICT CONFIDENTIALITY, UNLESS EXPRESS PERMISSION IS GIVEN.
3.E.4.				ASK "RANDOM" QUESTIONS ABOUT POTENTIAL INTERVIEWEE.
3.F.				USE RESULTS OF PROBING TO REVISE PREFERENCE/ORDER OF POTENTIAL INTERVIEWEES.
3.G.			<	SELECT INTERVIEWEE(S).
4.				REFINE QUESTIONS TO FIT SELECTED INDIVIDUAL(S).
4.A.				PREPARE LIST OF QUESTIONS WHICH SELECTED INTERVIEWEE CAN PROBABLY ANSWER WITH FIRST-HAND KNOWLEDGE OR INFORMED OPINION.
4.A.1.			<	SELECT APPROPRIATE QUESTIONS FROM INITIAL LIST (STEP 2).
4.A.2.				COMPOSE ADDITIONAL QUESTIONS AS/IF NEEDED ON BASIS OF UNIQUE CHARACTERISTICS OF INTERVIEWEE UNCOVERED BY BACKGROUND RESEARCH.
4.A.3.				REPHRASE QUESTIONS THAT ARE "ALMOST RIGHT".
4.A.4.				REVISE LIST AND NEWLY PREPARED QUESTIONS IAW STEP 2.
4.B.				ARRANGE QUESTIONS IN TENTATIVE SEQUENCE OF EXPECTED USE.
4.B.1.			<	SELECT EASILY ANSWERED QUESTION TO USE AS OPENER.
4.B.2.				ARRANGE OTHER QUESTIONS IN SEQUENCE WHICH SEEMS TO PROMISE ORDERLY PROGRESSION THRU TOPIC.

STEP NUMBER		J I D STEP STATEMENT
4.B.3.		INTERNALIZE THE QUESTIONS.
5.		DEAL WITH PHYSICAL ASPECTS OF PENDING INTERVIEW.
5.A.		MAKE APPOINTMENT WITH INTERVIEWEE IF CIRCUMSTANCES (I.E., IMPROMPTU STORY) DO NOT PRECLUDE.
5.A.1		CONTACT INTERVIEWEE COURTEOUSLY.
5.A.1.A.		IDENTIFY SELF, OFFICE/PUBLICATION, AND PURPOSE.
5.A.1.B.		STATE BRIEFLY ASSIGNED TOPIC AND REASON FOR SELECTION OF INTERVIEWEE AND HIS OPTIONS IN REGARD TO INTERVIEW PROCEDURES (PHOTOGRAPHY, OFF-THE-RECORD INFORMATION, PERMISSION FOR QUOTATIONS, ETC)
5.A.1.C.		GIVE BEST ESTIMATE OF TIME NEEDED FOR INTERVIEW.
5.A.2.	<	IF INTERVIEWEE IS AVAILABLE FOR FACE TO FACE MEETING, SCHEDULE A MUTUALLY AGREEABLE TIME/LOCATION.
5.A.3.	<	IF SELECTED INTERVIEWEE DECLINES, ASK IF INTERVIEWEE WOULD PREFER STORY BE WRITTEN WITHOUT BENEFIT OF HIS PERSPECTIVE.
5.A.3.A.	<	IF INTERVIEWEE RELENTS, GO BACK TO STEP 5.A.2.
5.A.3.B.	<	IF HE STILL DECLINES, GO BACK TO STEP 3.D.
5.B		ASSEMBLE NOTES, PAD(S), PENS/PENCILS, AND ANY OTHER MATERIALS NEEDED FOR INTERVIEW.
5.C.	<	DETERMINE IF ASSIGNMENT WOULD BE ENHANCED BY/REQUIRES PHOTOGRAPHS.
5.C.1.	<	IF NO, GO TO STEP 5.D.
5.C.2.	<	IF YES, MAKE NEEDED ARRANGEMENTS.
5.C.2.A.	<	IF TAKING OWN PHOTOGRAPHS, CHECK CAMERA, FILM, AND FLASH TO ASSURE ADEQUACY/FUNCTIONING.
5.C.2.B.	<	IF NOT TAKING OWN PHOTOGRAPHS, REQUEST SUPERVISOR TO ASSIGN A PHOTOGRAPHER.
5.D	<	IF INTERVIEW IS NOT CONVENIENT FOR WALKING, MAKE TRANSPORTATION ARRANGEMENTS.
5.D.1.	<	IF USING MOTOR POOL VEHICLE, DO NEEDED SCHEDULING/PAPERWORK.
5.D.2.	<	IF USING PUBLIC TRANSPORT, MAKE NEEDED PREPARATION (SCHEDULING, RESERVATIONS, TICKET PURCHASE, ETC).
5.E		ATTEND TO PERSONAL APPEARANCE.
5.E.1		GROOM SELF IAW MILITARY STANDARDS OF CLEANLINESS (HAIR LENGTH/STYLE, FACIAL HAIR, AND OVERALL APPEARANCE).
5.E.2		DON CLOTHING/UNIFORM APPROPRIATE TO THE OCCASION AND IAW MILITARY STANDARDS.
5.F		TRAVEL TO INTERVIEW SITE, ARRIVING SHORTLY BEFORE SCHEDULED TIME.
6		CONDUCT INTERVIEW.
6.A		CONDUCT INTRODUCTORY DIALOGUE.
6.A.1		INTRODUCE SELF BRIEFLY.
6.A.2		THANK INTERVIEWEE FOR GRANTING TIME.
6.A.3		RESTATE BRIEFLY PARAMETERS OF ASSIGNMENT AND RESTATE THE INTERVIEW PROCEDURES DISCUSSED EARLIER.

STEP NUMBER	J	I	D	STEP STATEMENT
5.A.4				RESPOND TO QUESTIONS AND COMMENTS.
5.A.5			\	IF INTERVIEWEE BEGINS TO DIRECT INTERVIEW, REASSERT CONTROL.
5.A.5.A.				INTERRUPT POLITELY.
5.A.5.B.				RESTATE FOCUS/PURPOSE OF INTERVIEW, AND/OR.
5.A.5.C.				ASK QUESTION THAT LEADS BACK TO TOPIC.
6.B.				OPEN TOPIC BY ASKING LEAD-IN QUESTION.
6.C.				ASSESS INTERVIEWEE'S RESPONSE STYLE.
6.C.1.				WATCH FOR CUES TO INDIVIDUAL'S TYPICAL WAY OF REACTING TO QUESTIONS.
6.C.2.				CATEGORIZE INTERVIEWEE INFORMALLY INTO A PERSONALLY USEFUL/ MEANINGFUL "TYPE".
6.D.				MATCH QUESTIONING STRATEGY TO RESPONSE STYLE OF RESPONDENT.
6.E.				QUESTION INTERVIEWEE.
6.E.1.			<	IF LEAD-IN QUESTION DOES NOT PRODUCE A CHAIN OF USEFUL COMMENTS/OPPORTUNITIES FOR FOLLOW-UP QUESTIONS, USE QUESTIONS PREPARED EARLIER TO INITIATE/GUIDE INTERVIEW.
6.E.2.				GENERATE NEW QUESTIONS TO HANDLE CONTINGENCIES.
6.E.2.A.			<	IF INTERVIEWEE DIGRESSES UNPRODUCTIVELY, REFOCUS ON TOPIC.
6.E.2.B.			<	IF LEADING QUESTIONS SEEM NECESSARY, USE SPARINGLY AND CAREFULLY.
6.E.2.C.				FOLLOW UP CUES TO UNANTICIPATED AREAS OF RELEVANCE/INTEREST/ KNOWLEDGE.
6.E.2.D.				MOVE AWAY FROM AREA/ASPECT IN WHICH INTERVIEWEE LACKS COMPETENT/PERTINENT INFORMATION.
6.E.2.E.				ASK REPHRASED QUESTIONS TO ELICIT CLARIFICATION WHEN RESPONSES SEEM UNCLEAR/CONTRADICTORY/CONFUSING.
6.E.2.F.				RESTORE WANING INTEREST.
6.E.3.				QUESTION RESPONSIVELY.
6.E.3.A.				RELATE NEXT QUESTION TO PRECEDING RESPONSE.
6.E.3.B.				RELATE NEW LINE(S) OF QUESTIONING TO INFORMATION GIVEN IN EARLIER RESPONSES.
6.E.3.C.				LISTEN ATTENTIVELY TO RESPONSE BEFORE DECIDING NEXT QUESTION TO ASK.
6.F.				RESPOND CONSIDERATELY TO INTERVIEWEE AT ALL TIMES.
6.F.1.				ALLOW "SUFFICIENT" TIME FOR THOUGHTFUL RESPONSE IN MOST CIRCUMSTANCES.
6.F.2.				SPEAK IN NORMAL TONE.
6.F.3.				LISTEN ACTIVELY AND INTENTLY.
6.F.4.				AVOID "ANNOYING" BEHAVIORS.
6.F.5.			$	RECORD RESPONSES AS COMPLETELY AS NEEDED FOR LATER RECALL.
6.F.5.A.				WRITE KEY WORDS/PHRASES.
6.F.5.B.				WRITE QUOTABLE MATERIAL IN FULL.
6.F.5.C.				READ QUOTATIONS TO INTERVIEWEE TO VERIFY ACCURACY OF NOTES.
6.F.5.D.				ASK INTERVIEWEE FOR PERMISSION TO BE QUOTED.
6.F.6.				ENCOURAGE INTERVIEWEE WITH NONVERBAL AFFIRMATIVE CUES AND/OR BRIEF VERBAL COMMENTS.
6.F.7.				MAINTAIN EYE CONTACT AS MUCH AS POSSIBLE.

STEP NUMBER	J	I	D	STEP STATEMENT
6.F.8				REASSURE CONTINUALLY THAT PRIMARY CONCERN IS GETTING THE STORY STRAIGHT.
6.G				RESPOND CONSTRUCTIVELY TO DISCONCERTING CONTINGENCIES.
6.G.1				RESPOND TO INTERRUPTIONS/DISTRACTIONS.
6.G.1.A.		<		IF INTERVIEW CAN BE CONTINUED, ADAPT INTERVIEWING STYLE.
6.G.1.A.1.		<		IF NECESSARY, SPEAK A LITTLE LOUDER AND.
6.G.1.A.2.				ASK NEW, REFOCUSSING QUESTION OR.
6.G.1.A.3.				SUMMARIZE RESPONSE GIVEN JUST BEFORE DISTRACTION OCCURRED.
6.G.1.B		<		IF INTERVIEW CANNOT BE CONTINUED, SCHEDULE NEW DATE/TIME TO RESUME.
6.G.2.		<		IF INTERVIEWEE'S REACTIONS INDICATE INTERVIEW IS CONTINUING TOO LONG, RESPOND TO CIRCUMSTANCES.
6.G.2.A.		<		IF REMAINING QUESTIONS CAN BE COVERED QUICKLY, CONTINUE.
6.G.2.A.1.				ASSURE THAT INTERVIEW WILL SOON BE TERMINATED, AND.
6.G.2.A.2.				INCREASE PACE.
6.G.2.B.		<		IF REMAINING QUESTIONS CANNOT BE COVERED QUICKLY, SCHEDULE NEW DATE/TIME TO COMPLETE INTERVIEW FACE TO FACE OR BY TELEPHONE.
6.G.3		<		IF INTERVIEWEE WISHES TO SEE STORY BEFORE PUBLICATION, ADAPT TO CIRCUMSTANCES.
6.G.3.A		<		IF STORY IS POTENTIALLY SENSITIVE IN NATURE OR CONTAINS COMPLEX/TECHNICAL MATERIAL, AGREE WITH REQUEST BEING SURE TO REPORT IT TO OWN SUPERVISOR.
6.G.3.B		<		IF ALLOWING STORY REVIEW IS NOT PRECLUDED BY PUBLICATION POLICY, STORY DEADLINE, OR NON-AVAILABILITY OF INTERVIEWEE, AGREE TO PERMIT REVIEW FOR FACTUAL ACCURACY ONLY.
6.G.3.B.1.				OFFER TO READ STORY OVER TELEPHONE.
6.G.3.B.2.		<		IF INTERVIEWEE OBJECTS AND HAS AUTHORITY TO INSIST ON SEEING A COPY, AGREE TO PROVIDE.
6.G.3.B.3.				ASSURE INTERVIEWEE THAT MISUNDERSTOOD/MISSTATED FACTS POINTED OUT BY INTERVIEWEE WILL BE CORRECTED.
6.G.3.C.		<		IF ALLOWING STORY REVIEW IS PRECLUDED, EXPLAIN COURTEOUSLY WHY REQUEST MUST BE DENIED.
6.G.3.D.				ASSURE INTERVIEWEE AGAIN OF INTENT TO BE OBJECTIVE AND FAIR.
6.H.				CLOSE INTERVIEW
6.H.1.				REVIEW NOTES QUICKLY TO DISCOVER GAPS IN INFORMATION OR ITEMS NEEDING FURTHER EXPLICATION.
6.H.2				ASK ADDITIONAL QUESTION'S AS NEEDED.
6.H.3				SUMMARIZE MAIN POINTS COVERED AND ITEMS OF SIGNIFICANCE.
6.H.4				REQUEST PERMISSION TO MAKE FOLLOW UP PHONE CALL FOR ADDITIONAL INFORMATION/VERIFICATION.
6.H.4.A.				GIVE REASON.
6.H.4.B				GIVE APPROXIMATION OF HOW SOON CALL WILL BE MADE.
6.H.5				THANK INTERVIEWEE FOR TIME AND COOPERATION.
6.H.6				DEPART.
7				PERFORM FOLLOW UP CHORES.

TASK PERFORMANCE ANALYSIS

STEP NUMBER	J I D	STEP STATEMENT
7 A		PROCESS NOTES AS SOON AS POSSIBLE AFTER INTERVIEW.
7 A.1		TRANSCRIBE NOTES INTO COMPLETE SENTENCES.
7 A.2		WRITE UP DETAILS/IMPRESSIONS WHICH SEEM RELEVANT TO STORY.
7 B		MAKE DECISIONS ABOUT FURTHER ACTION.
7 B.1	<	IF ADDITIONAL INFORMATION IS NEEDED FROM ORIGINAL INTERVIEWEE ASK FOR IT DURING FOLLOW-UP CALL (REFER TO STEP 6.H.4).
7 B.2	-	IF SOME OTHER INFORMANT WILL BE A BETTER SOURCE FROM PERSPECTIVE OF NEWSWORTHINESS/QUALITY OF INFORMATION, GO BACK TO STEP 3.G.
7 B.3	-	IF INFORAMTION IS SUFFICIENT, EXIT TO TASK 214-176-1402 (WRITE A STRAIGHT NEWS STORY) OR TASK 214-176-1404 (WRITE A FEATURE STORY)(END OF TASK).

STATEMENT

26 1.C.1.A.
IDENTIFY KEY WORDS/PHRASES

27 1.C.1.B.
ACCESS RELEVANT IFORMATION IN STANDARD SOURCES BY USE OF KEY WORDS/PHRASES

28 1.C.1.D.
READ REFERENCE MATERIALS AND SOURCE MATERIALS FOR INFORMATION ABOUT TOPIC

36 1.C.1.E.
TAKE NOTES

36 1.C.2.B.
TAKE NOTES

36 1.C.1.F.
ANNOTATE NOTES WITH INFORMATION NEEDED TO LOCATE SOURCE

27 1.C.2.C.
ANNOTATE NOTES WITH INFORMATION NEEDED TO LOCATE SOURCE

25 1.C.3.A.
ARRANGE INFORMATION INTO USEFUL FORMAT

36 2.A.
WRITE QUESTIONS

36 4.A.2.3.
WRITE QUESTIONS

47 5.A.1.
DIAL TELEPHONE

48 5.A.1.B.
GIVE ORAL SUMMARY OF INFORMATION

41 5.B.
RECOGNIZE MATERIALS NEEDED FOR USE IN INTERVIEW

41 6.F.5.A.
RECOGNIZE AND WRITE DESIRED MATERIAL GIVEN ORALLY

36 6.F.5.A.
RECOGNIZE AND WRITE DESIRED MATERIAL GIVEN ORALLY

36 6.F.5.A.
RECOGNIZE AND WRITE DESIRED MATERIAL GIVEN ORALLY

STATEMENT

36 7.A.1.2.
CONVERT NOTES AND PERSONAL IMPRESSIONS INTO WRITTEN SENTENCES

36 7.A.1.2.
CONVERT NOTES AND PERSONAL IMPRESSIONS INTO WRITTEN SENTENCES

1.B. CONTRAINTS
VIEW BOUNDARIES IMPLIED BY ASSIGNMENT/WORKING CONDITIONS AS SOMEWHAT FLEXIBLE, I.E.,DO NOT PERMIT SUCH BOUNDARIES/LIMITS TO SQUELCH PURSUIT OF PROMISING LEADS.

1.B. CONSTRAINTS (TIME)
BUDGET TIME FOR EACH PART OF TASK IAW ITS IMPORTANCE & DIFFICULTY. ANTICIPATE VARIATION IN IMPORTANCE/DIFFICULTY OF PARTS FROM ASSIGNMENT TO ASSIGNMENT. BUDGET TIME IAW WITH OWN WORKING STYLE/ABILITIES.

1.B. CONSTRAINTS (TOPIC)
VIEW STATED TOPIC AS A FRAME ROUGHLY IMPLYING AREA(S) APPROPRIATE FOR EXPLORATION. PROBE STATED TOPIC & OWN EXPERIENCE FOR IMPLICATIONS WITH REGARD TO APPROPRIATE INTERVIEWEES/INFORMATION SOURCES.

1.B. CONTRAINTS (SPACE ALLOTTED).
VIEW INDICATED SPACE ALLOTMENT AS GUIDE TO STORY LENGTH/DEPTH OF RESEARCH & INTERVIEW. VIEW INDICATED ALLOTMENT AS FLEXIBLE IF RESULTING STORY JUSTIFIES BY ITS NEWSWORTHINESS OR LACK THEREOF AN INCREASE/REDUCTIONS

1.B. CONTRAINTS (WORKING CONDITIONS)
ASSESS OWN FREEDOM OF OPERATION, I.E., IN DEVIATING FROM STATED TOPIC CONTRAINTS, IN LIGHT OF WORKING RELATIONSHIPS WITH SUPERVISOR & COLLEAGUES.

1.B. PERSONAL KNOWLEDGE
USE OWN KNOWLEDGE, WHATEVER IT MAY BE, AS STARTING POINT FOR PREPARING FOR THE INTERVIEW.

1.B. GENERATE APPROACHES
USE WHATEVER TECHNIQUES YOU HAVE FOR STIMULATING A VARIETY OF POSSIBILITIES. IF FAMILIAR WITH, USE SUCH TECHNIQUES AS FREE ASSOCIATION, IDEA NETWORKING, BRAIN-STORMING, ASK KNOWLEDGEABLE PEOPLE, FOR IDEAS USE ANY METHODS, SERENDIPITOUS OR

1.B. GENERATE APPROACHES
(CONT.) OTHERWISE, OF INVENTION WHICH SEEM PRODUCTIVE.

1.B. EVALUATE APPROACHES
MATCH APPROACH IDEAS GENERATED AGAINST CONSIDERATIONS IN STEPS 1.B.1.2-3.

1.B SELECT APPROACHES
USE OWN JUDGEMENT OF "BEST FIT". SELECT APPROACH THAT IS COMPATIBLE WITH OWN INTERESTS, STYLE, & PREFERENCES.

1.C. NOTES-USEFUL DATA
SELECT INFORMATION TO RECORD ON BASIS OF ITS APPARENT RELEVANCE TO TOPIC, POTENTIAL INTERVIEWEES, &/OR OWN KNOWLEDGE & INTERESTS. SELECT INFORMATION TO RECORD ON BASIS OF ITS POWER TO EVOKE A CHAIN OF USEFUL/RELEVANT ASSOCIATIONS.

1.C. ORGANIZE MATERIAL
CATEGORIZE GATHERED MATERIAL IN SOME PERSONALLY USEFUL/MEANINGFUL WAY, SUCH AS BUT NOT PRESCRIBED OR LIMITED TO, CHRONOLOGICALLY, TOPICALLY, HIERARCHICALLY. SET UP CATEGORIES THAT MAKE SENSE SELF, I.E.,THAT SEEM TO MAKE THE TOPIC

1.C. ORGANIZE MATERIAL
(CONT.) UNDERSTANDABLE. ARRANGE MATERIAL IN AN ORDER/FORMAT TO MAKE IT READILY ACCESSIBLE TO RECALL/RETRIEVABLE.

1.C. SUFFICIENT MATERIAL
DECIDE SUFFICIENCY ON BASIS OF OWN SENSE OF COMPREHENSION/INCOMPREHENSION OF GENERAL AREA OF FOCUS.

1.C. AVAILABLE TIME/INGENUITY
ESTIMATE/GUESS AT THE TRADE-OFF TO BE MADE BETWEEN TIME REMAINING & DIFFICULTY/TIME EXPENDITURE REQUIRED TO FIND & EXPLORE ADDITIONAL RESOURCES. ABANDON SEARCH AT POINT AT WHICH BEING LESS WELL-PREPARED THAN ONE WISHES IS

1.C. AVAILABLE TIME/INGENUITY
(CONT.) PERCEIVED AS LESS COSTLY THAN DELAYING OTHER ASPECTS OF TASK.

2.A. COMPOSE QUESTIONS
DESIGN QUESTIONS TO ELICIT WHO, WHAT, WHERE, WHEN, WHY, & HOW ABOUT SITUATION/EVENT/TOPIC. DESIGN QUESTIONS TO VERIFY INFORMATION ALREADY GATHERED. DESIGN QUESTIONS TO ELICIT OPINIONS/FEELINGS WHICH WILL OFTEN BE QUOTABLE MATERIAL

2.A. COMPOSE QUESTIONS
(CONT.) ADDING "COLOR" TO RESULTING STORY. USE OWN HUMAN RELATIONS EXPERIENCES AS GUIDE TO MEANS OF ELICITING OPINIONS/FEELINGS. COMPOSE QUESTIONS THAT CHALLENGE, THREATEN, STRONGLY ENCOURAGE, SUBTLY FLATTER, &/OR EVOKE EMOTIONAL

2.A. COMPOSE QUESTIONS
(CONT.) ASSOCIATIONS. AVOID QUESTIONS THAT WILL BIAS RESULTING STORY. AVOID "LEADING" QUESTIONS UNDER MOST CIRCUMSTANCES. AVOID "CLOSED" QUESTIONS, I.E., QUESTIONS NEEDING ONLY YES/NO ANSWERS. AVOID QUESTIONS NOT PERTINENT TO DESIRED

2.A. COMPOSE QUESTIONS
(CONT.) STORY. IF A DEFINITE YES/NO IS SOUGHT WITH RESPECT TO CERTAIN INFORMATION, PHRASE QUESTION TO ELICIT THE REASON FOR THE RESPONSE (EITHER) INCORPORATE THE "REASON FOR" CUE IN BASIC QUESTION (OR) ASK A 2-PART QUESTION.

2.B. GAPS IN QUESTIONS
USE OWN COMPREHENSION OF THE TOPIC AS A WHOLE & ITS PARTS TO DETERMINE WHETHER QUESTIONS DEAL ADEQUATELY WITH ALL IMPORTANT ASPECTS.

3.A. NUMBER OF INTERVIEWEES
ESTIMATE NUMBER NEEDED/DESIRED ON BASIS OF TYPE OF TOPIC, DEPTH OF COVERAGE DESIRED, &/OR AVAILABILITY OF QUALIFIED INFORMANTS (E.G. A MAN-IN-THE-STREET STORY OR AN OPINION SURVEY WILL REQUIRE SEVERAL INFORMANTS, A TECHNICAL ARTICLE
3.A. NUMBER OF INTERVIEWEES
(CONT.) THOUGH TREATED IN DEPTH, MAY HAVE TO BE BASED ON THE ONLY QUALIFIED INDIVIDUAL WHO IS AVAILABLE).

3.B. LIST POTENTIALS
DRAW ON NAMES/DATA DISCOVERED DURING BACKGROUND RESEARCH.

3.C. ORDER POTENTIALS
EVALUATE INFORMALLY ON BASIS OF BACKGROUND INFORMATION RELATIVE NEWSWORTHINESS/EXPERTISE ETC OF THE INDIVIDUALS ON THE LIST. RECOGNIZE THAT ESTIMATES OF NEWSWORTHINESS & EXPERTISE ARE OFTEN INTUITIVE & IMPRECISE.MAKE DECISION QUICKLY
3.C. ORDER POTENTIALS
(CONT.) WITHOUT BELABORING OR LINGERING OVER CHOICES WHERE UNCERTAINTIES PREVAIL

3.E. PROBING
SEEK TO ELICIT RESPONSES REVEALING TENTATIVE INTERVIEWEE'S PERSONALITY/CHARACTER, E.G., HOW HE REACTS TO STRESS, HIS PERSONAL INTERESTS/LIKES/DISLIKES, HIS HOBBIES, PROFESSIONAL EXPERIENCE NOT ACCESSIBLE IN PUBLIC SOURCES, ETC.
3.E. PROBING
(CONT.) ATTEMPT TO ELICIT NAMES OF OTHER CONTACTS WORTH PROBING, E.G. FRIENDS/ENEMIES OF TENTATIVE INTERVIEWEE, OTHER AUTHORITIES/OPINION-MAKERS, COLLEAGUES FROM EARLIER PERIODS, ETC.
3.E. "RANDOM" QUESTIONS
ASK PROVOCATIVE QUESTIONS ABOUT TENTATIVE INTERVIEWEE, SUCH AS, HOW DOES HE ACT WHEN HE'S ANGRY, WHAT KINDS OF THINGS TURN HIM ON/OFF, HAVE YOU EVER SEEN HIM WHEN HE WAS EMBARRASSED (WHAT DID HE DO) FOLLOW LEAD/INCLINATION OF INFORMANT.
3.E. "RANDOM" QUESTIONS
(CONT.) SO LONG AS THE INFORMATION SEEMS RELEVANT (OR) TO BE LEADING INTO SOMETHING RELEVANT.

STEP NUMBER PRINCIPLE STATEMENT

4.A. REFINING LIST OF QUESTIONS.
SELECT QUESTIONS IN LIGHT OF BACKGROUND & PROBING. WRITE NEW QUESTIONS TO FIT PERSONALITY OF INTERVIEWEE. REPHRASE "ALMOST RIGHT" QUESTIONS SO THAT WORDING "FITS" INTERVIEWEE'S PERSONALITY BETTER.

4.B. OPENING QUESTION
CHOOSE OPENING "EASY" QUESTION THAT, WHILE READILY DEALT WITH, IS NOT SO EASY OR GENERAL AS TO IMPLY A LACK OF SERIOUSNESS OR PREPARATION. CHOOSE "EASY" QUESTIONS THAT, AT THE SAME TIME, SIGNALS OWN KNOWLEDGEABILITY, I.E., THAT

4.B. OPENING QUESTION
(CONT.) HOMEWORK HAS BEEN DONE.

4.B. SEQUENCING QUESTIONS
ARRANGE QUESTIONS IN SEQUENTIAL ORDER WHICH "FEELS RIGHT" WHICH MAY BE LOGICAL/TOPICAL/PSYCHOLOGICAL OR SOME OTHER PROGRESSION. DO NOT FEEL OBLIGATED TO ADHERE TO ANTICIPATED SEQUENCE IN THE INTERVIEW ITSELF.

4.B. DON'T MEMORIZE
INTERNALIZE SUBSTANCE OF QUESTIONS. CONCENTRATE IN THE ACTUAL INTERVIEW ON THE INTERVIEWEE RATHER THAN ON SELF/PREPARATION.

5.A. FESIBILITY OF PHONE INTERVIEW.
DECIDE ON BASIS OF OWN UNDERSTANDING OF TOPIC & EXPERIENCE WITH INTERVIEWING WHETHER TOPIC IS TOO TECHNICAL OR QUESTIONS TOO MANY TO HANDLE BY TELEPHONE.

5.E. DRESS
IF WEARING UNIFORM, SELECT UNIFORM TO CONFORM WITH UNIFORM OF THE DAY/LOCAL SOP/SITUATIONAL CONSIDERATIONS, IF SITUATION IS IDIOSYNCRATIC, SELECT UNIFORM MOST LIKELY TO PUT SELF ON COMMMON GROUND WITH INTERVIEW.IF WEARING CIVILIAN ATTIRE,

5.E. DRESS
(CONT.) SELECT CLOTHING IAW OWN UNDERSTANDING OF WHAT IS APPROPRIATE FOR ONE APPEARING IN PUBLIC AS A REPRESENTATIVE OF THE U.S. ARMY. BASE SELECTION ON EXPECTATIONS EXPRESSED IN ARMY INDOCTRINATION & BY SUPERIORS & BASE SELECTION ON

5.E. DRESS
(CONT.) OWN SENSE OF GOOD TASTE/PROPRIETY.

6.A. INTRODUCTORY DIALOGUE
REASSURE INTERVIEWEE OF OWN PROFESSIONALISM/COMPETENCE BY APPEARING BEFORE HIM WELL PREPARED.

6.A. RESPOND TO QUESTIONS
RESPOND OPENLY TO COMMUNICATE THAT NO "HIDDEN AGENDA" EXISTS, RESPOND SUCCINCTLY TO DISCOURAGE UNDESIRED DIGRESSIONS. RESPOND COURTEOUSLY & POSITIVELY TO BUILD RAPPORT. SHAPE RESPONSE IN SUCH A WAY AS TO MAINTAIN/REGAIN CONTROL OF DIRECTION
6.A. RESPOND TO QUESTIONS
(CONT.) OF INTERVIEW.

6.C. WATCH FOR CUES
NOTICE DURING INTRODUCTORY DIALOGUE WHAT THE INTERVIEWEE DOES WITH THE INTERACTION & HOW FULLY HE ENGAGES IN MAINTAINING THE FLOW. ENCOURAGE INTERVIEWEE TO MAKE COMMENTS/ASK QUESTIONS IN ORDER TO SIZE UP
6.C. WATCH FOR CUES
(CONT.)HOW LOQUACIOUS & ASSERTIVE HE MAY BE. LOOK FOR CONSISTENCIES/REPETITIONS IN HIS RESPONSE/REACTIONS.

6.C. CATEGORIZE "TYPE" OF RESPONSE STYLE.
SELECT A FEW (THREE OR FOUR) CATEGORIES WHICH SEEM TO OFFER A MEANINGFUL/USEFUL WAY OF VIEWING THE INTERVIEWEE AS A "TYPE" SUCH AS, FREE-TALKER, CLAM, TONGUE TIED. ASSIGN INTERVIEWEE ON BASIS ON INITIAL RESPONSES TO APPROPRIATE TYPE.
6.D. MATCH STRATEGY TO RESPONSE STYLE.
USE HUMAN RELATIONS SKILLS TO PUT INTERVIEWEE AT EASE REGARDLESS OF RESPONSE STYLE. USE ASSESSMENT OF INTERVIEWEE'S RESPONSE STYLE AS TRIGGER TO AN APPROPRIATE QUESTIONING STYLE ADAPTED TO COPING WITH PECULIARITIES/PROBLEMS OF
6.D. MATCH STRATEGY TO RESPONSE STYLE.
(CONT.) PARTICULAR TYPE OF RESPONDENT, E.G. WITH A "CLAM" IT MAY BE NECESSARY TO USE "LEADING QUESTIONS".

6.E. LEADING QUESTIONS.
USE LEADING QUESTIONS ONLY WHEN SOMETHING IS NEEDED TO ELICIT A RESPONSE TO AN AREA WHICH THE INTERVIEWEE HAS OVERLOOKED, TAKEN FOR GRANTED, OR AVOIDED. DO NOT USE LEADING QUESTIONS TO SHAPE INTERVIEW/STORY TO OWN PRECONCEPTIONS/PREJUDICES.
6.E. RESTORE WANING INTEREST.
SHIFT DIRECTION OF INQUIRY OR CHANGE PACE OF INTERVIEW OR RETURN TO AREAS OF OBVIOUS INTEREST TO INTERVIEWEE.

6.F. SUFFICIENT TIME.
ALLOW ORDINARILY, ENOUGH TIME FOR INTERVIEWEE TO THINK THROUGH HIS ANSWER BEFORE RESPONDING, TO ANSWER WITHOUT FEELING/APPEARING RUSHED/FLUSTERED, & TO REVISE HIS ANSWER AS HE REALIZES IMPLICATIONS OF WHAT HE HAS SAID. IF IMPROMPTU

STEP NUMBER PRINCIPLE STATEMENT

6.F. SUFFICIENT TIME.
(CONT.) RESPONSE (OFF-THE-CUFF) IS DESIRED. ALLOW ONLY ENOUGH TIME FOR INITIAL REACTION.

6.F. NORMAL TONE.
REASSURE INTERVIEWEE BY USE OF NORMAL VOICE TONES THAT SITUATION IS NORMAL/NON-THREATENING.

6.F. ACTIVE LISTENING.
SIGNAL INTEREST/COMPREHENSION/ACCEPTANCE OF INTERVIEWEE BY MAINTAINING ALERT, COMFORTABLE POSTURE. SIGNAL I/C/A BY GIVING POSITIVE FEEDBACK, SUCH AS FACIAL EXPRESSIONS &/OR COMMENTS WHICH SIGNIFY UNDERSTANDING.

6.F. "ANNOYING" BEHAVIORS.
OBSERVE INTERVIEWEE FOR CUES SIGNALLING ANNOYANCE, SUCH AS INATTENTION, BELLIGERENCE, CHANGE OF COMPLEXION, CURT ANSWERS, SARCASM. ASSOCIATE ANNOYANCE REACTION WITH PROXIMATE PERSONAL BEHAVIOR WHICH MIGHT BE THE CAUSE. MODIFY

6.F. "ANNOYING" BEHAVIORS.
(CONT.) BEHAVIOR OBSERVING WHETHER MODIFICATION REDUCES ANNOYANCE REACTIONS.

6.F. KEY WORDS/PHRASES.
RECOGNIZE WORDS/PHRASES WHICH SEEM IMPORTANT TO INTERVIEWEE. RECOGNIZE WORDS/PHRASES WHICH WERE SIGNIFICANT IN BACKGROUND RESEARCH.

6.F. QUOTABLE MATERIAL.
ASSESS QUOTABILITY ON BASIS OF SUCH CHARACTERISTICS AS NOVELTY, SIGNIFICANCE, CLEVERNESS OF STATEMENT, IMPORTANCE/AUTHORITY OF SPEAKER, SPEAKER'S OWN ASSESSMENT OF THE IMPORTANCE OF THE STATEMENT ETC. ERR, IF NECESSARY, ON THE

6.F. QUOTABLE MATERIAL.
(CONT.) SIDE OF COLLECTING TOO MUCH VERBATIM MATERIAL RATHER THAN TOO LITTLE.

6.F. PERMISSION QUOTING
VIEW REFUSAL TO PERMIT QUOTATION AS A CLUE TO AN AREA NEEDING FURTHER INVESTIGATION.

6.F. EYE CONTACT.
USE EYE CONTACT TO SIGNAL INTEREST/OPENNESS, USE EYE CONTACT TO INHIBIT EVASION BY INTERVIEWEE.

6.F. REASSURE.
GIVE REASSURANCE BY NONVERBAL AS WELL AS VERBAL MEANS, BUILD INTERVIEWEE'S CONFIDENCE IN CREDIBILITY OF REPORTER BY OFFERING UNSOLICITED REASSURANCE.

6.G. IS CONTINUATION POSSIBLE.
ASSESS WHETHER TO CONTINUE ON BASIS OF INTERVIEWEE'S REACTION TO THE DISRUPTION & OWN COMFORT/DISCOMFORT IN SITUATION. IF EITHER PARTY (SELF OR SUBJECT) SEEMS UNABLE TO REFOCUS, RECOVER, DO NOT CONTINUE.

6.G. CHOICE OF STRATEGY.
FOLLOW OWN INCLINATION AT THE TIME.

6.H. SUMMARIZE.
VERIFY BY SUMMARIZING, THAT INTERVIEWEE WAS UNDERSTOOD. OFFER, BY SUMMARIZING, AN OPPORTUNITY FOR INTERVIEWEE TO CORRECT MISUNDERSTANDINGS. GIVE FEEDBACK TO INTERVIEWEE SO THAT HE MAY CORRECT ANY MISSTATEMENTS HE MAY HAVE MADE.

6.H. FOLLOW-UP CALL.
REINFORCE OWN CREDIBILITY, POSTPONE UNWANTED QUESTIONS ABOUT RESULTING STORY BY ASSURING OPPORTUNITY AT A MORE APPROPRIATE TIME.

6.H. TIME FRAME.
GIVE ADDITIONAL ASSURANCE OF PROFESSIONALISM, INDICATE ASSURANCE OF A PLANNED PROGRESSION FROM ASSIGNMENT THRU INTERVIEW & FOLLOW-UP TO PUBLICATION.

7.A. PROCESS NOTES.
WRITE UP NOTES IN FULLER FORM WHILE IMPRESSIONS ARE STILL FRESH & CLEAR-CUT, WRITE UP BEFORE TIME PASSAGE LEACHES AWAY VALUABLE DATA.

CATEGORY	STEP	NUMBER	STATEMENT
		1.B	LIMITS ON PERSONAL KNOWLEDGE OF TOPIC
		1.B	LIMITS TO TOPIC'S SCOPE AND DEPTH, AS IMPOSED BY PERSON ASSIGNING STORY
	29E	1.B	EVALUATE CONSTRAINTS IMPOSED BY ASSIGNMENTS: LIMITS OF TIME
		1.C	SEARCH OFFICE MORGUE/LIBRARY FOR RELATED MATERIAL
	27G	1.C	PLAN RESEARCH SCOPE: SEARCH STANDARD REFERENCE (DICTIONARIES, ALMANACS, ENCYCLOPEDIAS, ETC)
	32E	1.C	TAKE THOROUGH NOTES ON MATERIAL RESEARCHED, ORGANIZE THEM FOR FUTURE REFERENCE
	33B	1.C	TAKE THOROUGH NOTES ON MATERIAL RESEARCHED, ORGANIZE THEM FOR FUTURE REFERENCE
	29F	2.A	COMPOSE WELL-ROUNDED SET OF QUESTIONS FOR INTERVIEWEES
	28D	3.B	ASSIGN ORDER OF PREFERENCE/DESIRABILITY TO POTENTIAL INTERVIEWEES, CONSIDERING THESE CRITERIA: NEWSWORTHINESS
		3.B	PROMIMITY
		3.B	AVAILABILITY
		3.B	AUTHORITY
		3.B	EXPERTISE
		3.B	EXPECTED YIELD VIS A VIS CONTACT TIME
		3.B	WILLINGNESS
	27E	3.E	PROBE ACQUAINTANCES/COLLEAGUES OF POTENTIAL INTERVIEWEES FOR ADDITIONAL BACKGROUND, USE RESULTS OF PROBING TO REVISE PREF/ORDER OF POTENTIAL INTVW

STATEMENT	CATEGORY	STEP NUMBER
ARRANGE QUESTIONS IN A SEQUENCE WHICH SEEMS TO PROMISE ORDERLY PROGRESSION THRU THE TOPIC	29E	4.B
QUESTION RESPONSIVELY, RELATING NEXT QUESTION TO PRECEDING RESPONSE		6.A
GENERATE NEW QUESTIONS TO HANDLE CONTINGENCIES		6.A
CONDUCT INTRODUCTORY DIALOGUE, BRIEFLY RESTATING PARAMETERS OF ASSIGNMENT		6.A
QUESTION INTERVIEWEE FOLLOWING THIS PROTOCOL: BEGIN WITH LEAD-IN QUESTION, THEN MOVE TO OTHER PREPARED QUESTIONS	27E	6.A
WRITE QUOTABLE MATERIAL IN FULL		6.F
RECORD INTERVIEWEE RESPONSES AS COMPLETELY AS NEEDED FOR LATER RECALL: WRITE KEY WORDS/PHRASES	33B	6.F
CLOSE INTERVIEW BY REVIEWING NOTES QUICKLY, SUMMARIZING MAIN POINTS COVERED	33B	6.H
PROCESS NOTES AS SOON AS POSSIBLE, TRANSCRIBE NOTES INTO COMPLETE SENTENCES	36H	7.A
PROCESS NOTES AS SOON AS POSSIBLE, TRANSCRIBE NOTES INTO COMPLETE SENTENCES	33B	7.A
PROCESS NOTES AS SOON AS POSSIBLE, TRANSCRIBE NOTES INTO COMPLETE SENTENCES	32E	7.A
PROCESS NOTES AS SOON AS POSSIBLE, TRANSCRIBE NOTES INTO COMPLETE SENTENCES	35C	7.A
PROCESS NOTES AS SOON AS POSSIBLE, TRANSCRIBE NOTES INTO COMPLETE SENTENCES	36F	7.A

CONTRACT NO. DAB160-81-C-0017

DATE PRINTED
03/08/83

ERRATA

MOS: 71Q TASK NUMBER: 214-176-1401

TPA-2

STEP NO	RECOMMENDED CHANGES AND REASONS
S.G.S.D.	DELETE ENTIRE LINE.

Example 4: Ft. Sam Houston

MOS: 91B MEDICAL SPECIALIST
TASK NUMBER: 081 340 0021 BASE 1 ANALYSIS SITE: AHS
IDENTIFIES BASIC ANATOMY AND PHYSIOLOGY OF MUSCULOSKELETAL SYSTEM

MANUAL: TASK LIST 91B (MARCH 1982)
DATE STARTED: 160682 DATE COMPLETED: 170682 HOURS: 2.5
ORIGINAL ANALYSIS: 160682 VERIFICATION: 170682 INSTRUCTIONAL REVIEW: 160682

- - - - - - - - - - - - - - - TASK SYNOPSIS - - - - - - - - - - - - - - -

- - - - - - - - - - - - - - - - EQUIPMENT - - - - - - - - - - - - - - -

NONE

- - - - - - - - - - - - - - - COMMENTS NO ERRATA - - - - - - - - - - - - -

NONE

- - - - - - - - - - - - - - - - - MAJOR STEPS - - - - - - - - - - - - - - - - -

1. IDENTIFIES BASIC ANATOMY AND PHYSIOLOGY OF MUSCULOSKELETAL SYSTEM

- - - - - - - - - - - - - - - MOTOR SKILLS ANALYZED - - - - - - - - - - - - - - -

45A MULTI LIMB COORDINATION
45B MANUAL DEXTERITY
45C CONTROL PRECISION
45D RESPONSE ORIENTATION
45E REACTION TIME
45F SALE [illegible] CONTROL
45 [illegible] DEXTERITY
45 [illegible] EFFECTIVENESS
45 [illegible] SPEED
45

46A OPERATE EQUIPMENT MANUALLY LIFT
46B USE HAND TOOLS DETERMINE SIZE
46C INSTALL, RELOCATE AND REMOVE
46D MAINTAIN SUBSYSTEMS W/HAND TOOLS
46E USE TEST EQUIPMENT
46F FORGE, SHAPE, FABRICATE MATERIALS
46G CHECKS AND SERVICES
46H PERFORM COMBAT OR POLICE ACTIONS
46I PERFORM CLERICAL DUTIES
46J CARE FOR THE INJURED OR INFIRM
46

STEP NUMBER	PREREQUISITE COMPETENCIES	J I B	STEP STATEMENT
1			IDENTIFIES BASIC ANATOMY AND PHYSIOLOGY OF THE MUSCULOSKELETAL SYSTEM.
1 A			IDENTIFIES MAJOR FUNCTIONS OF SKELETAL SYSTEM.
1 B			IDENTIFIES MAJOR DIVISIONS OF SKELETAL SYSTEM.
1 B 1			HEAD OR SKULL.
1 B 2			TRUNK.
1 B 3			UPPER EXTREMITIES.
1 B 4		S	PELVIC GIRDLE.
1 B 5			LOWER EXTREMITIES.
1 C			IDENTIFIES BASIC STRUCTURAL ELEMENTS OF BONES.
1 C 1			IDENTIFIES THE VARIETIES OF BONES AND FUNCTIONS OF EACH (IE LONG, SHORT, SMALL, FLAT AND IRREGULAR).
1 C 2			IDENTIFIES THE BASIC COMPOSITION OF BONES.
1 D			IDENTIFIES THE MAJOR BONES OF BODY, BOTH THEIR MEDICAL AND COMMON NAMES AND ANATOMICAL LOCATIONS OF EACH.
1 E			IDENTIFIES ANATOMICAL CONNECTIONS/PARTS INVOLVED IN PROTECTION, MOVEMENT, AND HOLDING TOGETHER BONES.
1 E 1			IDENTIFIES JOINTS AND THEIR FUNCTIONS.
1 E 2			IDENTIFIES TYPES OF JOINTS AND EXAMPLES OF EACH.
1 E 3		S	IDENTIFIES BURSA SAC AND ITS FUNCTION.
1 E 4			IDENTIFIES LIGAMENTS AND THEIR FUNCTIONS.
1 E 5			IDENTIFIES CARTILAGE AND THEIR FUNCTION.
1 E 6			IDENTIFIES TENDONS AND THEIR FUNCTIONS.
1 F			IDENTIFIES POSITIONAL/SPATIAL ORIENTATION OF BONES, LIGAMENTS, TENDONS, CARTILAGE, BURSA, AND JOINTS TO EACH OTHER.
1 G			IDENTIFIES THE MAJOR FUNCTIONS OF MUSCULAR SYSTEM.
1 H			IDENTIFIES THE GENERAL STRUCTURE OF THE MUSCULAR SYSTEM.
1 H 1		S	MUSCLES ARE COMPOSED OF BUNDLES OF FIBERS HELD TOGETHER BY CONNECTIVE TISSUE.
1 H 2		S	MUSCLES ARE CATEGORIZED INTO TWO MAJOR TYPES, VOLUNTARY (MUSCLES MOVED VOLUNTARILY, STRIATED) AND INVOLUNTARY (MUSCLES NOT CONTROLLED CONSCIOUSLY, SMOOTH)
1 I		S	IDENTIFIES THE MAJOR MUSCLES OF THE BODY AND ANATOMICAL LOCATIONS OF EACH.
1 J			IDENTIFIES COMMON CONDITIONS/DISORDERS INTERRUPTING NORMAL PHYSIOLOGY OF MUSCULOSKELETAL SYSTEM DUE TO INJURY OR DISEASE AND ASSOCIATED SIGNS AND SYMPTOMS.
1 J 1			FRACTURES.
1 J 2			SPRAINS
1 J 3			SPRAINS (END OF TASK).

THE KNOWLEDGES AND CODES BELOW ARE REFERENCED IN OTHER 91B TASKS.

57A
IDENTIFIES MAJOR FUNCTIONS OF SKELETAL SYSTEM.

57B
IDENTIFIES MAJOR DIVISIONS OF SKELETAL SYSTEM.

57C
IDENTIFIES BASIC STRUCTURAL ELEMENTS OF BONES.

57D
IDENTIFIES THE MAJOR BONES OF BODY, BOTH THEIR MEDICAL AND COMMON NAMES AND ANATOMICAL LOCATIONS OF EACH.

57E
IDENTIFIES ANATOMICAL CONNECTIONS/PARTS INVOLVED IN PROTECTION, MOVEMENT, AND HOLDING TOGETHER BONES.

57F
IDENTIFIES POSITIONAL/SPATIAL ORIENTATION OF BONES, LIGAMENTS, TENDONS, CARTILAGE, BURSA, AND JOINTS TO EACH OTHER.

57G
IDENTIFIES THE MAJOR FUNCTIONS OF MUSCULAR SYSTEM.

57H
IDENTIFIES THE GENERAL STRUCTURE OF THE MUSCULAR SYSTEM.

57I
IDENTIFIES THE MAJOR MUSCLES OF THE BODY AND ANATOMICAL LOCATIONS OF EACH.

57J
IDENTIFIES COMMON CONDITIONS/DISORDERS INTERRUPTING NORMAL PHYSIOLOGY OF MUSCULOSKELETAL SYSTEM DUE TO INJURY OR DISEASE AND ASSOCIATED SIGNS & SYMPTOMS.

57K
IDENTIFIES THE BASIC ANATOMICAL STRUCTURE OF EACH MAJOR DIVISION.

ATTACHMENT H

ETAP Report Description

. ETAP REPORT DESCRIPTION

I. TPA-1

1. MOS Number and Name
   From AR-611-201, Enlisted Career Management Fields and Military Occupation Specialties.

2. Task Number
   From GFM (SM, Task Lists), as revised.

3. BSEP
   Tasks trained in residence to qualification in IET are BSEP I. Others are BSEP II.

4. Task Statement
   From the field analyst's sources--SM, Task List.

5. Manuals
   The Soldier's Manual or Task List for that MOS, and the date issued.

6. Analysis Site
   A 4-character code.

7. Date Started
   The date analysis started.

8. Date Completed
   When all events were completed and the ETAP results were ready to be sent to Cherry Hill.

9. Hours
   The number of hours spent on the initial interview and write-up of this task.

10. Original Analysis
    The initial interview with SME1.

11. Verification
    The date the analysis was reviewed with a second SME.

12. Instructional Review
    The date the analysis was reviewed with a school instructor. As of 22 March 1982, an instructional review process was not completed for BSEP II tasks unless the task was resident trained.

13. Task Synopsis
    Usually an expanded task statement, clarifying the dimensions of the task.

14. Equipment
    Major material items, e.g. tools, supply items and test equipment.

required to successfully complete the task.

15. Comments
Pertinent observations by the analyst and/or qualifying statements of the SME.
As of Sept 81, certain "comments" were identified as discrepancies. For this project, a discrepancy is a difference between job requirements in the field as identified by SMEs and doctrinal procedures included in the FMs, TMs, resident training, etc.
Comments that were identified as discrepancies are shown on the TPA-1 report as the last entries in the Comments section, and are preceded with an asterisk (*) in the first position.

15a. The headline of the Comments section will indicate ERRATA or NO ERRATA. If ERRATA, there will be an attachment. See section V below.

16. Major Steps
The major steps, as identified by the analyst, with the SME, that must be performed to successfully complete this task

17. (Comments Attached)
When entries on the TPA-1 form in the Task Synopsis, Equipment, Comments or Major Steps sections exceed the space provided on the TPA-1 report, the only entry made in the effected section of the report is, "See comments attached". The entries are reported on an attachment to the TPA-1 report, under the appropriate heading.

18. Motor Skills
As of July 1982, certain motor skills were identified as applicable to certain tasks. For final delivery, the Motor Skills section is shown on each TPA-1 report, and its headline shows ANALYZED or NOT ANALYZED. If analyzed, the applicable motor skill designations are preceded with an "X".

II. TPA-2

1. Step Number
TPA-2s were written using generally accepted outline numeration procedures -- i.e. Roman numeral, upper-case alpha, Arabic numeral, etc. At entry, we converted the step numbers to a computer-compatible format of numeric-then-alpha sequence, with dots delimiting the levels of specificity.
The word RESOURCE in the step number field indicates that a manual, chart, etc. is available to the soldier for reference in performing this step.

2. Step Statement
The words of the various analysts were--to the extent possible--faithfully reproduced. Step Statements were indented based on a mathematical formula that operates on the Step Number. This gives a hierarchical representation of the procedural analysis.
If the word RESOURCE is in the step number field, the identification of the manual, chart, etc. that is available will be shown in the related step statement field.
Project-specific editing rules were established to handle such

areas as

- job aid and resource citation
- using abbreviations IAW AR-310-50
- expressing mathematical formulae
- cross-referencing between ETAPs
- recording and reporting symbols.

3. Prerequisite Competencies Codes
As part of ETAP event 10, analysts attempted to determine from the SME what a soldier must know to successfully perform the task. For "new format" MOS (see VII below), the results of this effort are presented on the TPA-3 form and report. The category shown is the code of an entry on the taxonomy.

4. J - Intrinsic Job Aids
If a TM, FM, manufacturer's manual, conversion chart, etc. is required for the successful completion of the job step, it is cited in the step statement, and a plus sign (+) is shown in the "J" column of the TPA-2 report.

5. I - Instructional Review
If an instructor told the analyst that particular job steps were not taught as part of resident training, the analyst noted that fact on the TPA-2. This information is reported through the appearance of a dollar sign ($) in the "I" column on the TPA-2 report. Statements thus identified are technical prerequisites. It should be noted that determining the degree of instruction (the continuum from familiarity to mastery) is not part of the ETAP procedure.

6. D - Decision Points
Step statements beginning with the words

if, select(s), determine(s), choose(s), consider(s)
decide(s), judge(s), and observe(s)

are further highlighted with a less-than symbol (<), or carat, in the "D" column of the TPA-2 report. This is a programming notation that was agreed upon

7. Subtasks
Subtasks are a set of job steps, previously analyzed or pre-analyzed, that represent a piece of work that may be repeated in other tasks. Analysts may have referred to subtasks rather than re-writing common job steps. When a subtask is printed within a TPA-2 report, its title is shown, the step statements are indented and steps are numbered beginning with step S1.

III. TPA-3

As part of event 10, analysts attempted to determine from SMEs what a soldier must know to successfully perform the task. The results of this effort are presented on the TPA-3 form and report. The category shown is the code of an entry on the taxonomy. A step number is shown to direct the reviewer to a specific location on the procedural analysis where the application of this knowledge is needed. If the analyst was told that the knowledge is not

instructed as part of resident training, a "S" is shown in the "TPA" column of the TPA-3 report.

IV. KNOWLEDGE ANALYSIS

As a result of a home office review of the field analysis, prerequisite competencies were identified within the context of the task. The knowledge analysis report shows the taxonomy code, a procedural locator to the TPA-2, and the prerequisite competency indicator statement.

V. ERRATA

Results of the review process conducted at the schools, and reported to USA on TSTODS Form 914-R, that were judgemental in nature or that would have added or deleted procedural steps, are reported on an Errata report. Analysis results having Errata reports attached are identified with the legend "COMMENTS - ERRATA" on the Comments section headline.

VI. TPA-X

When a task was analyzed using the principle transfer approach, a TPA-X report is included, listing the underlying principles identified within the context of that task. The statements are grouped topically and accompanied by a locator.

VII. OLD FORMAT MOS

With the introduction of the elaborated taxonomy in April 1982, prerequisite competency codes were applied to the TPA-2 form and report, rather than to the TPA-3 and Knowledge Analysis forms and reports. To accommodate this change, task analysis results for all tasks in 24 MOS are delivered in "old" format--that is, with TPA-3s and KAs.
The old format MOS are:

05B	16D	31M	57E	67U	71Q
05C	16E	43M	61B	68G	75B
13F	26L	44B	63H	71D	76X
15D	26Q	44E	63W	71L	96B

ATTACHMENT 1

Guidance for Processing Analysis Review Comments

MOS BASELINE SKILLS PROJECT

CONTRACT NO. DABT 60-81-C-0017

PROCEDURE FOR PROCESSING TRADOC FORM 314-R, MOS TASK ANALYSIS REVIEW

Based upon the review process conducted at each individual school and the results reported to RCA on TRADOC Form 314-R, final corrections have been made to the ETAPs. All review comments are on file both at TRADOC and at RCA. In deciding how to incorporate the review comments, the following criteria were employed by RCA:

1. Changes were made directly onto the ETAP printout for technical changes in steps (e.g., "150 PSI" should be "105PSI"), typographical errors ("from" to "form"), additional prerequisite competency indicator statements (add 41G at step 1.B.1.), additions to the equipment list (add torque wrench), and additions to a single step.

2. Changes were reported on a separate ERRATA sheet whenever a step was added (add new step 2.C.1.A. "Torque bolts") or deleted (delete steps 3.D through 3.D.3.). Because these changes would alter the numbering system and totally confuse any cross-references in other tasks, they were not incorporated directly onto the ETAP. Also, non-specific comments about the task ("task number has been changed to 999-999-9999" or "task analysis should be redone") were placed on the ERRATA sheet.

3. Comments of a judgmental nature ("This was a good analysis") were not placed on the ERRATA sheets. These comments will be kept on file at both TRADOC and RCA, however. Likewise changes which would violate the conventions used during the entire ETAP process were not incorporated.

4. In accordance with directions from the COR, the review identified tasks as "approved", "approved with change," or "disapproved." If review comments (changes) were provided for tasks which were either "approved with changes" or "disapproved" these comments (changes) were handled as described above. Also, "disapproved" was noted on ERRATA sheets. Reanalysis was not performed.

Some of the conventions which resulted in misunderstandings during the review process were:

a. Cross-references to other tasks in the same MOS need not include an MOS identifier in front of the task reference.

b. Old format tasks which contain cross-references on the Knowledge Analysis page did not require a prerequisite competency (PC) indicator.

c. On the Knowledge Analysis pages of old format tasks, the step locator need not go beyond the second level (e.g., 3.3).

d. Additions to the taxonomy developed by the individual schools as a result of the review process were not incorporated into the ETAP printout. Obvious erroneous PC codes were corrected using the existing taxonomy.

e. The conversion from the old to the new taxonomy allowed for general citations such as "01" as opposed to "01A" or "01D" on the old format tasks. Old format tasks might also carry the codes 45, 47, or 48 which denote motor skills, equipment usage, or "other".

f. Subcategories for 45 and 46 (Motor Skills) apply only to new format tasks. Within the new format they apply to the task as a whole, are shown on TPA-1, and will never appear as PC code entries on TPA-2.

g. RCA analysts used an expanded taxonomy which included the category 41H: Interpret Codes and Symbols.

h. Differences of opinion about what constitutes a major step were not reported during final corrections.

i. ETAPs are presented in a clipped outline style which ignores many standard grammatical rules. For reasons of cost efficiency, changes in grammar and punctuation were incorporated only when failing to do so would make the sentence unclear or when a specific entry for a form was cited (e.g., Write "Number of Gallons:" in Block 6).

j. For old format tasks, new PC codes identified as a result of the review process were incorporated onto the ETAP. Additional citations of identified PC codes could appear on the ERRATA sheet.

k. Tasks for which no review comments were received were assumed to be accepted with no changes.

l. To avoid misinterpretation ERRATA comments were reported as written.

m. The presence or absence of ERRATA will be indicated in the "Comments" headline of TPA-1 for each task.

Cherry Hill, NJ
11 March 1983

Revised April 19--

ATTACHMENT J

Taxonomy Developed for Use with Analysis

Item 1 - Initial Version
Item 2 - Expanded Version
Item 3 - Elaborated Version
Item 4 - Explanation of Conversion

Item 1 - Initial Version

TASK = _____ _____ _____ PAGE _____ OF _____

KNOWLEDGE ANALYSIS

Category	Category Numbers	Procedure Location	IR	Statement
READING				
1 Procedural Directions				
2 Process				
3 Locator				
4 Specifications				
5 Terminology				
6 Recognition				
7 Safety				
MATHEMATICS				
8 Numeration Place Value				
9 Addition Subtraction				
10 Multiplication/ Division				
11 Geometry				
12 Algebra				
13 Trigonometry				
WRITING				
14 Composition				
15 Spelling				
ADDITIONAL				
16 Equipment Use				
17 Motor Skill				
18 Other				

Item 2 - Expanded Version

Revised April 1984

1. Procedural Directions

To obtain information from a highly-detailed, step by-step description in order to accomplish a specific task activity.

a) Identify factual details
   1. Select the topic sentence in a given paragraph(s).
   2. Locating words, sentences, or parts of a reading selection that answer questions, match descriptions, or support conclusions.
b) Locate parts of reading material for given purpose
   3. List specific details to support the main idea.
   4. Given a topic, take notes, synthesize information into a written sequence.
c) Follow directions
   5. Follow direction given in reading material.
d) Identify sequence of events
   6. Given informational statements, organize them sequentially into a paragraph.
   7. Arrange sentences, paragraphs or events in a sequential order.
   8. Organize a given selection according to a time or ordering sequence.
e) Identify the main idea
   9. Identify the main idea, specifically or implicitly stated, in a reading selection.
   10. Select sentences in a given selection that are subordinate to the main idea.
f) Make inferences
   11. Rephrase, making a sentence shorter by maintaining the essential meaning.
   12. Understanding of a reading selection to evaluate ideas, answer logical questions, establish proof and to determine authenticity.

2. Process

Applying information presented in a job aid, where reading is required in combination with the use of graphics, maps, exploded-view diagrams and schematics in order to perform a subtask activity.

a) Identify factual details from illustrative materials
   1. Answer factual questions, or recall of details, from illustrative materials.
b) Identify factual details combining text with illustrations
   2. Answer factual questions, or recall of details, combining illustrations with text.
c) Match illustrative materials to text
   3. Match illustrations to text and activity to directions.
d) Select parts of text and visual materials for a given purpose
   5. Select words, phrases, sections of visual materials, related to task performance.
   6. Select those sentences, paragraphs, and visual used to perform a task.
e) Identify sequence of events
   7. Identify those events that should occur in the performing of a task.
   8. List in order of their occurrence the events of a task.
f) Identify main idea of text and/or visual materials
   9. Make inferences based on the presentation of visual and text materials.
   10. Select words, phrases, sections of visual materials, related to task performance.
g) Make inferences from text and visual materials
   11. Make inferences based on the presentation of visual and text materials.
h) Integrate information from various sources
   12. Given information from different sources, identify main ideas and details.
   13. Integrate meaning from all job aid sources and apply the information to accomplish a task.

3. Locate

Using written aids (Tables of Contents, Appendixes, Indexes, Dictionaries, Directories...) in order to locate more detailed sub-task related information.

a) Identify appropriate document for given purpose
   1. Determine from various sources whether information concerning the task is contained within the content of the document.
   2. Distinguish between relevant and irrelevant information for a particular purpose.
b) Use index, table of contents, glossary, etc. to locate specified information
   3. Identify specific information in documents pertaining to the title page, preface, index, glossary and appendix.
c) Select the information needed to complete a task
   4. Locate the pages on which information concerning the task would appear.
   5. Select topics and subtopics from the index of a document that refer to the information needed to answer questions or to solve problems concerning the task.
   6. Given a problem within a task, select that information which would be useful in solving the problem.
d) Use cross referencing to locate information in various sources
   7. Locate specific information, from various sources, by cross referencing.
e) Organize and sequence information from various sources
   8. Given a task requiring research from multiple sources to accomplish the task, an informational synthesis would be required.
   9. Organize the informational synthesis into a sequentially ordered series of events.

4. Specifications

Using tables, graphics, charts, or written text to determine a fact, standard, tolerance, or rule to which a sub-task procedure must conform.

a) Locate specified information in the material
   1. Select words, phrases, or numerical values that support a conclusion
b) Identify factual details, torque
   2. Identify factual details in reading material which must be followed to avoid any negative consequences in task performance.
c) Draw comparisons and contrasts between specification and task situation
   3. Apply rules to be observed, in a cause and effect relationship, that must be followed to achieve satisfactory task performance
d) Discriminate among alternative choices
   4. Discriminate, when alternative choices are available, the best choice to be made in conformance with a standard or tolerance.

14. Composition:

Applying proper English skills, appropriate grammar, vocabulary and style, to the completion of a written sub-task activity.

a) Use appropriate capitalization and punctuation.
b) Use appropriate grammar and syntax
c) Distinguish between relevant and irrelevant content for a given purpose.
d) Organize material appropriately for a given purpose, format.
e) Identify main ideas and essential details through observing, listening or reading and record them in notes

15. Spelling:

The writing of letters in words in accordance with an acceptable form found in a dictionary, thesaurus, or word list specific to sub task performance.

5. Terminology

Recognizing and applying task-specific vocabulary, jargon, abbreviations used in the job environment

a) Know meaning of specified words, contractions and abbreviations
   1. Know the meaning of common contractions and task related abbreviations
b) Know meaning of common prefixes and suffixes
   2. Know the meaning of common prefixes and suffixes and identify roots in affixed words.
c) Identify meaning of word from context
   3. Identify the correct meaning of a word from the context of a sentence using words from a specific vocabulary list.
   4. Identify words from a specific vocabulary list that have same or opposite meanings in isolation or in context.
d) Understand figurative or idiomatic (task related) meanings of words
   5. Understand figurative, idiomatic (jargon) and task related words and terms
   6. Identify words peculiar to disciplines of mathematics, science, and communications.

6. Recognition:

Identifying, within sub-tasks, distinctions to be made regarding symbols, sizes, shapes, colors and sounds.

a) Identify similarities and differences among stimuli
   1. Identify similarities and differences among visual objects specific to a task
b) Classify stimuli by specified characteristics (objective)
   2. Classify objects by size, shape, color, significant markings that are used in a task.
   3. Match objects by size, shape, color, significant markings, sounds and within a task.
c) Determine specified characteristics of stimuli (objective)
   4. Determine direction, duration, and intensity of sound, [illegible]
d) Identify stimuli that are task related
   5. Identify and know the significance of various [illegible]
   6. Identify different scents (smells) and their significance
   7. Distinguish different kinds of sounds and their significance
e) Make a task related inference based on characteristics of an
   1. Translate written and oral directions into [illegible] performance of a task.

7. Safety

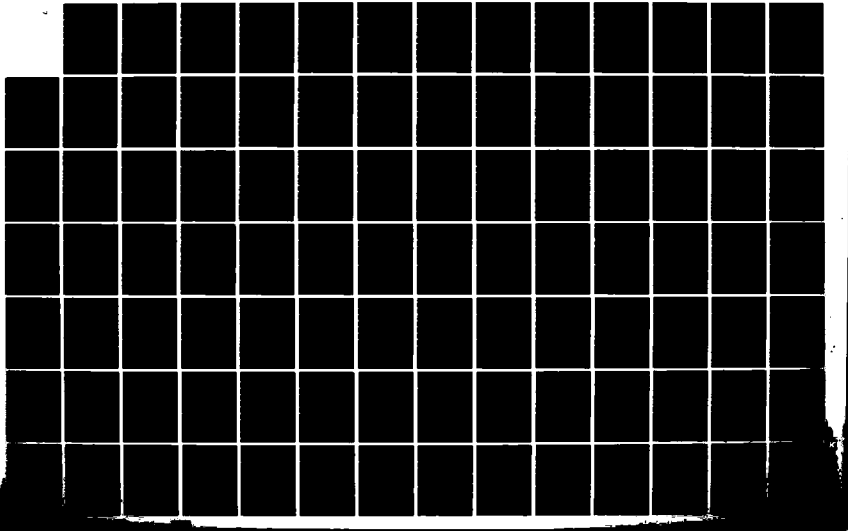
Observing rules and precautions that must be exercised during sub-task activities in order to prevent injury to self or equipment

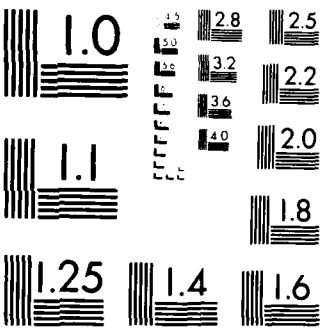
a) Identify rules related to safety
   1. Know the rules and precautions that must be taken [illegible]
b) Identify factual details with safety implications
   2. Recognize the significance of sounds, [illegible] of a safety procedure
c) Follow directions related to safe
   3. Know the factual limitations on characteristics of the task [illegible] performed safely.
d) Make inferences concerning safe
   4. Know the procedures that are to be followed [illegible] requires some action.
e) Discriminate among alternatives to select the safest
   5. Know the procedures that are to be followed [illegible] therefor requires some action

9/17/81

AD-A143 593 NEEDS ASSESSMENT TO DEFINE THE TRAINING REQUIREMENTS FOR A BASIC SKILLS E..(U) RCA SERVICE CO CHERRY HILL NJ APR 84 DABT60-81-C-0017 2/7

UNCLASSIFIED F/G 5/9 NL





MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS 1963 A

8.

- Activities especially emphasizing counting, recording, or reading numbers (on a gauge, on a scale, in tables, etc.)
- Includes recognizing numbers in various forms (fractions, decimals, percents). Does not usually include integers.

- Recognizing important fractions. Does not include estimating or aggregate numbers (e.g., a little more than 1/2, about 1/4, etc.)
- Comparing numerals with a view to ordering them (e.g., 1/4 < 1/2 and 1/4 with 1/2 < 3/4; 1/2 < 2/3 and 1/4 with 1/2 < 2/3; 1/2 < 3/4 and 1/4 with 1/2 < 3/4; 1/2 < 2/3 and 1/4 with 1/2 < 3/4; 1/2 < 2/3 and 1/4 with 1/2 < 3/4; 1/2 < 2/3

Item 3 - Elaborated Version

Revised April 1982

NUMERATION/PLACE VALUE

NT

1 NUMBER SEQUENCING

- a Match numerals with words, objects and models
- b Write numerals in correct order, N, N+1, N+2 order, from any starting point
- c State what number comes before or between any two given numerals
- d Select the number that is greater/lesser from a set of numerals
- e Identify an object with a specified ordinal position
- f Write or state the place value of a particular digit in whole or decimal number
- g Round off a number to a specified place, whole or decimal
- h Count by ones, twos, fives, tens, etc. backward or forward (skip counting)
- i Match numbers with points or intervals on a number line (positive (+) or negative (-) values)

UNITS OF MEASUREMENT

2 LINEAR, WEIGHT, AND VOLUME MEASURES

- a Name the markings on a linear scale
- b Differentiate units of measure and equivalents in the English and metric system
- c Use a ruler, yardstick, meter stick or scale to measure lengths of objects or distances
- d Identify measures of ounce, pound, gram
- e Identify measures of pints, quarts, gallons, liters
- f Use a scale which is not numerically calibrated
- g Estimate measures of varying lengths, dimensions or weights

3 DEGREE MEASURES

- a Identify degree or mil as a unit in determining direction, distance or temperature
- b Estimate the measure of a given angle not greater than 180°
- c Interpret bearings, azimuth and other contexts in which the measure of an angle may range from 0° to 360°/0 to 6400 mils

4. TIME TELLING MEASURES

- a Use a 24 hour or digital clock to tell time
- b Name intervals and tell time in hours, minutes, and seconds
- c Estimate time in seconds, minutes, and parts of an hour
- d Identify calendar units and arrange them in Julian style
- e Convert time into hours and tenths of hours
- f Compute time using Greenwich Mean Time (GMT) as a basis for establishing zones and distances

NT

5 GAUGE MEASURES

- a Identify the unit of measurement found on an instrument
- b Interpret the number, word, symbol from a display read-out
- c Recognize a "reading" from a gauge with color divisions
- d Recognize positive (+) and negative (-) demarcations on a scale
- e Select band(s) from a multi-scale gauge
- f Match a gauge reading to a specification using numbered or labeled intervals
- g Interpret gauge readings from an unnumbered, unmarked interval
- h Interpret a gauge reading which is fluctuating or momentarily sustained
- i Match specifications of required measure by manipulation, alignment or maintenance

VISUAL/SPATIAL RELATIONSHIPS

6. SPATIAL

- a Identify directions that tools, hardware, or components may be moved
- b Manipulate objects to align, match, mate, make parallel, be perpendicular or be at an angle
- c Interpret spatial relationships of figures and objects from 2 dimensional drawings, pictures, or photographs
- d Relate geometric symbols and graphic representations to actual systems, subsystems and components

GEOMETRY

7 LINES

- a. Identify and name points, lines, rays, and segments
- b. Identify intersecting lines, parallel lines, and line segments
- c. Define and identify perpendicular lines
- d. Identify congruent segments

8. PLANES

- a. Identify and name plane geometric figures
- b. List the characteristics of geometric figures
- c. Classify figures according to the number or measure of its sides or angles
- d. Identify figures which possess similarities
- e. Identify figures which may be parallel, perpendicular or congruent

9. ANGLES AND TRIANGLES

- a Identify and name the different kinds of angles and triangles, with their corresponding figures
- b Identify vertical, adjacent, complementary or supplementary angles
- c Classify triangles according to their sides or angle size
- d Identify altitudes and medians of triangles or the bisector of an angle
- e. Name an angle by using letters, a number, or a single letter

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10 SOLIDS

- a Recognize and match the names of solids with their corresponding figures

11 TERMINOLOGY

- a Identify technical words associated with geometric figures
- b Interpret meaning of terms derived from spatial orientation

COMPUTE OR PERFORM

12 ADDITION AND SUBTRACTION

- a Add or subtract whole numbers, without carrying or borrowing
- b Add or subtract whole numbers, carrying and borrowing
- c Add and subtract, borrowing and carrying with mixed numbers (whole and decimals)
- d Add or subtract positive (+) and negative (-) numbers using a number line to arrive at a solution
- e Add or subtract to find correct time (24 hr. clock) using hours or minutes
- f Add or subtract various increments on gauges dials, or any other measuring instrument
- g Add or subtract time, linear, dry, liquid or degree measures requiring regrouping
- h. Estimate a sum or difference

13. MULTIPLICATION AND DIVISION

- a Multiply and divide whole numbers
- b Multiply and divide mixed numbers (whole and decimals)
- c Divide a number with decimals in both divisor and dividend
- d Multiply and divide integers, both positive (+) and negative (-), and assign proper sign to product or quotient
- e. Estimate a product or quotient

14. FRACTIONS/DECIMALS

- a Subdivide whole objects or a set of objects into halves (1/2), thirds (1/3), fourths (1/4) eighths (1/8)
- b Reduce fractions to lowest terms
- c Convert fractions (proper and improper) to decimal equivalents, and vice versa, using a table, chart or gauge
- d Compute equivalent value of fractions, decimals, percents, and mixed numbers to lowest terms
- e Add and subtract fractions, with same or *different denominators*
- f Multiply and divide fractions with and without whole numbers
- g Estimate a fractional sum, product, or quotient

NT

15 GEOMETRY

- a Draw geometric figures, plane and solid
- b Match geometric figures with word names, equivalent measures
- c. Label all parts of geometric figures using mathematical and characteristic designators
- d. Use a protractor to measure angles, make geometrical constructions
- e. Construct perpendicular on a line segment, bisector of an angle
- f Compute the perimeter and area of any figure
- g. Compute the circumference and area of a circle
- h. Compute the area and volume of any solid figure
- i. Use formulas in solving problems involving geometric figures
- j. Solve problems and interpret spatial relationships of figures, symbols, and objects from 2-dimensional displays

16. COMBINATION OF PROCESSES

- a Identify median and mode
- b. Compute averages
- c Solve problems combining all processes using whole, mixed numbers and fractions
- d Solve problems, combining all processes, involving units of measurement
- e. Interpret information from charts, number lines, scales and graphs to solve arithmetic problems
- f. Solve conversion problems of linear (metric and English) liquid, weight, and temperature (F^{o} or C^{o}) measures
- g Solve problems involving ratio and proportion
- h. Solve word problems where any mathematical process may occur

17. GRAPHING IN THE COORDINATE PLANE

- a Identify coordinates of a point in any grid system
- b Identify points on a line graph
- c. Match a graph with its equation

18 ALGEBRA

- a Solve simple algebraic equations with one unknown
- b Recognize and derive equivalent algebraic expressions
- c Evaluate powers and estimate roots

19 TRIGONOMETRY

- a Use tables of trigonometric functions
- b Use tables of logarithms to solve problems
- c Solve geometric problems using trigonometric functions
- d Use trigonometric ratios to solve problems

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CONTENT READING

NT

25. PROCEDURAL DIRECTIONS

- a. Identify the purpose of written procedures that are found in maintenance manuals
- b. Select parts of text and visual materials to complete a task activity
- c. Follow highly detailed step-by-step directions in order to accomplish a sequence of task activities
- d. Determine the essential message of a paragraph or section of written material
- e. Infer from a written source which does not explicitly provide required information in order to make a decision
- f. Synthesize information from written sources which contributes to the completion of a task activity

26. VOCABULARY

- a. Recognize common words and their meanings
- b. Recognize task related words with technical meanings
- c. Identify the correct meaning of a word from the context of a sentence
- d. Recognize the meaning of common contractions, abbreviations and acronyms
- e. Determine the meaning of figurative, idiomatic, and technical terms by using context clues or by using a reference source(s)

INFORMATION ACCESS

27. REFERENCE SKILLS

- a. Locate a Technical Manual, Field Manual or any related source document by code number and title
- b. Alphabetize words or topics to locate information
- c. Use the table of contents, index system or sub system heading, appendix and glossary to locate information
- d. Locate the page, title, paragraph, figure, or chart needed to answer a question or to solve a problem
- e. Determine, after scanning or skim reading, whether the information is relevant
- f. Cross-reference within and across source documents to select information needed to perform a routine
- g. Organize information from multiple sources into a sequenced series of events

28. TABLES/CHARTS

- a. Obtain a fact or specification from a two column table or chart to find information
- b. Obtain a fact or specification from an intersection of a row by column table or chart
- c. Use a complex table or chart requiring cross referencing within or in combination with text material outside the chart
- d. Apply information from tables and charts for locating malfunctions, or for selecting a course of action

VISUAL AIDS

NT

29. ILLUSTRATIONS

- a. Identify details, part numbers, and parts locations in an operational picture
- b. Identify parts or details according to a key
- c. Interpret a drawing which shows a cross section view of an object for assembly, disassembly
- d. Interpret a three dimensional projection or exploded view of object for assembly, disassembly, or position in system or sub system
- e. Follow illustrations, or photographs, arranged in a sequential order as a guide to a course of action
- f. Integrate information from various sources to select a course of action

30. FLOW CHARTS

- a. Use a simple linear path of an organizational chart to list events in sequential order
- b. Use a linear path of a flow chart to provide visual and textual directions to a procedure, to arrive at decision points, and to provide alternate paths in problem-solving
- c. Translate the significance of the symbols into physical activities

31. SCHEMATICS

- a. Isolate each major section or entity presented in a schematic diagram
- b. Identify the components within each entity
- c. Trace connections in an integrated circuit from their origin to another point within or from one entity to another
- d. Isolate a problem component in a schematic and trace it to components believed to cause the problem
- e. Interpret symbols to indicate direction of flow, test points, components and diagrammatic decision points

WRITTEN COMMUNICATION

32. FORMS

- a. Locate the block on a form to enter the appropriate information
- b. Transfer a number, code, date, figure or related data from equipment or written sources onto an appropriate section of the form
- c. Write the name of the organization, responsible personnel, disposition of the part or equipment, and nomenclature, in appropriate sections of the form
- d. Write a descriptive account of an activity or transaction performed
- e. Use a completed form to locate or compare information

33. NOTE-TAKING

- a. Distinguish between essential and non-essential details during the note taking process
- b. Record details without misinterpreting the intent of either written material or an interview
- c. Rewrite all recorded details in sentence form
- d. Organize all sentences into paragraphs

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34. OUTLINING (topic or sentence)

- a. Distinguish between major and subordinate topics
- b. Generate titles for each major topic selected
- c. Use phrases or sentences to provide subordinate details under each major topic
- d. Alternate, indent numbers and letters to establish a hierarchy

35. REPORT WRITING

- a. State the intent or objective(s) of the report
- b. Describe the parameters of the event or situation
- c. Distinguish between relevant and irrelevant details
- d. Sequence events in the order they have occurred
- e. State general impressions of events described
- f. Select examples that will clarify major issues presented in the report
- g. Examine opposing points of view in the report
- h. Summarize the major points developed in the report
- i. Justify an action taken and give reasons for rejecting alternatives

36. EDITING

- a. Spell frequently used words correctly
- b. Spell task-related words correctly
- c. Identify words that need to be capitalized
- d. Correct all misspelled words with or without the use of a reference source
- e. Apply all rules for end marks, commas, and apostrophes
- f. Apply common rules of grammar
- g. Rewrite the paragraph by stating the main idea in the first sentence, and restructuring the sentences for coherence
- h. Appraise an entire written communication and make adjustments to improve clarity

VERBAL COMMUNICATION

37. TYPE

- a. Individual – a person working on a task and communicating with another when assistance is needed or when a supervisory decision is needed
- b. Instruction - a task activity requiring communication between an instructor, an individual or small group where the purpose is to give facts or rules to inform or guide
- c. Tutor – interaction takes place between two persons where one is instructing and the other is doing the task
- d. Peer Group (less than 10) – all members engage in an activity where one person assumes a leadership role and communicates to others what is to be done
- e. Interview – a person communicating with another about his activities, opinions, or subject expertise for the purpose of using the information in a task
- f. Briefing – communicating final instructions to others or giving an account in summary
- g. Counsel - communicating together to exchange ideas or opinions to recommend, give or take advice, or to arrive at an acceptance of a plan or decision
- h. Command - communicate to others an order or action to be taken where a person has a position of authority

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38. CHARACTERISTICS

- a. Enunciate clearly, using the proper rate of speech
- b. Use technical vocabulary suitable to the task and level of the person
- c. Determine the appropriate amount of information to communicate
- d. Interpret figurative or idiomatic language by reference to its use in context
- e. Follow highly detailed, step by step directions
- f. Solicit feedback to confirm the accurate reception of the communication
- g. Recognize when a low key, informal dialogue is suitable
- h. Recognize when direct verbal commands are necessary
- i. Recognize when a prescribed series of verbal interactions is required to coordinate a group effort
- j. Recognize when the situation will require a structured, preplanned method of presentation

39. BARRIERS

- a. Recognize the need for clear, concise directions in order to avoid language or word-meaning differences
- b. Recognize personality factors and inter-personal relationships that may exist
- c. Recognize feedback as a means of communicating more effectively and increasing task competence

SAFETY/SECURITY

40. PRECAUTIONS

- a. Use common knowledge to avoid hazards in order to prevent injury to self or equipment
- b. Apply preventive measures prior to task performance to minimize any potential safety or security problem
- c. Select an appropriate course of action in the event of an emergency

PERCEPTUAL

41. RECOGNITION

- a. Identify similarities and differences between and among objects
- b. Use body language (motions, gestures, postures) to communicate or signal
- c. Determine the presence of a defect or extent of damage
- d. Match objects by size, shape, color and significant markings
- e. Classify objects by size, shape, color and significant markings
- f. Determine direction, duration, and intensity of sounds, sightings and smells
- g. Infer from sights, sounds, touch, smells, or tastes to determine a course of action
- h. Interpret codes and symbols

J-10

J-10

Task _____ _____ _____ page____of_____

MOTOR SKILLS

45. Functions

_____ a. Multi-Limb Coordination – coordinate gross movements requiring use of larger skeletal muscles for strength

_____ b. Manual Dexterity – make skillful, controlled arm, hand movements in manipulating large objects under speed conditions

_____ c. Control Precision – highly controlled, precise muscular adjustments, operating controls by hand, arm or foot movements. Speed and accuracy

_____ d. Response Orientation – select appropriate response, each pattern of signals requires a different choice of controls and direction of movement. High speed and accuracy

_____ e. Reaction Time – speed with which an individual is able to respond to an auditory or visual stimulus

_____ f. Rate Control – make continuous anticipatory motor adjustments relative to changes in speed of a moving target. Pursuit and tracking

_____ g. Finger Dexterity – skillful, controlled manipulations of small objects, primarily finger movements

_____ h. Arm-Hand Steadiness – make precise arm-hand positioning movements where strength and speed are minimized

_____ i. Wrist-Finger Speed – make rapid, precise turning, tapping, tripping, aligning motions in response to auditory or visual stimuli

Other: _____

_____

_____

46. Operations

_____ a. Operate equipment or be a crew member engaged in manually lifting or moving objects

_____ b. Uses hand tools considered to be common. Determines sizes and selection. Pliers, screwdrivers, hand drills . Simple mechanical operations, mainly remove and replace

_____ c. Install, relocate and remove

_____ d. Adjust, repair, maintain mechanical, electrical, hydraulic systems or subsystems. Disassemble and assemble, using hand tools

_____ e. Testing equipment used in the production, transmission, distribution, and utilization of energy sources

_____ f. Cutting, bending, trimming, welding, riveting, etc. to force, shape or fabricate materials

_____ g. Operator checks and services in response to a variety of external stimuli (sounds and sights)

_____ h. Possess the physical ability to perform in combat or police actions

_____ i. Clerical duties: maintaining records, operating office machines, processing data using electronic machines

_____ j. Perform acts requiring skill and tact in nursing or infirmed persons

Other: _____

_____

_____

Item 4 - Explanation of Conversion

Need For Conversion

As shown in this attachment taxonomy development consisted of three main phases. Each version of the taxonomy was an expansion that accounted for information from previous version(s) and for new information resulting from the on-going analysis effort. To ensure for uniformity of results and to assist with product usability, all analysis reporting was in terms of the codes from the elaborated taxonomy.

Conversion Process

To convert from previous version(s) to the elaborated taxonomy, a cross-match was made between previous codes and codes on the elaborated taxonomy. This cross-match table was then entered into the data processing system and the conversions were made. Three (3) areas could not be cross-matched and appear as follows on the analysis reports:

Code	Explanation
45	Motor skills
47	Equipment usage
48	Other

ATTACHMENT K

Analysis Related Reports Produced Via Data Processing

CDRL Reference	Report Title
A004	MOS Baseline Skills Profile (except summary)
A004	Analysis Data
A004	Task Statement List
A004	Task Statement List (Complete)
A004	Subtask Statement List
A004	Subtask Statement List (Complete)
A004	Discrepancy Statement List
A004	Knowleage Statement List
A004	Technical Prerequisite Statement List
A004	Prerequisite Competency Indicator Statement List
A004	Prerequisite Competency Indicator Statement List (Complete)
A004	Matrix of Prerequisites
A006	Clustering Report (data only)
A005	IETCSS Report (data only)
A012	Preliminary IETCSS Report (data only)

Derivation of Task Analysis Reports

Analysis reports, all in response to CDRL Sequence Number A004, are characterized as analysis results (data) and summary reports. Figures 1 and 2, below, show the derivation of each report. Two (2) additional reports were produced. The first is an operational summary that describes major features of events associated with conducting the task analysis effort. The second is a matrix which provides prerequisite competency frequency and percentage of frequency of occurrence data on an MOS-by-MOS basis by BSEP level.

Listing and Description of Analysis Reports

The separate analysis reports and a brief description of each are as follows:

1. Analysis Data (Results) - A two- or three-part report, on a task-by-task basis. Contains descriptive information on the task, including discrepencies; the hierarchical arrangement of task analysis information; and prerequisite competency information.

2. Operational Summary - As noted above, describes major features of events associated with conducting the task analysis effort; presented mainly on an MOS-by-MOS basis.

3. Task Statement List - Presented on an MOS-by-MOS basis and as a complete listing. Shows shared tasks and common tasks.

4. Subtask Statement List - Presented as a listing of titles which shows the original task and all other tasks that use the subtask. Also, presented with all steps and substeps (complete subtask).

5. Discrepencies - Information on variance between doctrine and stated procedure and performance of procedure as reported by an SME.

6. Knowledge Statements - Statements obtained from SME in response to questions concerning information related to task performance; may include entries from the taxonomy.

7. Technical Prerequisites - A procedural (action) statement within task analysis results (data) which is identified as not instructed as a result of enactment of the instructional review process.

8. Prerequisite Competency Indicator Statements - Procedural (action) statements within task analysis results (data) and the attendant prerequisite competency statement code. Presented on both an MOS-by-MOS and complete basis.

9. Matrix - As noted above, provides prerequisite competency frequency and percentage of frequency of occurrence data on an MOS-by-MOS basis by BSEP level.

10. MOS Baseline Skills Profile - Presented on an MOS-by-MOS basis by BSEP level. Contains: prerequisite competencies, example prerequisite competency indicator statements, frequency of occurrence of prerequisite competencies, and descriptive summary information.

Figure 1

RCA/BSEP ANALYSIS, CLUSTERING AND DESIGN INFORMATION FLOW FOR 24 MOS TO BE DELIVERED USING THE ORIGINAL BSEP TAXONOMY

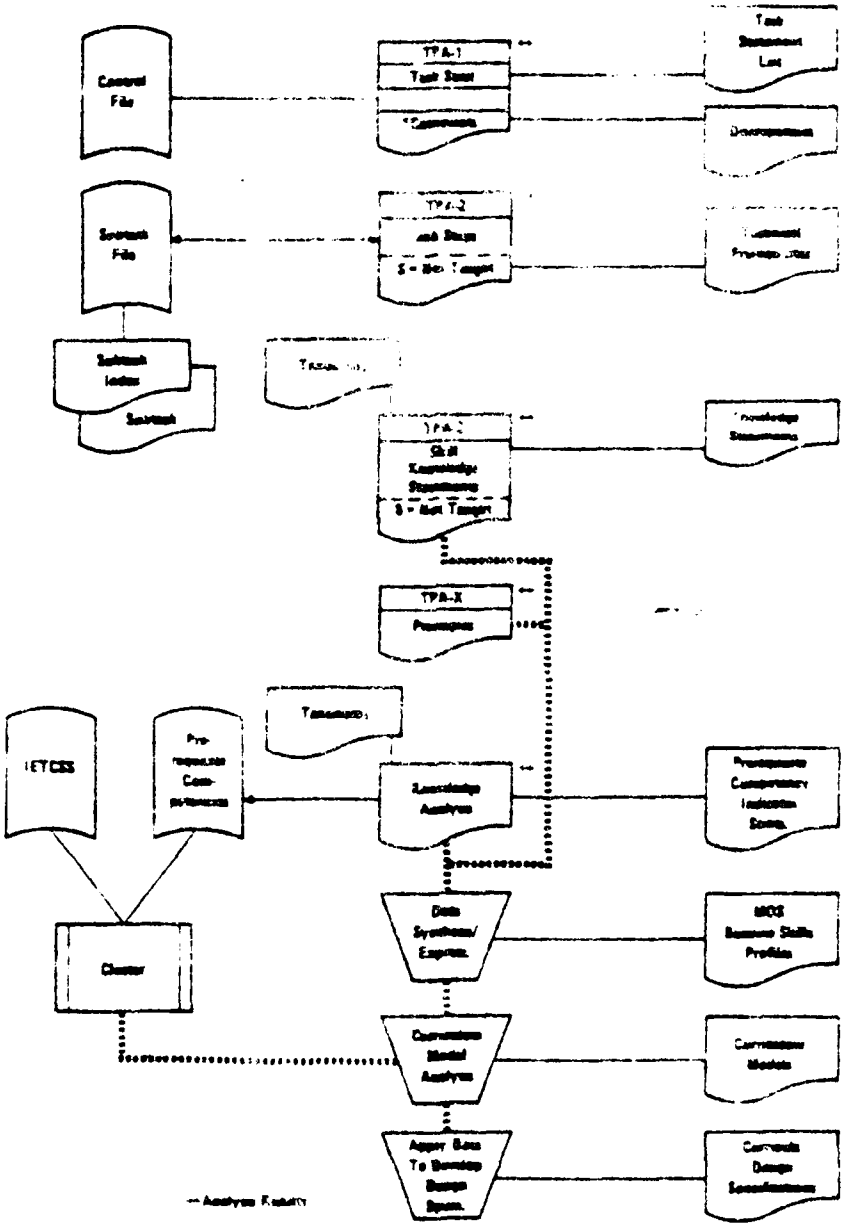
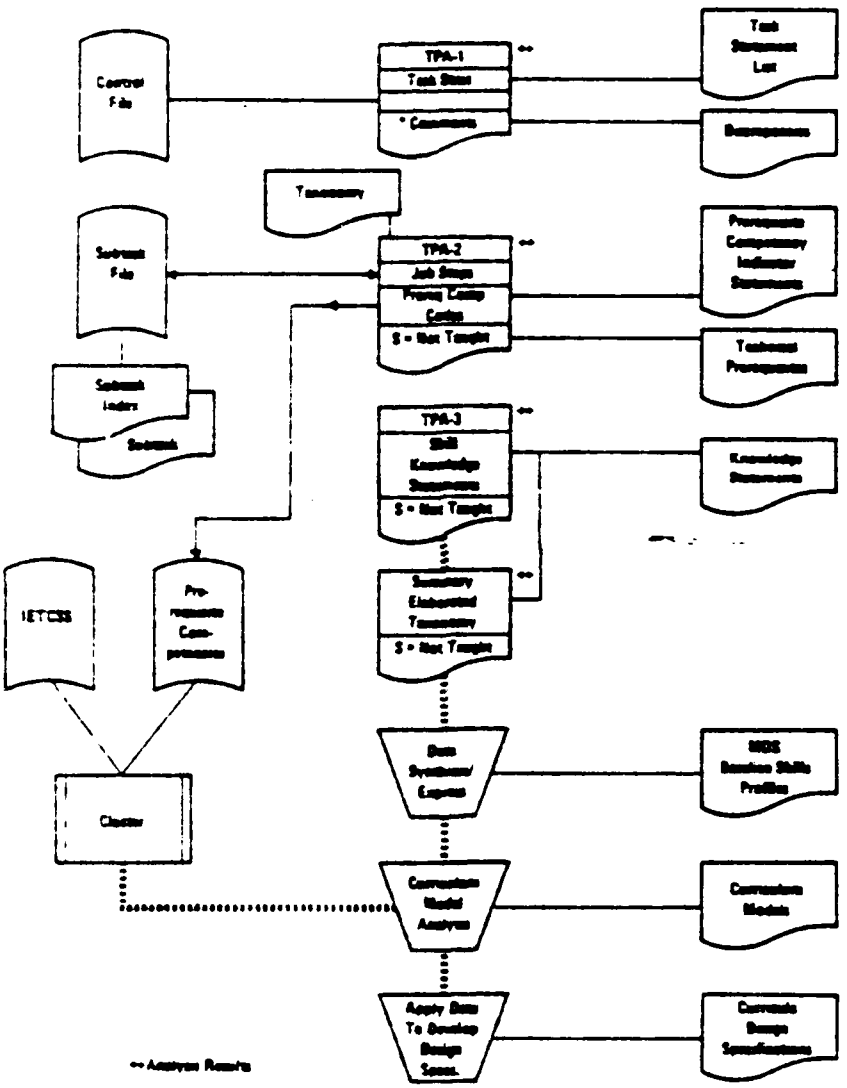


Figure 2

RCA/BSEP ANALYSIS, CLUSTERING AND DESIGN INFORMATION FLOW FOR 72 MOS TO BE DELIVERED USING THE ELABORATED BSEP TAXONOMY



Formats for Final Reports

As shown on the listing of reports at the beginning of this attachment and on figures 1 and 2, two analysis products were required from completion of the project. One product was the analysis data which were to be obtained by "using an action and hierarchical analysis procedure" and which were to be prepared in a hard copy format "capable of being entered into a computer compatible system of hierarchical display and search." The other product was to be the MOS Baseline Skills Profile for each MOS. A description of how the formats for the final reports were derived includes the following major operational decisions and/or considerations:

1. Data recording forms were developed during the initial stages of the project. To gain efficiency in data collection; forestall cost considerations related to input, data manipulation, and data file upkeep associated with flowcharts and other graphic presentations; and attempt to standardize recording conventions, a procedural outline approach was recommended with a step, substep coding system that used numeric and alpha characters to denote structure in a hierarchical manner.

2. Analysis efforts were recognized early in the project as being very labor intensive, especially the time needed to accurately record and verify the information obtained from interviews with SME's. In response to this situation several approaches were recommended to streamline the analysis effort. These approaches were as follows:

   a. Use of subtasks and subtask inventories as described earlier. Limited use of subtasks was possible due to the level of specificity of analysis results. However, a method of documenting the use of subtasks was recommended and utilized in the printing of analysis results.

   b. Use of cross references in which analysts could refer to previous analysis results. Documentation guidelines were developed, recommended, and utilized in the printing of cross references.

   c. Replicate analysis procedures were recommended and utilized to accommodate shared and common tasks. Conventions for noting the results of the use of replicate analysis were developed, recommended, and utilized on TPA-1 reports.

   d. Taxonomy development, as described earlier and in Attachment J, assisted with recording information about prerequisite competencies. The motor skills rating portion of the taxonomy was a late development that was added to the TPA-1 report.

3. As the analysis effort progressed, techniques employed generated data which were not originally envisioned. The types of data were as follows:

   a. Discrepancies which are differences between job requirements in the field as identified by SME's and doctrine and procedures included in the FM's, TM's, AR's, or resident training.

b. General comments which are pertinent observations of the analyst and/or qualifying statements of the SME.

c. Job aid designations as instrinsic or resource and appropriate printing on TPA-2 reports.

d. Designating procedures as "not taught" on TPA-2 reports.

e. Highlighting decision points on TPA-2 reports.

The major operational decisions and/or considerations listed above serve to demonstrate the research and development nature of the analysis process. As analysis progressed new problems, issues, or discoveries required that decisions be made to accommodate the data which were being collected or which could be collected. The decisions were often made by the process of recommendation, review, and affirmation between the contractor and Government. At all times resources were considered as part of the decision-making process.

The considerations listed above were primarily involved in deriving the formats for analysis results and profiles. However, as shown on the listing of reports at the beginning of this attachment and on figures 1 and 2, ten summary (additional) reports associated with the analysis results were produced. Each report is directly derived from portion(s) of the analysis results. Major operational decisions and/or considerations associated with deriving the formats for the summary reports are as follows:

1. Modification P00001 called for use of the most recent task list or Soldier's Manual as the basis for analysis and that the document be available within 10 days of the analysis start date. This process helped ensure that analysis results were current and relevant. It also meant that most task lists or Soldier's Manuals were changed during the term of the project. The Task Statement Lists provide an historical record of the tasks actually analyzed. The Complete Task Statement List (for all MOS) also shows shared tasks.

2. Subtask utilization was described earlier. The Subtask Statement Lists provide one indication of the amount of overlap between tasks in various MOS. Obviously the shared task information described above provides another indication.

3. The Discrepancy Statement List provides a summary of the major variance resulting from the validation. It is more usable as a result of being extracted from the analysis results.

4. Early in the analysis process SME's were asked to provide input on prerequisite competencies. After the elaborated taxonomy was developed the SME's responses were structured in terms of the taxonomy. The Knowledge Statement Report captures the responses of SME to open-ended interview questions about prerequisite skills and knowledges.

5. As a result of the instructional review process various procedural portions of tasks were being designated as "not taught." To highlight these results and to provide a basis for an action report, such statements were labeled technical prerequisites and extracted from the TPA-2 reports.

c. As the taxonomy was being developed a choice was made to have the statements be as representative as possible of the actual prerequisite skill involved. Consequently, much of the potential MOS or job specific nature of the statements was supressed. To highlight the technical context for the prerequisite competencies for the various MOS the prerequisite competency indicator statement list was developed. It should prove to be a valuable document for any subsequent curriculum development.

7. The Matrix of Prerequisites provides an indication of the degree of sharing of prerequisite competencies across MOS.

It should be noted that most summary reports are divided into BSEP I and BSEP II segments. This segmentation addresses a need expressed by the Government concerning follow-on curricula development efforts.

Date File Maintenance and Recommendations

Date files and system documentation descriptions were provided as part of the effort associated with producing data tapes in accordance with Modification P00007. The following major considerations and/or recommendations are associated with data file utilization and update (maintenance):

1. It could be assumed that one major use of the analysis results is to contribute to the various training development activities at TRADOC installations. As such, there would be a need to retrieve and prints analysis results. Revisions may then be needed via input of new data or editing of data files. Retrieval and printing must be accomplished with consideration for replicate tasks, duplicate tasks, subtasks, and cross references. In other words, various files must be accessed to ensure complete coverage for a given MOS. As described in the system documentation, various conventions have been utilized so that replicates, duplicates, subtasks, and cross references can be identified and accessed. Provided frequency of usability and resources available would warrant it, the following changes in data files could be made to provide for ease of access for MOS analysis results:

   a. Complete results for replicate tasks could be entered (TPA-2 file created) for each MOS for which the results apply. (Currently complete results are contained only in the "parent MOS," unless major changes were made as the result of the replicate analysis process.) The convention for noting replicate analysis should be maintained on the TPA-1 report.

   b. In cases where there is complete duplication of tasks and there is currently only a TPA-1 file, complete results for the duplicate task(s) could be entered (TPA-2 file created) as applicable. The convention for noting duplicate tasks should be maintained on the TPA-1 report.

   c. In cases where a portion of a task is duplicated or where cross references are included in the analysis results, the TPA-2 files could be edited to include the information covered by the duplicate or cross reference notation. The editing would remove any notation for duplicates on the TPA-1 report and any notation for cross references on the TPA-2 report.

d. Because of the potential usability in future analysis efforts no changes are recommended for handling subtasks.

e. In accordance with Modification P00005, replicate analysis procedures were not utilized for approximately 150 tasks. Such tasks are identified by a notation in the "Comments" section of the TPA-1 report. By using procedures described in "a" above, TPA-2 files could be created.

2. Currently there are analysis results for 24 MOS formatted to include TPA-1, TPA-2, and TPA-3 with prerequisite competency codes shown on TPA-2. All results could be made parimonious via the following procedures:

   a. For the 24 MOS SME's and analysts should review th TPA-3 and knowledge analysis. All information on these reports which can be accommodated should be coded directly on the TPA-2 report using codes from the elaborated taxonomy. Any information which can not be accommodated, should be retained on TPA-3.

   b. Likewise for the 24 MOS, SME's and analysts should review the TPA-2 reports and enter prerequisite competency codes from the elaborated taxonomy directly on the TPA-2 reports.

   c. Files should then be edited in accordance with changes.

   d. It is estimated that this procedure would take approximately 1.5 hours per task (3 person hours total).

3. The above mentioned assumptions and/or considerations focus on areas of concern that have become readily apparent as a result of attempting to utilize or faster utilization of analysis results by the Government. Other considerations are less apparent or unknown. Accordingly, the following general recommendation is made:

   a. Decide if an automated system for analysis results should be maintained and expanded. A study of potential usability may be appropriate.

   b. Assuming the decision is to maintain and expand the system, identify and prepare to assign personnel. Based on the types of personnel needed to develop the system and the potential for expansion and utilization beyond the parameters in effect on the project, consideration should be given to the following categories of personnel: management with expertise in training and analysis (comparable to the COR for the project); systems analyst, programmer, input clerks, editors, and analysts (at field locations).

Assistance in Developing Programs, Documentation, and Demonstration of System

Fortran programs were written when the process required that the data be selected, formatted, or otherwise manipulated in a manner beyond the capabilities of in-house utilities or editors. Fortran programs have been delivered that extract discrepancies from TPA-1 data files, print TPA-3 reports,

and print TPA-2 reports while creating PC codes, PC indicator statements, and technical prerequisite statement files. Other Fortran programs were developed too, for example, sort TPA-1 data files, create input to cluster procedures, and put headings on MOS profile reports.

Most of our data processing effort--input, editing, and some report generation--used the in-house IBM CMS utilities, XEDIT and EXEC2. Because most of the input was unique, and because the project represented a one-time effort, no programming effort was expended in providing for internal editing, validation, or updating.

A data base management system (DBMS) was considered and used on some of the initial analysis data. Because (1) the nature of the data made it difficult to define fields, (2) the files were not to be updated, (3) the DBMS required an excessive amount of core storage, (4) its editor was most "unfriendly," and (5) the files created would not be readily transferrable to another installation, we chose to work with "flat" files.

The System Documentation (21 Oct 83) records our data entry rules, file naming conventions and other pertinent static information of the project data system. Procedures were in place throughout the project term to direct and control the flow of analysis data--from the field to final print. On 26 Jan 82, copies of the following procedures were sent to TRADOC:

Maintaining the control file
Field analysis
Adding subtasks to the index
Accessing subtask files
Processing ETAPs at the home office

A procedure for field entry of ETAPs and subtasks was developed, as required by the contract, and because of time, cost, and control considerations, was replaced with home office entry.

Procedures were also written and instruction given to field analysts on the use of their terminals and RCA's electronic mail (MEMO) system.

Specific instructions for entry clerks for each ETAP form were developed and changed as required. From Sep 81 through Feb 83, four entry clerks worked full-time in this office. During the period 24 Aug 82 through 21 Dec 82, as many as 14 temporary clerks entered ETAPs in a second-shift operation. The instructions provided entry clerks could never have been all-inclusive because of the combinations of variables among MOS, SMEs, tasks, and analysts. To make decisions about the exceptions, entry clerks were instructed to ask questions of the home office staff. To provide similar coverage to the second-shift operation, one of the staff was present during the first 28 sessions. Thereafter, clerks were instructed to enter x's where words were not clear or to refer tasks to the first shift for entry.

Control files listing the task numbers and task statements for each MOS were developed both manually and in the computer. These were noted as tasks were received, reviewed, and entered. All analysis data entered was printed for editing. In the case of TPA-2 files, a program was written to print the reports using double spacing and eliminating the "JID" symbols. Editors made the

required changes to the data files and renamed the files with an "X" following the file name in the computer. In this way, we could instruct the machine to identify the status of files entered so we would know when to produce the "final print" for one of the MOS.

The first assignment of the computer was to organize the 15,000 task numbers and statements that had been recorded on 3 x 5 cards. Using an outside service bureau, the 3 x 5's were entered onto magnetic tape, read into RCA's computer, sorted and printed to identify duplicates. This effort reducted by half, the expected number of tasks to analyze.

Following much preliminary discussion concerning computers, operating systems, tape density, etc., in May 83, BSEP analysis data, programs, and supporting files were delivered to TRADOC c/o ARI. On 24 and 25 May 83, the project systems analyst and the project programmer met with Mr. Richard Scott of Ari at NIH, Bethesda, MD to load and manipulate the data on the NIH computer system. With assistance from Mr. Laurie Wise, ARI, we created job streams and compiled Fortran programs to print reports. On the afternoon of 26 May, we successfully demonstrated the system at ARI, Alexandria, VA, using remote connection to NIH.

While the documentation that we presented with the tapes was complete in terms of listing the files, their size and location, it was not as detailed, nor as helpful, as the System Documentation delivered in October. It would have been beneficial if someone had become more familiar with the project and its data system before attempting to deal with the 2.9 million records in 1340 files plus 317 files of programs and documentation. Our recommendation for the demonstration was to load a few files and their pertinent programs onto the system to test the operation of the data and programs on the NIH installation. Work was in progress loading all files that we had sent earlier. We were unable to proceed with our plan until our second day at the site.

We had made errors on our initial documentation, and had put certain files on the tape out of order. Two replacement tapes were sent in July. We have heard of no other problems.

ATTACHMENT L

Complete Subtask Index

RCA/BSEP

SUBTASK INDEX

AH				
AH	* * * * AIRCRAFT-HELICOPTER REPAIR * * * *			
AH16	ADHESIVE INJECTION REPAIR, ROTOR BLADE	1.A-F	68G	5517532302
AH15	ADHESIVE REPAIR, ROTOR BLADE	1.A-F	68G	5517532302
AH22	AUXILIARY POWER UNIT, PRELIM. CHK. OF SWITCHES	3.A-B	67U	5517692044
AH20	BRAKE ASSEMBLY, BLEED	9.B-C	67U	5517541042
AH18	CHIP DETECTOR, GEARBOX, INSTALL	9.A-E	67U	5517691086
AH2	DEICER BOOT, PREPARE SURFACE FOR INSTALL.	4.A-E	68G	5517531063
AH10	DEICER BOOT, REPAIR LOOSE VENEER	4.A-D	68G	5517531061
AH13	FABRICATE STRUCT. PARTS, CUT OUT	5.A	68G	5517532034
AH14	FABRICATE STRUCT. PARTS, FORMING	6.A-E	68G	5517532034
AH03	FUELING, GROUND HELICOP & TANKER	2.A-D	67U	5517651021
AH02*	FUELING, IMPLEMENT SAFETY STANDARDS	1.A-H	67U	5517651021
AH01	HAND SIGNALS, GUIDE A/C "TOW TUG" OPERATOR	4.A	67U	5517651005
AH11	LAYOUT DIMENSIONS, DETERM. FOR LENGTH OF PART	5.A-C	68G	5517532033
AH12	LAYOUT DIMENSIONS, REVIEW TECH DRAWING	4.A-C	68G	5517532033
AH07	PAINTING PREPARE ITEM	4.A-G	68G	5517531046
AH09	PLUG PATCH REPAIR, ROTOR BLADE	2.A-G	68G	5517532014
AH04	RIVETS, LAYOUT PATTERN, DETERM. MIN. NUM. REQ.	3.A-B	68G	5517531035
AH05	SHOCK ABSORBER SERVICE	5.A-C	67U	5517561059
AH 8	SKIN PATCH REPAIR, ROTOR BLADE	1.A-L	68G	5517532014
AH 3	TIP CAP HOLES, ROTOR BLADE, REPAIR	7.A-F	68G	5517532302
AH19	TRAILING EDGE PATCH REPAIR, ROTOR BLADE	3.A-H	68G	5517532014
AH06	VISCOUS DAMPER, REPLACE	4.A-C	67U	5517621052
AV				
AV	* * * * ARMORED VEHICLE * * * *			
AV96*	CLEAN MECHANICAL COMPONENTS (M60 TURRET)		45K	
AV08*	DECK, INSTALL TOP, M60 TANK	6.A-D	63N	0914841003
AV06*	DECK, REMOVE TOP, M60 TANK	2.	63N	0914841002
AV11*	GRILLE DOORS, CLOSE EXHAUST M60 TANK	6.I	63N	0914841003
AV04*	GRILLE DOORS, OPEN EXHAUST, M60 TANK	1.F	63N	0914841002
AV02*	GRILLE DOORS, OPEN TOP DECK, M60 TANK	2.A	63N	0914841002
AV03*	GRILLE DOORS, CLOSE TOP DECK M60 TANK	5.F	63N	0914841003
AV1	GROUND HOP KIT, DISCONNECT M60 TANK	5.A	63N	0914841059
AV1	GROUND HOP KIT, HOOK UP M60 TANK	1.E	63N	0914841059
AV9	INSPECT MECHANICAL COMPONENTS (M60 TURRET)		45K	
AV1	MAIN GUN, PUT IN TRAVEL LOCK M60 TANK	7.B	63N	0914841003
AV0	MOUNT & GUN FRM GUNNERS STATION M48A5/M60 TNK	1.A-J	19E	1711221043
AV0	OPN LOADERS HATCH FOR INTRL OF M48A5/M60 TNK	4.A	19E	1711231054
AV94*	REPAIR ELECTRICAL COMPONENTS (GUNNER)		45K	
AV08*	REPAIR ELECTRICAL COMPONENTS (M60 TURRET)		45K	
	SERVICE ELECTRICAL COMPONENTS (M60 ARMORED VEHICLE)		45K	
	TRAK ASSEMBLY, M60 TANK	6.C-H	63N	0914841003
	TRAK ASSEMBLY, M60 TANK	1.G	63N	0914841002
	ADJ OF TRACK	1.A-J	19E	1711231059
	TNK		63N	0914841003
	MALFUNCTIONS (M60)		45K	
	MALFUNCTIONS (M90)		45K	

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CA                          * * * *  CABLE  * * * *
  A02 CX-112301G,SURFACE CABLE,INSTALL                    1.A-D    36C 1135881009
  A04 REEL UNIT RL-207/G,OPERATE                          3.A-C    36C 1135882001
  A05 REEL UNIT RL-207/G,PERFORMANCE CHECK                2.A-D    36C 1135883002
  A06 WD 1/TT,WF16/U,REPAIR                               3.A-C    36C 1135836018
  A01 WD 1/TT,WF16/U,TROUBLESHOOT MALFUNCTION             1.A-Q    36C 1135860005
  A03 WD 1/WF16U,RECOVER THE LINE                         1.A-I    36C 1135881058
CT                * * * *  SOLDIER COMMON TASKS  * * * *
  CT38*CONSTRUCT INDIVIDUAL FIGHTING POSITION             1        11B 0713260703
  CT27 CONTROL FIRE TEAT MOVEMENT                         1-5      11B 0713265105
  CT   CROSS BARBED WIRE OBSTACLES                        2.A-D    11B 0713260503
  CT   DETERMINE DIRECTION USING FIELD EXPEDIENT          1-2      11B 0713291018
  CT   DISTANCE - PACE FACTOR FOR LESS THAN 100 METERS    5.A-D    113 0713291007
  CT   DISTANCE - PACE MASTER STRIDE PACE COUNT           1.A-B    113 0713291007
  CT   DISTANCE - PACE FACTOR, DETERMINE A PACE COUNT     2.A-C    113 0713291007
  CT   DISTANCE - MEASURED BASE LINE                      4.A-C    113 0713291007
  CT   DISTANCE - PACE COUNT FOR CONVOY TO M INTERVALS    3.A-E    11B 0713291007
  CT   MOVEMENT AND CONTROL WITH/WITHOUT WARNING          1-5      11B 0713261011
  CT   VISUAL SIGNALS, GIVE & INTERPRET OPERATOR          5.C      63N 0914641002
  CT14 MAP AND COMPASS METHOD, LOCATE UNKNOWN, INTERSECT  1.A-E    11B 0713291014
  CT25 MAP, CHARACTERISTICS OF CONTOUR LINES              4.A-D    11B 0713291004
  CT19 MAP, DETERMINE A BACK AZIMUTH                      1.A-B    11B 0713291031
  CT   MAP, DETERMINE AN AZIMUTH-CENTERHOLD TECHNIQUE     1.A-E    11B 0713291003
  CT18 MAP, DETERMINE AN AZIMUTH-EYE-SIGHTING TECHNIQUE   2.A-F    11B 0713291003
  CT26 MAP, DETERMINE ELEVATION                           5.-4     11B 0713291004
  CT   MAP, DETERMINE ELEVATION POINT/CONTOUR LINE        3.A-C    11B 0713291004
  CT17 MAP, DETERMINE GRID MAGNETIC (G-M) ANGLE           2.A-B    11B 0713291011
  CT16 MAP, IDENT. TERRAIN FEATURES (NAT.,MMDE.) ON MAP   1-5      11B 0713291001
  CT24 MAP, IDENTIFY AZIMUTHS, DEGREES OR MILS            1.A-D    11B 0713291031
  CT15 MAP, ORIENT MAP TO GROUND                          1-3      11B 0713291012
  CT28 MAP, POSITIONING A PROTRACTOR                      3.A-B    11B 0713291031
  CT29 MAP, READ AZIMUTH                                  4.A-D    11B 0713291031
  CT32 MAP, STRAIGHTEDGE METHOD, LOCATE UNKNOWN INTERSECT 2.A-E    11B 0713291014
  CT13 MAP,DET. DISTANCE AROUND CURVE(S) BETWEEN 2 POINTS 3.A-I    11B 0713291008
  CT12 MAP,DET. STRAIGHT LINE DISTANCE BETWEEN TWO POINTS 2.A-F    11B 0713291008
  CT04 MOVE IN AREAS, OVER OBSTACLES, INFANTRY            3-4      11B 0713260503
  CT06*M60 MACHINEGUN, FIRE                               1-7      11B 0713123002
  CT33 REVOLVER, .38, ENGAGE TARGETS                      1.A-C    000 1913760004
  CT34 REVOLVER, .38, MAINTENANCE                         TASK     000 1913760005
  CT10 USE CHALLENGE AND PASSWORD                         1-3      11B 0713310801
  CT02 VISUAL SIGNALS TO CONTROL MOVEMENT                 1-2      11B 0713260600
  CT11 50 CAL. MG, LOAD, REDUCE STOPPAGE, UNLOAD, CLEAR   1-4      11B 0713133453
  DR
  DR                  * * * *  DRILLING (WOOD & METAL)  * * * *
  DR07 COUNTERBORE & PILOT,SELECT & INSTALL               2.A-F    44E 0914691032
  DR09 COUNTERBORE,PERFORM BENCH MAINTENANCE              5.A-E    44E 0914691032
  DR08 COUNTERBORE,PERFORM OPERATIONS                     3.A-E    44E 0914691032
  DR06 COUNTERSINK,PERFORM OPERATION                      3.A-F    44E 0914691031
  DR05 COUNTERSINK,SELECT,INSTALL,ALIGN                   2.A-F    44E 0914691031
  DR10*DRILL HOLE, CHECK COMPLETED WORK                   9.A-F    44E 0914691056
  DR01*ELECTRIC DRILL (1/2"),PROPER DRILLING METHOD       3.A-H    44E 0914691005
  DR04*HAND DIE,CUT THREADS                               3.A-G    44E 0914691007
  DR03*HAND TAP,PERFORM TAPPING OPERATION                 4.A-D    44E 0914691006
  DR02*HAND TAP,SELECT & MOUNT                            2.A-C    44E 0914691006
  EC
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EC	* * ELECTRONIC COMMUNICATIONS DEVICES * *		
EC01	DIGITAL MESSAGE DEVICE, (PSG-2A), ATTACH POWER	1.A-E	13F 0612731001
EC09	DIGITAL MESSAGE DEVICE, CHECK POWER FAILURE	1.A-B	13F 0612731007
EC08	DIGITAL MESSAGE DEVICE, CLEAN BATTERY COMPARTMENT	2.A-D	13F 0612731006
EC07	DIGITAL MESSAGE DEVICE, CLEAN EXTERIOR	1.A-D	13F 0612731006
EC02	DIGITAL MESSAGE DEVICE, CONNECT AUDIO CABLES	2.A-E	13F 0612731001
EC04	DIGITAL MESSAGE DEVICE, CORRECT ERRORS	3.A	13F 0612731003
EC03	DIGITAL MESSAGE DEVICE, ENTER MISSION DATA	2.A-C	13F 0612731003
EC05	DIGITAL MESSAGE DEVICE, TRANSMIT DATA	3.B	13F 0612731003
EC06	DIGITAL MESSAGE DEVICE, TRANSMIT FIRE ADJUSTMENTS	4.A-D	13F 0612731003
EC14	PRINTER, ELECTRONIC LINE, CLEAN	3.A-M	13F 0612731013
EC13	PRINTER, ELECTRONIC LINE, CLOSE	4.A-I	13F 0612731011
EC12	PRINTER, ELECTRONIC LINE, FEED PAPER	3.A-F	13F 0612731011
EC11	PRINTER, ELECTRONIC LINE, LOAD PAPER	2.A-G	13F 0612731011
EC10	PRINTER, ELECTRONIC LINE, OPEN UP	1.A-F	13F 0612731011
EC15	VARIABLE FORMAT MESSAGE ENTRY DEVICE, CLEAN	2.A-C	13F 0612731013
EU			
EU	* * * * EQUIPMENT USE * * * *		
EU15	BATTERY CHARGER, PD4127/U, SERVICE, PMCS	TASK	17K 3013411515
EU14*	BATTERY, BB-643/U, SERVICE PMCS	TASK	17K 3013411514
EU18*	CHECK/TEST SWITCH/RELAY CNTC FOR CONT W MULTIMETER		45K
EU07*	DEPTH GAGE, INSPECT FOR GOUGES/SCRATCHES	7.B	67U 5517561064
EU23	DESOLDER LEADS		45K
EU02	FIRE EXTINGUISHERS, EXTINGUISH FIRE WITH	3	19D 1711211003
EU01	FIRE EXTINGUISHERS, REMOVE FROM BRACKET	2	19D 1711211003
EU26	INSTALLS REPLACEMENT ELECTRICAL COMPONENTS		45K
EU 9	INSULATION SLEEVING, SHRINK	6.H	27E 0934111309
EU20	MICROFICHE READER, OPERATE, LOCATE DATA	1-3.	76C 1015391101
EU09*	MICROMETER, OUTSIDE, USUAGE	3.E.2	63W 0914802028
EU08*	MULTIMETER, CHK FOR CALIBRATION DATE, DAMAGE	2.B1-2	63N 0914841048
EU14*	MULTIMETER, CONTINUITY TEST	1.E	63W 0914802023
EU10*	MULTIMETER, DC VOLTAGE TEST	1.C	63W 0914802023
EU13*	MULTIMETER, MAINTAIN TS 352 B/V	TASK	17K 3013411308
EU21	MULTIMETER, MEASURE DC VOLTAGE (TS352 B/V)	1-2	17K 3013411306
EU22	MULTIMETER, MEASURE RESISTANCE (TS-352 B/V)	1-3	17K 3013411307
EU12*	MULTIMETER, ZERO	2.B	63N 0914841048
EU17*	SET UP MULTIMETER TO CHECK RESISTANCE/CONTINUITY		45K
EU25	SOLDERS LEADS		45K
EU05*	TORQUE WRENCH, USE OF	5.D.1-12	63W 0914801238
EU16*	USING VERNIER CALIPER AND WEAR LIMITS TABLE		45K
EU04*	WINCH, (M911 TRUCK), DETERM. MECHANICAL ADVANT.	3.A-B	63W 0914991917
EU03*	WINCH, (M911), CONNECT TO DISABLED VEHICLE	4.F	63W 0914991917
EU06*	WINCH, (M911), SHUTDOWN OPERATIONS	6.A-D	63W 0914991917
EX			
EX	* * * * EXPLOSIVES * * * *		
EX	*BLASTING CAP, CONNECT TO FUSE	2.A-B	15D 0612856002
EX	*BLASTING FUSE, DETERMINE LENGTH, TIME	1.A-D	15D 0612856002
FO			
FO	* * * * * * FORMS * * * * * *		
FO11*	COMPLETE DA FORM 2407, MAINTENANCE REQUEST	TASK	46Q 1136233003
FO12*	COMPLETE DA FORM 672 FOR SECURITY CONTAINER	1.C	96B 3013_6X107
FO13*	COMPLETE DA FORM 727 FOR SECURITY CONTAINER	1.D	96B 3013_6X107
FO14*	COMPLETE DD FORM 173 FOR ELECTRONIC MESSAGE	IC	71E 1210041205
FO 2	DA FORM 2404, USED FOR DIRECT EXCHANGE AND ID	5.C	24C 4410530261
FO24*	TO USE DA FORM 2028, PREPARE	1.	26Q 1136233003

F012	*DA FORM 2765 - AVIATION REQUEST FORM	2.A-B	67U	5517651024
F[illegible]	DD FORM 314 (SCHEDULED & PERFORMED MAINTENANCE)	1.A-K	26Q	1136233004
F[illegible]	DETERMINE A JULIAN DATE	1.B	26Q	1136013003
F[illegible]	*SHEET FRAGMENTARY ORDERS, DD FORM 173	2.	96B	3013562205
F[illegible]	FORM COMPLETION DA FORM 1150	2.A-D	19D	1711231003
F[illegible]	FORM COMPLETION DA FORM 2062	1.A-E	19D	1711231003
F[illegible]	FORM COMPLETION DA FORM 2404	1.-2.	17K	3013611309
F[illegible]	FORM COMPLETION DA FORM 2408-1	2.A-F	19D	1711231023
F[illegible]	FORM COMPLETION DA FORM 2408-12	2.A-H	67U	5517651010
F013	FORM COMPLETION DA FORM 2408-13	2.A-P	67U	5517651011
F014	*FORM COMPLETION DA FORM 2408-14	2.A-I	67U	5517651012
F[illegible]	FORM COMPLETION DA FORM 2408-15	3.A-G	67U	5517652007
F[illegible]	FORM COMPLETION DA FORM 2408-18	3.A-H	67U	5517651015
F[illegible]	FORM COMPLETION DA FORM 2445	1-4	71L	1210041223
F008	FORM COMPLETION DA FORM 2496	4-9	71L	1210041201
F[illegible]	FORM COMPLETION DA FORM 4569	2.A-B	71L	1210041207
F[illegible]	*FORM COMPLETION DD FORM 1970	9.A-H	63Z	0914991912
F[illegible]	FORM COMPLETION, DA FORM 2402	2.A-H	67U	5517651007
F027	*FORM INSPECTION COMPLETED DA FORM 2404	2.	36C	1135947003
F031	*NATIONAL STOCK NUMBER, ALL INFORMATION IN USE	3.A-B	24C	441053G261
F01[illegible]	PM CHECKLIST, (HELICOPTER), UPDATE	9.C	67U	5517561064
F01[illegible]	PROC USE OF TAB, PERF P.M. CHKS SERV OF SPEC TSKS	1.D	13E	0612811000
GN				
GN	* * * * GENERATORS * * * *			
GN05	*POSITIONING AND SET-UP,DIRECT	1.A-M	26Q	1136017033
GN06	*PU422/U(IPS-33A), SERVICE GENERATOR SET	TASK	17K	3013411410
GN07	*PU532/PPS-4, SERVICE GENERATOR SET	TASK	17K	3013411410
GN12	*10KW, MEP-018A, MEP-023A, INSTALL	1-3	26Q	1136011002
GN13	*10KW, MEP-018A, MEP-023A, OPERATE	1-7	26Q	1136012003
GN15	*10KW, MEP-018A, MEP-023A, PERFORM PMCS	1-11	26Q	1136013002
GN04	*15KW, PV-405/G, PERFORM DAILY PM	1.A-C	26Q	1136013007
GN03	*15KW, PV-405/G, START AND APPLY LOAD	2.A-EE	26Q	1136012012
GN10	3KW (28VDC), PU-615G OR PU-628G, INSTALL	1-3	26Q	1136011006
GN18	3KW (28VDC), PU-615G OR PU-628G, OPERATE	1-5	26Q	1136012009
GN01	3KW, MEP-016A, -021A, PM CHECKSS	1.A-E	43M	1015131106
GN02	3KW, MEP-016A, -021A, START	2.A-G	43M	1015131106
GN11	*5KW, MEP-017A, MEP-022A, INSTALL	1-3	26Q	1136011001
GN09	*5KW, MEP-017A, MEP-022A, OPERATE	1-6	26Q	1136012001
GN14	*5KW, MEP-017A, MEP-022A, PERFORM PMCS	1-8	26Q	1136013001
GP				
GP	* * * * GLASS, PLASTIC REPAIR * * * *			
GP08	FIBERGLASS, APPLY PATCHES	6.A-G	68G	5517531047
GP06	FIBERGLASS, MAJOR CORE DAMAGE, REPAIR	4.A-O	68G	5517531046
GP05	FIBERGLASS, MINOR CORE DAMAGE, REPAIR	3.A-K	68G	5517531046
GP09	FIBERGLASS, PREPARE BLADE FOR REPAIR	4.A-M	68G	5517532058
GP07	FIBERGLASS, PREPARE SURFACE FOR REPAIR	3.A-C	68G	5517531047
GP04	FIBERGLASS, SKIN DELAMINATIONS, REPAIR	2.A-K	68G	5517531046
GP02	GLASS, MAKE PATTERN TO CUT GLASS FOR REPLACEMENT	2.A-C	44B	0914681080
GP01	GLASS, REMOVE FROM FRAME	1.A-D	44B	0914681080
GP03	PLASTIC, CUT FOR REPLACEMENT PURPOSES	4.A-C	44B	0914681080
LA				
LA	* * * * LATHE WORK * * * *			
LA02	ADJUST CROSS-SLIDE COMPOUND/GIBS	6.A-C	44E	0914691050
LA03	ALIGN CENTERS	7.A-J	44E	0914691050
LA19	BORE CUT,FINISHING PERFORM	8.A-E	44E	0914691061

LA04 COMPUTE SPINDLE SPEED	1.A-E	44E	0914691055
LA27 CUTTER BIT MOUNT IN TOOL HOLDER	5.A-G	44E	0914691065
LA25 EXTERNAL THREADS, FINISH CUT	7.A-M	44E	0914691064
LA24 EXTERNAL THREADS, TRIAL CUT	6.A-H	44E	0914691064
LA23 EXTERNAL THREADS,DETERMINE DIMENSION	1.A-C	44E	0914691064
LA06 FACING TOOL,MOUNT & ADJUST	4.A-G	44E	0914691055
LA08 FINISHING CUT, SET FEED & DEPTH	6.A-F	44E	0914691055
LA16 GROOVING CUTTER, MOUNT & ADJUST	4.A-G	44E	0914691060
LA17 GROOVING,MACHINE WORK PIECE	5.A-I	44E	0914691060
LA28 INTERNAL THREADS, FINISH CUT	8.A-D	44E	0914691065
LA26 INTERNAL THREADS, TRIAL CUT	7.A-I	44E	0914691065
LA01 LUBRICATE	1.A-H	44E	0914691050
LA05 MOUNT WORKHOLDING DEVICE	2.A-G	44E	0914691055
LA14 PARTING TOOL,MOUNT & ADJUST	4.A-H	44E	0914691059
LA15 PARTING TOOL,PERFORM CUT	5.A-D	44E	0914691059
LA07 ROUGH CUT (FACE),SET FEED & DEPTH	5.A-G	44E	0914691055
LA12 ROUGH CUT (SHOULDER TURN), SET FEED & DEPTH	6.A-H	44E	0914691058
LA13 ROUGH CUT (STRAIGHT TURN), SET FEED & DEPTH	6.A-G	44E	0914691057
LA18 ROUGHING BORE,PERFORM	7.A-E	44E	0914691061
LA20 TAPER ATTACHMENT,SET UP	2.A-E	44E	0914691062
LA21 TAPERING, MAKE TRIAL ROUGH CUT	6.A-D	44E	0914691062
LA22 TAPERING,COMPOUND REST METHOD	10.A-H	44E	0914691062
LA11 TOOL & MACHINE MAINTENANCE,PERFORM	9.A-F	44E	0914691057
LA10 TOOL BIT & HOLDER,MOUNT	5.A-D	44E	0914691057
LN			
LN * * * * LAUNCHER * * * *			
LN03 JACK SUPPORTS, LOWER (LANCE)	3.A-E	15D	0612851060
LN04*MISSILE, TRANSFER TO LAUNCHER (LANCE)	4.A-D	15D	0612851070
LN07 SELF PROPELLED, CHARGE BATTERY	2.A-E	15D	0612851520
LN06 SELF-PROPELLED, CLEAN AND INSPECT BATTERY	1.A-E	15D	0612851520
LN05 SELF-PROPELLED, CONVERT TO ZERO-LENGTH	1.A-T	15D	0612851430
LN01 SUSPENSION LOCKOUT, ENGAGE (LANCE)	1.A-C	15D	0612851020
LN02 TRUSS, ELEVATED (LANCE)	2.A-D	15D	0612851060
LT			
LT * * * * LOADER-TRANSPORTER * * * *			
LT01 PREPARE (LANCE MISSILE)	1.A-E	15D	0612851070
MG			
MG * * * * MACHINEGUNS * * * *			
MG07*ADJUST HEADSPACE ON THE CAL 50 M2 HBTT MACHINEGUN	1.A-B	19E	1711221047
MG08*ADJUST TIMING ON THE CAL 50 M2 HBTT MACHINEGUN	2.A-B	19E	1711221047
MG06*ASSEMBLE CAL 50 M2 HBTT MACHINEGUN	4.A-G	19E	1711221027
MG04*ASSEMBLE CAL 50 M85 MACHINEGUN	4.A-I	19E	1711221019
MG02 ASSEMBLE M240 MACHINEGUN	4.A-E	19E	1711221012
MG05*DISASSEMBLE CAL 50 M2 HBTT MACHINEGUN	2.A-G	19E	1711221029
MG03*DISASSEMBLE CAL 50 M85 MACHINEGUN	2.A-I	19E	1711221018
MG01 DISASSEMBLE M240 MACHINEGUN	2.A-E	19E	1711221012
MG10 ENG TARG VEH MOV CAL 50 M2 HB MCHG M551/M113/M48A5	4.A-B	19D	1711221056
MG09 ENG TARG VEH STP CAL 50 M2 HB MCHG M551/M113/M48A5	3.A-D	19D	1711221056
MG11 M60 MACHINEGUN, DISASSEMBLE	1.A-B	11B	0713126006
MG14 M60, MACHINEGUN, ASSEMBLE	4.A-B	11B	0713126006
MG15 M60, MACHINEGUN, INSPECT AMMUNITION	5.A-E	11B	0713123065
MG13 M60, MACHINEGUN, LUBRICATE	3.A-D	11B	0713123005
MG12 M60, MACHINEGUN, CLEAN	2.A	11B	0712125005
MI * * * * MILITARY INTELLIGENCE * * * *			
MI69 PRICE PARTS NUMBERS	1.	96B	3013362702

MI24 CLOSE INTELLIGENCE JOURNAL FILE	4.	96B	3013361302
MI44 COLLECT TARGET DATA FROM INTELLIGENCE HOLDINGS	1.B	96B	3013362405
MI16*CONTROL OF KEYS ON SECURITY CONTAINER	1.B	96B	30133.X107
MI07*CONVERT AZIMUTH TO BACK AZIMUTH	2.	96B	0713291010
MI05*CONVERT AZIMUTHS, MAGNETIC OR GRID	TASK	96B	0713291009
MI45*CREATE A TARGET FILE	2.	96B	3013362405
MI50 DEBRIEF PATROL MEMBERS	2.	96B	3013362702
MI14 DECODE MESSAGE USING KTC 600 TACTICAL OPS. CODE	2.	96B	1135734001
MI35 DELIVER INTELLIGENCE BRIEFING	3.	96B	3013361505
MI10*DESTROY CLASSIFIED MATERIAL	2.C	96B	301336X107
MI04*DETERMINE ELEVATION OF A POINT ON A MAP	1.	96B	0713291004
MI01*DETERMINE MAP SCALE	1.A	96B	0512035501
MI33*DETERMINE MILITARY ASPECTS OF TERRAIN	1.B	96B	3013361404
MI34*DETERMINE MILITARY ASPECTS OF WEATHER	2.	96B	3013361404
MI43 DETM. ACCURACY AND RELIABILITY OF INCOMING INFO.	2.	96B	3013362301
MI06*DETM. AZIMUTHS, USING COORDINATE SCALE/PROTRACTOR	1.	96B	0713291010
MI09*DETM. GRID COORDINATES OF A POINT	1.D.	96B	0713291014
MI39*DISTRIBUTE MESSAGE BY MAIL OR COURIER	2.C	96B	3013361507
MI38 DISTRIBUTE MESSAGE BY SECURE VOICE PHONE	2.A	96B	3013361507
MI46 DRAFT AN INTELLIGENCE REPORT	2.A	96B	3013362501
MI13*ENCODE MESSAGE USING KTC 600 TACTICAL OPS. CODE	1.	96B	1135734001
MI31 ENTER INFORMATION INTO ORDER OF BATTLE FILES	2.	96B	3013361305
MI25*ENTER INFORMATION ON SIT MAP	1.A	96B	3013361303
MI32 EXTRACT INFORMATION FROM ORDER OF BATTLE FILES	1.	96B	3013361401
MI17*HANDLE CLASSIFIED DOCUMENTS	2.A	96B	301336X107
MI18 HANDLE DRAFTS, CARBONS, PLATES OF CLAS. DOCUMENTS	2.B	96B	301336X107
MI19*LOC. POINT ON MAP BY INTERSECTION WITHOUT COMPASS	2.A-E.	11B	0713291014
MI11*LOC. POINT ON MAP BY RESECTION WITH COMPASS	1.	96B	0713291014
MI12*LOC. POINT ON MAP BY RESECTION WITHOUT COMPASS	2.	96B	0713291014
MI03*LOCATE A POINT OF THE MAP USING COORDINATE SCALE	1.	96B	0713291004
MI08*LOCATE POINT ON MAP BY INTERSECTION WITH COMPASS	1.A-E.	11B	0713291014
MI40 MAINTAIN COLLECTION WORKSHEET	TASK	96B	3013362204
MI23 MAINTAIN INTELLIGENCE JOURNAL FILE	3.	96B	3013361302
MI47 MAKE FINAL COPY OF INTELLIGENCE REPORT	2.B	96B	3013362501
MI30 PREPARE A PERSONALITY FILE	1.B	96B	3013361305
MI42 PREPARE ACQ. REQUESTS TO HIGHER OR ADJACENT UNITS	2.B	96B	3013362207
MI41 PREPARE ACQUISITION ORDERS TO SUBORDINATE UNITS	2.A	96B	3013362207
MI29 PREPARE AN ORDER OF BATTLE CARD	1.	96B	3013361305
MI37 PREPARE BRIEFING FOLLOW-UP	4.	96B	3013361505
MI35 PREPARE INTELLIGENCE BRIEFING	1.-2	96B	3013361505
MI27 PREPARE ORDER OF BATTLE WORKBOOK	1.	96B	3013361304
MI48 PREPARE THE INTELLIGENCE ESTIMATE REPORT	TASK	96B	3013362502
MI22*RECEIVE CLASSIFIED DOCUMENTS	1.	96B	3013361101
MI26 REPLACE OVERLAY ON MAP	1.B	96B	3013361303
MI20*SECURE CLASSIFIED MATERIAL	3.	96B	301336X107
MI02*USE AN ARMY MAP CATALOG	TASK	96B	051203X502
MI28 USE AN ORDER OF BATTLE WORKBOOK	2.	96B	3013361304
MI15*USE COMBINATION LOCK ON SECURITY CONTAINER	1.A.	96B	301336X107
MI21*USE MARGINAL INFORMATION ON MAP	TASK	96D	3013361004
MP			
MP * * * * MULTIPLEXER * * * *			
MP10*SIGNAL CONVERTER (TD-202), TROUBLESHOOT	2.A-SSSS	26L	1136060036
MP02 TD-204/U, ALIGN	3.A-JJ	26L	1136060006
MP01 TD-204/U, TROUBLESHOOT	2.A-P	26L	1136060906
MP12*TD-351/U, OPERATIONAL CHECK	3.A-PP	26Q	1135932007

MP05 TD-352/U, CA CODER ADJUSTMENT	5.A-FFFF	26L	1136060009
MP04 TD-352/U, CCL ADJUSTMENT	4.A-EE	26L	1136060009
MP03*TD-352/U, TROUBLESHOOT	2.A-Q	26L	1136060009
MP09 TD-660/AG, CODER ADJUSTMENT	5.A-GG	26L	1136060015
MP08 TD-660/AG, PAM LEVEL ADJUSTMENT	4.A-Q	26L	1136060015
MP07 TD-660/AG, PCM OUT-TMC OUT PHASE ADJUSTMENT	3.A-V	26L	1136060015
MP06 TD-660/AG, TROUBLESHOOT	2.A-NN	26L	1136060015
MR			
MR * * * * METAL REPAIR * * * *			
MR20 AIR-TEST, UNDERWATER, CHECKING FOR LEAKS	2.A-E	44B	0914681100
MR15*ARC WELDER SET UP AND OPERATE	3.A-E	44B	0914681060
MR42*BASTARD FILE,PROPER FILING METHOD	3.A-D	44E	0914691004
MR34 BIT,DRILL,PORTABLE,SELECT,INSTALL AND ADJUST	3-4	44B	0914681213
MR27 COMPRESSOR, AIR, SET UP BEFORE OPERATING	1.B	44B	0914681190
MR30 COMPRESSOR,AIR,GAS POWERED,PREOPERATION CHKS	5.A-E	44B	0914681190
MR24*FILE, SELECTION, USE DIRECTIONS	1.A-B	44B	0914681160
MR21 FLOW-TEST,RATE OF WATER FLOW, RADIATOR ETC.	1.A-H	44B	0914681121
MR33*GRINDER,INSPECT AND SET-UP MACHINE	1.A-I	44B	0914681212
MR40 HACKSAW,MOUNT BLADE	3.A	44E	0914691003
MR41 HACKSAW,PROPER SAWING METHOD	6.A-F	44E	0914691003
MR39 HACKSAW,SELECT PROPER BLADE	2.A	44E	0914691003
MR43 HELI-COIL INSERTS,DETERMINE HOLE SIZE	1.A-D	44E	0914691009
MR44 HELI-COIL,INSERT ASSEMBLY	6.A	44E	0914691009
MR25 JACK HYDRAULIC, INSPECT AND PROVIDE MAINTENANCE	2.A-E	44B	0914681161
MR10*LIBBY ARC WELDER, SET UP	1.A	44B	0914681020
MR11*LIBBY ARC WELDER, START, ADJUST VOLTAGE/CURRENT	3.A-C	44B	0914681020
MR06*MATERIAL, CUTTING PROCEDURE USING A TORCH	5.A-H	44B	0914681066
MR05*METAL WELD, ALINE AND TACK	7.B-C	44B	0914681005
MR08*METAL, CLEANING AND PREPARING FOR WELDING	4.A	44B	0914681009
MR07*METAL, FERROUS OR NONFERROUS TESTING	1.A	44B	0914681007
MR14 MIG WELDING, SET UP EQUIPMENT	4.A-E	44B	0914681040
MR01*OXYACETYLENE WELD, EQUIPMENT SET UP	3.A	44B	0914681001
MR04*OXYACETYLENE WELD, EQUIPMENT SHUT-DOWN	11.A-F	44B	0914681001
MR03*OXYGEN, ACETYLENE, ADJUST PRESSURE TO WELD	5.A-D	44B	0914681001
MR28 PAINTS AND PRIMER, MIXING, THINNING AND STRAINING	2.A-C	44B	0914681190
MR13 PIPE CUT,BEVEL-CLEAN WITH OXYACETYLENE TORCH	3.A-C	44B	0914681022
MR45 RESPIRATOR, CARE OF	8.G	44B	0914681190
MR22 SANDER, HAND, SET-UP AND OPERATE DISC SANDER	1-3	44B	0914681158
MR23*SANDPAPER, SELECTION AND PREPARATION FOR SANDING	1.A-B	44B	0914681159
MR17*SOLDERING IRON,PREPARATION	2.A	44B	0914681100
MR31 SPRAY GUN, OPERATING	6.A-D	44B	0914681190
MR26 SPRAY GUN, SET-UP	1.A	44B	0914681190
MR32 SPRAY PAINTING, EQUIPMENT SHUTDOWN PROCEDURES	8.A-F	44B	0914681190
MR36*SUPERVISION,ASSEMBLY OF TOOLS AND MATERIALS	3.A-B	44B	0914682040
MR37*SUPERVISION,EVALUATION OF LEVEL AND PROGRESS	4.A-D	44B	0914682040
MR35*SUPERVISION,EVALUATION OF SUBORDINATE	1-2	44B	0914682040
MR38*SUPERVISION,INSPECTION OF COMPLETED WORK	5.A-C	44B	0914682040
MR29 SURFACES METAL, PREPARATION FOR PAINTING	3.A-C	44B	0914681193
MR19 SWEATING, JOINING METAL PIECES WITH SOLDER	6.A-F	44B	0914681100
MR16*TIG WELDER, SET UP AND OPERATE	4.A-E	44B	0914681060
MR18*TINNING, PREPARING AN AREA FOR METAL PATCH	5.A-B	44B	0914681100
MR02*TIP, WELDING, SELECT AND INSTALL	4.A-B	44B	0914681001
MR12*WELD INSPECTION OF EQUIPMENT	5.A	44B	0914681020
MR09*WELDING TORCH, LIGHT AND ADJUST	5.A	44B	0914681009
MR			

MS	* * * * MISSILES * * * *			
MS03	CONTROL SURFACES (LANCE), INSTALL	1.A-C	15D	0612851200
MS04	CONTROL SURFACES (LANCE), REMOVE	2.A-C	15D	0612851200
MS01	UMBILICAL CABLE (LANCE) CONNECT	2.A-E	15D	0612851120
MS07	VAPOR LEAKS, CONDUCT CHECK	2.A-E	15D	0612851300
MS06	VAPOR LEAKS, DON PROTECTIVE GEAR	1.A-F	15D	0612851300
MS09	WARHEAD (LANCE), DEMATE FROM MISSILE	3.A-J	15D	0612851920
MS08	WARHEAD (LANCE), MATE TO MAIN ASSEMBLY	3.A-E	15D	0612851580
MS05	WARHEAD (LANCE), MISSILE-ROUND CHECKOUT	2.A-C	15D	0612851220
MS02	WARHEAD (LANCE), PERFORM MISFIRE PROCEDURES	1.A-J	15D	0612851160
NT				
NT	* * * * NAUTICAL OPERATION * * * *			
NT08	ANCHOR, PREPARE TO (LCM-8)	1.A-B	61B	5517362531
NT07	DISTRESS SCENE, TAKE ACTION	3.A-F	61B	5517352301
NT05	DISTRESS SIGNALS, RECOGNIZE	1.A-C	61B	5517352301
NT06	DISTRESS SIGNALS, RESPOND TO	2.A-D	61B	5517352301
NT04	DOCK ALONGSIDE SHIP	3.A-H	61B	5517342310
NT03	DOCK ALONGSIDE SHIP, PREPARE TO	2.A-D	61B	5517342310
NT01	SURF OR SHALLOW WATER, PREPARE TO ENTER	1.A-G	61B	5517342309
NT02	SURF OR SHALLOW WATER,ENTER	2.A-C	61B	5517342309
RA				
RA	* * * * RADIO * * * *			
RA12	AN/GRC-103,RECEIVER,PERFORM CHECKS	1.A-H	26L	1135910067
RA13	AN/GRC-103,TRANSMITTER,PERFORM CHECKS	2.A-J	26L	1135910067
RA06	AN/GRC-143, FILAMENT VOLT.METER,CALIBRATE	2.A-AA	26L	1135915003
RA05	AN/GRC-143, PWR AMP BEAM VOLT METER, CALIBRATE	1.A-FF	26L	1135915003
RA08	AN/GRC-143, PWR AMP DC OVERLOAD TRIP PT, ADJUST	8.A-GG	26L	1135915003
RA07	AN/GRC-143, PWR AMP METERING CIRCUIT, CALIBRATE	6.A-III	26L	1135915003
RA11	AN/GRC-144, REFLECTED RF PWR METER, CALIBRATE	3.A-GGG	26L	1135915004
RA09	AN/GRC-144, TRANSMIT METER 1A15A8M1,CALIBRATE	1.A-U	26L	1135915004
RA10	AN/GRC-144, TRANSMIT METER 1A16M2, CALIBRATE	2.A-AA	26L	1135915004
RA27	AN/GRC-50, TUNE TRANSMITTER	1.A-PPP	26L	1135913001
RA57	AN/TCC-38 GROUNDING OF CHASSIS	1.A-B	36C	1136037002
RA60	AN/TCC-38 PERF. CONTROL & SWITCH CHECK, FRONT PNL.	3.A-C	36C	1136037002
RA59	AN/TCC-38 PERFORM A LAMP TEST	3.A-B	36C	1136037002
RA58	AN/TCC-38 POWER CABLE CONNECTIONS	2.A-D	36C	1136037002
RA53	AN/TCC-60, 61, 69 ADJUST CHANNELS, TD 352	3.B	31M	1135932024
RA52	AN/TCC-60, 61, 69 PERF CABLE POWER CHKS, ALIGNMENT	3.A-L	31M	1135932024
RA22	AN/TCC-61,PERFORM DURING-OPERATION PM	1.A-D	26Q	1135933007
RA23	AN/TCC-61,PERFORM WEEKLY PM CHECKS	3.A-D	26Q	1135933007
RA26	AN/TCC-65,PERFORM EXTERIOR CHECKS	1.A-B	26Q	1135933020
RA21	AN/TCC-65,PERFORM OPERATIONAL CHECKS	3.A-B	26Q	1135933004
RA24	AN/TCC-73,PERFORM DURING-OPERATION PM	1.A-D	26Q	1135933012
RA25	AN/TCC-73,PERFORM WEEKLY PM CHECKS	3.A-Y	26Q	1135933012
RA36*	AN/TRA-37, ASSEMBLE ANTENNA, WAVEGUIDE	4.A-R	26Q	1135911025
RA35*	AN/TRA-37, ASSEMBLE GIN POLE	3.A-U	26Q	1135911025
RA34*	AN/TRA-37, ASSEMBLE MASTS	2.A-O	26Q	1135911025
RA33	AN/TRA-37, BASEPLATE/ANCHORING LAYOUTS	1.A-J	26Q	1135911025
RA37*	AN/TRA-37, RAISE ANTENNA	5.A-HH	26Q	1135911025
RA46*	AN/TRC-106, ADJUST ANTENNA DIRECTION	5.A-O	26Q	1135912031
RA48	AN/TRC-106, ADJUST ORDERWIRE LEVEL	7.A-K	26Q	1135912031
RA47	AN/TRC-106, ADJUST TRAFFIC LEVELS	6.A-J	26Q	1135912031
RA45	AN/TRC-106, TUNE	3.A-W	26Q	1135912031
RA28	AN/TRC-112, GROUND SHELTER	1.A-K	26Q	1135911004
RA29	AN/TRC-112, PREPARE TO APPLY POWER	3.A-F	26Q	1135911004

RA15	AN/TRC-112,-121,DAILY PM,DIRECT	1.A-J	26Q	1135917012
RA16	AN/TRC-112,-121,MONTHLY PM,DIRECT	2.A-I	26Q	1135917012
RA17	AN/TRC-112,-121,QUARTERLY PM,DIRECT	3.A-I	26Q	1135917012
RA50	AN/TRC-117(V) PERFORM ORDERWIRE ADJUSTMENT	2.A-F	31M	1135932023
RA51	AN/TRC-117(V) PERFORM PCM ALIGNMENT	3.A-K	31M	1135932023
RA43	AN/TRC-138, ACTIVATE POWER SOURCE	2.A-K	26Q	1135912014
RA39	AN/TRC-138, ASSEMBLE ANTENNA, LAUNCHER	2.A-S	26Q	1135911026
RA40	AN/TRC-138, ATTACH FEEDHORN TO REFLECTOR	3.A-H	26Q	1135911026
RA41	AN/TRC-138, ATTACH GUY WIRES, RAISE LAUNCHER	4.A-L	26Q	1135911026
RA44	AN/TRC-138, CHECK FREQUENCIES	5.A-D	26Q	1135912014
RA32	AN/TRC-138, CONNECT VIDEO CABLES	4.A-B	26Q	1135911009
RA30	AN/TRC-138, CONNECT WAVEGUIDE TO SHELTER	2.A-F	26Q	1135911009
RA38	AN/TRC-138, POSITION GUY STAKES	1.A-E	26Q	1135911026
RA31	AN/TRC-138, PREPARE TO APPLY POWER	3.A-K	26Q	1135911009
RA42	AN/TRC-138, RAISE ANTENNA	5.A-BB	26Q	1135911026
RA49*	ANTENNA, INSTALL RC292	1-4	05B	1135961018
RA04*	ANTENNA,RADIO,1729/VRC,ASSEMBLE AND ERECT	4.A-B	05B	1135871002
RA14*	ANTENNAS,RADIO TERMINAL,DIRECT INSTALLATION	3.A-F	26Q	1135917011
RA01	MOUNT, RADIO(MT-1029),INSPECT AND CLEAN	1.B	05B	1135871002
RA03	MOUNT,RECEIVER(RADIO),MT-1898/VRC,INSPECT & CLEAN	2.B	05B	1135871002
RA18	RADIO REPEATER SETS, DAILY PM,DIRECT	1.A-C	26Q,	1135917007
RA02	RADIO(AN/VR-12),INSTALL IN MOUNT	1.C	05B	1135871002
RA19	RADIO-REPEATER SETS, MONTHLY PM,DIRECT	2.A-C	26Q	1135917007
RA56	RL-31E, PREPARE REEL UNIT, GROUND USE	2.A-E	36C	1135887037
RA55	SB-3614(V)ITT, CHECK ALL CABLE CONNECTIONS	2.A-B	36C	1135957010
RA54	SB-3614(V)ITT, CHECK PRINTED CIRCUIT BOARD (PCB)	1.A.C	36C	1135957010
RA62	SET TT-76 ( )/GGC-ADJ. TRIP LATCH, LEV.,DIS. CAM.	5A1I	31J	1135980002
RA64	SET TT-76 ( )/GGC-ADJUST PRINT MECHANISM	5.D	31J	1135980002
RA65	SET TT-76 ( )/GGC-ADJUST TAPE FEED MECHANISM	5.E	31J	1135980002
RA61	SET TT-76 ( )/GGC-CODE RING LOCKING BAIL	5A1G	31J	1135980002
RA63	SET TT-76 ( )/GGC-STOP ARM,TYPE WHEEL ASSY,ALIGNED	5.C	31J	1135980002
RA23	TELEPHONE CIRCUIT LINES, CONNECT (AN/TCC-65)	3.A-B	26Q	1135931004
RD				
RD	* * * * * RADAR * * * * *			
RD04	CWAR, POSITION CONTROLS BEFORE POWER ON	1.A-G	16E	4410521019
RD12	CWAR, RADAR FAIL LIGHTS, DAILY CHECK	2.A-V	16E	4410521037
RD11	CWAR, TRANSMITTER-RECEIVER, DAILY CHECK	1.A-K	16E	4410521037
RD08	HIPIR, AMPLIFIER ASSEMBLY, CHECK	3.A-Q	16E	4410521025
RD05	HIPIR, ENERGIZE TO STANDBY	1.A-G	16E	4410521020
RD07	HIPIR, FALSE RADIATE TO FULL RADIATE	3.A-N	16E	4410521020
RD10	HIPIR, MO AND PA FILAMENT, DAILY CHECK	2.A-S	16E	4410521035
RD06	HIPIR, STANDBY TO FALSE RADIATE	2.A-K	16E	4410521020
RD15	IFF, ALINE TO BASE, PREPARE	1.A-I	16E	4410521052
RD16	IFF, ALINE WITH BASE PIECE	2.A-D	16E	4410521052
RD17	IFF, ALINEMENT WITH BASE, VERIFY	3.A-G	16E	4410521052
RD01	PAR, ANTENNAS, DISASSEMBLE AND STOW	3.A-F	16E	4410521001
RD03	PAR, ANTENNAS, UNPACK AND ASSEMBLE	5.A-E	16E	4410521009
RD13	PAR, EQUIPMENT CABINETS, CLEAN AND DRY	1.A-G	16E	4410521042
RD02	PAR, M390 TRAILER, PREPARE FOR TRAVEL	4.A-K	16E	4410521001
RD09	PAR, RECEIVER MODES, DAILY CHECK	2.A-K	16E	4410521027
RD14	ROR, NULLING PROCEDURES, PERFORM	3.A-M	16E	4410521049
RH				
RH	* * * * RANGEFINDER * * * *			
RH04*	RANGEFINDER, LASER, CHECK BATTERY	1.F	13F	0612731950
RH02*	RANGEFINDER, LASER, CHECK FOCUS ADJUST.	1.B	13F	0612731950

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RN01*RANGEFINDER, LASER, CHECK LENSES                          1.A      13F 0612731950
RN03 RANGEFINDER, LASER, CHECK MINIMUM RANGE                   1.E      13F 0612731950
RN05*RANGEFINDER, LASER, CHECK RETICLE ILLUM.                  1.G      13F 0612731950
RN06*RANGEFINDER, LASER, OPERATE AT DAWN                       1.A-G    13F 0612731953
RN08*RANGEFINDER, LASER, OPERATE IN DUST, SAND                 4.A-D    13F 0612731953
RN07*RANGEFINDER, LASER, OPERATE IN RAIN                       3.A-D    13F 0612731953
RS              * * * * RADAR SURVEILLANCE * * * *
RS04 DESTROY EQUIPMENT, PREVENT ENEMY USE                      TASK     17K 3013411303
RS01*ENCODE MESSAGE, USING KAL 61                              2.A.C    17K 3013411301
RS03 ORGANIC RADIO EQUIPMENT, CONSTRUCT DIRECTIONAL ANT        3.B-F    17K 3013411302
RS02 ORGANIC RADIO EQUIPMENT, DET. TYPE OF INTERFERENCE        1.A-B    17K 3013411302
RS05 RADAR, CAMOUFLAGE, POSITION IMPROVEMENT                   2.A-C    17K 3013411304
RS08 RADAR, CONFIRM NOISE AS ELECTROMAGNETIC INTERFER.         1.A-C    17K 3013411310
RS09 RADAR, LOCATE SOURCE OF ELECTROMAGNETIC INTERFER.         2.A-C    17K 3013411310
RS06 RADAR, SET-UP SURVEILLANCE CARD AND PLOTTER               1.A-B    17K 3013451305
RS07 RADAR, USE SURVEILLANCE CARD AND PLOTTER                  2.A-B    17K 3013451305
SM
SM                    * * * SEWING/SEWING MACHINES * * *
SM06 MOBILE CLOTHING REPAIR SHOP EQUIP,SET UP                  7.A-F    43M 1015131101
SM05 TROUSER LEGS, HEM                                         2.A-B    43M 1015131151
SM04 TROUSER LEGS, PREPARE FOR SEWING                          1.A-C    43M 1015131151
SM02 331K1 LIGHT DUTY, PREPARE FOR OPERATION                   5.A-F    43M 1015131107
SM03 331K1 LIGHT-DUTY, AFTER-OPERATION MAINT.                  5.A-D    43M 1015131107
SM01 331K1 LIGHT-DUTY, DAILY PM CHECKS                         1.A-Q    43M 1015131107
TE
TE          * * * *  TELECOMMUNICATIONS EQUIPMENT  * * * *
TE03 TEL SWITCHBOARD SB/86P, OPERATOR'S INSPECTION             1.       36C 1135947003
TE04 TEL, OPERATE CONSOLE 1A11 AN/TTC-25(V)                    1.-2     36C 1135952002
TE13 TEL, SIGNAL CONVERTER, CV1919A1G,SB86/P, INSTALL          1.-4     36C 1136051001
TE12 TEL, SIGNAL CONVTER, CV-1919A1G, SB86/P, OPERATE          1.-4     36C 1136052001
TE06*TEL, SWITCHBOARD SB-86/P, GROUNDING                       2.A-D    36C 1135941001
TE07*TEL, SWITCHBOARD SB-86/P, INSTALL BATTERIES               3.-4     36C 1135941001
TE05*TEL, SWITCHBOARD SB-86/P, INSTALL, PREPARE                1.A-C    36C 1135941001
TE11*TEL, SWITCHBOARD SB-86/P, OPERATE                         1.-3     36C 1135942001
TE08*TEL, SWITCHBOARD SB-86/P, POWER CONNECTIONS               5.A-T    36C 1135941001
TE09*TEL, SWITCHBOARD SB-86/P, TEL, TRUNK, CONECS              6.A-C    36C 1135941001
TE10*TEL, SWITCHBOARD SB-86/P, PMCS                            1.3      36C 1135943001
TE14*TEL, SWITCHBOARD, SB-86/P, INSPECT INSTALLATION           1.A-E    36C 1135947001
TE02 TELEPHONE SET TA-312/PT, PM CHECK                         1.A-D    36C 1135887057
TE01 TELEPHONE SET TA-341/TT,INSTALL                           1.A-B    36C 1136001003
TR
TR                          * * * * TARGETING * * * *
TR03*BINOCULARS METHOD                                         1.C      13F 0612831001
TR18*BORESIGHT, AUTO COLLIMATE CANT AXIS MIRROR                2.A-E    15D 0612852020
TR19 BORESIGHT, AUTO COLLIMATE FORWARD MIRROR                  3.A-C    15D 0612852020
TR25 BORESIGHT, CANT MIRROR ALIGNMENT                          5.A-D    15D 0612852050
TR23 BORESIGHT, HORIZONTAL COLLIMATION ADJUSTMENT              3.A-D    15D 0612852050
TR21 BORESIGHT, LAY MISSILE FOR AZIMUTH                        3.A-H    15D 0612852030
TR20 BORESIGHT, LAY MISSILE FOR ELEVATION                      1.A-E    15D 0612852030
TR17*BORESIGHT, PREPARE GUN SIGHT UNIT                         1.A-C    15D 0612852020
TR22 BORESIGHT, STORE SIGHT-UNIT                               4.A-G    15D 0612852030
TR24 BORESIGHT, VERTICAL COLLIMATION ADJUSTMENT                4.A-I    15D 0612852050
TR06*CALL-FOR-FIRE, CORRECT                                    2.A-D    13F 0612831021
TR28 CRATER/SHELL FRAGMENTS, ANALYZE                           2.A-D    13F 0613066004
TR10*FINAL PROTECTIVE FIRE, ADJUST                             2.A-D    13F 0612832002
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TR09*FINAL PROTECTIVE FIRE, TRANSMIT CALL	1.A-D	13F	0612832002
TR08*FIRE-FOR-EFFECT,ADJUST	2.A-B	13F	0612832001
TR04*GRID SQUARE COORDINATES,LOCATE	3.B	13F	0612831002
TR14*HIGH-EXPLOSIVE ROUNDS, ADJUST	3.A-D	13F	0612831022
TR07*ILLUMINATION/HE ROUNDS, COORDINATE	2.A-B	13F	0612831022
TR02*MAP AND M2 COMPASS METHOD	1.B	13F	0612831001
TR01*MAP AND OBSERVED FIRE FAN METHOD	1.A	13F	0612831001
TR05*OBSERVE-TARGET DIRECTION	1.A-C	13F	0612831004
TR13*RANGE,DEVIATION DATA (MORTARS), TRANSMIT	2.A-B	13F	0612832104
TR12*REFINEMENT DATA, TRANSMIT	2.A-D	13F	0612832103
TR26*SMOKE MISSION, CALL FOR FIRE	2.A-D	13F	0612832021
TR27*SUCCESSIVE BRACKETING, REFINE	3.A-E	13F	0612832102
TR15*TARGET SET TRIPOD, EMPLACE	1.A-B	15D	0612851290
TR16*TARGET SET, LEVEL	3.A-B	15D	0612851290
TR11*TARGETS, IRREGULARLY-SHAPED, LOCATE	1.A-D	13F	0612832003
TS			
TS * * * * TROUBLESHOOTING * * * *			
TS05 TROUBLESHOOTING, DSPO OF COMPONENTS, BR & FLOW	5.	24C	4410531062B
TS07 TROUBLESHOOTING, ISOLAT FAULT, FAULT ISOLAT PROC	2.	24C	4410531062A
TS02 TROUBLESHOOTING, ISOLATE FAULT, BRANCH AND FLOW	2.	24C	4410531062B
TS03 TROUBLESHOOTING, LEVEL OF MAINT.AUTH, BR & FLOW	4.	24C	4410531062B
TS04 TROUBLESHOOTING, OPERATIONAL CHECK, BR & FLOW	4.	24C	4410531062B
TS01 TROUBLESHOOTING, VERIFY FAULT, BRANCH AND FLOW	1.	24C	4410531062B
TS06 TROUBLESHOOTING, VERIFY FAULT, FAULT ISOLAT PROC	1.	24C	4410531062A
WV			
WV * * * * WHEELED VEHICLE REPAIR * * * *			
WV21 ALTERNATOR,REMOVE (M911)	4.A2	63W	0914801259
WV04*BRAKE ASSEMBLY,CHECK AND REMOVE PARTS (915)	3.A-E	63W	0914801034
WV05*BRAKE ASSEMBLY,REPLACE PARTS (915)	4.A-F	63W	0914801034
WV02*BRAKES, ADJUST DRAG (915)	4.A-G	63W	0914801053
WV47*BRAKES, BLEED (5-TON)	4.I	63W	0914801243
WV10 CENTER DRAG LINK,REMOVE (4 X 2)	3.A-C	63W	0914801175
WV56 CONTROL VALVE BANK (M819 TRK),CLEAN	2.A-B	63W	0914802046
WV13*CYLINDER HEAD,CHECK FOR WARPAGE (M151)	2.A-B	63W	0914801003
WV14*CYLINDER HEAD,REMOVE PARTS (M151)	3.A-E	63W	0914801003
WV65 DRIVE NUT M911 UNDER DIFF. ROAD CONDITIONS	4.A-E	63W	0914991912
WV27 ENGINE REMOVAL (5 TON TRUCK) DISCONNECT ATTACH.	3.A-M	63W	0914801236
WV20 ENGINE REMOVAL,LIFTING OUT (911)	3.A	63W	0914801259
WV19 ENGINE REMOVAL,M911,DISCONNECT ALL ATTACH.(M911)	2.A-V	63W	0914801259
WV18 ENGINE REMOVAL,M911,PRELIMINARY PROCEDURES (M911)	1.A-F	63W	0914801259
WV44*ENGINE, START, 5-TON SERIES, ABOVE 32 DEGREE F	6.A1	63W	0914802282
WV45*ENGINE, START, 5-TON SERIES, BELOW 32 DEGREE F	6.A2	63W	0914802282
WV24 ENGINE,INSTALL (M911)	6.A-HH	63W	0914801259
WV16 FLYWHEEL,INSPECTS	1.A-E	63W	0914801045
WV66 FORDING WATER WITH VEHICLE (M911)	4.G-H	63W	0914991912
WV55 FORKLIFT, EXTENSION SYS., PRESSURE TEST	2.B	63W	0914802179
WV49 FORKLIFT, FLOW TEST ON FRONT STEERING CYLINDER	1.A	63W	0914802172
WV54 FORKLIFT, HYDRAULIC SYS. CYLINDER FLOW TEST	1.A	63W	0914802179
WV53 FORKLIFT, PRESSURE TEST ON FRONT STEERING CYL.	1.B	63W	0914802172
WV23 FUEL FILTER HOUSING REMOVE (M911)	4.A6	63W	0914001259
WV41 FUEL INJECTOR RACK CLEVIS, ADJUST CLEARANCE	3.A-B	63W	0914202431
WV40 FUEL INJECTOR RACK, ADJUST	2.A-I	63W	0914802431
WV01 FUEL INJECTORS, (M815), ADJUST	4.A.2-5	63W	0914802265
WV42*IDLE, ADJUST	1.A-F	63W	0914802432
WV35 PILOT BEARING REPAIR	3.A	63W	0914201238

WV63 PRE-STARTING CHECKS (HET M911), PERFORM	2.A	63W	0914991912
WV28*PRESSURE PLATE (5 TON TRUCK),INSPECT	2.A	63W	0914801239
WV51 RIGGING CABLES,(M911), CONNECT TO DISABLED VEH.	3.A-J	63W	0914991917
WV60 ROCKER LEVER HOUSING (M313), REPLACE	4.B	63W	0914802265
WV01 SLACK ADJUSTER, REMOVE (915)	2.A-G	63W	0914801053
WV22*STARTER,REMOVE (M911)	4.A5	63W	0914801259
WV64 STARTING CHECKS, (HET M911), PERFORM	2.B	63W	0914991912
WV06 STEERING GEAR ASSEMBLY (M125),REPLACE	1.A-I	63W	0914801083
WV07 STEERING GEAR BOX,REPLACE (M125)	4.A-H	63W	0914801083
WV43 STEERING GEAR COLUMN, REMOVE (5-TON)	1.A-E	63W	0914802282
WV46 STEERING, CHECK FOR PROPER OPERATION (5 TON)	6.C	63W	0914802282
WV17 TIRE & HUB ASSEMBLY,REMOVE (915 SERIES)	2.A-M	63W	0914801051
WV05 TIRE & HUB ASSEMBLY,REMOVE FROM 915 SERIES	2.A-M	63W	0914801054
WV11 TIRE PRESSURE, CHECK & FILL (4 X 2)	5.A-B	63W	0914801175
WV18 TOE-IN ADJUSTMENT (5-TON VEHICLE)	4.L	63W	0914801243
WV12 TOE-IN ALIGNMENT,PERFORM (4 X 2)	6.A-D	63W	0914801175
WV26 TRANSFER CASE (2-1/2 TON TRUCK), POST-MAINT.CHECK	4.A-D	63W	0914801226
WV25 TRANSFER CASE (2-1/2 TON TRUCK),REMOVE	2.A-M	63W	0914801226
WV29 TRANSMISSION (5 TON TRK),REMOVAL,PRELIM.PROCED.	1.A-L	63W	0914801241
WV08 TRANSMISSION & ENGINE ASSEMBLY (M880),REMOVE	2.A-D	63W	0914801169
WV09 TRANSMISSION & ENGINE ASSEMBLY (M880),SEPARATE	3.A-H	63W	0914801169
WV31 TRANSMISSION(M911) REMOVAL PROCEDURES	1.A-F	63W	0914801256
WV30 TRANSMISSION(5-TON TRK)REMOVAL,FOLLOW-UP MAINT.	4.A-K	63W	0914801241
WV57 VALVE LASH (M 35), CHECK	1.C1	63W	0914802019
WV62 VALVES (M813), ADJUST	4.I.6-8	63W	0914802265
WV33 VALVES, LEAKING (M 35), CHECK	1.C2	63W	0914802019
WV15*VALVES,ADJUST (M151)	4.D	63W	0914801003
WV59 WATER MANIFOLD (M813), REMOVE	1.F	63W	0914802265
WV34 WRECKER, CHECK EQUIP. BEFORE LEAVING SHOP	1.A	63W	0914991906
WV36*WRECKER, DETERMINE TOWING METHOD	3.A-I	63W	0914991906
WV35 WRECKER, INSPECT DISABLED VEHICLE	2.B-D	63W	0914991906
WV53 WRECKER, PREPARE FOR TRAVEL	7.A	63W	0914991902
WV52 WRECKER, RIG LOAD BY DETERM. MECH. ADVANTAGE	4.A-I	63W	0914991902
WV38 WRECKER, TOW BY LIFTING FRONT END	5.A-G	63W	0914991906
WV39 WRECKER, TOW BY LIFTING REAR END	6.A	63W	0914991906
WV37*WRECKER, TOW W/STRAIGHT PULL, NO LIFT	4.A-D	63W	0914991906
WV32*WRECKER,DETERM. WT. & LENGTH BEFORE LIFTING VEH.	1.A-B	63W	0914991905

ATTACHMENT M

Complete List of Subtasks Developed and Used

RCA/BSEP

FINAL SUBTASK INDEX

AV	* * * * ARMORED VEHICLE * * * *			
AV11	GRILLE DOORS, CLOSE EXHAUST M60 TANK	6.I	63N	0914841003
AV04	GRILLE DOORS, OPEN EXHAUST, M60 TANK	1.F	63N	0914841002
AV05	GRILLE DOORS, OPEN TOP DECK, M60 TANK	2.A	63N	0914841002
AV09	GRILLE DOORS,CLOSE TOP DECK M60 TANK	6.F	63N	0914841003
AV17	IDENTIFY ELECTRICAL MALFUNCTIONS USING SCHEMATIC DIAGRAM		45K	
AV16	REPAIR ELECTRICAL COMPONENTS		45K	
AV93	REPAIR ELECTRICAL COMPONENTS (KNOX ARMORED VEHICLE)		45K	
AV10	SHROUD, INSTALL TRANSMISSION M60 TANK	6.G-H	63N	0914841003
AV07	SHROUD, REMOVE TRANSMISSION M60 TANK	1.G	63N	0914841002
AV15	TURRET, RETURN TO TRAVEL MODE M60 TANK	7.	63N	0914841003
CT				
CT	* * * * SOLDIER COMMON TASKS * * * *			
CT01	HAND SIGNALS, GUIDE HOIST/VEHICLE OPERATOR	5.C	63N	0914841002
DR				
DR	* * * * DRILLING (WOOD & METAL) * * * *			
DR10	DRILL HOLE, CHECK COMPLETED WORK	9.A-F	44E	0914691006
DR01	ELECTRIC DRILL (1/2"),PROPER DRILLING METHOD	3.A-H	44E	0914691005
DR03	HAND TAP,PERFORM TAPPING OPERATION	4.A-D	44E	0914691006
EU				
EU	* * * * EQUIPMENT USE * * * *			
EU18	CHECK/TEST SWITCH/RELAY CNTC FOR CONT W MULTIMETER		45K	
EU07	DEPTH GAGE, INSPECT FOR GOUGES/SCRATCHES	7.B	67U	5517561064
EU23	DESOLDER LEADS		45K	
EU24	INSTALLS REPLACEMENT ELECTRICAL COMPONENTS		45K	
EU09	MICROMETER, OUTSIDE, USAGE	3.E.2	63W	0914802028
EU08	MULTIMETER, CHK FOR CALIBRATION DATE, DAMAGE	2.B1-2	63N	0914841048
EU11	MULTIMETER, CONTINUITY TEST	1.E	63W	0914802023
EU10	MULTIMETER, DC VOLTAGE TEST	1.C	63W	0914802023
EU13	MULTIMETER, MAINTAIN TS 352 B/V	TASK	17K	3013411308
EU12	MULTIMETER, ZERO	2.B	63N	0914841048
EU17	SET UP MULTIMETER TO CHECK RESISTANCE/CONTINUITY		45K	
EU25	SOLDERS LEADS		45K	
EU03	TORQUE WRENCH, USE OF	5.D.1-12	63W	0914801238
EU16	USING VERNIER CALIPER AND WEAR LIMITS TABLE		45K	
EX				
EX	* * * * EXPLOSIVES * * * *			
EX02	BLASTING CAP, CONNECT TO FUSE	2.A-B	15D	0612856002
EX01	BLASTING FUSE, DETERMINE LENGTH, TIME	1.A-D	15D	0612856002
FO				
FO	* * * * * * FORMS * * * * * *			
FO21	COMPLETE DA FORM 2407, MAINTENANCE REQUEST	TASK	26Q	1136233003
FO02	DA FORM 2402, USED FOR DIRECT EXCHANGE AND ID	5.C	24C	4410538261
FO19	DA FORM 2765 - AVIATION REQUEST FORM	2.A-B	67U	5517651024
FO03	DD FORM 314 (SCHEDULED & PERFORMED MAINTENANCE)	1.A-K	26Q	1136233004
FO05	FORM COMPLETION DA FORM 1150	2.A-D	19D	1711231003
FO04	FORM COMPLETION DA FORM 2062	1.A-E	19D	1711231003
FO06	FORM COMPLETION DA FORM 2404	1.-2.	17K	3013411309
FO07	FORM COMPLETION DA FORM 2408-1	2.A-F	19D	1711231023

FO12	FORM COMPLETION DA FORM 2408-12	2.A-H	67U 5517651010
FO13	FORM COMPLETION DA FORM 2408-13	2.A-P	67U 5517651011
FO08	FORM COMPLETION DA FORM 2496	4-9	71L 1210041201
FO18	FORM COMPLETION, DA FORM 2402	2.A-H	67U 5517651007
FO27	FORM INSPECTION COMPLETED DA FORM 2404	2.	36C 1135947003
FO31	NATIONAL STOCK NUMBER, ALL INFORMATION IN USE	3.A-B	24C 441053G261
GN			
GN	* * * * GENERATORS * * * *		
GN05	POSITIONING AND SET-UP,DIRECT	1.A-M	26Q 1136017033
GN12	10KW, MEP-018A, MEP-023A, INSTALL	1-3	26Q 1136011002
GN13	10KW, MEP-018A, MEP-023A, OPERATE	1-7	26Q 1136012003
GN04	15KW, PU-405/G, PERFORM DAILY PM	1.A-C	26Q 1136013007
GN03	15KW, PU-405/G, START AND APPLY LOAD	2.A-EE	26Q 1136012012
GN02	3KW, MEP-016A, -021A, START	2.A-G	43M 1015131106
GN11	5KW, MEP-017A, MEP-022A, INSTALL	1-3	26Q 1136011001
GN09	5KW, MEP-017A, MEP-022A, OPERATE	1-6	26Q 1136012001
MI			
MI	* * * * MILITARY INTELLIGENCE * * * *		
MI04	DETERMINE ELEVATION OF A POINT ON A MAP	1.	96B 0713291004
MI34	DETERMINE MILITARY ASPECTS OF WEATHER	2.	96B 3013361404
MI06	DETM. AZIMUTHS, USING COORDINATE SCALE/PROTRACTOR	1.	96B 0713291010
MI25	ENTER INFORMATION ON SIT MAP	1.A	96B 3013361303
MI03	LOCATE A POINT OF THE MAP USING COORDINATE SCALE	1.	96B 0713291004
MI21	USE MARGINAL INFORMATION ON MAP	TASK	96B 3013361004
MR			
MR	* * * * METAL REPAIR * * * *		
MR34	BIT,DRILL,PORTABLE,SELECT,INSTALL AND ADJUST	3-4	44B 0914681213
TR			
TR	* * * * TARGETING * * * *		
TR06	CALL-FOR-FIRE, CORRECT	2.A-D	13F 0612831021
WV			
WV	* * * * WHEELED VEHICLE REPAIR * * * *		
WV44	ENGINE, START, 5-TON SERIES, ABOVE 32 DEGREE F	6.A1	63W 0914802282

ATTACHMENT N

MOS Summaries

MOS Summary - 05B RADIO OPERATOR

Analysis Approach - Interviewing was done in the morning, 3-4 days per week, with Friday meetings reserved for verification. Meetings with SMEs were held in the RCA office with visits to the course, whenever it could be arranged, if certain concepts required detailing. Tasks to be analyzed were given to RTMD each week and they were responsible for contacting the course to locate knowledgeable SMEs.

Problems - There was a problem in communication between "departments" with the SME receiving the "short end". The course would be notified by RTMD and then they (the course) were to notify the SME. Often the SME was not notified and when RCA called to tell the course no one had showed up for the interview, the SME would be pulled from the classroom without notice or might not be available because of special duty, etc. This caused loss of time, attitudinal problems and created problems for the students.

One section of the course caused a little stir when a section chief told the SMEs from his area of the course not to give the analyst any information. Perhaps he had not been informed as the purpose of the project.

Discrepancies - The only discrepancies noted concerned equipment that was outdated. The task would state how to perform using the outdated equipment, and the SME would know how to perform the task using other types of equipment more readily found. There were a few pieces of equipment that were so specialized that RTMD could not locate people familiar with them. Ex. FRC-93.

There were some procedural and equipment differences brought about by the SME's experience in different units. For example, an 05B in an infantry unit may not have performed the task quite the same or used the same equipment to perform the task as an SME in a signal unit.

Soldier's Manual - The Soldier's Manual was helpful on some of the tasks, but sometimes the setting in which the task was performed seemed artificial and could not readily be identified with. After setting a scenario, analysis could proceed, but this did cause some time loss

Equipment - Some equipment was not available due to security reasons. Some newer equipment was not available, causing analysis to be sketchy and idealistic. Much of the equipment was multipurpose. The same RT (receiver-transmitter) could be used with different components for different purposes. It seemed that the "12 Series" radios were the bread and butter of the MOS and could be used in a variety of ways with the addition or substitution of components.

Personnel - SMEs were knowledgeable concerning almost all of the equipment and knew the capabilities of each piece, if they were older - especially the E-7's with 15+ years of experience. Younger SMEs were more limited due to lack of real field experience. Changes occurred in personnel because of duties, moves, experience, but not burn-out.

Types of Knowledges - Safety and identification seemed to be the most important knowledges. Lack of understanding on how the equipment operates causes damage to equipment and down time.

Radio Procedures, which comprise short term memory, some memorization, sequencing, familiarity with technical vocabulary and use of charts were important.

Troubleshooting of equipment requires knowledge of "what causes what" and demands basic electronic skills that only the older operators seemed to possess.

Reading skills required seemed to be confined to use of CEOI, report writing, and form filling.

Instructional Review - Review was done by a person in DTD who was familiar with the course and the lesson plans. OSB is totally self-paced, with some variety of instruction at Willard and Mobile Training areas. At times when we were asking SMEs what was taught, they were only able to respond to things in their own lesson: they were not sure what was tuaght anywhere else. Some things were taught rather off-hand but not as a major objective.

ETAP Manual - Procedures used in the ETAP Manual were very helpful.

MOS Summary - 05C RADIO TELETYPE OPERATOR

Analysis Approach - Interviewing was done in the morning, 3-4 days per week, with Friday mornings reserved for verification. Meetings with SMEs were held in the RCA office with visits to the course, whenever it could be arranged, if certain concepts required detailing. Tasks to be analyzed were given to RTMD each week and they were responsible for contacting the course to locate knowledgeable SMEs.

Problems - The only problem encountered was finding somebody qualified to operate the UGC-74 teletype.

Discrepancies - The only discrepancies noted concerned equipment that was outdated. The task would describe how to use this outdated equipment, but the SME knew how to perform the task using other types of updated equipment. There were a few pieces of equipment that were so specialized that RTMD could not locate people familiar with them, Ex. FRC-93.

There were some procedural and equipment differences brought about by the SME's experience in different units. For example, an 05B in an infantry unit may not have performed the task quite the same or used the same equipment to perform the task as an SME in a signal unit.

Soldier's Manual - The Soldier's Manual was helpful on some of the tasks, but sometimes the setting in which the task was performed seemed aritifical and could not readily be identified with. After setting a scenario, analysis could proceed, but this did cause some time loss.

Almost all tasks were covered in the 05B analysis using 05C personnel; there weren't very many 05B's. Only a few additional tasks were required to perform as an 05C, especially those involving the use of the teletype.

Equipment - Some equipment was not available due to security reasons. Some newer equipment was not available, causing analysis to be sketchy and idealistic. Much of the equipment was multipurpose. The same RT (Receiver-Transmitter) could be used with different components for different purposes. It seemed that the "12 Series" radios were the "bread and butter" of the MOS and could be used in a variety of ways with the addition or substitution of components.

Personnel - SMEs were knowledgeable concerning almost all of the equipment and knew the capabilities of each piece, especially the E-7's with 15+ years of experience. Younger SMEs were more limited due to lack of real field experience. Changes occurred in personnel

because of duties, moves, experience, but not burn-out.

Types of Knowledges - Safety and identification seemed to be the most important knowledges. Lack of understanding on how the equipment operates causes damage to equipment and down time.

Radio Procedures, which comprise short term memory, some memorization, sequencing, familiarization with technical vocabulary and use of charts were important.

Troubleshooting of equipment requires knowledge of "what causes what" and demands basic electronics skills that only the older operators seemed to possess.

Reading skills required seemed to be confined to use of CEOI, report writing, form filling.

Instructional Review - Review was done by a person in DTD who was familiar with the course and the lesson plans. 05B is totally self-paced, with some variety of instructions at Willard and Mobile Training areas. At times when we were asking SMEs what was taught, they were only able to respond on things in their own lesson and they were not sure what all was taught anywhere else. Some things were taught rather off-hand not as a major objective.

ETAP Manual - Procedures used in the ETAP Manual were very helpful.

MOS SUMMARY - 05G SIGNAL SECURITY SPECIALIST

Analysis Approach - Analyst was given an office adjacent to instructor's offices to facilitate the interviewing process. There, interviews were conducted for four to five hours per day, four days per week. It was observed that beyond 3.5 hours of interview time, SME and analyst became less effective in uncovering procedure detail. Several interviews were cancelled by SMEs with no prior notice, often leaving analyst waiting. Analyst observed that SME assignment was passed around with little deliberation or prior planning. The verification process, on the other hand, was approached with more seriousness. All work was verified by an experienced 05G who also served as school and TADD (Training Analysis Design Division) liaison. This increased analyst's confidence in work obtained from SMEs.

Problems - No significant problems.

Discrepancies - None.

Soldier's Manual - Analyst found Soldier's Manual accurate and comparatively up to date. The manual was concise and outlined tasks with clarity. Some areas were identified by SMEs where "05G's" are increasingly being required to be knowledgeable, specifically, radar and computer surveillance. These areas were felt to be inadequately represented in Soldier's Manual and Task List.

Equipment - None.

Personnel - None.

Type of Knowledge - 05G MOS was analytical in nature. The 05G must be able to take fragments of information over a period of time, switch to enemy point of view, and then coalesce the information into possible security leaks. While math skills are necessary, their use is limited; the important skills are reading and synthesizing ideas.

MOS SUMMARY - 11B INFANTRYMAN

Analysis Approach - Over 50 SMEs were required to complete the MOS 11B due to the [illegible] particular areas. In many cases, the SMEs were very specialized in one area and the[y] [illegible] be interviewed for any tasks outside their area of expertise. A different SME or group of [illegible] were required to be used for each specialized area. Committee groups of instructors were utilized for added verification and input. The added review was valuable in identifying discrepancies and producing a better final product.

Problems - A shortage of qualified experts in technical areas created pressures [illegible] when coupled with the demands of the analysis, caused a reluctance on the part of [illegible] participate in full support of the project. This caused [illegible] to be extracted. It was often difficult to obtain the [illegible] manner because of the demands in their schedules. This problem [illegible] on temporary hold until the SME was available again to [illegible] tasks.

Discrepancies - The major discrepancies found involved the [illegible] rifle. The tasks were written and verified by the instructors [illegible] when analyzing the starlight scope in the M203 grenade [illegible] was being used and taught were incorrect for the M16A1 rifle. [illegible] the tasks were corrected. The instructors of the starlight scope [illegible] plans and corrected the errors in the use of the equipment. This [illegible] implementation and usage of the starlight scope which [illegible] taught improperly.

Soldier's Manual - The soldier's manual varied greatly in the content [illegible] tasks were written well and were up to date. These were the [illegible] assembly and disassembly of various pieces of equipment. Most tasks [illegible] manual were explained in general terms and lacked the comprehensive [illegible] for their accomplishment. Many of the newer tasks were nonexistent [illegible] causing the manual to be of limited value in only certain areas.

Equipment - Equipment for the 11B (Infantryman) soldier is varied and complex. Some equipment such as the platoon early warning system and night vision equipment is in very limited supply because of time demands in training experience. Due to the limited time of training, familiarization is kept to a minimum. Much of the responsibility seems to be delegated to the unit the individual will be going to and its specific unit requirements.

[illegible]el - The availability of the SMEs was unreliable. Some SMEs would say they were going for a task interview and then not show up for the meetings. The analyst notified the POC on these occasions who was able to rectify the situation each time. The support given by the POC and Infantry School was extremely beneficial in completing the project.

Types of knowledges - Estimating measures of varying lengths are used throughout the MOS in performing many of the tasks involving the alignment of weapons on targets. Map reading, involving recognition of characteristic symbols, and math are skills used extensively. Number lines and scales are used for various weapon sights. Verbal and visual communication is needed in leading patrols and adjusting firing positions. Safety must be practiced constantly in working with ammunition, from technical equipment to the reconnaissance of pertinent information.

MOS Summary - 11C INDIRECT FIRE INFANTRYMAN

Analysis Approach - Pre-analysis planning determined that the 11C MOS consisted of two distinct schools: the mortar crewmen and the computer. Subject Matter Experts advised that the analysis would be easier beginning with the mortar crewmen tasks. The more difficult computer tasks were those which followed the completion of the mortar crewmen tasks.

The tasks were analyzed by equipment. For example, all 81-MM mortar tasks were analyzed first followed by 4.2-inch mortar tasks, then 60-MM mortar tasks, M19 plotting board tasks, M16 plotting board tasks, and firing chart tasks. Although interviews were conducted in an office away from the sites, there was access to the necessary TMs for picture references and the necessary computer equipment. Following the completion of a number of tasks, the SME would take the write-ups to the mortar committee for verification. The tasks were returned within a week with suggestions for improvement. This feedback was conveyed to the analyst by the SME.

Problems - No problems were encountered. Full cooperation by all military and civilian personnel involved with the project was the norm at the 11C course.

Discrepancies - The only semblance of a discrepancy was that the tasks were written with the emphasis on the gunner's role in the 3- or 4-man crew (i.e., those tasks in the FM). The analysis, however, was written describing each man's role as a member of the crew in terms of functions and when such functions would be performed.

Soldier's Manual - The 18 September 1981 soldier's manuals were used as references. Both the Skill Level 1 and 2 manuals were better than most in outlining each task.

Equipment - Equipment used by 11C personnel include:

A. 4.2-Inch mortar
B. 81-MM mortar
C. 60-MM mortar
D. Equipment associated with the mortars includes various types of ammunition, a bore-sight, and a sight
E. M2 compass
F. Aiming circle
G. Mortar firing tables
H. M16 Plotting board
I. M19 Plotting board
J. Firing chart and its associated equipment
K. Communications equipment including the AN/VRC-64 radio, AN/GRC-160 radio, SB-22 switchboard, and the TA-312/PT and TA-1/PT telephone sets

Personnel - Except for the first week or two of analysis, one SME was used for the entire MOS. The SME and other 11C personnel were dedicated to the project, which resulted in complete cooperation. The one SME used for the original analysis was extremely bright and articulate in making information-gathering quite easy. The SME had all of the tasks verified through the mortar committee which saved considerable amounts of time for the analyst.

Types of Knowledges - Types of knowledges included:

A. Graphing in coordinate planes
B. Recognizing task-related vocabulary
C. Geometry to include lines and planes
D. Gauge measurement
E. Degree measures (azimuth)
F. Numbering and counting
G. Linear measures
H. Identifying parts or details according to a key or legend
I. Determining grid coordinates
J. Adding and subtracting of whole numbers and fractions
K. Manipulating objects to align, match, mate, make parallel, be perpendicular, or be at an angle
L. Completing forms
M. Determining information from charts and tables
N. Providing the appropriate amount of information via verbal communication
O. Note taking
P. Recognizing the types of firing missions and how each is fired and plotted
Q. Motor skills to include controlled precision and finger dexterity in operating equipment in coordination with crew members and plotting points and determining firing data
R. Selecting appropriate action in emergency situations

MOS SUMMARY - 11H HEAVY ANTIARMOR WEAPONS CREWMAN

General Commentary:

Major Problems - No major problems occurred during analysis.

Manual (Skill Level 1 and Skill Level 2) - Subject Matter Experts (SMEs) point out that tasks included in Soldier's Manual FM7-11H1 and Soldier's Manual FM7-11H2 are written to reflect skill qualification test (SQT) standards and do not reflect the combat standards according to which these tasks are taught in advanced individual training (AIT). TOW/ITV instruction is crew-drill oriented, according to SMEs, whereas the soldier's manuals focus on performance measures geared to the individual soldier. The SMEs say that the tasks presented in the soldier's manuals are out of synchronization with the school's program of instruction (POI), but not so much with reference to what is taught as with reference to how it is taught.

According to the analyst, the soldier's manuals seem to him confronted by a problem of semantics: 'conditions', as interpreted for each task, apparently means equipment and not a stipulation or provision -- a circumstance essential to the appearance or occurrence of something else; a prerequisite: 'standards', as interpreted for each task, apparently means a prerequisite and not that which is set up and established by authority as a rule for the measure of quality, or excellence: 'performance measures', as interpreted for each task, apparently means background information -- i.e., something about something, and not a detailed proceduralization.

Equipment - All equipment specified in FM7-11H1 and in FM7-11H2 for tasks listed was made available for original analysis.

Discrepancies - SMEs concur in opinion with reference to the amount of time allotted for TOW/ITV instruction, saying that it is insufficient. Approximately 75% of the information contained in the soldier's manuals is covered during AIT (TOW, 40 hours; ITV, 80 hours). SMEs say that instruction at Lee Field provides the entry-level soldier with an orientation to the TOW Weapons System; this instruction differs, according to unit SOP, after the soldier graduates and goes to a unit; so they say, the instruction that is provided by the unit has no homogeneity Army-wide.

Personnel - The majority of 11H instructors interviewed demonstrated an appreciable understanding of their task-specific objectives, according to the analyst, and the majority of them seemed motivated both as individuals and as a group. All of the SMEs expressed their enthusiasm about the mechanization of the infantry, and they take pride in the uniformity of their instructional techniques. The analyst said that this pride and this enthusiasm pervades the ranks of the trainees, too, as they show plenty of incentive to become top gunner among their peers, a distinction that the instructors extol. There is a marked absence of a polarization of personalities among

the personnel on Lee Field, the analyst said, and he cited the substantive support given to the analysis project. Of particular importance in expediting the analysis was the expertise of the SME responsible for the bulk of original analysis interviews; for, according to the analyst, it was this soldier's professionalism -- acknowledged by his fellow instructors as well as by his superiors -- that got the job accomplished with maximum effect in a minimum amount of time. He also is a soldier who thinks consistently in terms of the combined arms concept, the analyst said.

Depth and Type of Knowledges - Though the type of knowledge differs for each crewman's on-vehicle duty position (ITV) and for his duty position whenever utilizing the TOW weapons system in its ground-mounted mode (TOW), because the 11H soldier is cross-trained to function effectively at any of these duty positions it is assumed that the various knowledges apply to the entire crew, according to the analyst. He said that the 11M soldier must make many choices, drew inferences and determine various courses of action; his powers for verbal communication, for comprehending visual spatial relationships, for an awareness of and an attentiveness to safety and security are expected to be high. The 11H soldier also must possess quick reaction time, muscular control combined with agile multi-limb coordination, and motor skills that enable him to perform equally effectively either while on foot or while mounted on a vehicle; his capacity to recognize changes via his five senses must be acute. The analyst also said that the 11H soldier must comprehend time-telling measures, degree measures, and linear measures, read various types of gauges, count and differentiate among methods of numeration, and carry out the simple mathematics procedures of addition, subtraction, multiplication, and division.

Analysis Approach Commentary:

Extended Task Analysis Procedure (ETAP) Manual - A variation from the approach presented in the ETAP Manual was made by the analyst with reference to a hierarchical format and also with reference to the methodology for arriving at a knowledge analysis.

Because many of the 11H tasks included in FM7-11H1 and in FM7-11H2 are crew-drill oriented, the analyst chose to proceduralize these tasks according to each crewman's actions. He said that he chose this format because it assigns specific facts within a specific portion of the proceduralization to a specific crewman. In short, the proceduralization is given additional form in order to prevent the facts from eluding the crewman. Facts and ideas in chronological order alone cannot be conveyed always to another's mind without loss and are hardly likely to carry much meaning even for the possessor. Each crewman's mind demands regularity and symmetry, and is affected by the presence of a form that tailors the facts and ideas to him. In the act of impressing facts on the crewman's mind, form also expresses for the crewman the relationship of his actions to the actions of the various other crewman performing the task. This, according to the analyst, leaves less room for guessing at what the facts mean. Such organization distributes emphasis in the right places. The crewman's mind cannot give equal attention to every part;

it must be guided to those parts which it should attend to for a correct understanding. Repetition, likewise, is a form. Repetition is a signpost emphasizing that the crewman's mind look this way or that. For example, whenever a step within the proceduralization calls for the recording of information such as on DA Form 2404 then the very next step must read 'notify organizational of any deficiencies, by using DA Form 2404 columns "a" and "c"!' The wrong emphasis, as exemplified by the placement of a single blurb with reference to recording a report of damages at the ending of a proceduralization, destroys form; and, according to the analyst, it robs the crewman of the regularity and symmetry his mind demands. Consequently, the facts elude him. Consequently, a report that must be recorded may well be relegated to a later time when, in fact, the idea of the urgency for such a report carries little meaning.

Skill and knowledge analyses more often than not has caused SMEs interviewed to become uncomfortable, the analyst said; therefore, in light of past results obtained with SMEs in other MOS, instead of following the ETAP Manual's guidelines without any degree of divergence, the analyst teased out from the SMEs interviewed in the 11H MOS generalizations with reference to skills and knowledges required by the entry-level soldier and did not inquire repeatedly for such information in relationship to each and every performance measure. By-and-large, the attitude expressed by SMEs with reference to analysis of skills and knowledges is of no value, i.e., to the soldier. The analyst said that whenever the interview went beyond a discussion of the motions a soldier goes through in performing a task the SMEs - even the best among them - reacted defensively to the analyst's questioning, almost as though each of them was then waiting to be asked to work a mathematics problem at a chalkboard at the head of a classroom, and suddenly experienced a rush of embarrassment. The analyst's approach to this reaction was to back off from further questioning, explaining to the SME that it would be helpful enough on the SME's part if he simply were to indicate the specific points throughout the interview where it was his opinion that a soldier may need to know arthmetic, or may need to become keenly observant of some phenomena, or may need to do various actions simultaneously. Whenever the SMEs opinion had been offered, the analyst then made a marginal note of what was said and returned to that note either later during the interview or else during the analysis write-up in order to isolate skills and knowledges utilized. Also, during the verification procedure and the instructor review procedure, the problem was approached by asking the verifier or else the instructor where they in agreement with the knowledge analysis as presented by the SME who had contributed the facts during original analysis. Sometimes very favorable responses were elicited, the analyst said, because the verifier or the instructor seemed less likely to hold back from articulating his own insights in relationship to the things already said by someone else before him. In this manner, the analyst obtained additional input with reference to skills and knowledges.

MOS SUMMARY - 11M FIGHTING VEHICLE INFANTRYMAN

General Commentary:

Major Problems - No major problems occurred during analysis.

Manual - (Skill Level 1 and Skill Level 2): FM7-11M10 and FM7-11M20 are outlines of major steps involved in carrying out the performance measures of the tasks included in each of these soldier's manuals. A few of the tasks, as explained in these soldier's manuals do contain extended proceduralizations; but even these few tasks do not proceduralize the performance measures with a focus on crew-drill, which must be done and specifically with reference to those tasks dealing with the Bradley Fighting Vehicle M2/M3. Because these two soldier's manuals are draft publications, the proceduralizations developed by extended task analysis procedures (ETAP) for the crew-oriented tasks may become part of any future publications, as well as the various proceduralizations derived from ETAPs conducted by RCA in related MOS.

Equipment - A Bradley Fighting Vehicle M2 was made available for hands-on analysis throughout the course of the project.

Discrepancies (over-all MOS) - No apparent discrepancies are reported by the analyst, although he said that he did overhear talk among the SMEs with reference to problems in two areas: a lack of resident instructors, and inadequate planning in the construction of the training ranges (1 out of 3 can be utilized whenever other than stationary firing is conducted).

Personnel - All of the 11M instructors interviewed demonstrated an appreciable understanding of the [illegible]-task-specific objectives, according to the analyst, and all of them seemed motivated both as individuals and as a group. Each of these instructors displayed a capacity for conceptualization and each of them expressed well verbally. Every one of these instructors interviewed was able to use the Bradley Vehicle and its components in a hands-on fashion to explain further how the Soldier's Manual tasks are performed, the analyst said. The SME responsible for the majority of original analysis displayed a keen intelligence, compiled notes, and wrote suggestions to himself which he intends to employ in his role as instructor. The analyst said that this SME is a good instructor.

Depth and Type of Knowledges - The 11M soldier must make many choices, draw inferences and determine various courses of action... as must his first-cousin in the 11H MOS. He must communicate verbally with his fellow crewmen, and oftentimes must give directions or else issue commands, the analyst said. Comprehending spatial relationships, attending to safety and security, reacting quickly using multi-limb coordination and also muscular control are prerequisites to the 11M soldier's success. The analyst said that this soldier's capacity to recognize

changes via his five senses must also be high; he must comprehend time-telling measures, degree measures, linear measures and be able to read various types of gauges, count and differentiate among methods of numeration and carry out simple mathematics procedures of addition, subtraction, multiplication and division.

Analysis Approach Commentary:

Extended Task Analysis (ETAP) Manual - Refer to and use commentary offered with reference to MOS 11H (Analysis Approach Commentary), pages 3-5.

The manual is helpful, according to the analyst, especially during pre-analysis planning; he used it during the planning stage of analysis as a guideline for his explanation to the SME of what results were to be achieved through the analysis. After the SME understood that a data bank of information is of importance to developing the analysis the SME then was able to give input to planning by structuring a route of travel through the maze of tasks, utilizing each task as a kind of building block to be referred to later (alone or else in combination with other tasks), as the over-all analysis of the MOS progressed.

Commenting with reference to the substantiation, the verification and the review procedures, the analyst said that he found such a cross-check on information beneficial to isolating gross errors as well as to polishing, to refining detail.

RCA Service Company's Computer Terminal system saved much valuable time whenever action was necessitated with reference to an exchange of information. Good communications via this electronic medium, as well as responsive, immediate personal communication between RCA's Cherry Hill staff and the analysis site, contributed to resolving most appropriately any difficulties encountered by the analyst.

MOS SUMMARY - 12B COMBAT ENGINEER

Pre-Analysis Approach - Pre-analysis of the MOS consisted of briefing sessions with 12B personnel to familiarize them with the project. Goals were discussed as well as procedures for implementing the analysis, plus the requirements necessary to complete the analysis.

A senior NCO was furnished to review the contract task list for possible changes and to generally go through pre-analysis checklist found in ETAP manual. As a result of this meeting, the analyst found that the SM was being completely revised and that instead of some 118 tasks, there would be 48 skill level 1 and 2 tasks, plus 3 common subject tasks for which the Engineer School has proponency. A letter for the Colonel's signature outlining proposed changes was prepared, signature obtained and forwarded to the Project Director, RCA, Cherry Hill, N.J.

Tasks were arranged in ascending order of difficulty. Two SMEs were to perform all tasks with help from 12C section on bridging.

Analysis - Interviews were held in Conference Room of 12B section which enabled easy access to section personnel and the reference materials. Interviews were held 5 days a week for 3 hours each morning, starting in April 1982.

The format used was that established by ETAP manual: The first SME provided a detailed breakdown of how task was performed in the field; the second SME validated the data provided in first interview; and the Instructor Review was conducted at Ft. Leonard Wood, MO., during the week of September 13-17, 1982.

Problems - No major problems were encountered while analyzing mine/countermine operations, field fortifications, and demolitions, as the SME had had recent field experience, was knowledgeable, and possessed adequate verbal ability. It was more difficult to complete analysis on the Bridging and River Crossing tasks. There seems to be a problem as to what the 12B soldier really does at the 10 level and how responsibilities are divided between 12B and 12C personnel in these two areas.

Problems in communication exists because the courses are written at Ft. Belvoir and instructed at Ft. Leonard Wood, MO.

Discrepancies - There are differences as to the role of 12B10 as seen by 12B and 12C NCO's. Some differences as to how task is listed in SM by Belvoir and how it is taught by instructional personnel at Ft. Leonard Wood.

Discrepancies were noted on the way task is performed in field and the procedure as given in SM. This was noted on MGB bridge particularly.

There are no 20 level tasks taught at Ft. Leonard Wood and there is no 20 level course later on, so all 20 level tasks must be unit trained. According to SME's, unit training quality varies from adequate to non-existent.

Proponency for Claymore Mine was transferred to Infantry School, Ft. Benning, GA. However, the task is still being instructed at Ft. Leonard Wood, following the Engineer School content.

Soldier's Manual - The task list from the March 1982 SM was used as a basis for the analysis. The SM gave the task title, task number and the major steps involved.

Personnel - The 12B personnel at Ft. Belvoir were extremely cooperative and helpful while performing as SMEs and Reviewers.

The 12C personnel used in cross-checking on Bridging and River Crossing tasks were generally non-commital and not very cooperative. Persistence by 12B personnel and the analyst finally got the job done.

The Ft. Leonard Wood 12B Site Personnel were very cooperative once the analyst was able to get down through the staff hierarchy to them.

Types of Knowledge Needed - The soldier needs to know task related terminology so that he can perform tasks at 10 level in a squad setting. Objects must be classified by size, shape and color.

Finger dexterity is needed to work with intricate mechanicms found in demolitions and mine/countermine operations.

The soldier does not use TMs or written aids, but takes verbal direction from squad leader in accomplishing most tasks.

MOS SUMMARY - 13B CANNON CREWMAN

Analysis Approach - Most interview sessions were held in the office area provided to RCA Service Company. Occasionally interviews were held at the training area so the analyst could observe task performance. This was done most frequently for group tasks - those tasks requiring two to six soldiers. SME's were provided upon request through the point of contact. Replicate analysis procedures were used for tasks for which analysis was done in the following MOS: 11B, 12B, 15D, 15E, 19D, 19E, 55B, 64C, 95B.

Problems - Analysis was accomplished using a draft Soldier's Manual, dated 1981. A great number of tasks were duplicates - only the equipment changed, such as M-12 series or M-100 series. To accomplish analysis efficiently the task was analyzed first for one type of equipment, and replicate (duplicate) analysis procedures were used for subsequent types of equipment. A second major problem had to do with analyzing group tasks. A format was developed so each group member's activities were included.

Discrepancies - Most discrepancies were the results of incomplete task statements - no listing for tools, vehicles, or lubrication orders. Use of the log book was the responsibility of the section supervisor, as reported by SME's, not the 10 - or 20 - level soldier. Some tasks were selectively trained. For example, everyone was trained to emplace aiming posts, but only some soldiers were trained to aline them.

Soldier's Manual - As described above a draft version, dated 1981, was used.

Equipment - The types of equipment needed to perform the tasks were listed in the Soldier's Manual. Little discrepancy in use was noted. For some replicate tasks from 19D and 19E the type of equipment, mainly machine guns, varied with the equipment used by the 13B soldier.

Types of Knowledges - In general, spatial orientation and environmental observation skills predominated. Also, basic skills in numeracy are required. Because of the crew nature of the MOS, receptive communication skills are important for the 10- and 20-level soldier. At the higher skill levels expressive communication scores become important.

Tasks on M-36 chronograph are to be deleted, but school wanted the tasks analyzed. The M-36 is no longer taught in the school for 13E's. M-90 chronograph is to become a portion of the instruction of MOS 13B; M-90 is an item issued at firing battery level and the M-36 issued at division artillery level. M90 provides identical data as the M-36.

Tasks on computer set, field artillery general, TI-59 is taught only in Officer's Basic Course, not in 13E course. Planned 3-hour course possible will be increased to 8 hours in new 13E program of instruction. After interviewing several SME's, the analyst discovered a lack of knowledge and very little use of TI-59 in field units. Under revision is Ft. Sill Reference Note (Jan. 80), a job aid, which is needed for nuclear and meterology computation.

Duplication and reorganization of identical data from task to task is prevalent in Soldier's Manual 13E. An example of this is the repetitious use of equipment programmed for additional or continued tasks using field artillery digital automatic computer (FADAC) and the computer set TI-59. Tasks are duplicated by use of equipment. Data in the tabular firing table (book) is on the graphical firing table (stick) and on charts attached to the FADAC (computer).

Detailed instruction appears in numerous tasks but rarely used in field training such as direct fire procedures and use of M-10 plotting board, according to SMEs.

New materials or systems are not in the field nor is equipment for performance of tasks such as the Copperhead and the Battery Computer System.

Some forms for merely recording data obtained elsewhere are not needed in computer operations, since data is stored. Most forms are commonly called "idiot sheets" by SMEs. Form titles are not consistent in soldier's manual such as highburst/mean point of impact (HB/MPI) to only HB or MPI. "8-inch Nuclear Computation" is form title having two sections, the task calls the form name according to section utilized.

MOS SUMMARY - 13E CANNON FIRE DIRECTION SPECIALIST

The 13E MOS is a highly skilled and elite group within the artillery MOS. They are the fire [illegible] (FDC). The main job of the 13E is to calculate where an artillery round will [illegible] by manipulating numbers of math of various kinds. In its purest sense, a 13E must be [illegible] add, subtract, multiply, divide, use geometry, algebra, and trigonometry, in addition [illegible] and decimals. The 13E must plot and update points reported to them by the forward [illegible] to the guns.

Much of what a 13E does involves looking up data in charts and tables. Sometimes these are relatively simple charts limited to locating a specification from an intersection of a row and column. Sometimes requiring cross referencing between tables. Some tables require interpolation of the values. Slide rules are commonly used to obtain information to relate to the guns. They require a soldier to align numbers precisely and to read values off a scale, often estimating between values.

In general the 13E MOS is a speed oriented MOS requiring high math skills. Very few tasks require mechanical functions except to manipulate and align slides and platters. The Army is slowly and reluctantly switching to more electronic methods of fire direction control such as [illegible] hand calculators. These should take some of the mental burdens off the 13E [illegible] but will still be an elite MOS requiring exceptional math abilities.

MOS SUMMARY - 13F FIRE SUPPORT SPECIALIST

A soldier in the 13F MOS must be concerned with many areas of skills and knowledges. A few of these are essential to function effectively. The primary task a 13F must do is to spot and locate targets. Almost all other tasks rely on this skill. Several key components are contained within this spot and locate function. First a soldier must be adept at map reading and locating ground points on a map. This includes recognizing terrain features on maps, contour lines, grid coordinate systems, and measuring distances on a map. Second, a soldier in 13F must be able to estimate distances accurately from several kilometers down to a few meters. Third, he must be familiar with the MIL system of measuring angles and be competent at estimating angles. All of these skills are used to accurately locate, by coordinates, a target for the artillery.

Many of the tasks performed by a 13F are extensions of the primary task of locating targets. Radio communication skills and procedures are used to relay target information to the fire direction control (FDC). Encoding and decoding messages are used for security purposes. Bracketing and adjusting of guns requires some basic math in addition to estimating skills. Very little technical skill is required by a 13F but a great deal of practice to develop precise estimating skills is essential.

Very little technical knowledge is required of a soldier in 13F at this time. The only equipment generally used is binoculars, compass, map, radio, and sometimes a digital message device. The near future may see the forward observers with a complex vehicle with lasar range finders and targeters, numerous radios, and other sophisticated items to use and maintain. With all the improvements, the forward observer's (13F) job will still be to locate targets, and provide information to them on direct artillery rounds.

MOS SUMMARY - 15D LANCE MISSILE CREW MEMBER

The 15D MOS is basically a labor related MOS. The soldier is concerned primarily with assembly and preparation of a lance missile. Many of the tasks require the soldier to manipulate and mate parts. There are very few tasks that involve mental processes, computations, or even much thinking. The tasks are basically mechanical in nature and some require considerable strength. Most tasks are just one portion of a team effort to prepare a lance missile for launch. Speed to complete the team effort is critical and minimum time standards have been established for many of the tasks. All 15D are trained in all tasks but when someone is particularly adept at a particular task that will become their assigned job in the team.

At the skill level II, a 15D assumes a bit more responsibility. Instead of the pure muscle tasks, the 15D now performs tasks involving finer alignments and setting. Adjusting and setting fuses and autocolliminating devices on the missile, while still being basically mechanical operations, require fine manipulative skills.

Due to the sensitivity of missiles and nuclear warheads, a 15D is responsible for a great deal of safety and security. Numerous cautions must be followed and procedures to check and double-check settings before the missile is ready to fire are quite common. In addition, inspections and the perpetual stream of forms must be completed at regular intervals. These are most often done by a skill level II soldier.

MOS SUMMARY - 15E PERSHING MISSILE CREW MEMBER

Analysis Approach - Most interview sessions were held in the office area provided to RCA Service Company. Occasionally interviews were held at the training area so the analyst could observe task performance. This was done most frequently for group (crew) tasks - those tasks requiring more than one soldier. SME's were provided upon request through the point of contact. Replicate analysis procedures were used for tasks for which analysis was done in the following MOS: 13B, 15D, 26Q, 63N, 63 W, and 64C.

Problems/Discrepancies - No major problems were encountered, nor discrepancies noted.

Soldier's Manual - An undated draft version was used. The standards required in each task were referenced to technical manuals. SME's advised this was due to periodic revision of the Soldier's Manual.

Equipment - 15E contains equipment, programmer test set, and power station also used by MOS 21G, Pershing missile Maintenance Specialist.

Types of Knowledges - Spatial orientation and environmental observation skills predominated. Also, basic skills in numeracy are required. Because of the crew nature of the MOS, receptive communication skills are important for the 10- and 20- level soldier.

MOS SUMMARY - 16D HAWK MISSILE CREW MEMBER

The first MOS to be done - straightforward, with good SM, SMEs and job aids.

This is an MOS that does not call for any extraordinary skills and knowledges.

Some minor electronic skills, team work, strength, attention to safety inputs, ability to follow detailed procedures (crew drill) and ability to do a pressure job in a hurry (as preparing for action on march ordering the equipment), must be done within prescribed time limits. The 16D must know it's limits and when to call for further assistance.

The coordinating problems with other Service Schools and the need to work through TRADOC apply. Much too torturous a route for something that should be simple.

The better 16D's in many cases cross-train as 16E's to enhance their promotion potential and their career progression. Of course, they are much more valuable to their unit when they can operate all of the HAWK equipment.

The actual training course in AIT suffers from a lack of motor transport, lifting apparatus and some other handling equipment so the 16D fresh out of school needs a lot more training that must be given at the first unit.

MOS SUMMARY - 16E HAWK FIRE CONTROL CREW MEMBER

The following comments were distilled from pertinent conversations.

Major skills and knowledges required are ability to follow detailed procedures (crew drill), work under pressure, teamwork, strength, march ordering, emplacement, ability to work with maintenance personnel, and identify and explain problem areas. Others include being able to recognize symbology, knowing when equipment is operating properly, being able to use complex communication equipment, reading scopes, interpreting and reacting to signals from other agencies, superior, lateral, and subordinates, and knowing when to call for help and assistance.

The Soldier's Manual was in draft form and was satisfactory except for the shared tasks that were incomplete. This is a recurring problem and was a factor in all analyses at this site.

There were many SME problems: no-shows, lack of pertinent knowledges, inarticulate people when it came to explaining tasks. It was a constant battle to stay even with the program. There seemed to be a shortage of "available" 16E's so it was a constant problem getting enough qualified people to assist us.

Recommendation for any future such efforts: attempt to nail down the Service Schools a little better. Those who were briefed by TRADOC never seemed to be the real participants.

MOS SUMMARY - 16H ADA OPERATIONS AND INTELLIGENCE ASSISTANCE

This MOS was scheduled to be analyzed first. No one was ready so it wound up being the last one. Even then, things (SM's, Job Aids, personnel) were not always ready.

The MOS is really a potpourri of many others. The operator portion of 25L, some 05B, some 63W (sic), some 71L and some others. The first course to train 16H under the new scheme of things is still in residence so there was no field feedback or any longitudinal experience to draw from.

The 16H must be a jack-of-all-trades: an operator of a complex Air Defense Coordinating System, a radio operator, a generator operator, a driver, and a clerk. So all the skills and knowledges required come from all these areas mainly being part of a complex team, having better than average coordination, visual acuity, and mental alertness to recognize all the sights and sounds of the AADCP.

The Soldier's Manual is a semi-disaster and the Air Defense School has requested and obtained permission for a 12-month delay to do another front-end analysis and to restudy the entire MOS and its supporting documentation. All of this occurred during the course of analysis.

A major problem with the Soldier's Manual is that the pieces that came from Signal, Engineer, Transportation, Administration, etc., must pass through a labyrinth created and manned by TRADOC so that the SME's at Ft. Bliss cannot deal directly with their counterparts at the other Service Schools. This compounds time, understanding and coordination problems. Just too many people in the process. In fact, there are numerous versions of a task with the identical number that pertained to the same piece of equipment, but were quite different in content.

This comment may apply to most any MOS, but the 16H with its content coming from so many other areas is particularly susceptible to an over-control problem. There are so many in charge, that really no one is in charge.

MOS SUMMARY - 16P ADA SHORT RANGE MISSILE CREWMAN

The analysis was done by two analysts. The following comment is distilled from various conversations as the work progressed.

Major Skills and Knowledges required are: ability to follow detailed procedures (crew drill), work under pressure - many times short-handed. React quickly to changes in situation - short time available to detect, identify, engaged, and destroy targets.

Know when equipment is operating properly - know when to seek assistance as necessary. Be able to use communications equipment - procedures, maintenance and be able to work with other agencies - superior, lateral, and subordinate.

The Soldier's Manual (1976 version still the official one) was a disaster: out-dated, many tasks had become incorporated into FM's 21-2 and 21-3. Draft manuals were in a constant state of flux. As of this date, they still are undergoing extensive changes.

SMEs had to be procured from first ADA Tng Bde which required many coordinating steps, all in writing - a simple chore was over-complicated. SMEs were however very competent and knowledgeable.

The Shared Task problem that surfaced in the 16H area applies as well for 16P. This has not been solved as of this date. By the time TRADOC guidance gets to the schools for implementation, the next round is being sent out.

MOS SUMMARY - 17B FIELD ARTILLERY RADAR CREW MEMBER

A problem exists in the plotting, as with the 17C. The students are taught the 3-point method with the boxwood scale and in the field either the metal coordinate scale or the plastic L-shaped scale is used.

The Soldier's Manual and the Trainer's Guide is not detailed enough for the soldier to complete a task, especially the air lifting and rigging tasks. The soldiers are not tested on these tasks and only see films covering air lifting.

All the soldiers (17B) are not trained on the AN/TPS-58 radar; only a selected number receive this training. Those TPS-58 units in the U.S. and in Germany actually perform most of the TPS-58 tasks. The units in Korea never move the sets which are emplaced on the DMZ. This also applied to the AN/TPS-25 radars. The only place the MEP-017A generator is used is in Korea and there only as a back-up. The MEP-025A is used worldwide. There is one task on the 025A and two tasks on the 017A.

There is no field training in the radar course. The complete course is self-paced and conducted entirely at the counter-fire department. Many of the tasks cannot be performed by only one individual and many are not performed by the students during the course, (march order, emplacement, registrations, etc.). When the student completes the course, he has received an introduction to radar and radar operations, but wouldn't be considered a competent operator as stated by most of the instructors at Counter-fire department.

The conditions, standards, and performance measures on many of the tasks are exactly the same, although some of these shouldn't be the same. The equipment listed in the task, as required for task completion, is not complete.

Currently, and for approximately five MOS, there has only been one 17B at the SQT branch. He is not qualified on the TPS-58, has never operated the set, or supervised a TPS-58 section. Yet he is responsible for putting out test products on this equipment.

MOS SUMMARY - 17C FIELD ARTILLERY TARGET ACQUISITION SPECIALIST

MOS 17C seems to be undergoing a change in equipment and personnel. Many new systems are being introduced into the MOS, which were not analyzed. (AN/GRA-114 data link, variable format message entry device (VFMED), Digital Message Device (DMD)). Many of the personnel assigned to the MOS have been reclassified into the MOS. The 17C personnel working in SQT Branch do not seem to be qualified because they were reclassified. When they were asked questions on many of the tasks or pieces of equipment, the answers were, "I've never seen that piece of equipment", or "I've never done that in the field". These people are SFCs/E-7s and in a field unit would run an entire 17C platoon!

The instructors at the school (counter-fire dept.) do not seem to know which tasks are taught and which are not taught. I have three different lists of tasks which are BSEP I and BSEP II tasks. I had to get the final list from the Government Civilian in the department.

There is a discrepancy in the way plotting is done. The students are taught the 3-point method using a boxwood scale but in the field they use a metal coordinate scale or the L-shaped plastic scale. They do this because it's a much faster method of plotting.

The soldiers are taught how to do a task but never why. Until he is very familiar with the task, if the soldier is interrupted, he will return to the beginning of the task and not at the point of interruption for task completion.

MOS SUMMARY - 17K GROUND SURVEILLANCE RADAR CREWMAN

I. Problems, General

A. Three models of AN/PPS-5 caused some difficulty in write-ups

B. Lack of knowledge on some equipment by "desk-bound" SMEs caused some trouble in write-ups, to include:

1. multimeter, TS-352 B/U
2. AN/PPS-15 radar because of being newer equipment

C. Shortage and available time of instructors

1. When available however, were excellent

II. Discrepancies, general

A. None noted

III. Observations of Soldier's Manual

A. Some references incorrect on final draft

B. No task on ECM or ECCM on radar equipment (non-communication)

C. Brought to attention of POC that there were duplicate task numbers in final draft, which was in camera ready format

D. Some equipment indicated in "conditions" not required for task

E. Some common/shared tasks do not fill needs of 17K e.g., ECM/ECCM

IV. Observations of equipment

A. Available in quantity

V. Observations of personnel

A. Assistance was excellent in most areas, except 1B above

B. Instructors in general, and especially one individual, were superior

VI Depth and type of knowledge required

A. Good grasp of basic math, e.g., add, subtract, divide, and multiply in whole/decimals or fractions

B. Basic electronics would be extremely helpful along with radio wave propagation

C. Good mechanical aptitude

MOS SUMMARY - 19D CAVALRY SCOUT

Analysis Approach - Site supervisor decided on a group approach to analysis of the MOS, assigning tasks to all three analysts. Interviews were held in the office with trips being made to view equipment components prior to/during analysis as desired; soldiers were on hand to answer questions and explain operations.

The ETAP manual was helpful in training at the startup of the project; it was not used by our group during analysis.

Major Problems - Twenty working day lead time to obtain SME 2/Instructors at the outset. Problem was alleviated when we volunteered to go to the SMEs; POC seem surprised, when we volunteered, that we were willing to go to the personnel.

Discrepancies - Inclusion of tasks which are done so rarely by 19Ds that SMEs were hard to find (e.g., booby trap tasks and several of the demolition tasks, which are ordinarily performed by engineers; several of the radio tasks).

Inclusion of a number of supervisory tasks which, as written by proponent, are at an inappropriate level for SL 1 and 2 soldiers. SMEs said tasks were included because 19Ds need the skills which are being supervised and there are no appropriate tasks available for the skills themselves.

Soldier's Manual - Tasks written by other proponents vary considerably in completeness, level of specificity, and applicability to 19D soldier. SMEs said that proponents had been informed that certain tasks, as written, are inapplicable; but proponent refused to modify or to permit Armor School to modify task to fit.

Confusion in a number of tasks over what constitutes a performance step and over difference between standards and performance steps. Background information is presented fairly often as a performance step rather than as an explanatory note.

Equipment - With respect to certain radio tasks, several SMEs (E6s and E7s) admitted they were unfamiliar with the particular radio.

Personnel - Cooperative. Knowledgeable in most tasks (exceptions noted above). SMEs could not identify major steps unless led.

Depth/Type of Knowledges - Reference and reading skills on a rather low level, form completion, and operation of a wide range of equipment.

MOS SUMMARY - 19E M48-M60A1/A3 ARMOR CREWMAN

Analysis Approach - Site supervisor decided on a group approach to analysis of the MOS, assigning tasks to all three analysts. Interviews were held in the office with trips being made to view equipment components prior to/during analysis as desired, soldiers were on hand to answer questions and explain operations.

The ETAP manual was helpful in training at the startup of the project; it was not used by our group during analysis.

Major Problems - Twenty working day lead time to obtain SME 2/Instructors at the outset. Problem was alleviated when we volunteered to go to the SMEs; POC seem surprised, when we volunteered, that we were willing to go to the personnel.

Discrepancies - Redundancy of tasks among three different tanks, i.e., separate tasks for M48A5, M60A1, and M60A3 covering procedures which are essentially alike.

Inclusion of several tasks with limited application probability, i.e., M551 Sheridan is found only at Fort Bragg and is being phased out; M73/M219 machineguns are obsolete.

Soldier's Manual - Tasks from other proponents vary considerably in completeness, level of specificity, and applicability to MOS 19E. Armor School's efforts to modify some tasks for better fit have been rebuffed by some proponents.

Heavy reliance in some tasks on TM references. The TMs for the M60A1 series tanks are well-illustrated and generally easy to follow; so the referencing probably is more useful than written descriptions would be.

Inclusion of separate group of five tasks for M48A5 seems of questionable value since, in general, the M48A5 (which is used in Korea and by National Guard units) functions like M60 series tanks.

Equipment - Thirty-one tasks were deleted because the M55A (Sheridan) is being phased out and is no longer appropriate to the MOS.

M73/M219 machinegun tasks are not taught because these weapons are being phased out due to the superiority of the M240.

19E - 2

Personnel - Cooperative, knowledgeable. SMEs could not identify major steps unless led.

Depth/Type of Knowledges - Knowledges required for the MOS include locating information in the TM for the equipment and following TM instructions for conducting PMCS and troubleshooting. Other knowledges/requirements include filling out forms and performing tasks both individually and with a crew.

MOS SUMMARY - 24C IMPROVED HAWK FIRING SECTION MECHANIC

Of all the MOS analyzed at Ft. Bliss, the 24C effort went the best.

This was due to a number of factors: the Draft Soldier Manual, although late, supplemented the task list and Job Performance Measures (JPMs); the SME's were the most knowledgeable, most cooperative and most available of any of the SMEs; they could place themselves into the role of the Level 1 and 2 Soldier and approach the various tasks from the viewpoint.

The 24C as part of his AIT is first trained as a 16D HAWK Missile Crewworker prior to entry into the Technician course. This extra knowledge and skill helps him appreciate the point of view of an operation and enables him to use the operator as an assistant when required (2-man rule application).

The 24C must be able to think logically, analyze symptoms, read and understand directions, read meters, diodes, indicator lights and understand proper and/or improper readings.

The 24C must know parts locations on equipment, on schematics, and in the parts manuals. He must know supply procedures, forms, and when parts may be obtained.

The 24C must be able to perform troubleshooting by Branch and Flow (B&F), Fault Isolation Procedures (FIP), and Logic Methods. This requires that he read schematics after finding the proper ones, detailed or general, with associated symbology and logic.

He must have manual dexterity, strength, the ability to work in close quarters around high voltages and the knowledges and skills to bypass interlocks.

The 24C must know and apply safety precautions concerning himself, the equipment and others.

The 24C must be able to interact with others: superiors, peers and subordinates in such a manner that the required job gets done. Many tasks performed by a 24C have extreme time limitations and constraints so that a sense of humor and patience are essential.

The 24C MOS is highly synergistic (the sum total of all skills and knowledges is much greater than the sum of all the individual parts that are taught). The successful 24C must continue to grow and build upon the base constructed in the Service School if he is to be of value to himself and his unit.

MOS SUMMARY - 24H IMPROVED HAWK FIRE CONTROL REPAIRER

Analysis Approach - After much discussion with 24H SMEs it was decided that to analyze the myriad of possible repair problems, troubleshooting techniques, etc., the best approach was to develop a model format for Skill Level 1 and Skill Level 2 tasks that remained to be analyzed. The models were, in their opinion, a more realistic method of laying out a routine which may vary from person to person. The models were then filled in with appropriate references which are both a resource and a job aid to the 24H. Any special problems or knowledges were entered in the area they would be encountered in the format.

Problems Encountered - None

Discrepancies - None noted.

Observations of Soldier's Manual - Probably the best I've seen, laid out and referenced well.

Observations of Equipment - Seems to be ever improving and some will be obsolete when our job is finished.

Observations of Personnel - The three men I had the pleasure to work with were some of the best trained people I have ever met. They showed a definite interest in the project and expressed the hope that it might bring a better starting product to their field.

Depth and Types of Knowledges to do Job - In general, the student should possess a good, if not above average, grasp of the following: common sense (hard to test), math (trig. at least), read well, be able to use tools, have a working knowledge of electronics.

Be able to work in odd positions (upside down on back), be able to lift at least 100 pounds to about 3 feet.

MOS Summary - 26L TACTICAL MICROWAVE SYSTEMS REPAIRER

Analysis Approach - Analysis planning began June 5, 1981, with analysis start date scheduled for June 12, 1981. The estimated completion date was set for August 20, 1981. The location where analysis took place was in the course area with the equipment. Final write-ups and reviews took place in room 211 of Brant Hall (contractor location). The RCA analyst and the school analyst met with the course chief at the 26L course area to discuss methods and procedures for analysis. During the planning session, officials at the course agreed to provide qualified SMEs with field experience on a daily basis for four hours per day. A list of tasks deleted from the Soldier's Manual was provided to the RCA analyst. No further training analysis pertaining to those systems was conducted by the activity, due to equipment being phased out of the Active Army Inventory. There were no common nor reserve component tasks on the task list to be analyzed.

Problems/Discrepancies - The RCA Analyst reported no problems in getting qualified SMEs for analysis. Task dealing with the Radio Terminal Sets AN/TRC-129A, AN/TRC-132A, and AN/TRC-80B were dropped from analysis because of their low density in the Army.

Soldier's Manual - The RCA Analyst used the Soldier's Manuals to obtain task titles and task numbers for analysis write-ups. However, outlines in the manual could not be used as guides for task write-ups because the major steps identified by the SME were not always the same as those identified in the Soldier's Manual.

Equipment - The equipment density of Radio Terminal Sets AN/TRC-129A, AN/TRC-132A and AN/TRC-80B was determined by a phone conversation between Sgt. Randolph and Mr. Joe Silva on August 13, 1981. The gist of the conversation follows.

1. There are only 2 Radio Terminal Sets AN/TRC-129A in the inventory. They are here at Ft. Gordon and are being utilized by ICTS as circuit conditioning loop back terminals. There is no MOS 26L training on this equipment and none is required.
2. There are currently 14 Radio Terminal Sets AN/TRC-132 in the inventory. Twelve are at Ft. Huachuca and the other 2 are at Air Force Base in Massachusetts. Recommend unit training.
3. There are a total of 36 AN/TRC-80B's. 33 are in Europe, and 3 are at Ft. Sill. (These are currently being turned in or being cannibalized as obsolete). Recommend unit training until all are out of the system.
4. Tasks pertaining to the AN/TRC-132A are not in the coordinating draft of the new Soldier's Manual because of the low density of equipment (only 12 are left in the Army inventory).

In view of the above information, all tasks listed on the RCA memo will be deleted from the 26L Soldier's Manual. These tasks were dropped from RCA analysis.

Personnel - All personnel at the 26L course were cooperative. Knowledgeable SMEs with field experience were provided on a daily basis for four hours per day. Course instructors served as verifiers and reviewers.

Types of Knowledges - The 26L soldier needs to have all the skills that the 26Q soldier (Microwave Operator) has. He/she should be able to number and count, read gauge measures, compute or perform using addition and subtraction/multiplication and division facts. He/she should be able to read and follow procedural directions, read reference materials (TM's, tables/charts, illustrations, maps, schematics, etc.) to gain access to information for completing a task activity or for selecting a course of action. Completing and using completed forms to locate or compare information is a very necessary skill of the 26L soldier. Above all, knowledge of safety and security precautions is very important to avoid hazards or prevent injury to self and/or equipment.

MOS Summary - 26Q TACTICAL SATELLITE/MICROWAVE SYSTEMS OPERATOR

Analysis Approach - Analysis planning began June, 1981. The RCA Analyst and the school analyst met with the course chief at the 26Q course. During pre-analysis planning, methods for analysis were discussed. It was decided that the course would provide SMEs for four hours daily. Analysis took place in Brant Hall (Room 211) and at equipment site locations, building 29811, OT 28.

Problems/Discrepancies - No problems were encountered during the analysis of the 26Q MOS.

Soldier's Manual - The RCA analyst used the Soldier's Manual to obtain task titles and task numbers for analysis write-ups. However, outlines in the manual were not very helpful as guides for task write-ups because, in some instances, major steps were not properly identified.

Equipment - Many of the tasks in the 26Q MOS were deleted due to the fact that the equipment was obsolete.

Personnel - SMEs were generally cooperative, courteous, and extremely knowledgeable in their field. Although instructor shortage existed, SMEs were always provided for analysis and verification.

Types of Knowledges - The 26Q soldier needs to be able to number and count, use units of measurement, and read and interpret gauge measures. He/she must be able to read and follow directions as well as be able to use reference materials, tables and charts, illustrations and diagrams to gain access to information relevant to the MOS. Completing forms and using completed forms to locate or compare information are also necessary skills required of the 26Q soldier. Identifying and observing precautions relating to safety and security are important knowledges required for the 26Q soldier.

MOS SUMMARY - 27E TOW/DRAGON REPAIRER

Analysis Approach - Interviews for 27E (Tow/Dragon Repairer) were held solely in the office space provided RCA Service Company (Building 3344) which was convenient to the work site of the SME and in which SMEs were comfortable.

Providing SMEs was a burden on the providing agency due to shortages of the MOS. Interviews were adjusted to SMEs schedule. Cooperation and support were excellent.

Problems - The analysis of tasks of this MOS was made solely from TMs and interviews, not from field observations. This in itself was not a major problem as the MOS works within a standardized workshop-van and works within the procedures of the TMs.

The SME attitude reflected a desire to present the "school position or solution." The undetermined problem is how well this reflects or hides field experiences such as poor sequence or lack of special tools or parts.

Soldier's Manual - The current Soldier's Manual was dated 23 July 1982. After the analysis began, the changes did result in some confusion over which tasks were to be considered.

This Soldier's Manual was frequently too broad in performance measures. Typically, they were "1. Do the disassembly steps. 2. Do the repair procedures. 3. Do the assembly steps."

Often Repair, Alignment, Troubleshoot type tasks had the same first and third steps when the task required the item to be whole. At times, the sequence of tasks was not logical. Troubleshooting following Alignment and Repair, when it appeared that Troubleshoot, Repair, Alignment would be the sequence in the field.

The Soldier's Manual gave excellent references and condition statements.

Equipment - This MOS works in a specific shop designed and equipped to service the Tow/Dragon weapon components and the associated accessories.

Personnel - More personnel would have been advantageous. The limited number did not delay the completion of the analysis process.

Types of Knowledges - The 27E Soldier must read well, comprehend technical manuals, and sophisticated electronic repair. He must replace electronic components of a complicated nature. He works with items and components both sensitive and delicate. He uses test equipment. He must be exact in reading and in making adjustments to equipment. Basic math skills are needed. Reference skills are required daily.

Analysis Approach - The ETAP Manual was a good reference/guide. When SME indicated the task was completed exactly as detailed in TM, details were taken from TM and then confirmed. The substantiation - verification - instructional review processes seemed to be necessary and valuable. No problems developed requiring RCA action - schedule problems resulted in no loss of time. There was always something else to do.

MOS SUMMARY - 31J TELETYPEWRITER REPAIRER

Analysis Approach - All interviewing was done in the 31J Course area, allowing access to specific equipment for technical details. Generally, interviewing was confined to afternoons, but some tasks became so involved that all-day sessions became necessary. An SME was chosen for the equipment to be analyzed, as no one SME could be used for all. The procedure to be used was explained to the SME, and, after some trial and error, a systematic troubleshooting procedure was developed and pursued. Verifiers were chosen for their expertise in operating a particular piece of equipment. The course and section chiefs were conscientious providers and if a particular person was requested, he was provided. Supervisory personnel were very knowledgeable about the equipment and SME quality. All were very cooperative and professional. The verifiers were thorough and capable.

Problems - A major problem was a shortage of instructors, especially for unusual pieces of equipment. The course chief was especially helpful in providing people when problems were encountered. A secondary problem encountered was due to the fact that whenever a new person was needed for a different piece of equipment, the analysis rationale and procedure had to be explained and the system for troubleshooting had to be developed all over again. This took time, and some times we had to regroup and start over, once a more comfortable system emerged. The longer the analyst was involved with the course, the easier it became, because the "new" SMEs used later in the analysis were more aware of the project. Thirdly, a problem was encountered as to determining the level or type of maintenance involved. Each "shop" in the field is run differently, depending on personnel or mission. The type of shop determines test equipment availability and method used for repair. Basically, the analyst chose to attack the task as the SME had performed it in his experience or the setting in which the equipment was most often found. There is no clear cut delineation of skill level I and II. Once the SME chose the setting, he was able to proceed and structure their responses accordingly. The lines of communication had to open between the SME and the analyst with a great deal of sensitivity on the analyst's part not to be pushy, and to be respectful of the SME and his part in the analysis-people don't ordinarily think in the realm necessary to troubleshoot.

Discrepancies - Methodology of troubleshooting is a personal experience for each repairman. Each has his set set of procedures determined by experience with the equipment involved. Generally speaking, the end result was the same, but the procedure involved for solving the problem could vary, sometimes drastically. Even so, a verifier could track the procedure used fairly easily, but it was difficulty to change SMEs in the middle of a task without losing time and having to redo what was analyzed. If an SME had to be gone for awhile, the analyst would select another task for a different SME. Some problems (symptoms) were more universal than others, especially with the older equipment and fewer discrepancies arose between SMEs and became noticeable between TMs and SMEs. The SMs would give certain specifications for adjustments per specific components. In reality, the older the equipment was, the more the

parts became worn, the less a repairman could rely on those specifications and the more he had to rely on his knowledge of the system of operation of all mechanisms involved

Soldier's Manual - The Soldier's Manual was not much help, in fact, the task performance standards were more confusing than helpful. Even the titles were misleading. We had problems separating the troubleshooting and repair tasks, realistically. By the time you have gotten to the point of isolating the trouble, you fix it. This made the analysis artificial, until a method was developed whereby the troubleshooting and repair was done as in "real-life" in the troubleshooting task and references only were used in the repair task.

Equipment - The "bread and butter" of the 31J repairman is taught in the course, hands-on, with limited use equipment being reserved for on-the-job training. Test and tools are instructed except for some new equipment not yet available. However, an experienced repairman rarely uses all the tools, relying on his trained "eye" for measuring specifications and knowledge of how parts work together to correct problems. Much of the equipment is similar according to the manufacturer, teletypes made by Kleinschmidt use much of the same components and adjustments, while those manufactured by Teletype Corp. have a different set of characteristics relative to each other. It seemed to the analyst that if a repairman had experienced with one, and was familiar with electronic and mechanical theory, he could effectively work on another using the TMs. Because of time, the equipment used in training is modified and stripped and practice is limited to the more available kinds of adjustments

Personnel - Except for specialized or new equipment, no problems were encountered as to availability of SMEs. SMEs were cooperative, competent, and sincerely interested in participating. Pleasure was expressed in the fact that they were being consulted, and their experience was desirable.

Types of Knowledges - In general, the knowledge of electronic principals and mechanical operations were the most important. One of the SMEs was hesitant to use the TMs or to read anything, but was quite capable and informative. An interesting point discovered was that the instructors were very much aware of the reference and paragraph number and used it to discuss lessons with the student, but in reality, rarely used the TMs on the job. Reading and use of schematics are important The soldier can glean from a schematic and electricaly theory all that is necessary to know as long as he has the equipment handy. Terminology is not as important for the repairmas as it was for the analyst. In order to describe the procedure, we had to use the technical vocabulary while the repairman needed to know its function. A knowledge of math - especially measurement skills - is necessary, but more in a functional way are the calculations. The repairman especially needs to know what a very small measurement looks

like, for example...2003". Betweenness was also important. Reading is necessary when problems are encountered that experience cannot solve. It seems that a repairman "tinkers" first, and reads only when nothing else works. Even then, key phrases and information is selected because of a background in electronics and mechanics.

Instructional Review - This was the first MOS in which the new instructional review procedure was used. Fortunately, the supervisory personnel selected had a lot of experience in all the sections of the course and so the review went very smoothly.

ETAP Manual - The ETAP Manual wasn't used, but the procedures were as practiced at the training session. Procedures have been modified to suit the personality of the analyst, only as to the formality of the procedure.

MOS SUMMARY - 31M MULTICHANNEL COMMUNICATIONS EQUIPMENT OPERATOR

Analysis Approach - Analysis planning began November 3, 1981. Analysis start date was November 4, 1981. The RCA analyst and the school analyst met with the Course Chief and his assistant at the 31M course. During pre-analysis planning, methods for analysis were discussed. It was decided by the group that a weekly list of tasks to be analyzed would be provided to the course chief by the RCA analyst. Course officials certified that those tasks would be supported with SMEs during that week. Interviews for analysis were held at the 31M course (room 205 of Burkhart Hall). Analysis write-up took place in room 211 of Brant Hall. Analysis verification and instructor review took place at the 31M course and in room 211 of Brant Hall.

Problems/Discrepancies - No major problems existed during the analysis other than SME "burn-out" due to instructor shortage.

Soldier's Manual - The Soldier's Manual was used only to obtain task numbers and task titles. The outlines could not be used in task write-ups because they did not reflect the major steps in the procedures as described by the SMEs.

Equipment - The majority of the equipment used in the 31M MOS was available at the course for task demonstrations by SMEs.

Personnel - Despite instructor shortage, SMEs were always provided for analysis and verification. Usually, the SME verifier was able to do the instructor review. All personnel at the 31M course were extremely cooperative and courteous. SMEs demonstrated a thorough knowledge of communications systems.

Types of Knowledges - The 31M soldier must possess quite a variety of skills and knowledges. He/she must be able to synthesize information from written sources which may contribute to the completion of a task activity. The 31M soldier must have the skills necessary to identify, select and use appropriate reference materials (tables, charts, illustrations, and schematic diagrams) to gain access to information pertinent to the task at hand. He/she must have the necessary skills to complete forms and to use them to locate or compare information. Above all, the 31M soldier must use common knowledge to prevent safety hazards and to minimize any safety or security problems.

MOS SUMMARY - 31N TACTICAL CIRCUIT CONTROLLER

Analysis Approach - Interviewing was mainly conducted in the morning with 31N SMEs at Willard Training Area. An SME was chosen or assigned to assist in analyzing all tasks. If and when tasks came up that were concerning equipment the SME was not familiar with, we went to the site of that equipment or to an experienced person for assistance. Verification was often done in a small group with two or three people participating.

Problems - A major problem occurred when the original SME was assigned elsewhere and new people were made available. The new SMEs were never really sure what was expected or how much time was demanded of them. At Willard they were still available to the students and sometimes this caused interruptions. This was further compounded by the fact that the analysis was started and then stopped, when the first analyst left and another analyst was assigned.

The civilian responsible for 31N training at Willard was extremely cooperative and helpful, both technically and as a supervisor. There are very few military people involved in the training of the 31N. At the classroom part of the course there are no military instructors and only military presence was an NCOIC.

Discrepancies - There is quite a bit of difference between how the task is performed in the field and how it is taught in the classroom. This is caused by the actual intent of task. SMEs stated that organizational maintenance is not a responsibility of the 31N operator, even though much of the task is performed by the operator as a part of daily preventive maintenance. DA Form 2407 is not always the responsibility of the 31N operator and DD Form 314 is not usually available either as a reference or to be filled out. The Master Station Log does not always exist as such, but the same information is recorded in the "cash book". The Cable Diagram is rarely available to the operator, but similar information is recorded as cables that are connected, or a bulletin board in the patching shelter.

Soldier's Manual - The Soldier's Manual was very helpful for many of the tasks. It provided a good guide for major steps and was usually correct. Only problems occurred with the "Check and Inspect" tasks as they just stated the same information as the parent task. In reality, the operator checks and inspects - there are no team chiefs or other supervisory personnel who perform the task, per se, on a regular basis. Some information in the body of the task related to other MOS but was not really identified as such. This was helpful to the operator in performing the task, but was not a 31N responsibility.

Equipment - Most all equipment was available and was taught at some point in the course, as part of a self-paced program of instruction. The procedures used to connect circuit to circuit

systems are all basically the same, no matter which patch panel is used, except for the TSQ-84. The TSQ-84 is an interim piece of equipment used in situations where other eq will not work as well. It has some standard items and test equipment not available with shelters.

Personnel - Personnel were knowledgeable and competent.

Types of Knowledges - Knowledge most difficult to pinpoint was the knowledge the 31N to know in relation to other MOS. Since he is part of a large system involving other MO personnel connected to his equipment, it is helpful to know what they are doing. Knowl of types of circuits, signals, and the language of other systems is helpful

Instructional Review - Instructional Review and Knowledge Analysis were done using per from both the classroom part of the course and Willard, the field site

ETAP Manual - After one and one half years of ETAPping, the manual was not used, but course the procedures were.

MOS SUMMARY - 31V TACTICAL COMMUNICATIONS SYSTEMS OPERATOR/MECHANIC

Despite a shortage of instructional personnel, Subject Matter Experts (SMEs) maximized responses and participated in the analysis project without reserve. Overall analysis strategy focused on coordinating skill level 1 tasks and skill level 2 tasks from Soldier's Manual FM 31V 1/2 into an integrated modular systematization, by organizing residual informational components and fragmented informational inputs into a well-balanced presentation.

The communication school's shortage of instructional personnel has caused a disproportionate student-instructor ratio, according to SMEs; 31V 10/20 students matriculated under extant circumstances receive a minimum of individualized training; thereby, realistic hands-on laboratory training capabilities relative to technological access diminish radically. Missing is the immediate and optimal feedback recognized by educators as critical to student motivation and goal maintenance. Many students experience reading comprehension difficulties (according to SMEs, some students cannot read, at all), making the efficacy of their self-paced mode of instruction questionable. A reciprocal cost-benefit relationship perhaps is unachieved.

SMEs offer the opinion that this self-paced instructional program must be dropped in favor of a return to a lock-step instructional program. They contend that a principal benefit of a lock-step program is a viable control exercised by instructors over academic discipline. They also suggest diagnostic screening for entry-level soldiers characterized by a kind of inquisitiveness, those with patient and analytical personalities; for such kind of people, so they say, hold promise for becoming fine repairmen.

In order to develop a theoretical understanding of applied electronics, at the outset of their training all 31V 10/20 soldiers perform a four-week long block of classes referred to as enabling exercises. Yet neither the skill level 1 nor the skill level 2 tasks included in FM 31V 1/2 comprise a monitor per se that checks mastery of this theoretical understanding; the student's understanding is assumed to have increased, say the SMEs, otherwise the students could not perform the soldier's manual tasks. Because the 31V Extended Task Analysis Procedures (ETAPs) reveal several examples of how skill level 2 tasks duplicate performance measures found in skill level 1 tasks, the analyst suggests scrutinizing these enabling exercises as a source of empirical data which may become the basis for new tasks -- to replace the deadspace now occupied by duplication.

Some major problems encountered during analysis resulted in deleting several tasks from analysis, because they are security related. Another major problem was the unavailability of major equipment as follows: [illegible] VSC-3 and ATL VSC-3 teletypewriters, and AN/PRC-74 radio.

All SMEs requested a copy of ETAP results, acknowledging the usefulness of the final product [illegible].

MOS SUMMARY - 32D STATION TECHNICAL CONTROLLER

Analysis Approach - Analysis planning began October 29, 1982. Government Furnished Materials were delivered to RCA on January 5, 1982. Analysis start date was planned for November 2, 1981, but was changed to January 25, 1982, due to having to analyze the 31M course first. SMEs were provided for analysis four hours a day or more, four days a week. Review SMEs were provided as needed for up to four hours a day, once a week. Analysis took place at site location of equipment and in room 211 of Brant Hall.

Problems/Discrepancies - No major problems were encountered during the analysis.

Soldier's Manual - The Soldier's Manual was used only to obtain task titles and numbers.

Equipment - Some of the equipment used to analyze the tasks in 32D were in eight vans (less than 1% density) army wide. These vans are not being used in the field and may be totally replaced by the 84 van. No SMEs were available at Fort Gordon.

Personnel - SMEs were generally cooperative, courteous, and very knowledgeable. Although instructor shortage existed, SMEs were usually provided for analysis and verification. Usually the verifier was able to do the instructor review, thus avoiding time loss during analysis.

Types of Knowledges - The 32D soldier must be able to use time-telling measures and gauge measures. He/she must be able to add and subtract, multiply and divide. He she must be able to solve simple algebraic equations with one unknown. In the 32D MOS, it is often necessary for the soldier to synthesize information from written sources which contribute to the completion of a task activity. He/she must be able to use reference materials, tables and charts, illustrations, and diagrams to gain access to information relevant to the MOS. The soldier must be able to complete forms and be able to use completed forms to locate or compare information. The soldier must be able to communicate well verbally with other individuals when working on a task. The soldier must be able to use and apply common knowledge to avoid hazards to prevent injury to self or equipment

MOS SUMMARY - 32H FIXED STATION RADIO REPAIRER

Analysis Approach - During pre-analysis planning, an SME from the course looked over the list of tasks to be analyzed and explained that the names of some of the pieces of equipment have been changed. For example, the radio receiver R-390 A/URR has been modified and is now called the radio receiver R-1981; the single sideband converter CV-157/URR is now known as converter C/-3300; the radio frequency oscillator O-1706/TSC-25 is now synonymous with the [illegible]-2 exciter. The SME identified simpler tasks to be analyzed first so that these could serve as building blocks for longer and more complicated tasks which were to be analyzed later. For example, the SME identified the pieces of equipment that go together to make up the Communications Central AN/TSC-25 (the radio receiving set AN/FRR-40/41, the radio transmitting set AN/FRT-53A, (the telegraph terminal AN/FGC-77/61A.) The operate, troubleshoot, align, and repair tasks, dealing with each piece of equipment comprising the AN/TSC-25, were analyzed first before dealing with the Communications Central AN/TSC-25 tasks. This same procedure was followed in the analysis of the radio set AN/FRC-93.)

Interview sessions were generally held 3-5 days per week utilizing one SME per session. SMEs were provided for task verification and instructor review.

If equipment was available at the course, SMEs usually demonstrated procedures during the interview which made identification and location of parts and components easier to explain during the write-ups.

Problems/Discrepancies - No major problems were encountered, although instructor shortage created SME "burnout". Obtaining accurate, appropriate, and updated technical manuals for the equipment used in the MOS was a problem at times. Some of the equipment taught at the course is no longer used in the field. SMEs stated that often equipment used in the field is not actually repaired by the 32H repairman. Private contractors are usually called in to do the repair work. Not all the tasks on the task list were taught at the school. This made finding qualified SMEs difficult.

Soldier's Manual - The December 1981 draft was used during analysis. It was not very helpful as a guide for task analysis write-up because at times it listed inappropriate equipment for task performance and frequently major steps were not properly identified.

Equipment - As was stated above, most of the equipment taught at the course is no longer used in the field.

Personnel - Despite instructor shortage, SMEs were always provided for analysis and verification. Usually the SME verifier was able to do the instructor review, thus avoiding time loss during analysis.

All personnel at the 32H course were extremely cooperative and courteous. SMEs demonstrated a thorough understanding of communications systems and field services experiences. Their excellent ability to articulate technical information in plausible terms enabled the analyst to proceed effectively without contract delay.

Types of Knowledges - SMEs must be thoroughly familiar with all test equipment used in the MOS (multimeter, signal generator, oscilloscope, spectrum analyzer, etc.). They must possess thorough knowledge and understanding of basic electronics. They must be able to read gauges and meters as well as be familiar with tools used to adjust, align, tune and repair electronics equipment. They must apply certain preventive measures prior to task performance to minimize any potential safety or security problems. They must be able to read and apply information found in the various technical manuals (read and interpret wire diagrams, schematic diagrams, and charts). They must be able to recognize task-related words with technical meanings. They must be able to use formulas to solve mathematical problems and they must be able to complete forms and use completed forms to locate or compare information.

MOS SUMMARY - 33S EW/INTERCEPT EQUIPMENT REPAIRER

Analysis Approach - Interviews were conducted in front of equipment which facilitated the detail required. The equipment was stationed in Classroom labs with four systems in secured areas. Generally, interviews were held with one SME per system/piece of equipment. Tasks were grouped around systems/pieces of equipment. For each system/piece of equipment, 3 tasks were defined as Troubleshoot XXX, Align XXX, Repair XXX. These task definitions were found to be inaccurate of what was actually being accomplished, and somewhat contrived in drawing lines of distinction between them. For example, Repair XXX is normally accomplished in the performance of Troubleshooting XXX. To separate these as distinct tasks is misleading and difficult to describe. Also, alignment is the natural consequence of Preventive Maintenance Checks and Services (PMCS). However, PMCS is not included in any task definition, and yet it is routinely performed by "33S" at the organizational level of maintenance.

Problems Encountered - The first and foremost problem was that of creating a useable task list. Additions and deletions occurred to the task list throughout the analysis. 33S as a MOS is on the threshold of total reorganization. This one MOS will be split into 5 MOS within two years. Further, the equipment inventory a "33S" is expected to service is 2500 pieces of electronic equipment. This inventory is in dynamic change always as the state of electronic technology becomes more and more sophisticated. So arriving at a reasonably representative task list was a task in itself. It should be noted military personnel remained cooperative and helpful throughout this process. They seemed eager for any assistance.

Secondly, several pieces of equipment were classified, limiting the amount of analysis released on them to RCA headquarters. However, there were no variations of basic skills and knowledges on this equipment from that other equipment analyzed more fully and completely.

Discrepancies - None.

Soldier's Manual - The existing Soldier's Manual was hardly used inasmuch as it contained out-of-date equipment and procedures.

Equipment - None.

Personnel - None.

Types of Knowledges - There seemed to be several echelons of repair being performed. All required solid basic math logic, and electronic theory - however, for advanced digital equipment, algebra and logic became primary. Ability to read and not be overcome by the complexity of

schematic diagrams is essential. Most SMEs displayed a high degree of seriousness and thoroughness in their approach to the analysis and their jobs within the MOS. I observed in them the ability to deal with large, complex problem solving and the determination to pursue the task until complete.

MOS SUMMARY - 35K AVIONIC MECHANIC

Analysis Approach - Interviewing was conducted whenever the SME was available and for as long a time as he could spend with the analyst. Tasks were given to the course chief or the NCOIC and they would assign an expert when available. If no one was available, or had expertise on the equipment, we asked the Avionics people in TADS or DTD for help and they would send someone. Verification was done whenever a second knowledgeable person was available.

Problems - The greatest problem in 35K was a shortage of instructors. Sometimes there just wasn't anyone available for interviewing, let alone for verification. The course chief and division chief and TADS personnel were very cooperative, we just had to work around the shortage. It did cause some time loss.

Problems occurred in the area of rare, and new equipment. Some pieces of equipment are the responsibility of a 35K only when he has the additional skill identifier (ASI) training. It's hard to find these SMEs.

Discrepancies - Number of discrepancies were limited to a few errors in the TMs. There were some discrepancies in terminology - for example, the word "repair" used in task titles is misleading, as the 35K doesn't repair anything but the wiring, he is a component replacer. His main function is to troubleshoot a system, not really repair.

Soldier's Manual - The soldier's manual was helpful in some cases, but we did not use it much, except for references.

Equipment - We had use of mock-up equipment at the course for many of the tasks. This was extremely helpful and as close as we could come to the real thing. Some equipment is so touchy, so critical, that the 35K is generally not allowed to work on it until he has years of experience on the job with knowledgeable personnel. These tasks were identified as such in the comment section. Some tasks had to be analyzed by personnel in other MOS who, in reality, really performed the job.

Some equipment was so new that we performed the analysis only as it should have been done. We were unable to identify location as it hadn't been installed yet.

Personnel - Personnel were knowledgeable; it was evident they had been motivated to learn many related skills in order to perform their jobs. Many were pilots, or qualified to fly with the aircraft, which is an add-on skill. Older 35K's had had a more complete background in electronics and this made them more qualified to make educated choices when troubleshooting equipment. Younger SMEs had had to learn electronics on their own to be proficient in their job. This was especially true when reading schematics in order to track down faults.

SMEs were very courteous, helpful, and very patient.

Type of Knowledges - Knowledges concerning what "the thing" looks like and its function is important in order to locate it among all the other equipment on the aircraft. One needs to know how each piece of equipment fits into its system in relation to its wiring, in order to troubleshoot effectively. Terminology and technical vocabulary is important to know, in order to communicate with the pilot and other members of the maintenance team as well as in the use of the reference material and form completion. Certain electronics knowledges are necessary such as frequency settings for tuning radios and navigation equipment, and electrical principals involved in reading schematics and wiring diagrams, to troubleshoot. Use of TMs and other references require certain reading skills necessary to the 35K. They are important as there are just too many pieces of equipment to locate and operate to have them all in memory.

Instructional Review - Review was done per task by an instructor familiar with the course, and there were no problems in determining what was taught and not taught in the group-paced, lock-step course. However, the equipment is taught using mock-up, not real situations (the pieces of equipment and parts of the aircraft were real, but much of the equipment was removed and some things were not hooked up the "real" way or in the correct location). This is, of course, due to the nature of the MOS.

ETAP Manual - The procedures in the manual were used, but not necessarily the manual per se.

MOS Summary - 36C Wire Systems Installer/Operator

Analysis Approach - During pre-analysis planning, it was determined that interviews for 36C (Wire Systems Installer/Operator) would have to be held at various locations due to the fact that the course is divided up into sections because of the large number of tasks and variety of equipment used in the MOS. Going to the different sections to conduct interviews allowed SMEs to demonstrate task procedures for analysis. Tasks dealing with pole climbing and pole rescue operations, wire ties, and repair of field wire/cable lines were analyzed at the Pole Orchard. Those dealing with construction and troubleshooting of field cable lines and installation/operation of telephone sets and terminal boards were analyzed at the Tact Wire Unit. Tasks dealing with switchboard installation/operation were analyzed at the Switchboard Unit. Analysis of tasks involving installation of aerial field cable on poles and A-frames using reeling machines were analyzed at the Ponderosa, while those involving the use of telephone central office equipment installed in shelters were analyzed at section 10-A.

Interview sessions were generally held 3-5 days per week, utilizing one SME per session. During pre-analysis planning, simpler tasks such as pole climbing and making wire ties were identified to be analyzed first so as to serve as building blocks for longer and more complicated tasks to be analyzed later. Approximately two verifiers from each setion were used to verify tasks for the 36C MOS all of whom were extremely cooperative and thorough.

The ETAP manual served as a good source of reference in conducting a task analysis. The definition of terms, the flowchart depicting the Extended Task Analysis Procedure, the explanation of ETAP features, along with the Taxonomy of Skills and Knowledges aided the analyst in ensuring that the project was implemented as prescribed.

Problems - The major problem encountered was instructor shortage which caused SME "burnout". As with the 67Y analysis, a shortage of instructors created pressure on the men which, when coupled with the demands of analysis, caused reluctance on the part of some SMEs to participate in the project. Again, as with 67Y, this caused some difficulty for the analyst to extract information: less information was volunteered, questions had to be more probing, and the interview setting became somewhat less relaxed. Despite instructor shortage, SMEs were very cooperative and helpful. Another problem with the 36C analysis was having two analysts interviewing within the same MOS. This was a problem because of instructor shortage.

Discrepancies - None, other than the expected differences in opinion among SMEs on insignificant items.

Soldier's Manual - The July 1980 edition of the Soldier's Manual was used. It served as an excellent guide in determining type of tools/equipment and major steps to include in each task analysis write-up.

Equipment - Some of the tasks dealing with the new telephone truck M-878 used by the 36C soldier were difficult to analyze due to nonavailability of SMEs who had had field experience with the equipment. The majority of the equipment used in the 36C MOS was available at the different course locations for task demonstrations by SMEs.

Personnel - SMEs were generally cooperative, courteous, and very knowledgeable. Although instructor shortage existed, SMEs were always provided for analysis and verification. Usually the SME verifier was able to do the instructor review thus avoiding time loss during analysis.

Types of Knowledges - The 36C soldier not only must be in good physical condition, but must possess good body coordination and motor skills for pole climbing and maneuvering equipment while on the pole. He/she also must be able to run along behind a moving vehicle to pay out and pick up cable. He/she must be able to read and comprehend written material as well as apply map reading and reference skills to locate and use information in TM's and job aids. He/she must possess good speaking and handwriting skills to communicate effectively orally and in written. Some basic math skills are required as the 36C soldier must be able to read and interpret gauges and calculate distances and measurements. He/she must be familiar with various safety precautions to avoid hazards and prevent injury to self and/or equipment.

MOS Summary - 36K Tactical Wire Operations/Specialist

Analysis Approach - During pre-analysis planning, it was determined that many of the tasks in the 36K MOS were the same as in the 36C MOS. For example, installation/operation of reeling unit RL-31E, installation/operation of switchboard SB-86, installation/operation of telephone set TA-312, and installation/recovery of field wire lines were tasks shared by the two MOS.

Interviews for the 36K MOS were held at various locations, as was done with the 36C MOS, due to the variety of equipment used. Interview sessions were held 3-5 days per week, utilizing one SME per session and one verifier per task.

Problems - Again, as with 36C, instructor shortage was the main problem. Whenever an SME was unavailable (which was rare), the analyst used the time to plan for the next interview by studying the equipment to be used in the next task analysis and by locating and skimming TM's applicable to that task to determine which questions to ask during the interview.

Discrepancies - None, other than differences in opinion among SMEs on insignificant matters.

Soldier's Manual - The July 1980 Soldier's Manual was used. It served as a good reference in determining major steps of task analysis write-up. In some instances, the equipment listed for task performance was incomplete.

Equipment - Despite instructor shortage, SMEs were always provided for analysis interview and verification. SMEs were very knowledgeable, courteous, and cooperative. They all had had field experience with the tasks.

Types of Knowledges - The 36K soldier must possess good reading and language communications skills to communicate with team members and to communicate in writing. He/she must possess good map reading and reference skills to locate, compare, and use information in TMs and job aids to select a course of action.

Basic math skills are also required of the 36K soldier. He/she must be able to estimate units of measure, compute time in Greenwich Mean Time, identify units of measure on instruments, compute and solve problems and interpret spatial relationships of figures, symbols and objects.

36K - 2

The 36K soldier must be in good physical condition to climb poles, lift and operate heavy equipment, and run along behind a moving vehicle while paying out cable.

The 36K soldier must use common knowledge to avoid hazards in order to prevent injury to self and equipment and apply preventive measures prior to task performance to minimize any potential safety or security problem.

MOS SUMMARY - 43E PARACHUTE RIGGER

Problems - The availability of trained personnel proved to be a major problem during the analysis.

Discrepancies - The Soldier's Manual did not include much essential information needed to complete task.

Soldier's Manual - As stated above, the Soldier's Manual did not include much essential information necessary for completing task. The manual often jumped from one step to another without instructing the soldier how to get there. The analyst noted that the Soldier's Manual relied heavily on technical manuals that were not always available to ten and twenty level soldiers.

Steps that proved to be identical to those listed in other task did not always follow the same format. The analyst noted that this was especially true with instructions on placing parachutes in their proper layout.

Photographs were often included in the manual for identifying certain parts of parachutes or for actions the soldier might need to take. The analyst found the photographs unclear and of poor quality in many cases.

Equipment - All equipment was available to the analyst during training (school) hours.

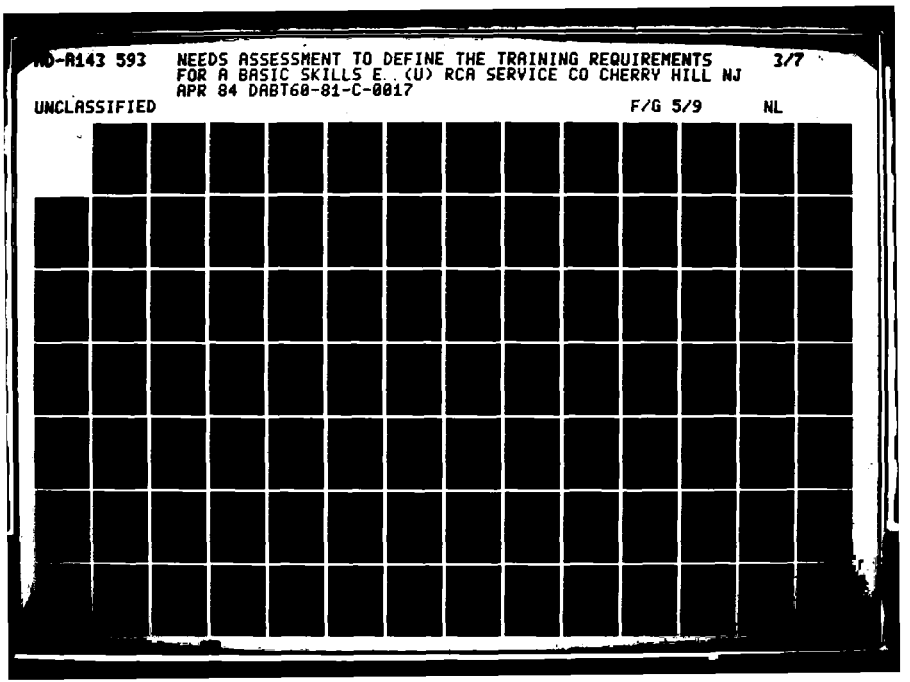
Personnel - The analyst worked with a large number of personnel during the analysis. Their knowledge ranged from superior to very poor. The analyst asked that one SME be excused from the project

Team members often displayed disagreements as to how a task or step was to be performed with each other. Official manuals were often said to be incorrect by the subject matter experts.

Additional job duties often made the more knowledgeable personnel unavailable.

Knowledges - Knowledges involving directions appeared to be VERY ESSENTIAL FOR WORKING WITH PARACHUTES. It appeared very important that a soldier recognize what directions a parachute gore or clevis be moved.

The ability to identify certain parts of parachutes according to numerals appeared to be very important. For example, recognizing the meaning of gore 16.


AD-A143 593 NEEDS ASSESSMENT TO DEFINE THE TRAINING REQUIREMENTS 3/7
FOR A BASIC SKILLS E..(U) RCA SERVICE CO CHERRY HILL NJ
APR 84 DABT60-81-C-0017
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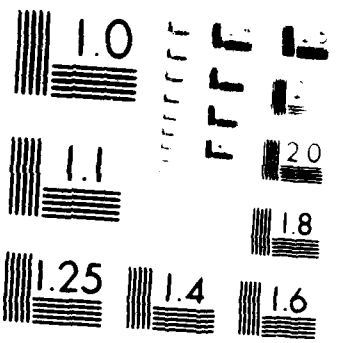

MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS 1963-A

MOS SUMMARY - 43M FABRIC REPAIR SPECIALIST

Analysis Approach - Interviews for 43M (Fabric Repair Specialist) were generally conducted at the fabric repair classroom sites where light-, medium-, and heavy-duty sewing machines were located. Since virtually every task within this MOS involved operating and maintaining this machinery, the SMEs were inclined to demonstrate how this equipment was used in typical field operations. These demonstrations facilitated the interviewing process and subsequent write-up of ETAPs, because the procedures were often complex and difficult for the SME to verbalize.

Two SMEs were assigned to this MOS analysis, but one in particular served as principal informant approximately 85 percent of the time. A task list was provided and closely followed throughout the analyses. In most cases, each task was written in final form during the interview; tasks requiring editing were completed the following morning in the field analyst's office. Typically a one- to two-hour block of time was reserved each morning for editing ETAPs and scheduling interviews.

Prior to analyzing a higher skill level of tasks, the completed ETAPs were submitted in batch to a small review committee for verification. The reviewers were both former 43M instructors who interacted with each other and the principal SME during verification.

Problems - A consistent problem that was encountered involved having access to the classroom buildings. Due to prearranged meetings among the instructional cadre, battalion inspections, and periodic unavailability of keys to the buildings, the analyst - SME interview had to be rescheduled on several occasions.

Discrepancies - Although there were relatively few and minor discrepancies, they usually involved a lack of agreement between the way in which procedures were written in the current FM and the SME's account of how such procedures were to be followed. More specifically, certain procedures in the FM often required additional steps and, in some cases, further elaboration on descriptions of machine maintenance.

Soldier's Manual - A xeroxed copy of a 1979 edition of a Soldier's Manual was made available to the analyst prior to analysis of 43M. Because it was only a xeroxed copy, the photographs displayed throughout the manual were lacking in detail. There was sufficient clarity of detail among simple illustrations and diagrams.

Equipment - The 10-level soldier was trained to operate and maintain a light-duty sewing machine and was expected to be facile with sewing accessories, such as scissors, cutting blades, small pliers, chalk, lubricating oil, and brushes for cleaning the sewing machine. The 20-level soldier was responsible for operating and maintaining medium- and heavy-duty sewing machines.

For mobile unit operations, the 10-level soldier was expected to set up and operate a 3-kilowatt generator set, and various tables designed to support the sewing machines.

Personnel - As stated earlier, two SMEs were available for interviewing: one principal and one auxiliary. The principal SME was extremely cooperative and patient. The auxiliary SME was less available due to his increased involvement in developing skill qualification tests for 43M. The SME involved in the ETAP review was very thorough and helpful in suggesting ways to revise certain statements. The instructor had several years of teaching and field experience, and was extremely thorough in his review.

Types of Knowledges - Overall, six skill areas were consistently identified in the tasks comprising 43M. They involved: recognizing various shapes of tears in fabrics; discrimating among various simple geometric shapes (for patching materials); marking off whole numbers and fractions on a standard 12-inch ruler; estimating fractional distances; applying motor skills (e.g., regulating a foot treadle and manipulating fabric under a sewing machine); and completing various forms.

Very few tasks required a soldier to reference and read information in documents outside the manual.

MOS SUMMARY - 44B METAL WORKER

Pre-Analysis - Blair Bryant, POC at Aberdeen, set up and presented a one-hour briefing on the goals of the BSEP Analysis Contract, the personnel requirement, procedures for completing the analysis, verification and Instructor Review. The briefing was given to officers and key enlisted personnel responsible for administering the 7 MOS being analyzed. The briefing was given the week of 7 June 1981.

An additional briefing was given by the analyst to each SME and to key 44B course NCO's concerning analysis procedures plus a general overview of project.

Analysis - Interviews were held with a different SME for each metalworker task. The interviews were conducted on job site with SME physically performing the task first and then verbally outlining how the task was performed. Interviews were conducted five mornings a week from 7:30-10:30, followed each day by a verification interview with a section NCO. Instructor Reviews were usually done on Fridays with a section Chief NCO.

The format followed was taken from an original ETAP manual with original forms. TPA-1 was completed with SME to get major Step breakdown, data on how task was performed was placed on TPA-2, Knowledge Analyses were completed on original TPA-3, which meant writing volumes over and over.

Problems - One major problem incurred was trying to get SMEs who had performed the various welding and metal working tasks in the field. Some SMEs had to be rejected and a qualified one found. The Chief Instructor was always cooperative and helpful with this problem.

Using a different SME each day required an initial orientation period to tell about program, find out something about SME and let him get used to analyst.

Many of the SMEs had difficulty with the oral interview format, thus we quickly changed to the performance/oral interview style. The SME could talk if they had the equipment in their hands.

It was a constant battle to keep analysis on what was done in the field rather than how it was instructed at the school.

Discrepancies - Discrepancies existed between procedures cited by school and SM and those as performed in a field environment. Discrepancies noted in Comments Section, TPA-1.

Soldier's Manual - SM dated January 1981 used to obtain task number and task title. The task contained in SM did outline major points to be covered fairly well. Some disagreement by the SMEs as to whether task should be included in SM or not, based on their field experience.

SM divided into Duty Position tasks Skill Level 1-2 in Chapter 2 and Related Technical Tasks, Skill Level 1 and 2 in Chapter 3. The factors of their being Resident or Non-Resident and Critical or Non-Critical tasks was a source of confusion as to whether or not it was to be analyzed. The school position at start was that every task in SM was to be analyzed. This was later revised, and some tasks were excluded.

Personnel - SMEs were provided on a timely basis by Senior Instructor, even if all of them did not meet the required criteria of field exposure or possess the oral skills required of analysis.

The key instructor personnel were most cooperative and helpful and believed the analysis would be of direct benefit to them at a later date in their Army careers.

Course used "self-paced" which meant instructors were constantly busy and served as a resource person.

Types of Knowledges Needed - MOS requires ability to read charts and TMs used in performing tasks.

Metal worker must possess good eye-hand coordination to be a successful welder. Normal color vision is required to recognize colors in flames and in determining heat in each flame.

Soldier must be able to assemble, disassemble and maintain welding torches, paint sprayers and perform body repair procedures, and must possess basic measuring skills.

MOS SUMMARY - 44E MACHINIST

Pre-Analysis - Briefing for all section NCO's, Instructors and Course Director was conducted by POC and RCA Analyst on 14 September 1981. The briefing included goals of MOS Basic Skills Contract and the procedures by which the analysis would be carried out.

A pre-analysis session was conducted with a Senior Instructor on Quality and Quantity of SME's needed, the reference materials required, a time schedule and a location to start analysis process. A key decision made was that we would use only one or two SME's for each of the sections of the course: Bench operations, Lathe operations, Versa-mil operations, and Bandsaw operations.

Analysis - Interviews were held on specific job site for that task with the SME performing the tasks and orally telling what was required in performing the task. Interviews were conducted each morning from about 0730-1030 hours. Verification interviews on previous analysis followed with section Senior Instructor. Instructor Reviews were conducted on Fridays with Section Senior Instructor.

Problems - One major problem was that SMEs had trouble talking about how band saws and mills were used in field, because band saws were not in field use and mills were in field use only in a few selected places. The decision to analyze these two machines was made by operating POC.

Some of the SMEs had difficulty with the depth of interview process and felt it was enough to say what was done to complete task and not the "nitty gritty" details of how.

Student "surge" in classroom space required moving analysis site several times which bothered the course people more than the analyst.

Discrepancies - Discrepancy existed between procedure cited by school and how it is actually performed in a field environment. Such discrepancies were cited in Comment Section on TPA-1.

Soldier's Manual - SM dated January 1981 was used to obtain task number and task title.

SM contains many 20-level tasks for performing milling operations and band saw operations. SMEs state they never saw this type band saw in field, and milling machines only in a few selected sites.

The Soldier's Manual is divided in Chapter 2 with Duty Position Tasks, Skill Level 1/2 and Chapter 3, Related Tasks, Skill Level 1/2. The critical/non-critical, resident/non-resident factors tended to further confuse issue of which task should be taught/analyzed or not by SME Instructors.

Personnel - SMEs were provided as necessary to complete analyses. Overall, they were of excellent quality and most were cooperative and helpful. The Course Director and Senior NCOs were very supportive of the process.

Course "surge" created additional pressure on instructors and they were not as relaxed in the analysis process as when there was less student personnel participating in the course. The course was "self-paced" which meant Instructors (SMEs) were constantly being involved as resource persons.

Types of Knowledge Needed - Reading, Comprehension and reference skills are needed to read TMs and the maintenance manuals.

Basic Math Skills are required for reading and interpreting complex gauges, calculating measurements to .0000 and manipulating numbers.

An understanding of manipulating basic Trig formulas to work with degrees and angles is necessary. A full blown mastery of Trigonometry is not essential.

Comprehension of technical terms is essential.

MOS SUMMARY - 45B SMALL ARMS REPAIRER

Pre-Analysis - A one-hour briefing for all section NCOs, Instructors and the Course Director was conducted by POC and RCA Analyst during the week of 11 December 1981. The briefing included goals of MOS Basic Skills Contract, and the procedures by which analysis would be performed. A question and answer session followed the formal briefing.

A pre-analysis session was conducted with the Senior Instructor to work out the specifics of the Analysis Process. This included such things as quality and quantity of SMEs, a logical order of progress through MOS tasks, site for analysis to take place, and a discussion of reference materials used and needed.

A decision was made to do the analysis in rooms holding the small arms equipment that SME worked in. A schedule was established, taking into account that we would progress from the simple to complex weapons and from the easily learned to those tasks that the 10-level soldier had trouble learning.

Analysis - Interviews and analysis were conducted in rooms in which the equipment and SME were located. SMEs were designated by the Senior Instructor. Interviews were conducted daily from 0730-1030 hours. Basic ETAP Procedures were followed. Verification interviews and Instructor Reviews were scheduled and conducted with Senior Instructor on an as needed basis.

Problems - One of the major problems incurred was to keep analysis at what 10-level soldier did in a DS, GS repair unit, and to sort out what operator and organizational level maintenance personnel did in the task.

The Christmas holiday period from 18 December to 4 January proved to be a difficult one to find SMEs who were not on leave or performing needed repairer and update work in the 45B course. In addition, the entire tile floor was taken up and replaced during this holiday period.

Student "surge" periods put additional pressure on SME Instructors which required more adept handling by analyst to relax SMEs in the interview process.

Discrepancies - The M219 machine gun was not analyzed as it had been replaced in field by M240 except in NG units. It has been dropped from instructional schedule at Aberdeen.

It appears to be a difficult task to keep the TMs up to date with the constantly changing inspection criteria coming forth.

Soldier's Manual - SM dated January 1981 used to obtain task numbers and the task title. Major steps contained were usually complete and accurate.

The 9 tasks for the M219 machine gun should be removed from SM as weapon has basically been removed from field use.

Soldier's Manual is divided into Chapter 2, Duty Position Tasks, Skill levels 1/2 and Chapter 3, Related Tasks, Skill levels 1/2. The critical/non-critical, resident/non/resident factors tend to further confuse issue of whether task require analysis or not.

Personnel - The quality of SMEs was excellent with quality and attitude of Senior Instructor who performed pre-analysis, verification, and instructor review as very superior.

Course "surge" and Christmas holiday period caused some "scurrying around" but no unsurmountable obstacles.

Types of Knowledges Needed - Reading and comprehension and reference skills are essential for soldier to follow the TM reading and to interpret assembly/disassembly illustrations.

Must read gauges and calculate measurements with accuracy. If not accurate, could cause weapon to explode.

Must be adept at disassembly/assembly of weapons with many, intricate parts.

Must learn technical nomenclature of weapon parts.

MOS SUMMARY - 45K TANK TURRET REPAIRER

The soldier in 45K is basically a mechanic. He is responsible for fixing or replacing anything that goes wrong on a tank turret. Most tasks involve a wrench and tools, although some tasks such as troubleshooting a particular system require some mental thought and understanding. The procedures involved in repairing a turret are covered in great detail in the technical manuals. Some referencing skills are required to locate the proper TM's and to reference through them. The only other skills necessary other than tool use and following directions are some measuring skills. Components must often be measured and these measures compared with tolerances in a table. Troubleshooting requires logic, following charts, making decisions, an understanding of the system, and common sense.

In general, to be a 45K requires basic mechanical skills, and some strength (some components are heavy). Tool use and following directions are the largest assets a 45K could have.

MOS SUMMARY - 52C UTILITIES EQUIPMENT REPAIRER

Analysis Approach - Pre-analysis of the MOS consisted of briefings, grouping tasks, and developing a schedule to facilitate implementation of the program. Briefings were held with the Branch chiefs and several members of the school to familiarize them with the goals of the program, the procedures used at interviews and the requirements necessary for the successful completion of the project. An SME was provided by the school to arrange tasks according to complexity and equipment so that those tasks first analyzed would be used as building blocks for later tasks. A tentative schedule was also created to provide SMEs time to prepare for the interview.

Interviews were held within the training area, thus enabling easy access to personnel and equipment. Interviews generally took place 4-5 days per week, utilizing one SME per session. Approximately 10 SMEs were required to complete the MOS.

The format used for the interview was basically that established by the ETAP Manual. The first SME provided a detailed description of how the task was performed in the field. The second SME validated the information provided by the first SME and fulfilled the role of instructor by identifying skills and knowledges taught at the school.

Problems - The MOS was being reorganized when analysis took place. Many of the tasks previously contained in the MOS were being assigned to other MOS and new tasks were being added. Given these changes, general confusion existed as to which tasks and performance measures should be analyzed for each task. On several occasions tasks were changed and consultations had to be held.

Coupled with a reorganization of the MOS was a change in branch chiefs. Different individuals at different times were assigned responsibility for briefing and assigning SMEs. As a result there was little coordination between personnel within the MOS. SMEs often arrived late and sometimes totally unprepared. Meetings were held with the branch chiefs to rectify this problem and there were some positive results near the end of the MOS.

Other problems encountered resulted from the interview format itself. Some SMEs found it difficult giving a step-by-step detailed description of procedures. When forced to describe those procedures which they felt were explained by common sense, some SMEs became frustrated and angry.

Discrepancies - Some discrepancies existed between procedures cited by the school and Soldier's Manual and those used in the field. Several tasks called for repairing faulty components which would normally be replaced. Such discrepancies were cited in the Comments Section of the ETAP.

Soldier's Manual - The Soldier's Manual provided the basic performance measures for 10 level tasks, except for those tasks pertaining to the Bottle Cleaning and Charging Station. Tasks and task performance measures for the Bottle Cleaning and Charging Station as well as for all 20 level tasks were supplied by the school. As stated above, clarification of tasks and task performance measures had to be sought on several occasions.

Training - The 10 level soldier is taught how to operate and maintain utility equipment ... by the 52C soldier. He is also taught how to fill out forms, use the TM, and read schema... diagrams. The 20 level repair person is taught how to repair and troubleshoot equipment. ...tion for 52C soldier consists of video tape recorders, platform instruction or demonstration ... classroom instruction. Seldom is the soldier given hands-on instruction.

Personnel - The majority of SMEs were cooperative. The amount of enthusiasm and cooperation exhibited by each SME seemed to be related to whether or not he adjusted to the interview format. The branch chiefs were also very cooperative. Most of the problems cited seemed to stem from lack of communication and coordination between the branch chiefs and SMEs assigned for analysis within the school.

Types of Knowledges - The 52C soldier must constantly use a TM to perform tasks. Many of the tasks involve operating and maintaining equipment, disassembling, assembling and replacing components and the reading of test equipment gauges and schematic diagrams. Thus, the necessary skills required of a 52C soldier include recognition, referencing basic mathematics, following procedural directions, and interpreting illustrations and schematics.

MOS SUMMARY - 52D POWER GENERATION EQUIPMENT REPAIRER

Analysis Approach - Pre-analysis of the MOS consisted of briefings, grouping tasks, and developing a schedule to facilitate implementation of the program. Briefings were held with the Branch Chiefs and several members of the school to familiarize them with the goals of the program, the procedures used at interview, and the requirements necessary for the successful completion of the project. An SME was provided by the school to arrange tasks according to complexity of generator systems so that those tasks first analyzed would be used as building blocks for later tasks. A tentative schedule was also created to provide SMEs time to prepare for the interview.

Interviews were held within the training area enabling easy access to personnel and equipment. Interviews generally took place 4-5 days per week, utilizing one SME per session. Approximately 30 SMEs were required to complete the MOS.

The format used for the interview was basically that established by the ETAP Manual. The first SME provided a detailed description of how the task was performed in the field. The second SME validated the information provided by the first SME and fulfilled the role of instructor by identifying skills and knowledges taught at the school.

Problems - One of the major problems encountered was the inability of the Engineer School to provide SMEs who had field experience. On several occasions an SME had to be dismissed after admitting that he had never performed the task in the field. The causes for this problem were twofold: poor screening on the part of the School Training Brigade and lack of qualified personnel. To rectify this problem, several meetings were held with the Branch Chief. Another major problem involved SMEs coming unprepared to the interview. Some SMEs spent the initial part of the interview sifting through the Technical Manuals trying to locate procedures for performing the task. Other SMEs came to the interview not knowing what tasks they had been assigned. Several meetings were held with the Branch Chief to discuss this problem. It was suggested on several occasions that a briefing be given to all SMEs, but this was rejected because of the School's manpower needs. Finally, a checklist was created to be given to each SME prior to coming to the interview. The checklist contained a brief introduction explaining the purpose and importance of the program and their role in it. The checklist also contained questions geared toward insuring that the SME would be prepared for the interview. The checklist improved the preparation of SMEs for task analysis.

Other problems encountered resulted from the interview format itself. Some SMEs found it difficult giving a step-by-step detailed description of how a task was performed. When forced to describe procedures they felt were common knowledge, several SMEs became frustrated and even angry.

Since all of the SMEs were instructors, it is felt that the information they provided was greatly influenced by what is taught at the School. The analyst had to constantly probe the SME to determine if the procedure given was that which was performed in the field. During validation,

the analyst had to insure that the SME was not simply "rubber stamping" his predecessor's work. This was accomplished by asking general and specific questions concerning the procedures listed.

Discrepancies - Basic discrepancies existed between procedures cited in the Soldier's Manual and those used in the field. Several tasks called for the repairing of faulty components which would normally be replaced in the field. Discrepancies also existed between test equipment cited in the Soldier's Manual and test equipment used in the field. According to several SMEs, test equipment cited in the Soldier's Manual would not be used in the field either because the equipment normally would not be available or because the test procedure would be too time consuming. Such discrepancies were cited in the Comments Section of the ETAP when they occurred.

Soldier's Manual - The Soldier's Manual provided the basic performance measures for each task, except for the discrepancies cited above. It provided a good guide for determining what each task actually entailed.

Training - The 10-level soldier is taught how to operate and maintain generators, remove, disassemble, assemble and replace various components. He is also taught how to fill out forms, use the TM, test equipment, and read schematic diagrams. The 20-level soldier is taught the same repair skills as the 10-level soldier, however, emphasis is placed on isolating faults and using test equipment. Instruction consisted of self-paced programs, video tape records, platform instruction of demonstration and classroom instruction.

Types of Knowledges - The 52D soldier must constantly use a TM to perform tasks. Many of the tasks involve operating and maintaining equipment, disassembling, assembling and replacing components and the reading of test equipment gauges and schematic diagrams. Thus, the necessary skills required of a 52D soldier include, recognition, referencing basic mathematics, following procedural directions, and interpreting illustrations and schematics.

MOS Summary - 54E Chemical Operations Specialist

Analysis Approach - The majority of the SMEs were instructors because of the requirements of the MOS. Forty-six SMEs participated in the analysis due to the complexity of the MOS and the organization of the Chemical School into different divisions, e.g., Radiological, Chemical/ Biological, Management Logistics, Military Arts.

Problems - Constant relocation of RCA personnel office space during the first half of the analysis (six times) caused significant loss of time on the part of some SMEs in spite of the large number of SMEs who participated in the analysis.

Initially, a somewhat negative attitude toward the project was projected by the school; however, this changed for the better during analysis as the school perceived the benefits possible from this in-depth, detailed analysis.

Discrepancies - Inclusion of a number of tasks that should properly be two tasks because of the inclusion of two areas: Chemical/Biological and Radiological. Each of these, in many cases, constitute an entire task.

Inclusion of two tasks on the 100 GPM pump, when, in fact, there are no 100 GPM pumps at Ft. McClellan. (See equipment section).

Soldier's Manual - The 54E SM skill level 1/2 was somewhat deficient in information. Many SMEs found fault with existing task titles and performance measures, as well as significant gaps in information and inadequately-expressed steps in the manual.

Equipment - As noted in the discrepancies, there are no 100 GPM pumps at McClellan, even though there are two tasks in the POI. Analysis was done on the 65 GPM (sometimes called 60 GPM), which is what is actually taught.

Personnel - For the most part, personnel were cooperative. A number of SMEs made a special effort to provide assistance, working around a very busy schedule.

Types of Knowledges - Heavy emphasis on reference and procedural skills and in Skill Level 1, basic mathematics. MOS covers a wide range of highly technical material since it covers chemical, biological, and nuclear tasks, resulting in the soldier specializing in a particular area.

MOS SUMMARY - 55B AMMUNITION SPECIALIST

Analysis Approach - Interviews for the 55B were held in the office. They were followed up in the training areas in many cases, to clarify the tasks. This was extremely helpful in providing for a visual understanding of the verbal presentation. The tasks were approached by identifying those that were part of the other tasks and doing those first. The operation of training Ammunition Supply Point (ASP) included most of the basis of the MOS.

Problems - There was one major problem involved in the analysis which concerned the priority duties that the SME often was faced with. Despite this demand on the SME's time, very little lost time resulted.

Soldier's Manual - The Soldier's Manual was well written with one exception: the referencing of various publications was poorly done. It is doubtful a soldier using the manual would have had much success in referencing the various parts of the task to the specific publications (TM's, FM's, etc.).

Discrepancies - None of significant value was found.

Equipment - The 10/20 level soldier is taught the use of common hand tools and use of available dunnage for bracing of ammunition in various loading configurations. The major equipment taught is use of the conveyor and operation of the forklift.

Personnel - There were two (2) primary SMEs used for most of the tasks. One was well versed in operations of a field ASP and the other more experienced in higher echelon facilities. They complemented one another nicely. Cooperation and interest in the project was very high for both SMEs.

Types of Knowledges - The primary skills present were perceptual, in recognition and precautions. Basic math skills for addition, subtraction, and multiplication of various amounts are required. Basic reading and reference skills are necessary to determine storage and loading requirements.

MOS SUMMARY - 55D EXPLOSIVE ORDNANCE DISPOSAL SPECIALIST

Analysis Approach - All interviews were done in the office setting. Due to the sensitive nature of the material no observation was allowed of equipment or performance of the tasks.

Problems - The major obstruction to performing this analysis was the sensitive nature of the material being analyzed. The major reference source was TM 60 Series, to which access was denied due to the Navy being the proponent of the series and its "For Official Use Only" classification. This limitation extended in many cases to what could be communicated by the SMEs, as it was felt that to discuss it was to utilize information included in the TM 60 Series. After much discussion it was decided to utilize a technique that still would provide the type of knowledge necessary without detailing specifics of tasks that could possibly be interpreted as infringing on the sensitivity of the material. Another problem was the demands on the SME's time. Although no major loss of time was experienced much ingenuity had to be exercised in accomplishing the analysis.

Discrepancies - No major discrepancies were experienced, only minor disagreements on the method of performing the task between various SMEs.

Soldier's Manual - The usefulness of the soldier's manual was difficult to determine as most of the referencing was to the TM 60 Series. That which was not, provided a well-thought out guide for determining the steps of the tasks.

Personnel - SMEs were extremely cooperative after the purpose of the analysis was understood. The demands on their time were critical in how much time they could allocate to the project. Despite a heavy demand on their time, various methods of utilizing all available personnel of the 55D grouping in the area kept the project active and productive.

Equipment - The 10/20 level soldier utilizes a variety of common hand tools, engineer tools and specialized EOD tools. The equipment is demonstrated and utilized both at Redstone Arsenal and at Indian Head, Maryland.

Types of Knowledges - Reading, comprehension and reference skills are the most important knowledges the 55D has to possess, since he must locate various items of ordnance in various reference publications utilizing information gained in comparison of known and unknown material. The ability to retain a great deal of information and accurately recall it when needed is essential. Math skills range from basic to instant recognition of various planes and angles. The reading of schematics to determine the internal workings of various pieces of ordnance is essential in determining safe procedures.

MOS SUMMARY - 57E LAUNDRY AND BATH SPECIALIST

Analysis Approach - Interviews for the 57E (Laundry and Bath Specialist) were held in the classroom. Interview sessions were held 5 days per week for 6-7 hours per day. The tasks were analyzed in the order in which they appeared in the Soldier's Manual. One primary SME and two verifiers were needed to analyze the MOS. The verification process consisted of the initial SME, the verifier, an instructor, and the analyst reviewing the tasks for accuracy and clarification. During the instructor review, the instructor reviewed the tasks with the analyst to determine what steps were not taught and to review the knowledges.

Problems/Discrepancies - No major problems were encountered, nor discrepancies noted. However, there was a tendency for SME's to go "strickly by the manual", i.e. steps in the Soldier's Manual. In some instances different major steps were identified as part of the analysis. In these cases the SME's noted that they were further breakdowns of steps listed in the Soldier's Manual.

Soldier's Manual - The January 1980 version was used. It provided a comprehensive guide to task performance. In many instances it duplicates material contained in technical manuals. SME's generally thought this was a defensible procedure.

Equipment - The types of equipment needed to perform the tasks were listed in the Soldier's Manual. Most equipment items have been standard in the inventory for many years and have well established operating and maintenance procedures.

Types of Knowledges - In general, spatial orientation and environmental observation skills predominated. The 57E is required to use technical manuals and must complete forms. Most forms require attention to detail and counting skills. Writing skills required are minimal. Denominate numbers are used.

MOS SUMMARY - 57H TERMINAL OPERATIONS COORDINATOR

Analysis Approach - The analyst conducted interviews at different site locations at Ft. Eustis, Transportation School Headquarters, Rigging Loft classrooms, and RCA field office.

Interview sessions were held two days per week, leaving the remaining days for write-up. The task list was divided by subject and topical areas which required several or more SMEs to participate.

Two verification committees were involved to complete the analysis effort. The committees consisted of DTD personnel to review technical accuracy and a BSEP civilian committee to review the ETAP format, level of detail, and specificity.

Problems - The major problem encountered was with the level of detail, specificity and ETAP format. Although the DTD verification for technical accuracy found little error in the analysis, the BSEP committee would not accept 78 tasks. To remedy the situation, the Site Supervisor met with the BSEP Committee and DTD Committee members to identify the weak areas of analysis and to seek further detail. 78 tasks were re-analyzed by the Site Supervisor with SMEs and resubmitted for both committee approval. This effort involved an additional three weeks of analysis. All 78 tasks were accepted by committee with minor changes to be made.

Discrepancies - None.

Soldier's Manual - A current task list and Field Manual 55-57H Skill Level 10 and 20, June, 1981, were used.

Equipment - The 10/20 level is taught the use of basic hand tools, major equipment involved in the MOS is taught hands-on with close supervision. Many of the tasks require more than two personnel assistants.

Personnel - SMEs were readily available for all various subject areas on the task list.

Types of Knowledges - Reading, comprehension, reference skills, and basic mathematics (addition, subtraction, multiplication and division) are necessary for this particular MOS. Although much of the task performances are physical activities, the soldier must also compute tonnages, and solve math problems for marine terminal operations.

MOS SUMMARY - 61B WATERCRAFT OPERATOR

Analysis Approach - Interviews for 61B were conducted at Ft. Eustis in the RCA Field Office, 61B classroom/instructional area, and the Officer's Club (during hot/humid weather conditions). In addition, some tasks with certain vessels required analysis interviews at Ft. Story for approximately 2 weeks. Interview sessions were generally held 4-5 days per week.

The task list was grouped only in areas which required following a systematic area of performance for certain subject areas, but generally it was followed in order by which it was presented.

One verifier was provided to review technical content.

In most cases, verification and instructor review were conducted at the same time with both SMEs.

Problems - Any problem areas are identified under "Discrepancies", "Personnel", and "Equipment".

Discrepancies - The analyst identified discrepancies that the SME commented on concerning what the Draft Soldier's Manual listed for task performance, versus actual field experience. In many cases, the 10-level will perform minimal task performances and are not responsible for particular requirements inducted in the Draft Soldier's Manual.

Soldier's Manual - A draft Soldier's Manual was provided by the POC which was beneficial as guidance for task analysis, however, many steps in the draft were not in order and did not reflect real current requirements by the soldier.

Personnel - One SME for initial analysis was provided, when this SME was not available occasionally, the back-up SME would fail to show up for the interview. This hindered the analysis effort on periodic occasions.

Types of Knowledges - Reading, comprehension and reference skills are necessary for certain task performances, but a majority of the tasks are purely physical activities.

MOS SUMMARY - 61C WATERCRAFT ENGINEER

Analysis Approach - The initial problem faced in developing an analysis approach to 61C was that of identifying the number and nature of the tasks to be analyzed. As the most recent 61C soldier's manual was current in 1977, the analysis was to be based on a task list provided by the Transportation School.

The first list provided consisted of 523 task statements. Several dozen entries were identified as "common tasks", generic-type activities presumed on any vessel (e.g., "Start/Stop High Speed Heavy-Duty Diesel Engine"; "Stand Throttle Watch"). The remainder of the list was divided into a series of "vessel-specific" lists identifying tasks to be performed on particular watercraft (e.g., "Clean Oil Cooler Element/LCM-8"). Both common and vessel-specific lists were further divided into Skill Level 1 (C10) and Skill Level 2 (C20) task groups.

The first few weeks of work on 61C were devoted to analyzing the task list. Many discrepancies affecting the accuracy of the task count were easily apparent: particular task statements/numbers appearing repeatedly within and across the sub-lists comprising the master document; identical task statements appearing under two or more different identifying numbers within and across lists, numerous task statements presented without identifying numbers; whole pages of statements that appeared to be duplications or paraphrases of statements listed elsewhere.

After the analyst reviewed the master list with a 61C SME from the Instructor Branch, many additional problems became apparent, chiefly arising from the nature of some of the task statements. A common task titled "Maintain Vessel Engineering Equipment", for example, was considered by the SME as too broad in scope to be meaningful; without clarification from the T-School limiting the focus of analysis to particular pieces of equipment as installed on particular vessels, an analysis of the task appeared to be impossible. Similar difficulties were encountered with a number of the common tasks; the generic nature of many of the task statements seemed to be in direct conflict with the specific nature of the required ETAP format.

An annotated draft of the master list, including all duplicarions and discrepancies noted as well as numerous requrests for clarification of individual task statements, was submitted to the POC's office. It was also suggested to the T-School that the list, as presented, appeared to be a working draft rather than a final product accurately reflecting the training needs of the MOS, and was therefore not an appropriate basis for analysis.

The analyst was advised that no significant revision of the list would be forthcoming, and that the analysis effort would have to proceed based on the list essentially as given. Requests for clarification of particular task statements were to be resubmitted to the POC as needed for work in progress. The T-School established a priority sequence for the analysis, indicating that the common tasks were to be considered first, followed by vessel-specifics for the LCU-, the LCM-8, the tug-boats, the amphibious vessels, and all remaining watercraft.

The issue of the task list was, however, to be re-opened some five months later, when independent inquiry by the analyst revealed that the master list had, in fact, been a working draft

intended to encompass the broadest possible range of activities for a marine engineman on any Army vessel. Many task statements had been rephrased, combined with one another, or completely eliminated; the total number of statements listed had been reduced roughly by half, to approximately two hundred and fifty. DTD personnel had restructured the list into a matrix format, with task statements grouped numerically by vessel system (electrical, hydraulic, engine, etc.), and flagged for application to particular vessels by means of a check mark in the matrix block at the point of intersection between task title and vessel name.

The analyst informed the POC's office of the existence of the revised list, and in the meetings that followed, the list was formally presented for consideration. Given the limited time remaining for analysis, it was decided that work on the LCU-presumed to be complete before the arrival of the revised task list should be reopened to include the thirty seven new tasks listed on the new matrix. The analysis was to be based on daily interview sessions with an SME experienced in engine-servicing on the LCU, with the Army's own task analysis results (graciously provided by DTD personnel in the form of their 550 task analysis summaries) being utilized as a framework for defining the basic parameters of the task activities.

At the end of the time period allotted for analysis, all seventy LCU tasks (as per the revised matrix list) had been analyzed; another dozen tasks analyzed prior to the arrival of the new list were also submitted to the School for consideration.

Personnel - Four different SMEs were utilized for the analysis of 61C. Interviews took place variously in the RCA field office, in the offices of the 61C Instructor Branch, in maintenance shops and on-board vessels docked in Third Port.

The analysis effort was severely hampered by the limited availability of SME time. The analyst was informed by DOTD instructors that, given the fact that 61C-10/20 classes were in progress at the time, and given the shortage of advanced 61C personnel Army-wide, SME time would be on a catch-as-catch-can basis. Regular scheduling of interview sessions proved to be impossible: meetings between analyst and SMEs were repeatedly cancelled - often without notice - due to conflicting demands on SME time. While the POC's office continued to express confidence in their ability to support the analysis effort, it gradually became apparent that the analysis of 61C would be characterized by weeks of frenzied activity followed by weeks of "dead time" when no SME was available, forcing the analyst to work on portions of other MOS undergoing analysis by other RCA field staff.

The fourth SME assigned to the project is to be particularly commended for her contribution to the process. Faced with the prospect of interviewing more than thirty tasks in less than two weeks time, the SME agreed to participate in marathon interview sessions of six to eight hours duration daily. Her cooperative spirit, energy, and initiative throughout the period were truly admirable, and her unflagging concern for accuracy of detail suggested a dedicated professionalism worthy of special recognition. Her supervisors are also to be commended, both for restructuring her work-load to permit the interviews to proceed without interference, and for their willingness to

offer the analyst and SME the benefit of their own knowledge and expertise in resolving questions that arose regarding specific task activities and procedures.

It should be noted that DOTD (Instructor Branch) personnel for 61C must cope with exceptionally difficult circumstances in creating a program of instruction to meet the training needs of the MIS. It appears that 61C is unique among the many MOS trained at the T-School. Aviation MOS, for example, are indeed trained as "occupational specialities"; helicopter repair is divided into 67N (Huey), 67T (Blackhawk), 67Y (Cobra), and so on. The marine engineman, however, may eventually be assigned to any one of a dozen different types of watercraft in Army inventory, and the time allotted for C10/20 schooling is simply not sufficient to allow training of "vessel-specific" procedures for all vessels. The best that instructors can hope for is to teach their students sufficient general theory and fundamental principles of engineering equipment operation/service/replacement/repair to permit later transfer of generic skills and knowledges to specific vessel applications, when given the pertinent TMs and specific on-the-job-training. The Instructor Review phase of the 61C analysis revealed a majority of the tasks analyzed to be classified as "Not Taught" in the C10/20 programs: this is not surprising, since most of the task titles pertain to specific procedures for particular pieces of equipment as installed on a particular vessel. Limitations of classroom time and limited availability of training aids require that all such tasks be taught on an OJT basis.

Additional challenges faced by instructional staff apparently arise from administrative divisiveness within the marine field. Personnel from DTD are tasked with creating the task list which forms the basis of the Soldier's Manual, presumably a reference point for design of the C10/20 POI. Task descriptions are generated through the use of Army manuals and field procedure. DOES, however, is responsible for licensing the students upon completion of their formal training: DOES personnel work from Navy manuals and references, and often arrive at task descriptions that bear little resemblance to the DTD product. Further, DOTD instructors are currently denied access to the DOES licensing examinations, and are given virtually no guidance regarding the particular skills and knowledges that students must possess in order to attain marine licensing in accordance with the expectations of the DOES branch. The result of this awkward situation is that a student who successfully completes his 61C-10 or -20 training program may find that he is unable to pass his licensing exam without extensive additional study.

In sum, it appears that the difficulties faced by the RCA analyst over the course of work on 61C are a direct reflection of the overall status of the MOS: manpower shortages, confusion over task count, conflicting definitions of task statements and procedures, discrepancies between the actual content of the POI and various administrative perspectives on what the POI should include ... it is hoped that when the time comes for Army training command to give meaningful consideration to the status of 61C, many of these problematic elements can be eliminated, and the training process restructured to allow the 61C student a simpler path of access to the skills and knowledges necessary for successful job performance.

MOS SUMMARY - 62B CONSTRUCTION EQUIPMENT REPAIRER

Analysis Approach - Interviews for 62B (Construction Equipment Repairer) were held at the training sites of the 62B courses or at the office of the SME. Seven percent of the interviews were conducted in the office of the analyst. In all cases, the convenience of the SME was the prime consideration.

Working with the SMEs at their training sites reinforced the SMEs with coworkers for consultation and actual objects with which to refer to and upon which to demonstrate.

Coordination was accomplished through the chain of command with working details at the lowest level possible, which was very effective.

Many SMEs and verifiers were utilized in the 163 tasks of this MOS, necessitated by the great variety of items of equipment serviced by this MOS.

The organization of the tasks in the Soldier's Manual was used as the general pattern followed in analyzing the tasks.

The procedures detailed by or in the ETAP manual were followed. At the time that I most needed the guidance I did not have the background knowledge to read the manual with the desired speed and comprehension.

Instructional review was easily obtained as the SME and the verifier were both instructors. Those performing verification were conscientious.

SMEs and verifiers were all interested in improving the MOS field, improving the Soldier's Manual, and the TMs. Most of these men had recently returned from overseas assignments involving the MOS and spoke knowingly of the needs of improvements.

In the majority of tasks, both SMEs and verifiers consulted with fellow workers. The total project was much more of a team effort than the result of individuals.

No major problems developed. Local action corrected the problems by informal actions.

At no time was there a lapse in production. Effort was applied to another task, moved to another teaching area, do administrative work, etc. Cooperation and assistance from everyone was exceptional. Each person was genuinely eager to participate.

Problems and Observations - No major problems were encountered. The very wide variety of equipment repaired by this MOS demands extensive training by students which resulted in a large number of tasks in the Soldier's Manual (163). The construction equipment repaired by this MOS generally is very large, yet parts have tolerances into thousandths of an inch. The

same diesel engine installed two different items would usually have considerably different specifications. This variety within the MOS causes the repairman to refer to technical manuals frequently.

The MOS includes assignments from organization repairs to repairs in general support shops where skill level requirements would exceed the 10 and 20 level.

The soldier trains in only 40% of the tasks during residence instruction. Of the remaining 60%, the soldier will be instructed in very few tasks. He will be exposed to only tasks relating to equipment of the unit(s) to which he is assigned.

Upon completing AIT, this soldier is not qualified for his MOS. He is merely an apprentice. This situation is not recognized in the field. Commanders expect the individual to be a functioning competent mechanic.

All personnel have emphasized that the MOS is too broad in assignment skill levels and the MOS is responsible for too great a scope of equipment.

A problem frequently voiced by personnel from the field was the lack of the specialized tools for repairing the equipment specified in the TMs. The individuals did not know why the tools were not available.

SMEs state that some precision measuring tools are marked in fractions of an inch. The mechanic is given tolerances in decimals (hundredths or thousandths) of an inch. This results in errors in conversion which could just as easily be avoided by issuing precision measuring tools marked in decimal values.

Soldier's Manual - The tasks in the Soldier's Manual, FM 5-62B 1/2, were specific and in detail, serving as a progressive guide through qualification within the MOS.

The present manual needs editing to correct minor low-level errors. A number of tasks do not indicate that they require team effort, extensive equipment, and/or special tools. Some of the tasks cannot be completed in one workday.

In 163 tasks, not once was the word "troubleshooting" used. The technique was not utilized. Many times SMEs commented that they felt the technique should be well instructed and should be included within the tasks.

MOS SUMMARY - 62E HEAVY CONSTRUCTION EQUIPMENT OPERATOR

Pre-Analysis Approach - Pre-analysis consisted of conducting briefing sessions with the 62E officers and enlisted personnel to re-emphasize the project goals and to give them the procedures and requirements necessary to complete the analysis process. The POC had previously given an overview of the project some months earlier.

The Course Director wanted us to use a task list that was being revised in updating the SM, but it was determined that this was not feasible as it was only a preliminary listing and had not been staffed at Belvoir or at Leonard Wood.

The Course Director and RCA analyst reviewed task list together from current SM and decided the analysis would be divided among 4 NCO's in each of four vehicles to be analyzed: Crawler Tractor, Wheeled-Tractor Scraper; Scoop Loader; and the Motorized Grader. 32 Skill Level 10 and 7 Skill Level 20 tasks were included on task list.

Analysis Approach - Interviews were held in office area of the 63E enlisted personnel. The area was quiet and the reference materials needed were readily available. Interview sessions were held 3 mornings a week for 3-4 hours at a time.

A knowledgeable NCO was used for a detailed first interview on vehicle being analyzed.

The verification interview was conducted with a senior NCO on an ongoing basis three afternoons a week.

Instructor review was accomplished at Ft. Leonard Wood during week of Sept 13-17, 1982.

Problems - The major problem encountered was scheduling SMEs to perform analyses around the end of summer leave schedule. The most knowledgeable with most recent field experience was not always available, so the interview process took longer and was more difficult to accomplish.

There was some difficulty in getting SMEs to give a step-by-step detailed analyses; they were more interested in telling you what steps rather than how a task was performed.

It was found to be more difficult to perform the Instructor Review in a separate site as you have to brief the Instructor Personnel and get them on the same sheet of music.

Discrepancies - Some tasks put in SM at Ft. Belvoir were not taught at Ft. Leonard Wood. i.e., 051-191-1010: Tree Removal with Crawler Tractor cannot be performed due to Post regulations forbidding tree removal; 051-191-1011: Side-hill excavation is not done as a PE due to equipment damage that incurs. No 20-level tasks are taught at Ft. Leonard Wood and there is no 20-level course to attend. All 20-level tasks are to be Unit trained but SMEs say the Quality and Quantity varies greatly with the unit.

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Soldier's Manual - The current SM dated 11 April 1979 was used as a basis for tasks to be analyzed. The SM is in process of being completely revised. Considerations is being given to combining skill levels I and II and to breaking tasks down to more definitive entities as steps given for major steps are now on too broad a level to be useful.

Personnel - The 62E Officer personnel were very helpful and cooperative. Some of section NCO's were not too happy with performing this detailed, demanding type work; however, when Senior NCO returned from leave this reticience disappeared.

Types of Knowledges Needed - Needs to know task related vocabulary in order to perform operating and maintenance tasks.

10 Soldier learns to operate 4 different kinds of wheeled (tracked) equipment so must have good hand-foot coordination. Must be able to read checklist in TM and LO's to perform preventive maintenance tasks on each of 4 kinds of motorized equipment.

MOS SUMMARY - 63G FUEL AND ELECTRICAL SYSTEMS REPAIRER

Analysis Approach - The POC at Aberdeen set up and presented a one-hour briefing on the goals of the BSEP Analysis Contract, the personnel requirements, and procedures for completing the analysis, verification and Instructor Review. The briefing was given to the officers and key enlisted personnel responsible for administering and participating in analysis of MOS. The briefing was given during the week of 19 October, 1981.

Interviews were held in the shop area to allow the SME to work/talk through the task being analyzed with equipment available. Interview sessions of 2-3 hours were held daily using one SME per session, but with shop resource personnel available for consultation, if required.

Verification interviews were done with a different SME when the task had been completed and written. Instructor review was done as a separate process. Five/six senior instructors were used for analysis of the 46 tasks. It was determined that 29.1 hours were spent as an average on each task.

Proolems - As all SMEs were instructors, the analyst had to constantly insure that this was how the task was performed in the field and not how it was instructed in school. Some of the tasks given in the SM were not taught in the 63G course, i.e., master cylinder. Some tests given in the task statement were not taught, i.e., leakage test on Cumming in task 1069. Many different models of equipment were worked on in the field for a task, but only one model was available for analysis.

The TMs were a problem because of the following discrepancies:

1. Some TM procedures for assembly/disassembly were incomplete
2. In some TMs, steps were left out or were incomplete
3. Task 1084 - Pulley formula does not work on alternator
4. Task 1122 - Described procedure was confusing for test and assembly steps
5. Task 1138 - Spatial directions were given as seen from viewer at front and while facing tester
6. Task 2041 - No DS/GS manuals were available for GMC Diesel Engine diagnosis
7. Task 1059 - TM is incorrect one for engine given (Cummings)

Discrepancies - TM discrepancies were cited in problems above. All discrepancies were noted in Comments Section of TPA-1. Other discrepancies include the following:

1. Task 2035 - Troubleshooting is done by replacement of equipment
2. Task 2044 - (Troubleshooting Cummings Engine) no Cummings are available, so task is taught on TM 809.

Soldier's Manual - SM dated January 1981 was used to obtain the task number and task title. There was some diagreement by SMEs as to whether certain tasks should be in the SM or not, based on their field experience.

The division of task into Chapter 2 and Chapter 3 was a source of confusion, plus the Chapter 3 tasks only contained a number and a title with nothing on procedural steps.

Equipment - Includes Fuel Systems used on Wheeled Vehicles. Includes Electrical Systems used on Wheeled Vehicles. Includes PSG 6 and 12, Engine, Fuel, Injector Pump. Tools include Hand Tools, Special Tools, F & E Tool Box tools, 300 amp Generator, 500 amp Test Stand. All tools and equipment were listed on TPA-1.

Personnel - SMEs were provided on a timely basis by Senior Instructor. They were of excellent quality and made every effort to be helpful to the project. Each task was lengthy, which required a great deal of persistence by SME/Analyst to accomplish a task and eventually the MOS Analysis.

Types of Knowledges - Reading, comprehension, and reference skills are of utmost importance to the 63G soldier since he must access, locate data, read and understand information from manuals, as well as have the skill to read complex schematics.

Basic math skills are used for reading and interpreting gauges and identifying and manipulating numbers. The soldier in 63G uses principles underlying troubleshooting techniques.

MOS Summary - 63H TRACK VEHICLE REPAIRER

Analysis Approach - Each analysis session started off in a small lounge area. The tasks were stated as they appeared in the task list. A discussion followed as to the scope and nature of the task. In many cases, due to different SMEs and their unfamiliarity with the process, explanations of the project and the approach were necessary prior to any analysis. Procedures in the technical manual were immediately referenced. This ensured a necessary structure to the interview. It also provided a crosscheck to SME input. Analysis attempted to fill in gaps or clarify procedures in the technical manuals. The training areas were visited frequently not only to verify and identify procedures lacking or missing in the technical manuals, but also to give the analyst a greater sense of what he was analyzing. The analyst used an aggressive style of analysis in order to pry procedures written off to "common sense" or those assumed soldiers would know. Discrepancies between SMEs or between SMEs and the technical manual were attempted to be resolved through consensus.

Problems - The major problem encountered in 63H was a shortage of instructors, and in some cases a shortage of qualified ones. There is no sense elaborating on a problem experienced by the Army as a whole. The lack of qualified instructors, however, did present problems for a number of tasks. In some cases, tasks had to be rewritten or delayed. In other cases, a small number of tasks may have had gaps or inaccuracies. Nevertheless, considering the problems, the analysis went smoothly and without serious interruption. The 63H personnel were supportive and cooperative in this effort.

Discrepancies - The major discrepancies occurred in the technical manual. Occasionally, discrepancies occurred between SMEs, but as mentioned earlier, were usually resolved through consensus. Otherwise, discrepancies of any significance have been noted on the individual tasks.

Soldier's Manual - The Soldier's Manual was used very little as a guide through analysis. Occasionally, it would be referenced when some boundaries needed to be established for a task, but for the most part was used only to generate the task list.

Equipment - The 63H Soldier is responsible for using tools in various sets of tool boxes. Various special tools, identified in the tasks, are also necessary to use. Recovery tasks necessitate operating track vehicles. The STE/ICE stands out as the primary piece of test equipment that the 63H would be responsible for knowing.

Personnel - As mentioned previously, availability of SMEs was an ongoing problem. Occasionally, inexperience and lack of expertise on the part of SMEs was encountered. But for the most part, SMEs showed a high degree of professionalism despite an interviewing process which was tedious and cumbersome at times. Many of the SMEs viewed the process as challenging and important to their MOS. It provided an outlet for some of their frustrations about the training and the quality of soldiers, and perhaps opened their eyes a bit as to some of the assumptions they were making in their instruction

Types of Knowledges - A wide spectrum of skills and knowledges were covered in the RCA Taxonomy in both math and reading. Basic math skills include reading and interpreting gauges, calculating measurements, solving mechanical advantage problems, along with the majority of computational skills. Basic reading skills include all the necessary skills in reading a technical manual and all the necessary writing skills in filling out forms.

MOS SUMMARY - 63N M60A1/A3 TANK SYSTEM MECHANIC

Analysis Approach - Interviews were conducted at various locations because 63Ns share training and training sites with several other MOS which have many shared tasks. 63Ns are expected to be proficient mechanics not only for the hulls and hull systems of M60A1 series tanks (which may have any of three different diesel engines), but also for the M151 (¼ T. truck), the M35A2 (2½ T. truck), the M113A1/A2 (armored personnel carrier), the M578 (light recovery vehicle), and the M88/88A1 (medium recovery vehicle). In all, 63Ns are expected to be able to repair any of eleven different engines as well as many other components of each vehicle.

Most of the SMEs used for this MOS were instructors as well. In spite of a strong tendency to encourage the analysts to describe "school solutions" the SMEs were often quite candid in admitting that soldiers in the field depart from the procedures specified in the school's lesson plans.

ETAP procedures were followed; however, SMEs had to be led by the interviewers when major steps were requested. SMEs tended to see tasks as linear sequences of steps rather than as subsystems which can be discretely identified as major steps.

Tasks were divided among three analysts, usually on the basis of systems within a vehicle (e.g., electrical, powerplant, suspension) or by particular vehicle (e.g., one analyst analyzed all of the M35A2 tasks).

Major Problems - The majority of the tasks listed in the Soldier's Manual are identified only by number and title. No conditions, standards, or performance steps are given; and in some cases the TM cited is for obsolete equipment (e.g., for the M60A2 tank).

Obtaining SMEs with recent field experience was an unresolved problem. For instance, our SMEs used for all electrical tasks were civilians who had been out of the service for at least 7 years.

Discrepancies - The new SPAs TMs contain numerous errors of varying seriousness -- such as incorrect procedures, erroneous page references, reversed diagrams, mislabelled diagrams, incorrect nomenclature. Some of the errors appear to have resulted from careless editorial work and proof-reading; others appear to have reflected a failure to understand the procedure.

Soldier's Manual - Majority of tasks lack conditions, standards, and performance steps.

Task titles fail to indicate equipment on which the particular task is to be performed. This results in confusion since there are separate tasks with same or similar titles for each of the vehicles cited above (e.g., "Install Powerplant").

Some tasks are on obsolete equipment (e.g., M60A2).

Some task titles imply a different procedure and task from that which is actually intended (judging from the Task Data Analysis Sheets provided by Aberdeen).

Equipment - M88s with V-12 gasoline engines are rarely found anymore, and the branch which teaches the M88/M88A1 tasks does not have one; yet there is a task for timing the magnetos on the V-12 gasoline engine.

M151s have been converted to electronic ignition systems which do not have points to be adjusted, yet the task for setting the ignition points on an M151 remains in the Soldier's Manual.

Personnel - Personnel were cooperative, courteous, and knowledgeable. They made time for our interviews even when they were short of personnel and/or had overloads of students.

Types of Knowledge Actually Required - Knowledges required represent a broad range of typical mechanics' skills such as tool use (particularly wrenches), use of measuring devices and gauges, ability to follow troubleshooting charts and written directions, and basic mathematics.

MOS Summary - 63W WHEEL VEHICLE REPAIRER

Analysis Approach - Analysis sessions took place at the location of training. SMEs were familiarized with the process of analysis and the purposes of the project when necessary. First, the task was stated as found on the task list. Next, discussion ensued as to the scope and nature of the task. Parameters were set and Procedures in the technical manual were immediately referenced. This ensured a necessary structure to the interview. It also provided a means by which to crosscheck SME input. Analysis centered around identifying these procedures along with clarifying or filling in gaps as necessary. The training areas were visited frequently to ensure accuracy, provide a more natural setting for analysis, identify additional procedures, and familiarize the analyst with the task. The analyst employed an aggressive style of interviewing in order to pry procedures written off to "common sense" or assumed soldiers would know.

Problems - The major problems faced in 63W were as follows:

1. Lack of availability of SMEs to conduct analysis. This resulted in a number of delays.
2. Too large a rotation of SMEs initially. This resulted in delays in terms of having to familiarize each SME with the process. Additionally, the "practice" curve was not allowed to build up, resulting in further time delays and poorer analysis results.
3. Too small a pool of SMEs for more highly technical tasks. As a result, availability became a problem, forcing time delays. Additionally, in some cases, analysis reflected in real terms only one person'e expertise simply because that person was the only one knowledgeable about the task. It also increased SME "burnout".
4. A number of tasks where the SMEs clearly did not have the expertise and experience to analyze the task. This resulted in poor or inaccurate analysis, delays in rewriting, and/or a regurgitation of the procedures in the technical manual.

Discrepancies - Discrepancies, on a large part, resulted between inconsistencies in field applications and training excercises in the sense that equipment in training might never be found in the field or that entire tasks were never performed in the field. In addition, discrepancies resulted from procedures being able to be performed in a training setting, but for a variety of reasons not able to be performed in the field. Otherwise, discrepancies of a technical nature were for the most part resolved using a consensus approach. Discrepancies were noted on each of the individual tasks.

Soldier's Manual - The Soldier's Manual was used very little as a guide for analysis. Occasionally, it would be referenced when some boundaries needed to be set on a task, but for the most part was used only to generate the task list.

Equipment - The 63W is responsible for being familiar with the tools in the standard issue tool box. In addition, a variety of special tools must be used. Various measuring instruments such as the multimeter and STE/ICE are required as part of selected tasks. Recovery tasks require the operation of a number of different types of wheeled vehicle.

Personnel - SMEs in 63W showed a high degree of professionalism and cooperation. The analysis at times could become tedious and cumbersome and required all the personality traits needed to go through excruciating detail. The problems encountered have been mentioned previously and need not be repeated. Special commendation should go to those SMEs who carried the burden of many of the more highly technical tasks which were considerable in number.

Types of Knowledges - A wide spectrum of skills and knowledges were covered in the RCA Taxonomy in both math and reading. Basic math skills include reading and interpreting gauges, calculating measurements, solving mechanical advantage problems, along with the majority of computational skills. Basic reading skills include all the necessary skills in reading a technical manual and all the necessary writing skills in filling out forms.

MOS SUMMARY - 64C MOTOR TRANSPORT OPERATOR

Analysis Approach - The procedures followed were the results of several pre-analysis planning sessions. The assigned Army personnel and the analysis adopted the following procedures.

1. A weekly list of the tasks to be analyzed, and the list of the required publications (regulations, forms, etc.) was given to Sergeant in charge. Special attention was given concerning the choice of the SME, the verifiers and the instructor. The Sergeant responded with necessary lists, and the schedule planned and approved.

2. The analysis procedure was carefully explained to each of the SMEs to relieve any suspicion that he was being analyzed rather than the task. It was also important to impress the SMEs of the importance of the programs. After several analyses had occurred, the program proceeded smoothly.

3. The analysis usually took place in the morning, the afternoons were spent in completing the required recording. The various communications and suggestions from the home office made the recording a systematic procedure an easy format to follow.

4. The verifiers and the instructor reviews usually completed the weekly schedule.

5. Verifiers and Instructors were chosen with the expertise required of the task.

6. Supervisory personnel were most interested in the program and followed the progress by requesting frequent status reports. All were most interested and cooperative.

7. In several tasks, the analysis actually took place during teaching the task to the new soldier - this was further expanded with conversation and question before, during, and after the instructional period.

8. In several tasks, the first SME analysis took place during actual driving, in convoy, at night, during attack conditions - each of these were further expanded with conversations before and after the driving experience.

Major Problems - The only problem encountered was a lack of communication between the program and supervisory personnel, the office in charge of the program had received his new orders and his replacement had not reported on board during my stay at the fort. The course chief was excellent in helping to overcome the problem.

The analysis differed with the various SMEs because each of them had such diversified field experiences, their differences prompted occasional meetings of SMEs to clarify the analysis reports.

The instructional program did not use the MOS as an instructional format, however, every task in the MOS was instructed at some time.

The school taught only the driver-related tasks; the dispatching tasks were completed at the fort's transportation center.

Discrepancies - The Soldier's Manual was not used as a guide to the instructional program. During the program all phases of the manual were instructed, but not according to the listed tasks progression. The MOS listed tasks that were related to driving and to dispatching - those only related to driving were instructed. Dispatching was considered as "on the job training".

Soldier's Manual - See Discrepancies.

Equipment - The various pieces of equipment required for the instructional program were in abundance. A large portion of the equipment was obsolete and the rest was soon to become obsolete. Although all equipment was old, it was in excellent condition. Conditioning of the equipment was part of the instructional program.

Personnel - The school was greatly endowed with well-trained, interested, and competent personnel. Because of various field experiences, the approach to the interview varied among those interviewed in certain phases of instructing. The officer and administrative personnel was limited due to transfer and change of duty status.

Types of Knowledges - The knowledges required ran the entire range of knowledges. The use of the various pieces of equipment required a great deal of motor skills, coupled with terminology, recognition, and identification. Many of the tasks had various forms to be completed, filed and recorded requiring writing, reading, mathematics, and in some areas, the use of the typewriter.

MOS SUMMARY - 67G AIRPLANE REPAIRER

Analysis Approach - Interviews were conducted in the hangar area and in the 67G classroom/office. During the preanalysis planning period (1 week) the analyst sat in on classroom instruction for basic tool use, safety-wiring, DA Forms and use of Technical and Parts Manual. This enabled the analysis to gain a clear insight to the sub-activities associated in task performance and what is germane to 67G 10-level tasks. The original SME assigned, numbered the task list by order of performance and to enable the analyst to cross-reference tasks previously analyzed.

One verifier was assigned to review technical data for approximately 70% of the tasks, then the DTD Verification Committee and 3SEP Civilian Committee was designated to review the remainder of the MOS. The DTD Committee focused attention upon technical accuracy and the 3SEP Committee reviewed for ETAP format, level of detail and specificity. Instructor Review occurred continuously by a different SME (in more cases) throughout the analysis. Interview sessions were held 4-5 days per week, and in some case five to six hours per day.

Problems - Three problem areas were identified in the analysis effort. The first problem area occurred on the first day of orientation between the analyst and SME, Verifier and Instructor. Due to the lack of a detailed briefing by the POC for military personnel involved with 67G analysis, a problem was created by their misinterpretation, misunderstanding and cooperation by the SMEs. The SMEs felt that the RCA project was a duplication of efforts with their own DTD analysis and considered the Project meaningless. This problem was finally rectified by the Site Supervisor through lengthy discussions and explanations on the project's objectives and the type of detailed analysis required. This hindered the analysis from the start but relations with the SMEs improved gradually. In addition, the POC did not verify SME availability and support for the RCA Project which continued to be an on-going problem throughout the analysis. SMEs were not always available and sometimes had to leave interview sessions prematurely.

The second problem concerned the analysts write-up approach in the areas of ETAP format and basic style, and identification of knowledges. This problem or rather a concern was quickly addressed by the assistance of RCA Home Office personnel and the Site Supervisor. The analyst with assistance, was able to bring the analysis effort up to project standards.

The third problem or concern was with the analyst's turn around time to submit ETAPs to the verifier and to the Home Office. It appeared that the analyst was spending too much time on each task such as the flow of effort: Interview session note taking, rewrite of the notes to actual project standards then notes were types into the ETAP forms. This approach by the analyst delayed the work effort. To speed up the process, the Site Supervisor reviewed the analyst's rewrite of the notes which appeared to be acceptable and thus typing was not required. The analyst felt that her typing ability (50 wpm+) would speed up the process but the original write-up was sufficient.

67G - 2

Discrepancies - None

Soldier's Manual - Only a current task list was provided by the POC.

Equipment - The 10-level is taught the use of basic hand tools. Some of the major equipment is taught hands-on under close supervision.

Personnel - Two SMEs were assigned with back-up personnel; however, problems with scheduling were frequent because the SMEs and back-up personnel were always in demand for instructional duties.

Types of Knowledges - Reading, comprehension, reference skills and basic math are necessary for the 67G soldier in order to obtain information from Technical Manuals and apply mathematics to task procedures.

MOS SUMMARY - 67N UTILITY HELICOPTER REPAIRER

Analysis Approach - Interviews for 67N (Utility Helicopter Repairman) took place almost entirely in an office setting. Work in the hangar was not a viable option, because while Ft. Eustis has proponency for this MOS, it is instructed at Ft. Rucker, so training aids and aircraft under work were not available for observation at this site. This was not a major handicap to the analysis effort, but probably served to slow down the process slightly, since all information had to be conveyed by verbal description alone.

The analysis approach included daily interview sessions with a single SME, who worked the task list from start to finish. A sequence was established that dealt with repair/replacement of aircraft components within various functional groups - tasks related to the rotor system, for example, were interviewed in sequence, with the task containing the most extensive procedures interviewed first to serve as a basis for cross-reference to other related tasks.

Forms and records tasks - many of which could be referenced to work completed for other MOS at this site - were interviewed first, followed by 10-level tasks grouped by related components and systems; the extension tasks and 20-level tasks were interviewed last. This sequence also corresponded roughly to the SMEs level of familiarity with the procedures being analyzed.

Questions about the meaning of task statements, i.e., which specific procedures should be included in the analysis, which models/types of components were to be the focus of the procedure - were discussed between SME and verifier prior to the start of the interview to assure that interview time would be spent most effectively.

The interviews were relaxed and unhurried, and resulted in extensive notes arranged in rough outline form. This made it possible for the interviews to be written up at a later date with little or no loss of accuracy and detail.

Discrepancies - No significant discrepancies found, although there was the expected amount of variation between field expedient procedure and process as per TMs.

Soldier's Manual - Current SM not available. Analysis was based on current task list and Job Performance Measures/Standards generated by DTD as pre-draft basis for new SM.

Major Equipment - Major equipment/test equipment rarely utilized for hands-on instruction because of cost; however, since most 67N work involves basic hand tools, this is probably not a major handicap for soldiers in training. 10-level soldier will be closely supervised during all operations.

Personnel - SME was available daily with little interference from other duties. Analyst was notified of anticipated TDY time well in advance. SME was highly experienced and knowleageable; he was also very expressive, capable of verbalizing even the most complex procedural descriptions clearly and in detail. This was a major asset to the analysis effort, especially in view of fact that no aircraft were available for reference during the process.

The level of his familiarity with task procedures permitted the SME to "talk through" the steps without constant referral to TMs; the appropriate manual was always open, and served as a check on his memory and a framework for task sequence, but he did not depend on it for descriptions of task procedures.

The verifier - a member of the Army's own 67N task analysis team - was both familiar with the goals of analysis and with the details of 67N functional operations. He was thorough and painstaking in his review of task write-ups, and appeared to keep the project objective - identification of skills and knowledges - foremost in mind. His cooperation with analyst and SME proved very advantageous to the analysis effort.

Working with a single SME and a single verifier throughout the entire analysis of 67N was also an advantage. Continued daily contact allowed for a build-up of rapport and the formation of an effective working relationship that enhanced the overall quality of the product.

Types of Skills/knowledges required for task performance - Instructors suggest that critical skills include reading comprehension and referencing skills, since the entry level soldier is heavily dependent on the TMs for information. A less concrete but equally important element in this regard is initiative. The TMs for 67N, though adequate for their purpose, often fail to describe operations in a detailed, step-by-step manner; the soldier who is afraid to ask questions might have difficulty performing tasks with no more than the current TMs as a guide.

Basic math skills are also a necessity, for calculating measurements to specification, for interpreting gauges, and for manipulating numerical valves relevant to task performance.

Finally, instructors suggest that some familiarity with the use of basic hand and power tools would be an asset to the entry-level soldier in 67N.

MOS SUMMARY - 67T TACTICAL TRANSPORT HELICOPTER REPAIRER

Analysis Approach - Interviews were conducted both in the hangar area and in the RCA field offices. Interview sessions were held 4-5 days per week utilizing one SME per session.

The analyst and SME grouped the task list by helicopter systems and sub-systems order of events.

Two verification committees were assigned to complete the MOS. A DTD Committee reviewed the ETAP format, level of detail and specificity. Instructor review occurred throughout the analysis effort and at the completion of analysis.

Problems - The major problems encountered were the ETAP format, level of detail and specificity on a majority of tasks.

In addition, the DTD verification committee (only one person) was not briefed thoroughly on the responsibilities of the verification process. To remedy the problems in 67T, the Site Supervisor met with the POC, BSEP Committee and DTD Verifier to identify the weak areas of the analysis.

The analyst attempted to strengthen the analysis efforts prior to leaving the position.

The Site Supervisor assumed the role of analyst for 67T. In order to complete the work effort, many of the tasks required a rewrite of procedural steps, changes in the ETAP format and further detail on sub-step performances. In addition, 12 tasks had to be written from notes left by the former analyst.

With the rewrite of tasks and the strengthening of sub-step activities, the MOS was finally completed after considerable time spent on rewrite efforts.

In addition, the format analyst tried to save time on write-ups and interview sessions by using typed-out performance steps supplied by DTD from their In-Process-Review for 67T. Although it saved time during the interview sessions, the process of taping or gluing the information of steps to the ETAP format on TPA-2 became somewhat cumbersome, and difficult to follow for the verification committee. Thus this approach hindered the analysis in the sense to add additional steps for more elaborate detail.

Discrepancies - None, other than the fact that the Black Hawk Helicopter is relatively new to the Army's training structure and some of the interpretations of tasks for a 10-level needed further investigation by additional SMEs. Because of this situation, no SME actually had any field experience on the Black Hawk, but could transfer their experience from MOS 67N which a majority of SMEs had been certified.

67T - 2

Equipment - The 10-level soldier at Fort Eustis is taught the use of basic hand tools and is given hands-on training for some of the major equipment.

Personnel - For the initial start of the MOS, a different analyst and SME began the analysis effort and completed 3 tasks. The POC informed RCA that scheduling of an SME would have to be on a day-by-day basis; however, no real problem existed with the scheduling process. A new SME was assigned to the project with the analyst who worked on the remaining tasks.

Types of Knowledges - Reading, comprehension, reference skills and basic mathematics are required for the 67T soldier to perform the tasks. The Technical Manuals for 67T are written in a very simplified step-by-step procedure which enables the soldier to have a complete picture and detailed description of each task from equipment needed and step-by-step performance steps. Each task activity in the Technical Manual is divided by Helicopter System and then labeled as a "Task" activity.

MOS SUMMARY - 67U MEDIUM HELICOPTER REPAIRER

Analysis Approach - The approach to analysis changed after the first three months due to the SME tiring easily after the first hour of interviewing. The analyst decided to concentrate on tasks that were relatively brief and those the SME felt most comfortable with, and opted to save the write-ups for a later time in order to complete the interviewing with the SME. This approach worked out well, and the SME showed full cooperation. At one point, the analyst had approximately 35-40 tasks in note form, but felt that the notes were adequate to write the task, and that the verifier was very thorough. The verifier was used as the initial SME for the remainder of the analysis. The majority of the interviews occurred in the hangar setting which, for the analyst and the SME, made the analysis easier and more productive.

Discrepancies - The major discrepancy was the use of Anti-Seize Compound. It is applied to components as a light, thin coat to prevent seizure; any excess is to be wiped off. Many of the 67U personnel refuse to use it and instruct students not to apply the compound. They claim that it causes seizure of components.

Other 67U personnel explained that it will cause seizure only if too much compound is applied and if any excess is not wiped off. It is stated in the TM to use this compound which means it is mandatory. Failure to use anti-seize compound will cause seizure and permanent damage which can be costly.

This discrepancy was brought to the attention of the POC and is stated on several tasks.

Soldier's Manual - Only the draft soldier's manual was available. It was identical to the explanations in the TMs for each task subject area. Major steps and sub-steps were not always in order and some steps were not included. A 10-level could have great difficulty following the soldier's draft manual and TM's. Some of the subject areas were not properly listed under the topical headings in the TMs. Therefore, the soldier would have to do a lot of page turning to find the proper paragraph or illustration.

Equipment - The 10-level was exposed to the major equipment for "hands-on" training and under close supervision.

Personnel - SME's were available with little interference of other duties. Changes in SME roles such as initial SME and verifier occurred with the approval of the POC and Site Supervisor.

Type of Knowledges - The most important knowledges that the soldier needs to actually perform the job are those concerning reading, comprehension, and reference skills. The soldier utilizes the TM daily and must be able to follow written instructions.

Basic math skills are also necessary in order to perform measuring activities, reading gauges, and identifying numerical values.

The instructor's greatest concern for the type of student they are to train are those that have difficulty with reading and comprehension.

MOS SUMMARY - 67V OBSERVATION/SCOUT HELICOPTER REPAIRER

Analysis Approach - The approach was consistent with interviewing, immediate write-ups, and verification throughout most of the analysis. In preparation of periods which the SME would not be available, interviews were conducted in abundance so that the balance of the time was spent in writing ETAPs. This occurred at the end of the analysis for the last 30 tasks. Instructor review occurred at Ft. Rucker.

All interviews took place at the SMEs office in the Hangar setting. Although no tasks were taught or performed at Ft. Eustis, the OH-58 helicopter was available in the hangar. This greatly helped in the analysis effort.

Soldier's Manual - The Soldier's Manual or draft was not available, only a current task list was provided, dated 10/18/81.

Personnel - Sometimes it was necessary to schedule tasks on a daily basis. Only one SME was available as the initial SME. Interviewing could occur 2 hours one day or 8 hours the next. Every effort was made by the SME to provide as much time as possible.

Discrepancies - None.

Equipment - While at Ft. Rucker for Instructor Review, some test and major equipment was not provided to the student for "hands-on" training because of cost factors involved, although classroom instruction of the equipment and simulation tests were provided.

Type of Knowledges - As in the case of 67U, the actual skills needed to perform the job are those concerning reading, comprehension and reference skills. The soldier needs the ability to follow written instructions from the Technical Manuals.

Basic Math skills are also important to perform measuring activities, reading gauges, and identifying numerical values.

Instructors feel that reading, comprehension and reference skills are most essential.

As part of the training for 67V, instructors take the approach that the average 10-level soldier has never used common tools, so they instruct them from the basic of turning clockwise/counterclockwise to the more complex of how to use the torque wrench and the various special tools.

MOS Summary - 67Y ATTACK HELICOPTER REPAIRER

Analysis Approach - Interviews for 67Y (Attack Helicopter Repairer) were held solely in the hangar area, thus enabling the SME and analyst to confer with instructors or view the helicopter when needed to complete u task interview accurately. Interview sessions were generally held 3-5 days per week, utilizing one SME per session. Five SMEs were required to complete the MOS due to SME "burn-out", instructor shortage, and special knowledge requirements. During the start-up of the MOS, the task list was divided into groups by the SME according to various aircraft systems. Tasks relating to the rotor system, for example, were approached in a short-to-long task sequence, with earlier tasks acting as building blocks for the later (and generally longer) tasks. Two verifiers were required to complete the MOS, both of whom were extremely cooperative and thorough.

Problems - The major problem encountered was SME "burn-out". A shortage of instructors evidently created pressure on the men which, when coupled with the demands of the analysis, caused a reluctance on the part of some SMEs to participate with the project. This caused some difficulty for the analyst to extract information: less information was volunteered, questions had to be more probing, and the interview setting became somewhat less relaxed. Nevertheless, given the instructor shortage situation, 67Y personnel were fairly cooperative.

Discrepancies - None, other than the expected difference in opinion between personnel on insignificant items.

Soldier's Manual - Only the Draft Soldier's Manual was available. Occasionally, steps were out of order or omitted. However, it provided a good guide for determining what to include in each task write-up. For example, a "replace" task might include the steps of "remove", "inspect", "clean", "install", and "take clearances"; or it might include only "remove" and "install" steps.

Equipment - The 10/20 level soldier is taught usage of basic hand tools, generally found in the tool box or tool room. Major equipment/test equipment is seldom taught hands-on, although the soldier may be exposed to it through VTRs, platform instruction, or demonstration in the hangar.

Personnel - SMEs were readily available for the first three months, after which 67Y seemed to experience an instructor shortage. SMEs were generally cooperative; the Platoon Sgt. in particular backed the project wholeheartedly. Verifiers were courteous and cooperative, as stated before, and no problems were experienced with availability.

Types of Knowledges - Reading, comprehension, and reference skills are the most important knowledges for the 67Y soldier to possess since he must locate, read, and understand information in the TM daily in order to perform any task. Basic math skills are also required for reading and interpreting gauges, calculating measurements, and identifying and manipulating numbers.

MOS SUMMARY - 68B AIRCRAFT POWERPLANT REPAIRER

Analysis Approach - Interviews for MOS 68B were held solely in the hangar area, thus enabling the SME and analyst to confer with instructors or view the engines when needed to complete a task interview accurately. Interview sessions were generally held 3 to 5 days per week, utilizing from one to five SMEs per session. Tasks for each engine required different SMEs, since SMEs tended to specialize in only one or two (at most) engine(s). Eight SMEs were required to complete the MOS, not including the instructor-SMEs utilized to "draw loose ends together" and those conferring with the "main" SME on a task. Also, instructor shortage contributed to the usage of several SMEs.

The task list was divided by engine prior to MOS start-up. Tasks were approached (1) by category, as to engine, and (2) in a short-to-long task sequence within each category, with earlier tasks acting as building blocks for the later (and generally longer) tasks.

Problems - The major problem encountered was verification. Initially, a verifier from DTD was assigned who "rubber-stamped" the tasks through verification. He didn't utilize a TM during verification sessions with the analyst, and consequently found no errors. He also admitted a lack of knowledge with the subject matter. After repeatedly expressing discontent with this situation to the POC, and having seen no resultant action taken, the analyst chose to utilize a qualified SME from the hangar area. As a result, the POC became very upset with the analyst, instructing her never to do such again. Another "qualified" SME was assigned, who expressed extreme discontent with the arrangement to the analyst in "choice" language. These happenings were reported to the POC, along with the analyst's reluctance (refusal) to work with vulgar, uncooperative persons.

No verification took place for a month or so; the POC attempting to arrange a verification committee. Once formed, tasks were submitted, the bulk of which were not returned for a month or more. Tasks which had been previously verified in the present of the analyst were required to be submitted to the committee for reverification.

The committee tended to "rubber-stamp" tasks, providing little or no changes. When verification was performed on a one-on-one basis with the analyst and an SME working together, changes or suggestions were frequently made.

It should be noted that the persons from the hangar used by the analyst for verification to whom the POC had so strongly objected, were serving on the committee. The analyst found this to be an amusing, if not irritating, point. Also, generally one person was used to verify each task, thus eliminating the benefits of the POC's committee concept.

As a result of confusion surrounding verification, much 68B work was delayed.

Discrepancies - None, other than the expected difference in opinion between personnel on insignificant items.

Soldier's Manual - None was provided. The analyst used a task list dated 4/14/82.

Equipment - The 10/20 level soldier is taught usage of basic hand tools and special tools generally found in the tool box or tool room. Major equipment/test equipment is seldom taught hands-on, although the soldier may be exposed to it through slide presentations, platform instruction, or demonstration in the hangar.

Personnel - SMEs were, for the most part, readily available and very courteous and cooperative. Upon occasion, an instructor shortage arose, however, the Master Sgt. released his men to the analyst whenever possible.

Types of Knowledges - Reading, comprehension, and reference skills are the most important knowledges for the 68B soldier to possess, since he must locate, read, and understand information in the TM daily in order to perform any task. Basic math skills are also required, for reading and interpreting gauges, calculating measurements, and identifying and manipulating numbers.

MOS SUMMARY - 68D AIRCRAFT POWERTRAIN REPAIRER

Background - 68D Task list consisted of 57 tasks; 8 were requested for deletion. 49 tasks were analyzed.

All 49 tasks were 10-level activities which involved repair, replacement, and inspection of components removed from the aircraft.

Analysis Approach - Interviews were conducted in the hangar area 3-5 days per week from the period of July to September 1982.

The MOS involved five different helicopters; CH-47, OH58, UH-60, UH-1, and AH-1. It was then necessary to group and analyze tasks by helicopter. The analysis effort involved six SMEs.

The CH-47 was the first group of tasks to be analyzed because of its detailed performance and it served as the basis for some of the routine cross-referencing of substeps for the other helicopter tasks.

Each task was written with the component already removed from the aircraft, the 10-level would then make repairs, replace parts and inspect components on a bench or in the shop setting.

Discrepancies - Task list indicated that all tasks are "resident trained", however some are taught OJT.

Soldier's Manual - Only a task list was provided by the POC, dated 5/24/82.

Equipment - The 10-level soldier is taught the usage of basic hand tools found in the tool box and tool room. A majority of the major equipment is also taught with hands-on training.

Personnel - No problems with SME time, availability, cooperation, or scheduling.

Types of Knowledges - Reading, comprehension, and reference skills are the most important knowledges for the 68D soldier in order to locate, read, understand information and sequential steps in the TM for each task. Basic math skills are also required for reading and interpreting gauges, calculating measurements, and identifying numbers.

MOS Summary - 68F AIRCRAFT ELECTRICIAN

Analysis Approach - Interviews for 68F were conducted solely in the hangar and classroom setting. The availability of various aircraft and test equipment enabled the analyst and SME to approach the work effort with little difficulty.

The task list supplied by the POC listed the task statements in a general sense for "Test" and "Repair" performances. In the estimation of the analyst and SME, analysis of general task performances would be a very lengthy process and would not be completed by the end of the October completion date. Through the recommendation of RCA, the task list was suggested to be broken down by helicopter, the system/component to be "repaired" or "tested" and to analyze a problem most common to arrive in the actual field conditions. This approach was agreed upon by the POC, SME, and DTD Personnel.

Problems - As described in the Analysis Approach section, the first problem was the task list statements. Then the turn-around time for approval by DTD and the POC delayed the effort for two weeks. In addition, the original SME assigned had difficulty understanding the analysis effort and his time for the project was extremely limited (contrary to the thoughts of the POC). Finally, after about three to four weeks from the start of 68F, a new SME was provided who proved to be extremely knowledgeable, experienced, and well-prepared.

Discrepancies - None.

Soldier's Manual - Only a current task list was provided by the POC.

Equipment - The 10/20 level received basic theory of electricity and its application to "Repair" and "Test" performances. The soldier also received detailed classroom instruction and hands-on training on equipment and test sets that have designated BSEP I or AIT tasks.

Personnel - Two SMEs were provided for the analysis effort. The first SME was in demand for instructional duties, however his replacement was available until the analysis was completed. The 68F Instructional Branch was very cooperative with our SME needs, scheduling, and reference manuals.

Types of Knowledges - Reading, comprehension, reference skills, and basic math skills are the most important knowledges the 68F must possess. It is expected that, with these skills, a soldier is trainable in basic electricity theory and its application to helicopter repair. It should be noted that the reoccuring types of activities the 68F will perform is in continuity tests, reading a multimeter, reading specifications charts-tables from TMs and following procedures outlined in the Job Aid.

MOS Summary - 68G AIRCRAFT STRUCTURAL REPAIRER

Analysis Approach - Interviews were conducted solely in the RCA Field Office with occasional visits to the hangar area. Interview sessions were held 4-5 days per week utilizing the afternoon for write-up.

One SME was provided for the initial analysis and instructor review. Several verifiers were used to complete the review process.

The initial SME selected tasks from the list for a systematic analysis effort.

Problems - None.

Discrepancies - None.

Soldier's Manual - Only a current task list was provided by the POC.

Equipment - The 10-level soldier is taught the use of basic hand tools and receives hands-on training for major equipment for BSEP I Tasks.

Personnel - The analyst benefited by using the same SME throughout the analysis. The SME was well experienced, knowledgeable, and came well-prepared for interview sessions.

Types of Knowledges - Reading, comprehension, reference skills and basic math are necessary for the 68G soldier. Since the MOS concerns aircraft structural repair, the soldier needs to apply mathematics to cut, match, seal structural damage in aircraft structure and select appropriate size tools to make repairs.

MOS Summary - 68H AIRCRAFT PNEUDRAULICS REPAIRER

Analysis Approach - Interviews for 68H were conducted solely in the RCA Site Office. Due to the fact that the MOS is instructed at Chanute Air Forace Base, this hindered the analysis for the lack of analyst observation and clarification of task content.

The task list was grouped by the SME into various types of repair functions. Interviews were conducted on a daily basis.

Problems - The major problem encountered was the lack of instructors as an additional input to the analysis. (See Equipment)

Discrepancies - None.

Soldier's Manual - Only a current task list was provided consisting of 34 tasks.

Equipment - The 10/20 level soldier is taught only in a classroom setting on various types of equipment or tools used for Pneudraulics Repair. The soldier may be exposed to audio-visual presentation of equipment use. The actual training is very limited to the 68H because instruction is provided only on Air Force components. Therefore the 68H will only gain some of the necessary theories of equipment use and functions.

Personnel - Two SMEs were available for the analysis, and served frequently as the initial SME and the other as a verifier. The initial SME proved to be very knowledgeable and experienced in his MOS. The verifier lacked field experience and relied heavily upon Technical Manuals to verify the ETAP. A military BSEP Staff member was utilized to conduct Instructor Review at Chanute Air Force Base at the end of the verification process.

Types of Knowledges - Reading, comprehension, and reference skills are the most important knowledges for the 68H soldier to possess, since locating, reading, and understanding information in the TM daily are needed in order to perform any task. Basic math skills are also required for reading and interpreting gauges, calculating measurements and identifying and manipulating numbers.

Special Note: It was conveyed by the SMEs that the 68H soldier will have great difficulty once in the field when it comes time to perform repair upon Pneudraulic systems because of the lack of relevant training, and the only training received is on Air Force Aircraft Systems.

MOS Summary - 68J AIRCRAFT FIRE CONTROL REPAIRER

Analysis Approach - The start-up of task analysis was relatively slow. This was attributed to the initial SME experiencing the "burn-out" syndrome as an SME. He was more verbal on the platform than as an interviewer. This hindered productivity until communication established another SME to assist with analysis. After 3 months, the analyst was assigned another SME and utilized the same approach as with MOS 68M. All interviewing was doncuted in an environment easily assessible to aircraft armament: 1) to accomplish clarity, and 2) for accuracy, expediency, hands-on and visual experience. The analyst utilized the interviewing technique first, thus saving the write-ups for last. This was done in an attempt to, hopefully, decrease the consumption time of the SME. However, the complexity and involvement of skills and knowledges pertinent to the analysis took us far beyond projected schedule to interview.

Soldier's Manual - None Used. A task list was used, dated 1-28-82.

Personnel - The SME and his superiors cooperated admirably to assist in any manner feasible to conduct the analysis. If initial SME was not available, an alternate was provided. Much of the time the analyst was able to work with two SMEs simultaneously - usually the 68M SME - and one would serve as a verifier to the other, as interviewed. As with 68M, interviewing was conducted 4 to 6 hours per day.

Discrepancies - SME felt some tasks duplicated others on the list, i.e., different task statement, but same task. Also, SME felt that some tasks were obsolete.

Equipment - This MOS is more electrical than mechanical. The soldier is taught how to troubleshoot and test equipment. One must trace wires on the aircraft using schematics. The soldier learns how to hook-up electrical and hydraulic power to the aircraft, also to BAGSE (Boresight Assembly Ground Support Equipment) and to boresight the aircraft. The soldier repairs and tests components on the aircraft. The student has access to an aircraft armament tool box. Performance of systems check-out is done for hands-on training also. The student is very closely supervised.

Types of Knowledges - Important knowledges a soldier needs to perform this MOS are reading, comprehension and reference skills. Math skills for calculations, i.e., finding percentages, tracing schematics, are also necessary. Some electrical background is an asset. The soldier engages in some mechanical work, however, the main job is to repair components on the aircraft and troubleshoot anything pertaining to armament system. Courses have been

extended into longer weeks for this MOS because it deals with repair and adjustment of electrical components, therefore, more emphasis is stressed on schematics and electrical components.

The soldier should be able to follow written instructions in accordance with the Technical Manuals.

MOS Summary - 68M AIRCRAFT WEAPON SYSTEMS REPAIRER

Analysis Approach - The approach to analysis was changed after the first 2½ months from an office environment to a hangar environment. The SME and analyst agreed it was pertinent to work in an environment easily accessible to aircraft armament -- 1) to accomplish clarity for the level of task analysis we were attempting and 2) for accuracy, expediency, hands-on and visual experience.

The analyst's approach was consistent with interviewing first and saving the write-ups for last. The SME and his superiors cooperated admirable to assist in any manner feasible to conduct the analysis.

At several points, the analyst had approximately 40-50 tasks in annotated form. The analyst did a re-write then submitted to the verifier. He was very thorough and cooperative with time.

Soldier's Manual - None used. A current task list was used, dated 1-28-82.

Personnel - The majority of the time an SME was available to interview. Usually if it was inconvenient to interview the initial SME, an alternate was assigned. If this was not condusive, the analyst worked with the 68J SME and did a replicate analysis or vice-versa. Interviewing was conducted 4 to 6 hours per day. The initial SME made every effort to provide as much time as requested. At times, interviews were conducted for 8 consecutive hours, yet the SME was very zealous.

Discrepancies - SME felt some of the tasks were obsolete. A few of the tasks were taught without actual equipment, i.e., Align Airborned laser track with the BAGSE, but theory was only method of instruction.

Equipment - This is a mechanical MOS. The 10-level soldier had access to an aircraft armament tool box. The soldier was exposed to the auxiliary power supply to work on the aircraft's hydraulic unit and had to perform a systems operation check for hands-on training. The 10-level disassembles and assembles the components on the turret. This includes testing and replacing components on the aircraft, i.e., electronic component assembly. Testing with and without test set is performed on different components. A soldier disassembles the weapon, i.e., 40 mm grenage launcher and 7.62 machine gun. The student is closely supervised while engaged in hands-on training.

Types of Knowledges - Relevant knowledges for performing the MOS are reading, comprehension and reference skills. The soldier should be able to follow written instructions in accordance with the Technical Manuals. Fundamental math skills are necessary for measuring activities, reading mechanical and electrical gauges and identifying numerical values. The soldier should have some mechanical background and a small knowledge of tools.

MOS SUMMARY - 71D LEGAL CLERK

Analysis Approach - Two SMEs who were writing the 71D 10/20 Soldier's Manual served as initial and verifying SMEs for all 71D tasks. Initial and verification interviews were all conducted in the DTD/Soldier's Manual office area. Instructors came from the "schoolhouse" to the RCA office area. The analysts worked from photocopied working drafts of 71D tasks for a new Soldier's Manual which was not yet in coordinating draft form by the time the bulk of the analysis was complete. ETAP procedures were followed, except the request for the SMEs to identify major steps was dropped after several futile attempts. SMEs indicated that 71D tasks are of a sort that soldiers in the MOS think of them in terms of a chain of activities rather than as systems, subsystems, or clusters of related steps.

Major Problems - Working from draft copies of tasks which were being written and revised at the time was awkward. Analysis of one task had to be delayed for several weeks because the writer of the tasks was awaiting the arrival of a new form which was central to the task and which he had not seen. When the form finally arrived, the analysis was delayed again because there were parts of the form which no one knew how to complete; so an interpretation was required from the Judge Advocate General's office.

We did not see a complete Soldier's Manual until after analysis of the MOS was nearly complete. This circumstance made analysis planning difficult since we often received the draft copy of the task at the initial interview.

Indecision by the Army about new Article 15 procedures delayed completion of the MOS for nearly 9 months.

Soldier's Manual - Working from draft copies which in some tasks needed considerable editing and proofreading was sometimes confusing and misleading.

Some tasks in which branching occurs are plagued with much needless repetition because the writers branched too early in the performance steps; thus, many steps (which should have been preliminary to the branch) are repeated verbatim within each of the alternative branches.

Equipment - Only equipment used in training was typewriters which seemed in good condition and up-to-date.

Personnel - Personnel were excellent -- intelligent, cooperative, knowledgeable. The SMEs and the Instructors were precise and properly critical.

Discrepancies - None of any significance.

Depth/Type of Knowledge Required to Perform the MOS - 71Ds need to be able to read legal language with comprehension and with the understanding that legal language is precise and narrow in meaning. This requires not only a fairly high level of reading skills, but also the ability to force oneself to reread material in order to verify or correct one's first impression of what one had read. In addition, 71Ds need a solid command of written language, spelling, grammar, and punctuation. They must be concise, precise, and lucid in their written composition, clearly conveying exactly what occurred or was intended. Basic math is also needed for some relatively simple computations.

MOS Summary - 71L ADMINISTRATIVE SPECIALIST

Analysis Approach - 71L tasks for 10 and 20 skill level and 71L (ASI-F5) (Postal Clerk) tasks for 10 and 20 skill level were analyzed. Four soldiers in the Soldier's Manual section of the Directorate of Training Developments served as SMEs for the initial interviews, two for 71L and two others for 71L (ASI-F5). Three soldiers in the Soldier's Manual section (including the two who served as first SMEs) served as our SMEs for verification of the 71L tasks.

Since 71L course-work is conducted at Fort Jackson, the site supervisor took the 71L tasks there for the Instructor Review.

The 71L (ASI-F5) tasks posed a dilemma. At the time the initial 71L analysis was conducted, a major change was anticipated in the ASI-F5; therefore, although we completed 71L in July 1981, we were unable to being 71L (ASI-F5) until January 1982. A soldier in the SQT section of the Directorate of Training Developments and Chief Master Sergeant Jarvis (U.S.A.F.) from Washington, D.C., served as our second SMEs for verifying the postal (F5) tasks. Since the tasks represented some major changes in procedure and were not yet being taught under the new rules and guidelines, no Instructor Review was conducted.

Major Problems - Since 71L was the first MOS attempted at Fort Harrison and since it was very early in the RCA/BSEP Project, determining and appropriate level of detail and identifying the level at which an SL10 or SL20 soldier would be expected to function were problems for the analysts.

The other major problems arose in relation to ASI-F5. The necessity of delaying completion of 71L until F5 could be addressed was more of an annoyance than a problem. We did encounter some difficulties, however, in the analysis itself since the SMEs were learning the new guidelines and rules at the same time that we were attempting to analyze how they would be applied in actual practice. This resulted in some re-writing which would probably not have been necessary had the SMEs been more familiar with the new structure of the tasks.

Discrepancies - None.

Soldier's Manual - In general, the Soldier's Manual for 71L is well-written in considerable detail.

Equipment - Since training for 71L is performed at Fort Jackson and no Instructor Review was conducted for ASI-F5, we had no opportunity to make any observations.

Personnel - Our SMEs were very knowledgeable, friendly, and cooperative.

Types of Knowledges - The knowledges required of a 71L or a 71L (ASI-F5) are those required of an efficient secretary, namely: alphabetizing, spelling, having an acceptable grasp of abbreviations, dictionary use, capitalization and punctuation skills, using a model format when typing a communication, proofreading, reading for the main idea in a communication, and using a numerical classification system. ASI-F5 also needs to be able to make changes.

MOS SUMMARY - 71M CHAPEL ACTIVITIES SPECIALIST

Analysis Approach - The procedures followed were the results of several pre-analysis planning sessions. The assigned Army personnel and the analysis adopted the following procedures.

1. A weekly list of the tasks to be analyzed, and the list of the required publication (regulations, forms, etc.) was given to Sergeant in charge. Special attention was given concerning the choice of the SME, the verifiers, and the instructor. The Sgt. responded with necessary lists, and the schedule planned and approved.

2. The analysis procedure was carefully explained to each of the SMEs to relieve any suspicion that he was being analyzed rather than the task. It was also necessary to impress the SMEs of the importance of the program. After several analyses had occurred, the program proceeded smoothly.

3. The analysis usually took place in the mornings; the afternoons were spent in completing the required recording. The various communications and suggestions from the home office made the recording a systematic procedure and an easy format to follow.

4. The verifiers and the instructor reviews usually completed the weekly schedule.

5. Verifiers and instructors were chosen with the expertise required of the task.

6. Supervisory personnel were most interested in the program and followed the progress by requesting frequent status reports. All were most interested and cooperative.

Problems - The major problem encountered was the shortage of SMEs with recent field experience. Many of the SMEs had not experienced field work in many years. The staffs of the school, both in the project planning and in the instructional field, were greatly below normal complement. The Chapel Assistant Specialists were most competent in the MOS related tasks; however, in the other tasks they had little to offer (again from lack of recent field experiences). In areas of the transportation tasks, they had little to offer the analysis procedures.

It became most difficult to obtain the necessary manuals, regulations, and the forms necessary to complete the analysis in these common tasks. Even the fort library could not supply all of the requirements.

Discrepancies - The Soldier's Manual contained a number of omissions and mistakes. In some cases the conditions and procedures to follow did not lead to the correct conditions. In other cases, the picture settings of the various chapel arrangements were either incomplete, or incorrect. The tasks involved with the Jewish faith seemed to contain more inaccuracies than the other faiths. All of the above observations and inaccuracies were reported as requested to the task force involved with updating the manual.

Soldier's Manual - The manual was followed completely. Since the date of the manual was '81, it was for the most part updated. All omissions and mistakes were reported to the task force re-writing the manual as per their request.

Several of the tasks listed relating to reconciliation of funds were under the advisory committee but were handled completely by civilian programs at the fort level.

The tasks listed under the general heading of transportation were difficult to analyze because of a lack of recent transportation experiences, however, the tasks were analyzed.

Equipment - The use of equipment was minimal, but those required were the various religious appointments according to each faith for the different types of chapel settings. The settings were for masses, weddings, marriages, burials, etc. All equipment and robes were in excellent condition and stored in appropriate manner.

Personnel - The problem that existed was the face that all phases of the program was undermanned. All of the SMEs and verifiers were far removed from any field experience. All were cooperative, professional and eager to be a part of the program. The officer and administrative personnel were abundant and most interested in the program.

Types of Knowledges - The knowledges required to perform the tasks were mainly pertaining to identification, terminology, recognition, and the coordination of these knowledges. In the completion of those tasks which required the completion of various forms, reading and writing knowledges were required. Some of the tasks required the use of the typewriter; therefore, certain motor knowledges were required. Some of the tasks were related to the keeping records of funds and those required the understanding of various phases of mathematics. In the area of the common tasks the whole knowledge summary was required.

MOS SUMMARY - 71P FLIGHT OPERATIONS COORDINATOR

Problems - The analyst did not encounter any significant problems during the analysis.

Discrepancies - No major discrepancies were cited during the analysis.

Soldier's Manual - The Soldier's Manual relied heavily upon abbreviations and acronyms. The analyst found the manual difficult to follow for this reason. The FM also referred to a number of other technical manuals. The analyst concurs that it might make the steps easier to follow if the soldier's manual listed the steps instead of just providing a reference.

Equipment - Flight operators use a variety of different equipment ranging from forms and flight publications to radios and emergency equipment. All equipment was available for the analyst to observe during training (school) hours at the air fields.

Personnel - Fewer flight operators were available to the analyst because a number of personnel were on leave or currently being transferred. The small group of operators associated with the project helped create a more consistent product.

Knowledges - Proper communication and safety precautions proved to be two of the key knowledges essential for performing as a flight operator. Clerical duties appeared to be an important function also.

MOS Summary - 71Q Journalist

Analysis Approach - Tasks were divided among the three analysts. Analyst conducted interviews in 71Q office area with first SMEs and at the school with second SMEs and instructors.

The ETAP Manual was not used during 71Q analysis as analysts were familiar with the procedure by then.

Major Problems - Delay in completion because of decision by site supervisor to work on other MOS.

Instructor reviews on developing tasks (black and white film and black and white photographic prints) had to be done with 83E because 71Q SMEs do not know the tasks (and receive very cursory instruction on them). Because 71Qs do not know the tasks (and soldier's manual has them wrong), extensive re-writes of the tasks was required.

Discrepancies - None other than those noted in SM section.

Soldier's Manual - Inclusion of tasks on developing film and prints which SMEs indicated are not done by 71Qs. SMEs stated that 83Es (photo and layout specialist) don't permit 71Qs in their labs.

Some tasks incorrectly written (see major problems).

Some tasks, written by civilian personnel, reflect civilian rather than military orientation.

Equipment - None

Personnel - Cooperative and knowledgeable, except for developing tasks.

Depth/Type of Knowledge - 71Qs operate with less immediate direction by supervisor than is expected of most soldiers; thus, the depth/type knowledge required is somewhat greater than might be expected in other MOS. Expectations seemed realistic. SMEs readily acknowledged that the new 71Q will function at a modest level until field experience has been gained.

71Qs must have strong reading and composition skills, including spelling, grammar, vocabulary, sentence, and paragraph writing.

MOS Summary - 72E Telecommunications Center Operator

Analysis Approach - An initial meeting with the course chief of 72E was planned at 1300 for February 12, 1982. Actual start date was February 24, 1982. Interviews for the first half of the analysis were held at the 72E course site. Interviews for the second half were held at Williard Training Area. Analysis write-up took place in room 211, Brant Hall. Instructor review occurred at Brant Hall, Williard Training Area, and Burkhardt Hall 72E.

Preanalysis planning consisted of meeting with the course chief and BN Commander with RCA analyst. The analysis schedule was planned in blocks of tasks to correspond with sections of the course so that segments of the schedule were completed conveniently. The course chief was furnished a list of tasks and provided the recommendations and guidance for each of the segments, coordinating SMEs accordingly.

Problems/Discrepancies - Some SMEs for the DST van and the MGC 23 radio were not available. SMEs outside the course were found for partial completion of the DST van tasks to assist with the analysis. None were found for the MGC 23 radio.

Soldier's Manual - Some typographical errors in the Soldier's Manual were noted.

Equipment - As was stated previously, most of the tasks dealing with the DST van and the MGC 23 radio were difficult to analyze, due to nonavailability of SMEs. These pieces of equipment are relatively new, therefore, few SMEs have had field experience with the equipment.

Personnel - SMEs met with the RCA analyst on a daily basis for 2-4 hours each weekday morning for interview purposes in the analysis of each critical task. SMEs chosen were those who had had recent field experience in the MOS. Course instructors served as reviewers and verifiers. All personnel were extremely cooperative and knowledgeable.

Types of Knowledges - SMEs must be able to type using the teletypewriter. They must be able to use various publications to determine codings to transmit messages. Simple math skills are required to do time analysis and time conversions. SMEs must have a certain amount of mechanical ability to perform preventive maintenance on equipment. Because some tasks require lifting of heavy objects, SMEs must be in good physical condition. Being able to read and use circuit diagrams is a necessary skill of 72E soldiers. Good reading and handwriting skills are required to complete forms and maintain daily logs. SMEs must be familiar with safety and security measures appropriate for the different tasks in the MOS. Estimating distances is a necessary skill for the soldiers, along with reading and using various kinds of maps and charts. Finally, SMEs must be able to recognize and identify components on pieces of equipment and know how they are moved or positioned to complete a task activity.

MOS Summary - 74D COMPUTER/MACHINE OPERATOR

Analysis Approach - We used a committee approach for the initial interview, verification, and instructor review, with the analyst present for all three phases. Three instructors served on the committee for most of the interviews (one instructor was re-assigned during the period of the analysis) and several other instructors (possible as many as eight or ten) assisted on one or two tasks each for which the core of the committee felt they needed additional expertise.

Major Problems - A number of the tasks in the 74D task list are not truly tasks. For example, "Affixing a Magnetic Marker to a Magnetic Tape" is never done apart from performing other closely related operations on the tape and requires about 20 seconds.

Because of the many variations of equipment configurations and the idiosyncracies of local SOPs at Data Processing Activities, few specifics could be written about a majority of the tasks.

Initiation of analysis on 74D was delayed for several months because decisions concerning what equipment, how many configurations of equipment, and what sorts of programs were to be analyzed had not been made.

Discrepancies - None.

Soldier's Manual - One task had only the word "NONE" under Performance Steps. A number of tasks, as noted above, were not really tasks. SMEs indicated that some essential tasks for 74D had not been included in the task list. The number of tasks lacking content in the Manual convey an impression that there is little substance to the MOS.

Equipment - The equipment on hand seemed adequate for training purposes.

Personnel - Our SMEs were knowledgeable, friendly, and cooperative.

Types of Knowledges Required - Among the knowledges required for a 74D are an aptitude for attending to coded data, a capability for transcribing coded information accurately, good recognition of numerals, letters, and symbols, ability to find necessary information in a source document (often a very sizeable volume or set of volumes) quickly and accurately, and ability to use reference materials to find specific information.

MOS SUMMARY - 74F PROGRAMMER/ANALYST

Analysis Approach - What amounted to a committee approach was used with the main group of tasks. Several instructors were interviewed for each task. A consolidation of the results of the interviews was used in the task writeups. Similarly groups of instructors were used for verification and instructional review. Replicate analysis procedures were used for several tasks for which analysis had been accomplished in MOS 71L and 74D.

Problems - The major concerns during analysis were dealing with task statements (less than 10) which were written to encompass performance for skill levels 10 thru 40 and a multitude of programming languages for which additional training is often provided. The task statements were written in such broad and general terms, as were the performances standards listed in the Soldier's Manual, that no readily apparent level of performance could be described for the 10- and 20-level soldiers. Much of the analyst's time was devoted to attending meetings at which this issue was discussed. As regards the second area of concern, there was general agreement that analysis results should reflect the COBOL language for an IBM 360/370 series computer.

Discrepancies - No doctrinal discrepancies were noted. However, because the responsibilities of the 74F are so ill-defined at the various skill levels, it is apparent that there is wide diversity in tasks actually performed on the job. Consequently, a heavy burden is placed on field locations to provide specific training related to the duty assignment; i.e. programming language and operating system.

Soldier's Manual - The August 1981 version was used. As noted above, it provided very little guidance to the effort.

Equipment - It appears as though the U.S. Army maintains a diverse inventory of data processing equipment which requires duty specific additional training. The IBM 360/370 series was used throughout analysis as the basic type of equipment.

Types of Knowledges - Key skills required by the 74F involve written and numerical expression. To cope with programming languages requires attention to detail in using codes, words, and symbols. Reference skills are also essential.

MOS Summary - 75B Personnel Administration Specialist

Analysis Approach - The site supervisor assigned 75B tasks to himself and the other two analysts. To some extent the assignments maintained continuity with related tasks which the analysts had already analyzed in 71D and 71L.

Analysis and verification interviews were all conducted in or near the RCA office space at Fort Harrison with SMEs who had participated in writing the new Soldier's Manual for the MOS. Instructor reviews were conducted in the same area with instructors from the "schoolhouse". In general, ETAP procedures were followed; however, it became apparent very early in the MOS analysis that SMEs were distressed by the request to identify major steps and had considerable difficulty in doing so.

Major Problems - Analysis of the SIDPERS (Standard Installation/Division Personnel System) tasks was complex and at times difficult, the difficulty being amplified by the fact that the SIDPERS tasks were distributed among all three analysts.

The analyst experienced a communication problem with one SME. The SME was intelligent, pleasant, cooperative, and knowledgeable; however, English was his second language. His use of English idiom was rather unusual, and on occasion, communication between analyst and SME did not quite mesh.

Discrepancies - None of any significance.

Soldier's Manual - Some task descriptions seem overly detailed (e.g., "Enter a period (.) in the next box").

There is some tendency to treat the completion of forms as if completing forms were done for its own sake, thus losing sight of the personnel and personal transactions which are what the task is really about.

Several Skill Level 10 tasks refer to using Army Regulations requiring the 75B to read and make judgments based on the content of the AR. The SM tends at times to imply that a 75B10 will interpret the AR. In actual practice, the 75B should only apply specific directions/mandates of the ARs, not interpret what they intend nor mean to other soldiers.

Equipment - Only equipment involved was typewriters which appeared to be in reasonable good repair.

Personnel - SMEs and Instructors were cooperative, knowledgeable, and meticulous about details. Their tendency to rely on acronyms (and there are many in the 75B field) frequently required explanation and restatement.

Depth/Type of Knowledge Required - 75Bs need to be able to read at an average or above average level since they often must derive information and follow specific directions (often quite detailed) from ARs and DA Pams, particularly when performing SIDPERS tasks. They also need basic math skills and mastery of basic grammar, spelling, and punctuation.

MOS SUMMARY - 76C EQUIPMENT RECORDS AND PART SPECIALIST

Analysis Approach - Interviews for 76C were held primarily in the offices of the SME. This approach allowed the analyst easy access to forms and job references. SME's were readily available and several were used because of the different areas of specialty within the MOS. Both the original SME and a second instructor were used in the verification process. Since the Soldier's Manual was being revised the instructional review process took note of the intended POI changes.

Problems/Discrepancies - No major problems were encountered, nor discrepancies noted. There was some variability in the requirements to make all entries in pencil during training, when doctrine requires pen entries in many instances. The use of DD form 1348-1 was not included in the Soldier's Manual.

Soldier's Manual - A 1982 draft version was used. SME's were very thorough in checking Soldier's Manual references against technical manual and regulation changes. The Soldier's Manual appeared well organized and up-to-date. In some cases steps listed on figures (drawings) proved difficult for the analyst to follow. Perhaps a step-by-step outline of what the soldier is to do might prove more helpful.

Equipment - There is no major equipment associated with this MOS, other than a microfiche reader.

Types of Knowledges - All subskills shown on the taxonomy for completing forms and for referencing information in publications, on charts, and in tables are essential. Attention to detail in copying printed information and making extensions and totals are also important.

MOS SUMMARY - 76P MATERIEL CONTROL AND ACCOUNTING SPECIALIST

Analysis Approach - Interviews for the 76P were held in the offices of the SME and the analyst. Several SMEs, verifiers, and instructors were required to complete the MOS due to special knowledge requirements. Interviews were held 3-5 days per week for 4-5 hours per day. Verification of the analyses consisted of the initial SME and the verifier reviewing the tasks with the analyst for accuracy and clarity. Instructor reviews consisted of the instructor reviewing the tasks with the analyst for accuracy and to determine what steps were not taught.

Problems - No major problems were encountered.

Discrepancies - No major discrepancies were noted.

Soldier's Manual - The draft Soldier's Manual was very accurate and complete.

Equipment - No major equipment is used.

Personnel - 76P personnel were readily available and cooperative.

Types of Knowledges - Reading comprehension and reference skills are the most important knowledges required for the 76P soldier.

MOS SUMMARY - 76V MATERIEL STORAGE AND HANDLING SPECIALIST

Analysis Approach - Interviews for the 76V were held in the classroom. Interviews were held for 5-6 hours per day for 4-5 days per week. Several SME's were needed to complete the MOS due to special knowledge requirements. The tasks were analyzed in the order in which they appeared in the Soldier's Manual. Verification of the analyses took place in the classroom with the initial SME, the verifier, and the analyst. The tasks were verified for accuracy and clarity. Additions, deletions, and/or rewriteswere made as a result of the verification process. The instructor review for the analyses took place in the classroom. The tasks were reviewed by the instructor with the analyst to determine what steps were not taught.

Problems/Discrepancies - One major problem was getting personnel knowledgeable in the areas of packaging and preservation. This is a specialty within 76V and is trained through correspondence courses as noted in the analysis results. There was some variation as to how to most safely and efficiently operate the forklift with palletized supplies. Also some variation was noted in field procedures for processing incoming supplies and selecting supplies for issue or shipping.

Soldier's Manual - A draft version, dated 1981, was available. Because references to regulations and manuals were not completely updated, it was not heavily relied upon.

Equipment - The types of equipment needed to perform the tasks were listed in the Soldier's Manual. Most equipment items have been standard in the inventory for many years and have well established operating and maintenance procedures.

Types of Knowledges - 76V soldiers rely heavily on reading procedures which provide guidance for completing various forms. All subskills associated with form preparation are essential. Spatial orientation and environmental observation skills are essential. To handle publications and regulations, referencing skills are required.

MOS SUMMARY - 76W PETROLEUM SUPPLY SPECIALIST

Problems - The availability of trained personnel proved to be a major problem during the analysis.

Discrepancies - No major discrepancies, other than the soldier's manual (as indicated below) were cited by the analyst during the analysis.

Soldier's Manual - The Soldier's Manual that was issued to the analyst contained a number of discrepancies and mistakes. A corrected copy was used instead.

The analyst noted three major areas of discrepancies in the Soldier's Manual. First, the examples included for clarification were written as part of the task. The analyst found the examples misleading because they made it appear as if they were the only possible answer or situation to be encountered when completing the task. Second, the steps that proved to be identical to those listed in other tasks did not use the same format. The SME attributed the use of different formats to the fact that different personnel had been responsible for writing different tasks. Third, the analyst found those steps listed on figures (drawings) difficult to follow. The analyst concurs that a step-by-step outline of what the soldier is to do might prove more helpful.

Equipment - All petroleum equipment was available to the analyst for observation during training (school) hours. Only authorized personnel were allowed to demonstrate the equipment.

Personnel - The analyst worked with a number of different Subject Matter Experts during the analysis. Their knowledge appeared to range from superior to very poor. The analyst asked that one SME be excused from the project. Additional job duties often made the more knowledgeable personnel unavailable.

Knowledges - The most common knowledges that appeared repeatedly throughout the analysis were those pertaining to preparing forms, completing forms, and transferring data from one form to another. Directions in assemblying/disassemblying pipes, hoses, and valves proved essential in completing certain tasks.

MOS SUMMARY - 76X SUBSISTENCE SUPPLY SPECIALIST

Analysis Approach - Interviews for the 76X were held in the SME's work area. This approach afforded the analyst access to all forms and job references. A team approach was used for verification and instructional review. The 76X team members involved in the analysis proved to be most cooperative and knowledgeable. The analyst was given first priority to designated personnel at all times. Such an attitude toward the project enabled the analyst and SME's to complete work in an efficient manner.

Problems/Discrepancies - No major problems were encountered, nor discrepancies noted. This was the smoothest analysis effort at Fort Lee.

Soldier's Manual - The April 1981 versions of the Soldier's Manual was used. It appeared to be well written and SME's were very capable of supplementing it.

Equipment - There is no major equipment associated with this MOS, other than a microfiche reader.

Types of Knowledges - The knowledges that appeared repeatedly throughout the analysis were those pertaining to preparing forms, completing forms, and transfering data from one form to another. Basic skills of counting, adding, subtracting, multiplying, and dividing are essential. Denominate numbers are used frequently.

MOS SUMMARY - 76Y UNIT SUPPLY SPECIALIST

Analysis Approach - Interviews for the 76Y were held in the classroom and offices of the SMEs. Several SMEs were used due to special knowledge requirements. Interviews were held 5-6 hours per day for 5 days per week. The tasks were analyzed in the order in which they appeared in the Soldier's Manual. Verification of the analyses consisted of the analyst, the initial SME, and the verifier reviewing the tasks for accuracy and clarification.

Problems/Discrepancies - No major problems were encountered, nor discrepancies noted. However, there was considerable discussion and rewrite during the verification. This result because the 76Y performs duties in a variety of settings and most regulations and manuals are written to allow for these variations. The analysis results rely heavily on the regulations and manuals, thereby avoiding the rewriting of specific procedures and doctrine.

Soldier's Manual - A 1981 draft version was utilized. It provided a comprehensive guide to task performance. SMEs were very diligent in checking all references to procedures.

Equipment - Major equipment items were available for examination by the analyst. It appears as though some types of automation may be introduced into 76Y in the near future. This may require expansion of the task list.

Types of knowledges - Skills required to initiate and complete forms and to transfer information from one form to another are critical. Referencing skills are essential because the 76Y comes in contact with publications which use a variety of formats. Verbal communication skills are important because of the "in between" position of the 76Y. Basic counting and mathematics computational skills are necessary for inventory tasks.

MOS SUMMARY - 82C FIELD ARTILLERY SURVEYOR

Personnel - An almost identical information base common to one category of Subject Matter Expert (SME) interviewed seems to reflect an identifiable marginal performance level among some few 82C soldiers. These SMEs demonstrate in-depth knowledgeability with reference to a particular piece of survey equipment, a particular principle, and the application of these particulars in field artillery survey. Since SMEs within this category invariably articulate poorly, however, perhaps parameters extraneous to expertise contribute to their performance. A recommendation for SMEs within this category is remediation with an emphasis on cross-training.

According to the analyst, significant scope of knowledgeability, with a concomitant high-level of performance, characterizes another category of 82C SME. Whereas the aforementioned category of SME evidences a non-eclectic approach to the 82C MOS, in contrast, SMEs in this category maintain updated information (obtained by keeping abreast of changes in doctrine), proficient manipulation of all required equipment (gained by working frequently with the equipment), and alternative solutions to a wide variety of field circumstances (learned both from first-hand experience and from selective research).

These SMEs extrapolate, and substantive responses as well as structured time-management procedures are hallmarks of their professionalism. Representative of a top-echelon professional within this category, the SME responsible for the majority of interviews conducted during BSEP analysis shows optimal methodological capability.

Draft Soldier's Manual - Dismiss it.

Types of Knowledges - Beneficial to an 82C Entry-level soldier's success are such prerequisite skills and knowledges as acute spatial perception, adeptness at swiftly performing simple mathematical processes, ability to solve basic algebraic equations, affinity for operating both electronic and mechanical measurement devices, and tenacity to carry out detailed step-by-step procedures. According to the analyst, proficient 82C SMEs rely heavily on such skills and knowledges in order to conceptualize and then implement a meaningful schema of field artillery survey in relationship to field artillery objectives.

MOS, In General - The amount of theoretical understanding offered during AIT to the entry-level 82C soldier decreases each and every year, say the SMEs, because technological innovations lessen ever increasingly the necessity of theoretical studies. Sophisticated engineering in electronics is turning the 82C soldier into a button pushing type, so say some SMEs, who also point out that such a soldier may find himself at a loss on the battlefield if electronic gadgetry fails him. On one hand these SMEs argue for an increase in the entry-level soldier's time spent studying theory; but, on the other hand, they also number the days until technology renders the traditional field artillery survey party obsolete.

Equipment - One major piece of survey equipment is cited as unavailable for analysis, the ABLE gyroscope. SMEs say ABLE is unavailable because it is soon to phase-out from the Army's inventory of equipment.

Problems - With reference to major problems encountered during BSEP analysis of MOS 82C, no major problems occurred.

MOS SUMMARY - 91B MEDICAL SPECIALIST

Analysis Approach - Analysis was conducted at the Medical Specialist building. Approximately 60 to 70 percent of the analysis was performed with Subject Matter Experts (SMEs) working in the office. On a number of occasions, the office responsibilities of the SMEs conflicted with their availability to be interviewed. This was resolved when instructors on two-week breaks were brought in to serve as SMEs in the analysis. Due to the level of detail desired and the variability inherent in some of the tasks, task interviews could be a trying and rather difficult experience for some SMEs, especially those who did many tasks. The analysis approach concentrated on those tasks serving as a building block for others. Tasks were also selected based upon the expertise and experience of the SME. For example, those SMEs with front edge of battle area (FEBA) experience were selected to do FEBA related tasks, or an SME particularly knowledgeable in burns would be selected to do burn tasks. Many times individuals with expertise in a certain area were sought after for specialized tasks. One additional approach needs mention. All 210 Series tasks reflecting combat conditions (i.e., wounds, fractures, etc.), were analyzed in the context of surveying, evaluating, and triaging combat injuries. Examination of these tasks will reveal the approach taken. In terms of analyst styles in the interview process, both analysts could be categorized as using an agressive style.

Problems - The problems experienced were typical of prior ones: occasional SME "burnout", shortages of SMEs at times, and instances of SME inexperience or knowledge gaps for certain tasks. For the most part, however, these problems were overcome with minor interruptions to the analysis effort.

Discrepancies - Major discrepancies occurred in two major areas: burns and triage. There was a wide diversity of opinion in these areas and it appeared students were receiving different thoughts in these areas based on the instructor. Otherwise, all attempts were made to resolve discrepancies between two or more SMEs. Most discrepancies were noted on the tasks themselves.

Soldier's Manual - No soldier's manual was available. Analysts worked from a task list exclusively.

Equipment - There is a wide variety of equipment the 91B is responsible for using. Measuring instruments, hospital equipment, aid bag supplies, etc. comprise only a few of the categories necessary.

Personnel - The personnel, especially the core group of SMEs in the office, are to be highly commended for their cooperation and contributions to this analysis effort. Many times the SMEs were forced into a kind of juggling act between their work responsibilities and the analysis.

In addition, many who participated gained a certain satisfaction in correcting some of the wrongs they perceived. On the whole, the SMEs demonstrated high levels of expertise and professionalism.

Types of Knowledges - The basic skills and knowledges covered most of the skills on the RCA taxonomy. A 91B is almost assured of running into difficulty without basic reading and math skills. In addition, technical knowledge in basic anatomy, physiology, and biology is essential to success.

MOS SUMMARY - 93J ATC RADAR CONTROLLER

Problems - The Subject Matter Experts displayed a very confused view of the project, how an analysis was to be completed, and what the data was to be used for. The analyst attributed this to the amount of time required to complete the analysis and the different anclyst involved.

Discrepancies - The analyst cited no discrepancies during the analysis other than those listed above.

Soldier's Manual - The Soldier's Manual contained very long and descriptive paragraphs of what the soldier was to do. The paragraphs contained much information that was not essential for completing the task.

The examples included for clarification were written as a part of the task. The analyst found the examples misleading because they made it appear as if they were the only possible answer or situation to be encountered when completing a task.

Equipment - Forms and flight publications were available to the analyst. Air traffic equipment was only available during training (school) hours when accompanied by authorized personnel.

Personnel - The personnel involved in the completion of the analysis were very helpful considering the circumstances. The analyst found that certain personnel held very confused views concerning the project. There was limited availability of feedback concerning certain tasks.

Knowledges - Those knowledges involving directions proved to be very important when operating air traffic control equipment. Good communication between the controller and the pilot proved essential.

MOS Summary - 94B Food Service Specialist

Analysis Approach - Interviews for the 94B (Food Service Specialist) were held in the office of the SME, the classroom, and the dining facility. Several SMEs were used due to special knowledge requirements and SME workload. Interviews were held 5-6 hours per day for 5 days per week. The tasks were analyzed in the order in which they appeared in the Soldier's Manual. Verification of the analyses took place in the classroom and consisted of the initial SME, the verifier, an instructor, and the analyst reviewing the tasks for accuracy and clarification. During the instructor review, the instructor reviewed the knowledges and the steps in the tasks which were not taught.

Problems - No major problems were encountered.

Discrepancies - No major discrepancies were noted.

Soldier's Manual - The Soldier's Manual provided a good guide for major steps to be included in each task.

Equipment - Major equipment is taught hands on, through the use of VIR's, and platform instruction.

Personnel - The 94B personnel were extremely cooperative and helpful. They were readily available to the analyst at all times during the analyses.

Types of Knowledges - To perform tasks successfully, the 94B soldier must possess basic math skills which include fractions, decimals, units of measurement, and reading and interpreting gauges. Additionally, the soldier must possess reading comprehension and reference skills.

MOS SUMMARY - 95B MILITARY POLICE

Analysis Approach - Initial analysis interviews, verification interviews, and instructor reviews were nearly all conducted in the instructional areas or instructor areas for the MOS. Because of the diversity of tasks, many areas and 73 SMEs were used. Analysts not only conducted interviews but upon some occasions attended classes, observed student walk-throughs, and observed students participating in training exercises and hands-on testing.

Problems - Although two earlier analysts on this MOS complained of SME non-availability, the analyst writing this summary encountered no significant problems of this sort. In fact, the most difficult problem (and it was of no real consequence) was finding SMEs for a few somewhat unusual non-proponent tasks, such as "Develop a Squad Loading Plan for Transporting by Air."

Several Skill Level 20 non-proponent tasks seem more appropriate to Skill Level 30 since they are specifically focused at the squad leader level or above.

Six tasks on the 90 MM RCLR (Recoilless Rifle) are included in the task list even though no MP units have had such weapons for nearly 10 years. The only explanation given for this oddity was that the tasks were left in until a replacement weapon is designated.

Discrepancies - None other than those noted above under problems.

Soldier's Manual - Proponent tasks are very well written with the performance steps in most cases explicit and in agreement with information given by SMEs.

Skill Level 20 supervisory tasks tend to reiterate the SL 10 skills which are being supervised. This occasionally results in some seeming confusion of roles, but SMEs are generally quite clear on the proper division of authority and responsibilities.

Tasks do not (in many instances) occur in the manual in the numerical order of their task numbers. This occasionally creates difficulty in locating a particular task, especially since the Soldier's Manuals have no indexes.

Equipment - A common complaint among instructors was that there was not enough equipment, equipment seriously worn by extensive use, and difficulty of getting equipment to teach new tasks in the POI.

Personnel - Generally, excellent. SMEs went out of their way to be helpful and make themselves available. The few times appointments were not kept because of unexpected assignments or forgetfulness were more than adequately compensated later by the same individuals.

Types of Knowledges - Because of the sensitivity of their role in dealing with civilian visitors to military installations as well as with the military community, 95Bs need a high level of human relations skills and knowledges, a fact which is repeatedly emphasized in their training. Also, because they must keep many records, forms, and their MP notebooks, 95Bs need a firm grasp of composition, grammar, spelling, and punctuation skills. They also must be accurate in noting specific times, dates, and factual details - skillfully sorting observable facts from impressions and interpretations. Some math skills are required for relatively simple measurements and computations.

MOS SUMMARY - 95C CORRECTIONAL SPECIALIST

Analysis Approach - 95C and 95B tasks are very closely related, with all the non-proponent tasks that are taught being taught together. Because of that, all 95C non-proponent tasks were treated as replicates of 95B tasks, facilitating bookkeeping. This summary will focus on the 95C proponent tasks.

Only four SMEs were used for this MOS, all of them instructors. All interviews - initial, verification/IR were conducted in the instructional area.

Major Problems - The original anclyst for this MOS left rather suddently without providing input for the MOS summary. The analyst completing the MOS encountered no problems of significance other than the fact that initial interviews had been conducted for all tasks, and that 15 proponent tasks had to be re-interviewed.

Discrepancies - Inclusion of one task in the soldier's manual, Take Record Fingerprint Impressions, which SMEs stated is not done by 95C.

Soldier's Manual - Inclusion of one task in Skill Level 1 manual which is not done by 95C - Take Record Fingerprint Impressions.

Equipment - None

Personnel - Excellent cooperation. SME willingly submitted to being interviewed a second time (See Major Problems) and went through all 15 tasks at one sitting.

Depth/Type of Knowledges - Because the 95C deals with processing and controlling prisoners and civilian visits to prisoners, they need a high level of human relations skills and knowledges. In maintaining accountability of prisoners, equipment, and supplies, forms are often utilized for record-keeping -- requiring accuracy, precision, and the ability to record information.

MOS SUMMARY - 96B INTELLIGENCE ANALYST

The 96B MOS is a purely mental MOS. There is no equipment or items to be handled or manipulated. Most of what a 96B does involves paperwork and filing of reports. The 96B obtains information from all sources and compiles, sorts, analyzes, files, and re-disseminates the information. Because most of the information a 96B handles is intelligence information, he must be familiar with security procedures and the forms and paperwork involved.

A 96B's main job is analyzing information. To do this, skill is needed to separate useful information from the extraneous material and to compile it into a meaningful manner. Areas where information is required to complete a file must be recognized and communicated to a source capable of acquiring that information.

Many times a 96B is called upon to provide intelligence information that has been compiled. Report writing skills are invaluable as well as verbal communication skills up to giving a formal briefing.

Because this MOS requires analysis of information from all sources, knowledge of many areas is helpful. Common sense and logical thought both are quite important.

FIELD SITE SUMMARY REPORT

Ft. Eustis

Prepared by:
Mike Andriliunas
Site Supervisor, Ft. Eustis

Operational Period: June 1981-December 1982

Total MOS: 16

RCA Personnel/Analysts: Long Term - 4 (12-18 months)
Short Term - 5 (3-6 months)

RCA Field Office: Excellent location for work activities within the domain of Army training

Support Equipment: 2 post telephones, 2 business phones, 1 copier, 1 CRT and printer

POC: Brenda Dawson/ Rose Marie Taylor

Summary of Work Effort

Operations

During the period from June 1981 - August 1982, two analysts left and six were assigned to the field site. The average day-to-day operations of analysis consisted of:

Interviews - daily, approximately 7:30 a.m. - 1:00 p.m.
Verification - bi-monthly
Instructor Review - upon completion of verification
Write-Up - daily

Usually the average amount of tasks to be written up from notes were 10-12. In some cases, greater amounts were in note form due to conducting more interviews in advance to anticipate SME rescheduling or non-availability. Interview sessions were conducted at various locations on post in order to avoid overcrowding and disruptions of analysis in the field office.

Weekly meetings occurred between Site Supervisor and POC to discuss current status of each MOS, SME scheduling, and a specific briefing on new developments in the ETAP Format (TPA-1, TPA-2, TPA-3, and KA).

Weekly meetings occurred between Site Supervisor and Analysts to review and discuss current status of individual efforts, SME scheduling, and RCA-BSEP guidelines and procedures.

SME cooperation was very good in most cases. There were periods where the SME was required to perform Instructional duties in addition to support BSEP. This conflict would indicate a frustrated attitude by the SME. The only way to cope with this was to request back-up personnel. In MOS 67Y, several SMEs were needed to support the effort due to SME "burn out" and conflicting instructional duties. Overall, the SMEs strived for quality in our product and prepared themselves well prior to each interview session.

MOS Scheduling, Verification, Time Constraints

The work flow remained continuous and in a routine fashion up to July 1982. The project goal was to complete analysis activities by October 1982. Two major factors restricted the October deadline.

The first factor was the analysis of MOS 61C. This MOS suffered problems with a lengthy task list not anticipated. In addition, there were problems with the task numbers and statements being identical and the availability of SMEs. The analyst had to spend a great deal of time from July to October to finally arrive at a workable task list. The analyst really had to analyze the task list before analysis could get underway. Therefore, from July to October, the analyst was involved in an "on-off" work effort. During any lag time on 61C, the analyst assisted in analyses of 68J and 67T. The 61C analysis was finally completed in early December. Details of 61C can be found in the MOS Summary Report.

The second factor was the change in the verification procedures which occurred in July and in October. A verification committee approach was initiated to review each task of an MOS for technical accuracy, excluding the analyst from participation. Usually, the committee consisted of one SME (DTD), and it appeared to be the original designated verifier from the start of the project. The committee approach to verification was beneficial to both RCA and the Army because it gave the Army an opportunity to perform a final review and make changes by which the analyst was available to send RCA with a finalized product. From the start, the committee made relatively slow progress during the first month. However, their work effort did increase towards the beginning of November.

Some of the problems with the committee involved the verifiers assigned to the project, which included:

- Some verifiers were not properly briefed by the POC concerning the analysis effort, format and objectives.
- Some verifiers tend to only attach a copy of a DTD analysis (major steps) which did not indicate if the task reviewed was acceptable or if changes were needed.
- Verifiers were not always provided with the TRADOC Review forms, therefore verification results were returned on various types of loose paper.
- Some verifiers were not informed as to how cross-referencing worked in the ETAP and its use in analysis.

- Overall, verification was not consistent and it became necessary for the analyst to brief committee members on verification needs and procedures in order to have a workable product.
- Some verifiers did not have any field experience and had to rely upon the Technical Manual to review the task.

In late October and early November, a second committee process was included in the overall verification process. This committee was composed of BSEP Civilian staff. Their function was to review each task prior to submittal to the Verification (SME) Committee. The BSEP civilian would review the ETAP for format, detail and level of specificity. This aspect of verification was again beneficial to the Army and RCA because it was an aspect of a final review of the MOS. Again, similar problems developed as indicated in the Verification Committee, which were consistency and understanding of how the ETAP was written.

In summary of the Committee's involvement (both Civilian and SME), time was lost due to the lack of a uniform briefing by the POC to all staff involved. The RCA staff found themselves answering questions about format for review rather than task content. It appeared that some of the BSEP staff were unsure of their duties and responsibilities. It became necessary for RCA staff to meet frequently to discuss how they should approach their work effort which should have been defined by the POC.

Two MOS suffered criticism for ETAP format, detail, and level of specificity. This required a rewrite and re-analysis of 77 tasks in 57H and 32 tasks in 67T for final approval.

Equipment - CRT and Printer

The CRT and printer proved to be a valuable time-saving tool to transfer analysis notes to a final printed ETAP. Two analysts utilized the equipment daily and probably cut the write-up time by 50% or more. Using the CRT, the analyst was able to edit the analysis and insert changes or additions to the ETAP quickly. This allowed the analyst to work on fresh analysis continually and submit the task to verifiers on a timely fashion.

Staff Training/Supervision

Staff training at the field site for new analyst involved similar activities used by the Home Office such as role-playing and practical sessions for writing ETAPs. All analysts were provided with a check-off list for pre-analysis planning, including specific questions to ask the SME during the first interview session. Throughout the analysis effort, staff would informally assist each in areas of writing style, level of detail, use of job aids, knowledge analysis and to share experiences concerning interviewing techniques.

All analysts were required to leave a written schedule of work activities planned on a daily basis which included names, location of interviews, and phone numbers.

Discussion of individual projects occurred to identify current progress and quality of work effort and uniformity of style.

In many cases, informal group sessions were used to clarify ETAP procedures and knowledge analysis.

Each analyst submitted projected (2 week advanced) schedules of tasks to be analyzed which was used as a guide to follow the analysis as well as a projected plan sent to the Home Office via the computer.

An MOS wall chart was utilized to monitor the total work effort. The chart was divided by specific categories of individual MOS status which included tasks interviewed, tasks written up, tasks in verification, tasks deleted, tasks sent to HQ, and tasks remaining. The analyst would update their MOS on a daily basis in order to have an accurate account of each individual MOS activity.

ATTACHMENT O

Taxonomy Summaries

Notes:

1. A check (✓) in the "NT" column means the prerequisite competency is not taught in AIT.

2. A check (✓) in the second column means the prerequisite competency was identified as part of the analysis.

3. Not all MOS are represented because some analysts were unavailable to complete summary taxonomies.

NUMERATION/PLACE VALUE

NT

1 NUMBERING AND COUNTING

- a Match numerals with word names and models
- b Write numerals one through N in sequential order from any starting point
- c State what numeral comes after, before, or between any two given numerals
- d Select the numeral which is greater/lesser from a set of numerals
- e Identify an object with a specified ordinal position
- f Write or state the place value of a particular digit, whole or decimal number
- g Round off a number to a specified place, whole or decimal
- h Count by ones, twos, fives, tens, etc backward or forward (skip counting)
- i Match numbers with points or intervals on a number line (positive (+) or negative (-) values)

UNITS OF MEASUREMENT

2 LINEAR, WEIGHT, AND VOLUME MEASURES

- a Name the markings on a linear scale
- b Differentiate units of measure and equivalents in the English and metric system
- c Use a ruler, yardstick, meter stick or scale to measure lengths of objects or distances
- d Identify measures of ounce, pound, gram
- e Identify measures of pints, quarts, gallons, liters
- f Use a scale which is not numerically calibrated
- g Estimate measures of varying lengths, dimensions or weights

3 DEGREE MEASURES

- a Identify degree or mil as a unit in determining direction, distance or temperature
- b Estimate the measure of a given angle not greater than 180°
- c Interpret bearings, azimuth and other contexts in which the measure of an angle may range from 0° to 360°/0 to 6400 mils

4 TIME TELLING MEASURES

- a Use a 24 hour or digital clock to tell time
- b Name intervals and tell time in hours, minutes, and seconds
- c Estimate time in seconds, minutes, and parts of an hour
- d Identify calendar units and arrange them in Julian style
- e Convert time into hours and tenths of hours
- f Compute time using Greenwich Mean Time (GMT) as a basis for establishing zones and distances

NT

5 GAUGE MEASURES

- a Identify the unit of measurement found on an instrument
- b Interpret the number, word, symbol from a display read out
- c Recognize a "reading" from a gauge with color divisions
- d Recognize positive (+) and negative (-) demarcation on a scale
- e Select band(s) from a multi-scale gauge
- f Match a gauge reading to a specification using numbered or labeled intervals
- g Interpret gauge readings from an unnumbered/unmarked interval
- h Interpret a gauge reading which is fluctuating or momentarily sustained
- i Match specifications of required measures by manipulation, alignment or maintenance

VISUAL/SPATIAL RELATIONSHIPS

6 SPATIAL

- a Identify directions that tools, hardware, or components may be moved
- b Manipulate objects to align, match, mate, make parallel, be perpendicular or be at an angle
- c Interpret spatial relationships of figures and objects from 2 dimensional drawings, pictures, or photographs
- d Relate geometric symbols and graphic representations to actual systems, subsystems and components

GEOMETRY

7 LINES

- a Identify and name points, lines, rays, and segments
- b Identify intersecting lines, parallel lines, and line segments
- c Define and identify perpendicular lines
- d Identify congruent segments

8 PLANES

- a Identify and name plane geometric figures
- b List the characteristics of geometric figures
- c Classify figures according to the number or measure of its sides or angles
- d Identify figures which possess similarities
- e Identify figures which may be parallel, perpendicular or congruent

9 ANGLES AND TRIANGLES

- a Identify and name the different kinds of angles and triangles, with the corresponding figures
- b Identify vertical, adjacent, complementary or supplementary angles
- c Classify triangles according to their sides or angle size
- d Identify altitudes and medians of triangles or the bisector of an angle
- e Name an angle by using letters, a number, or a single letter

NT

12 SOLIDS

- a Recognize or match the names of solids with their corresponding figures

[illegible] GEOMETRY

- a [illegible] associated with geometric figures
- [illegible] spatial orientation

[illegible] OR PERFORM

[illegible] Addition Facts

- [illegible] whole numbers without carrying or borrowing
- [illegible] whole numbers, carrying and borrowing
- [illegible] carrying with mixed numbers (whole and decimals)
- [illegible] positive (+) and negative (-) numbers, using a number line to arrive at a solution
- e Add or subtract to find correct time (24 hr. clock) using hours or minutes
- f Add or subtract various increments on gauges, dials, or any other measuring instrument
- g Add or subtract time, linear, dry, liquid or degree measures requiring regrouping
- h Estimate a sum or difference

13 MULTIPLICATION AND DIVISION

- a Multiply and divide whole numbers
- b Multiply and divide mixed numbers (whole and decimals)
- c Divide a number with decimals in both divisor and dividend
- d Multiply and divide integers, both positive (+) and negative (-), and assign proper sign to product or quotient
- e Estimate a product or quotient

14 FRACTIONS/DECIMALS

- a Subdivide whole objects or a set of objects into halves (1/2), thirds (1/3), fourths (1/4), eighths (1/8)
- b Reduce fractions to lowest terms
- c Convert fractions (proper and improper) to decimal equivalents, and vice versa, using a table, chart or gauge
- d Compute equivalent value of fractions, decimals, percents, and mixed numbers to lowest terms
- e Add and subtract fractions, with same or different denominators
- f Multiply and divide fractions with and without whole numbers
- g Estimate a fractional sum, product, or quotient

[illegible]82

NT

15 GEOMETRY

- a Draw geometric figures, plane and solid
- b Match geometric figures with word names, equivalent measures
- c Label all parts of geometric figures using mathematical and characteristic designators
- d Use a protractor to measure angles, make geometrical constructions
- e Construct perpendicular or a line segment, bisector of an angle
- f Compute the perimeter and area of any figure
- g Compute the circumference and area of a circle
- h Compute the area and volume of any solid figure
- i Use formulas in solving problems involving geometric figures
- j Solve problems and interpret spatial relationships of figures, symbols, and objects from 2 dimensional displays

16 COMBINATION OF PROCESSES

- a Identify median and mode
- b Compute averages
- c Solve problems combining all processes using whole, mixed numbers and fractions
- d Solve problems, combining all processes, involving units of measurement
- e Interpret information from charts, number lines, scales and graphs to solve arithmetic problems
- f Solve conversion problems of linear (metric and English) liquid, weight, and temperature (F^{o} or C^{o}) measures
- g Solve problems involving ratio and proportion
- h Solve word problems where any mathematical process may occur

17 GRAPHING IN THE COORDINATE PLANE

- a Identify coordinates of a point in any grid system
- b Identify points on a line graph
- c Match a graph with its equation

18 ALGEBRA

- a Solve simple algebraic equations with one unknown
- b Recognize and derive equivalent algebraic expressions
- c Evaluate powers and estimate roots

19 TRIGONOMETRY

- a Use tables of trigonometric functions
- b Use tables of logarithms to solve problems
- c Solve geometric problems using trigonometric functions
- d Use trigonometric ratios to solve problems

CONTENT READING

NT

25 PROCEDURAL DIRECTIONS

- a Identify factual details or specifications that are found within a statement or written selection
- b Select parts of text and visual materials to complete a task activity
- c Follow highly detailed, step by step directions in order to accomplish a sequence of task activities
- d Determine the essential message of a paragraph or section of written material
- e Infer from a written source which does not explicitly provide required information in order to make a decision
- f Synthesize information from written sources which contributes to the completion of a task activity

26 VOCABULARY

- a Recognize common words and their meanings
- b Recognize task related words with technical meanings
- c Identify the correct meaning of a word from the context of a sentence
- d Recognize the meaning of common contractions, abbreviations and acronyms
- e Determine the meaning of figurative, idiomatic, and technical terms by using context clues or by using a reference source(s)

INFORMATION ACCESS

27 REFERENCE SKILLS

- a Locate a Technical Manual, Field Manual or any related source document by code number and title
- b Alphabetize words or topics to locate information
- c Use the table of contents, index, system or sub system heading, appendix and glossary to locate information
- d Locate the page, true, paragraph, figure, or chart needed to answer question or to solve a problem
- e Determine, after scanning or skim reading, whether the information is relevant
- f Cross reference within and across source documents to select information needed to perform a routine
- g Organize information from multiple sources into a sequenced series of events

28 TABLES/CHARTS

- a Obtain a fact or specification from a two column table or chart to find information
- b Obtain a fact or specification from an intersection of a row by column table or chart
- c Use a complex table or chart requiring cross referencing within or in combination with text material outside the chart
- d Apply information from tables and charts for locating malfunctions, or for determining course of action

VISUAL AIDS

NT

29 ILLUSTRATIONS

- a Identify details, labels, numbers, and parts from an illustration or picture
- b Identify parts or details according to a key or legend
- c Interpret a drawing which shows a cross sectional view of an object for assembly, disassembly
- d Interpret a three dimensional projection or exploded view of object(s) for assembly, disassembly, or position in system or sub system
- e Follow illustrations, or photographs, arranged in a sequential order, as a guide
- f Integrate information from various sources to select a course of action

30 FLOW CHARTS

- a Use a simple linear path of an organizational chart to list events in sequential order
- b Use a linear path of a flow chart to provide visual and textual directions to a procedure, to arrive at decision points, and to provide alternate paths in problem solving
- c Translate the significance of the symbols into physical activities

31 SCHEMATICS

- a Isolate each major section or entity presented in a schematic diagram
- b Identify the components within each entity
- c Trace connections in an integrated circuit from their origin to another point within or from one entity to another
- d Isolate a problem component in a schematic and trace it to components believed to cause the problem
- e Interpret symbols to indicate direction of flow, test points, components and diagrammatic decision points

WRITTEN COMMUNICATION

32 FORMS

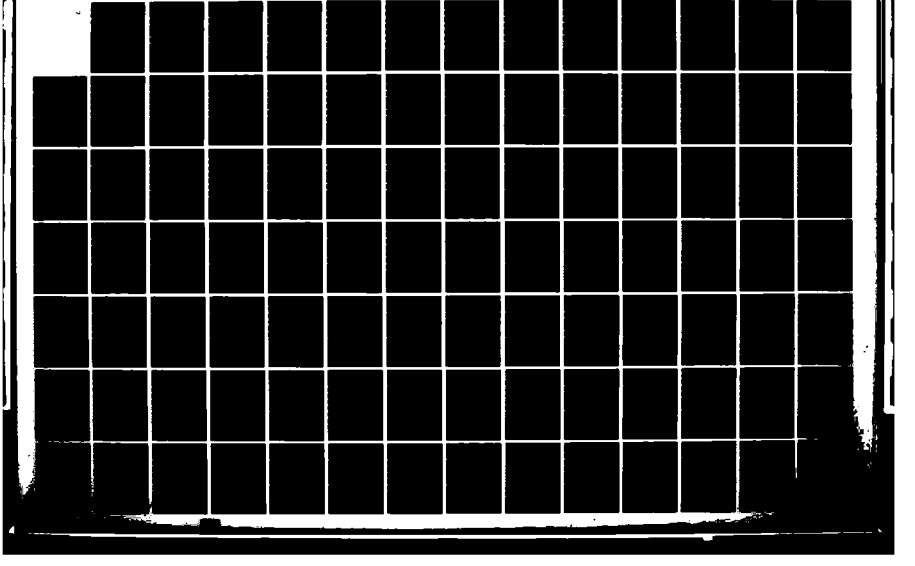
- a Locate the block on a form to enter the appropriate information
- b Transfer a number, code, date, figure or related data from equipment or written sources onto an appropriate section of the form
- c Write the name of the organization, responsible personnel, disposition of the part or equipment, and nomenclature, in appropriate sections of the form
- d Write a descriptive account of an activity or transaction performed
- e Use a completed form to locate or compare information

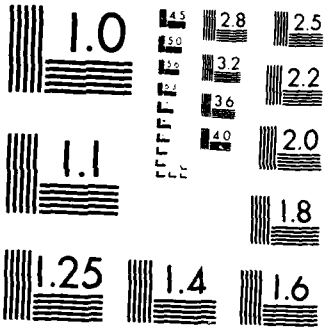
33 NOTE-TAKING

- a Distinguish between essential and non essential details during the note taking process
- b Record details without misinterpreting the intent of either written material or an interview
- c Rewrite all recorded details in sentence form
- d Organize all sentences into paragraphs

AD-A143 593 NEEDS ASSESSMENT TO DEFINE THE TRAINING REQUIREMENTS FOR A BASIC SKILLS E..(U) RCA SERVICE CO CHERRY HILL NJ APR 84 DABT60-81-C-0017 4/7

UNCLASSIFIED F/G 5/9 NL





MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS 1963 A

NT

34 OUTLINING (topic or sentence)

- a. Distinguish between major and subordinate topics
- b. Generate titles for each major topic selected
- c. Use phrases or sentences to provide subordinate details under each major topic
- d. Alternate, indent numbers and letters to establish a hierarchy

35 REPORT WRITING

- a. State the intent or objective(s) of the report
- b. Describe the parameters of the event or situation
- c. Distinguish between relevant and irrelevant details
- d. Sequence events in the order they have occurred
- e. State general impressions of events described
- f. Select examples that will clarify major issues presented in the report
- g. Examine opposing points of view in the report
- h. Summarize the major points developed in the report
- i. Justify an action taken and give reasons for rejecting alternatives

36 EDITING

- a. Spell frequently used words correctly
- b. Spell task related words correctly
- c. Identify words that need to be capitalized
- d. Correct all misspelled words with or without the use of a reference source
- e. Apply all rules for end marks, commas, and apostrophes
- f. Apply common rules of grammar
- g. Rewrite the paragraph by stating the main idea in the first sentence, and restructuring the sentences for coherence
- h. Appraise an entire written communication and make adjustments to improve clarity

VERBAL COMMUNICATION

37 TYPE

- a. Individual – a person working on a task and communicating with another when assistance is needed or when a supervisory decision is needed
- b. Instruction – a task activity requiring communication between an instructor, an individual or small group where the purpose is to give facts or rules to inform or guide
- c. Tutor – interaction takes place between two persons where one is instructing and the other is doing the task
- d. Peer Group (less than 10) – all members engage in an activity where one person assumes a leadership role and communicates to others what is to be done
- e. Interview – a person communicating with another about his activities, opinions, or subject expertise for the purpose of using the information in a task
- f. Briefing – communicating final instructions to others or giving an account in summary
- g. Counsel – communicating together to exchange ideas or opinions to recommend, give or take advice, or to arrive at an acceptance of a plan or decision
- h. Command – communicate to others an order or action to be taken where a person has a position of authority

NT

38 CHARACTERISTICS

- a. Enunciate clearly, using the proper rate of speech
- b. Use technical vocabulary suitable to the task and level of the person
- c. Determine the appropriate amount of information to communicate
- d. Interpret figurative or idiomatic language by reference to its use in context
- e. Follow highly detailed, step-by-step directions
- f. Solicit feedback to confirm the accurate reception of the communication
- g. Recognize when a low key, informal dialogue is suitable
- h. Recognize when direct verbal commands are necessary
- i. Recognize when a prescribed series of verbal interactions is required to coordinate a group effort
- j. Recognize when the situation will require a structured, preplanned method of presentation

39. BARRIERS

- a. Recognize the need for clear, concise directions in order to avoid language or word-meaning differences
- b. Recognize personality factors and inter-personal relationships that may exist
- c. Recognize feedback as a means of communicating more effectively and increasing task competence

SAFETY/SECURITY

40. PRECAUTIONS

- a. Use common knowledge to avoid hazards in order to prevent injury to self or equipment
- b. Apply preventive measures prior to task performance to minimize any potential safety or security problem
- c. Select an appropriate course of action in the event of an emergency

PERCEPTUAL

41 RECOGNITION

- a. Identify similarities and differences between and among objects
- b. Use body language (motions, gestures, postures) to communicate or signal
- c. Determine the presence of a defect or extent of damage
- d. Match objects by size, shape, color and significant markings
- e. Classify objects by size, shape, color and significant markings
- f. Determine direction, duration, and intensity of sounds, sightings and smells
- g. Infer from sights, sounds, touch, smells, or tastes to determine a course of action

NUMERATION/PLACE VALUE

NT

1 NUMBERING AND COUNTING

- a. Match numerals with word names and models
- b. Write numerals one through N in sequential order from any starting point
- c. State what numeral comes after, before, or between any two given numerals
- d. Select the numeral which is greater/lesser from a set of numerals
- e. Identify an object with a specified ordinal position
- f. Write or state the place value of a particular digit, whole or decimal number
- g. Round off a number to a specified place, whole or decimal
- h. Count by ones, twos, fives, tens, etc. backward or forward (skip counting)
- i. Match numbers with points or intervals on a number line (positive (+) or negative (-) values)

UNITS OF MEASUREMENT

2 LINEAR, WEIGHT, AND VOLUME MEASURES

- a. Name the markings on a linear scale
- b. Differentiate units of measure and equivalents in the English and metric system
- c. Use a ruler, yardstick, meter stick or scale to measure lengths of objects or distances
- d. Identify measures of ounce, pound, gram
- e. Identify measures of pints, quarts, gallons, liters
- f. Use a scale which is not numerically calibrated
- g. Estimate measures of varying lengths, dimensions or weights

3. DEGREE MEASURES

- a. Identify degree or mil as a unit in determining direction, distance or temperature
- b. Estimate the measure of a given angle not greater than 180°
- c. Interpret bearings, azimuth and other contexts in which the measure of an angle may range from 0° to 360°/0 to 6400 mils

4 TIME TELLING MEASURES

- a. Use a 24-hour or digital clock to tell time
- b. Name intervals and tell time in hours, minutes, and seconds
- c. Estimate time in seconds, minutes, and parts of an hour
- d. Identify calendar units and arrange them in Julian style
- e. Convert time into hours and tenths of hours
- f. Compute time using Greenwich Mean Time (GMT) as a basis for establishing zones and distances

NT

5 GAUGE MEASURES

- a. Identify the unit of measurement found on an instrument
- b. Interpret the number, word, symbol from a display read out
- c. Recognize a "reading" from a gauge with color divisions
- d. Recognize positive (+) and negative (-) demarcation on a scale
- e. Select band(s) from a multi-scale gauge
- f. Match a gauge reading to a specification using numbered or labeled intervals
- g. Interpret gauge readings from an unnumbered/unmarked interval
- h. Interpret a gauge reading which is fluctuating or momentarily sustained
- i. Match specifications of required measures by manipulation, alignment or maintenance

VISUAL/SPATIAL RELATIONSHIPS

6. SPATIAL

- a. Identify directions that tools, hardware, or components may be moved
- b. Manipulate objects to align, match, mate, make parallel, be perpendicular or be at an angle
- c. Interpret spatial relationships of figures and objects from 2-dimensional drawings, pictures, or photographs
- d. Relate geometric symbols and graphic representations to actual systems, subsystems and components

GEOMETRY

7 LINES

- a. Identify and name points, lines, rays, and segments
- b. Identify intersecting lines, parallel lines, and line segments
- c. Define and identify perpendicular lines
- d. Identify congruent segments

8. PLANES

- a. Identify and name plane geometric figures
- b. List the characteristics of geometric figures
- c. Classify figures according to the number or measure of its sides or angles
- d. Identify figures which possess similarities
- e. Identify figures which may be parallel, perpendicular or congruent

9 ANGLES AND TRIANGLES

- a. Identify and name the different kinds of angles and triangles, with their corresponding figures
- b. Identify vertical, adjacent, complementary or supplementary angles
- c. Classify triangles according to their sides or angle size
- d. Identify altitudes and medians of triangles or the bisector of an angle
- e. Name an angle by using letters, a number, or a single letter

NT

10 SOLIDS

- a. Recognize and match the names of solids with their corresponding figures

11 TERMINOLOGY

- a. Identify technical words associated with geometric figures
- b. Interpret meaning of terms derived from spatial orientation

COMPUTE OR PERFORM

12 ADDITION AND SUBTRACTION

- a. Add or subtract whole numbers, without carrying or borrowing
- b. Add or subtract whole numbers, carrying and borrowing
- c. Add and subtract, borrowing and carrying with mixed numbers (whole and decimals)
- d. Add or subtract positive (+) and negative (-) numbers, using a number line to arrive at a solution
- e. Add or subtract to find correct time (24 hr. clock) using hours or minutes
- f. Add or subtract various increments on gauges, dials, or any other measuring instrument
- g. Add or subtract time, linear, dry, liquid or degree measures requiring regrouping
- h. Estimate a sum or difference

13 MULTIPLICATION AND DIVISION

- a. Multiply and divide whole numbers
- b. Multiply and divide mixed numbers (whole and decimals)
- c. Divide a number with decimals in both divisor and dividend
- d. Multiply and divide integers, both positive (+) and negative (-), and assign proper sign to product or quotient
- e. Estimate a product or quotient

14 FRACTIONS/DECIMALS

- a. Subdivide whole objects or a set of objects into halves (1/2), thirds (1/3), fourths (1/4), eighths (1/8)
- b. Reduce fractions to lowest terms
- c. Convert fractions (proper and improper) to decimal equivalents, and vice versa, using a table, chart or gauge
- d. Compute equivalent value of fractions, decimals, percents, and mixed numbers to lowest terms
- e. Add and subtract fractions, with same or different denominators
- f. Multiply and divide fractions with and without whole numbers
- g. Estimate a fractional sum, product, or quotient

NT

15 GEOMETRY

- a. Draw geometric figures, plane and solid
- b. Match geometric figures with word names, equivalent measures
- c. Label all parts of geometric figures using mathematical and characteristic designators
- d. Use a protractor to measure angles, make geometrical constructions
- e. Construct perpendicular on a line segment, bisector of an angle
- f. Compute the perimeter and area of any figure
- g. Compute the circumference and area of a circle
- h. Compute the area and volume of any solid figure
- i. Use formulas in solving problems involving geometric figures
- j. Solve problems and interpret spatial relationships of figures, symbols, and objects from 2 dimensional displays

16. COMBINATION OF PROCESSES

- a. Identify median and mode
- b. Compute averages
- c. Solve problems combining all processes using whole, mixed numbers and fractions
- d. Solve problems, combining all processes, involving units of measurement
- e. Interpret information from charts, number lines, scales and graphs to solve arithmetic problems
- f. Solve conversion problems of linear (metric and English) liquid, weight, and temperature (F° or C°) measures
- g. Solve problems involving ratio and proportion
- h. Solve word problems where any mathematical process may occur

17. GRAPHING IN THE COORDINATE PLANE

- a. Identify coordinates of a point in any grid system
- b. Identify points on a line graph
- c. Match a graph with its equation

18 ALGEBRA

- a. Solve simple algebraic equations with one unknown
- b. Recognize and derive equivalent algebraic expressions
- c. Evaluate powers and estimate roots

19 TRIGONOMETRY

- a. Use tables of trigonometric functions
- b. Use tables of logarithms to solve problems
- c. Solve geometric problems using trigonometric functions
- d. Use trigonometric ratios to solve problems

CONTENT READING

NT

25 PROCEDURAL DIRECTIONS

- a Identify factual details or specifications that are found within a statement or written selection
- b Select parts of text and visual materials to complete a task activity
- c Follow highly detailed, step by step directions in order to accomplish a sequence of task activities
- d Determine the essential message of a paragraph or section of written material
- e Infer from a written source, which does not explicitly provide required information, in order to make a decision
- f Synthesize information from written sources which contributes to the completion of a task activity

26 VOCABULARY

- a Recognize common words and their meanings
- b Recognize task related words with technical meanings
- c Identify the correct meaning of a word from the context of a sentence
- d Recognize the meaning of common contractions, abbreviations and acronyms
- e *Determine the meaning of figurative, idiomatic, and technical terms by using context clues or by using a reference source(s)*

INFORMATION ACCESS

27 REFERENCE SKILLS

- a Locate a Technical Manual, Field Manual or any related source document by code number and title
- b *Alphabetize words or topics to locate information*
- c Use the table of contents, index, system or sub-system heading, appendix and glossary to locate information
- d Locate the page, title, paragraph, figure, or chart needed to answer a question or to solve a problem
- e Determine, after scanning or skim-reading, whether the information is relevant
- f Cross reference within and across source documents to select information needed to perform a routine
- g *Organize information from multiple sources into a sequenced series of events*

28 TABLES/CHARTS

- a *Obtain a fact or specification from a two column table or chart to find information*
- b *Obtain a fact or specification from an intersection of a row by column table or chart*
- c Use a complex table or chart requiring cross referencing within or in combination with text material outside the chart
- d Apply information from tables and charts for locating malfunctions, or for selecting a course of action

VISUAL AIDS

NT

29 ILLUSTRATIONS

- a Identify details, labels, numbers, and parts from an illustration or picture
- b Identify parts or details according to a key or legend
- c Interpret a drawing which shows a cross sectional view of an object for assembly, disassembly
- d *Interpret a three dimensional projection or exploded view of object(s) for assembly, disassembly, or position in system or sub system*
- e Follow illustrations, or photographs, arranged in a sequential order, as a guide
- f *Integrate information from various sources to select a course of action*

30. FLOW CHARTS

- a. Use a simple linear path of an organizational chart to list events in sequential order
- b *Use a linear path of a flow chart to provide visual and textual directions* to a procedure, to arrive at decision points, and to provide alternate paths in problem-solving
- c. *Translate the significance of the symbols into physical activities*

31. SCHEMATICS

- a Isolate each major section or entity presented in a schematic diagram
- b. Identify the components within each entity
- c Trace connections in an integrated circuit from their origin to another point within or from one entity to another
- d. Isolate a problem component in a schematic and trace it to components believed to cause the problem
- e. Interpret symbols to indicate direction of flow, test points, components and diagrammatic decision points

WRITTEN COMMUNICATION

32. FORMS

- a. Locate the block on a form to enter the appropriate information
- b. Transfer a number, code, date, figure or related data from equipment or written sources onto an appropriate section of the form
- c. Write the name of the organization, responsible personnel, disposition of the part or equipment, and nomenclature, in appropriate sections of the form
- d. Write a descriptive account of an activity or transaction performed
- e. Use a completed form to locate or compare information

33. NOTE-TAKING

- a. Distinguish between essential and non-essential details during the note taking process
- b Record details without misinterpreting the intent of either written material or an interview
- c. Rewrite all recorded details in sentence form
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NT

34 OUTLINING (topic or sentence)

- a Distinguish between major and subordinate topics
- b Generate titles for each major topic selected
- c Use phrases or sentences to provide subordinate details under each major topic
- d Alternate, indent numbers and letters to establish a hierarchy

35 REPORT WRITING

- a State the intent or objective(s) of the report
- b Describe the parameters of the event or situation
- c Distinguish between relevant and irrelevant details
- d Sequence events in the order they have occurred
- e State general impressions of events described
- f Select examples that will clarify major issues presented in the report
- g Examine opposing points of view in the report
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- i Justify an action taken and give reasons for rejecting alternatives

36 EDITING

- a Spell frequently used words correctly
- b Spell task related words correctly
- c Identify words that need to be capitalized
- d Correct all misspelled words with or without the use of a reference source
- e Apply all rules for end marks, commas, and apostrophes
- f Apply common rules of grammar
- g Rewrite the paragraph by stating the main idea in the first sentence, and restructuring the sentences for coherence
- h Appraise an entire written communication and make adjustments to improve clarity

VERBAL COMMUNICATION

37 TYPE

- a Individual – a person working on a task and communicating with another when assistance is needed or when a supervisory decision is needed
- b Instruction – a task activity requiring communication between an instructor, an individual or small group where the purpose is to give facts or rules to inform or guide
- c Tutor – interaction takes place between two persons where one is instructing and the other is doing the task
- d Peer Group (less than 10) – all members engage in an activity where one person assumes a leadership role and communicates to others what is to be done
- e Interview – a person communicating with another about his activities, opinions, or subject expertise for the purpose of using the information in a task
- f Briefing – communicating final instructions to others or giving an account in summary
- g Counsel – communicating together to exchange ideas or opinions to recommend, give or take advice, or to arrive at an acceptance of a plan or decision
- h Command – communicate to others an order or action to be taken where a person has a position of authority

4/23/82

NT

38 CHARACTERISTICS

- a Enunciate clearly, using the proper rate of speech
- b Use technical vocabulary suitable to the task and level of the person
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- b Recognize personality factors and inter-personal relationships that may exist
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SAFETY/SECURITY

40. PRECAUTIONS

- a. Use common knowledge to avoid hazards in order to prevent injury to self or equipment
- b. Apply preventive measures prior to task performance to minimize any potential safety or security problem
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PERCEPTUAL

41. RECOGNITION

- a Identify similarities and differences between and among objects
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05G Signal Security Specialist

BSEP I

NUMERATION/PLACE VALUE

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BSEP I

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- g Round off a number to a specified place, whole or decimal
- h Count by ones, twos, fives, tens, etc backward or forward (skip counting)
- i Match numbers with points or intervals on a number line (positive (+) or negative ( ) values)

UNITS OF MEASUREMENT

2 LINEAR, WEIGHT, AND VOLUME MEASURES

- a Name the markings on a linear scale
- b Differentiate units of measure and equivalents in the English and metric system
- c Use a ruler, yardstick, meter stick or scale to measure lengths of objects or distances
- d Identify measures of ounce, pound, gram
- e Identify measures of pints, quarts, gallons, liters
- f Use a scale which is not numerically calibrated
- g Estimate measures of varying lengths, dimensions or weights

3 DEGREE MEASURES

- a Identify degree or mil as a unit in determining direction, distance or temperature
- b Estimate the measure of a given angle not greater than 180^{0}
- c Interpret bearings, azimuth and other contexts in which the measure of an angle may range from 0^{0} to 360^{0}/0 to 6400 mils

4 TIME TELLING MEASURES

- a Use a 24 hour or digital clock to tell time
- b Name intervals and tell time in hours, minutes, and seconds
- c Estimate time in seconds, minutes, and parts of an hour
- d Identify calendar units and arrange them in Julian style
- e Convert time into hours and tenths of hours
- f Compute time using Greenwich Mean Time (GMT) as a basis for establishing zones and distances

NT

5 GAUGE MEASURES

- a Identify the unit of measurement found on an instrument
- b. Interpret the number, word, symbol from a display read out
- c. Recognize a "reading" from a gauge with color divisions
- d. Recognize positive (+) and negative ( ) demarcation on a scale
- e Select band(s) from a multi scale gauge
- f. Match a gauge reading to a specification using numbered or labeled intervals
- g Interpret gauge readings from an unnumbered/unmarked interval
- h Interpret a gauge reading which is fluctuating or momentarily sustained
- i. Match specifications of required measures by manipulation, alignment or maintenance

VISUAL/SPATIAL RELATIONSHIPS

6. SPATIAL

- a Identify the directions that tools, hardware, or components may be moved
- b Manipulate objects to align, match, mate, make parallel, be perpendicular or be at an angle
- c Interpret spatial relationships of figures and objects from 2-dimensional drawings, pictures, or photographs
- d. Relate geometric symbols and graphic representations to actual systems, subsystems and components

GEOMETRY

7. LINES

- a. Identify and name points, lines, rays, and segments
- b Identify intersecting lines, parallel lines, and line segments
- c Define and identify perpendicular lines
- d Identify congruent segments

8 PLANES

- a. Identify and name plane geometric figures
- b List the characteristics of geometric figures
- c Classify figures according to the number or measure of its sides or angles
- d Identify figures which possess similarities
- e Identify figures which may be parallel, perpendicular or congruent

9 ANGLES AND TRIANGLES

- a. Identify and name the different kinds of angles and triangles, with their corresponding figures
- b Identify vertical, adjacent, complementary or supplementary angles
- c Classify triangles according to their sides or angle size
- d Identify altitudes and medians of triangles or the bisector of an angle
- e Name an angle by using letters, a number, or a single letter

NT

10 SOLIDS

- a. Recognize and match the names of solids with their corresponding figures

11 TERMINOLOGY

- a. Identify technical words associated with geometric figures
- b. Interpret meaning of terms derived from spatial orientation

COMPUTE OR PERFORM

12 ADDITION AND SUBTRACTION

- a. Add or subtract whole numbers, without carrying or borrowing
- b. Add or subtract whole numbers, carrying and borrowing
- c. Add and subtract, borrowing and carrying with mixed numbers (whole and decimals)
- d. Add or subtract positive (+) and negative ( ) numbers, using a number line to arrive at a solution
- e. Add or subtract to find correct time (24 hr. clock) using hours or minutes
- f. Add or subtract various increments on gauges, dials, or any other measuring instrument
- g. Add or subtract time, linear, dry, liquid or degree measures requiring regrouping
- h. Estimate a sum or difference

13 MULTIPLICATION AND DIVISION

- a. Multiply and divide whole numbers
- b. Multiply and divide mixed numbers (whole and decimals)
- c. Divide a number with decimals in both divisor and dividend
- d. Multiply and divide integers, both positive (+) and negative ( ), and assign proper sign to product or quotient
- e. Estimate a product or quotient

14 FRACTIONS/DECIMALS

- a. Subdivide whole objects or a set of objects into halves (1/2), thirds (1/3), fourths (1/4), eighths (1/8)
- b. Reduce fractions to lowest terms
- c. Convert fractions (proper and improper) to decimal equivalents, and vice versa, using a table, chart or gauge
- d. Compute equivalent value of fractions, decimals, percents, and mixed numbers to lowest terms
- e. Add and subtract fractions, with same or different denominators
- f. Multiply and divide fractions with and without whole numbers
- g. Estimate a fractional sum, product, or quotient

NT

15 GEOMETRY

- a. Draw geometric figures, plane and solid
- b. Match geometric figures with word names, equivalent measures
- c. Label all parts of geometric figures using mathematical and characteristic designators
- d. Use a protractor to measure angles, make geometrical constructions
- e. Construct perpendicular on a line segment, bisector of an angle
- f. Compute the perimeter and area of any figure
- g. Compute the circumference and area of a circle
- h. Compute the area and volume of any solid figure
- i. Use formulas in solving problems involving geometric figures
- j. Solve problems and interpret spatial relationships of figures, symbols, and objects from 2-dimensional displays

16. COMBINATION OF PROCESSES

- a. Identify median and mode
- b. Compute averages
- c. Solve problems combining all processes using whole, mixed numbers and fractions
- d. Solve problems, combining all processes, involving units of measurement
- e. Interpret information from charts, number lines, scales and graphs to solve arithmetic problems
- f. Solve conversion problems of linear (metric and English) liquid, weight, and temperature (F° or C°) measures
- g. Solve problems involving ratio and proportion
- h. Solve word problems where any mathematical process may occur

17. GRAPHING IN THE COORDINATE PLANE

- a. Identify coordinates of a point in any grid system
- b. Identify points on a line graph
- c. Match a graph with its equation

18. ALGEBRA

- a. Solve simple algebraic equations with one unknown
- b. Recognize and derive equivalent algebraic expressions
- c. Evaluate powers and estimate roots

19 TRIGONOMETRY

- a. Use tables of trigonometric functions
- b. Use tables of logarithms to solve problems
- c. Solve geometric problems using trigonometric functions
- d. Use trigonometric ratios to solve problems

CONTENT READING

NT

25 PROCEDURAL DIRECTIONS

- a Identify factual details or specifications that are found within a statement or written selection
- b Select parts of text and visual materials to complete a task activity
- c Follow highly detailed, step by step directions in order to accomplish a sequence of task activities
- d Determine the essential message of a paragraph or section of written material
- e Infer from a written source which does not explicitly provide required information in order to make a decision
- f Synthesize information from written sources which contributes to the completion of a task activity

26 VOCABULARY

- a Recognize common words and their meanings
- b Recognize task related words with technical meanings
- c Identify the correct meaning of a word from the context of a sentence
- d Recognize the meaning of common contractions, abbreviations and acronyms
- e Determine the meaning of figurative, idiomatic, and technical terms by using context clues or by using a reference source(s)

INFORMATION ACCESS

27 REFERENCE SKILLS

- a Locate a Technical Manual, Field Manual or any related source document by code number and title
- b Alphabetize words or topics to locate information
- c Use the table of contents, index, system or sub system heading, appendix and glossary to locate information
- d Locate the page, title, paragraph, figure, or chart needed to answer a question or to solve a problem
- e Determine, after scanning or skim-reading, whether the information is relevant
- f Cross reference within and across source documents to select information needed to perform a routine
- g Organize information from multiple sources into a sequenced series of events

28 TABLES/CHARTS

- a Obtain a fact or specification from a two column table or chart to find information
- b Obtain a fact or specification from an intersection of a row by column table or chart
- c Use a complex table or chart requiring cross referencing within or in combination with text material outside the chart
- d Apply information from tables and charts for locating malfunctions, or for selecting a course of action

VISUAL AIDS

NT

29 ILLUSTRATIONS

- a Identify details, labels, numbers, and parts from an illustration or picture
- b Identify parts or details according to a key or legend
- c Interpret a drawing which shows a cross sectional view of an object for assembly, disassembly
- d Interpret a three dimensional projection or exploded view of object(s) for assembly, disassembly, or position in system or sub system
- e Follow illustrations, or photographs, arranged in a sequential order, as a guide
- f Integrate information from various sources to select a course of action

30 FLOW CHARTS

- a Use a simple linear path of an organizational chart to list events in sequential order
- b Use a linear path in a flow chart to provide visual and textual directions to a procedure, to arrive at decision points and to provide alternate paths in problem solving
- c Translate the significance of the symbols into physical activities

31 SCHEMATICS

- a Isolate each major section or entity presented in a schematic diagram
- b Identify the components within each entity
- c Trace connections in an integrated circuit from their origin to another point within or from one entity to another
- d Isolate a problem component in a schematic and trace it to components believed to cause the problem
- e Interpret symbols to indicate direction of flow, test points, components and diagrammatic decision points

WRITTEN COMMUNICATION

32 FORMS

- a Locate the block on a form to enter the appropriate information
- b Transfer a number, code, date, figure or related data from equipment to written sources onto an appropriate section of the form
- c Write the name of the organization, responsible personnel, disposition of the part or equipment, and nomenclature, in appropriate sections of the form
- d Write a descriptive account of an activity or transaction performed
- e Use a completed form to locate or compare information

33 NOTE TAKING

- a Distinguish between essential and non-essential details during the note taking process
- b Record details without substantially reducing the content of either written material or an interview
- c Rewrite all recorded details in sentence form
- d Organize all sentences into paragraphs

NT

34 OUTLINING (topic or sentence)

- a Distinguish between major and subordinate topics
- b Generate titles for each major topic selected
- c Use phrases or sentences to provide subordinate details under each major topic
- d Alternate, indent numbers and letters to establish a hierarchy

35 REPORT WRITING

- a State the intent or objective(s) of the report
- b Describe the parameters of the event or situation
- c Distinguish between relevant and irrelevant details
- d Sequence events in the order they have occurred
- e State general impressions of events described
- f Select examples that will clarify major issues presented in the report
- g Examine opposing points of view in the report
- h. Summarize the major points developed in the report
- i Justify an action taken and give reasons for rejecting alternatives

36 EDITING

- a. Spell frequently used words correctly
- b Spell task-related words correctly
- c Identify words that need to be capitalized
- d Correct all misspelled words with or without the use of a reference source
- e Apply all rules for end marks, commas, and apostrophes
- f Apply common rules of grammar
- g Rewrite the paragraph by stating the main idea in the first sentence, and restructuring the sentences for coherence
- h. Appraise an entire written communication and make adjustments to improve clarity

VERBAL COMMUNICATION

37 TYPE

- a. Individual - a person working on a task and communicating with another when assistance is needed or when a supervisory decision is needed
- b Instruction - a task activity requiring communication between an instructor, an individual or small group where the purpose is to give facts or rules to inform or guide
- c Tutor - interaction takes place between two persons where one is instructing and the other is doing the task
- d Peer Group (less than 10) - all members engage in an activity where one person assumes a leadership role and communicates to others what is to be done
- e Interview - a person communicating with another about his activities, opinions, or subject expertise for the purpose of using the information in a task
- f Briefing - communicating final instructions to others or giving an account in summary
- g Counsel - communicating together to exchange ideas or opinions to recommend, give or take advice, or to arrive at an acceptance of a plan or decision
- h Command - communicate to others an order or action to be taken where a person has a position of authority

4/23/82

NT

38 CHARACTERISTICS

- a Enunciate clearly, using the proper rate of speech
- b Use technical vocabulary suitable to the task and level of the person
- c Determine the appropriate amount of information to communicate
- d Interpret figurative or idiomatic language by reference to its use in context
- e Follow highly detailed, step by-step directions
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- a. Recognize the need for clear, concise directions in order to avoid language or word meaning differences
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SAFETY/SECURITY

40 PRECAUTIONS

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- a. Identify similarities and differences between and among objects
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- e Classify objects by size, shape, color and significant markings
- f. Determine direction, duration, and intensity of sounds, sightings and smells
- g Infer from sights, sounds, touch, smells, or tastes to determine a course of action

h. Interpret Codes & Symbols

11C Indirect Fire Infantryman

BSEP 1

NUMERATION/PLACE VALUE

NT

1 NUMBERING AND COUNTING

- a Match numerals with word names and models
- b Write numerals one through N in sequential order from any starting point
- c State what numeral comes after, before, or between any two given numerals
- d Select the numeral which is greater/lesser from a set of numerals
- e Identify an object with a specified ordinal position
- f Write or state the place value of a particular digit, whole or decimal number
- g Round off a number to a specified place, whole or decimal
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2 LINEAR, WEIGHT, AND VOLUME MEASURES

- a. Name the markings on a linear scale
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NT

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- a Recognize and match the names of solids with their corresponding figures

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- a Identify technical words associated with geometric figures
- b Interpret meaning of terms derived from spatial orientation

COMPUTE OR PERFORM

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- a. Multiply and divide whole numbers
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- a. *Solve simple algebraic equations with one unknown*
- b. Recognize and derive equivalent algebraic expressions
- c. Evaluate powers and estimate roots

19. TRIGONOMETRY

- a. *Use tables of trigonometric functions*
- b. Use tables of logarithms to solve problems
- c. Solve geometric problems using trigonometric functions
- d Use trigonometric ratios to solve problems

CONTENT READING

NT

25 PROCEDURAL DIRECTIONS

- a Identify factual details or specifications that are found within a statement or written selection
- b Select parts of text and visual materials to complete a task activity
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VISUAL AIDS

NT

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- a. Locate the block on a form to enter the appropriate information
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NT

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- f Select examples that will clarify major issues presented in the report
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- i Justify an action taken and give reasons for rejecting alternatives

36 EDITING

- a Spell frequently used words correctly
- b Spell task-related words correctly
- c Identify words that need to be capitalized
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- g Rewrite the paragraph by stating the main idea in the first sentence, and restructuring the sentences for coherence
- h. Appraise an entire written communication and make adjustments to improve clarity

VERBAL COMMUNICATION

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- a Individual – a person working on a task and communicating with another when assistance is needed or when a supervisory decision is needed
- b. Instruction – a task activity requiring communication between an instructor, an individual or small group where the purpose is to give facts or rules to inform or guide
- c. Tutor – interaction takes place between two persons where one is instructing and the other is doing the task
- d. Peer Group (less than 10) – all members engage in an activity where one person assumes a leadership role and communicates to others what is to be done
- e. Interview – a person communicating with another about his activities, opinions, or subject expertise for the purpose of using the information in a task
- f Briefing – communicating final instructions to others or giving an account in summary
- g Counsel – communicating together to exchange ideas or opinions to recommend, give or take advice, or to arrive at an acceptance of a plan or decision
- h Command – communicate to others an order or action to be taken where a person has a position of authority

4/23/82

NT

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- a Enunciate clearly, using the proper rate of speech
- b Use technical vocabulary suitable to the task and level of the person
- c Determine the appropriate amount of information to communicate
- d Interpret figurative or idiomatic language by reference to its use in context
- e Follow highly detailed, step-by-step directions
- f Solicit feedback to confirm the accurate reception of the communication
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- i Recognize when a prescribed series of verbal interactions is required to coordinate a group effort
- j. Recognize when the situation will require a structured, preplanned method of presentation

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- a Recognize the need for clear, concise directions in order to avoid language or word-meaning differences
- b. Recognize personality factors and inter-personal relationships that may exist
- c. Recognize feedback as a means of communicating more effectively and increasing task competence

SAFETY/SECURITY

40. PRECAUTIONS

- a. Use common knowledge to avoid hazards in order to prevent injury to self or equipment
- b Apply preventive measures prior to task performance to minimize any potential safety or security problem
- c. Select an appropriate course of action in the event of an emergency

PERCEPTUAL

41. RECOGNITION

- a Identify similarities and differences between and among objects
- b. Use body language (motions, gestures, postures) to communicate or signal
- c. Determine the presence of a defect or extent of damage
- d. Match objects by size, shape, color and significant markings
- e Classify objects by size, shape, color and significant markings
- f. Determine direction, duration, and intensity of sounds, sightings and smells
- g. Infer from sights, sounds, touch, smells, or tastes to determine a course of action
- h. Interpret Codes & Symbols

11H Heavy Antiarmor Weapons Crewman

BSEP 1

NUMERATION/PLACE VALUE

NT

1 NUMBERING AND COUNTING

a. Match numerals with word names and models
b. Write numerals one through N in sequential order from any starting point
c. State what numeral comes after, before, or between any two given numerals
d. Select the numeral which is greater/lesser from a set of numerals
e. Identify an object with a specified ordinal position
f. Write or state the place value of a particular digit, whole or decimal number
g. Round off a number to a specified place, whole or decimal
h. Count by ones, twos, fives, tens, etc. backward or forward (skip counting)
i. Match numbers with points or intervals on a number line (positive (+) or negative ( ) values)

UNITS OF MEASUREMENT

2 LINEAR, WEIGHT, AND VOLUME MEASURES

a. Name the markings on a linear scale
b. Differentiate units of measure and equivalents in the English and metric system
c. Use a ruler, yardstick, meter stick or scale to measure lengths of objects or distances
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e. Identify measures of pints, quarts, gallons, liters
f. Use a scale which is not numerically calibrated
g. Estimate measures of varying lengths, dimensions or weights

3 DEGREE MEASURES

a. Identify degree or mil as a unit in determining direction, distance or temperature
b. Estimate the measure of a given angle not greater than 180°
c. Interpret bearings, azimuth and other contexts in which the measure of an angle may range from 0° to 360°/0 to 6400 mils

4 TIME TELLING MEASURES

a. Use a 24 hour or digital clock to tell time
b. Name intervals and tell time in hours, minutes, and seconds
c. Estimate time in seconds, minutes, and parts of an hour
d. Identify calender units and arrange them in Julian style
e. Convert time into hours and tenths of hours
f. Compute time using Greenwich Mean Time (GMT) as a basis for establishing zones and distances

NT

5 GAUGE MEASURES

a. Identify the unit of measurement found on an instrument
b. Interpret the number, word, symbol from a display read out
c. Recognize a "reading" from a gauge with color divisions
d. Recognize positive (+) and negative ( ) demarcation on a scale
e. Select band(s) from a multi scale gauge
f. Match a gauge reading to a specification using numbered or labeled intervals
g. Interpret gauge readings from an unnumbered/unmarked interval
h. Interpret a gauge reading which is fluctuating or momentarily sustained
i. Match specifications of required measures by manipulation, alignment or maintenance

VISUAL/SPATIAL RELATIONSHIPS

6 SPATIAL

a. Identify directions that tools, hardware, or components may be moved
b. Manipulate objects to align, match, mate, make parallel, be perpendicular or be at an angle
c. Interpret spatial relationships of figures and objects from 2-dimensional drawings, pictures, or photographs
d. Relate geometric symbols and graphic representations to actual systems, subsystems and components

GEOMETRY

7 LINES

a. Identify and name points, lines, rays, and segments
b. Identify intersecting lines, parallel lines, and line segments
c. Define and identify perpendicular lines
d. Identify congruent segments

8 PLANES

a. Identify and name plane geometric figures
b. List the characteristics of geometric figures
c. Classify figures according to the number or measure of its sides or angles
d. Identify figures which possess similarities
e. Identify figures which may be parallel, perpendicular or congruent

9 ANGLES AND TRIANGLES

a. Identify and name the different kinds of angles and triangles, with their corresponding figures
b. Identify vertical, adjacent, complementary or supplementary angles
c. Classify triangles according to their sides or angle size
d. Identify altitudes and medians of triangles or the bisector of an angle
e. Name an angle by using letters, a number, or a single letter

NT

10 SOLIDS

- a. Recognize and match the names of solids with their corresponding figures

11 TERMINOLOGY

- a. Identify technical words associated with geometric figures
- b. Interpret meaning of terms derived from spatial orientation

COMPUTE OR PERFORM

12 ADDITION AND SUBTRACTION

- a. Add or subtract whole numbers, without carrying or borrowing
- b. Add or subtract whole numbers, carrying and borrowing
- c. Add and subtract, borrowing and carrying with mixed numbers (whole and decimals)
- d. Add or subtract positive (+) and negative (-) numbers, using a number line to arrive at a solution
- e. Add or subtract to find correct time (24 hr. clock) using hours or minutes
- f. Add or subtract various increments on gauges, dials, or any other measuring instrument
- g. Add or subtract time, linear, dry, liquid or degree measures requiring regrouping
- h. Estimate a sum or difference

13 MULTIPLICATION AND DIVISION

- a. Multiply and divide whole numbers
- b. Multiply and divide mixed numbers (whole and decimals)
- c. Divide a number with decimals in both divisor and dividend
- d. Multiply and divide integers, both positive (+) and negative (-), and assign proper sign to product or quotient
- e. Estimate a product or quotient

14 FRACTIONS/DECIMALS

- a. Subdivide whole objects or a set of objects into halves (1/2), thirds (1/3), fourths (1/4), eighths (1/8)
- b. Reduce fractions to lowest terms
- c. Convert fractions (proper and improper) to decimal equivalents, and vice versa, using a table, chart or gauge
- d. Compute equivalent value of fractions, decimals, percents, and mixed numbers to lowest terms
- e. Add and subtract fractions, with same or different denominators
- f. Multiply and divide fractions with and without whole numbers
- g. Estimate a fractional sum, product, or quotient

NT

15 GEOMETRY

- a. Draw geometric figures, plane and solid
- b. Match geometric figures with word names, equivalent measures
- c. Label all parts of geometric figures using mathematical and characteristic designators
- d. Use a protractor to measure angles, make geometrical constructions
- e. Construct perpendicular on a line segment, bisector of an angle
- f. Compute the perimeter and area of any figure
- g. Compute the circumference and area of a circle
- h. Compute the area and volume of any solid figure
- i. Use formulas in solving problems involving geometric figures
- j. Solve problems and interpret spatial relationships of figures, symbols, and objects from 2-dimensional displays

16. COMBINATION OF PROCESSES

- a. Identify median and mode
- b. Compute averages
- c. Solve problems combining all processes using whole, mixed numbers and fractions
- d. Solve problems, combining all processes, involving units of measurement
- e. Interpret information from charts, number lines, scales and graphs to solve arithmetic problems
- f. Solve conversion problems of linear (metric and English) liquid, weight, and temperature (F^{o} or C^{o}) measures
- g. Solve problems involving ratio and proportion
- h. Solve word problems where any mathematical process may occur

17. GRAPHING IN THE COORDINATE PLANE

- a. Identify coordinates of a point in any grid system
- b. Identify points on a line graph
- c. Match a graph with its equation

18. ALGEBRA

- a. Solve simple algebraic equations with one unknown
- b. Recognize and derive equivalent algebraic expressions
- c. Evaluate powers and estimate roots

19. TRIGONOMETRY

- a. Use tables of trigonometric functions
- b. Use tables of logarithms to solve problems
- c. Solve geometric problems using trigonometric functions
- d. Use trigonometric ratios to solve problems

CONTENT READING

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25 PROCEDURAL DIRECTIONS

- a Identify factual details or specifications that are found within a statement or written selection
- b Select parts of text and visual materials to complete a task activity
- c Follow highly detailed, step by step directions in order to accomplish a sequence of task activities
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- f Synthesize information from written sources which contributes to the completion of a task activity

26 VOCABULARY

- a Recognize common words and their meanings
- b Recognize task related words with technical meanings
- c Identify the correct meaning of a word from the context of a sentence
- d Recognize the meaning of common contractions, abbreviations and acronyms
- e Determine the meaning of figurative, idiomatic, and technical terms by using context clues or by using a reference source(s)

INFORMATION ACCESS

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- a Locate a Technical Manual, Field Manual or any related source document by code number and title
- b Alphabetize words or topics to locate information
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28 TABLES/CHARTS

- a Obtain a fact or specification from a two-column table or chart to find information
- b Obtain a fact or specification from an intersection of a row by column table or chart
- c Use a complex table or chart requiring cross referencing within or in combination with text material outside the chart
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NT

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- a Identify details, labels, numbers, and parts from an illustration or picture
- b Identify parts or details according to a key or legend
- c Interpret a drawing which shows a cross sectional view of an object for assembly, disassembly
- d Interpret a three dimensional projection or exploded view of object(s) for assembly, disassembly, or position in system or sub system
- e Follow illustrations, or photographs, arranged in a sequential order, as a guide
- f Integrate information from various sources to select a course of action

30 FLOW CHARTS

- a Use a simple linear path of an organizational chart to list events in sequential order
- b Use a linear path of a flow chart to provide visual and textual directions to a procedure, to arrive at decision points, and to provide alternate paths in problem solving
- c Translate the significance of the symbols into physical activities

31 SCHEMATICS

- a Isolate each major section or entity presented in a schematic diagram
- b Identify the components within each entity
- c Trace connections in an integrated circuit from their origin to another point within or from one entity to another
- d Isolate a problem component in a schematic and trace it to components believed to cause the problem
- e Interpret symbols to indicate direction of flow, test points, components and diagrammatic decision points

WRITTEN COMMUNICATION

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- a Locate the block on a form to enter the appropriate information
- b Transfer a number, code, date, figure or related data from equipment or written sources onto an appropriate section of the form
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- d Write a descriptive account of an activity or transaction performed
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- a Distinguish between essential and non-essential details during the note taking process
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- c Rewrite all recorded details in sentence form
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- a Spell frequently used words correctly
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- c Identify words that need to be capitalized
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VERBAL COMMUNICATION

37 TYPE

- a Individual - a person working on a task and communicating with another when assistance is needed or when a supervisory decision is needed
- b Instruction - a task activity requiring communication between an instructor, an individual or small group where the purpose is to give facts or rules to inform or guide
- c Tutor - interaction takes place between two persons where one is instructing and the other is doing the task
- d Peer Group (less than 10) - all members engage in an activity where one person assumes a leadership role and communicates to others what is to be done
- e Interview - a person communicating with another about his activities, opinions, or subject expertise for the purpose of using the information in a task
- f Briefing - communicating final instructions to others or giving an account in summary
- g Counsel - communicating together to exchange ideas or opinions to recommend, give or take advice, or to arrive at an acceptance of a plan or decision
- h Command - communicate to others an order or action to be taken where a person has a position of authority

4/23/82

NT

38 CHARACTERISTICS

- a Enunciate clearly, using the proper rate of speech
- b Use technical vocabulary suitable to the task and level of the person
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11M Fighting Vehicle Infantryman

BSEP I

NUMERATION/PLACE VALUE

NT

1 NUMBERING AND COUNTING

- a Match numerals with word names and models
- b Write numerals one through N in sequential order from any starting point
- c State what numeral comes after, before, or between any two given numerals
- d Select the numeral which is greater/lesser from a set of numerals
- e Identify an object with a specified ordinal position
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- g Round off a number to a specified place, whole or decimal
- h Count by ones, twos, fives, tens, etc. backward or forward (skip counting)
- i Match numbers with points or intervals on a number line (positive (+) or negative (-) values)

UNITS OF MEASUREMENT

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- a. Identify similarities and differences between and among objects
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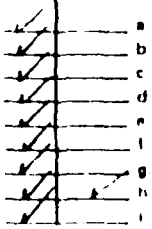
- e Classify objects by size, shape, color and significant markings
- f Determine direction, duration, and intensity of sounds, sightings and smells
- g. Infer from sights, sounds, touch, smells, or tastes to determine a course of action
- h. Interpret Codes & Symbols

NUMERATION/PLACE VALUE

NT

1 NUMBERING AND COUNTING



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b Write numerals one through N in sequential order from any starting point
c State what numeral comes after, before, or between any two given numerals
d Select the numeral which is greater/lesser from a set of numerals
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f Write or state the place value of a particular digit, whole or decimal number
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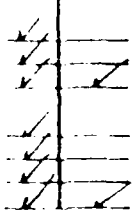
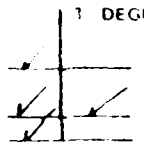
UNITS OF MEASUREMENT

2 LINEAR, WEIGHT, AND VOLUME MEASURES



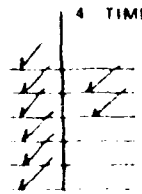
a Name the markings on a linear scale
b Differentiate units of measure and equivalents in the English and metric system
c Use a ruler, yardstick, meter stick or scale to measure lengths of objects or distances
d Identify measures of ounce, pound, gram
e Identify measures of pints, quarts, gallons, liters
f Use a scale which is not numerically calibrated
g Estimate measures of varying lengths, dimensions or weights

3 DEGREE MEASURES



a Identify degree or mil as a unit in determining direction, distance or temperature
b Estimate the measure of a given angle not greater than 180^{o}
c Interpret bearings, azimuth and other contexts in which the measure of an angle may range from 0^{o} to 360^{o}/0 to 6400 mils

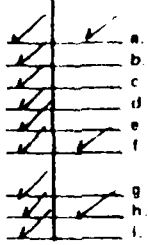
4 TIME TELLING MEASURES



a Use a 24 hour or digital clock to tell time
b Name intervals and tell time in hours, minutes, and seconds
c Estimate time in seconds, minutes, and parts of an hour
d Identify calendar units and arrange them in Julian style
e Convert time into hours and tenths of hours
f Compute time using Greenwich Mean Time (GMT) as a basis for establishing zones and distances

NT

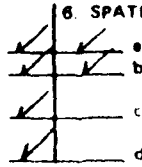
5 GAUGE MEASURES



a. Identify the unit of measurement found on an instrument
b. Interpret the number, word, symbol from a display read out
c Recognize a "reading" from a gauge with color divisions
d Recognize positive (+) and negative ( ) demarcation on a scale
e Select band(s) from a multi scale gauge
f Match a gauge reading to a specification using numbered or labeled intervals
g Interpret gauge readings from an unnumbered/unmarked interval
h. Interpret a gauge reading which is fluctuating or momentarily sustained
i. Match specifications of required measures by manipulation, alignment or maintenance

VISUAL/SPATIAL RELATIONSHIPS

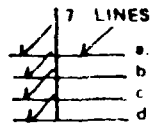
6. SPATIAL



a. Identify directions that tools, hardware, or components may be moved
b. Manipulate objects to align, match, mate, make parallel, be perpendicular or be at an angle
c. Interpret spatial relationships of figures and objects from 2-dimensional drawings, pictures, or photographs
d Relate geometric symbols and graphic representations to actual systems, subsystems and components

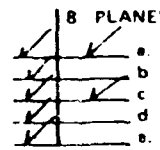
GEOMETRY

7 LINES



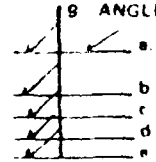
a. Identify and name points, lines, rays, and segments
b Identify intersecting lines, parallel lines, and line segments
c Define and identify perpendicular lines
d Identify congruent segments

8 PLANES



a. Identify and name plane geometric figures
b List the characteristics of geometric figures
c Classify figures according to the number or measure of its sides or angles
d Identify figures which possess similarities
e. Identify figures which may be parallel, perpendicular or congruent

9 ANGLES AND TRIANGLES



a. Identify and name the different kinds of angles and triangles, with the corresponding figures
b Identify vertical, adjacent, complementary or supplementary angles
c Classify triangles according to their sides or angle size
d Identify altitudes and medians of triangles or the bisector of an angle
e Name an angle by using letters, a number, or a single letter

NT

10 SOLIDS

- a. Recognize and match the names of solids with their corresponding figures

11 TERMINOLOGY

- a. Identify technical words associated with geometric figures
- b. Interpret meaning of terms derived from spatial orientation

COMPUTE OR PERFORM

12 ADDITION AND SUBTRACTION

- a. Add or subtract whole numbers, without carrying or borrowing
- b. Add or subtract whole numbers, carrying and borrowing
- c. Add and subtract, borrowing and carrying with mixed numbers (whole and decimals)
- d. Add or subtract positive (+) and negative (-) numbers, using a number line to arrive at a solution
- e. Add or subtract to find correct time (24 hr. clock) using hours or minutes
- f. Add or subtract various increments on gauges, dials, or any other measuring instrument
- g. Add or subtract time, linear, dry, liquid or degree measures requiring regrouping
- h. Estimate a sum or difference

13 MULTIPLICATION AND DIVISION

- a. Multiply and divide whole numbers
- b. Multiply and divide mixed numbers (whole and decimals)
- c. Divide a number with decimals in both divisor and dividend
- d. Multiply and divide integers, both positive (+) and negative (-), and assign proper sign to product or quotient
- e. Estimate a product or quotient

14 FRACTIONS/DECIMALS

- a. Subdivide whole objects or a set of objects into halves (1/2), thirds (1/3), fourths (1/4), eighths (1/8)
- b. Reduce fractions to lowest terms
- c. Convert fractions (proper and improper) to decimal equivalents, and vice versa, using a table, chart or gauge
- d. Compute equivalent value of fractions, decimals, percents, and mixed numbers to lowest terms
- e. Add and subtract fractions, with same or different denominators
- f. Multiply and divide fractions with and without whole numbers
- g. Estimate a fractional sum, product, or quotient

NT

15 GEOMETRY

- a. Draw geometric figures, plane and solid
- b. Match geometric figures with word names, equivalent measures
- c. Label all parts of geometric figures using mathematical and characteristic designators
- d. Use a protractor to measure angles, make geometrical constructions
- e. Construct perpendicular on a line segment, bisector of an angle
- f. Compute the perimeter and area of any figure
- g. Compute the circumference and area of a circle
- h. Compute the area and volume of any solid figure
- i. Use formulas in solving problems involving geometric figures
- j. Solve problems and interpret spatial relationships of figures, symbols, and objects from 2-dimensional displays

16. COMBINATION OF PROCESSES

- a. Identify median and mode
- b. Compute averages
- c. Solve problems combining all processes using whole, mixed numbers and fractions
- d. Solve problems, combining all processes, involving units of measurement
- e. Interpret information from charts, number lines, scales and graphs to solve arithmetic problems
- f. Solve conversion problems of linear (metric and English) liquid, weight, and temperature (F^{O} or C^{O}) measures
- g. Solve problems involving ratio and proportion
- h. Solve word problems where any mathematical process may occur

17. GRAPHING IN THE COORDINATE PLANE

- a. Identify coordinates of a point in any grid system
- b. Identify points on a line graph
- c. Match a graph with its equation

18. ALGEBRA

- a. Solve simple algebraic equations with one unknown
- b. Recognize and derive equivalent algebraic expressions
- c. Evaluate powers and estimate roots

19. TRIGONOMETRY

- a. Use tables of trigonometric functions
- b. Use tables of logarithms to solve problems
- c. Solve geometric problems using trigonometric functions
- d. Use trigonometric ratios to solve problems

CONTENT READING

NT

25 PROCEDURAL DIRECTIONS

- a Identify factual details or specifications that are found within a statement or written selection
- b. Select parts of text and visual materials to complete a task activity
- c Follow highly detailed, step by step directions in order to accomplish a sequence of task activities
- d Determine the essential message of a paragraph or section of written material
- e Infer from a written source, which does not explicitly provide required information, in order to make a decision
- f Synthesize information from written sources which contributes to the completion of a task activity

26 VOCABULARY

- a Recognize common words and their meanings
- b Recognize task related words with technical meanings
- c Identify the correct meaning of a word from the context of a sentence
- d Recognize the meaning of common contractions, abbreviations and acronyms
- e *Determine the meaning of figurative, idiomatic, and technical terms by using context clues or by using a reference source(s)*

INFORMATION ACCESS

27 REFERENCE SKILLS

- a Locate a Technical Manual, Field Manual or any related source document by code number and title
- b Alphabetize words or topics to locate information
- c Use the table of contents, index, system or sub-system heading, appendix and glossary to locate information
- d Locate the page, title, paragraph, figure, or chart needed to answer a question or to solve a problem
- e Determine, after scanning or skim-reading, whether the information is relevant
- f Cross reference within and across source documents to select information needed to perform a routine
- g Organize information from *multiple sources into a sequenced series of events*

28 TABLES/CHARTS

- a Obtain a fact or specification from a two column table or chart to find information
- b Obtain a fact or specification from an intersection of a row by column table or chart
- c Use a complex table or chart requiring cross referencing within or in combination with text material outside the chart
- d Apply information from tables and charts for locating malfunctions, or for selecting a course of action

VISUAL AIDS

NT

29 ILLUSTRATIONS

- a Identify details, labels, numbers, and parts from an illustration or picture
- b Identify parts or details according to a key or legend
- c. Interpret a drawing which shows a cross sectional view of an object for assembly, disassembly
- d Interpret a three dimensional projection or exploded view of object(s) for assembly, disassembly, or position in system or sub system
- e Follow illustrations, or photographs, arranged in a sequential order, as a guide
- f Integrate information from various sources to select a course of action

30 FLOW CHARTS

- a. Use a simple linear path of an organizational chart to list events in sequential order
- b Use a linear path of a flow chart to provide visual and textual directions to a procedure, to arrive at decision points, and to provide alternate paths in problem-solving
- c. Translate the significance of the symbols into physical activities

31. SCHEMATICS

- a Isolate each major section or entity presented in a schematic diagram
- b. Identify the components within each entity
- c. Trace connections in an integrated circuit from their origin to another point within or from one entity to another
- d. Isolate a problem component in a schematic and trace it to components believed to cause the problem
- e. Interpret symbols to indicate direction of flow, test points, components and diagrammatic decision points

WRITTEN COMMUNICATION

32. FORMS

- a Locate the block on a form to enter the appropriate information
- b. Transfer a number, code, date, figure or related data from equipment or written sources onto an appropriate section of the form
- c Write the name of the organization, responsible personnel, disposition of the part or equipment, and nomenclature, in appropriate sections of the form
- d Write a descriptive account of an activity or transaction performed
- e Use a completed form to locate or compare information

33. NOTE-TAKING

- a Distinguish between essential and non-essential details during the note taking process
- b Record details without misinterpreting the intent of either written material or an interview
- c Rewrite all recorded details in sentence form
- d Organize all sentences into paragraphs

NT

34 OUTLINING (topic or sentence)

- a Distinguish between major and subordinate topics
- b Generate titles for each major topic selected
- c Use phrases or sentences to provide subordinate details under each major topic
- d Alternate, indent numbers and letters to establish a hierarchy

35 REPORT WRITING

- a State the intent or objective(s) of the report
- b Describe the parameters of the event or situation
- c Distinguish between relevant and irrelevant details
- d Sequence events in the order they have occurred
- e State general impressions of events described
- f Select examples that will clarify major issues presented in the report
- g Examine opposing points of view in the report
- h Summarize the major points developed in the report
- i Justify an action taken and give reasons for rejecting alternatives

36 EDITING

- a Spell frequently used words correctly
- b. Spell task-related words correctly
- c. Identify words that need to be capitalized
- d. Correct all misspelled words with or without the use of a reference source
- e. Apply all rules for end marks, commas, and apostrophes
- f Apply common rules of grammar
- g. Rewrite the paragraph by stating the main idea in the first sentence, and restructuring the sentences for coherence
- h. Appraise an entire written communication and make adjustments to improve clarity

VERBAL COMMUNICATION

37. TYPE

- a Individual – a person working on a task and communicating with another when assistance is needed or when a supervisory decision is needed
- b Instruction – a task activity requiring communication between an instructor, an individual or small group where the purpose is to give facts or rules to inform or guide
- c. Tutor – Interaction takes place between two persons where one is instructing and the other is doing the task
- d Peer Group (less than 10) – all members engage in an activity where one person assumes a leadership role and communicates to others what is to be done
- e. Interview – a person communicating with another about his activities, opinions, or subject expertise for the purpose of using the information in a task
- f Briefing – communicating final instructions to others or giving an account in summary
- g Counsel – communicating together to exchange ideas or opinions to recommend, give or take advice, or to arrive at an acceptance of a plan or decision
- h Command – communicate to others an order or action to be taken where a person has a position of authority

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NT

38 CHARACTERISTICS

- a Enunciate clearly, using the proper rate of speech
- b Use technical vocabulary suitable to the task and level of the person
- c Determine the appropriate amount of information to communicate
- d Interpret figurative or idiomatic language by reference to its use in context
- e. Follow highly detailed, step-by-step directions
- f. Solicit feedback to confirm the accurate reception of the communication
- g Recognize when a low key, informal dialogue is suitable
- h Recognize when direct verbal commands are necessary
- i. Recognize when a prescribed series of verbal interactions is required to coordinate a group effort
- j. Recognize when the situation will require a structured, preplanned method of presentation

39. BARRIERS

- a Recognize the need for clear, concise directions in order to avoid language or word-meaning differences
- b Recognize personality factors and inter personal relationships that may exist
- c. Recognize feedback as a means of communicating more effectively and increasing task competence

SAFETY/SECURITY

40. PRECAUTIONS

- a. Use common knowledge to avoid hazards in order to prevent injury to self or equipment
- b. Apply preventive measures prior to task performance to minimize any potential safety or security problem
- c. Select an appropriate course of action in the event of an emergency

PERCEPTUAL

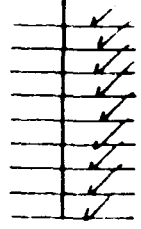
41. RECOGNITION

- a. Identify similarities and differences between and among objects
- b. Use body language (motions, gestures, postures) to communicate or signal
- c. Determine the presence of a defect or extent of damage
- d. Match objects by size, shape, color and significant markings
- e Classify objects by size, shape, color and significant markings
- f. Determine direction, duration, and intensity of sounds, sightings and smells
- g. Infer from sights, sounds, touch, smells, or tastes to determine a course of action

NUMERATION/PLACE VALUE

NT

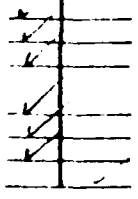
1 NUMBERING AND COUNTING



- a Match numerals with word names and models
- b Write numerals one through N in sequential order from any starting point
- c State what numeral comes after, before, or between any two given numerals
- d Select the numeral which is greater/lesser from a set of numerals
- e Identify an object with a specified ordinal position
- f Write or state the place value of a particular digit, whole or decimal number
- g Round off a number to a specified place, whole or decimal
- h Count by ones, twos, fives, tens, etc. backward or forward (skip counting)
- i Match numbers with points or intervals on a number line (positive (+) or negative ( ) values)

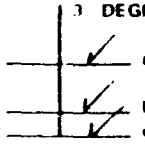
UNITS OF MEASUREMENT

2 LINEAR, WEIGHT, AND VOLUME MEASURES



- a Name the markings on a linear scale
- b *Differentiate units of* measure and equivalents in the English and metric system
- c Use a ruler, yardstick, meter stick or scale to measure lengths of objects or distances
- d Identify measures of ounce, pound, gram
- e Identify measures of pints, quarts, gallons, liters
- f Use a scale which is not numerically calibrated
- g Estimate measures of varying lengths, dimensions or weights

3 DEGREE MEASURES



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- b Estimate the measure of a given angle not greater than 180°
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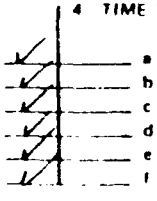

- a Use a 24 hour or digital clock to tell time
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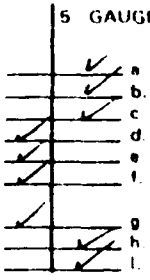

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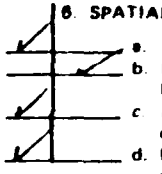

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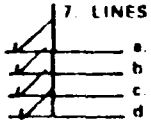

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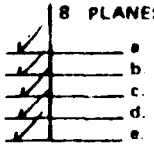

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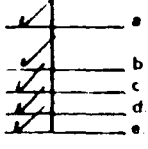

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28 TABLES/CHARTS

- a Obtain a fact or specification from a two column table or chart to find information
- b Obtain a fact or specification from an intersection of a row by column table or chart
- c Use a complex table or chart requiring cross referencing within or in combination with text material outside the chart
- d Apply information from tables and charts for locating malfunctions, or for selecting a course of action

VISUAL AIDS

NT

29 ILLUSTRATIONS

- a Identify details, labels, numbers, and parts from an illustration or picture
- b Identify parts or details according to a key or legend
- c Interpret a drawing which shows a cross sectional view of an object for assembly, disassembly
- d Interpret a three dimensional projection or exploded view of object(s) for assembly, disassembly, or position in system or sub system
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- f Integrate information from various sources to select a course of action

30 FLOW CHARTS

- a Use a simple linear path of an organizational chart to list events in sequential order
- b Use a linear path of a flow chart to provide visual and textual directions to a procedure, to arrive at decision points, and to provide alternate paths in problem solving
- c Translate the significance of the symbols into physical activities

31 SCHEMATICS

- a Isolate each major section or entity presented in a schematic diagram
- b. Identify the components within each entity
- c Trace connections in an integrated circuit from their origin to another point within or from one entity to another
- d Isolate a problem component in a schematic and trace it to components believed to cause the problem
- e Interpret symbols to indicate direction of flow, test points, components and diagrammatic decision points

WRITTEN COMMUNICATION

32 FORMS

- a. Locate the block on a form to enter the appropriate information
- b Transfer a number, code, date, figure or related data from equipment or written sources onto an appropriate section of the form
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- d Write a descriptive account of an activity or transaction performed
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33 NOTE TAKING

- a Distinguish between essential and non-essential details during the note taking process
- b Record details without misinterpreting the intent of either written material or an interview
- c Rewrite all recorded details in sentence form
- d Organize all sentences into paragraphs

NT

34 OUTLINING (topic or sentence)

- a Distinguish between major and subordinate topics
- b Generate titles for each major topic selected
- c Use phrases or sentences to provide subordinate details under each major topic
- d Alternate, indent numbers and letters to establish a hierarchy

35 REPORT WRITING

- a State the intent or objective(s) of the report
- b Describe the parameters of the event or situation
- c Distinguish between relevant and irrelevant details
- d Sequence events in the order they have occurred
- e State general impressions of events described
- f Select examples that will clarify major issues presented in the report
- g Examine opposing points of view in the report
- h Summarize the major points developed in the report
- i Justify an action taken and give reasons for rejecting alternatives

36 EDITING

- a Spell frequently used words correctly
- b. Spell task-related words correctly
- c Identify words that need to be capitalized
- d Correct all misspelled words with or without the use of a reference source
- e Apply all rules for end marks, commas, and apostrophes
- f Apply common rules of grammar
- g Rewrite the paragraph by stating the main idea in the first sentence, and restructuring the sentences for coherence
- h Appraise an entire written communication and make adjustments to improve clarity

VERBAL COMMUNICATION

37 TYPE

- a. Individual – a person working on a task and communicating with another when assistance is needed or when a supervisory decision is needed
- b Instruction – a task activity requiring communication between an instructor, an individual or small group where the purpose is to give facts or rules to inform or guide
- c. Tutor – interaction takes place between two persons where one is instructing and the other is doing the task
- d Peer Group (less than 10) – all members engage in an activity where one person assumes a leadership role and communicates to others what is to be done
- e. Interview – a person communicating with another about his activities, opinions, or subject expertise for the purpose of using the information in a task
- f Briefing – communicating final instructions to others or giving an account in summary
- g Counsel – communicating together to exchange ideas or opinions to recommend, give or take advice, or to arrive at an acceptance of a plan or decision
- h Command – communicate to others an order or action to be taken where a person has a position of authority

NT

38 CHARACTERISTICS

- a Enunciate clearly, using the proper rate of speech
- b Use technical vocabulary suitable to the task and level of the person
- c Determine the appropriate amount of information to communicate
- d Interpret figurative or idiomatic language by reference to its use in context
- e Follow highly detailed, step by step directions
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- g. Recognize when a low key, informal dialogue is suitable
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39. BARRIERS

- a. Recognize the need for clear, concise directions in order to avoid language or word-meaning differences
- b. Recognize personality factors and inter personal relationships that may exist
- c Recognize feedback as a means of communicating more effectively and increasing task competence

SAFETY/SECURITY

40. PRECAUTIONS

- a. Use common knowledge to avoid hazards in order to prevent injury to self or equipment
- b. Apply preventive measures prior to task performance to minimize any potential safety or security problem
- c. Select an appropriate course of action in the event of an emergency

PERCEPTUAL

41. RECOGNITION

- a. Identify similarities and differences between and among objects
- b. Use body language (motions, gestures, postures) to communicate or signal
- c. Determine the presence of a defect or extent of damage
- d. Match objects by size, shape, color and significant markings
- e Classify objects by size, shape, color and significant markings
- f. Determine direction, duration, and intensity of sounds, sightings and smells
- g. Infer from sights, sounds, touch, smells, or tastes to determine a course of action

13E Cannon Fire Direction Specialist

BSEP I

NUMERATION/PLACE VALUE

NT

1 NUMBERING AND COUNTING

- a. Match numerals with word names and models
- b. Write numerals one through N in sequential order from any starting point
- c. State what numeral comes after, before, or between any two given numerals
- d. Select the numeral which is greater/lesser from a set of numerals
- e. Identify an object with a specified ordinal position
- f. Write or state the place value of a particular digit, whole or decimal number
- g. Round off a number to a specified place, whole or decimal
- h. Count by ones, twos, fives, tens, etc. backward or forward (skip counting)
- i. Match numbers with points or intervals on a number line (positive (+) or negative ( ) values)

UNITS OF MEASUREMENT

2 LINEAR, WEIGHT, AND VOLUME MEASURES

- a. Name the markings on a linear scale
- b. Differentiate units of measure and equivalents in the English and metric system
- c. Use a ruler, yardstick, meter stick or scale to measure lengths of objects or distances
- d. Identify measures of ounce, pound, grain
- e. Identify measures of pints, quarts, gallons, liters
- f. Use a scale which is not numerically calibrated
- g. Estimate measures of varying lengths, dimensions or weights

3 DEGREE MEASURES

- a. Identify degree or mil as a unit in determining direction, distance or temperature
- b. Estimate the measure of a given angle not greater than 180°
- c. Interpret bearings, azimuth and other contexts in which the measure of an angle may range from 0° to 360°/0 to 6400 mils

4 TIME TELLING MEASURES

- a. Use a 24 hour or digital clock to tell time
- b. Name intervals and tell time in hours, minutes, and seconds
- c. Estimate time in seconds, minutes, and parts of an hour
- d. Identify calendar units and arrange them in Julian style
- e. Convert time into hours and tenths of hours
- f. Compute time using Greenwich Mean Time (GMT) as a basis for establishing zones and distances

NT

5 GAUGE MEASURES

- a. Identify the unit of measurement found on an instrument
- b. Interpret the number, word, symbol from a display read out
- c. Recognize a "reading" from a gauge with color divisions
- d. Recognize positive (+) and negative ( ) demarcation on a scale
- e. Select band(s) from a multi-scale gauge
- f. Match a gauge reading to a specification using numbered or labeled intervals
- g. Interpret gauge readings from an unnumbered/unmarked interval
- h. Interpret a gauge reading which is fluctuating or momentarily sustained
- i. Match specifications of required measures by manipulation, alignment or maintenance

VISUAL/SPATIAL RELATIONSHIPS

6. SPATIAL

- a. Identify directions that tools, hardware, or components may be moved
- b. Manipulate objects to align, match, mate, make parallel, be perpendicular or be at an angle
- c. Interpret spatial relationships of figures and objects from 2-dimensional drawings, pictures, or photographs
- d. Relate geometric symbols and graphic representations to actual systems, subsystems and components

GEOMETRY

7. LINES

- a. Identify and name points, lines, rays, and segments
- b. Identify intersecting lines, parallel lines, and line segments
- c. Define and identify perpendicular lines
- d. Identify congruent segments

8 PLANES

- a. Identify and name plane geometric figures
- b. List the characteristics of geometric figures
- c. Classify figures according to the number or measure of its sides or angles
- d. Identify figures which possess similarities
- e. Identify figures which may be parallel, perpendicular or congruent

9. ANGLES AND TRIANGLES

- a. Identify and name the different kinds of angles and triangles, with their corresponding figures
- b. Identify vertical, adjacent, complementary or supplementary angles
- c. Classify triangles according to their sides or angle size
- d. Identify altitudes and medians of triangles or the bisector of an angle
- e. Name an angle by using letters, a number, or a single letter

NT

10 SOLIDS

- a. Recognize and match the names of solids with their corresponding figures

11 TERMINOLOGY

- a. Identify technical words associated with geometric figures
- b. Interpret meaning of terms derived from spatial orientation

COMPUTE OR PERFORM

12 ADDITION AND SUBTRACTION

- a. Add or subtract whole numbers, without carrying or borrowing
- b. Add or subtract whole numbers, carrying and borrowing
- c. Add and subtract, borrowing and carrying with mixed numbers (whole and decimals)
- d. Add or subtract positive (+) and negative (-) numbers, using a number line to arrive at a solution
- e. Add or subtract to find correct time (24 hr clock) using hours or minutes
- f. Add or subtract various increments on gauges, dials, or any other measuring instrument
- g. Add or subtract time, linear, dry, liquid or degree measures requiring regrouping
- h. Estimate a sum or difference

13. MULTIPLICATION AND DIVISION

- a. Multiply and divide whole numbers
- b. Multiply and divide mixed numbers (whole and decimals)
- c. Divide a number with decimals in both divisor and dividend
- d. Multiply and divide integers, both positive (+) and negative (-), and assign proper sign to product or quotient
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14. FRACTIONS/DECIMALS

- a. Subdivide whole objects or a set of objects into halves (1/2), thirds (1/3), fourths (1/4), eighths (1/8)
- b. Reduce fractions to lowest terms
- c. Convert fractions (proper and improper) to decimal equivalents, and vice verse, using a table, chart or gauge
- d. Compute equivalent value of fractions, decimals, percents, and mixed numbers to lowest terms
- e. Add and subtract fractions, with same or different denominators
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- g. Estimate a fractional sum, product, or quotient

NT

15 GEOMETRY

- a. Draw geometric figures, plane and solid
- b. Match geometric figures with word names, equivalent measures
- c. Label all parts of geometric figures using mathematical and characteristic designators
- d. Use a protractor to measure angles, make geometrical constructions
- e. Construct perpendicular on a line segment, bisector of an angle
- f. Compute the perimeter and area of any figure
- g. Compute the circumference and area of a circle
- h. Compute the area and volume of any solid figure
- i. Use formulas in solving problems involving geometric figures
- j. Solve problems and interpret spatial relationships of figures, symbols, and objects from 2-dimensional displays

16. COMBINATION OF PROCESSES

- a. Identify median and mode
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- c. Solve problems combining all processes using whole, mixed numbers and fractions
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- a. Identify coordinates of a point in any grid system
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- a. Solve simple algebraic equations with one unknown
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19. TRIGONOMETRY

- a. Use tables of trigonometric functions
- b. Use tables of logarithms to solve problems
- c. Solve geometric problems using trigonometric functions
- d. Use trigonometric ratios to solve problems

CONTENT READING

NT

25 PROCEDURAL DIRECTIONS

- a Identify factual details or specifications that are found within a statement or written selection
- b Select parts of text and visual materials to complete a task activity
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- b Recognize task related words with technical meanings
- c Identify the correct meaning of a word from the context of a sentence
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4/23/82

NT

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13F Fire Support Specialist

BSEP I

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NT

10 SOLIDS

- a. Recognize and match the names of solids with their corresponding figures

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- a. Identify technical words associated with geometric figures
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COMPUTE OR PERFORM

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- e. Add or subtract to find correct time (24 hr. clock) using hours or minutes
- f. Add or subtract various increments on gauges, dials, or any other measuring instrument
- g. Add or subtract time, linear, dry, liquid or degree measures requiring regrouping
- h. Estimate a sum or difference

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- a. Multiply and divide whole numbers
- b. Multiply and divide mixed numbers (whole and decimals)
- c. Divide a number with decimals in both divisor and dividend
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NT

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- a. Identify coordinates of a point in any grid system
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- a. Solve simple algebraic equations with one unknown
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19 TRIGONOMETRY

- a. Use tables of trigonometric functions
- b. Use tables of logarithms to solve problems
- c. Solve geometric problems using trigonometric functions
- d. Use trigonometric ratios to solve problems

CONTENT READING

NT

25 PROCEDURAL DIRECTIONS

- a Identify factual details or specifications that are found within a statement or written selection
- b Select parts of text and visual materials to complete a task activity
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26 VOCABULARY

- a Recognize common words and their meanings
- b Recognize task related words with technical meanings
- c Identify the correct meaning of a word from the context of a sentence
- d Recognize the meaning of common contractions, abbreviations and acronyms
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- a Distinguish between essential and non-essential details during the note taking process
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- b Spell task-related words correctly
- c Identify words that need to be capitalized
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4/23/82

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- a. Recognize the need for clear, concise directions in order to avoid language or word meaning differences
- b. Recognize personality factors and inter personal relationships that may exist
- c. Recognize feedback as a means of communicating more effectively and increasing task competence

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- a. Use common knowledge to avoid hazards in order to prevent injury to self or equipment
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- a. Identify similarities and differences between and among objects
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- c. Determine the presence of a defect or extent of damage
- d. Match objects by size, shape, color and significant markings
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15D Lance Missile Crew Member

BSEP I

NUMERATION/PLACE VALUE

NT

1 NUMBERING AND COUNTING

- a Match numerals with word names and models
- b Write numerals one through N in sequential order from any starting point
- c State what numeral comes after, before, or between any two given numerals
- d Select the numeral which is greater/lesser from a set of numerals
- e Identify an object with a specified ordinal position
- f Write or state the place value of a particular digit, whole or decimal number
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- a Name the markings on a linear scale
- b Differentiate units of measure and equivalents in the English and metric system
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- c. Interpret spatial relationships of figures and objects from 2-dimensional drawings, pictures, or photographs
- d. Relate geometric symbols and graphic representations to actual systems, subsystems and components

GEOMETRY

7. LINES

- a. Identify and name points, lines, rays, and segments
- b. Identify intersecting lines, parallel lines, and line segments
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- c. Classify figures according to the number or measure of its sides or angles
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- a Recognize and match the names of solids with their corresponding figures

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- a Identify technical words associated with geometric figures
- b Interpret meaning of terms derived from spatial orientation

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- a Add or subtract whole numbers, without carrying or borrowing
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- c Add and subtract, borrowing and carrying with mixed numbers (whole and decimals)
- d Add or subtract positive (+) and negative ( ) numbers, using a number line to arrive at a solution
- e Add or subtract to find correct time (24 hr. clock) using hours or minutes
- f Add or subtract various increments on gauges, dials, or any other measuring instrument
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- a Multiply and divide whole numbers
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- a. Use tables of trigonometric functions
- b. Use tables of logarithms to solve problems
- c. Solve geometric problems using trigonometric functions
- d Use trigonometric ratios to solve problems

CONTENT READING

NT

25 PROCEDURAL DIRECTIONS

- a Identify factual details or specifications that are found within a statement or written selection
- b Select parts of text and visual materials to complete a task activity
- c Follow highly detailed, step by step directions in order to accomplish a sequence of task activities
- d Determine the essential message of a paragraph or section of written material
- e Infer from a written source, which does not explicitly provide required information, in order to make a decision
- f Synthesize information from written sources which contributes to the completion of a task activity

26 VOCABULARY

- a Recognize common words and their meanings
- b Recognize task related words with technical meanings
- c Identify the correct meaning of a word from the context of a sentence
- d Recognize the meaning of common contractions, abbreviations and acronyms
- e Determine the meaning of figurative, idiomatic, and technical terms by using context clues or by using a reference source(s)

INFORMATION ACCESS

27 REFERENCE SKILLS

- a Locate a Technical Manual, Field Manual or any related source document by code number and title
- b Alphabetize words or topics to locate information
- c Use the table of contents, index, system or sub system heading, appendix and glossary to locate information
- d Locate the page, title, paragraph, figure, or chart needed to answer a question or to solve a problem
- e Determine, after scanning or skim reading, whether the information is relevant
- f Cross reference within and across source documents to select information needed to perform a routine
- g Organize information from multiple sources into a sequenced series of events

28 TABLES/CHARTS

- a Obtain a fact or specification from a two column table or chart to find information
- b Obtain a fact or specification from an intersection of a row by column table or chart
- c Use a complex table or chart requiring cross referencing within or in combination with text material outside the chart
- d Apply information from tables and charts for locating malfunctions, or for selecting a course of action

VISUAL AIDS

NT

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- a Identify details, labels, numbers, and parts from an illustration or picture
- b Identify parts or details according to a key or legend
- c Interpret a drawing which shows a cross sectional view of an object for assembly, disassembly
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15E Pershing Missile Crew Member

BSEP I

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41 RECOGNITION

- a Identify similarities and differences between and among objects
- b Use body language (motions, gestures, postures) to communicate or signal
- c Determine the presence of a defect or extent of damage
- d Match objects by size, shape, color and significant markings
- e Classify objects by size, shape, color and significant markings
- f Determine direction, duration, and intensity of sounds, sightings and smells
- g Infer from sights, sounds, touch, smells, or tastes to determine a course of action

CONTENT READING

NT

25 PROCEDURAL DIRECTIONS

- a Identify factual details or specifications that are found within a statement or written selection
- b Select parts of text and visual materials to complete a task activity
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VISUAL AIDS

NT

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- a. Locate the block on a form to enter the appropriate information
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16D HAWK Missile Crew Member

BSEP I

NUMERATION/PLACE VALUE

NT

1 NUMBERING AND COUNTING

- a Match numerals with word names and models
- b Write numerals one through N in sequential order from any starting point
- c State what numeral comes after, before, or between any two given numerals
- d Select the numeral which is greater/lesser from a set of numerals
- e Identify an object with a specified ordinal position
- f Write or state the place value of a particular digit, whole or decimal number
- g Round off a number to a specified place, whole or decimal
- h Count by ones, twos, fives, tens, etc backward or forward (skip counting)
- i *Match numbers with points or intervals on a number line* (positive (+) or negative ( ) values)

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2 LINEAR, WEIGHT, AND VOLUME MEASURES

- a Name the markings on a linear scale
- b *Differentiate units of measure and equivalents in the English and metric system*
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GEOMETRY

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- a. Identify and name points, lines, rays, and segments
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- e Name an angle by using letters, a number, or a single letter

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10 SOLIDS

- a. Recognize and match the names of solids with their corresponding figures

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- a. Identify technical words associated with geometric figures
- b. Interpret meaning of terms derived from spatial orientation

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- a. Add or subtract whole numbers, without carrying or borrowing
- b. Add or subtract whole numbers, carrying and borrowing
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- d. Add or subtract positive (+) and negative (-) numbers, using a number line to arrive at a solution
- e. Add or subtract to find correct time (24 hr. clock) using hours or minutes
- f. Add or subtract various increments on gauges, dials, or any other measuring instrument
- g. Add or subtract time, linear, dry, liquid or degree measures requiring regrouping
- h. Estimate a sum or difference

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- a. Multiply and divide whole numbers
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- b Generate titles for each major topic selected
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- c Distinguish between relevant and irrelevant details
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- f Select examples that will clarify major issues presented in the report
- g Examine opposing points of view in the report
- h Summarize the major points developed in the report
- i Justify an action taken and give reasons for rejecting alternatives

36 EDITING

- a Spell frequently used words correctly
- b Spell task-related words correctly
- c Identify words that need to be capitalized
- d Correct all misspelled words with or without the use of a reference source
- e Apply all rules for end marks, commas, and apostrophes
- f Apply common rules of grammar
- g Rewrite the paragraph by stating the main idea in the first sentence, and restructuring the sentences for coherence
- h Appraise an entire written communication and make adjustments to improve clarity

VERBAL COMMUNICATION

37 TYPE

- a Individual – a person working on a task and communicating with another when assistance is needed or when a supervisory decision is needed
- b Instruction – *a task activity requiring communication between an* instructor, an individual or small group where the purpose is to give facts or rules to inform or guide
- c Tutor – interaction takes place between two persons where one is instructing and the other is doing the task
- d Peer Group (less than 10) – all members engage in an activity where one person assumes a leadership role and communicates to others what is to be done
- e Interview – a person communicating with another about his activities, opinions, or subject expertise for the purpose of using the information in a task
- f Briefing – communicating final instructions to others or giving an account in summary
- g Counsel – *communicating together to exchange ideas or opinions to* recommend, give or take advice, or to arrive at an acceptance of a plan or decision
- h Command – communicate to others an order or action to be taken where a person has a position of authority

NT

38 CHARACTERISTICS

- a Enunciate clearly, using the proper rate of speech
- b Use technical vocabulary suitable to the task and level of the person
- c Determine the appropriate amount of information to communicate
- d Interpret figurative or idiomatic language by reference to its use in context
- e Follow highly detailed, step by step directions
- f *Solicit feedback to confirm the accurate reception of the communication*
- g Recognize when a low key, informal dialogue is suitable
- h Recognize when direct verbal commands are necessary
- i Recognize when a prescribed series of verbal interactions is required to coordinate a group effort
- j Recognize when the situation will require a structured, preplanned method of presentation

39 BARRIERS

- a Recognize the need for clear, concise directions in order to avoid language or word meaning differences
- b. Recognize personality factors and inter personal relationships that may exist
- c Recognize feedback as a means of communicating more effectively and increasing task competence

SAFETY/SECURITY

40 PRECAUTIONS

- a Use common knowledge to avoid hazards in order to prevent injury to self or equipment
- b Apply preventive measures prior to task performance to minimize any potential safety or security problem
- c. Select an appropriate course of action in the event of an emergency

PERCEPTUAL

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16E HAWK Fire Control Crew Member

BSEP I

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4/23/82

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- a Spell frequently used words correctly
- b Spell task related words correctly
- c Identify words that need to be capitalized
- d Correct all misspelled words with or without the use of a reference source
- e Apply all rules for end marks, commas, and apostrophes
- f Apply common rules of grammar
- g Rewrite the paragraph by stating the main idea in the first sentence, and restructuring the sentences for coherence
- h Appraise an entire written communication and make adjustments to improve clarity

VERBAL COMMUNICATION

37 TYPE

- a Individual – a person working on a task and communicating with another when assistance is needed or when a supervisory decision is needed
- b Instruction – a task activity requiring communication between an instructor, an individual or small group where the purpose is to give facts or rules to inform or guide
- c Tutor – interaction takes place between two persons where one is instructing and the other is doing the task
- d Peer Group (less than 10) – all members engage in an activity where one person assumes a leadership role and communicates to others what is to be done
- e Interview – a person communicating with another about his activities, opinions, or subject expertise for the purpose of using the information in a task
- f Briefing – communicating final instructions to others or giving an account in summary
- g Counsel – communicating together to exchange ideas or opinions to recommend, give or take advice, or to arrive at an acceptance of a plan or decision
- h Command – communicate to others an order or action to be taken where a person has a position of authority

4/23/82

NT

38 CHARACTERISTICS

- a Enunciate clearly using the proper rate of speech
- b Use technical vocabulary suitable to the task and level of the person
- c Determine the appropriate amount of information to communicate
- d Interpret figurative or idiomatic language by reference to its use in context
- e Follow highly detailed, step by step directions
- f Solicit feedback to confirm the accurate reception of the communication
- g Recognize when a low key, informal dialogue is suitable
- h Recognize when direct verbal commands are necessary
- i Recognize when a prescribed series of verbal interactions is required to coordinate a group effort
- j Recognize when the situation will require a structured, preplanned method of presentation

39 BARRIERS

- a Recognize the need for clear, concise directions in order to avoid language or word meaning differences
- b Recognize personality factors and inter personal relationships that may exist
- c Recognize feedback as a means of communicating more effectively and increasing task competence

SAFETY/SECURITY

40 PRECAUTIONS

- a Use common knowledge to avoid hazards in order to prevent injury to self or equipment
- b Apply preventive measures prior to task performance to minimize any potential safety or security problem
- c Select an appropriate course of action in the event of an emergency

PERCEPTUAL

41 RECOGNITION

- a Identify similarities and differences between and among objects
- b Use body language (motions, gestures, postures) to communicate or signal
- c Determine the presence of a defect or extent of damage
- d Match objects by size, shape, color and significant markings
- e Classify objects by size, shape, color and significant markings
- f Determine direction, duration, and intensity of sounds, sightings and smells
- g Infer from sights, sounds, touch, smells, or tastes to determine a course of action

16P ADA Short Range Missile Crewman

BSEP I

NUMERATION/PLACE VALUE

NT

1 NUMBERING AND COUNTING

- a. Match numerals with word names and models
- b. Write numerals one through N in sequential order from any starting point
- c. State what numeral comes after, before, or between any two given numerals
- d. Select the numeral which is greater/lesser from a set of numerals
- e. Identify an object with a specified ordinal position
- f. Write or state the place value of a particular digit, whole or decimal number
- g. Round off a number to a specified place, whole or decimal
- h. Count by ones, twos, fives, tens, etc. backward or forward (skip counting)
- i. Match numbers with points or intervals on a number line (positive (+) or negative (-) values)

UNITS OF MEASUREMENT

2 LINEAR, WEIGHT, AND VOLUME MEASURES

- a. Name the markings on a linear scale
- b. Differentiate units of measure and equivalents in the English and metric system
- c. Use a ruler, yardstick, meter stick or scale to measure lengths of objects or distances
- d. Identify measures of ounce, pound, gram
- e. Identify measures of pints, quarts, gallons, liters
- f. Use a scale which is not numerically calibrated
- g. Estimate measures of varying lengths, dimensions or weights

3 DEGREE MEASURES

- a. Identify degree or mil as a unit in determining direction, distance or temperature
- b. Estimate the measure of a given angle not greater than 180^{0}
- c. Interpret bearings, azimuth and other contexts in which the measure of an angle may range from 0^{0} to 360^{0}/0 to 6400 mils

4 TIME TELLING MEASURES

- a. Use a 24 hour or digital clock to tell time
- b. Name intervals and tell time in hours, minutes, and seconds
- c. Estimate time in seconds, minutes, and parts of an hour
- d. Identify calendar units and arrange them in Julian style
- e. Convert time into hours and tenths of hours
- f. Compute time using Greenwich Mean Time (GMT) as a basis for establishing zones and distances

NT

5 GAUGE MEASURES

- a. Identify the unit of measurement found on an instrument
- b. Interpret the number, word, symbol from a display read out
- c. Recognize a "reading" from a gauge with color divisions
- d. Recognize positive (+) and negative (-) demarcation on a scale
- e. Select hand(s) from a multi-scale gauge
- f. Match a gauge reading to a specification using numbered or labeled intervals
- g. Interpret gauge readings from an unnumbered/unmarked interval
- h. Interpret a gauge reading which is fluctuating or momentarily sustained
- i. Match specifications of required measures by manipulation, alignment or maintenance

VISUAL/SPATIAL RELATIONSHIPS

6 SPATIAL

- a. Identify directions that tools, hardware, or components may be moved
- b. Manipulate objects to align, match, mate, make parallel, be perpendicular or be at an angle
- c. Interpret spatial relationships of figures and objects from 2 dimensional drawings, pictures, or photographs
- d. Relate geometric symbols and graphic representations to actual systems, subsystems and components

GEOMETRY

7 LINES

- a. Identify and name points, lines, rays, and segments
- b. Identify intersecting lines, parallel lines, and line segments
- c. Define and identify perpendicular lines
- d. Identify congruent segments

8 PLANES

- a. Identify and name plane geometric figures
- b. List the characteristics of geometric figures
- c. Classify figures according to the number or measure of its sides or angles
- d. Identify figures which possess similarities
- e. Identify figures which may be parallel, perpendicular or congruent

9 ANGLES AND TRIANGLES

- a. Identify and name the different kinds of angles and triangles, with their corresponding figures
- b. Identify vertical, adjacent, complementary or supplementary angles
- c. Classify triangles according to their sides or angle size
- d. Identify altitudes and medians of triangles or the bisector of an angle
- e. Name an angle by using letters, a number, or a single letter

NT

10 SOLIDS

- a Recognize and match the names of solids with their corresponding figures

11 TERMINOLOGY

- a Identify technical words associated with geometric figures
- b Interpret meaning of terms derived from spatial orientation

COMPUTE OR PERFORM

12 ADDITION AND SUBTRACTION

- a Add or subtract whole numbers, without carrying or borrowing
- b Add or subtract whole numbers, carrying and borrowing
- c Add and subtract, borrowing and carrying with mixed numbers (whole and decimals)
- d Add or subtract positive (+) and negative ( ) numbers, using a number line to arrive at a solution
- e Add or subtract to find correct time (24 hr. clock) using hours or minutes
- f Add or subtract various increments on gauges, dials, or any other measuring instrument
- g Add or subtract time, linear, dry, liquid or degree measures requiring regrouping
- h Estimate a sum or difference

13 MULTIPLICATION AND DIVISION

- a Multiply and divide whole numbers
- b Multiply and divide mixed numbers (whole and decimals)
- c Divide a number with decimals in both divisor and dividend
- d Multiply and divide integers, both positive (+) and negative ( ), and assign proper sign to product or quotient
- e Estimate a product or quotient

14 FRACTIONS/DECIMALS

- a Subdivide whole objects or a set of objects into halves (1/2), thirds (1/3), fourths (1/4), eighths (1/8)
- b. Reduce fractions to lowest terms
- c Convert fractions (proper and improper) to decimal equivalents, and vice versa, using a table, chart or gauge
- d Compute equivalent value of fractions, decimals, percents, and mixed numbers to lowest terms
- e Add and subtract fractions, with same or different denominators
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NT

15 GEOMETRY

- a Draw geometric figures, plane and solid
- b Match geometric figures with word names, equivalent measures
- c Label all parts of geometric figures using mathematical and characteristic designators
- d Use a protractor to measure angles, make geometrical constructions
- e. Construct perpendicular on a line segment, bisector of an angle
- f Compute the perimeter and area of any figure
- g Compute the circumference and area of a circle
- h Compute the area and volume of any solid figure
- i. Use formulas in solving problems involving geometric figures
- j Solve problems and interpret spatial relationships of figures, symbols, and objects from 2 dimensional displays

16. COMBINATION OF PROCESSES

- a. Identify median and mode
- b. Compute averages
- c Solve problems combining all processes using whole, mixed numbers and fractions
- d. Solve problems, combining all processes, involving units of measurement
- e Interpret information from charts, number lines, scales and graphs to solve arithmetic problems
- f. Solve conversion problems of linear (metric and English) liquid, weight, and temperature (F^{O} or C^{O}) measures
- g. Solve problems involving ratio and proportion
- h. Solve word problems where any mathematical process may occur

17. GRAPHING IN THE COORDINATE PLANE

- a. Identify coordinates of a point in any grid system
- b Identify points on a line graph
- c. Match a graph with its equation

18. ALGEBRA

- a. Solve simple algebraic equations with one unknown
- b. Recognize and derive equivalent algebraic expressions
- c. Evaluate powers and estimate roots

19. TRIGONOMETRY

- a. Use tables of trigonometric functions
- b Use tables of logarithms to solve problems
- c. Solve geometric problems using trigonometric functions
- d. Use trigonometric ratios to solve problems

CONTENT READING

NT

25 PROCEDURAL DIRECTIONS

- a Identify factual details or specifications that are found within a statement or written selection
- b Select parts of text and visual materials to complete a task activity
- c Follow highly detailed, step by step directions in order to accomplish a sequence of task activities
- d Determine the essential message of a paragraph or section of written material
- e Infer from a written source, which does not explicitly provide required information, in order to make a decision
- f Synthesize information from written sources which contributes to the completion of a task activity

26 VOCABULARY

- a Recognize common words and their meanings
- b Recognize task related words with technical meanings
- c Identify the correct meaning of a word from the context of a sentence
- d Recognize the meaning of common contractions, abbreviations and acronyms
- e Determine the meaning of figurative, idiomatic, and technical terms by using context clues or by using a reference source(s)

INFORMATION ACCESS

27 REFERENCE SKILLS

- a Locate a Technical Manual, Field Manual or any related source document by code number and title
- b Alphabetize words or topics to locate information
- c Use the table of contents, index, system or sub system heading, appendix and glossary to locate information
- d Locate the page, title, paragraph, figure, or chart needed to answer a question or to solve a problem
- e Determine, after scanning or skim reading, whether the information is relevant
- f Cross reference within and across source documents to select information needed to perform a routine
- g Organize information from multiple sources into a sequenced series of events

28 TABLES/CHARTS

- a Obtain a fact or specification from a two column table or chart to find information
- b Obtain a fact or specification from an intersection of a row by column table or chart
- c Use a complex table or chart requiring cross referencing within or in combination with text material outside the chart
- d Apply information from tables and charts for locating malfunctions or for selecting a course of action

VISUAL AIDS

NT

29 ILLUSTRATIONS

- a Identify details, labels, numbers, and parts from an illustration or picture
- b Identify parts or details according to a key or legend
- c Interpret a drawing which shows a cross sectional view of an object for assembly, disassembly
- d Interpret a three dimensional projection or exploded view of object(s) for assembly, disassembly, or position in system or sub system
- e Follow illustrations, or photographs, arranged in a sequential order, as a guide
- f Integrate information from various sources to select a course of action

30 FLOW CHARTS

- a Use a simple linear path of an organizational chart to list events in sequential order
- b Use a linear path of a flow chart to provide visual and textual directions to a procedure, to arrive at decision points, and to provide alternate paths in problem solving
- c Translate the significance of the symbols into physical activities

31 SCHEMATICS

- a Isolate each major section or entity presented in a schematic diagram
- b Identify the components within each entity
- c Trace connections in an integrated circuit from their origin to another point within or from one entity to another
- d Isolate a problem component in a schematic and trace it to components believed to cause the problem
- e Interpret symbols to indicate direction of flow, test points, components and diagrammatic decision points

WRITTEN COMMUNICATION

32 FORMS

- a Locate the block on a form to enter the appropriate information
- b Transfer a number, code, date, figure or related data from equipment or written sources onto an appropriate section of the form
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33 NOTE TAKING

- a Distinguish between essential and non essential details during the note taking process
- b Record details without misinterpreting the intent of either written material or an interview
- c Rewrite all recorded details in sentence form
- d Organize all sentences into paragraphs

NT

34 OUTLINING (topic or sentence)

- a Distinguish between major and subordinate topics
- b Generate titles for each major topic selected
- c Use phrases or sentences to provide subordinate details under each major topic
- d Alternate indent numbers and letters to establish a hierarchy

35 REPORT WRITING

- a State the intent or objective(s) of the report
- b Describe the parameters of the event or situation
- c Distinguish between relevant and irrelevant details
- d Sequence events in the order they have occurred
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17B Field Artillery Radar Crew Member

BSEP I

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NT

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- g. Add or subtract time, linear, dry, liquid or degree measures requiring regrouping
- h. *Estimate a sum or difference*

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- a. Multiply and divide whole numbers
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NT

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- a Distinguish between essential and non-essential details during the note-taking process
- b Record details without misinterpreting the intent of either written material or an interview
- c Rewrite all recorded details in sentence form
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NT

34 [illegible]

- a Distinguish between major and subordinate topics
- b Generate titles for each major topic selected
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35 REPORT WRITING

- a State the intent or objective(s) of the report
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- f Briefing – communicating final instructions to others or giving an account in summary
- g Counsel – communicating together to exchange ideas or opinions to recommend, give or take advice, or to arrive at an acceptance of a plan or decision
- h Command – communicate to others an order or action to be taken where a person has a position of authority

[illegible]

NT

38 CHARACTERISTICS

- a Enunciate clearly, using the proper rate of speech
- b Use technical vocabulary suitable to the task and level of the person
- c Determine the appropriate amount of information to communicate
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- e Follow highly detailed, step by step directions
- f Solicit feedback to confirm the accurate reception of the communication
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- a Recognize the need for clear, concise directions in order to avoid language or word meaning differences
- b Recognize personality factors and inter personal relationships that may exist
- c Recognize feedback as a means of communicating more effectively and increasing task competence

SAFETY/SECURITY

40 PRECAUTIONS

- a. Use common knowledge to avoid hazards in order to prevent injury to self or equipment
- b. Apply preventive measures prior to task performance to minimize any potential safety or security problem
- c. Select an appropriate course of action in the event of an emergency

PERCEPTUAL

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- a Identify similarities and differences between and among objects
- b. Use body language (motions, gestures, postures) to communicate or signal
- c. Determine the presence of a defect or extent of damage
- d Match objects by size, shape, color and significant markings
- e Classify objects by size, shape, color and significant markings
- f Determine direction, duration, and intensity of sounds, sightings and smells
- g Infer from sights, sounds, touch, smells, or tastes to determine a course of action

17C Field Artillery Target Acquisition Specialist

BSEP I

NUMERATION/PLACE VALUE

NT

1 NUMBERING AND COUNTING

- a Match numerals with word names and models
- b Write numerals one through N in sequential order from any starting point
- c State what numeral comes after, before, or between any two given numerals
- d Select the numeral which is greater/lesser from a set of numerals
- e Identify an object with a specified ordinal position
- f Write or state the place value of a particular digit, whole or decimal number
- g Round off a number to a specified place, whole or decimal
- h Count by ones, twos, fives, tens, etc. backward or forward (skip counting)
- i Match numbers with points or intervals on a number line (positive (+) or negative (-) values)

UNITS OF MEASUREMENT

2 LINEAR, WEIGHT, AND VOLUME MEASURES

- a Name the markings on a linear scale
- b Differentiate units of measure and equivalents in the English and metric system
- c Use a ruler, yardstick, meter stick or scale to measure lengths of objects or distances
- d Identify measures of ounce, pound, gram
- e Identify measures of pints, quarts, gallons, liters
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- a Identify degree or mil as a unit in determining direction, distance or temperature
- b Estimate the measure of a given angle not greater than 180°
- c Interpret bearings, azimuth and other contexts in which the measure of an angle may range from 0° to 360°/0 to 6400 mils

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- a Use a 24 hour or digital clock to tell time
- b Name intervals and tell time in hours, minutes, and seconds
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- a Identify the unit of measurement found on an instrument
- b Interpret the number, word, symbol from a display read out
- c Recognize a "reading" from a gauge with color divisions
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- a Identify directions that tools, hardware, or components may be moved
- b Manipulate objects to align, match, mate, make parallel, be perpendicular or be at an angle
- c Interpret spatial relationships of figures and objects from 2 dimensional drawings, pictures, or photographs
- d Relate geometric symbols and graphic representations to actual systems, subsystems and components

GEOMETRY

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- a Identify and name points, lines, rays, and segments
- b Identify intersecting lines, parallel lines, and line segments
- c Define and identify perpendicular lines
- d Identify congruent segments

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- a Identify and name plane geometric figures
- b List the characteristics of geometric figures
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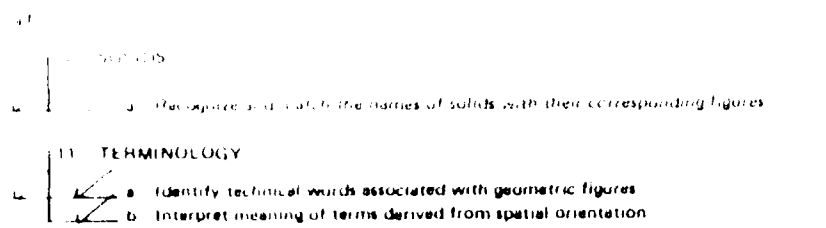
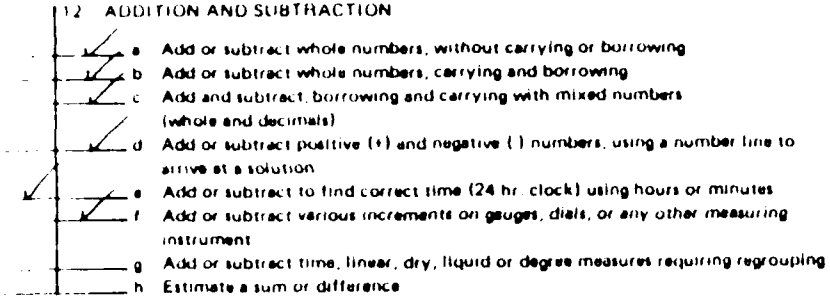
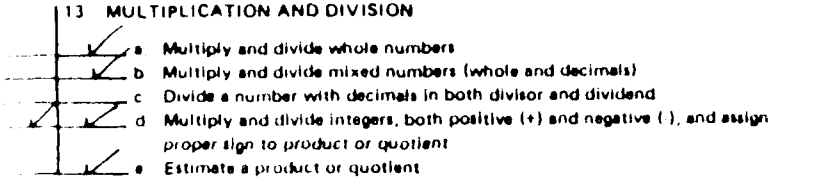
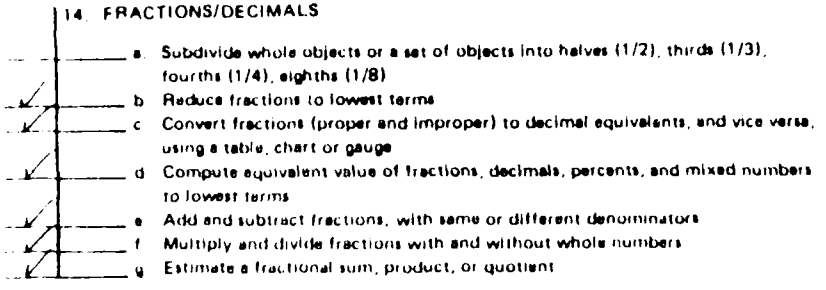
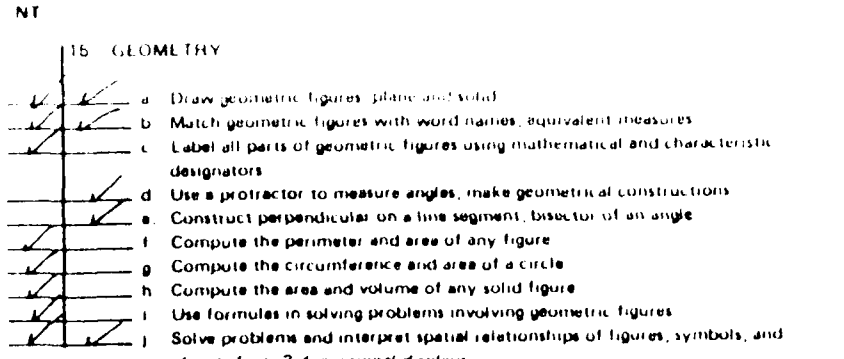


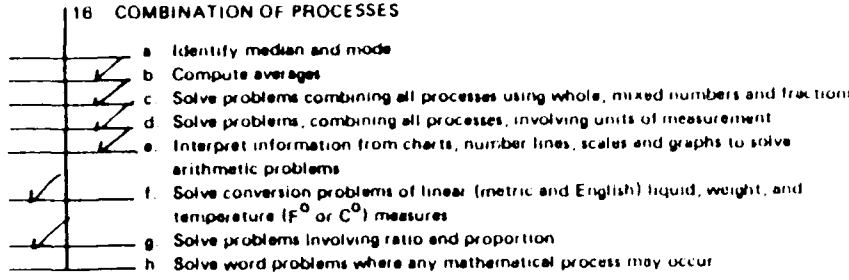
COMPUTE OR PERFORM

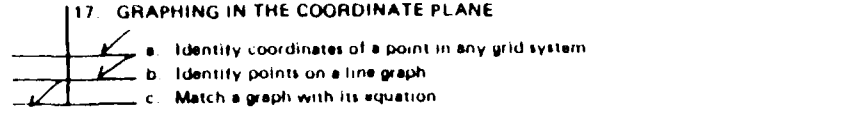


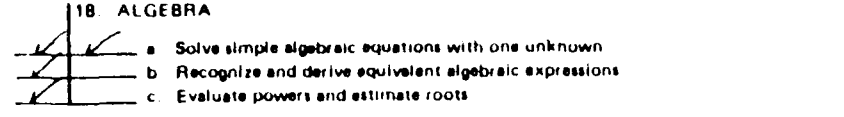


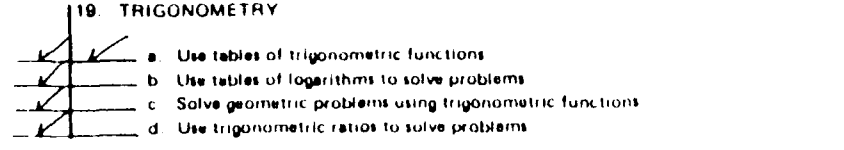












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NT

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- a. Identify factual details or specifications that are found within a statement or written selection
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- f. Synthesize information from written sources which contributes to the completion of a task activity

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- a. Recognize common words and their meanings
- b. Recognize task related words with technical meanings
- c. Identify the correct meaning of a word from the context of a sentence
- d. Recognize the meaning of common contractions, abbreviations and acronyms
- e. Determine the meaning of figurative, idiomatic, and technical terms by using context clues or by using a reference source(s)

INFORMATION ACCESS

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- a. Locate a Technical Manual, Field Manual or any related source document by code number and title
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VISUAL AIDS

NT

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- a. Identify details, labels, numbers, and parts from an illustration or picture
- b. Identify parts or details according to a key or legend
- c. Interpret a drawing which shows a cross sectional view of an object for assembly, disassembly
- d. Interpret a three dimensional projection or exploded view of object(s) for assembly, disassembly, or position in system or sub system
- e. Follow illustrations, or photographs, arranged in a sequential order, as a guide
- f. Integrate information from various sources to select a course of action

30 FLOW CHARTS

- a. Use a simple linear path of an organizational chart to list events in sequential order
- b. Use a linear path of a flow chart to provide visual and textual directions to a procedure, to arrive at decision points, and to provide alternate paths in problem solving
- c. Translate the significance of the symbols into physical activities

31 SCHEMATICS

- a. Isolate each major section or entity presented in a schematic diagram
- b. Identify the components within each entity
- c. Trace connections in an integrated circuit from their origin to another point within or from one entity to another
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WRITTEN COMMUNICATION

32 FORMS

- a. Locate the block on a form to enter the appropriate information
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- a. Distinguish between essential and non essential details during the note taking process
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34 OUTLINING (topic or content)

- a Distinguish between major and subordinate topics
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- g Rewrite the paragraph by stating the main idea in the first sentence, and restructuring the sentences for coherence
- h Appraise an entire written communication and make adjustments to improve clarity

VERBAL COMMUNICATION

37 TYPE

- a Individual – a person working on a task and communicating with another when assistance is needed or when a supervisory decision is needed
- b Instruction – a task activity requiring communication between an instructor, an individual or small group where the purpose is to give facts or rules to inform or guide
- c Tutor – interaction takes place between two persons where one is instructing and the other is doing the task
- d Peer Group (less than 10) – all members engage in an activity where one person assumes a leadership role and communicates to others what is to be done
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4/23/82

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17K Ground Serveillance Radar Crewman

BSEP I

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NT

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- e. Name an angle by using letters, a number, or a single letter

NT

10 SOLIDS

- a Recognize and match the names of solids with their corresponding figures

11 TERMINOLOGY

- a Identify technical words associated with geometric figures
- b Interpret meaning of terms derived from spatial orientation

COMPUTE OR PERFORM

12 ADDITION AND SUBTRACTION

- a Add or subtract whole numbers, without carrying or borrowing
- b Add or subtract whole numbers, carrying and borrowing
- c Add and subtract, borrowing and carrying with mixed numbers (whole and decimals)
- d Add or subtract positive (+) and negative ( ) numbers, using a number line to arrive at a solution
- e Add or subtract to find correct time (24 hr. clock) using hours or minutes
- f Add or subtract various increments on gauges, dials, or any other measuring instrument
- g Add or subtract time, linear, dry, liquid or degree measures requiring regrouping
- h Estimate a sum or difference

13 MULTIPLICATION AND DIVISION

- a Multiply and divide whole numbers
- b Multiply and divide mixed numbers (whole and decimals)
- c Divide a number with decimals in both divisor and dividend
- d Multiply and divide integers, both positive (+) and negative ( ), and assign proper sign to product or quotient
- e Estimate a product or quotient

14 FRACTIONS/DECIMALS

- a Subdivide whole objects or a set of objects into halves (1/2), thirds (1/3), fourths (1/4), eighths (1/8)
- b Reduce fractions to lowest terms
- c Convert fractions (proper and improper) to decimal equivalents, and vice versa, using a table, chart or gauge
- d Compute equivalent value of fractions, decimals, percents, and mixed numbers to lowest terms
- e Add and subtract fractions, with same or different denominators
- f Multiply and divide fractions with and without whole numbers
- g Estimate a fractional sum, product, or quotient

NT

15 GEOMETRY

- a Draw geometric figures, plane and solid
- b Match geometric figures with word names, equivalent measures
- c Label all parts of geometric figures using mathematical and characteristic designators
- d Use a protractor to measure angles, make geometrical constructions
- e Construct perpendicular on a line segment, bisector of an angle
- f Compute the perimeter and area of any figure
- g Compute the circumference and area of a circle
- h Compute the area and volume of any solid figure
- i Use formulas in solving problems involving geometric figures
- j Solve problems and interpret spatial relationships of figures, symbols, and objects from 2 dimensional displays

16. COMBINATION OF PROCESSES

- a. Identify median and mode
- b. Compute averages
- c Solve problems combining all processes using whole, mixed numbers and fractions
- d Solve problems, combining all processes, involving units of measurement
- e. Interpret information from charts, number lines, scales and graphs to solve arithmetic problems
- f. Solve conversion problems of linear (metric and English) liquid, weight, and temperature (F^{O} or C^{O}) measures
- g. Solve problems involving ratio and proportion
- h. Solve word problems where any mathematical process may occur

17. GRAPHING IN THE COORDINATE PLANE

- a. Identify coordinates of a point in any grid system
- b. Identify points on a line graph
- c. Match a graph with its equation

18. ALGEBRA

- a. Solve simple algebraic equations with one unknown
- b. Recognize and derive equivalent algebraic expressions
- c. Evaluate powers and estimate roots

19. TRIGONOMETRY

- a. Use tables of trigonometric functions
- b Use tables of logarithms to solve problems
- c. Solve geometric problems using trigonometric functions
- d. Use trigonometric ratios to solve problems

CONTENT READING

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VERBAL COMMUNICATION

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- a Individual – a person working on a task and communicating with another when assistance is needed or when a supervisory decision is needed
- b Instruction – a task activity requiring communication between an instructor, an individual or small group where the purpose is to give facts or rules to inform or guide
- c Tutor – interaction takes place between two persons where one is instructing and the other is doing the task
- d Peer Group (less than 10) – all members engage in an activity where one person assumes a leadership role and communicates to others what is to be done
- e Interview – a person communicating with another about his activities, opinions, or subject expertise for the purpose of using the information in a task
- f Briefing – communicating final instructions to others or giving an account in summary
- g Counsel – communicating together to exchange ideas or opinions to recommend, give or take advice, or to arrive at an acceptance of a plan or decision
- h Command – communicate to others an order or action to be taken where a person has a position of authority

4/23/82

NT

38 CHARACTERISTICS

- a Enunciate clearly, using the proper rate of speech
- b Use technical vocabulary suitable to the task and level of the person
- c Determine the appropriate amount of information to communicate
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- f Solicit feedback to confirm the accurate reception of the communication
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- a Recognize the need for clear, concise directions in order to avoid language or word meaning differences
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- c Recognize feedback as a means of communicating more effectively and increasing task competence

SAFETY/SECURITY

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- a Use common knowledge to avoid hazards in order to prevent injury to self or equipment
- b Apply preventive measures prior to task performance to minimize any potential safety or security problem
- c Select an appropriate course of action in the event of an emergency

PERCEPTUAL

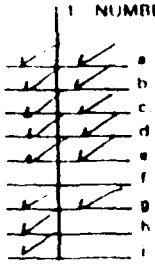
41 RECOGNITION

- a Identify similarities and differences between and among objects
- b Use body language (motions, gestures, postures) to communicate or signal
- c Determine the presence of a defect or extent of damage
- d Match objects by size, shape, color and significant markings
- e Classify objects by size, shape, color and significant markings
- f Determine direction, duration, and intensity of sounds, sightings and smells
- g Infer from sights, sounds, touch, smells, or tastes to determine a course of action
- h Interpret Codes or Symbols

NUMERATION/PLACE VALUE

NT

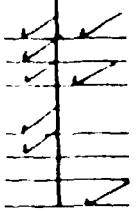
1 NUMBERING AND COUNTING



a Match numerals with word names and models
b Write numerals one through N in sequential order from any starting point
c State what numeral comes after, before, or between any two given numerals
d Select the numeral which is greater/lesser from a set of numerals
e Identify an object with a specified ordinal position
f Write or state the place value of a particular digit, whole or decimal number
g Round off a number to a specified place, whole or decimal
h Count by ones, twos, fives, tens, etc. backward or forward (skip counting)
i Match numbers with points or intervals on a number line (positive (+) or negative ( ) values)

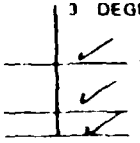
UNITS OF MEASUREMENT

2 LINEAR, WEIGHT, AND VOLUME MEASURES



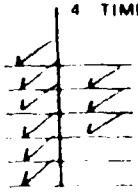
a Name the markings on a linear scale
b Differentiate units of measure and equivalents in the English and metric system
c Use a ruler, yardstick, meter stick or scale to measure lengths of objects or distances
d Identify measures of ounce, pound, gram
e Identify measures of pints, quarts, gallons, liters
f Use a scale which is not numerically calibrated
g Estimate measures of varying lengths, dimensions or weights

3 DEGREE MEASURES



a Identify degree or mil as a unit in determining direction, distance or temperature
b Estimate the measure of a given angle not greater than 180^{o}
c Interpret bearings, azimuth and other contexts in which the measure of an angle may range from 0^{o} to 360^{o}/0 to 6400 mils

4 TIME TELLING MEASURES



a Use a 24 hour or digital clock to tell time
b Name intervals and tell time in hours, minutes, and seconds
c Estimate time in seconds, minutes, and parts of an hour
d Identify calendar units and arrange them in Julian style
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NT

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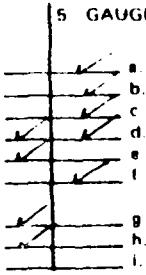

a. Identify the unit of measurement found on an instrument
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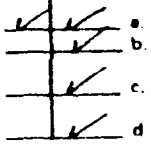
VISUAL/SPATIAL RELATIONSHIPS

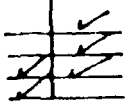
6. SPATIAL



a. Identify directions that tools, hardware, or components may be moved
b. Manipulate objects to align, match, mate, make parallel, be perpendicular or be at an angle
c. Interpret spatial relationships of figures and objects from 2-dimensional drawings, pictures, or photographs
d Relate geometric symbols and graphic representations to actual systems, subsystems and components

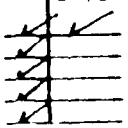
GEOMETRY

7 LINES



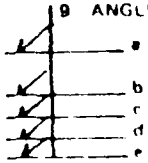
a Identify and name points, lines, rays, and segments
b Identify intersecting lines, parallel lines, and line segments
c Define and identify perpendicular lines
d Identify congruent segments

8 PLANES



a Identify and name plane geometric figures
b List the characteristics of geometric figures
c Classify figures according to the number or measure of its sides or angles
d Identify figures which possess similarities
e. Identify figures which may be parallel, perpendicular or congruent

9 ANGLES AND TRIANGLES



a Identify and name the different kinds of angles and triangles, with their corresponding figures
b Identify vertical, adjacent, complementary or supplementary angles
c Classify triangles according to their sides or angle size
d Identify altitudes and medians of triangles or the bisector of an angle
e Name an angle by using letters, a number or a single letter

NT

10 SOLIDS

- a Recognize and match the names of solids with their corresponding figures

11 TERMINOLOGY

- a Identify technical words associated with geometric figures
- b Interpret meaning of terms derived from spatial orientation

COMPUTE OR PERFORM

12 ADDITION AND SUBTRACTION

- a Add or subtract whole numbers, without carrying or borrowing
- b Add or subtract whole numbers, carrying and borrowing
- c Add and subtract, borrowing and carrying with mixed numbers (whole and decimals)
- d Add or subtract positive (+) and negative (-) numbers, using a number line to arrive at a solution
- e Add or subtract to find correct time (24 hr. clock) using hours or minutes
- f Add or subtract various increments on gauges, dials, or any other measuring instrument
- g Add or subtract time, linear, dry, liquid or degree measures requiring regrouping
- h Estimate a sum or difference

13 MULTIPLICATION AND DIVISION

- a Multiply and divide whole numbers
- b Multiply and divide mixed numbers (whole and decimals)
- c Divide a number with decimals in both divisor and dividend
- d Multiply and divide integers, both positive (+) and negative (-), and assign proper sign to product or quotient
- e Estimate a product or quotient

14 FRACTIONS/DECIMALS

- a Subdivide whole objects or a set of objects into halves (1/2), thirds (1/3), fourths (1/4), eighths (1/8)
- b Reduce fractions to lowest terms
- c Convert fractions (proper and improper) to decimal equivalents, and vice versa, *using a table, chart or gauge*
- d Compute equivalent value of fractions, decimals, percents, and mixed numbers to lowest terms
- e Add and subtract fractions, with same or different denominators
- f Multiply and divide fractions with and without whole numbers
- g Estimate a fractional sum, product, or quotient

NT

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- b Match geometric figures with word names, equivalent measures
- c Label all parts of geometric figures using mathematical and characteristic designators
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- i Use formulas in solving problems involving geometric figures
- j Solve problems and interpret spatial relationships of figures, symbols, and objects from 2-dimensional displays

16. COMBINATION OF PROCESSES

- a. Identify median and mode
- b Compute averages
- c Solve problems combining all processes using whole, mixed numbers and fractions
- d. Solve problems, combining all processes, involving units of measurement
- e Interpret information from charts, number lines, scales and graphs to solve arithmetic problems
- f. Solve conversion problems of linear (metric and English) liquid, weight, and temperature (F^{O} or C^{O}) measures
- g. Solve problems involving ratio and proportion
- h. Solve word problems where any mathematical process may occur

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- a. Identify coordinates of a point in any grid system
- b Identify points on a line graph
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- a Solve simple algebraic equations with one unknown
- b Recognize and derive equivalent algebraic expressions
- c. Evaluate powers and estimate roots

19. TRIGONOMETRY

- a Use tables of trigonometric functions
- b. Use tables of logarithms to solve problems
- c. Solve geometric problems using trigonometric functions
- d Use trigonometric ratios to solve problems

CONTENT READING

NT

25 PROCEDURAL DIRECTIONS

- a Identify factual details or specifications that are found within a statement or written selection
- b Select parts of text and visual materials to complete a task activity
- c Follow highly detailed, step by step directions in order to accomplish a sequence of task activities
- d Determine the essential message of a paragraph or section of written material
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- f Synthesize information from written sources which contributes to the completion of a task activity

26 VOCABULARY

- a Recognize common words and their meanings
- b Recognize task related words with technical meanings
- c Identify the correct meaning of a word from the context of a sentence
- d Recognize the meaning of common contractions, abbreviations and acronyms
- e Determine the meaning of figurative, idiomatic, and technical terms by *using context clues or by using a reference source(s)*

INFORMATION ACCESS

27 REFERENCE SKILLS

- a Locate a Technical Manual, Field Manual or any related source document by code number and title
- b Alphabetize words or topics to locate information
- c Use the table of contents, index, system or sub system heading, appendix and glossary to locate information
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- f Cross reference within and across source documents to select information needed to perform a routine
- g Organize information from multiple sources into a sequenced series of events

28 TABLES/CHARTS

- a Obtain a fact or specification from a two column table or chart to find information
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- c Use a complex table or chart requiring cross referencing within or in combination with text material outside the chart
- d Apply information from tables and charts for locating malfunctions, or for selecting a course of action

VISUAL AIDS

NT

29 ILLUSTRATIONS

- a *Identify details, labels, numbers, and parts from an illustration or picture*
- b Identify parts or details according to a key or legend
- c Interpret a drawing which shows a cross sectional view of an object for assembly, disassembly
- d Interpret a three dimensional projection or exploded view of object(s) for assembly, disassembly, or position in system or sub system
- e Follow illustrations, or photographs, arranged in a sequential order, as a guide
- f Integrate information from various sources to select a course of action

30 FLOW CHARTS

- a Use a simple linear path of an organizational chart to list events in sequential order
- b Use a linear path of a flow chart to provide visual and textual directions to a procedure, to arrive at decision points, and to provide alternate paths in problem solving
- c Translate the significance of the symbols into physical activities

31 SCHEMATICS

- a *Isolate each major section or entity presented* in a schematic diagram
- b Identify the components within each entity
- c Trace connections in an integrated circuit from their origin to another point within or from one entity to another
- d Isolate a problem component in a schematic and trace it to components believed to cause the problem
- e Interpret symbols to indicate direction of flow, test points, components and diagrammatic decision points

WRITTEN COMMUNICATION

32 FORMS

- a Locate the block on a form to enter the appropriate information
- b Transfer a number, code, date, figure or related data from equipment or written sources onto an appropriate section of the form
- c Write the name of the organization, responsible personnel, disposition of the part or equipment, and nomenclature, in appropriate sections of the form
- d Write a descriptive account of an activity or transaction performed
- e Use a completed form to locate or compare information

33 NOTE TAKING

- a Distinguish between essential and non-essential details during the note taking process
- b Record details without misinterpreting the intent of either written material or an interview
- c Rewrite all recorded details in sentence form
- d Organize all sentences into paragraphs

NT

34 OUTLINING (topic or sentence)

- a Distinguish between major and subordinate topics
- b Generate titles for each major topic selected
- c Use phrases or sentences to provide subordinate details under each major topic
- d Alternate, indent numbers and letters to establish a hierarchy

35 REPORT WRITING

- a State the intent or objective(s) of the report
- b *Describe the parameters of the event or situation*
- c Distinguish between relevant and irrelevant details
- d Sequence events in the order they have occurred
- e State general impressions of events described
- f Select examples that will clarify major issues presented in the report
- g Examine opposing points of view in the report
- h Summarize the major points developed in the report
- i Justify an action taken and give reasons for rejecting alternatives

36 EDITING

- a Spell frequently used words correctly
- b Spell task related words correctly
- c Identify words that need to be capitalized
- d Correct all misspelled words with or without the use of a reference source
- e Apply all rules for end marks, commas, and apostrophes
- f *Apply common rules of grammar*
- g Rewrite the paragraph by stating the main idea in the first sentence, and restructuring the sentences for coherence
- h Appraise an entire written communication and make adjustments to improve clarity

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19E M48-M60A1/A3 Armor Crewman

BSEP 1

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NT

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- b Obtain a fact or specification from an intersection of a row by column table or chart
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4-2 (18)

VISUAL AIDS

NT

29 ILLUSTRATIONS

- a Identify details, labels, numbers, and parts from an illustration or picture
- b Identify parts or details according to a key or legend
- c Interpret a drawing which shows a cross sectional view of an object for assembly, disassembly
- d Interpret a three dimensional projection or exploded view of object(s) for assembly, disassembly, or position in system or sub system
- e Follow illustrations, or photographs, arranged in a sequential order, as a guide
- f Integrate information from various sources to select a course of action

30 FLOW CHARTS

- a Use a simple linear path of an organizational chart to list events in sequential order
- b Use a linear path of a flow chart to provide visual and textual directions to a procedure, to arrive at decision points, and to provide alternate paths in problem solving
- c Translate the significance of the symbols into physical activities

31 SCHEMATICS

- a Isolate each major section or entity presented in a schematic diagram
- b Identify the components within each entity
- c Trace connections in an integrated circuit from their origin to another point within or from one entity to another
- d Isolate a problem component in a schematic and trace it to components believed to cause the problem
- e Interpret symbols to indicate direction of flow, test points, components and diagrammatic decision points

WRITTEN COMMUNICATION

32 FORMS

- a Locate the block on a form to enter the appropriate information
- b Transfer a number, code, date, figure or related data from equipment or written sources onto an appropriate section of the form
- c Write the name of the organization, responsible personnel, disposition of the part or equipment, and nomenclature, in appropriate sections of the form
- d Write a descriptive account of an activity or transaction performed
- e Use a completed form to locate or compare information

33 NOTE TAKING

- a Distinguish between essential and non-essential details during the note taking process
- b Record details without misinterpreting the intent of either written material or an interview
- c Rewrite all recorded details in sentence form
- d Organize all sentences into paragraphs

NT

34 OUTLINING (topic or word level)

- a Distinguish between major and subordinate topics
- b Generate topics for each major topic selected
- c Use phrases or sentences to provide subordinate details under each major topic
- d Alternate, order: numbers and letters to establish a hierarchy

35 REPORT WRITING

- a State the intent or objective(s) of the report
- b Describe the parameters of the event or situation
- c Distinguish *between relevant and irrelevant details*
- d Sequence events in the order they have occurred
- e State general impressions of events described
- f Select examples that will clarify major issues presented in the report
- g Examine opposing points of view in the report
- h Summarize the major points developed in the report
- i Justify an action taken and give reasons for rejecting alternatives

36 EDITING

- a Spell frequently used words correctly
- b Spell task related words correctly
- c Identify words that need to be capitalized
- d Correct all misspelled words with or without the use of a reference source
- e Apply all rules for end marks, commas, and apostrophes
- f Apply common rules of grammar
- g Rewrite the paragraph by stating the main idea in the first sentence, and restructuring the sentences for coherence
- h Appraise an entire written communication and make adjustments to improve clarity

VERBAL COMMUNICATION

37 TYPE

- a Individual – a person working on a task and communicating with another when assistance is needed or when a supervisory decision is needed
- b Instruction – a task activity requiring communication between an instructor, an individual or small group where the purpose is to give facts or rules to inform or guide
- c Tutor – interaction takes place between two persons where one is instructing and the other is doing the task
- d Peer Group (less than 10) – all members engage in an activity where one person assumes a leadership role and communicates to others what is to be done
- e Interview – a person communicating with another about his activities, opinions, or subject expertise for the purpose of using the information in a task
- f Briefing – communicating final instructions to others or giving an account in summary
- g Counsel – communicating together to exchange ideas or opinions to recommend, give or take advice, or to arrive at an acceptance of a plan or decision
- h Command – communicate to others an order or action to be taken where a person has a position of authority

4/23/82

NT

38 CHARACTERISTICS

- a Enunciate clearly, using the proper rate of speech
- b Use technical vocabulary suitable to the task and level of the person
- c *Determine the appropriate amount of information to communicate*
- d Interpret figurative or idiomatic language by reference to its use in context
- e Follow highly detailed, step by step directions
- f Solicit feedback to confirm the accurate reception of the communication
- g Recognize when a low key, informal dialogue is suitable
- h Recognize when direct verbal commands are necessary
- i Recognize when a prescribed series of verbal interactions is required to coordinate a group effort
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39 BARRIERS

- a Recognize the need for clear, concise directions in order to avoid language or word meaning differences
- b Recognize personality factors and inter personal relationships that may exist
- c *Recognize feedback as a means of communicating more effectively and* increasing task competence

SAFETY/SECURITY

40 PRECAUTIONS

- a Use common knowledge to avoid hazards in order to prevent injury to self or equipment
- b Apply preventive measures prior to task performance to minimize any potential safety or security problem
- c Select an appropriate course of action in the event of an emergency

PERCEPTUAL

41 RECOGNITION

- a Identify similarities and differences between and among objects
- b Use body language (motions, gestures, postures) to communicate or signal
- c Determine the presence of a defect or extent of damage
- d Match objects by size, shape, color and significant markings
- e Classify objects by size, shape, color and significant markings
- f Determine direction, duration, and intensity of sounds, sightings and smells
- g Infer from sights, sounds, touch, smells, or tastes to determine a course of action
- h. Interpret codes or Symbols

24C Improved HAWK Firing Section Mechanic

BSEP I

NUMERATION/PLACE VALUE

NT

1. NUMBERING AND COUNTING

- a. Match numerals with word names and models
- b. Write numerals one through N in sequential order from any starting point
- c. State what numeral comes after, before, or between any two given numerals
- d. Select the numeral which is greater/lesser from a set of numerals
- e. Identify an object with a specified ordinal position
- f. Write or state the place value of a particular digit, whole or decimal number
- g. Round off a number to a specified place, whole or decimal
- h. Count by ones, twos, fives, tens, etc. backward or forward (skip counting)
- i. Match numbers with points or intervals on a number line (positive (+) or negative (-) values)

UNITS OF MEASUREMENT

2. LINEAR, WEIGHT, AND VOLUME MEASURES

- a. Name the markings on a linear scale
- b. Differentiate units of measure and equivalents in the English and metric system
- c. Use a ruler, yardstick, meter stick or scale to measure lengths of objects or distances
- d. Identify measures of ounce, pound, gram
- e. Identify measures of pints, quarts, gallons, liters
- f. Use a scale which is not numerically calibrated
- g. Estimate measures of varying lengths, dimensions or weights

3. DEGREE MEASURES

- a. Identify degree or mil as a unit in determining direction, distance or temperature
- b. Estimate the measure of a given angle not greater than 180°
- c. Interpret bearings, azimuth and other contexts in which the measure of an angle may range from 0° to 360°/0 to 6400 mils

4. TIME TELLING MEASURES

- a. Use a 24 hour or digital clock to tell time
- b. Name intervals and tell time in hours, minutes, and seconds
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- e. Convert time into hours and tenths of hours
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NT

5. GAUGE MEASURES

- a. Identify the unit of measurement found on an instrument
- b. Interpret the number, word, symbol from a display read out
- c. Recognize a "reading" from a gauge with color divisions
- d. Recognize positive (+) and negative (-) demarcation on a scale
- e. Select band(s) from a multi-scale gauge
- f. Match a gauge reading to a specification using numbered or labeled intervals
- g. Interpret gauge readings from an unnumbered/unmarked interval
- h. Interpret a gauge reading which is fluctuating or momentarily sustained
- i. Match specifications of required measures by manipulation, alignment or maintenance

VISUAL/SPATIAL RELATIONSHIPS

6. SPATIAL

- a. Identify directions that tools, hardware, or components may be moved
- b. Manipulate objects to align, match, mate, make parallel, be perpendicular or be at an angle
- c. Interpret spatial relationships of figures and objects from 2-dimensional drawings, pictures, or photographs
- d. Relate geometric symbols and graphic representations to actual systems, subsystems and components

GEOMETRY

7. LINES

- a. Identify and name points, lines, rays, and segments
- b. Identify intersecting lines, parallel lines, and line segments
- c. Define and identify perpendicular lines
- d. Identify congruent segments

8. PLANES

- a. Identify and name plane geometric figures
- b. List the characteristics of geometric figures
- c. Classify figures according to the number or measure of its sides or angles
- d. Identify figures which possess similarities
- e. Identify figures which may be parallel, perpendicular or congruent

9. ANGLES AND TRIANGLES

- a. Identify and name the different kinds of angles and triangles, with their corresponding figures
- b. Identify vertical, adjacent, complementary or supplementary angles
- c. Classify triangles according to their sides or angle size
- d. Identify altitudes and medians of triangles or the bisector of an angle
- e. Name an angle by using letters, a number, or a single letter

NT

11 SOLIDS

a Recognize and match models of solids with their corresponding figures

12 TERMINOLOGY

a Identify technical words associated with geometric figures

b Interpret the meaning of terms derived from spatial orientation

COMPUTE OR PERFORM

12 ADDITION AND SUBTRACTION

a Add or subtract whole numbers, without carrying or borrowing

b Add or subtract whole numbers, carrying and borrowing

c Add and subtract, borrowing and carrying with mixed numbers (whole and decimals)

d Add or subtract positive (+) and negative (-) numbers, using a number line to arrive at a solution

e Add or subtract to find correct time (24 hr. clock) using hours or minutes

f Add or subtract various increments on gauges, dials, or any other measuring instrument

g Add or subtract time, linear, dry, liquid or degree measures requiring regrouping

h Estimate a sum or difference

13 MULTIPLICATION AND DIVISION

a Multiply and divide whole numbers

b Multiply and divide mixed numbers (whole and decimals)

c Divide a number with decimals in both divisor and dividend

d Multiply and divide integers, both positive (+) and negative (-), and assign proper sign to product or quotient

e Estimate a product or quotient

14 FRACTIONS, DECIMALS

a Subdivide whole objects or a set of objects into halves (1/2), thirds (1/3), fourths (1/4), eighths (1/8)

b Reduce fractions to lowest terms

c Convert fractions (proper and improper) to decimal equivalents, and vice versa, using a table, chart or gauge

d Compute equivalent value of fractions, decimals, percents, and mixed numbers to lowest terms

e Add and subtract fractions, with same or different denominators

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NT

15 GEOMETRY

a Draw geometric figures, plane and solid

b Match geometric figures with word names, equivalent measures

c Label all parts of geometric figures using mathematical and characteristic designators

d Use a protractor to measure angles, make geometrical constructions

e Construct perpendicular on a line segment, bisector of an angle

f Compute the perimeter and area of any figure

g Compute the circumference and area of a circle

h Compute the area and volume of any solid figure

i Use formulas in solving problems involving geometric figures

j Solve problems and interpret spatial relationships of figures, symbols, and objects from 2 dimensional displays

16 COMBINATION OF PROCESSES

a Identify median and mode

b Compute averages

c Solve problems combining all processes using whole, mixed numbers and fractions

d Solve problems, combining all processes, involving units of measurement

e Interpret information from charts, number lines, scales and graphs to solve arithmetic problems

f Solve conversion problems of lines, (metric and English) liquid, weight, and temperature (F^0 or C^0) measures

g Solve problems involving ratio and proportion

h Solve word problems where any mathematical process may occur

17 GRAPHING IN THE COORDINATE PLANE

a Identify coordinates of a point in any grid system

b Identify points on a line graph

c Match a graph with its equation

18 ALGEBRA

a Solve simple algebraic equations with one unknown

b Recognize and derive equivalent algebraic expressions

c Evaluate powers and estimate roots

19 TRIGONOMETRY

a Use tables of trigonometric functions

b Use tables of logarithms to solve problems

c Solve geometric problems using trigonometric functions

d Use trigonometric ratios to solve problems

CONTENT READING

NT

25 PROCEDURAL DIRECTIONS

- a Identify factual details or specifications that are found within a statement or written selection
- b Select parts of text and visual materials to complete a task activity
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BSEP I

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NT

10 SOLIDS

- a Recognize and match the names of solids with their corresponding figures

11 TERMINOLOGY

- a Identify technical words associated with geometric figures
- b Interpret meaning of terms derived from spatial orientation

COMPUTE OR PERFORM

12 ADDITION AND SUBTRACTION

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NT

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- a. Use tables of trigonometric functions
- b Use tables of logarithms to solve problems
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- d Use trigonometric ratios to solve problems

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- e Use a completed form to locate or compare information

33 NOTE TAKING

- a Distinguish between essential and non-essential details during the note taking process
- b Record details without misinterpreting the intent of either written material or an interview
- c Rewrite all recorded details in sentence form
- d Organize all sentences into paragraphs

[illegible]

d. Alternate (order) numbers and letters to establish a hierarchy

35 REPORT WRITING

- a. State the intent or objective(s) of the report
- b. Describe the parameters of the event or situation
- c. Distinguish between relevant and irrelevant details
- d. Sequence events in the order they have occurred
- e. State general impressions of events described
- f. Select examples that will clarify major issues presented in the report
- g. Examine opposing points of view in the report
- h. Summarize the major points developed in the report
- i. Justify an action taken and give reasons for rejecting alternatives

36 EDITING

- a. Spell frequently used words correctly
- b. Spell task related words correctly
- c. Identify words that need to be capitalized
- d. Correct all misspelled words with or without the use of a reference source
- e. Apply all rules for end marks, commas, and apostrophes
- f. Apply common rules of grammar
- g. Rewrite the paragraph by stating the main idea in the first sentence, and restructuring the sentences for coherence
- h. Appraise an entire written communication and make adjustments to improve clarity

VERBAL COMMUNICATION

37 TYPE

- a. Individual — a person working on a task and communicating with another when assistance is needed or when a supervisory decision is needed
- b. Instruction — a task activity requiring communication between an instructor, an individual or small group where the purpose is to give facts or rules to inform or guide
- c. Tutor — interaction takes place between two persons where one is instructing and the other is doing the task
- d. Peer Group (less than 10) — all members engage in an activity where one person assumes a leadership role and communicates to others what is to be done
- e. Interview — a person communicating with another about his activities, opinions, or subject expertise for the purpose of using the information in a task
- f. Briefing — communicating final instructions to others or giving an account in summary
- g. Counsel — communicating together to exchange ideas or opinions to recommend, give or take advice, or to arrive at an acceptance of a plan or decision
- h. Command — communicate to others an order or action to be taken where a person has a position of authority

4/23/82

C-92

NT

38 CHARACTERISTICS

- a. Enunciate clearly, using the proper rate of speech
- b. Use technical vocabulary suitable to the task and level of the person
- c. Determine the appropriate amount of information to communicate
- d. Interpret figurative or idiomatic language by reference to its use in context
- e. Follow highly detailed, step by step directions
- f. Solicit feedback to confirm the accurate reception of the communication
- g. Recognize when a low key, informal dialogue is suitable
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- a. Recognize the need for clear, concise directions in order to avoid language or word meaning differences
- b. Recognize personality factors and inter personal relationships that may exist
- c. Recognize feedback as a means of communicating more effectively and increasing task competence

SAFETY/SECURITY

40 PRECAUTIONS

- a. Use common knowledge to avoid hazards in order to prevent injury to self or equipment
- b. Apply preventive measures prior to task performance to minimize any potential safety or security problem
- c. Select an appropriate course of action in the event of an emergency

PERCEPTUAL

41 RECOGNITION

- a. Identify similarities and differences between and among objects
- b. Use body language (motions, gestures, postures) to communicate or signal
- c. Determine the presence of a defect or extent of damage
- d. Match objects by size, shape, color and significant markings
- e. Classify objects by size, shape, color and significant markings
- f. Determine direction, duration, and intensity of sounds, sightings and smells
- g. Infer from sights, sounds, touch, smells, or tastes to determine a course of action
- h. Interpret Codes or Symbols

26L Tactical Microwave Systems Repairer

BSEP I

NUMERATION/PLACE VALUE

NT

1 NUMBERING AND COUNTING

- a Match numerals with word names and models
- b Write numerals one through N in sequential order from any starting point
- c State what numeral comes after, before, or between any two given numerals
- d Select the numeral which is greater/lesser from a set of numerals
- e Identify an object with a specified ordinal position
- f Write or state the place value of a particular digit, whole or decimal number
- g Round off a number to a specified place, whole or decimal
- h Count by ones, twos, fives, tens, etc. backward or forward (skip counting)
- i Match numbers with points or intervals on a number line (positive (+) or negative ( ) values)

UNITS OF MEASUREMENT

2 LINEAR, WEIGHT, AND VOLUME MEASURES

- a Name the markings on a linear scale
- b Differentiate units of measure and equivalents in the English and metric system
- c Use a ruler, yardstick, meter stick or scale to measure lengths of objects or distances
- d Identify measures of ounce, pound, gram
- e Identify measures of pints, quarts, gallons, liters
- f Use a scale which is not numerically calibrated
- g Estimate measures of varying lengths, dimensions or weights

3 DEGREE MEASURES

- a Identify degree or mil as a unit in determining direction, distance or temperature
- b Estimate the measure of a given angle not greater than 180°
- c Interpret bearings, azimuth and other contexts in which the measure of an angle may range from 0° to 360°/0 to 6400 mils

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- a Use a 24 hour or digital clock to tell time
- b Name intervals and tell time in hours, minutes, and seconds
- c Estimate time in seconds, minutes, and parts of an hour
- d Identify calender units and arrange them in Julian style
- e Convert time into hours and tenths of hours
- f Compute time using Greenwich Mean Time (GMT) as a basis for establishing zones and distances

NT

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- a Identify the unit of measurement found on an instrument
- b. Interpret the number, word, symbol from a display read out
- c Recognize a "reading" from a gauge with color divisions
- d. Recognize positive (+) and negative (-) demarcation on a scale
- e Select band(s) from a multi scale gauge
- f. Match a gauge reading to a specification using numbered or labeled intervals
- g. Interpret gauge readings from an unnumbered/unmarked interval
- h. Interpret a gauge reading which is fluctuating or momentarily sustained
- i. Match specifications of required measures by manipulation, alignment or maintenance

VISUAL/SPATIAL RELATIONSHIPS

6 SPATIAL

- a. Identify directions that tools, hardware, or components may be moved
- b Manipulate objects to align, match, mate, make parallel, be perpendicular or be at an angle
- c. Interpret spatial relationships of figures and objects from 2-dimensional drawings, pictures, or photographs
- d. Relate geometric symbols and graphic representations to actual systems, subsystems and components

GEOMETRY

7 LINES

- a Identify and name points, lines, rays, and segments
- b Identify intersecting lines, parallel lines, and line segments
- c. Define and identify perpendicular lines
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- a Identify and name plane geometric figures
- b. List the characteristics of geometric figures
- c Classify figures according to the number or measure of its sides or angles
- d. Identify figures which possess similarities
- e. Identify figures which may be parallel, perpendicular or congruent

9 ANGLES AND TRIANGLES

- a Identify and name the different kinds of angles and triangles, with their corresponding figures
- b Identify vertical, adjacent, complementary, or supplementary angles
- c Classify triangles according to their sides or angle size
- d Identify altitudes and medians of triangles or the bisector of an angle
- e Name an angle by using letters, a number, or a single letter

NT

10 SOLIDS

- e Recognize and match the names of solids with their corresponding figures

11 TERMINOLOGY

- a Identify technical words associated with geometric figures
- b Interpret meaning of terms derived from spatial orientation

COMPUTE OR PERFORM

12 ADDITION AND SUBTRACTION

- a Add or subtract whole numbers, without carrying or borrowing
- b Add or subtract whole numbers, carrying and borrowing
- c Add and subtract, borrowing and carrying with mixed numbers (whole and decimals)
- d Add or subtract positive (+) and negative (-) numbers, using a number line to arrive at a solution
- e Add or subtract to find correct time (24 hr. clock) using hours or minutes
- f Add or subtract various increments on gauges, dials, or any other measuring instrument
- g Add or subtract time, linear, dry, liquid or degree measures requiring regrouping
- h Estimate a sum or difference

13 MULTIPLICATION AND DIVISION

- a Multiply and divide whole numbers
- b Multiply and divide mixed numbers (whole and decimals)
- c Divide a number with decimals in both divisor and dividend
- d Multiply and divide integers, both positive (+) and negative (-), and assign proper sign to product or quotient
- e Estimate a product or quotient

14 FRACTIONS/DECIMALS

- a Subdivide whole objects or a set of objects into halves (1/2), thirds (1/3), fourths (1/4), eighths (1/8)
- b Reduce fractions to lowest terms
- c Convert fractions (proper and improper) to decimal equivalents, and vice versa, using a table, chart or gauge
- d Compute equivalent value of fractions, decimals, percents, and mixed numbers to lowest terms
- e Add and subtract fractions, with same or different denominators
- f Multiply and divide fractions with and without whole numbers
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NT

15 GEOMETRY

- a Draw geometric figures, plane and solid
- b Match geometric figures with word names, equivalent measures
- c Label all parts of geometric figures using mathematical and characteristic designators
- d Use a protractor to measure angles, make geometrical constructions
- e. Construct perpendicular on a line segment, bisector of an angle
- f Compute the perimeter and area of any figure
- g Compute the circumference and area of a circle
- h Compute the area and volume of any solid figure
- i. Use formulas in solving problems involving geometric figures
- j. Solve problems and interpret spatial relationships of figures, symbols, and objects from 2 dimensional displays

16. COMBINATION OF PROCESSES

- a. Identify median and mode
- b Compute averages
- c. Solve problems combining all processes using whole, mixed numbers and fractions
- d. Solve problems, combining all processes, involving units of measurement
- e. Interpret information from charts, number lines, scales and graphs to solve arithmetic problems
- f Solve conversion problems of linear (metric and English) liquid, weight, and temperature (F° or C°) measures
- g. Solve problems involving ratio and proportion
- h. Solve word problems where any mathematical process may occur

17. GRAPHING IN THE COORDINATE PLANE

- a. Identify coordinates of a point in any grid system
- b. Identify points on a line graph
- c. Match a graph with its equation

18. ALGEBRA

- a. Solve simple algebraic equations with one unknown
- b Recognize and derive equivalent algebraic expressions
- c. Evaluate powers and estimate roots

19 TRIGONOMETRY

- a. Use tables of trigonometric functions
- b Use tables of logarithms to solve problems
- c. Solve geometric problems using trigonometric functions
- d Use trigonometric ratios to solve problems

CONTENT READING

NT

25 PROCEDURAL DIRECTIONS

- a Identify factual details or specifications that are found within a statement or written selection
- b Select parts of text and visual materials to complete a task activity
- c Follow highly detailed, step by step directions in order to accomplish a sequence of task activities
- d Determine the essential message of a paragraph or section of written material
- e Infer from a written source, which does not explicitly provide required information, in order to make a decision
- f Synthesize information from written sources which contributes to the completion of a task activity

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- a Recognize common words and their meanings
- b Recognize task related words with technical meanings
- c Identify the correct meaning of a word from the context of a sentence
- d Recognize the meaning of common contractions, abbreviations and acronyms
- e Determine the meaning of figurative, idiomatic, and technical terms by using context clues or by using a reference source(s)

INFORMATION ACCESS

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- a Locate a Technical Manual, Field Manual or any related source document by code number and title
- b Alphabetize words or topics to locate information
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- g Organize information from multiple sources into a sequenced series of events

28 TABLES/CHARTS

- a Obtain a fact or specification from a two column table or chart to find information
- b Obtain a fact or specification from an intersection of a row by column table or chart
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NT

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- a Identify details, labels, numbers, and parts from an illustration or picture
- b Identify parts or details according to a key or legend
- c Interpret a drawing which shows a cross sectional view of an object for assembly, disassembly
- d Interpret a three dimensional projection or exploded view of object(s) for assembly, disassembly, or position in system or sub system
- e Follow illustrations, or photographs, arranged in a sequential order, as a guide
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- a Use a simple linear path of an organizational chart to list events in sequential order
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- a Isolate each major section or entity presented in a schematic diagram
- b Identify the components within each entity
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NT

34 OUTLINING (topic or sentence)

- a Distinguish between major and subordinate topics
- b Generate titles for each major topic selected
- c Use phrases or sentences to provide subordinate details under each major topic
- d Alternate, indent numbers and letters to establish a hierarchy

35 REPORT WRITING

- a State the intent or objective(s) of the report
- b Describe the parameters of the event or situation
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4/23/82

NT

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96-C

26Q Tactical Satelite/Microwave Systems Operator

BSEP I

NUMERATION/PLACE VALUE

NT

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NT

10. SOLIDS

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NT

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CONTENT READING

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28 TABLES/CHARTS

- a *Locate a fact or specification from a two column table or chart to find another fact*
- b *Locate a fact or specification from an intersection of a row by column table*
- c *Locate information from complex table or chart requiring cross referencing within or in combination*
- d *Locate information from text material outside the chart*
- e *Interpret information from tables and charts for locating malfunctions, or for [illegible] course of action*

VISUAL AIDS

NT

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- a Identify details, labels, numbers, and parts from an illustration or picture
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- a *Isolate each major section or entity presented in a schematic diagram*
- b Identify the components within each entity
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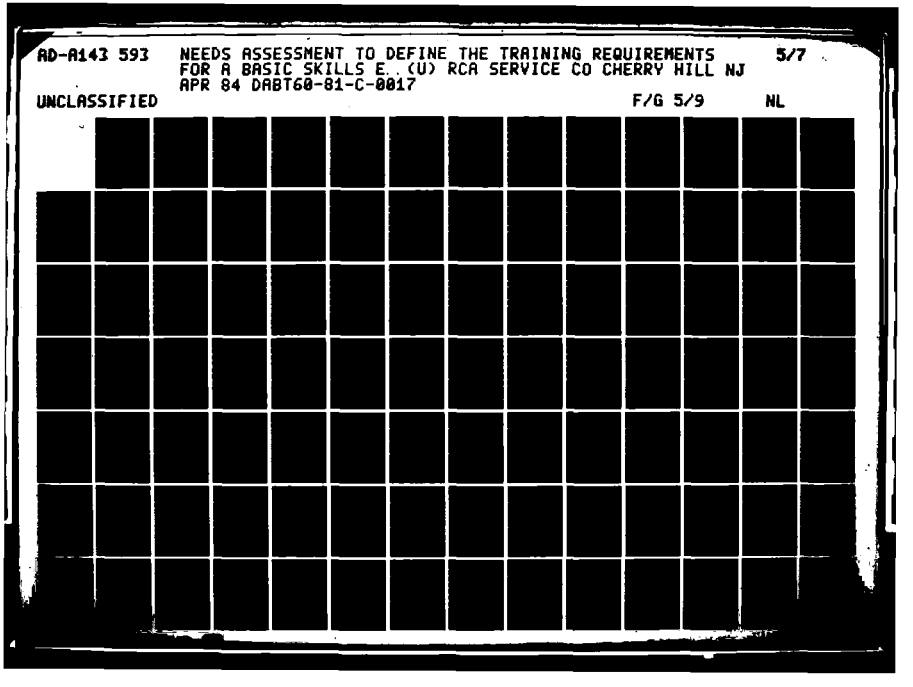
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NEEDS ASSESSMENT TO DEFINE THE TRAINING REQUIREMENTS FOR A BASIC SKILLS E..(U) RCA SERVICE CO CHERRY HILL NJ
APR 84 DABT60-81-C-0017
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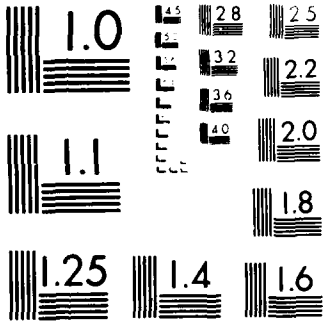


MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS-1963-A

NT

34 OUTLINING (topic or sentence)

- a. Distinguish between major and subordinate topics
- b. Generate titles for each major topic selected
- c. Use phrases or sentences to provide subordinate details under each major topic
- d. Alternate, indent numbers and letters to establish a hierarchy

35 REPORT WRITING

- a. State the intent or objective(s) of the report
- b. Describe the parameters of the event or situation
- c. Distinguish between relevant and irrelevant details
- d. Sequence events in the order they have occurred
- e. State general impressions of events described
- f. Select examples that will clarify major issues presented in the report
- g. Examine opposing points of view in the report
- h. Summarize the major points developed in the report
- i. Justify an action taken and give reasons for rejecting alternatives

36 EDITING

- a. Spell frequently used words correctly
- b. Spell task-related words correctly
- c. Identify words that need to be capitalized
- d. Correct all misspelled words with or without the use of a reference source
- e. Apply all rules for end marks, commas, and apostrophes
- f. Apply common rules of grammar
- g. Rewrite the paragraph by stating the main idea in the first sentence, and restructuring the sentences for coherence
- h. Appraise an entire written communication and make adjustments to improve clarity

VERBAL COMMUNICATION

37 TYPE

- a. Individual – a person working on a task and communicating with another when assistance is needed or when a supervisory decision is needed
- b. Instruction - a task activity requiring communication between an instructor, an individual or small group where the purpose is to give facts or rules to inform or guide
- c. Tutor – interaction takes place between two persons where one is instructing and the other is doing the task
- d. Peer Group (less than 10) - all members engage in an activity where one person assumes a leadership role and communicates to others what is to be done
- e. Interview - a person communicating with another about his activities, opinions, or subject expertise for the purpose of using the information in a task
- f. Briefing - communicating final instructions to others or giving an account in summary
- g. Counsel - communicating together to exchange ideas or opinions to recommend, give or take advice, or to arrive at an acceptance of a plan or decision
- h. Command - communicate to others an order or action to be taken where a person has a position of authority

4/23/82

NT

38 CHARACTERISTICS

- a. Enunciate clearly, using the proper rate of speech
- b. Use technical vocabulary suitable to the task and level of the person
- c. Determine the appropriate amount of information to communicate
- d. Interpret figurative or idiomatic language by reference to its use in context
- e. Follow highly detailed, step-by-step directions
- f. Solicit feedback to confirm the accurate reception of the communication
- g. Recognize when a low key, informal dialogue is suitable
- h. Recognize when direct verbal commands are necessary
- i. Recognize when a prescribed series of verbal interactions is required to coordinate a group effort
- j. Recognize when the situation will require a structured, preplanned method of presentation

39. BARRIERS

- a. Recognize the need for clear, concise directions in order to avoid language or word-meaning differences
- b. Recognize personality factors and inter personal relationships that may exist
- c. Recognize feedback as a means of communicating more effectively and increasing task competence

SAFETY/SECURITY

40. PRECAUTIONS

- a. Use common knowledge to avoid hazards in order to prevent injury to self or equipment
- b. Apply preventive measures prior to task performance to minimize any potential safety or security problem
- c. Select an appropriate course of action in the event of an emergency

PERCEPTUAL

41. RECOGNITION

- a. Identify similarities and differences between and among objects
- b. Use body language (motions, gestures, postures) to communicate or signal
- c. Determine the presence of a defect or extent of damage
- d. Match objects by size, shape, color and significant markings
- e. Classify objects by size, shape, color and significant markings
- f. Determine direction, duration, and intensity of sounds, sightings and smells
- g. Infer from sights, sounds, touch, smells, or tastes to determine a course of action

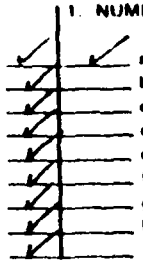
27E Tow/Dragon Repairer

BSEP I

NUMERATION/PLACE VALUE

NT

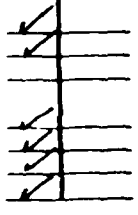
1. NUMBERING AND COUNTING



a. Match numerals with word names and models
b. Write numerals one through N in sequential order from any starting point
c. State what numeral comes after, before, or between any two given numerals
d. Select the numeral which is greater/lesser from a set of numerals
e. Identify an object with a specified ordinal position
f. Write or state the place value of a particular digit, whole or decimal number
g. Round off a number to a specified place, whole or decimal
h. Count by ones, twos, fives, tens, etc. backward or forward (skip counting)
i. Match numbers with points or intervals on a number line (positive (+) or negative (-) values)

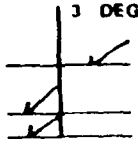
UNITS OF MEASUREMENT

2. LINEAR, WEIGHT, AND VOLUME MEASURES



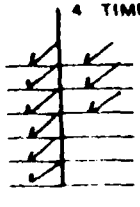
a. Name the markings on a linear scale
b. Differentiate units of measure and equivalents in the English and metric system
c. Use a ruler, yardstick, meter stick or scale to measure lengths of objects or distances
d. Identify measures of ounce, pound, gram
e. Identify measures of pints, quarts, gallons, liters
f. Use a scale which is not numerically calibrated
g. Estimate measures of varying lengths, dimensions or weights

3. DEGREE MEASURES



a. Identify degree or mil as a unit in determining direction, distance or temperature
b. Estimate the measure of a given angle not greater than 180°
c. Interpret bearings, azimuth and other contexts in which the measure of an angle may range from 0° to 360°/0 to 6400 mils

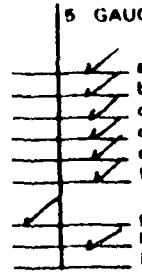
4. TIME TELLING MEASURES



a. Use a 24 hour or digital clock to tell time
b. Name intervals and tell time in hours, minutes, and seconds
c. Estimate time in seconds, minutes, and parts of an hour
d. Identify calendar units and arrange them in Julian style
e. Convert time into hours and tenths of hours
f. Compute time using Greenwich Mean Time (GMT) as a basis for establishing zones and distances

NT

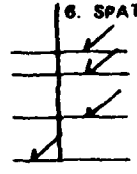
5. GAUGE MEASURES



a. Identify the unit of measurement found on an instrument
b. Interpret the number, word, symbol from a display read out
c. Recognize a "reading" from a gauge with color divisions
d. Recognize positive (+) and negative (-) demarcation on a scale
e. Select band(s) from a multi-scale gauge
f. Match a gauge reading to a specification using numbered or labeled intervals
g. Interpret gauge readings from an unnumbered/unmarked interval
h. Interpret a gauge reading which is fluctuating or momentarily sustained
i. Match specifications of required measures by manipulation, alignment or maintenance

VISUAL/SPATIAL RELATIONSHIPS

6. SPATIAL



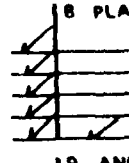
a. Identify directions that tools, hardware, or components may be moved
b. Manipulate objects to align, match, mate, make parallel, be perpendicular or be at an angle
c. Interpret spatial relationships of figures and objects from 2-dimensional drawings, pictures, or photographs
d. Relate geometric symbols and graphic representations to actual systems, subsystems and components

GEOMETRY

7. LINES

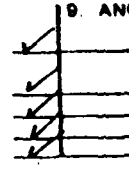
a. Identify and name points, lines, rays, and segments
b. Identify intersecting lines, parallel lines, and line segments
c. Define and identify perpendicular lines
d. Identify congruent segments

8. PLANES



a. Identify and name plane geometric figures
b. List the characteristics of geometric figures
c. Classify figures according to the number or measure of its sides or angles
d. Identify figures which possess similarities
e. Identify figures which may be parallel, perpendicular or congruent

9. ANGLES AND TRIANGLES



a. Identify and name the different kinds of angles and triangles, with their corresponding figures
b. Identify vertical, adjacent, complementary or supplementary angles
c. Classify triangles according to their sides or angle size
d. Identify altitudes and medians of triangles or the bisector of an angle
e. Name an angle by using letters, a number, or a single letter

NT

10 SOLIDS

- a. Recognize and match the names of solids with their corresponding figures

11 TERMINOLOGY

- a. Identify technical words associated with geometric figures
- b. Interpret meaning of terms derived from spatial orientation

COMPUTE OR PERFORM

12 ADDITION AND SUBTRACTION

- a. Add or subtract whole numbers, without carrying or borrowing
- b. Add or subtract whole numbers, carrying and borrowing
- c. Add and subtract, borrowing and carrying with mixed numbers (whole and decimals)
- d. Add or subtract positive (+) and negative ( ) numbers, using a number line to arrive at a solution
- e. Add or subtract to find correct time (24 hr. clock) using hours or minutes
- f. Add or subtract various increments on gauges, dials, or any other measuring instrument
- g. Add or subtract time, linear, dry, liquid or degree measures requiring regrouping
- h. Estimate a sum or difference

13. MULTIPLICATION AND DIVISION

- a. Multiply and divide whole numbers
- b. Multiply and divide mixed numbers (whole and decimals)
- c. Divide a number with decimals in both divisor and dividend
- d. Multiply and divide integers, both positive (+) and negative ( ), and assign proper sign to product or quotient
- e. Estimate a product or quotient

14. FRACTIONS/DECIMALS

- a. Subdivide whole objects or a set of objects into halves (1/2), thirds (1/3), fourths (1/4), eighths (1/8)
- b. Reduce fractions to lowest terms
- c. Convert fractions (proper and improper) to decimal equivalents, and vice versa, using a table, chart or gauge
- d. Compute equivalent value of fractions, decimals, percents, and mixed numbers to lowest terms
- e. Add and subtract fractions, with same or different denominators
- f. Multiply and divide fractions with and without whole numbers
- g. Estimate a fractional sum, product, or quotient

NT

15 GEOMETRY

- a. Draw geometric figures, plane and solid
- b. Match geometric figures with word names, equivalent measures
- c. Label all parts of geometric figures using mathematical and characteristic designators
- d. Use a protractor to measure angles, make geometrical constructions
- e. Construct perpendicular on a line segment, bisector of an angle
- f. Compute the perimeter and area of any figure
- g. Compute the circumference and area of a circle
- h. Compute the area and volume of any solid figure
- i. Use formulas in solving problems involving geometric figures
- j. Solve problems and interpret spatial relationships of figures, symbols, and objects from 2-dimensional displays

16. COMBINATION OF PROCESSES

- a. Identify median and mode
- b. Compute averages
- c. Solve problems combining all processes using whole, mixed numbers and fractions
- d. Solve problems, combining all processes, involving units of measurement
- e. Interpret information from charts, number lines, scales and graphs to solve arithmetic problems
- f. Solve conversion problems of linear (metric and English) liquid, weight, and temperature (F° or C°) measures
- g. Solve problems involving ratio and proportion
- h. Solve word problems where any mathematical process may occur

17. GRAPHING IN THE COORDINATE PLANE

- a. Identify coordinates of a point in any grid system
- b. Identify points on a line graph
- c. Match a graph with its equation

18. ALGEBRA

- a. Solve simple algebraic equations with one unknown
- b. Recognize and derive equivalent algebraic expressions
- c. Evaluate powers and estimate roots

19. TRIGONOMETRY

- a. Use tables of trigonometric functions
- b. Use tables of logarithms to solve problems
- c. Solve geometric problems using trigonometric functions
- d. Use trigonometric ratios to solve problems

CONTENT READING

NT

25 PROCEDURAL DIRECTIONS

- a. Identify factual details or specifications that are found within a statement or written selection
- b. Select parts of text and visual materials to complete a task activity
- c. Follow highly detailed, step by step directions in order to accomplish a sequence of task activities
- d. Determine the essential message of a paragraph or section of written material
- e. Infer from a written source, which does not explicitly provide required information, in order to make a decision
- f. Synthesize information from written sources which contributes to the completion of a task activity

26 VOCABULARY

- a. Recognize common words and their meanings
- b. Recognize task related words with technical meanings
- c. Identify the correct meaning of a word from the context of a sentence
- d. Recognize the meaning of common contractions, abbreviations and acronyms
- e. Determine the meaning of figurative, idiomatic, and technical terms by using context clues or by using a reference source(s)

INFORMATION ACCESS

27 REFERENCE SKILLS

- a. Locate a Technical Manual, Field Manual or any related source document by code number and title
- b. Alphabetize words or topics to locate information
- c. Use the table of contents, index, system or sub-system heading, appendix and glossary to locate information
- d. Locate the page, title, paragraph, figure, or chart needed to answer a question or to solve a problem
- e. Determine, after scanning or skim-reading, whether the information is relevant
- f. Cross reference within and across source documents to select information needed to perform a routine
- g. Organize information from multiple sources into a sequenced series of events

28 TABLES/CHARTS

- a. Obtain a fact or specification from a two-column table or chart to find information
- b. Obtain a fact or specification from an intersection of a row by column table or chart
- c. Use a complex table or chart requiring cross referencing within or in combination with text material outside the chart
- d. Apply information from tables and charts for locating malfunctions, or for selecting a course of action

VISUAL AIDS

NT

29 ILLUSTRATIONS

- a. Identify details, labels, numbers, and parts from an illustration or picture
- b. Identify parts or details according to a key or legend
- c. Interpret a drawing which shows a cross sectional view of an object for assembly, disassembly
- d. Interpret a three dimensional projection or exploded view of object(s) for assembly, disassembly, or position in system or sub-system
- e. Follow illustrations, or photographs, arranged in a sequential order, as a guide
- f. Integrate information from various sources to select a course of action

30 FLOW CHARTS

- a. Use a simple linear path of an organizational chart to list events in sequential order
- b. Use a linear path of a flow chart to provide visual and textual directions to a procedure, to arrive at decision points, and to provide alternate paths in problem solving
- c. Translate the significance of the symbols into physical activities

31 SCHEMATICS

- a. Isolate each major section or entity presented in a schematic diagram
- b. Identify the components within each entity
- c. Trace connections in an integrated circuit from their origin to another point within or from one entity to another
- d. Isolate a problem component in a schematic and trace it to components believed to cause the problem
- e. Interpret symbols to indicate direction of flow, test points, components and diagrammatic decision points

WRITTEN COMMUNICATION

32. FORMS

- a. Locate the block on a form to enter the appropriate information
- b. Transfer a number, code, date, figure or related data from equipment or written sources onto an appropriate section of the form
- c. Write the name of the organization, responsible personnel, disposition of the part or equipment, and nomenclature, in appropriate sections of the form
- d. Write a descriptive account of an activity or transaction performed
- e. Use a completed form to locate or compare information

33. NOTE TAKING

- a. Distinguish between essential and non essential details during the note taking process
- b. Record details without misinterpreting the intent of either written material or an interview
- c. Rewrite all recorded details in sentence form
- d. Organize all sentences into paragraphs

NT

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- a Distinguish between major and subordinate topics
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31J Teletypewriter Repairer

BSEP I

NUMERATION/PLACE VALUE

NT

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- f. Write or state the place value of a particular digit, whole or decimal number
- g. Round off a number to a specified place, whole or decimal
- h. Count by ones, twos, fives, tens, etc. backward or forward (skip counting)
- i. Match numbers with points or intervals on a number line (positive (+) or negative ( ) values)

UNITS OF MEASUREMENT

2 LINEAR, WEIGHT, AND VOLUME MEASURES

- a. Name the markings on a linear scale
- b. Differentiate units of measure and equivalents in the English and metric system
- c. Use a ruler, yardstick, meter stick or scale to measure lengths of objects or distances
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- a. Use a 24 hour or digital clock to tell time
- b. Name intervals and tell time in hours, minutes, and seconds
- c. Estimate time in seconds, minutes, and parts of an hour
- d. Identify calendar units and arrange them in Julian style
- e. Convert time into hours and tenths of hours
- f. Compute time using Greenwich Mean Time (GMT) as a basis for establishing zones and distances

NT

5 GAUGE MEASURES

- a. Identify the unit of measurement found on an instrument
- b. Interpret the number, word, symbol from a display read out
- c. Recognize a "reading" from a gauge with color divisions
- d. Recognize positive (+) and negative ( ) demarcation on a scale
- e. Select band(s) from a multi-scale gauge
- f. Match a gauge reading to a specification using numbered or labeled intervals
- g. Interpret gauge readings from an unnumbered/unmarked interval
- h. Interpret a gauge reading which is fluctuating or momentarily sustained
- i. Match specifications of required measures by manipulation, alignment or maintenance

VISUAL/SPATIAL RELATIONSHIPS

6. SPATIAL

- a. Identify directions that tools, hardware, or components may be moved
- b. Manipulate objects to align, match, mate, make parallel, be perpendicular or be at an angle
- c. Interpret spatial relationships of figures and objects from 2-dimensional drawings, pictures, or photographs
- d. Relate geometric symbols and graphic representations to actual systems, subsystems and components

GEOMETRY

7. LINES

- a. Identify and name points, lines, rays, and segments
- b. Identify intersecting lines, parallel lines, and line segments
- c. Define and identify perpendicular lines
- d. Identify congruent segments

8 PLANES

- a. Identify and name plane geometric figures
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- a. Identify and name the different kinds of angles and triangles, with their corresponding figures
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- c. Classify triangles according to their sides or angle size
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NT

10 SOLIDS

- a Recognize and match the names of solids with their corresponding figures

11 TERMINOLOGY

- a Identify technical words associated with geometric figures
- b Interpret meaning of terms derived from spatial orientation

COMPUTE OR PERFORM

12 ADDITION AND SUBTRACTION

- a Add or subtract whole numbers, without carrying or borrowing
- b Add or subtract whole numbers, carrying and borrowing
- c Add and subtract, borrowing and carrying with mixed numbers (whole and decimals)
- d Add or subtract positive (+) and negative ( ) numbers, using a number line to arrive at a solution
- e Add or subtract to find correct time (24 hr. clock) using hours or minutes
- f Add or subtract various increments on gauges, dials, or any other measuring instrument
- g Add or subtract time, linear, dry, liquid or degree measures requiring regrouping
- h Estimate a sum or difference

13. MULTIPLICATION AND DIVISION

- a Multiply and divide whole numbers
- b Multiply and divide mixed numbers (whole and decimals)
- c Divide a number with decimals in both divisor and dividend
- d Multiply and divide integers, both positive (+) and negative (-), and assign proper sign to product or quotient
- e Estimate a product or quotient

14. FRACTIONS/DECIMALS

- a Subdivide whole objects or a set of objects into halves (1/2), thirds (1/3), fourths (1/4), eighths (1/8)
- b Reduce fractions to lowest terms
- c Convert fractions (proper and improper) to decimal equivalents, and vice versa, using a table, chart or gauge
- d Compute equivalent value of fractions, decimals, percents, and mixed numbers to lowest terms
- e Add and subtract fractions, with same or different denominators
- f Multiply and divide fractions with and without whole numbers
- g Estimate a fractional sum, product, or quotient

NT

15 GEOMETRY

- a Draw geometric figures, plane and solid
- b Match geometric figures with word names, equivalent measures
- c Label all parts of geometric figures using mathematical and characteristic designators
- d Use a protractor to measure angles, make geometrical constructions
- e Construct perpendicular on a line segment, bisector of an angle
- f Compute the perimeter and area of any figure
- g Compute the circumference and area of a circle
- h Compute the area and volume of any solid figure
- i Use formulas in solving problems involving geometric figures
- j Solve problems and interpret spatial relationships of figures, symbols, and objects from 2-dimensional displays

16. COMBINATION OF PROCESSES

- a Identify median and mode
- b Compute averages
- c Solve problems combining all processes using whole, mixed numbers and fractions
- d Solve problems, combining all processes, involving units of measurement
- e Interpret information from charts, number lines, scales and graphs to solve arithmetic problems
- f Solve conversion problems of linear (metric and English) liquid, weight, and temperature (F° or C°) measures
- g Solve problems involving ratio and proportion
- h Solve word problems where any mathematical process may occur

17. GRAPHING IN THE COORDINATE PLANE

- a Identify coordinates of a point in any grid system
- b Identify points on a line graph
- c Match a graph with its equation

18. ALGEBRA

- a Solve simple algebraic equations with one unknown
- b Recognize and derive equivalent algebraic expressions
- c Evaluate powers and estimate roots

19. TRIGONOMETRY

- a Use tables of trigonometric functions
- b Use tables of logarithms to solve problems
- c Solve geometric problems using trigonometric functions
- d Use trigonometric ratios to solve problems

CONTENT READING

NT

25 PROCEDURAL DIRECTIONS

- a. Identify factual details or specifications that are found within a statement or written selection
- b. Select parts of text and visual materials to complete a task activity
- c. Follow highly detailed, step by step directions in order to accomplish a sequence of task activities
- d. Determine the essential message of a paragraph or section of written material
- e. Infer from a written source, which does not explicitly provide required information, in order to make a decision
- f. Synthesize information from written sources which contributes to the completion of a task activity

26 VOCABULARY

- a. Recognize common words and their meanings
- b. Recognize task related words with technical meanings
- c. Identify the correct meaning of a word from the context of a sentence
- d. Recognize the meaning of common contractions, abbreviations and acronyms
- e. Determine the meaning of figurative, idiomatic, and technical terms by using context clues or by using a reference source(s)

INFORMATION ACCESS

27 REFERENCE SKILLS

- a. Locate a Technical Manual, Field Manual or any related source document by code number and title
- b. Alphabetize words or topics to locate information
- c. Use the table of contents, index, system or sub-system heading, appendix and glossary to locate information
- d. Locate the page, title, paragraph, figure, or chart needed to answer a question or to solve a problem
- e. Determine, after scanning or skim reading, whether the information is relevant
- f. Cross reference within and across source documents to select information needed to perform a routine
- g. Organize information from multiple sources into a sequenced series of events

28 TABLES/CHARTS

- a. Obtain a fact or specification from a two column table or chart to find information
- b. Obtain a fact or specification from an intersection of a row by column table or chart
- c. Use a complex table or chart requiring cross referencing within or in combination with text material outside the chart
- d. Apply information from tables and charts for locating malfunctions, or for selecting a course of action

VISUAL AIDS

NT

29 ILLUSTRATIONS

- a. Identify details, labels, numbers, and parts from an illustration or picture
- b. Identify parts or details according to a key or legend
- c. Interpret a drawing which shows a cross sectional view of an object for assembly, disassembly
- d. Interpret a three dimensional projection or exploded view of object(s) for assembly, disassembly, or position in system or sub-system
- e. Follow illustrations, or photographs, arranged in a sequential order, as a guide
- f. Integrate information from various sources to select a course of action

30 FLOW CHARTS

- a. Use a simple linear path of an organizational chart to list events in sequential order
- b. Use a linear path of a flow chart to provide visual and textual directions to a procedure, to arrive at decision points, and to provide alternate paths in problem solving
- c. Translate the significance of the symbols into physical activities

31. SCHEMATICS

- a. Isolate each major section or entity presented in a schematic diagram
- b. Identify the components within each entity
- c. Trace connections in an integrated circuit from their origin to another point within or from one entity to another
- d. Isolate a problem component in a schematic and trace it to components believed to cause the problem
- e. Interpret symbols to indicate direction of flow, test points, components and diagrammatic decision points

WRITTEN COMMUNICATION

32 FORMS

- a. Locate the block on a form to enter the appropriate information
- b. Transfer a number, code, date, figure or related data from equipment or written sources onto an appropriate section of the form
- c. Write the name of the organization, responsible personnel, disposition of the part or equipment, and nomenclature, in appropriate sections of the form
- d. Write a descriptive account of an activity or transaction performed
- e. Use a completed form to locate or compare information

33 NOTE TAKING

- a. Distinguish between essential and non essential details during the note taking process
- b. Record details without misinterpreting the intent of either written material or an interview
- c. Rewrite all recorded details in sentence form
- d. Organize all sentences into paragraphs

NT

34 OUTLINING (topic or sentence)

- a Distinguish between major and subordinate topics
- b Generate titles for each major topic selected
- c Use phrases or sentences to provide subordinate details under each major topic
- d Alternate, indent numbers and letters to establish a hierarchy

35 REPORT WRITING

- a State the intent or objective(s) of the report
- b Describe the parameters of the event or situation
- c Distinguish between relevant and irrelevant details
- d Sequence events in the order they have occurred
- e State general impressions of events described
- f Select examples that will clarify major issues presented in the report
- g Examine opposing points of view in the report
- h Summarize the major points developed in the report
- i Make an analysis of ideas and give reasons for rejecting alternatives

[illegible]

- a Spell frequently [illegible] words correctly
- b Spell base or stem words correctly
- c Identify words that need to be capitalized
- d Correct all misspelled words with or without the use of a reference source
- e Apply all rules for end marks, commas, and apostrophes
- f Apply common rules of grammar
- g Rewrite the paragraph by stating the main idea in the first sentence, and restructuring the sentences for coherence
- h Appraise an entire written communication and make adjustments to improve clarity

VERBAL COMMUNICATION

37 TYPE

- a Individual -- a person working on a task and communicating with another when assistance is needed or when a supervisory decision is needed
- b Instruction - a task activity requiring communication between an instructor, an individual or small group where the purpose is to give facts or rules to inform or guide
- c Tutor -- interaction takes place between two persons where one is instructing and the other is doing the task
- d Peer Group (less than 10) -- all members engage in an activity where one person assumes a leadership role and communicates to others what is to be done
- e Interview - a person communicating with another about his activities, opinions, or subject expertise for the purpose of using the information in a task
- f Briefing - communicating final instructions to others or giving an account in summary
- g Counsel - communicating together to exchange ideas or opinions to recommend, give or take advice, or to arrive at an acceptance of a plan or decision
- h Command - communicate to others an order or action to be taken where a person has a position of authority

4/23/82

NT

38 CHARACTERISTICS

- a Enunciate clearly, using the proper rate of speech
- b Use technical vocabulary suitable to the task and level of the person
- c Determine the appropriate amount of information to communicate
- d Interpret figurative or idiomatic language by reference to its use in context
- e Follow highly detailed, step by step directions
- f Solicit feedback to confirm the accurate reception of the communication
- g Recognize when a low key, informal dialogue is suitable
- h Recognize when direct verbal commands are necessary
- i Recognize when a prescribed series of verbal interactions is required to coordinate a group effort
- j Recognize when the situation will require a structured, preplanned method of presentation

39 BARRIERS

- a Recognize the need for clarification when [illegible] or word meaning differences
- b Recognize personality [illegible] and other [illegible] that may exist
- c Recognize feedback as a means of [illegible] and increasing task competence

SAFETY/SECURITY

40 PRECAUTIONS

- a Use common knowledge to avoid hazards in order to prevent injury to self or equipment
- b Apply preventive measures prior to task performance to minimize any potential safety or security problem
- c Select an appropriate course of action in the event of an emergency

PERCEPTUAL

41 RECOGNITION

- a Identify similarities and differences between and among objects
- b Use body language (motions, gestures, postures) to communicate or signal
- c Determine the presence of a defect or extent of damage
- d Match objects by size, shape, color and significant markings
- e Classify objects by size, shape, color and significant markings
- f Determine direction, duration, and intensity of sounds, sightings and smells
- g Infer from sights, sounds, touch, smells, or tastes to determine a course of action

31M Multichannel Communications Equipment Operator

BSEP I

NUMERATION/PLACE VALUE

NT

1 NUMBERING AND COUNTING

- a Match numerals with word names and models
- b Write numerals one through N in sequential order from any starting point
- c State what numeral comes after, before, or between any two given numerals
- d Select the numeral which is greater/lesser from a set of numerals
- e Identify an object with a specified ordinal position
- f Write or state the place value of a particular digit, whole or decimal number
- g Round off a number to a specified place, whole or decimal
- h Count by ones, twos, fives, tens, etc. backward or forward (skip counting)
- i Match numbers with points or intervals on a number line (positive (+) or negative ( ) values)

UNITS OF MEASUREMENT

2 LINEAR, WEIGHT, AND VOLUME MEASURES

- a Name the markings on a linear scale
- b Differentiate units of measure and equivalents in the English and metric system
- c Use a ruler, yardstick, meter stick or scale to measure lengths of objects or distances
- d Identify measures of ounce, pound, gram
- e Identify measures of pints, quarts, gallons, liters
- f Use a scale which is not numerically calibrated
- g Estimate measures of varying lengths, dimensions or weights

3 DEGREE MEASURES

- a Identify degree or mil as a unit in determining direction, distance or temperature
- b Estimate the measure of a given angle not greater than 180°
- c Interpret bearings, azimuth and other contexts in which the measure of an angle may range from 0° to 360°/0 to 6400 mils

4 TIME TELLING MEASURES

- a Use a 24 hour or digital clock to tell time
- b Name intervals and tell time in hours, minutes, and seconds
- c Estimate time in seconds, minutes, and parts of an hour
- d Identify calendar units and arrange them in Julian style
- e Convert time into hours and tenths of hours
- f Compute time using Greenwich Mean Time (GMT) as a basis for establishing zones and distances

5 GAUGE MEASURES

- a Identify the unit of measurement found on an instrument
- b Interpret the number, word, symbol from a display read out
- c Recognize a "reading" from a gauge with color divisions
- d Recognize positive (+) and negative ( ) demarcation on a scale
- e Select band(s) from a multi-scale gauge
- f Match a gauge reading to a specification using numbered or labeled intervals
- g Interpret gauge readings from an unnumbered/unmarked interval
- h Interpret a gauge reading which is fluctuating or momentarily sustained
- i Match specifications of required measures by manipulation, alignment or maintenance

VISUAL/SPATIAL RELATIONSHIPS

6 SPATIAL

- a Identify directions that tools, hardware, or components may be moved
- b Manipulate objects to align, match, mate, make parallel, be perpendicular or be at an angle
- c Interpret spatial relationships of figures and objects from 2-dimensional drawings, pictures, or photographs
- d Relate geometric symbols and graphic representations to actual systems, subsystems and components

GEOMETRY

7 LINES

- a Identify and name points, lines, rays, and segments
- b Identify intersecting lines, parallel lines, and line segments
- c Define and identify perpendicular lines
- d Identify congruent segments

8 PLANES

- a Identify and name plane geometric figures
- b List the characteristics of geometric figures
- c Classify figures according to the number or measure of its sides or angles
- d Identify figures which possess similarities
- e Identify figures which may be parallel, perpendicular or congruent

9 ANGLES AND TRIANGLES

- a Identify and name the different kinds of angles and triangles with their corresponding figures
- b Identify vertical, adjacent, complementary or supplementary angles
- c Classify triangles according to their sides or angle size
- d Identify altitudes and medians of triangles or the bisector of an angle
- e Name an angle by using letters, a number, or a single letter

NT

10 SOLIDS

- a. Recognize and match the names of solids with their corresponding figures

11 TERMINOLOGY

- a. Identify technical words associated with geometric figures
- b. Interpret meaning of terms derived from spatial orientation

COMPUTE OR PERFORM

12 ADDITION AND SUBTRACTION

- a. Add or subtract whole numbers, without carrying or borrowing
- b. Add or subtract whole numbers, carrying and borrowing
- c. Add and subtract, borrowing and carrying with mixed numbers (whole and decimals)
- d. Add or subtract positive (+) and negative (-) numbers, using a number line to arrive at a solution
- e. Add or subtract to find correct time (24 hr. clock) using hours or minutes
- f. Add or subtract various increments on gauges, dials, or any other measuring instrument
- g. Add or subtract time, linear, dry, liquid or degree measures requiring regrouping
- h. Estimate a sum or difference

13. MULTIPLICATION AND DIVISION

- a. Multiply and divide whole numbers
- b. Multiply and divide mixed numbers (whole and decimals)
- c. Divide a number with decimals in both divisor and dividend
- d. Multiply and divide integers, both positive (+) and negative (-), and assign proper sign to product or quotient
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14 FRACTIONS/DECIMALS

- a. Subdivide whole objects or a set of objects into halves (1/2), thirds (1/3), fourths (1/4), eighths (1/8)
- b. Reduce fractions to lowest terms
- c. Convert fractions (proper and improper) to decimal equivalents, and vice versa, using a table, chart or gauge
- d. Compute equivalent value of fractions, decimals, percents, and mixed numbers to lowest terms
- e. Add and subtract fractions, with same or different denominators
- f. Multiply and divide fractions with and without whole numbers
- g. Estimate a fractional sum, product, or quotient

NT

15 GEOMETRY

- a. Draw geometric figures, plane and solid
- b. Match geometric figures with word names, equivalent measures
- c. Label all parts of geometric figures using mathematical and characteristic designators
- d. Use a protractor to measure angles, make geometrical constructions
- e. Construct perpendicular on a line segment, bisector of an angle
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- a Use a simple linear path of an organizational chart to list events in sequential order
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- c Translate the significance of the symbols into physical activities

31 SCHEMATICS

- a Isolate each major section or entity presented in a schematic diagram
- b Identify the components within each entity
- c Trace connections in an integrated circuit from their origin to another point within or from one entity to another
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NT

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- e State general impressions of events described
- f Select examples that will clarify major issues presented in the report
- g Examine opposing points of view in the report
- h Summarize the major points developed in the report
- i Justify an action taken and give reasons for rejecting alternatives

36 EDITING

- a. Spell frequently used words correctly
- b. Spell task related words correctly
- c Identify words that need to be capitalized
- d Correct all misspelled words with or without the use of a reference source
- e Apply all rules for end marks, commas, and apostrophes
- f. Apply common rules of grammar
- g. Rewrite the paragraph by stating the main idea in the first sentence, and restructuring the sentences for coherence
- h Appraise an entire written communication and make adjustments to improve clarity

VERBAL COMMUNICATION

37 TYPE

- a. Individual - a person working on a task and communicating with another when assistance is needed or when a supervisory decision is needed
- b Instruction - a task activity requiring communication between an instructor, an individual or small group where the purpose is to give facts or rules to inform or guide
- c Tutor - interaction takes place between two persons where one is instructing and the other is doing .. e task
- d Peer Group (less than 10) - all members engage in an activity where one person assumes a leadership role and communicates to others what is to be done
- e. Interview - a person communicating with another about his activities, opinions, or subject expertise for the purpose of using the information in a task
- f *Briefing* - *communicating final instructions to others or giving an account* in summary
- g Counsel - communicating together to exchange ideas or opinions to recommend, give or take advice, or to arrive at an acceptance of a plan or decision
- h Command - communicate to others an order or action to be taken where a person has a position of authority

NT

38 CHARACTERISTICS

- a Enunciate clearly, using the proper rate of speech
- b Use technical vocabulary suitable to the task and level of the person
- c *Determine the appropriate amount of information to communicate*
- d. Interpret figurative or idiomatic language by reference to its use in context
- e Follow highly detailed, step by step directions
- f *Solicit feedback to confirm the accurate reception of the communication*
- g. Recognize when a low key, informal dialogue is suitable
- h Recognize when direct verbal commands are necessary
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- j Recognize when the situation will require a structured, preplanned method of presentation

39. BARRIERS

- a Recognize the need for clear, concise directions in order to avoid language or word-meaning differences
- b. Recognize personality factors and inter personal relationships that may exist
- c Recognize feedback as a means of communicating more effectively and increasing task competence

SAFETY/SECURITY

40. PRECAUTIONS

- a Use common knowledge to avoid hazards in order to prevent injury to self or equipment
- b. Apply preventive measures prior to task performance to minimize any potential safety or security problem
- c. Select an appropriate course of action in the event of an emergency

PERCEPTUAL

41. RECOGNITION

- a. Identify similarities and differences between and among objects
- b. Use body language (motions, gestures, postures) to communicate or signal
- c. Determine the presence of a defect or extent of damage
- d. Match objects by size, shape, color and significant markings
- e. Classify objects by size, shape, color and significant markings
- f. *Determine direction, duration, and intensity of sounds, sightings and smells*
- g. Infer from sights, sounds, touch, smells, or tastes to determine a course of action

31N Tactical Circuit Controller

BSEP I

NUMERATION/PLACE VALUE

NT

1 NUMBERING AND COUNTING

- a Match numerals with word names and models
- b Write numerals *one through N in sequential order* from any starting point
- c State what numeral comes after, before, or between any two given numerals
- d Select the numeral which is *greater/lesser from a set of numerals*
- e Identify an object with a specified ordinal position
- f Write or state the place value of a *particular digit*, whole or decimal number
- g Round off a number to a specified place, whole or decimal
- h Count by ones, twos, fives, tens, etc backward or forward (skip counting)
- i Match numbers with points or intervals on a number line (positive (+) or negative ( ) values)

UNITS OF MEASUREMENT

2 LINEAR, WEIGHT, AND VOLUME MEASURES

- a Name the markings on a linear scale
- b *Differentiate units of measure and equivalents in the English and metric system*
- c Use a ruler, yardstick, meter stick or scale to measure lengths of objects or distances
- d Identify *measures of ounce, pound, gram*
- e Identify measures of pints, quarts, gallons, liters
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- a Identify degree or mil as a unit in determining direction, distance or temperature
- b *Estimate the measure of a given angle not greater than 180°*
- c Interpret bearings, azimuth and other contexts in which the measure of an angle may range from 0° to 360°/0 to 6400 mils

4 TIME TELLING MEASURES

- a Use *a 24 hour or digital clock to tell time*
- b Name intervals and tell time in hours, minutes, and seconds
- c Estimate time in seconds, minutes, and parts of an hour
- d Identify calendar units and arrange them in Julian style
- e Convert time into hours and tenths of hours
- f Compute time using Greenwich Mean Time (GMT) as a basis for establishing *zones and distances*

NT

5 GAUGE MEASURES

- a Identify the unit of measurement found on an instrument
- b. *Interpret the number, word, symbol from a display read out*
- c. Recognize a "reading" from a gauge with color divisions
- d. Recognize positive (+) and negative ( ) demarcation on a scale
- e. Select band(s) from a multi-scale gauge
- f Match a gauge reading to *a specification using numbered or labeled* intervals
- g *Interpret gauge readings from an unnumbered/unmarked interval*
- h Interpret a gauge reading which is fluctuating or momentarily sustained
- i. Match specifications of required measures by manipulation, alignment or maintenance

VISUAL/SPATIAL RELATIONSHIPS

6. SPATIAL

- a Identify directions that tools, hardware, or components may be moved
- b Manipulate objects to align, match, mate, make parallel, be perpendicular or be at an angle
- c Interpret spatial relationships of figures and objects from 2-dimensional drawings, pictures, or photographs
- d. Relate geometric symbols and graphic representations to actual systems, subsystems and components

GEOMETRY

7 LINES

- a. Identify and name points, lines, rays, and segments
- b Identify intersecting lines, parallel lines, and line segments
- c Define and identify perpendicular lines
- d Identify congruent segments

8 PLANES

- a Identify and name plane geometric figures
- b List the characteristics of geometric figures
- c Classify figures according to the number or measure of its sides or angles
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- a Identify and name the different kinds of angles and triangles, with their corresponding figures
- b Identify vertical, adjacent, complementary or supplementary angles
- c Classify triangles according to their sides or angle size
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- e Name an angle by using letters, a number, or a single letter

NT

10 SOLIDS

- a Recognize and match the names of solids with their corresponding figures

11 TERMINOLOGY

- a Identify technical words associated with geometric figures
- b Interpret meaning of terms derived from spatial orientation

COMPUTE OR PERFORM

12 ADDITION AND SUBTRACTION

- a Add or subtract whole numbers, without carrying or borrowing
- b Add or subtract whole numbers, carrying and borrowing
- c Add and subtract, borrowing and carrying with mixed numbers (whole and decimals)
- d Add or subtract positive (+) and negative (-) numbers, using a number line to arrive at a solution
- e Add or subtract to find correct time (24 hr. clock) using hours or minutes
- f Add or subtract various increments on gauges, dials, or any other measuring instrument
- g Add or subtract time, linear, dry, liquid or degree measures requiring regrouping
- h Estimate a sum or difference

13 MULTIPLICATION AND DIVISION

- a Multiply and divide whole numbers
- b Multiply and divide mixed numbers (whole and decimals)
- c *Divide a number with decimals in both divisor and dividend*
- d Multiply and divide integers, both positive (+) and negative (-), and assign proper sign to product or quotient
- e Estimate a product or quotient

14 FRACTIONS/DECIMALS

- a Subdivide whole objects or a set of objects into halves (1/2), thirds (1/3), *fourths* (1/4), *eighths* (1/8)
- b Reduce fractions to lowest terms
- c Convert fractions (proper and improper) to decimal equivalents, and vice versa, using a table, chart or gauge
- d Compute equivalent value of fractions, decimals, percents, and mixed numbers to lowest *terms*
- e Add and subtract fractions, with same or different denominators
- f Multiply and divide fractions with and without whole numbers
- g Estimate a fractional sum, product, or quotient

NT

16 GEOMETRY

- a Draw geometric figures, plane and solid
- b Match geometric figures with word names, equivalent measures
- c Label all parts of geometric figures using mathematical and characteristic designators
- d Use a protractor to measure angles, make geometrical constructions
- e Construct perpendicular on a line segment, bisector of an angle
- f Compute the perimeter and area of any figure
- g Compute the circumference and area of a circle
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- h. Solve word problems where any mathematical process may occur

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- a Identify coordinates of a point in any grid system
- b. Identify points on a line graph
- c. Match a graph with its equation

18. ALGEBRA

- a. Solve simple algebraic equations with one unknown
- b. Recognize and derive equivalent algebraic expressions
- c. Evaluate powers and estimate roots

19. TRIGONOMETRY

- a. Use tables of trigonometric functions
- b Use tables of logarithms to solve problems
- c. Solve geometric problems using trigonometric functions
- d Use trigonometric ratios to solve problems

CONTENT READING

NT

25 PROCEDURAL DIRECTIONS

- a Identify factual details or specifications that are found within a statement or written selection
- b Select parts of text and visual materials to complete a task activity
- c Follow highly detailed, step by step directions in order to accomplish a sequence of task activities
- d Determine the essential message of a paragraph or section of written material
- e Infer from a written source, which does not explicitly provide required information, in order to make a decision
- f Synthesize information from written sources which contributes to the completion of a task activity

26 VOCABULARY

- a Recognize common words and their meanings
- b Recognize task related words with technical meanings
- c Identify the correct meaning of a word from the context of a sentence
- d Recognize the meaning of common contractions, abbreviations and acronyms
- e Determine the meaning of figurative, idiomatic, and technical terms by using context clues or by using a reference source(s)

INFORMATION ACCESS

27 REFERENCE SKILLS

- a Locate a Technical Manual, Field Manual or any related source document by code number and title
- b Alphabetize words or topics to locate information
- c Use the table of contents, index, system or sub system heading, appendix and glossary to locate information
- d Locate the page, title, paragraph, figure, or chart needed to answer a question or to solve a problem
- e Determine, after scanning or skim reading, whether the information is relevant
- f Cross reference within and across source documents to select information needed to perform a routine
- g Organize information from multiple sources into a sequenced series of events

28 TABLES/CHARTS

- a Obtain a fact or specification from a two column table or chart to find information
- b Obtain a fact or specification from an intersection of a row by column table or chart
- c Use a complex table or chart requiring cross referencing within or in combination with text material outside the chart
- d Apply information from tables and charts for locating malfunctions, or for selecting a course of action

VISUAL AIDS

NT

29 ILLUSTRATIONS

- a Identify details, labels, numbers, and parts from an illustration or picture
- b Identify parts or details according to a key or legend
- c Interpret a drawing which shows a cross sectional view of an object for assembly, disassembly
- d Interpret a three dimensional projection or exploded view of object(s) for assembly, disassembly, or position in system or sub system
- e Follow illustrations, or photographs, arranged in a sequential order, as a guide
- f Integrate information from various sources to select a course of action

30 FLOW CHARTS

- a Use a simple linear path of an organizational chart to list events in sequential order
- b Use a linear path of a flow chart to provide visual and textual directions to a procedure, to arrive at decision points, and to provide alternate paths in problem solving
- c Translate the significance of the symbols into physical activities

31 SCHEMATICS

- a Isolate each major section or entity presented in a schematic diagram
- b Identify the components within each entity
- c Trace connections in an integrated circuit from their origin to another point within or from one entity to another
- d Isolate a problem component in a schematic and trace it to components believed to cause the problem
- e Interpret symbols to indicate direction of flow, test points, components and diagrammatic decision points

WRITTEN COMMUNICATION

32 FORMS

- a Locate the block on a form to enter the appropriate information
- b Transfer a number, code, date, figure or related data from equipment or written sources onto an appropriate section of the form
- c Write the name of the organization, responsible personnel, disposition of the part or equipment, and nomenclature, in appropriate sections of the form
- d Write a descriptive account of an activity or transaction performed
- e Use a completed form to locate or compare information

33 NOTE TAKING

- a Distinguish between essential and non essential details during the note taking process
- b Record details without misinterpreting the intent of either written material or an interview
- c Rewrite all recorded details in sentence form
- d Organize all sentences into paragraphs

NT

34 OUTLINING (topic or sentence)

- a Distinguish between major and subordinate topics
- b Generate titles for each major topic selected
- c Use phrases or sentences to provide subordinate details under each major topic
- d Alternate, indent numbers and letters to establish a hierarchy

35 REPORT WRITING

- a State the intent or objective(s) of the report
- b Describe the parameters of the event or situation
- c Distinguish between relevant and irrelevant details
- d Sequence events in the order they have occurred
- e State general impressions of events described
- f Select examples that will clarify major issues presented in the report
- g Examine opposing points of view in the report
- h Summarize the major points developed in the report
- i Justify an action taken and give reasons for rejecting alternatives

36 EDITING

- a Spell frequently used words correctly
- b. Spell task-related words correctly
- c Identify words that need to be capitalized
- d Correct all misspelled words with or without the use of a reference source
- e Apply all rules for end marks, commas, and apostrophes
- f Apply common rules of grammar
- g. Rewrite the paragraph by stating the main idea in the first sentence, and restructuring the sentences for coherence
- h Appraise an entire written communication and make adjustments to improve clarity

VERBAL COMMUNICATION

37 TYPE

- a. Individual – a person working on a task and communicating with another when assistance is needed or when a supervisory decision is needed
- b Instruction – a task activity requiring communication between an instructor, an individual or small group where the purpose is to give facts or rules to inform or guide
- c Tutor – interaction takes place between two persons where one is instructing and the other is doing the task
- d Peer Group (less than 10) – all members engage in an activity where one person assumes a leadership role and communicates to others what is to be done
- e. Interview – a person communicating with another about his activities, opinions, or subject expertise for the purpose of using the information in a task
- f Briefing – communicating final instructions to others or giving an account in summary
- g Counsel – communicating together to exchange ideas or opinions to recommend, give or take advice, or to arrive at an acceptance of a plan or decision
- h Command – communicate to others an order or action to be taken where a person has a position of authority

NT

38 CHARACTERISTICS

- a Enunciate clearly, using the proper rate of speech
- b Use technical vocabulary suitable to the task and level of the person
- c Determine the appropriate amount of information to communicate
- d Interpret figurative or idiomatic language by reference to its use in context
- e Follow highly detailed, step by step directions
- f Solicit feedback to confirm the accurate reception of the communication
- g Recognize when a low key, informal dialogue is suitable
- h Recognize when direct verbal commands are necessary
- i Recognize when a prescribed series of verbal interactions is required to coordinate a group effort
- j. Recognize when the situation will require a structured, preplanned method of presentation

39 BARRIERS

- a Recognize the need for clear, concise directions in order to avoid language or word meaning differences
- b Recognize personality factors and inter personal relationships that may exist
- c Recognize feedback as a means of communicating more effectively and increasing task competence

SAFETY/SECURITY

40 PRECAUTIONS

- a Use common knowledge to avoid hazards in order to prevent injury to self or equipment
- b. Apply preventive measures prior to task performance to minimize any potential safety or security problem
- c. Select an appropriate course of action in the event of an emergency

PERCEPTUAL

41 RECOGNITION

- a. Identify similarities and differences between and among objects
- b. Use body language (motions, gestures, postures) to communicate or signal
- c. Determine the presence of a defect or extent of damage
- d. Match objects by size, shape, color and significant markings
- e Classify objects by size, shape, color and significant markings
- f. Determine direction, duration, and intensity of sounds, sightings and smells
- g. Infer from sights, sounds, touch, smells, or tastes to determine a course of action

31N Tactical Circuit Controller

BSEP II

NUMERATION/PLACE VALUE

NT

1 NUMBERING AND COUNTING

- a Match numerals with word names and models
- b Write numerals one through N in sequential order from any starting point
- c State what numeral comes after, before, or between any two given numerals
- d Select the numeral which is greater/lesser from a set of numerals
- e *Identify an object with a specified ordinal position*
- f Write or state the place value of a particular digit, whole or decimal number
- g Round off a number to a specified place, whole or decimal
- h Count by ones, twos, fives, tens, etc. backward or forward (skip counting)
- i Match numbers with points or intervals on a number line (positive (+) or negative ( ) values)

UNITS OF MEASUREMENT

2 LINEAR, WEIGHT, AND VOLUME MEASURES

- a Name the markings on a linear scale
- b *Differentiate units of measure* and equivalents in the English and metric system
- c Use a ruler, yardstick, meter stick or scale to measure lengths of objects or distances
- d Identify measures of ounce, pound, gram
- e Identify measures of pints, quarts, gallons, liters
- f Use a scale which is not numerically calibrated
- g Estimate measures of varying lengths, dimensions or weights

3 DEGREE MEASURES

- a Identify degree or mil as a unit in determining direction, distance or temperature
- b Estimate the measure of a given angle not greater than 180^{0}
- c Interpret bearings, azimuth and other contexts in which the measure of an angle may range from 0^{0} to 360^{0}/0 to 6400 mils

4 TIME TELLING MEASURES

- a Use a 24 hour or digital clock to tell time
- b Name intervals and tell time in hours, minutes, and seconds
- c Estimate time in seconds, minutes, and parts of an hour
- d *Identify calendar units and arrange them in Julian style*
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- f Compute time using Greenwich Mean Time (GMT) as a basis for establishing zones and distances

NT

5 GAUGE MEASURES

- a Identify the unit of measurement found on an instrument
- b. Interpret the number, word, symbol from a display read-out
- c Recognize a "reading" from a gauge with color divisions
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- e. Select band(s) from a multi-scale gauge
- f Match a gauge reading to a specification using numbered or labeled intervals
- g. Interpret gauge readings from an unnumbered/unmarked interval
- h Interpret a gauge reading which is fluctuating or momentarily sustained
- i. Match specifications of required measures by manipulation, alignment or maintenance

VISUAL/SPATIAL RELATIONSHIPS

6. SPATIAL

- a. Identify directions that tools, hardware, or components may be moved
- b Manipulate objects to align, match, mate, make parallel, be perpendicular or be at an angle
- c. Interpret spatial relationships of figures and objects from 2-dimensional drawings, pictures, or photographs
- d. Relate geometric symbols and graphic representations to actual systems, subsystems and components

GEOMETRY

7 LINES

- a Identify and name points, lines, rays, and segments
- b Identify intersecting lines, parallel lines, and line segments
- c Define and identify perpendicular lines
- d Identify congruent segments

8 PLANES

- a Identify and name plane geometric figures
- b. List the characteristics of geometric figures
- c Classify figures according to the number or measure of its sides or angles
- d. Identify figures which possess similarities
- e. Identify figures which may be parallel, perpendicular or congruent

9 ANGLES AND TRIANGLES

- a. Identify and name the different kinds of angles and triangles, with their corresponding figures
- b Identify vertical, adjacent, complementary or supplementary angles
- c. Classify triangles according to their sides or angle size
- d Identify altitudes and medians of triangles or the bisector of an angle
- e Name an angle by using letters, a number, or a single letter

NT

10 SOLIDS

- a Recognize and match the names of solids with their corresponding figures

11 TERMINOLOGY

- a Identify technical words associated with geometric figures
- b Interpret meaning of terms derived from spatial orientation

COMPUTE OR PERFORM

12 ADDITION AND SUBTRACTION

- a Add or subtract whole numbers, without carrying or borrowing
- b Add or subtract whole numbers, carrying and borrowing
- c Add and subtract, borrowing and carrying with mixed numbers (whole and decimals)
- d Add or subtract positive (+) and negative ( ) numbers, using a number line to arrive at a solution
- e Add or subtract to find correct time (24 hr clock) using hours or minutes
- f Add or subtract various increments on gauges, dials, or any other measuring instrument
- g Add or subtract time, linear, dry, liquid or degree measures requiring regrouping
- h Estimate a sum or difference

13 MULTIPLICATION AND DIVISION

- a Multiply and divide whole numbers
- b Multiply and divide mixed numbers (whole and decimals)
- c Divide a number with decimals in both divisor and dividend
- d Multiply and divide integers, both positive (+) and negative ( ), and assign proper sign to product or quotient
- e Estimate a product or quotient

14 FRACTIONS/DECIMALS

- a Subdivide whole objects or a set of objects into halves (1/2), thirds (1/3), fourths (1/4), eighths (1/8)
- b Reduce fractions to lowest terms
- c Convert fractions (proper and improper) to decimal equivalents, and vice versa, using a table, chart or gauge
- d Compute equivalent value of fractions, decimals, percents, and mixed numbers to lowest terms
- e Add and subtract fractions, with same or different denominators
- f Multiply and divide fractions with and without whole numbers
- g Estimate a fractional sum, product, or quotient

NT

15 GEOMETRY

- a Draw geometric figures, plane and solid
- b Match geometric figures with word names, equivalent measures
- c Label all parts of geometric figures using mathematical and characteristic designators
- d Use a protractor to measure angles, make geometrical constructions
- e Construct perpendicular on a line segment, bisector of an angle
- f Compute the perimeter and area of any figure
- g Compute the circumference and area of a circle
- h Compute the area and volume of any solid figure
- i Use formulas in solving problems involving geometric figures
- j Solve problems and interpret spatial relationships of figures, symbols, and objects from 2-dimensional displays

16 COMBINATION OF PROCESSES

- a Identify median and mode
- b Compute averages
- c Solve problems combining all processes using whole, mixed numbers and fractions
- d Solve problems, combining all processes, involving units of measurement
- e Interpret information from charts, number lines, scales and graphs to solve arithmetic problems
- f Solve conversion problems of linear (metric and English) liquid, weight, and temperature (F^{o} or C^{o}) measures
- g Solve problems involving ratio and proportion
- h Solve word problems where any mathematical process may occur

17 GRAPHING IN THE COORDINATE PLANE

- a Identify coordinates of a point in any grid system
- b Identify points on a line graph
- c Match a graph with its equation

18 ALGEBRA

- a Solve simple algebraic equations with one unknown
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NT

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- h. Appraise an entire written communication and make adjustments to improve clarity

VERBAL COMMUNICATION

J7 TYPE

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- b Instruction – a task activity requiring communication between an instructor, an individual or small group where the purpose is to give facts or rules to inform or guide
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- g Counsel – communicating together to exchange ideas or opinions to recommend, give or take advice, or to arrive at an acceptance of a plan or decision
- h Command – communicate to others an order or action to be taken where a person has a position of authority

4/23/82

NT

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SAFETY/SECURITY

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- a Use common knowledge to avoid hazards in order to prevent injury to self or equipment
- b Apply preventive measures prior to task performance to minimize any potential safety or security problem
- c. Select an appropriate course of action in the event of an emergency

PERCEPTUAL

J1 RECOGNITION

- a Identify similarities and differences between and among objects
- b. Use body language (motions, gestures, postures) to communicate or signal
- c. Determine the presence of a defect or extent of damage
- d Match objects by size, shape, color and significant markings
- e Classify objects by size, shape, color and significant markings
- f Determine direction, duration, and intensity of sounds, sightings and smells
- g Infer from sights, sounds, touch, smells, or tastes to determine a course of action

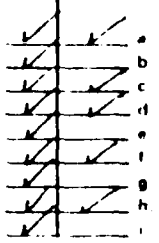
31V Tactical Communications Systems Operator/Mechanic

BSEP I

NUMERATION/PLACE VALUE

NT

1 NUMBERING AND COUNTING



a. Match numerals with word names and models
b. Write numerals one through N in sequential order from any starting point
c. State what numeral comes after, before, or between any two given numerals
d. Select the numeral which is greater/lesser from a set of numerals
e. Identify an object with a specified ordinal position
f. Write or state the place value of a particular digit, whole or decimal number
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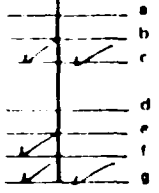
h. Count by ones, twos, fives, tens, etc. backward or forward (skip counting)
i. Match numbers with points or intervals on a number line (positive (+) or negative ( ) values)

UNITS OF MEASUREMENT

2 LINEAR, WEIGHT, AND VOLUME MEASURES



a. Name the markings on a linear scale
b. Differentiate units of measure and equivalents in the English and metric system
c. Use a ruler, yardstick, meter stick or scale to measure lengths of objects or distances
d. Identify measures of ounce, pound, gram
e. Identify measures of pints, quarts, gallons, liters
f. Use a scale which is not numerically calibrated
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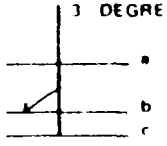
3 DEGREE MEASURES



a. Identify degree or mil as a unit in determining direction, distance or temperature
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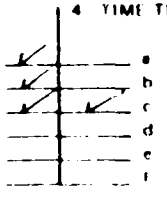
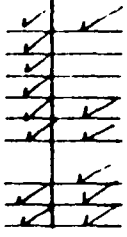
4 TIME TELLING MEASURES



a. Use a 24 hour or digital clock to tell time
b. Name intervals and tell time in hours, minutes, and seconds
c. Estimate time in seconds, minutes, and parts of an hour
d. Identify calendar units and arrange them in Julian style
e. Convert time into hours and tenths of hours
f. Compute time using Greenwich Mean Time (GMT) as a basis for establishing zones and distances

NT

5 GAUGE MEASURES



a. Identify the unit of measurement found on an instrument
b. Interpret the number, word, symbol from a display read out
c. Recognize a "reading" from a gauge with color divisions
d. Recognize positive (+) and negative ( ) demarcation on a scale
e. Select band(s) from a multi-scale gauge
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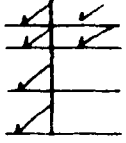
VISUAL/SPATIAL RELATIONSHIPS

6 SPATIAL



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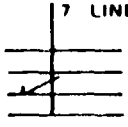
GEOMETRY

7 LINES

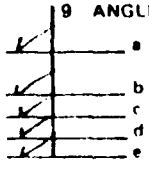


a. Identify and name points, lines, rays, and segments
b. Identify intersecting lines, parallel lines, and line segments
c. Define and identify perpendicular lines
d. Identify congruent segments

8 PLANES

a. Identify and name plane geometric figures
b. List the characteristics of geometric figures
c. Classify figures according to the number or measure of its sides or angles
d. Identify figures which possess similarities
e. Identify figures which may be parallel, perpendicular or congruent

9 ANGLES AND TRIANGLES



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NT

10 SOLIDS

- a Recognize and match the names of solids with their corresponding figures

11 TERMINOLOGY

- a Identify technical words associated with geometric figures
- b Interpret meaning of terms derived from spatial orientation

COMPUTE OR PERFORM

12 ADDITION AND SUBTRACTION

- a Add or subtract whole numbers, without carrying or borrowing
- b Add or subtract whole numbers, carrying and borrowing
- c Add and subtract, borrowing and carrying with mixed numbers (whole and decimals)
- d Add or subtract positive (+) and negative (-) numbers, using a number line to arrive at a solution
- e Add or subtract to find correct time (24 hr. clock) using hours or minutes
- f Add or subtract various increments on gauges, dials, or any other measuring instrument
- g Add or subtract time, linear, dry, liquid or degree measures requiring regrouping
- h Estimate a sum or difference

13 MULTIPLICATION AND DIVISION

- a Multiply and divide whole numbers
- b Multiply and divide mixed numbers (whole and decimals)
- c Divide a number with decimals in both divisor and dividend
- d Multiply and divide integers, both positive (+) and negative (-), and assign proper sign to product or quotient
- e Estimate a product or quotient

14 FRACTIONS/DECIMALS

- a Subdivide whole objects or a set of objects into halves (1/2), thirds (1/3), fourths (1/4), eighths (1/8)
- b Reduce fractions to lowest terms
- c Convert fractions (proper and improper) to decimal equivalents, and vice versa, using a table, chart or gauge
- d Compute equivalent value of fractions, decimals, percents, and mixed numbers to lowest terms
- e Add and subtract fractions, with same or different denominators
- f Multiply and divide fractions with and without whole numbers
- g Estimate a fractional sum, product, or quotient

NT

15 GEOMETRY

- a Draw geometric figures, plane and solid
- b Match geometric figures with word names, equivalent measures
- c Label all parts of geometric figures using mathematical and characteristic designators
- d Use a protractor to measure angles, make geometrical constructions
- e Construct perpendicular on a line segment, bisector of an angle
- f Compute the perimeter and area of any figure
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- h Compute the area and volume of any solid figure
- i Use formulas in solving problems involving geometric figures
- j Solve problems and interpret spatial relationships of figures, symbols, and objects from 2-dimensional displays

16 COMBINATION OF PROCESSES

- a Identify median and mode
- b Compute averages
- c Solve problems combining all processes using whole, mixed numbers and fractions
- d Solve problems, combining all processes, involving units of measurement
- e Interpret information from charts, number lines, scales and graphs to solve arithmetic problems
- f Solve conversion problems of linear (metric and English) liquid, weight, and temperature (F^{o} or C^{o}) measures
- g Solve problems involving ratio and proportion
- h Solve word problems where any mathematical process may occur

17 GRAPHING IN THE COORDINATE PLANE

- a Identify coordinates of a point in any grid system
- b Identify points on a line graph
- c Match a graph with its equation

18 ALGEBRA

- a Solve simple algebraic equations with one unknown
- b Recognize and derive equivalent algebraic expressions
- c Evaluate powers and estimate roots

19 TRIGONOMETRY

- a Use tables of trigonometric functions
- b Use tables of logarithms to solve problems
- c Solve geometric problems using trigonometric functions
- d Use trigonometric ratios to solve problems

CONTENT READING

NT

26 PROCEDURAL DIRECTIONS

- a Identify factual details or specifications that are found within a statement or written selection
- b Select parts of text and visual materials to complete a task activity
- c Follow highly detailed, step by step directions in order to accomplish a sequence of task activities
- d Determine the essential message of a paragraph or section of written material
- e Infer from a written source, which does not explicitly provide required information, in order to make a decision
- f Synthesize information from written sources which contributes to the completion of a task activity

26 VOCABULARY

- a Recognize common words and their meanings
- b Recognize task related words with technical meanings
- c Identify the correct meaning of a word from the context of a sentence
- d Recognize the meaning of common contractions, abbreviations and acronyms
- e Determine the meaning of figurative, idiomatic, and technical terms by using context clues or by using a reference source(s)

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27 REFERENCE SKILLS

- a Locate a Technical Manual, Field Manual or any related source document by code number and title
- b Alphabetize words or topics to locate information
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28 TABLES/CHARTS

- a Obtain a fact or specification from a two column table or chart to find information
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- c Use a complex table or chart requiring cross referencing within or in combination with text material outside the chart
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VISUAL AIDS

NT

29 ILLUSTRATIONS

- a Identify details, labels, numbers, and parts from an illustration or picture
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- d Interpret a three dimensional projection or exploded view of object(s) for assembly, disassembly, or position in system or sub system
- e Follow illustrations, or photographs, arranged in a sequential order, as a guide
- f Integrate information from various sources to select a course of action

30 FLOW CHARTS

- a Use a simple linear path of an organizational chart to list events in sequential order
- b Use a linear path of a flow chart to provide visual and textual directions to a procedure, to arrive at decision points, and to provide alternate paths in problem solving
- c Translate the significance of the symbols into physical activities

31 SCHEMATICS

- a Isolate each major section or entity presented in a schematic diagram
- b Identify the components within each entity
- c Trace connections in an integrated circuit from their origin to another point within or from one entity to another
- d Isolate a problem component in a schematic and trace it to components believed to cause the problem
- e Interpret symbols to indicate direction of flow, test points, components and diagrammatic decision points

WRITTEN COMMUNICATION

32 FORMS

- a Locate the block on a form to enter the appropriate information
- b Transfer a number, code, date, figure or related data from equipment or written sources onto an appropriate section of the form
- c Write the name of the organization, responsible personnel, description of the part or equipment, and nomenclature, in appropriate sections of the form
- d Write a descriptive account of an activity or transaction performed
- e Use a completed form to locate or compare information

33 NOTE TAKING

- a Distinguish between essential and non essential details during the note taking process
- b Record details without misinterpreting the intent of either written material or an interview
- c Rewrite all recorded details in sentence form
- d Organize all sentences into paragraphs

NT

34 OUTLINING (topic or sentence)

- a. Distinguish between major and subordinate topics
- b. Generate titles for each major topic selected
- c. Use phrases or sentences to provide subordinate details under each major topic
- d. Alternate, indent numbers and letters to establish a hierarchy

35 REPORT WRITING

- a. State the intent or objective(s) of the report
- b. Describe the parameters of the event or situation
- c. Distinguish between relevant and irrelevant details
- d. Sequence events in the order they have occurred
- e. State general impressions of events described
- f. Select examples that will clarify major issues presented in the report
- g. Examine opposing points of view in the report
- h. Summarize the major points developed in the report
- i. Justify an action taken and give reasons for rejecting alternatives

36 EDITING

- a. Spell frequently used words correctly
- b. Spell task related words correctly
- c. Identify words that need to be capitalized
- d. Correct all misspelled words with or without the use of a reference source
- e. Apply all rules for end marks, commas, and apostrophes
- f. Apply common rules of grammar
- g. Rewrite the paragraph by stating the main idea in the first sentence, and restructuring the sentences for coherence
- h. Appraise an entire written communication and make adjustments to improve clarity

VERBAL COMMUNICATION

37 TYPE

- a. Individual – a person working on a task and communicating with another when assistance is needed or when a supervisory decision is needed
- b. Instruction – a task activity requiring communication between an instructor, an individual or small group where the purpose is to give facts or rules to inform or guide
- c. Tutor – interaction takes place between two persons where one is instructing and the other is doing the task
- d. Peer Group (less than 10) – all members engage in an activity where one person assumes a leadership role and communicates to others what is to be done
- e. Interview – a person communicating with another about his activities, opinions, or subject expertise for the purpose of using the information in a task
- f. Briefing – communicating final instructions to others or giving an account in summary
- g. Counsel – communicating together to exchange ideas or opinions to recommend, give or take advice, or to arrive at an acceptance of a plan or decision
- h. Command – communicate to others an order or action to be taken where a person has a position of authority

4/23/82

NT

38 CHARACTERISTICS

- a. Enunciate clearly, using the proper rate of speech
- b. Use technical vocabulary suitable to the task and level of the person
- c. Determine the appropriate amount of information to communicate
- d. Interpret figurative or idiomatic language by reference to its use in context
- e. Follow highly detailed, step by step directions
- f. Solicit feedback to confirm the accurate reception of the communication
- g. Recognize when a low key, informal dialogue is suitable
- h. Recognize when direct verbal commands are necessary
- i. Recognize when a prescribed series of verbal interactions is required to coordinate a group effort
- j. Recognize when the situation will require a structured, preplanned method of presentation

39 BARRIERS

- a. Recognize the need for clear, concise directions in order to avoid language or word-meaning differences
- b. Recognize personality factors and inter personal relationships that may exist
- c. Recognize feedback as a means of communicating more effectively and increasing task competence

SAFETY/SECURITY

40 PRECAUTIONS

- a. Use common knowledge to avoid hazards in order to prevent injury to self or equipment
- b. Apply preventive measures prior to task performance to minimize any potential safety or security problem
- c. Select an appropriate course of action in the event of an emergency

PERCEPTUAL

41 RECOGNITION

- a. Identify similarities and differences between and among objects
- b. Use body language (motions, gestures, postures) to communicate or signal
- c. Determine the presence of a defect or extent of damage
- d. Match objects by size, shape, color and significant markings
- e. Classify objects by size, shape, color and significant markings
- f. Determine direction, duration, and intensity of sounds, sightings and smells
- g. Infer from sights, sounds, touch, smells, or tastes to determine a course of action
- h. Interpret Codes and Symbols

32D Station Technical Controller

BSEP I

NUMERATION/PLACE VALUE

NT

1 NUMBERING AND COUNTING

- a Match numerals with word names and models
- b Write numerals one through N in sequential order from any starting point
- c State what numeral comes after, before, or between any two given numerals.
- d Select the numeral which is greater/lesser from a set of numerals
- e Identify an object with a specified ordinal position
- f Write or state the place value of a particular digit, whole or decimal number
- g Round off a number to a specified place, whole or decimal
- h Count by ones, twos, fives, tens, etc. backward or forward (skip counting)
- i Match numbers with points or intervals on a number line (positive (+) or negative (-) values)

UNITS OF MEASUREMENT

2 LINEAR, WEIGHT, AND VOLUME MEASURES

- a Name the markings on a linear scale
- b Differentiate units of measure and equivalents in the English and metric system
- c Use a ruler, yardstick, meter stick or scale to measure lengths of objects or distances
- d Identify measures of ounce, pound, gram
- e Identify measures of pints, quarts, gallons, liters
- f Use a scale which is not numerically calibrated
- g Estimate measures of varying lengths, dimensions or weights

3 DEGREE MEASURES

- a Identify degree or mil as a unit in determining direction, distance or temperature
- b Estimate the measure of a given angle not greater than 180^{o}
- c Interpret bearings, azimuth and other contexts in which the measure of an angle may range from 0^{o} to 360^{o}/0 to 6400 mils

4 TIME TELLING MEASURES

- a Use a 24 hour or digital clock to tell time
- b Name intervals and tell time in hours, minutes, and seconds
- c Estimate time in seconds, minutes and parts of an hour
- d Identify calendar units and arrange them in Julian style
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NT

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- a Identify the unit of measurement found on an instrument
- b. Interpret the number, word, symbol from a display read out
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7 LINES

- a. Identify and name points, lines, rays, and segments
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- a. Identify and name plane geometric figures
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10 SOLIDS

- a Recognize and match the names of solids with their corresponding figures

11 TERMINOLOGY

- a Identify technical words associated with geometric figures
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UNITS OF MEASUREMENT

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- a Name the markings on a linear scale
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- a Identify and name the different kinds of angles and triangles with their corresponding figures
- b Identify vertical, adjacent, complementary, or supplementary angles
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- e Name an angle by using letters, a number or a single letter

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- a Recognize and match the names of solids with their corresponding figures

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- a Identify technical words associated with geometric figures
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- c *Convert fractions (proper and improper)* to decimal equivalents, *and vice versa*, using a table, chart or gauge
- d Compute equivalent value of fractions, decimals, percents, and mixed numbers to lowest terms
- e Add and subtract fractions, with same or different denominators
- f *Multiply and divide fractions with and without whole numbers*
- g Estimate a fractional sum, product, or quotient

NT

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- b Match geometric figures with word names, equivalent measures
- c Label all parts of geometric figures using mathematical and characteristic designators
- d Use a protractor to measure angles, make geometrical constructions
- e Construct perpendicular on a line segment, bisector of an angle
- f Compute the perimeter and area of any figure
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- j Solve problems and interpret spatial relationships of figures, symbols, and objects from 2 dimensional displays

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- a Identify coordinates of a point in any grid system
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- a Solve simple algebraic equations with one unknown
- b. Recognize and derive equivalent algebraic expressions
- c. Evaluate powers and estimate roots

19 TRIGONOMETRY

- a Use tables of trigonometric functions
- b. Use tables of logarithms to solve problems
- c. Solve geometric problems using trigonometric functions
- d Use trigonometric ratios to solve problems

CONTENT READING

NT

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- a Identify factual details or specifications that are found within a statement or written selection
- b Select parts of text and visual materials to complete a task activity
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- a Recognize common words and their meanings
- b Recognize task related words with technical meanings
- c Identify the correct meaning of a word from the context of a sentence
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- a Locate a Technical Manual, Field Manual or any related source document by title number and title
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- a Identify details, labels, numbers, and parts from an illustration or picture
- b Identify parts or details according to a key or legend
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- a Locate the block on a form to enter the appropriate information
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- a Spell frequently used words correctly
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- g. Infer from sights, sounds, touch, smells, or tastes to determine a course of action

335 EW/Intercept Equipment Repairer

BSEP I

NUMERATION/PLACE VALUE

NT

1 NUMBERING AND COUNTING

- a Match numerals with word names and models
- b Write numerals one through N in sequential order from any starting point
- c State what numeral comes after, before, or between any two given numerals
- d Select the numeral which is greater/lesser from a set of numerals
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UNITS OF MEASUREMENT

2. LINEAR, WEIGHT, AND VOLUME MEASURES

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6. SPATIAL

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- c Interpret spatial relationships of figures and objects from 2 dimensional drawings, pictures, or photographs
- d. Relate geometric symbols and graphic representations to actual systems subsystems and components

GEOMETRY

7. LINES

- a Identify and name points, lines, rays, and segments
- b. Identify intersecting lines, parallel lines and line segments
- c. Define and identify perpendicular lines
- d Identify congruent segments

8. PLANES

- a Identify and name plane geometric figures
- b. List the characteristics of geometric figures
- c. Classify figures according to the number or measure of its sides or angles
- d Identify figures which possess similarities
- e. Identify figures which may be parallel, perpendicular or congruent

9. ANGLES AND TRIANGLES

- a Identify and name the different kinds of angles and triangles, with the corresponding figures
- b Identify vertical, adjacent, complementary or supplementary angles
- c. Classify triangles according to their sides or angle size
- d Identify altitudes and medians of triangles or the bisector of an angle
- e. Name an angle by using letters, a number, or a single letter

NT

10 SOLIDS

- a. Recognize and match the names of solids with their corresponding figures

11 TERMINOLOGY

- a. Identify technical words associated with geometric figures
- b. Interpret meaning of terms derived from spatial orientation

COMPUTE OR PERFORM

12 ADDITION AND SUBTRACTION

- a. Add or subtract whole numbers, without carrying or borrowing
- b. Add or subtract whole numbers, carrying and borrowing
- c. Add and subtract, borrowing and carrying with mixed numbers (whole and decimals)
- d. Add or subtract positive (+) and negative ( ) numbers, using a number line to arrive at a solution
- e. Add or subtract to find correct time (24 hr. clock) using hours or minutes
- f. Add or subtract various increments on gauges, dials, or any other measuring instrument
- g. Add or subtract time, linear, dry, liquid or degree measures requiring regrouping
- h. Estimate a sum or difference

13 MULTIPLICATION AND DIVISION

- a. Multiply and divide whole numbers
- b. Multiply and divide mixed numbers (whole and decimals)
- c. Divide a number with decimals in both divisor and dividend
- d. Multiply and divide integers, both positive (+) and negative ( ), and assign proper sign to product or quotient
- e. Estimate a product or quotient

14 FRACTIONS/DECIMALS

- a. Subdivide whole objects or a set of objects into halves (1/2), thirds (1/3), fourths (1/4), eighths (1/8)
- b. Reduce fractions to lowest terms
- c. Convert fractions (proper and improper) to decimal equivalents, and vice versa, using a table, chart or gauge
- d. Compute equivalent value of fractions, decimals, percents, and mixed numbers to lowest terms
- e. Add and subtract fractions, with same or different denominators
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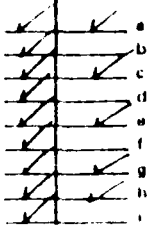
- h. Interpret codes or symbols

BSEP I

NUMERATION/PLACE VALUE

NT

1 NUMBERING AND COUNTING



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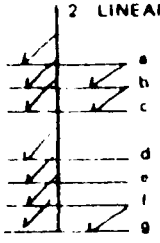

a. Name the markings on a linear scale
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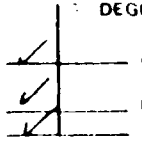

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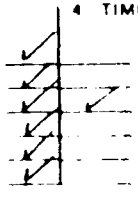
4 TIME TELLING MEASURES



a. Use a 24 hour or digital clock to tell time
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NT

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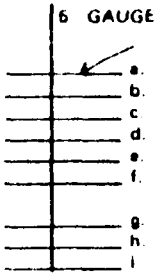

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VISUAL/SPATIAL RELATIONSHIPS

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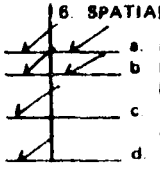

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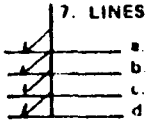
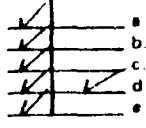
7. LINES



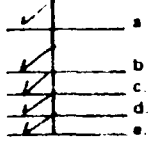
a. Identify and name points, lines, rays, and segments
b. Identify intersecting lines, parallel lines, and line segments
c. Define and identify perpendicular lines
d. Identify congruent segments

8 PLANES



a. Identify and name plane geometric figures
b. List the characteristics of geometric figures
c. Classify figures according to the number or measure of its sides or angles
d. Identify figures which possess similarities
e. Identify figures which may be parallel, perpendicular or congruent

9 ANGLES AND TRIANGLES



a. Identify and name the different kinds of angles and triangles, with their corresponding figures
b. Identify vertical, adjacent, complementary or supplementary angles
c. Classify triangles according to their sides or angle size
d. Identify altitudes and medians of triangles or the bisector of an angle
e. Name an angle by using letters, a number, or a single letter

NT

10 SOLIDS

- a. Recognize and match the names of solids with their corresponding figures

11 TERMINOLOGY

- a. Identify technical words associated with geometric figures
- b. Interpret meaning of terms derived from spatial orientation

COMPUTE OR PERFORM

12 ADDITION AND SUBTRACTION

- a. Add or subtract whole numbers, without carrying or borrowing
- b. Add or subtract whole numbers, carrying and borrowing
- c. Add and subtract, borrowing and carrying with mixed numbers (whole and decimals)
- d. Add or subtract positive (+) and negative ( ) numbers, using a number line to arrive at a solution
- e. Add or subtract to find correct time (24 hr. clock) using hours or minutes
- f. Add or subtract various increments on gauges, dials, or any other measuring instrument
- g. Add or subtract time, linear, dry, liquid or degree measures requiring regrouping
- h. Estimate a sum or difference

13 MULTIPLICATION AND DIVISION

- a. Multiply and divide whole numbers
- b. Multiply and divide mixed numbers (whole and decimals)
- c. Divide a number with decimals in both divisor and dividend
- d. Multiply and divide integers, both positive (+) and negative ( ), and assign proper sign to product or quotient
- e. Estimate a product or quotient

14. FRACTIONS/DECIMALS

- a. Subdivide whole objects or a set of objects into halves (1/2), thirds (1/3), fourths (1/4), eighths (1/8)
- b. Reduce fractions to lowest terms
- c. Convert fractions (proper and improper) to decimal equivalents, and vice versa, using a table, chart or gauge
- d. Compute equivalent value of fractions, decimals, percents, and mixed numbers to lowest terms
- e. Add and subtract fractions, with same or different denominators
- f. Multiply and divide fractions with and without whole numbers
- g. Estimate a fractional sum, product, or quotient

NT

15 GEOMETRY

- a. Draw geometric figures, plane and solid
- b. Match geometric figures with word names, equivalent measures
- c. Label all parts of geometric figures using mathematical and characteristic designators
- d. Use a protractor to measure angles, make geometrical constructions
- e. Construct perpendicular on a line segment, bisector of an angle
- f. Compute the perimeter and area of any figure
- g. Compute the circumference and area of a circle
- h. Compute the area and volume of any solid figure
- i. Use formulas in solving problems involving geometric figures
- j. Solve problems and interpret spatial relationships of figures, symbols, and objects from 2-dimensional displays

16. COMBINATION OF PROCESSES

- a. Identify median and mode
- b. Compute averages
- c. Solve problems combining all processes using whole, mixed numbers and fractions
- d. Solve problems, combining all processes, involving units of measurement
- e. Interpret information from charts, number lines, scales and graphs to solve arithmetic problems
- f. Solve conversion problems of linear (metric and English) liquid, weight, and temperature (F^{O} or C^{O}) measures
- g. Solve problems involving ratio and proportion
- h. Solve word problems where any mathematical process may occur

17. GRAPHING IN THE COORDINATE PLANE

- a. Identify coordinates of a point in any grid system
- b. Identify points on a line graph
- c. Match a graph with its equation

18. ALGEBRA

- a. Solve simple algebraic equations with one unknown
- b. Recognize and derive equivalent algebraic expressions
- c. Evaluate powers and estimate roots

19. TRIGONOMETRY

- a. Use tables of trigonometric functions
- b. Use tables of logarithms to solve problems
- c. Solve geometric problems using trigonometric functions
- d. Use trigonometric ratios to solve problems

CONTENT READING

NT

25 PROCEDURAL DIRECTIONS

- a *Identify factual details or specifications* that are found within a statement or written selection
- b Select parts of text and visual materials *to complete a task activity*
- c Follow highly detailed, step by step directions *in order to accomplish a sequence* of task activities
- d Determine the essential message of a paragraph or section of written *material*
- e *Infer from a written source, which does not explicitly provide required* information *in order to make a decision*
- f Synthesize information from written sources which contributes to the completion of a task activity

26 VOCABULARY

- a Recognize common words and their meanings
- b Recognize task related words with technical meanings
- c Identify the correct meaning of a word from the context of a sentence
- d Recognize the meaning of common contractions, abbreviations and acronyms
- e *Determine the meaning of figurative, idiomatic, and technical terms* by using context clues or by using a reference source(s)

INFORMATION ACCESS

27 REFERENCE SKILLS

- a Locate a Technical Manual, Field Manual or any related source document by code number and title
- b Alphabetize words or topics to locate information
- c Use the table of contents, index, system or sub system heading, appendix and glossary to locate information
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- e Determine, after scanning or skim reading, whether the information is relevant
- f Cross reference within and across source documents to select information needed to perform a routine
- g Organize information from multiple sources into a sequenced series of events

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- a Obtain a fact or specification from a two column table or chart to find information
- b Obtain a fact or specification from an intersection of a row by column table or chart
- c Use a complex table or chart requiring cross referencing within or in combination with text material outside the chart
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VISUAL AIDS

NT

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- a Identify details, labels, numbers, and parts from an illustration or picture
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- c *Interpret a drawing which shows a cross sectional view* of an object for assembly, disassembly
- d Interpret a three dimensional projection or exploded view of object(s) for assembly, disassembly, or position in system or sub system
- e Follow illustrations, or photographs, arranged in a sequential order, as a guide
- f Integrate information from various sources to select a course of action

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- a Use a simple linear path of an organizational chart to list events in sequential order
- b Use a linear path of a flow chart to provide visual and textual directions to a procedure, to arrive at decision points, and to provide alternate paths in problem solving
- c Translate the significance of the symbols into physical activities

31 SCHEMATICS

- a Isolate each major section or entity presented in a schematic diagram
- b Identify the components within each entity
- c Trace connections in an integrated circuit from their origin to another point within or from one entity to another
- d Isolate a problem component in a schematic and trace it to components believed to cause the problem
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WRITTEN COMMUNICATION

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- a Locate the block on a form to enter the appropriate information
- b Transfer a number, code, date, figure or related data from equipment or written sources onto an appropriate section of the form
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- a Distinguish between essential and non essential details during the [illegible] process
- b Record details without misinterpreting the intent of either written material or an interview
- c Rewrite all recorded details in sentence form
- d Organize all sentences into paragraphs

NT

34 OUTLINING (topic or sentence)

- a Distinguish between major and subordinate topics
- b Generate titles for each major topic selected
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- d Alternate, indent numbers and letters to establish a hierarchy

35 REPORT WRITING

- a State the intent or objective(s) of the report
- b Describe the parameters of the event or situation
- c Distinguish between relevant and irrelevant details
- d Sequence events in the order they have occurred
- e State general impressions of events described
- f Select examples that will clarify major issues presented in the report
- g Examine opposing points of view in the report
- h Summarize the major points developed in the report
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- a Spell frequently used words correctly
- b Spell task related words correctly
- c Identify words that need to be capitalized
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- f Apply common rules of grammar
- g Rewrite the paragraph by stating the main idea in the first sentence, and restructuring the sentences for coherence
- h Appraise an entire written communication and make adjustments to improve clarity

VERBAL COMMUNICATION

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- a Individual — a person working on a task and communicating with another when assistance is needed or when a supervisory decision is needed
- b Instruction — a task activity requiring communication between an instructor, an individual or small group where the purpose is to give facts or rules to inform or guide
- c Tutor — interaction takes place between two persons where one is instructing and the other is doing the task
- d Peer Group (less than 10) — all members engage in an activity where one person assumes a leadership role and communicates to others what is to be done
- e Interview — a person communicating with another about his activities, opinions, or subject expertise for the purpose of using the information in a task
- f Briefing — communicating final instructions to others or giving an account in summary
- g Counsel — communicating together to exchange ideas or opinions to recommend, give or take advice, or to arrive at an acceptance of a plan or decision
- h Command — communicate to others an order or action to be taken where a person has a position of authority

4/23/82

NT

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- a Enunciate clearly, using the proper rate of speech
- b Use technical vocabulary suitable to the task and level of the person
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- a Recognize the need for clear, concise directions in order to avoid language or word meaning differences
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- a. Use common knowledge to avoid hazards in order to prevent injury to self or equipment
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- c. Determine the presence of a defect or extent of damage
- d. Match objects by size, shape, color and significant markings
- e Classify objects by size, shape, color and significant markings
- f. Determine direction, duration, and intensity of sounds, sightings and smells
- g. Infer from sights, sounds, touch, smells, or tastes to determine a course of action

BSEP I

NUMERATION/PLACE VALUE

NT

1 NUMBERING AND COUNTING

- a Match numerals with word names and models
- b Write numerals one through N in sequential order from any starting point
- c State what numeral comes after, before, or between any two given numerals
- d Select the numeral which is greater/lesser from a set of numerals
- e Identify an object with a specified ordinal position
- f Write or state the place value of a particular digit, whole or decimal number
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- h Count by ones, twos, fives, tens, etc. backward or forward (skip counting)
- i Match numbers with points or intervals on a number line (positive (+) or negative ( ) values)

UNITS OF MEASUREMENT

2 LINEAR, WEIGHT, AND VOLUME MEASURES

- a Name the markings on a linear scale
- b Differentiate units of measure and equivalents in the English and metric system
- c Use a ruler, yardstick, meter stick or scale to measure lengths of objects or distances
- d Identify measures of ounce, pound, gram
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- a Identify degree or mil as a unit in determining direction, distance or temperature
- b Estimate the measure of a given angle not greater than 180^{0}
- c Interpret bearings, azimuth and other contexts in which the measure of an angle may range from 0^{0} to 360^{0}/0 to 6400 mils

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- e Select band(s) from a multi-scale gauge
- f. Match a gauge reading to a specification using numbered or labeled intervals
- g Interpret gauge readings from an unnumbered/unmarked interval
- h. Interpret a gauge reading which is fluctuating or momentarily sustained
- i Match specifications of required measures by manipulation, alignment or maintenance

VISUAL/SPATIAL RELATIONSHIPS

6. SPATIAL

- a Identify directions that tools, hardware, or components may be moved
- b Manipulate objects to align, match, mate, make parallel, be perpendicular or be at an angle
- c. Interpret spatial relationships of figures and objects from 2 dimensional drawings, pictures, or photographs
- d. Relate geometric symbols and graphic representations to actual systems, subsystems and components

GEOMETRY

7 LINES

- a. Identify and name points, lines, rays, and segments
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- c. Define and identify perpendicular lines
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4/23/82

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36K Tactical Wire Operations Specialist

BSEP 1

NUMERATION/PLACE VALUE

NT

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- g Interpret gauge readings from an unnumbered/unmarked interval
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- i. Match specifications of required measures by manipulation, alignment or maintenance

VISUAL/SPATIAL RELATIONSHIPS

6. SPATIAL

- a Identify directions that tools, hardware, or components may be moved
- b Manipulate objects to align, match, mate, make parallel, be perpendicular or be at an angle
- c. Interpret spatial relationships of figures and objects from 2 dimensional drawings, pictures, or photographs
- d. Relate geometric symbols and graphic representations to actual systems subsystems and components

GEOMETRY

7 LINES

- a. Identify and name points, lines, rays, and segments
- b Identify intersecting lines parallel lines, and line segments
- c Define and identify perpendicular lines
- d Identify congruent segments

8 PLANES

- a Identify and name plane geometric figures
- b List the characteristics of geometric figures
- c Classify figures according to the number or measure of its sides or angles
- d Identify figures which possess similarities
- e Identify figures which may be parallel, perpendicular or congruent

9 ANGLES AND TRIANGLES

- a Identify and name the different kinds of angles and triangles, with their corresponding figures
- b Identify vertical, adjacent, complementary or supplementary angles
- c Classify triangles according to their sides or angle size
- d Identify altitudes and medians of triangles or the bisector of an angle
- e Name an angle by using letters, a number or a single letter

NT

10 SOLIDS

- a Recognize and match the names of solids with their corresponding figures

11 TERMINOLOGY

- a Identify technical words associated with geometric figures
- b Interpret meaning of terms derived from spatial orientation

COMPUTE OR PERFORM

12 ADDITION AND SUBTRACTION

- a Add or subtract whole numbers, without carrying or borrowing
- b Add or subtract whole numbers, carrying and borrowing
- c Add and subtract, borrowing and carrying with mixed numbers (whole and decimals)
- d Add or subtract positive (+) and negative ( ) numbers, using a number line to arrive at a solution
- e Add or subtract to find correct time (24 hr. clock) using hours or minutes
- f Add or subtract various increments on gauges, dials, or any other measuring instrument
- g Add or subtract time, linear, dry, liquid or degree measures requiring regrouping
- h Estimate a sum or difference

13 MULTIPLICATION AND DIVISION

- a. Multiply and divide whole numbers
- b. Multiply and divide mixed numbers (whole and decimals)
- c Divide a number with decimals in both divisor and dividend
- d. Multiply and divide integers, both positive (+) and negative ( ), and assign proper sign to product or quotient
- e Estimate a product or quotient

14. FRACTIONS/DECIMALS

- a. Subdivide whole objects or a set of objects into halves (1/2), thirds (1/3), fourths (1/4), eighths (1/8)
- b. Reduce fractions to lowest terms
- c Convert fractions (proper and improper) to decimal equivalents, and vice versa, using a table, chart or gauge
- d. Compute equivalent value of fractions, decimals, percents, and mixed numbers to lowest terms
- e. Add and subtract fractions, with same or different denominators
- f Multiply and divide fractions with and without whole numbers
- g Estimate a fractional sum, product, or quotient

NT

15. GEOMETRY

- a. Draw geometric figures, plane and solid
- b. Match geometric figures with word names, equivalent measures
- c Label all parts of geometric figures using mathematical and characteristic designators
- d Use a protractor to measure angles, make geometrical constructions
- e Construct perpendicular on a line segment, bisector of an angle
- f Compute the perimeter and area of any figure
- g Compute the circumference and area of a circle
- h Compute the area and volume of any solid figure
- i. Use formulas in solving problems involving geometric figures
- j. Solve problems and interpret spatial relationships of figures, symbols, and objects from 2-dimensional displays

16. COMBINATION OF PROCESSES

- a Identify median and mode
- b Compute averages
- c. Solve problems combining all processes using whole, mixed numbers and fractions
- d. Solve problems, combining all processes, involving units of measurement
- e. Interpret information from charts, number lines, scales and graphs to solve arithmetic problems
- f. Solve conversion problems of linear (metric and English) liquid, weight, and temperature (F^{o} or C^{o}) measures
- g Solve problems involving ratio and proportion
- h. Solve word problems where any mathematical process may occur

17. GRAPHING IN THE COORDINATE PLANE

- a Identify coordinates of a point in any grid system
- b. Identify points on a line graph
- c. Match a graph with its equation

18. ALGEBRA

- a. Solve simple algebraic equations with one unknown
- b. Recognize and derive equivalent algebraic expressions
- c. Evaluate powers and estimate roots

19. TRIGONOMETRY

- a. Use tables of trigonometric functions
- b. Use tables of logarithms to solve problems
- c. Solve geometric problems using trigonometric functions
- d Use trigonometric ratios to solve problems

CONTENT READING

NT

25 PROCEDURAL DIRECTIONS

- a Identify factual details or specifications that are found within a statement or written selection
- b Select parts of text and visual materials to complete a task activity
- c Follow highly detailed, step by step directions in order to accomplish a sequence of task activities
- d Determine the essential message of a paragraph or section of written material
- e Infer from a written source, which does not explicitly provide required information, in order to make a decision
- f Synthesize information from written sources which contributes to the completion of a task activity

26 VOCABULARY

- a Recognize common words and their meanings
- b Recognize task related words with technical meanings
- c Identify the correct meaning of a word from the context of a sentence
- d Recognize the meaning of common contractions, abbreviations and acronyms
- e Determine the meaning of figurative, idiomatic, and technical terms by using context clues or by using a reference source(s)

INFORMATION ACCESS

27 REFERENCE SKILLS

- a Locate a Technical Manual, Field Manual or any related source document by code number and title
- b Alphabetize words or topics to locate information
- c Use the table of contents, index, system or sub-system heading, appendix and glossary to locate information
- d Locate the page, title, paragraph, figure, or chart needed to answer a question or to solve a problem
- e Determine, after scanning or skim reading, whether the information is relevant
- f Cross reference within and across source documents to select information needed to perform a routine
- g Organize information from multiple sources into a sequenced series of events

28 TABLES/CHARTS

- a Obtain a fact or specification from a two-column table or chart to find information
- b Obtain a fact or specification from an intersection of a row by column table or chart
- c Use a complex table or chart requiring cross referencing within or in combination with text material outside the chart
- d Apply information from tables and charts for locating malfunctions, or for selecting a course of action

VISUAL AIDS

NT

29 ILLUSTRATIONS

- a Identify details, labels, numbers, and parts from an illustration or picture
- b Identify parts or details according to a key or legend
- c Interpret a drawing which shows a cross sectional view of an object for assembly, disassembly
- d Interpret a three dimensional projection or exploded view of object(s) for assembly, disassembly, or position in system or sub system
- e Follow illustrations, or photographs, arranged in a sequential order, as a guide
- f Integrate information from various sources to select a course of action

30 FLOW CHARTS

- a Use a simple linear path of an organizational chart to list events in sequential order
- b Use a linear path of a flow chart to provide visual and textual directions to a procedure, to arrive at decision points, and to provide alternate paths in problem solving
- c Translate the significance of the symbols into physical activities

31 SCHEMATICS

- a Isolate each major section or entity presented in a schematic diagram
- b Identify the components within each entity
- c Trace connections in an integrated circuit from their origin to another point within or from one entity to another
- d Isolate a problem component in a schematic and trace it to components believed to cause the problem
- e Interpret symbols to indicate direction of flow, test points, components and diagrammatic decision points

WRITTEN COMMUNICATION

32 FORMS

- a Locate the block on a form to enter the appropriate information
- b Transfer a number, code, date, figure or related data from equipment or written sources onto an appropriate section of the form
- c Write the name of the organization, responsible personnel, disposition of the part or equipment, and nomenclature, in appropriate sections of the form
- d Write a descriptive account of an activity or transaction performed
- e Use a completed form to locate or compare information

33 NOTE-TAKING

- a Distinguish between essential and non-essential details during the note taking process
- b Record details without misinterpreting the intent of either written material or an interview
- c Rewrite all recorded details in sentence form
- d Organize all sentences into paragraphs

NT

34 OUTLINING (topic or sentence)

- a Distinguish between major and subordinate topics
- b Generate titles for each major topic selected
- c Use phrases or sentences to provide subordinate details under each major topic
- d Alternate, indent numbers and letters to establish a hierarchy

35 REPORT WRITING

- a State the intent or objective(s) of the report
- b Describe the parameters of the event or situation
- c Distinguish between relevant and irrelevant details
- d *Sequence events in the order they have occurred*
- e State general impressions of events described
- f Select examples that will clarify major issues presented in the report
- g Examine opposing points of view in the report
- h Summarize the major points developed in the report
- i Justify an action taken and give reasons for rejecting alternatives

36 EDITING

- a Spell frequently used words correctly
- b Spell task related words correctly
- c Identify words that need to be capitalized
- d Correct all misspelled words with or without the use of a reference source
- e Apply all rules for end marks, commas, and apostrophes
- f Apply common rules of grammar
- g Rewrite the paragraph by stating the main idea in the first sentence, and restructuring the sentences for coherence
- h Appraise an entire written communication and make adjustments to improve clarity

VERBAL COMMUNICATION

37 TYPE

- a Individual – a person working on a task and communicating with another when assistance is needed or when a supervisory decision is needed
- b Instruction – a task activity requiring communication between an instructor, an individual or small group where the purpose is to give facts or rules to inform or guide
- c Tutor – interaction takes place between two persons where one is instructing and the other is doing the task
- d Peer Group (less than 10) – all members engage in an activity where one person assumes a leadership role and communicates to others what is to be done
- e Interview – a person communicating with another about his activities, opinions, or subject expertise for the purpose of using the information in a task
- f Briefing – communicating final instructions to others or giving an account in summary
- g Counsel – communicating together to exchange ideas or opinions to recommend, give or take advice, or to arrive at an acceptance of a plan or decision
- h Command – communicate to others an order or action to be taken where *a person has a position of authority*

NT

38 CHARACTERISTICS

- a Enunciate clearly using the proper rate of speech
- b Use technical vocabulary suitable to the task and level of the person
- c Determine the appropriate amount of information to communicate
- d Interpret figurative or idiomatic language by reference to its use in context
- e Follow highly detailed step by step directions
- f Solicit feedback to confirm the accurate reception of the communication
- g Recognize when a low key, informal dialogue is suitable
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- i Recognize when a prescribed series of verbal interactions is required to coordinate a group effort
- j Recognize when the situation will require a structured, preplanned method of presentation

39. BARRIERS

- a Recognize the need for clear, concise directions in order to avoid language or word-meaning differences
- b Recognize personality factors and inter personal relationships that may exist
- c Recognize feedback as a means of communicating more effectively and increasing task competence

SAFETY/SECURITY

40. PRECAUTIONS

- a. Use common knowledge to avoid hazards in order to prevent injury to self or equipment
- b Apply preventive measures prior to task performance to minimize any potential safety or security problem
- c. Select an appropriate course of action in the event of an emergency

PERCEPTUAL

41 RECOGNITION

- a Identify similarities and differences between and among objects
- b Use body language (motions, gestures, postures) to communicate or signal
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- d Match objects by size, shape, color and significant markings
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- f Determine direction, duration, and intensity of sounds, sightings and smells
- g Infer from sights, sounds, touch, smells, or tastes to determine a course of action

BSEP 1

NUMERATION/PLACE VALUE

NT

1 NUMBERING AND COUNTING

- a Match numerals with word names and models
- b Write numerals one through N in sequential order from any starting point
- c State what numeral comes after, before, or between any two given numerals
- d Select the numeral which is greater/lesser from a set of numerals
- e Identify an object with a specified ordinal position
- f Write or state the place value of a particular digit, whole or decimal number
- g Round off a number to a specified place, whole or decimal
- h Count by ones, twos, fives, tens, etc backward or forward (skip counting)
- i Match numbers with points or intervals on a number line (positive (+) or negative ( ) values)

UNITS OF MEASUREMENT

2 LINEAR, WEIGHT, AND VOLUME MEASURES

- a Name the markings on a linear scale
- b Differentiate units of measure and equivalents in the English and metric system
- c Use a ruler, yardstick, meter stick or scale to measure lengths of objects or distances
- d Identify measures of ounce, pound, gram
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- f Use a scale which is not numerically calibrated
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- a Identify degree or mil as a unit in determining direction, distance or temperature
- b Estimate the measure of a given angle not greater than 180°
- c Interpret bearings, azimuth and other contexts in which the measure of an angle may range from 0° to 360°/0 to 6400 mils

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- a Use a 24 hour or digital clock to tell time
- b Name intervals and tell time in hours, minutes, and seconds
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- a Name the markings on a linear scale
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COMPUTE OR PERFORM

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- a Add or subtract whole numbers, without carrying or borrowing
- b Add or subtract whole numbers, carrying and borrowing
- c Add and subtract, borrowing and carrying with mixed numbers (whole and decimals)
- d Add or subtract positive (+) and negative (-) numbers, using a number line to arrive at a solution
- e Add or subtract to find correct time (24 hr. clock) using hours or minutes
- f Add or subtract various increments on gauges, dials, or any other measuring instrument
- g Add or subtract time, linear, dry, liquid or degree measures requiring regrouping
- h Estimate a sum or difference

13 MULTIPLICATION AND DIVISION

- a Multiply and divide whole numbers
- b Multiply and divide mixed numbers (whole and decimals)
- c Divide a number with decimals in both divisor and dividend
- d Multiply and divide integers, both positive (+) and negative (-), and assign proper sign to product or quotient
- e Estimate a product or quotient

14 FRACTIONS/DECIMALS

- a Subdivide whole objects or a set of objects into halves (1/2), thirds (1/3), fourths (1/4), eighths (1/8)
- b Reduce fractions to lowest terms
- c Convert fractions (proper and improper) to decimal equivalents, and vice versa, using a table, chart or gauge
- d Compute equivalent value of fractions, decimals, percents, and mixed numbers to lowest terms
- e Add and subtract fractions, with same or different denominators
- f Multiply and divide fractions with and without whole numbers
- g Estimate a fractional sum, product, or quotient

NT

15 GEOMETRY

- a Draw geometric figures, plane and solid
- b Match geometric figures with word names, equivalent measures
- c Label all parts of geometric figures using mathematical and characteristic designators
- d Use a protractor to measure angles, make geometrical constructions
- e Construct perpendicular on a line segment, bisector of an angle
- f Compute the perimeter and area of any figure
- g Compute the circumference and area of a circle
- h Compute the area and volume of any solid figure
- i Use formulas in solving problems involving geometric figures
- j Solve problems and interpret spatial relationships of figures, symbols, and objects from 2-dimensional displays

16 COMBINATION OF PROCESSES

- a Identify median and mode
- b Compute averages
- c Solve problems combining all processes using whole, mixed numbers and fractions
- d Solve problems, combining all processes, involving units of measurement
- e Interpret information from charts, number lines, scales and graphs to solve arithmetic problems
- f Solve conversion problems of linear (metric and English) liquid, weight, and temperature (F^{O} or C^{O}) measures
- g Solve problems involving ratio and proportion
- h Solve word problems where any mathematical process may occur

17 GRAPHING IN THE COORDINATE PLANE

- a Identify coordinates of a point in any grid system
- b Identify points on a line graph
- c Match a graph with its equation

18 ALGEBRA

- a Solve simple algebraic equations with one unknown
- b Recognize and derive equivalent algebraic expressions
- c Evaluate powers and estimate roots

19 TRIGONOMETRY

- a Use tables of trigonometric functions
- b Use tables of logarithms to solve problems
- c Solve geometric problems using trigonometric functions
- d Use trigonometric ratios to solve problems

CONTENT READING

NT

25 PROCEDURAL DIRECTIONS

- a Identify factual details or specifications that are found within a statement or written selection
- b Select parts of text and visual materials to complete a task activity
- c Follow highly detailed step by step directions in order to accomplish a sequence of task activities
- d Determine the essential message of a paragraph or section of written material
- e Infer from a written source which does not explicitly provide required information in order to make a decision
- f Synthesize information from written sources which contributes to the completion of a task activity

26 VOCABULARY

- a Recognize common words and their meanings
- b Recognize task related words with technical meanings
- c Identify the correct meaning of a word from the context of a sentence
- d Recognize the meaning of common contractions, abbreviations and acronyms
- e Determine the meaning of figurative, idiomatic, and technical terms by using context clues or by using a reference source(s)

INFORMATION ACCESS

27 REFERENCE SKILLS

- a Locate a Technical Manual, Field Manual or any related source document by code number and title
- b Alphabetize words or topics to locate information
- c Use the table of contents, index, system or sub system heading, appendix and glossary to locate information
- d Locate the page, title, paragraph, figure, or chart needed to answer a question or to solve a problem
- e Determine, after scanning or skim reading, whether the information is relevant
- f Cross reference within and across source documents to select information needed to perform a routine
- g Organize information from multiple sources into a sequenced series of events

28 TABLES/CHARTS

- a Obtain a fact or specification from a two column table or chart to find information
- b Obtain a fact or specification from an intersection of a row by column table or chart
- c Use a complex table or chart requiring cross referencing within or in combination with text material outside the chart
- d Apply information from tables and charts for locating malfunctions, or for selecting a course of action

VISUAL AIDS

NT

29 ILLUSTRATIONS

- a Identify details, labels, numbers, and parts from an illustration or picture
- b Identify parts or details according to a key or legend
- c Interpret a drawing which shows a cross sectional view of an object for assembly, disassembly
- d Interpret a three dimensional projection or exploded view of object(s) for assembly, disassembly, or position in system or sub system
- e Follow illustrations, or photographs, arranged in a sequential order, as a guide
- f Integrate information from various sources to select a course of action

30 FLOW CHARTS

- a Use a simple linear path of an organizational chart to list events in sequential order
- b Use a linear path of a flow chart to provide visual and textual directions to a procedure, to arrive at decision points, and to provide alternate paths in problem solving
- c Translate the significance of the symbols into physical activities

31 SCHEMATICS

- a Isolate each major section or entity presented in a schematic diagram
- b Identify the components within each entity
- c Trace connections in an integrated circuit from their origin to another point within or from one entity to another
- d Isolate a problem component in a schematic and trace it to components believed to cause the problem
- e Interpret symbols to indicate direction of flow, test points, components and diagrammatic decision points

WRITTEN COMMUNICATION

32 FORMS

- a Locate the block on a form to enter the appropriate information
- b Transfer a number, code, date, figure or related data from equipment or written sources onto an appropriate section of the form
- c Write the name of the organization, responsible personnel, disposition of the part or equipment, and nomenclature, in appropriate sections of the form
- d Write a descriptive account of an activity or transaction performed
- e Use a completed form to locate or compare information

33 NOTE TAKING

- a Distinguish between essential and non essential details during the note taking process
- b Record details without misinterpreting the intent of either written material or an interview
- c Rewrite all recorded details in sentence form
- d Organize all sentences into paragraphs

NT

34 OUTLINING (topic or subject)

- a Distinguish between major and subordinate topics
- b Generate titles for each major topic selected
- c Use phrases or sentences to provide subordinate details under each major topic
- d Alternate Arabic numbers and letters to establish a hierarchy

35 REPORT WRITING

- a State the intent or objective(s) of the report
- b Describe the parameters of the event or situation
- c Distinguish between relevant and irrelevant details
- d Sequence events in the order they have occurred
- e State general impressions of events described
- f Select examples that will clarify major issues presented in the report
- g Examine opposing points of view in the report
- h Summarize the major points developed in the report
- i Justify an action taken and give reasons for rejecting alternatives

36 EDITING

- a Spell frequently used words correctly
- b Spell task related words correctly
- c Identify words that need to be capitalized
- d Correct all misspelled words with or without the use of a reference source
- e Apply all rules for end marks, commas, and apostrophes
- f Apply common rules of grammar
- g Rewrite the paragraph by stating the main idea in the first sentence, and restructuring the sentences for coherence
- h Appraise an entire written communication and make adjustments to improve clarity

VERBAL COMMUNICATION

37 TYPE

- a Individual – a person working on a task and communicating with another when assistance is needed or when a supervisory decision is needed
- b Instruction – a task activity requiring communication between an instructor, an individual or small group where the purpose is to give facts or rules to inform or guide
- c Tutor – interaction takes place between two persons where one is instructing and the other is doing the task
- d Peer Group (less than 10) – all members engage in an activity where one person assumes a leadership role and communicates to others what is to be done
- e Interview – a person communicating with another about his activities, opinions, or subject expertise for the purpose of using the information in a task
- f Briefing – communicating final instructions to others or giving an account in summary
- g Counsel – communicating together to exchange ideas or opinions to recommend, give or take advice, or to arrive at an acceptance of a plan or decision
- h Command – communicate to others an order or action to be taken where a person has a position of authority

NT

38 CHARACTERISTICS

- a Enunciate clearly, using the proper rate of speech
- b Use technical vocabulary suitable to the task and level of the person
- c Determine the appropriate amount of information to communicate
- d Interpret figurative or idiomatic language by reference to its use in context
- e Follow highly detailed, step by step directions
- f Solicit feedback to confirm the accurate reception of the communication
- g Recognize when a low key, informal dialogue is suitable
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- i Recognize when a prescribed series of verbal interactions is required to coordinate a group effort
- j Recognize when the situation will require a structured, preplanned method of presentation

39 BARRIERS

- a Recognize the need for clear, concise directions in order to avoid language or word meaning differences
- b Recognize personality factors and inter personal relationships that may exist
- c Recognize feedback as a means of communicating more effectively and increasing task competence

SAFETY/SECURITY

40 PRECAUTIONS

- a Use common knowledge to avoid hazards in order to prevent injury to self or equipment
- b Apply preventive measures prior to task performance to minimize any potential safety or security problem
- c Select an appropriate course of action in the event of an emergency

PERCEPTUAL

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- a Identify similarities and differences between and among objects
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- d Match objects by size, shape, color and significant markings
- e Classify objects by size, shape, color and significant markings
- f Determine direction, duration, and intensity of sounds, sightings and smells
- g Infer from sights, sounds, touch, smells, or tastes to determine a course of action

45K Tank Turret Repairer

BSEP I

NUMERATION/PLACE VALUE

NT

1 NUMBERING AND COUNTING

- a Match numerals with word names and models
- b Write numerals one through N in sequential order from any starting point
- c State what numeral comes after, before, or between any two given numerals
- d Select the numeral which is greater/lesser from a set of numerals
- e Identify an object with a specified ordinal position
- f Write or state the place value of a particular digit, whole or decimal number
- g Round off a number to a specified place, whole or decimal
- h Count by ones, twos, fives, tens, etc. backward or forward (skip counting)
- i Match numbers with points or intervals on a number line (positive (+) or negative ( ) values)

UNITS OF MEASUREMENT

2 LINEAR, WEIGHT, AND VOLUME MEASURES

- a Name the markings on a linear scale
- b Differentiate units of measure and equivalents in the English and metric system
- c Use a ruler, yardstick, meter stick or scale to measure lengths of objects or distances
- d Identify measures of ounce, pound, gram
- e Identify measures of pints, quarts, gallons, liters
- f Use a scale which is not numerically calibrated
- g Estimate measures of varying lengths, dimensions or weights

3 DEGREE MEASURES

- a Identify degree or mil as a unit in determining direction, distance or temperature
- b Estimate the measure of a given angle not greater than 180°
- c Interpret bearings, azimuth and other contexts in which the measure of an angle may range from 0° to 360°/0 to 6400 mils

4 TIME TELLING MEASURES

- a Use a 24 hour or digital clock to tell time
- b Name intervals and tell time in hours, minutes, and seconds
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- d Identify calendar units and arrange them in Julian style
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NT

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- a Recognize and match the names of solids with their corresponding figures

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- a Identify technical words associated with geometric figures
- b Interpret meaning of terms derived from spatial orientation

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NT

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52C Utilities Equipment Repairer

BSEP I

NUMERATION/PLACE VALUE

NT

1 NUMBERING AND COUNTING

- a Match numerals with word names and models
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2 LINEAR, WEIGHT, AND VOLUME MEASURES

- a Name the markings on a linear scale
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- a Identify the unit of measurement found on an instrument
- b. Interpret the number, word, symbol from a display read out
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- a. Identify and name the different kinds of angles and triangles, with their corresponding figures
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- e Name an angle by using letters, a number, or a single letter

NT

10 SOLIDS

- a Recognize and match the names of solids with their corresponding figures

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- a Identify technical words associated with geometric figures
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- c Convert fractions (proper and improper) to decimal equivalents, and vice verse, using a table, chart or gauge
- d Compute equivalent value of fractions, decimals, percents, and mixed numbers to lowest terms
- e Add and subtract fractions, with same or different denominators
- f Multiply and divide fractions with and without whole numbers
- g Estimate a fractional sum, product, or quotient

NT

15 GEOMETRY

- a Draw geometric figures, plane and solid
- b Match geometric figures with word names, equivalent measures
- c Label all parts of geometric figures using mathematical and characteristic designators
- d Use a protractor to measure angles, make geometrical constructions
- e Construct perpendicular on a line segment, bisector of an angle
- f Compute the perimeter and area of any figure
- g Compute the circumference and area of a circle
- h Compute the area and volume of any solid figure
- i Use formulas in solving problems involving geometric figures
- j Solve problems and interpret spatial relationships of figures, symbols, and objects from 2-dimensional displays

16 COMBINATION OF PROCESSES

- a Identify *median* and *mode*
- b Compute averages
- c Solve problems combining all processes using whole, mixed numbers and fractions
- d Solve problems, combining all processes, involving units of measurement
- e Interpret information from charts, number lines, scales and graphs to solve arithmetic problems
- f Solve conversion problems of linear (metric and English) liquid, weight, and *temperature* (F° or C°) *measures*
- g Solve problems involving ratio and proportion
- h Solve word problems where any mathematical process may occur

17 GRAPHING IN THE COORDINATE PLANE

- a Identify coordinates of a point in any grid system
- b Identify points on a line graph
- c Match a graph with its equation

18 ALGEBRA

- a Solve simple algebraic equations with one unknown
- b Recognize and derive equivalent algebraic expressions
- c Evaluate powers and estimate roots

19 TRIGONOMETRY

- a Use tables of trigonometric functions
- b Use tables of logarithms to solve problems
- c Solve geometric problems using trigonometric functions
- d Use trigonometric ratios to solve problems

CONTENT READING

NT

25 PROCEDURAL DIRECTIONS

- a Identify factual details or specifications that are found within a statement or written selection
- b Select parts of text and visual materials to complete a task activity
- c Follow highly detailed, step by step directions in order to accomplish a sequence of task activities
- d Determine the essential message of a paragraph or section of written material
- e Infer from a written source, which does not explicitly provide required information, in order to make a decision
- f Synthesize information from written sources which contributes to the completion of a task activity

26 VOCABULARY

- a Recognize common words and their meanings
- b Recognize task related words with technical meanings
- c Identify the correct meaning of a word from the context of a sentence
- d Recognize the meaning of common contractions, abbreviations and acronyms
- e Determine the meaning of figurative, idiomatic, and technical terms by using context clues or by using a reference source(s)

INFORMATION ACCESS

27 REFERENCE SKILLS

- a Locate a Technical Manual, Field Manual or any related source document by code number and title
- b Alphabetize words or topics to locate information
- c Use the table of contents, index, system or sub system heading, appendix and glossary to locate information
- d Locate the page, title, paragraph, figure, or chart needed to answer a question or to solve a problem
- e Determine, after scanning or skim reading, whether the information is relevant
- f Cross reference within and across source documents to select information needed to perform a routine
- g Organize information from multiple sources into a sequenced series of events

28 TABLES/CHARTS

- a Obtain a fact or specification from a two column table or chart to find information
- b Obtain a fact or specification from an intersection of a row by column table or chart
- c Use a complex table or chart requiring cross referencing within or in combination with text material outside the chart
- d Apply information from tables and charts for locating malfunctions, or for selecting a course of action

VISUAL AIDS

NT

29 ILLUSTRATIONS

- a Identify details, labels, numbers, and parts from an illustration or picture
- b Identify parts or details according to a key or legend
- c Interpret a drawing which shows a cross sectional view of an object for assembly, disassembly
- d Interpret a three dimensional projection or exploded view of object(s) for assembly, disassembly, or position in system or sub system
- e Follow illustrations, or photographs, arranged in a sequential order, as a guide
- f Integrate information from various sources to select a course of action

30 FLOW CHARTS

- a Use a simple linear path of an organizational chart to list events in sequential order
- b Use a linear path of a flow chart to provide visual and textual directions to a procedure, to arrive at decision points, and to provide alternate paths in problem solving
- c Translate the significance of the symbols into physical activities

31 SCHEMATICS

- a Isolate each major section or entity presented on a schematic diagram
- b Identify the components within each entity
- c Trace connections in an integrated circuit from their origin to another point within or from one entity to another
- d Isolate a problem component in a schematic and trace it to components believed to cause the problem
- e Interpret symbols to indicate direction of flow, test points, components, and diagrammatic decision points

WRITTEN COMMUNICATION

32 FORMS

- a Locate the block on a form to enter the appropriate information
- b Transfer a number, code, date, figure or related data from equipment or written sources onto an appropriate section of the form
- c Write the name of the organization, responsible personnel, disposition of the part or equipment, and nomenclature, in appropriate sections of the form
- d Write a descriptive account of an activity or transaction performed
- e Use a completed form to locate or compare information

33 NOTE TAKING

- a Distinguish between essential and non essential details during the note taking process
- b Record details without misinterpreting the intent of either written material or an interview
- c Rewrite all recorded details in sentence form
- d Organize all sentences into paragraphs

NT

34 OUTLINING (topic or sentence)

- a Distinguish between major and subordinate topics
- b Generate titles for each major topic selected
- c Use phrases or sentences to provide subordinate details under each major topic
- d Alternate indent numbers and letters to establish a hierarchy

35 REPORT WRITING

- a State the intent or objective(s) of the report
- b Describe the parameters of the event or situation
- c Distinguish between relevant and irrelevant details
- d Sequence events in the order they have occurred
- e State general impressions of events described
- f Select examples that will clarify major issues presented in the report
- g Examine opposing points of view in the report
- h Summarize the major points developed in the report
- i Justify an action taken and give reasons for rejecting alternatives

36 EDITING

- a Spell frequently used words correctly
- b Spell task-related words correctly
- c Identify words that need to be capitalized
- d Correct all misspelled words with or without the use of a reference source
- e Apply all rules for end marks, commas, and apostrophes
- f Apply common rules of grammar
- g Rewrite the paragraph by stating the main idea in the first sentence, and restructuring the sentences for coherence
- h Appraise an entire written communication and make adjustments to improve clarity

VERBAL COMMUNICATION

37 TYPE

- a Individual – a person working on a task and communicating with another when assistance is needed or when a supervisory decision is needed
- b Instruction – a task activity requiring communication between an instructor, an individual or small group where the purpose is to give facts or rules to inform or guide
- c Tutor – interaction takes place between two persons where one is instructing and the other is doing the task
- d Peer Group (less than 10) – all members engage in an activity where one person assumes a leadership role and communicates to others what is to be done
- e Interview – a person communicating with another about his activities, opinions, or subject expertise for the purpose of using the information in a task
- f Briefing – communicating final instructions to others or giving an account in summary
- g Counsel – communicating together to exchange ideas or opinions to recommend, give or take advice, or to arrive at an acceptance of a plan or decision
- h Command – communicate to others an order or action to be taken where a person has a position of authority

NT

38 CHARACTERISTICS

- a Enunciate clearly, using the proper rate of speech
- b Use technical vocabulary suitable to the task and level of the person
- c Determine the appropriate amount of information to communicate
- d Interpret figurative or idiomatic language by reference to its use in context
- e Follow highly detailed, step by step directions
- f Solicit feedback to confirm the accurate reception of the communication
- g Recognize when a low key, informal dialogue is suitable
- h Recognize when direct verbal commands are necessary
- i Recognize when a prescribed series of verbal interactions is required to coordinate a group effort
- j Recognize when the situation will require a structured, preplanned method of presentation

39 BARRIERS

- a Recognize the need for clear, concise directions in order to avoid language or word meaning differences
- b Recognize personality factors and inter personal relationships that may exist
- c Recognize feedback as a means of communicating more effectively and increasing task competence

SAFETY/SECURITY

40 PRECAUTIONS

- a Use common knowledge to avoid hazards in order to prevent injury to self or equipment
- b Apply preventive measures prior to task performance to minimize any potential safety or security problem
- c. Select an appropriate course of action in the event of an emergency

PERCEPTUAL

41 RECOGNITION

- a Identify similarities and differences between and among objects
- b Use body language (motions, gestures, postures) to communicate or signal
- c. Determine the presence of a defect or extent of damage
- d Match objects by size, shape, color and significant markings
- e Classify objects by size, shape, color and significant markings
- f. Determine direction, duration, and intensity of sounds, sightings and smells
- g. Infer from sights, sounds, touch, smells, or tastes to determine a course of action

BSEP I

NUMERATION/PLACE VALUE

NT

1 NUMBERING AND COUNTING

- a Match numerals with word names and models
- b Write numerals one through N in sequential order from any starting point
- c State what numeral comes after, before, or between any two given numerals
- d Select the numeral which is *greater/lesser* from a set of numerals
- e Identify an object with a *specified ordinal position*
- f Write or state the place value of a particular digit, whole or decimal number
- g Round off a *number to a specified place*, whole or decimal
- h Count by ones, twos, fives, tens, etc. backward or forward (skip counting)
- i *Match numbers* with points or intervals on a number line (positive (+) or negative (-) values)

UNITS OF MEASUREMENT

2 LINEAR, WEIGHT, AND VOLUME MEASURES

- a Name the markings on a linear scale
- b Differentiate units of *measure and equivalents in the English and metric system*
- c Use a ruler, yardstick, meter stick or scale to measure lengths of objects or distances
- d Identify measures of ounce, pound, gram
- e Identify measures of pints, quarts, gallons, liters
- f Use a scale which is not numerically calibrated
- g Estimate measures of varying lengths, dimensions or weights

3 DEGREE MEASURES

- a Identify degree or mil as a unit in determining direction, distance or temperature
- b Estimate the measure of a given angle not greater than 180°
- c Interpret bearings, azimuth and other contexts in which *the measure of an* angle may range from 0° to 360°/0 to 6400 mils

4 TIME TELLING MEASURES

- a Use a 24 hour or digital clock to tell time
- b Name intervals and tell time in hours, minutes, and seconds
- c Estimate time in seconds, minutes, and parts of an hour
- d Identify calendar units and arrange them in Julian style
- e Convert time in to hours and tenths of hours
- f Convince time using Greenwich Mean Time (GMT) as a basis for establishing zones and distances

NT

5 GAUGE MEASURES

- a Identify the unit of measurement found on an instrument
- b. Interpret the number, word, symbol from a display read out
- c Recognize a "reading" from a gauge with color divisions
- d. Recognize positive (+) and negative (-) demarcation on a scale
- e Select band(s) from a multi scale gauge
- f Match a gauge reading to a specification using numbered or labelled intervals
- g Interpret gauge readings from an unnumbered/unmarked interval
- h. Interpret a gauge reading which is fluctuating or momentarily sustained
- i. Match specifications of required measures by manipulation, alignment or maintenance

VISUAL/SPATIAL RELATIONSHIPS

6 SPATIAL

- a. Identify directions that tools, hardware, or components may be moved
- b Manipulate objects to align, match, mate, make parallel, be perpendicular or be at an angle
- c. Interpret spatial relationships of figures and objects from 2 dimensional drawings, pictures, or photographs
- d Relate geometric symbols and graphic *representations* to actual systems subsystems and components

GEOMETRY

7 LINES

- a Identify and name points, lines, rays, and segments
- b. Identify intersecting lines, parallel lines, and line segments
- c Define and identify perpendicular lines
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8 PLANES

- a Identify and name plane geometric figures
- b *List the characteristics of geometric figures*
- c Classify figures according to the number or measure of its sides or angles
- d Identify figures which possess similarities
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9 ANGLES AND TRIANGLES

- a Identify and name the different kinds of angles and triangles, with their *corresponding figures*
- b Identify vertical, adjacent, complementary or supplementary angles
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- d Identify altitudes and medians of triangles or the bisector of an angle
- e Name an angle by using letters, a number, or a single letter

NT

10 SOLIDS

a Recognize and match the names of solids with their corresponding figures

11 TERMINOLOGY

a Identify technical words associated with geometric figures

b Interpret meaning of terms derived from spatial orientation

COMPUTE OR PERFORM

12 ADDITION AND SUBTRACTION

a Add or subtract whole numbers, without carrying or borrowing

b Add or subtract whole numbers, carrying and borrowing

c Add and subtract, borrowing and carrying with mixed numbers (whole and decimals)

d Add or subtract positive (+) and negative (-) numbers, using a number line to arrive at a solution

e Add or subtract to find correct time (24 hr. clock) using hours or minutes

f Add or subtract various increments on gauges, dials, or any other measuring instrument

g Add or subtract time, linear, dry, liquid or degree measures requiring regrouping

h Estimate a sum or difference

13 MULTIPLICATION AND DIVISION

a Multiply and divide whole numbers

b Multiply and divide mixed numbers (whole and decimals)

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14 FRACTIONS/DECIMALS

a Subdivide whole objects or a set of objects into halves (1/2), thirds (1/3), fourths (1/4), eighths (1/8)

b Reduce fractions to lowest terms

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- c Use a complex table or chart requiring cross referencing within or in combination with text material outside the chart
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4/23/82

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NUMERATION/PLACE VALUE

NT

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- b Write numerals one through N in sequential order from any starting point
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- d Select the numeral which is greater/lesser from a set of numerals
- e Identify an object with a specified ordinal position
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- i Match numbers with points or intervals on a number line (positive (+) or negative ( ) values)

UNITS OF MEASUREMENT

2 LINEAR, WEIGHT, AND VOLUME MEASURES

- a Name the markings on a linear scale
- b Differentiate units of measure and equivalents in the English and metric system
- c *Use a ruler, yardstick, meter stick or scale to measure* lengths of objects or distances
- d Identify measures of ounce, pound, gram
- e Identify measures of pints, quarts, gallons, liters
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- a Identify degree or mil as a unit in determining direction, distance or temperature
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- a Identify the unit of measurement found on an instrument
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- d. Recognize positive (+) and negative ( ) demarcation on a scale
- e Select band(s) from a multi scale gauge
- f Match a gauge reading to a specification using numbered or lettered intervals
- g *Interpret gauge readings from an unnumbered/unmarked interval*
- h Interpret a gauge reading which is fluctuating or momentarily [illegible]
- i Match specifications of required measures by manipulation, [illegible] or maintenance

VISUAL/SPATIAL RELATIONSHIPS

6 SPATIAL

- a. Identify directions that tools, hardware, or components may be moved
- b Manipulate objects to align, match, mate, make parallel, be perpendicular, or be at an angle
- c. Interpret spatial relationships of figures and objects from 2 dimensional drawings, pictures, or photographs
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GEOMETRY

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- a. Identify and name points, lines, rays, and segments
- b *Identify intersecting lines, parallel lines, and line segments*
- c. Define and identify perpendicular lines
- d Identify congruent segments

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- a Identify and name plane geometric figures
- b List the characteristics of geometric figures
- c Classify figures according to the number or measure of its sides [illegible]
- d Identify figures which possess similarities
- e. Identify figures which may be parallel, perpendicular or congruent

9 ANGLES AND TRIANGLES

- a Identify and name the different kinds of angles and triangles [illegible] corresponding figures
- b Identify vertical, adjacent, complementary or supplementary [illegible]
- c Classify triangles according to their sides or angle size
- d Identify altitudes and medians of triangles or the bisector of an [illegible]
- e Name an angle by using letters, a number, or a single letter

NT

10 SOLIDS

- a Recognize and match the names of solids with their corresponding figures

11 TERMINOLOGY

- a Identify technical words associated with geometric figures
- b Interpret meaning of terms derived from spatial orientation

COMPUTE OR PERFORM

12 ADDITION AND SUBTRACTION

- a Add or subtract whole numbers, without carrying or borrowing
- b Add or subtract whole numbers, carrying and borrowing
- c Add and subtract, borrowing and carrying with mixed numbers (whole and decimals)
- d Add or subtract positive (+) and negative ( ) numbers, using a number line to arrive at a solution
- e Add or subtract to find correct time (24 hr. clock) using hours or minutes
- f Add or subtract various increments on gauges, dials, or any other measuring instrument
- g Add or subtract time, linear, dry, liquid or degree measures requiring regrouping
- h Estimate a sum or difference

13 MULTIPLICATION AND DIVISION

- a Multiply and divide whole numbers
- b Multiply and divide mixed numbers (whole and decimals)
- c Divide a number with decimals in both divisor and dividend
- d Multiply and divide integers, both positive (+) and negative ( ), and assign proper sign to product or quotient
- e Estimate a product or quotient

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- b Reduce fractions to lowest terms
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- d Compute equivalent value of fractions, decimals, percents, and mixed numbers to lowest terms
- e Add and subtract fractions, with same or different denominators
- f Multiply and divide fractions with and without whole numbers
- g Estimate a fractional sum, product, or quotient

NT

15 GEOMETRY

- a *Draw geometric figures, plane and solid*
- b Match geometric figures with word names, equivalent measures
- c Label all parts of geometric figures using mathematical and characteristic designators
- d Use a protractor to measure angles, make geometrical constructions
- e Construct perpendicular on a line segment, bisector of an angle
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- g Solve problems involving ratio and proportion
- h. *Solve word problems where any mathematical process may occur*

17. GRAPHING IN THE COORDINATE PLANE

- a. Identify coordinates of a point in any grid system
- b Identify points on a line graph
- c Match a graph with its equation

18. ALGEBRA

- a. Solve simple algebraic equations with one unknown
- b. Recognize and derive equivalent algebraic expressions
- c. Evaluate powers and estimate roots

19 TRIGONOMETRY

- a Use tables of trigonometric functions
- b Use tables of logarithms to solve problems
- c Solve geometric problems using trigonometric functions
- d Use trigonometric ratios to solve problems

CONTENT READING

NT

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- a Identify factual details or specifications *that are found within a statement* or written selection
- b Select parts of text and visual materials to complete a task activity
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- d Determine the essential message of a paragraph or section of written material
- e *Infer from a written source*, which does not explicitly provide required information, in order to make a decision
- f Synthesize information *from written sources which contributes* to the completion of a task activity

26 VOCABULARY

- a Recognize common words and their meanings
- b Recognize task related words with technical meanings
- c Identify the correct meaning of a word from the context of a sentence
- d Recognize the meaning of common contractions, abbreviations and acronyms
- e Determine the meaning of figurative, idiomatic, and technical terms by using context clues or by using a reference source(s)

INFORMATION ACCESS

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- a Locate a Technical Manual, Field Manual or any related source document by code number and title
- b Alphabetize words or topics to locate information
- c Use the table of contents, index, system or sub system heading, appendix and glossary to locate information
- d Locate the page, title, paragraph, figure, or chart needed to answer a question or to solve a problem
- e Determine, after scanning or skim reading, whether the information is relevant
- f Cross reference within and across source documents to select *information* needed to perform a routine
- g Organize information from multiple sources into a sequenced series of events

28 TABLES/CHARTS

- a Obtain a fact or specification from a two column table or chart to find information
- b Obtain a fact or specification from an intersection of a row by column table or chart
- c Use a complex table or chart requiring cross referencing within or in combination with *text material* outside the chart
- d Apply information from tables and charts for locating malfunctions, or for selecting a course of action

VISUAL AIDS

NT

29 ILLUSTRATIONS

- a Identify details, labels, numbers, and parts from an illustration or picture
- b Identify parts or details according to a key or legend
- c Interpret a drawing which shows a cross sectional view of an object for assembly, disassembly
- d Interpret a three dimensional projection or exploded view of object(s) for assembly, disassembly, or position in system or sub system
- e *Follow illustrations*, or photographs, arranged in a sequential order, as a guide
- f Integrate information from various sources to select a course of action

30 FLOW CHARTS

- a Use a simple linear path of an organizational chart to list events in sequential order
- b Use a linear path of a flow chart to provide visual and textual directions to a procedure, to arrive at decision points, and to provide alternate paths in problem-solving
- c Translate the significance of the symbols into physical activities

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- a Isolate each major section or entity presented in a schematic diagram
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- e Interpret symbols to indicate direction of flow, test points, components and diagrammatic decision points

WRITTEN COMMUNICATION

32 FORMS

- a Locate the block on a form to enter the appropriate information
- b Transfer a number, code, *date, figure or related* data from equipment or written sources onto an appropriate section of the form
- c Write the name of the organization, *responsible personnel*, disposition of the part or equipment, and nomenclature, in appropriate sections of the form
- d Write *a descriptive account of an activity or transaction performed*
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33 NOTE TAKING

- a Distinguish between essential and non essential details *during the note taking* process
- b Record details without misinterpreting the intent of either written material or an interview
- c Rewrite all recorded details in sentence form
- d Organize all sentences into paragraphs

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34 OUTLINING (topic or activity)

- a Distinguish between major and subordinate topics
- b Generate titles for each major topic selected
- c Use phrases or sentences to provide subordinate details under each major topic
- d Alternate standard numbers and letters to establish a hierarchy

35 REPORT WRITING

- a State the intent or objective(s) of the report
- b Describe the parameters of the event or situation
- c Distinguish between relevant and irrelevant details
- d Sequence events in the order they have occurred
- e State general impressions of events described
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- h Summarize the major points developed in the report
- i Justify an action taken and give reasons for rejecting alternatives

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- a Spell frequently used words correctly
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- c Identify words that need to be capitalized
- d Correct all misspelled words with or without the use of a reference source
- e Apply all rules for end marks, commas, and apostrophes
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37 TYPE

- a Individual – a person working on a task and communicating with another when assistance is needed or when a supervisory decision is needed
- b Instruction – a task activity requiring communication between an instructor, an individual or small group where the purpose is to give facts or rules to inform or guide
- c Tutor – interaction takes place between two persons where one is instructing and the other is doing the task
- d Peer Group (less than 10) – all members engage in an activity where one person assumes a leadership role and communicates to others what is to be done
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- g Counsel – communicating together to exchange ideas or opinions to recommend, give or take advice, or to arrive at an acceptance of a plan or decision
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NT

38 CHARACTERISTICS

- a Enunciate clearly, using the proper rate of speech
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- a Use common knowledge to avoid hazards in order to prevent injury to self or equipment
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PERCEPTUAL

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- a Identify similarities and differences between and among objects
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- g. Infer from sights, sounds, touch, smells, or tastes to determine a course of action

NUMERATION/PLACE VALUE

NT

1 NUMBERING AND COUNTING

- a Match numerals with word names and models
- b Write numerals one through N in sequential order from any starting point
- c State what numeral comes after, before, or between any two given numerals
- d Select the numeral which is greater/lesser from a set of numerals
- e Identify an object with a specified ordinal position
- f Write or state the place value of a particular digit, whole or decimal number
- g Round off a number to a specified place, whole or decimal
- h Count by ones, twos, fives, tens, etc. backward or forward (skip counting)
- i Match numbers with points or intervals on a number line (positive (+) or negative (-) values)

UNITS OF MEASUREMENT

2 LINEAR, WEIGHT, AND VOLUME MEASURES

- a Name the markings on a linear scale
- b Differentiate units of measure and equivalents in the English and metric system
- c Use a ruler, yardstick, meter stick or scale to measure lengths of objects or distances
- d Identify measures of ounce, pound, gram
- e Identify measures of pints, quarts, gallons, liters
- f Use a scale which is not numerically calibrated
- g Estimate measures of varying lengths, dimensions or weights

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- a Identify degree or mil as a unit in determining direction, distance or temperature
- b Estimate the measure of a given angle not greater than 180°
- c Interpret bearings, azimuth and other contexts in which the measure of an angle may range from 0° to 360°/0 to 6400 mils

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6. SPATIAL

- a Identify directions that tools, hardware, or components may be moved
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- d. Relate geometric symbols and graphic representations to actual systems, subsystems and components

GEOMETRY

7. LINES

- a. Identify and name points, lines, rays, and segments
- b Identify intersecting lines, parallel lines, and line segments
- c. Define and identify perpendicular lines
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8 PLANES

- a Identify and name plane geometric figures
- b List the characteristics of geometric figures
- c. Classify figures according to the number or measure of its sides or angles
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- e. Identify figures which may be parallel, perpendicular or congruent

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- b Identify vertical, adjacent, complementary or supplementary angles
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- d. Identify altitudes and medians of triangles or the bisector of an angle
- e Name an angle by using letters, a number, or a single letter

NT

10 SOLIDS

- a Recognize and match the names of solids with their corresponding figures

11 TERMINOLOGY

- a Identify technical words associated with geometric figures
- b Interpret meaning of terms derived from spatial orientation

COMPUTE OR PERFORM

12 ADDITION AND SUBTRACTION

- a Add or subtract whole numbers, without carrying or borrowing
- b Add or subtract whole numbers, carrying and borrowing
- c Add and subtract, borrowing and carrying with mixed numbers (whole and decimals)
- d Add or subtract positive (+) and negative ( ) numbers, using a number line to arrive at a solution
- e Add or subtract to find correct time (24 hr clock) using hours or minutes
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4/23/82

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5/H Terminal Operations Coordinator

BSEP I

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- b Alphabetize words or topics to locate information
- c Use the table of contents, index, system or sub system heading, appendix and glossary to locate information
- d Locate the page, title, paragraph, figure, or chart needed to answer a question or to solve a problem
- e Determine, after scanning or skim reading, whether the information is relevant
- f Cross reference within and across source documents to select information needed to perform a routine
- g Organize information from multiple sources into a sequenced series of events

28 TABLES/CHARTS

- a Obtain a fact or specification from a two column table or chart to find information
- b Obtain a fact or specification from an intersection of a row by column table or chart
- c Use a complex table or chart requiring cross referencing within or in combination with text material outside the chart
- d Apply information from tables and charts for locating malfunctions, or for selecting a course of action

VISUAL AIDS

NT

29 ILLUSTRATIONS

- a Identify details, labels, numbers, and parts from an illustration or picture
- b Identify parts or details according to a key or legend
- c Interpret a drawing which shows a cross sectional view of an object for assembly, disassembly
- d Interpret a three dimensional projection or exploded view of object(s) for assembly, disassembly, or position in system or sub system
- e Follow illustrations, or photographs, arranged in a sequential order, as a guide
- f Integrate information from various sources to select a course of action

30 FLOW CHARTS

- a Use a simple linear path of an organizational chart to list events in sequential order
- b Use a linear path of a flow chart to provide visual and textual directions to a procedure, to arrive at decision points, and to provide alternate paths in problem solving
- c Translate the significance of the symbols into physical activities

31 SCHEMATICS

- a Isolate each major section or entity presented in a schematic diagram
- b Identify the components within each entity
- c Trace connections in an integrated circuit from their origin to another point within or from one entity to another
- d Isolate a problem component in a schematic and trace it to components believed to cause the problem
- e Interpret symbols to indicate direction of flow, test points, components and diagrammatic decision points

WRITTEN COMMUNICATION

32 FORMS

- a Locate the block on a form to enter the appropriate information
- b Transfer a number, code, date, figure or related data from equipment or written sources onto an appropriate section of the form
- c Write the name of the organization, responsible personnel, disposition of the part or equipment, and nomenclature, in appropriate sections of the form
- d Write a descriptive account of an activity or transaction performed
- e Use a completed form to locate or compare information

33 NOTE-TAKING

- a Distinguish between essential and non essential details during the note taking process
- b Record details without misinterpreting the intent of either written material or an interview
- c Rewrite all recorded details in sentence form
- d Organize all sentences into paragraphs

NT

34 OUTLINING (topic or sentence)

- a Distinguish between major and subordinate topics
- b Generate titles for each major topic selected
- c Use phrases or sentences to provide subordinate details under each major topic
- d Alternate indent numbers and letters to establish a hierarchy

35 REPORT WRITING

- a State the intent or objective(s) of the report
- b Describe the parameters of the event or situation
- c Distinguish between relevant and irrelevant details
- d Sequence events in the order they have occurred
- e State general impressions of events described
- f Select examples that will clarify major issues presented in the report
- g Examine opposing points of view in the report
- h Summarize the major points developed in the report
- i Justify an action taken and give reasons for rejecting alternatives

36 EDITING

- a Spell frequently used words correctly
- b Spell task related words correctly
- c Identify words that need to be capitalized
- d Correct all misspelled words with or without the use of a reference source
- e Apply all rules for end marks, commas, and apostrophes
- f Apply common rules of grammar
- g Rewrite the paragraph by stating the main idea in the first sentence, and restructuring the sentences for coherence
- h Appraise an entire written communication and make adjustments to improve clarity

VERBAL COMMUNICATION

37 TYPE

- a Individual - a person working on a task and communicating with another when assistance is needed or when a supervisory decision is needed
- b Instruction - a task activity requiring communication between an instructor, an individual or small group where the purpose is to give facts or rules to inform or guide
- c Tutor - interaction takes place between two persons where one is instructing and the other is doing the task
- d Peer Group (less than 10) - all members engage in an activity where one person assumes a leadership role and communicates to others what is to be done
- e Interview - a person communicating with another about his activities, opinions, or subject expertise for the purpose of using the information in a task
- f Briefing - communicating final instructions to others or giving an account in summary
- g Counsel - communicating together to exchange ideas or opinions to recommend, give or take advice, or to arrive at an acceptance of a plan or decision
- h Command - communicate to others an order or action to be taken where a person has a position of authority

4/23/82

NT

38 CHARACTERISTICS

- a Enunciate clearly, using the proper rate of speech
- b Use technical vocabulary suitable to the task and level of the person
- c Determine the appropriate amount of information to communicate
- d Interpret figurative or idiomatic language by reference to its use in context
- e Follow highly detailed, step by step directions
- f Solicit feedback to confirm the accurate reception of the communication
- g Recognize when a low key, informal dialogue is suitable
- h Recognize when direct verbal commands are necessary
- i Recognize when a prescribed series of verbal interactions is required to coordinate a group effort
- j Recognize when the situation will require a structured, preplanned method of presentation

39 BARRIERS

- a Recognize the need for clear, concise directions in order to avoid language or word meaning differences
- b Recognize personality factors and inter personal relationships that may exist
- c Recognize feedback as a means of communicating more effectively and increasing task competence

SAFETY/SECURITY

40 PRECAUTIONS

- a Use common knowledge to avoid hazards in order to prevent injury to self or equipment
- b Apply preventive measures prior to task performance to minimize any potential safety or security problem
- c. Select an appropriate course of action in the event of an emergency

PERCEPTUAL

41 RECOGNITION

- a Identify similarities and differences between and among objects
- b. Use body language (motions, gestures, postures) to communicate or signal
- c. Determine the presence of a defect or extent of damage
- d. Match objects by size, shape, color and significant markings
- e Classify objects by size, shape, color and significant markings
- f. Determine direction, duration, and intensity of sounds, sightings and smells
- g. Infer from sights, sounds, touch, smells, or tastes to determine a course of action

BSEP I

NUMERATION/PLACE VALUE

NT

1 NUMBERING AND COUNTING

- a Match numerals with word names and models
- b Write numerals one through N in sequential order from any starting point
- c State what numeral comes after, before, or between any two given numerals
- d Select the numeral which is greater/lessar from a set of numerals
- e Identify an object with a specified ordinal position
- f Write or state the place value of a particular digit, whole or decimal number
- g Round off a number to a specified place, whole or decimal
- h Count by ones, twos, fives, tens, etc. backward or forward (skip counting)
- i Match numbers with points or intervals on a number line (positive (+) or negative (-) values)

UNITS OF MEASUREMENT

2 LINEAR, WEIGHT, AND VOLUME MEASURES

- a Name the markings on a linear scale
- b Differentiate units of measure and equivalents in the English and metric system
- c Use a ruler, yardstick, meter stick or scale to measure lengths of objects or distances
- d Identify measures of ounce, pound, gram
- e Identify measures of pints, quarts, gallons, liters
- f Use a scale which is not numerically calibrated
- g Estimate measures of varying lengths, dimensions or weights

3 DEGREE MEASURES

- a Identify degree or mil as a unit in determining direction, distance or temperature
- b Estimate the measure of a given angle not greater than 180°
- c Interpret bearings, azimuth and other contexts in which the measure of an angle may range from 0° to 360°/0 to 6400 mils

4 TIME TELLING MEASURES

- a Use a 24 hour or digital clock to tell time
- b Name intervals and tell time in hours, minutes, and seconds
- c Estimate time in seconds, minutes, and parts of an hour
- d Identify calendar units and arrange them in Julian style
- e Convert time into hours and tenths of hours
- f Demonstrate the using Greenwich Mean Time (GMT) as a basis for establishing zones or standards

NT

5 GAUGE MEASURES

- a. Identify the unit of measurement found on an instrument
- b. Interpret the number, word, symbol from a display read out
- c. Recognize a "reading" from a gauge with color divisions
- d. Recognize positive (+) and negative (-) demarcation on a scale
- e Select band(s) from a multi scale gauge
- f Match a gauge reading to a specification using numbered or labeled intervals
- g Interpret gauge readings from an unnumbered/unmarked interval
- h. Interpret a gauge reading which is fluctuating or momentarily sustained
- i. Match specifications of required measures by manipulation, alignment or maintenance

VISUAL/SPATIAL RELATIONSHIPS

6. SPATIAL

- a Identify directions that tools, hardware, or components may be moved
- b Manipulate objects to align, match, mate, make parallel, be perpendicular or be at an angle
- c. Interpret spatial relationships of figures and objects from 2 dimensional drawings, pictures, or photographs
- d. Relate geometric symbols and graphic representations to actual systems, subsystems and components

GEOMETRY

7 LINES

- a. Identify and name points, lines, rays, and segments
- b Identify intersecting lines, parallel lines, and line segments
- c. Define and identify perpendicular lines
- d Identify congruent segments

8 PLANES

- a Identify and name plane geometric figures
- b List the characteristics of geometric figures
- c Classify figures according to the number or measure of its sides or angles
- d Identify figures which possess similarities
- e. Identify figures which may be parallel, perpendicular or congruent

9 ANGLES AND TRIANGLES

- a Identify and name the different kinds of angles and triangles with the corresponding figures
- b Identify vertical, adjacent, complementary or supplementary angles
- c Classify triangles according to their sides or angle size
- d Identify altitudes and medians of triangles or the bisector of an angle
- e Name an angle by using letters, a number, or a single letter

NT

11 SOLIDS

___ a Recognize and match the names of solids with their corresponding figures

11 TERMINOLOGY

___ a Identify technical words associated with geometric figures

___ b Interpret meaning of terms derived from spatial orientation

COMPUTE OR PERFORM

12 ADDITION AND SUBTRACTION

___ a Add or subtract whole numbers without carrying or borrowing

___ b Add or subtract whole numbers, carrying and borrowing

___ c Add and subtract, borrowing and carrying with mixed numbers (whole and decimals)

___ d Add or subtract positive (+) and negative (-) numbers, using a number line to arrive at a solution

___ e Add or subtract to find correct time (24 hr. clock) using hours or minutes

___ f Add or subtract various increments on gauges, dials, or any other measuring instrument

___ g Add or subtract time, linear, dry, liquid or degree measures requiring regrouping

___ h Estimate a sum or difference

13 MULTIPLICATION AND DIVISION

___ a Multiply and divide whole numbers

___ b Multiply and divide mixed numbers (whole and decimals)

___ c Divide a number with decimals in both divisor and dividend

___ d Multiply and divide integers, both positive (+) and negative (-), and assign proper sign to product or quotient

___ e Estimate a product or quotient

14 FRACTIONS/DECIMALS

___ a Subdivide whole objects or a set of objects into halves (1/2), thirds (1/3), fourths (1/4), eighths (1/8)

___ b Reduce fractions to lowest terms

___ c Convert fractions (proper and improper) to decimal equivalents, and vice versa, using a table, chart or gauge

___ d Compute equivalent value of fractions, decimals, percents, and mixed numbers to lowest terms

___ e Add and subtract fractions, with same or different denominators

___ f Multiply and divide fractions with and without whole numbers

___ g Estimate a fractional sum, product, or quotient

NT

15 GEOMETRY

___ a Draw geometric figures, plane and solid

___ b Match geometric figures with word names, equivalent measures

___ c Label all parts of geometric figures using mathematical and characteristic designators

___ d Use a protractor to measure angles, make geometrical constructions

___ e Construct perpendicular on a line segment, bisector of an angle

___ f Compute the perimeter and area of any figure

___ g Compute the circumference and area of a circle

___ h Compute the area and volume of any solid figure

___ i Use formulas in solving problems involving geometric figures

___ j Solve problems and interpret spatial relationships of figures, symbols, and objects from 2 dimensional displays

16 COMBINATION OF PROCESSES

___ a Identify median and mode

___ b Compute averages

___ c Solve problems combining all processes using whole, mixed numbers and fractions

___ d Solve problems, combining all processes, involving units of measurement

___ e Interpret information from charts, number lines, scales and graphs to solve arithmetic problems

___ f. Solve conversion problems of linear (metric and English) liquid, weight, and temperature (F^{O} or C^{O}) measures

___ g. Solve problems involving ratio and proportion

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___ a Identify coordinates of a point in any grid system

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___ c Match a graph with its equation

18 ALGEBRA

___ a. Solve simple algebraic equations with one unknown

___ b. Recognize and derive equivalent algebraic expressions

___ c Evaluate powers and estimate roots

19 TRIGONOMETRY

___ a Use tables of trigonometric functions

___ b Use tables of logarithms to solve problems

___ c Solve geometric problems using trigonometric functions

___ d Use trigonometric ratios to solve problems

CONTENT READING

NT

25 PROCEDURAL DIRECTIONS

- a Identify factual details or specifications that are found within a statement or written selection
- b Select parts of text and visual materials to complete a task activity
- c Follow highly detailed, step by step directions in order to accomplish a sequence of task activities
- d Determine the essential message of a paragraph or section of written material
- e Infer from a written source, which does not explicitly provide required information, in order to make a decision
- f Synthesize information from written sources which contributes to the completion of a task activity

26 VOCABULARY

- a Recognize common words and their meanings
- b Recognize task related words with technical meanings
- c Identify the correct meaning of a word from the context of a sentence
- d Recognize the meaning of common contractions, abbreviations and acronyms
- e Determine the meaning of figurative, idiomatic, and technical terms by using context clues or by using a reference source(s)

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NT

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- ___ b Generate [illegible] for each major topic selected
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- ___ a *State the intent or objective(s) of the report*
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4/23/82

NT

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- ___ a Enunciate clearly, using the proper rate of speech
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SAFETY/SECURITY

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- ___ a Use common knowledge to avoid hazards in order to prevent injur[illegible] to self *or equipment*
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- ___ c. Select an appropriate course of action in the event of an emergency

PERCEPTUAL

41 RECOGNITION

- ___ a Identify *similarities and differences between and among objects*
- ___ b. Use body language (motions, gestures, postures) to communicate or *signal*
- ___ c. Determine the presence of a defect or extent of damage
- ___ d. Match objects by size, shape, color and significant markings
- ___ e Classify objects by size, shape, color and significant markings
- ___ f. Determine direction, duration, and intensity of sounds, sightings and smells
- ___ g. Infer from sights, sounds, touch, smells, or tastes to determine a course of action

NUMERATION PLACE VALUE

NT

1 RECOGNITION AND COUNTING

- a Match numerals & groups of dots and shapes
- b Write numerals from dictation
- c Tell what number comes before, after, or between any two given numbers
- d Select the number that is greater (lesser) from a set of numerals
- e Identify an object with a specified ordinal position
- f Write or state the place value of a particular digit whole or decimal number
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UNITS OF MEASUREMENT

2 LINEAR, WEIGHT, AND VOLUME MEASURES

- a Name the markings on a linear scale
- b Differentiate units of measure and equivalents in the English and metric system
- c Use a ruler, yardstick, meter stick or scale to measure lengths of objects or distances
- d Identify measures of ounce, pound, gram
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- a Identify degree or mil as a unit in determining direction, distance or temperature
- b Estimate the measure of a given angle not greater than 180^{0}
- c Interpret bearings, azimuth and other contexts in which the measure of an angle may range from 0^{0} to 360^{0}/0 to 6400 mils

4 TIME TELLING MEASURES

- a Use a 24 hour or digital clock to tell time
- b Name intervals and tell time in hours, minutes, and seconds
- c Estimate time in seconds, minutes, and parts of an hour
- d Identify, differentiate and arrange A.M. and P.M. in proper style
- e Convert between units and lengths of hours
- f Compare the military system with A.M. and P.M. as a basis for establishing zones and standards

NT

5 GAUGE MEASURES

- a Identify the unit of measurement found on an instrument
- b Interpret the number, word, symbol from a display or readout
- c Recognize a "reading" from a gauge with color divisions
- d Recognize positive (+) and negative (-) deviation from a scale
- e Select band(s) from a multi-scale gauge
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- h Interpret a gauge reading which is fluctuating or momentarily sustained
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VISUAL/SPATIAL RELATIONSHIPS

6 SPATIAL

- a Identify directions that tools, hardware or components may be moved
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- c Interpret spatial relationships of figures and objects from 2 dimensional drawings, pictures or photographs
- d Relate geometric symbols and graphic representations to actual systems subsystems and components

GEOMETRY

7 LINES

- a Identify and name points, lines, rays, and segments
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- a Identify and name plane geometric figures
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- b Identify vertical, adjacent, complementary or supplementary, angles
- c Classify triangles according to their sides or angle size
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- e Name an angle by using letters, a number, or a single letter

NT

10 SOLIDS

a Recognize and match the names of solids with their corresponding figures

11 TERMINOLOGY

a Identify technical words associated with geometric figures

b Interpret meaning of terms derived from spatial orientation

COMPUTE OR PERFORM

12 ADDITION AND SUBTRACTION

a Add or subtract whole numbers, without carrying or borrowing

b Add or subtract whole numbers, carrying and borrowing

c Add and subtract, borrowing and carrying with mixed numbers (whole and decimals)

d Add or subtract positive (+) and negative (-) numbers, using a number line to arrive at a solution

e Add or subtract to find correct time (24 hr. clock) using hours or minutes

f Add or subtract various increments on gauges, dials, or any other measuring instrument

g Add or subtract time, linear, dry, liquid or degree measures requiring regrouping

h Estimate a sum or difference

13 MULTIPLICATION AND DIVISION

a Multiply and divide whole numbers

b Multiply and divide mixed numbers (whole and decimals)

c Divide a number with decimals in both divisor and dividend

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NT

15 GEOMETRY

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b Match geometric figures with word names, equivalent measures

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b Compute averages

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a. Solve simple algebraic equations with one unknown

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a Use tables of trigonometric functions

b Use tables of logarithms to solve problems

c Solve geometric problems using trigonometric functions

d Use trigonometric ratios to solve problems

COMPREHENSION

26 VOCABULARY

- a Recognize common words and their meanings
- b Recognize task related words with technical meanings
- c Identify the correct meaning of a word from the context of a sentence
- d Recognize the meaning of common contractions, abbreviations and acronyms
- e Determine the meaning of figurative, idiomatic, and technical terms by using context clues or by using a reference source(s)

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- b Obtain a fact or specification from an intersection of a row by column table or chart
- c Use a complex table or chart requiring cross referencing within or in combination with text material outside the chart
- d Apply information from tables and charts for locating malfunctions or for determining a course of action

VISUAL ARTS

29

- a Identify details, objects, or parts of objects from their relationship to the whole
- b Identify spatial relationships of objects or parts
- c Interpret a drawing which shows a series of broad views of objects for assembly, disassembly
- d Interpret a three dimensional projection or exploded view of objects for assembly, disassembly, or location in system or subsystem
- e From illustrations, or photographs, arranged in a sequence, infer a logical
- f Integrate information from various sources to select a course of action

30 FLOW CHARTS

- a Use a simple linear path of an operational flow chart to find a condition or specified order
- b Use a linear path of a flow chart to provide visual and textual directions for a procedure, to arrive at decision points, and to provide alternate paths in problem-solving
- c Translate the significance of the symbols into physical activities

31 SCHEMATICS

- a Isolate each major section or entity represented in a schematic diagram
- b Identify the components within each entity
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- d Isolate a problem component in a schematic and trace it to components believed to cause the problem
- e Interpret symbols to indicate direction of flow, test points, components and diagrammatic decision points

WRITTEN COMMUNICATION

32 FORMS

- a. Locate the block on a form to enter the appropriate information
- b. Transfer a number, code, date, figure or related data from equipment or written sources onto an appropriate section of the form
- c. Write the name of the organization, responsible personnel, if applicable of the part or equipment, and nomenclature, in appropriate sections of the form
- d Write a descriptive account of an activity or transaction part
- e Use a completed form to locate or compare information

33 NOTE-TAKING

- a Distinguish between essential and non-essential details during the note-taking process
- b. Record details without misinterpreting the intent of either written or spoken an interview
- c Rewrite all recorded details in sentence form
- d. Organize all sentences into paragraphs

NT

34 OUTLINING (topic or sentence)

- a. Distinguish between major and subordinate topics
- b. Generate titles for each major topic selected
- c. Use phrases or sentences to provide subordinate details under each major topic
- d. Alternate, indent numbers and letters to establish a hierarchy

35 REPORT WRITING

- a. State the intent or objective(s) of the report
- b. Describe the parameters of the event or situation
- c. Distinguish between relevant and irrelevant details
- d. Sequence events in the order they have occurred
- e. State general impressions of events described
- f. Select examples that will clarify major issues presented in the report
- g. Examine opposing points of view in the report
- h. Summarize the major points developed in the report
- i. Justify an action taken and give reasons for rejecting alternatives

36 EDITING

- a. Spell frequently used words correctly
- b. Spell task-related words correctly
- c. Identify words that need to be capitalized
- d. Correct all misspelled words with or without the use of a reference source
- e. Apply all rules for end marks, commas, and apostrophes
- f. Apply common rules of grammar
- g. Rewrite the paragraph by stating the main idea in the first sentence, and restructuring the sentences for coherence
- h. Appraise an entire written communication and make adjustments to improve clarity

VERBAL COMMUNICATION

37 TYPE

- a. Individual — a person working on a task and communicating with another when assistance is needed or when a supervisory decision is needed
- b. Instruction — a task activity requiring communication between an instructor, an individual or small group where the purpose is to give facts or rules to inform or guide
- c. Tutor — interaction takes place between two persons where one is instructing and the other is doing the task
- d. Peer Group (less than 10) — all members engage in an activity where one person assumes a leadership role and communicates to others what is to be done
- e. Interview — a person communicating with another about his activities opinions, or subject expertise for the purpose of using the information in a task
- f. Briefing — communicating final instructions to others or giving an account in summary
- g. Counsel — communicating together to exchange ideas or opinions to recommend, give or take advice, or to arrive at an acceptance of a plan or decision
- h. Command — communicate to others an order or action to be taken where a person has a position of authority

4/23/82

NT

38 CHARACTERISTICS

- a. Enunciate clearly, using the proper rate of speech
- b. Use technical vocabulary suitable to the task and level of the person
- c. Determine the appropriate amount of information to communicate
- d. Interpret figurative or idiomatic language by reference to its use in context
- e. Follow highly detailed step-by-step directions
- f. Solicit feedback to confirm the accurate reception of the communication
- g. Recognize when a low-key, informal dialogue is suitable
- h. Recognize when direct verbal commands are necessary
- i. Recognize when a prescribed series of verbal interactions is required to coordinate a group effort
- j. Recognize when the situation will require a structured, preplanned method of presentation

39 BARRIERS

- a. Recognize the need for clear, concise directions in order to avoid language or word-meaning differences
- b. Recognize personality factors and inter personal relationships that may exist
- c. Recognize feedback as a means of communicating more effectively and increasing task competence

SAFETY/SECURITY

40 PRECAUTIONS

- a. Use common knowledge to avoid hazards in order to prevent injury to self or equipment
- b. Apply preventive measures prior to task performance to minimize any potential safety or security problem
- c. Select an appropriate course of action in the event of an emergency

PERCEPTUAL

41 RECOGNITION

- a. Identify similarities and differences between and among objects
- b. Use body language (motions, gestures, postures) to communicate or signal
- c. Determine the presence of a defect or extent of damage
- d. Match objects by size, shape, color and significant markings
- e. Classify objects by size, shape, color and significant markings
- f. Determine direction, duration, and intensity of sounds, sightings and smells
- g. Infer from sights, sounds, touch, smells, or tastes to determine a course of action

NUMERATION/PLACE VALUE

N1

1. NUMBERING AND COUNTING

- a. Match numerals to the written number words and vice versa
- b. Write numerals and the words for sequential order from any starting point
- c. State what number comes after, before, or between any two given numerals
- d. Select the numeral which is greater/less than from a set of numerals
- e. Identify an object with a specified ordinal position
- f. Name or state the place value of a part of a digit, whole or decimal number
- g. Round off a number to a specified place, whole or decimal
- h. Count by ones from, from ten's, backward or forward (skip counting)
- i. Match numbers with points on a number line (including integers (positive (+) or negative (-) values))

UNITS OF MEASUREMENT

2. LINEAR, WEIGHT, AND VOLUME MEASURES

- a. Name the markings on a linear scale
- b. Differentiate units of measure and equivalents in the English and metric system
- c. Use a ruler, yardstick, meter stick or scale to measure lengths of objects or distances
- d. Identify measures of ounce, pound, gram
- e. Identify measures of pints, quarts, gallons, liters
- f. Use a scale which is not numerically calibrated
- g. Estimate measures of varying lengths, dimensions or weights

3. DEGREE MEASURES

- a. Identify degree or mil as a unit in determining direction, distance or temperature
- b. Estimate the measure of a given angle not greater than 180^{0}
- c. Interpret bearings, azimuth and other contexts in which the measure of an angle may range from 0^{0} to 360^{0}/0 to 6400 mils

4. TIME TELLING MEASURES

- a. Use a 24 hour or digital clock to tell time
- b. Name intervals and tell time in hours, minutes and seconds
- c. Estimate time in seconds, minutes, and parts of an hour
- d. Identify calendar units and arrange them in Julian style
- e. Convert time into hours and tenths of hours
- f. Compute time using Greenwich Mean Time (GMT) as a basis for establishing [illegible] and distances

N1

5. GAUGE MEASURES

- a. Identify the unit of measurement used on an instrument
- b. Interpret the number which is closest from a display read out
- c. Recognize a "reading" in a gauge with color divisions
- d. Recognize positive (+) and negative (-) deviations from a scale
- e. Select bands(s) from a multi scale gauge
- f. Match a gauge reading to a specification as to numbered or labeled intervals
- g. Interpret gauge readings from a non-standard unmarked interval
- h. Interpret a gauge reading which is fluctuating or momentarily out of
- i. Match specifications of required measures by manipulation adjustment or maintenance

VISUAL/SPATIAL RELATIONSHIPS

6. SPATIAL

- a. Identify directions that tools, hardware, or components may be moved
- b. Manipulate objects to align, match, mate, make parallel, be perpendicular or be at an angle
- c. Interpret spatial relationships of figures and objects from 2 dimensional drawings, pictures, or photographs
- d. Relate geometric symbols and graphic representations to actual systems subsystems and components

GEOMETRY

7. LINES

- a. Identify and name points, lines, rays and segments
- b. Identify intersecting lines, parallel lines, and line segments
- c. Define and identify perpendicular lines
- d. Identify congruent segments

8. PLANES

- a. Identify and name plane geometric figures
- b. List the characteristics of geometric figures
- c. Classify figures according to the number or measure of its sides or angles
- d. Identify figures which possess similarities
- e. Identify figures which may be parallel, perpendicular or congruent

9. ANGLES AND TRIANGLES

- a. Identify and name the different kinds of angles and triangles, with their corresponding figures
- b. Identify vertical, adjacent, complementary or supplementary angles
- c. Classify triangles according to their sides or angle size
- d. Identify altitudes and medians of triangles or the bisector of an angle
- e. Name an angle by using letters, a number, or a single letter

NT

10 SOLIDS

a. Recognize and match the names of solids with their corresponding figures

11 TERMINOLOGY

a. Identify technical words associated with geometric figures
b. Interpret meaning of terms derived from spatial orientation

COMPUTE OR PERFORM

12 ADDITION AND SUBTRACTION

a. Add or subtract whole numbers, without carrying or borrowing
b. Add or subtract whole numbers, carrying and borrowing
c. Add and subtract, borrowing and carrying with mixed numbers (whole and decimals)
d. Add or subtract positive (+) and negative (-) numbers, using a number line to arrive at a solution
e. Add or subtract to find correct time (24 hr. clock) using hours or minutes
f. Add or subtract various increments on gauges, dials, or any other measuring instrument
g. Add or subtract time, linear, dry, liquid or degree measures requiring regrouping
h. Estimate a sum or difference

13 MULTIPLICATION AND DIVISION

a. Multiply and divide whole numbers
b. Multiply and divide mixed numbers (whole and decimals)
c. Divide a number with decimals in both divisor and dividend
d. Multiply and divide integers, both positive (+) and negative (-), and assign proper sign to product or quotient
e. Estimate a product or quotient

14 FRACTIONS/DECIMALS

a. Subdivide whole objects or a set of objects into halves (1/2), thirds (1/3), fourths (1/4), eighths (1/8)
b. Reduce fractions to lowest terms
c. Convert fractions (proper and improper) to decimal equivalents, and vice versa, using a table, chart or gauge
d. Compute equivalent value of fractions, decimals, percents, and mixed numbers to lowest terms
e. Add and subtract fractions, with same or different denominators
f. Multiply and divide fractions with and without whole numbers
g. Estimate a fractional sum, product or quotient

NT

15 GEOMETRY

a. Draw geometric figures, plane and solid
b. Match geometric figures with word names, equivalent measures
c. Label all parts of geometric figures using mathematical and characteristic designators
d. Use a protractor to measure angles, make geometrical constructions
e. Construct perpendicular on a line segment, bisector of an angle
f. Compute the perimeter and area of any figure
g. Compute the circumference and area of a circle
h. Compute the area and volume of any solid figure
i. Use formulas in solving problems involving geometric figures
j. Solve problems and interpret spatial relationships of figures, symbols, and objects from 2 dimensional displays

16 COMBINATION OF PROCESSES

a. Identify median and mode
b. Compute averages
c. Solve problems combining all processes using whole, mixed numbers and fractions
d. Solve problems, combining all processes, involving units of measurement
e. Interpret information from charts, number lines, scales and graphs to solve arithmetic problems
f. Solve conversion problems of linear (metric and English) liquid, weight, and temperature (F° or C°) measures
g. Solve problems involving ratio and proportion
h. Solve word problems where any mathematical process may occur

17 GRAPHING IN THE COORDINATE PLANE

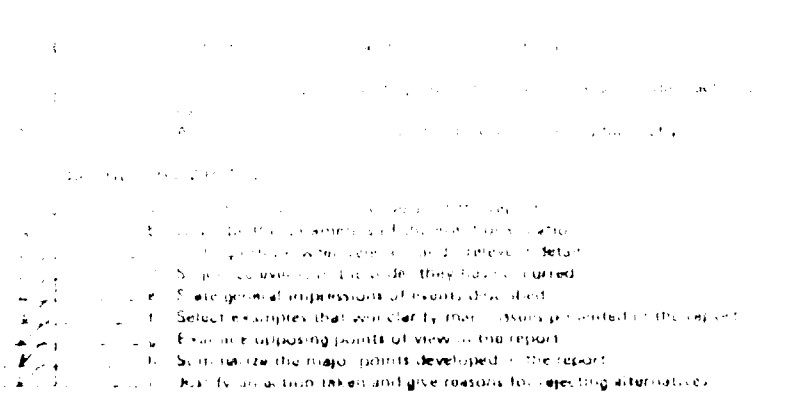
a. Identify coordinates of a point in any grid system
b. Identify points on a line graph
c. Match a graph with its equation

18 ALGEBRA

a. Solve simple algebraic equations with one unknown
b. Recognize and derive equivalent algebraic expressions
c. Evaluate powers and estimate roots

19 TRIGONOMETRY

a. Use tables of trigonometric functions
b. Use tables of logarithms to solve problems
c. Solve geometric problems using trigonometric functions
d. Use trigonometric ratios to solve problems



e. Select general impressions of events described
f. Select examples that will clarify main issues presented in the report
g. Evaluate opposing points of view in the report
h. Summarize the major points developed in the report
i. Justify an action taken and give reasons for rejecting alternatives

39 EDITING

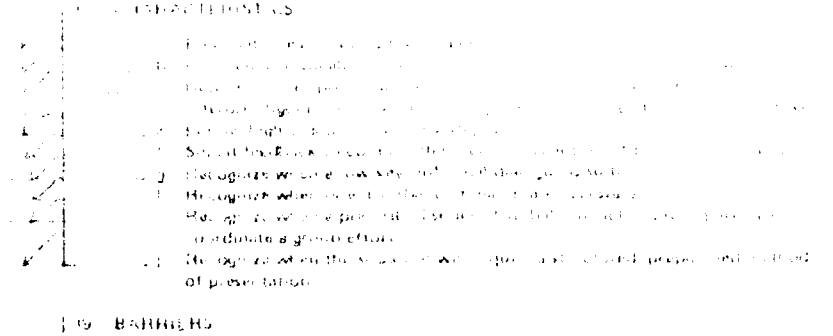
a. Spell frequently used words correctly
b. Spell task related words correctly
c. Identify words that need to be capitalized
d. Correct all misspelled words with or without the use of a reference source
e. Apply all rules for end marks, commas, and apostrophes
f. Apply common rules of grammar
g. Rewrite the paragraph by stating the main idea in the first sentence and restructuring the sentences for coherence
h. Appraise an entire written communication and make adjustments to improve clarity

VERBAL COMMUNICATION

37 TYPE

a. Individual - a person working on a task and communicating with another when assistance is needed or when a supervisory decision is needed
b. Instruction - a task activity requiring communication between an instructor, an individual or small group where the purpose is to give facts or notes to inform or guide
c. Face-to-face interaction takes place between two persons where one is instructing and the other is doing the task
d. Peer (or supervisor) - all members engage in an activity where one person assumes a leadership role and communicates to others what is to be done
e. Interview - a person communicating with another about his activities, opinions, or subject expertise for the purpose of using the information gained
f. Briefing - communicating facts, instructions, or others giving an account of events
Discussion - communicating together to exchange ideas or opinions to [illegible] give or take advice, or to arrive at the acceptance of a plan or decision
Command - communicate to others an order, direction, to be taken, where [illegible] is exercised by virtue of authority

4 [illegible]



of presentation

39 BARRIERS

a. Recognize the need for clear communication in order to avoid misunderstandings or word meaning differences
b. Recognize personality traits and interpersonal relationships that block communication
c. Recognize feedback as a means of communicating more efficiently and increasing task competence

SAFETY/SECURITY

40 PRECAUTIONS

a. Use common knowledge to avoid hazards in order to prevent injury to self or equipment
b. Apply preventive measures prior to task performance to minimize any potential safety or security problem
c. Select an appropriate course of action in the event of an emergency

PERCEPTUAL

41 RECOGNITION

a. Identify similarities and differences between and among objects
b. Use body language (motions, gestures, postures) to communicate a signal
c. Determine the presence of a defect or extent of damage
d. Match objects by size, shape, color and significant marking
e. Classify objects by size, shape, color and significant marking
f. Determine direction, duration, and intensity of sounds, sightings, and smells
g. Infer from sights, sounds, touch, smells, or tastes to determine a corrective action

CONTENT READING

25. PROCEDURAL DIRECTIONS

- a. Identify factual data or specifications that are found within a statement or written section
- b. Select parts of text and visual materials to complete a task activity
- c. Follow highly detailed step by step directions in order to accomplish a sequence of task activities
- d. Determine the central message of a paragraph or section of written material
- e. Infer from a written source, which does not explicitly provide required information, in order to make a decision
- f. Synthesize information from written sources which contributes to the completion of a task activity

26. VOCABULARY

- a. Recognize words on sight and their meanings
- b. Recognize technical words with technical meanings
- c. Identify the correct meaning of a word from the context of a sentence
- d. Recognize the meaning of common contractions, abbreviations and acronyms
- e. Determine the meaning of figurative, idiomatic, and technical terms by using context clues or by using reference source(s)

INFORMATION ACCESS

27. REFERENCE SKILLS

- a. Locate a Technical Manual, Field Manual, or any related source document by code number and title
- b. Alphabetize words or topics to locate information
- c. Use the table of contents, index system or sub system heading, appendix and glossary to locate information
- d. Locate the page, title, paragraph, figure or chart needed to answer a question or to solve a problem
- e. Determine, after scanning or skim reading, whether the information is relevant
- f. Cross reference within and across source documents to select information needed to perform a task
- g. Organize information from multiple sources into a sequenced series of events

28. TABLES AND GRAPHS

- a. [illegible]
- b. [illegible]
- c. [illegible]
- d. [illegible]
- e. [illegible]

VISUAL AIDS

NT

29. ILLUSTRATIONS

- a. Identify details, labels, numbers and parts from an illustration or picture
- b. Identify parts or details according to a key or legend
- c. Interpret a drawing which shows a cross sectional view of an object for assembly, disassembly
- d. Interpret a three dimensional projection or exploded view of object(s) for assembly, disassembly, or position in system or sub system
- e. Follow illustrations, or photographs, arranged in a sequential order, as a guide
- f. Integrate information from various sources to select a course of action

30. FLOW CHARTS

- a. Use a simple linear path of an organizational chart to list events in sequential order
- b. Use a linear path of a flow chart to provide visual and textual directions to a procedure, to arrive at decision points, and to provide alternate paths in problem solving
- c. Translate the significance of the symbols into physical activities

31. SCHEMATICS

- a. Isolate each major section or entity presented in a schematic diagram
- b. Identify the components within each entity
- c. Trace connections in an integrated circuit from their origin to another point within or from one entity to another
- d. Isolate a problem component in a schematic and trace it to components believed to cause the problem
- e. Interpret symbols to indicate direction of flow, test points, components and diagrammatic decision points

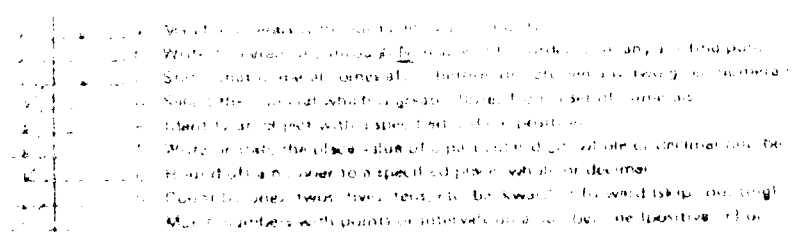
WRITTEN COMMUNICATION

32. FORMS

- a. Locate the block on a form to enter the appropriate information
- b. Transfer a number, code, date, figure or related data from a paragraph or written sources onto an appropriate section of the form
- c. [illegible]
- d. [illegible]
- e. [illegible]

33. NOTE TAKING

- a. [illegible]
- b. [illegible]
- c. [illegible]
- d. [illegible]



UNITS OF MEASUREMENT

2 LINEAR, WEIGHT, AND VOLUME MEASURES

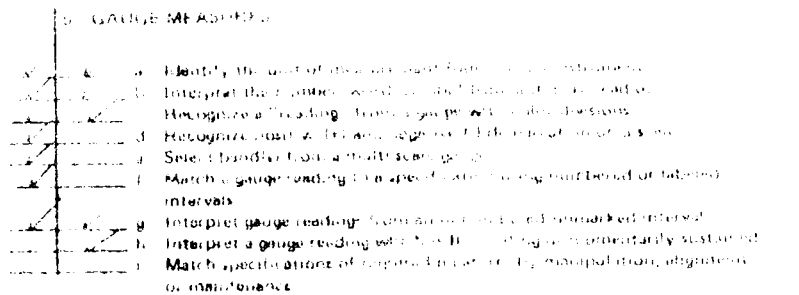
a. Name the markings on a linear scale
b. Differentiate units of measure and equivalents in the English and metric system
c. Use a ruler, yardstick, meter stick or scale to measure lengths of objects or distances
d. Identify measures of ounce, pound, gram
e. Identify measures of pints, quarts, gallons, liters
f. Use a scale which is not numerically calibrated
g. Estimate measures of varying lengths, dimensions or weights

3 DEGREE MEASURES

a. Identify degree or mil as a unit in determining direction, distance or temperature
b. Estimate the measure of a given angle not greater than 180°
c. Interpret bearings, azimuth and other contexts in which the measure of an angle may range from 0° to 360°/0 to 6400 mils

4 TIME TELLING MEASURES

a. Use a 24 hour or digital clock to tell time
b. Name intervals and tell time in hours, minutes, and seconds
c. Estimate time in seconds, minutes, and parts of an hour
d. Identify calendar units and arrange them in Julian style
e. Convert time into hours and tenths of hours
f. Compute time using Greenwich Mean Time (GMT) as a basis for establishing [illegible] and distances



5 GAUGE MEASURES

a. Identify the unit of measure used [illegible]
b. Interpret the [illegible]
c. Recognize a "reading" [illegible]
d. Recognize [illegible]
e. Select [illegible]
f. Match a gauge reading [illegible] intervals
g. Interpret gauge readings [illegible]
h. Interpret a gauge reading [illegible]
i. Match specifications of [illegible] or maintenance

VISUAL/SPATIAL RELATIONSHIPS

6 SPATIAL

a. Identify [illegible] that tools, hardware or components may be moved
b. Manipulate objects to align, merge, or make parallel, be perpendicular or be at an angle
c. Interpret spatial relationships of three dimensional objects from 2 dimensional drawings, pictures, or photographs
d. Relate geometric symbols and graphic representations to actual systems, subsystems and components

GEOMETRY

7 LINES

a. Identify and name points, lines, rays, and segments
b. Identify intersecting lines, parallel lines, and line segments
c. Define and identify perpendicular lines
d. Identify congruent segments

8 PLANES

a. Identify and name plane geometric figures
b. List the characteristics of geometric figures
c. Classify figures according to the number or measure of its sides or angles
d. Identify figures which possess similarities
e. Identify figures which may be parallel, perpendicular or congruent

9 ANGLES AND TRIANGLES

a. Identify and name the different kinds of angles and/or angles with their corresponding figures
b. Identify vertical, adjacent, complementary or supplementary angles
c. Classify triangles according to their sides or angle size
d. Identify altitudes and medians of triangles or the bisector of an angle
e. Name an angle by using letters, a number or a single letter

NT

10 SOLIDS

a. Recognize and match the names of solids with their corresponding figures

11 TERMINOLOGY

a Identify technical words associated with geometric figures

b Interpret meaning of terms derived from spatial orientation

COMPUTE OR PERFORM

12 ADDITION AND SUBTRACTION

a Add or subtract whole numbers, without carrying or borrowing

b Add or subtract whole numbers, carrying and borrowing

c Add and subtract fractions, borrowing and carrying with mixed numbers

d

e

13

a Substitute equivalent objects or pictures for objects into halves (1/2), thirds (1/3), fourths (1/4), eighths (1/8)

b Reduce fractions to lowest terms

c Convert fractions (proper and improper) to decimal equivalents, and vice versa using a table, chart, or gauge

d

e

f

g

h

NT

15 GEOMETRY

a Draw geometric figures, plane and solid

b. Match geometric figures with word names, equivalent measures

c. Label all parts of geometric figures using mathematical and characteristic designators

d. Use a protractor to measure angles, make geometrical constructions

e. Construct perpendicular on a line segment, bisector of an angle

f Compute the perimeter and area of any figure

g. Compute the circumference and area of a circle

h Compute the area and volume of any solid figure

i. Use formulas in solving problems involving geometric figures

j Solve problems and interpret spatial relationships of figures, symbols, and objects from 2-dimensional displays

16 COMBINATION OF PROCESSES

a Identify median and mode

b Compute averages

c

d

e

f

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o

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x

y

z

18 ALGEBRA

a Solve simple algebraic equations involving one unknown

b Recognize and derive equivalent algebraic expressions

c. Evaluate powers and estimate roots

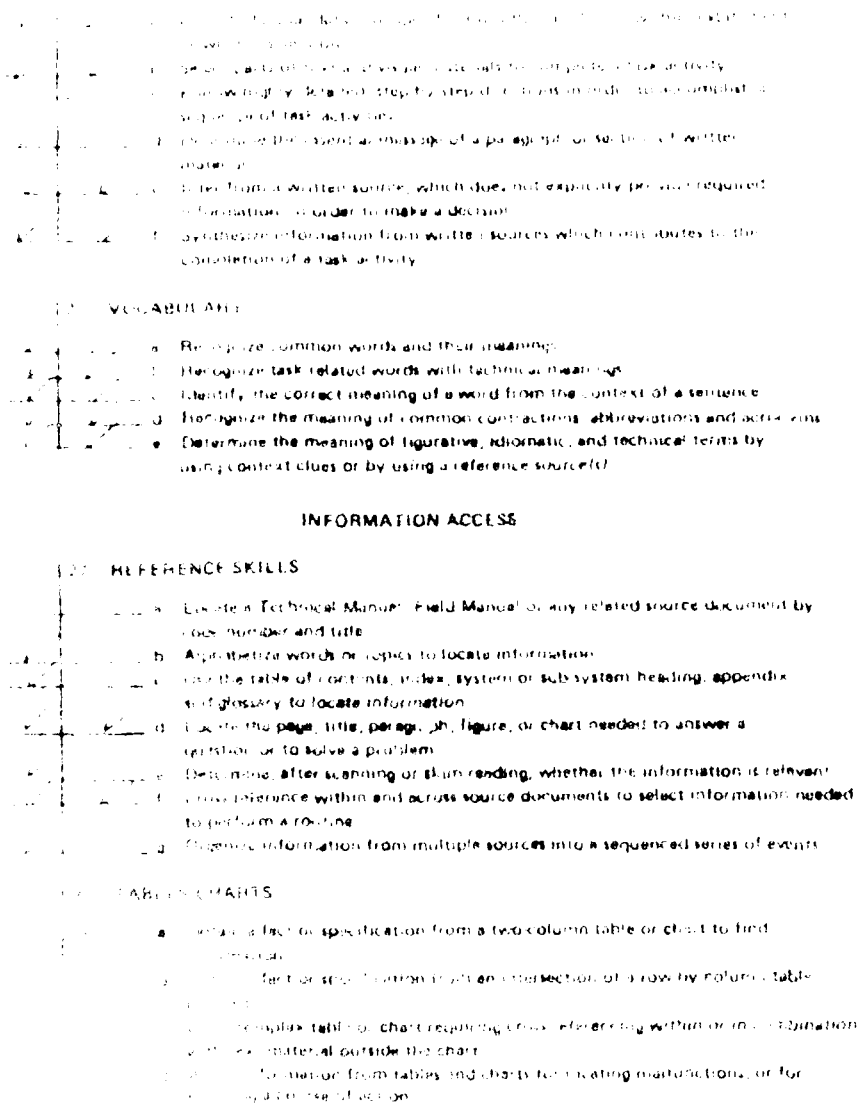
19 TRIGONOMETRY

a Use tables of trigonometric function

b Use tables of logarithms to solve problems

c Solve geometric problems using trigonometric functions

d Use trigonometric values to solve problems



VOCABULARY

a. Recognize common words and their meanings
b. Recognize task related words with technical meanings
c. Identify the correct meaning of a word from the context of a sentence
d. Recognize the meaning of common contractions, abbreviations and acronyms
e. Determine the meaning of figurative, idiomatic, and technical terms by using context clues or by using a reference source(s)

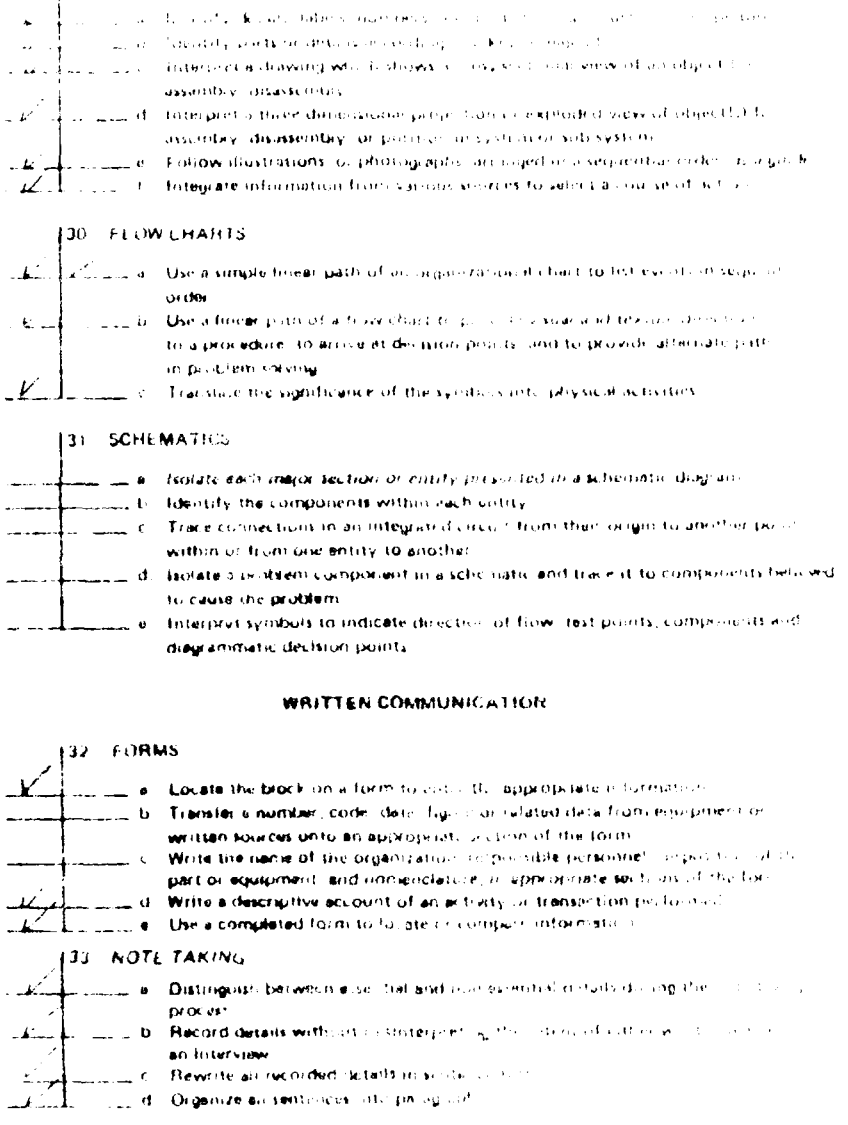
INFORMATION ACCESS

REFERENCE SKILLS

a. Locate a Technical Manual, Field Manual or any related source document by page number and title
b. Apply alphabetical words or topics to locate information
c. Use the table of contents, index, system or sub system heading, appendix and glossary to locate information
d. Locate the page, title, paragraph, figure, or chart needed to answer a question or to solve a problem
e. Determine, after scanning or skim reading, whether the information is relevant
f. Cross reference within and across source documents to select information needed to perform a routine
g. Organize information from multiple sources into a sequenced series of events

TABLES AND CHARTS

a. Locate a fact or specification from a two column table or chart to find [illegible]
b. Locate a fact or specification at an intersection of a row by column table
c. Locate information in a complex table or chart requiring cross referencing within or outside the chart
d. Locate material outside the chart
e. Draw information from tables and charts for illustrating instructions, or for [illegible]



VISUAL AIDS

DRAWINGS

a. Identify, locate, label, name, and describe the function of parts
b. Identify parts or components on drawings, photographs
c. Interpret a drawing which shows a cutaway, exploded view of an object for assembly, disassembly
d. Interpret a three dimensional perspective, exploded view of object for assembly, disassembly, or portion or system or subsystem
e. Follow illustrations or photographs arranged in a sequential order to accomplish a task
f. Integrate information from various sources to select a course of action

FLOW CHARTS

a. Use a simple linear path of an organizational chart to list events in sequential order
b. Use a linear path of a flowchart to [illegible] to a procedure, to arrive at decision points, and to provide alternate paths in problem solving
c. Translate the significance of the symbols into physical activities

SCHEMATICS

a. Isolate each major section or entity presented in a schematic diagram
b. Identify the components within each entity
c. Trace connections in an integrated circuit from their origin to another point within or from one entity to another
d. Isolate a problem component in a schematic and trace it to components believed to cause the problem
e. Interpret symbols to indicate direction of flow, test points, components and diagrammatic decision points

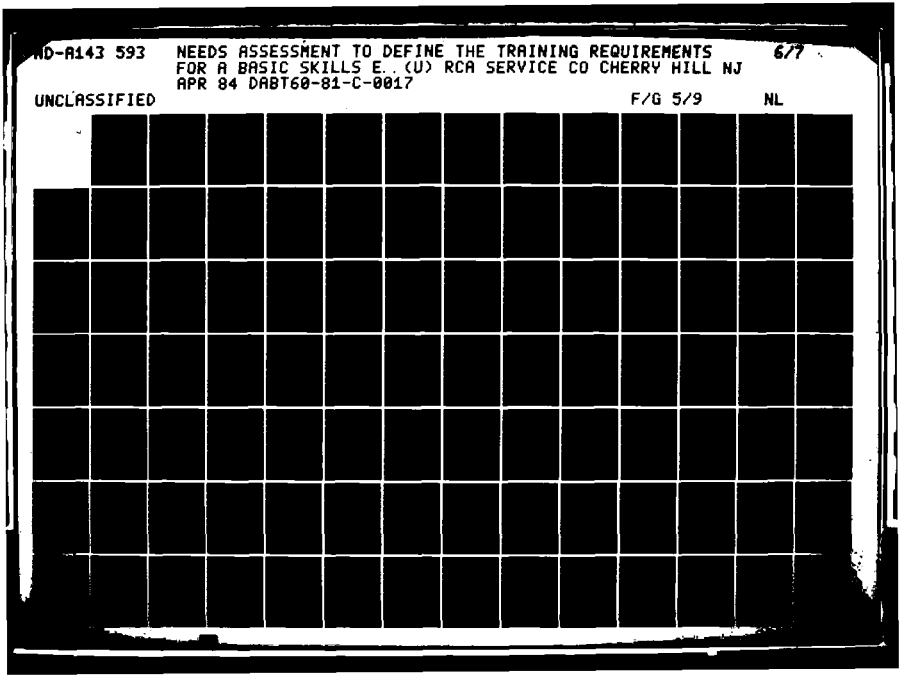
WRITTEN COMMUNICATION

FORMS

a. Locate the block on a form to enter the appropriate information
b. Transfer a number, code, date, figure or related data from equipment or written sources onto an appropriate section of the form
c. Write the name of the organization responsible personnel, [illegible] part or equipment, and nomenclature, as appropriate, on sections of the form
d. Write a descriptive account of an activity or transaction performed
e. Use a completed form to locate or compare information

NOTE TAKING

a. Distinguish between essential and non essential details during the [illegible] process
b. Record details without misinterpretation [illegible] an interview
c. Rewrite all recorded details in [illegible]
d. Organize all sentences into paragraphs


AD-A143 593 NEEDS ASSESSMENT TO DEFINE THE TRAINING REQUIREMENTS
FOR A BASIC SKILLS E.. (U) RCA SERVICE CO CHERRY HILL NJ
APR 84 DABT60-81-C-0017
6/7
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F/G 5/9
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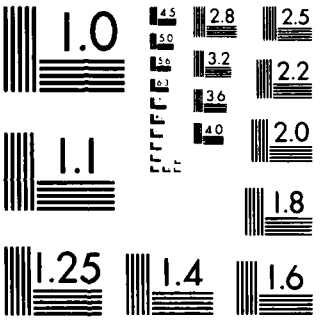

MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS 1963-A

NT

34 OUTLINING (topic or sentence)

- a. Distinguish between major and subordinate topics
- b. Generate titles for each major topic selected
- c. Use phrases or sentences to provide subordinate details under each major topic
- d. Alternate, indent numbers and letters to establish a hierarchy

35 REPORT WRITING

- a. State the intent or objective(s) of the report
- b. Describe the parameters of the event or situation
- c. Distinguish between relevant and irrelevant details
- d. Sequence events in the order they have occurred
- e. State general impressions of events described
- f. Select examples that will clarify major issues presented in the report
- g. Examine opposing points of view in the report
- h. Summarize the major points developed in the report
- i. Justify an action taken and give reasons for rejecting alternatives

36 EDITING

- a. Spell frequently used words correctly
- b. Spell task related words correctly
- c. Identify words that need to be capitalized
- d. Correct all misspelled words with or without the use of a reference source
- e. Apply all rules for end marks, commas, and apostrophes
- f. Apply common rules of grammar
- g. Rewrite the paragraph by stating the main idea in the first sentence, and restructuring the sentences for coherence
- h. Appraise an entire written communication and make adjustments to improve clarity

VERBAL COMMUNICATION

37 TYPE

- a. Individual — a person working on a task and communicating with another when assistance is needed or when a supervisory decision is needed
- b. Instruction — a task activity requiring communication between an instructor, an individual or small group where the purpose is to give facts or rules to inform or guide
- c. Tutor — interaction takes place between two persons where one is instructing and the other is doing the task
- d. Peer Group (less than 10) — all members engage in an activity where one person assumes a leadership role and communicates to others what is to be done
- e. Interview — a person communicating with another about his activities, opinions, or subject expertise for the purpose of using the information in a task
- f. Briefing — communicating final instructions to others or giving an account in summary
- g. Counsel — communicating together to exchange ideas or opinions to recommend, give or take advice, or to arrive at an acceptance of a plan or decision
- h. Command — communicate to others an order or action to be taken where a person has a position of authority

NT

38 CHARACTERISTICS

- a. Enunciate clearly, using the proper rate of speech
- b. Use technical vocabulary suitable to the task and level of the person
- c. Determine the appropriate amount of information to communicate
- d. Interpret figurative or idiomatic language by reference to its use in context
- e. Follow highly detailed, step by step directions
- f. Solicit feedback to confirm the accurate reception of the communication
- g. Recognize when a low-key, informal dialogue is suitable
- h. Recognize when direct verbal commands are necessary
- i. Recognize when a prescribed series of verbal interactions is required to coordinate a group effort
- j. Recognize when the situation will require a structured, preplanned method of presentation

39. BARRIERS

- a. Recognize the need for clear, concise directions in order to avoid language or word meaning differences
- b. Recognize personality factors and inter-personal relationships that may exist
- c. Recognize feedback as a means of communicating more effectively and increasing task competence

SAFETY/SECURITY

40. PRECAUTIONS

- a. Use common knowledge to avoid hazards in order to prevent injury to self or equipment
- b. Apply preventive measures prior to task performance to minimize any potential safety or security problem
- c. Select an appropriate course of action in the event of an emergency

PERCEPTUAL

41 RECOGNITION

- a. Identify similarities and differences between and among objects
- b. Use body language (motions, gestures, postures) to communicate or signal
- c. Determine the presence of a defect or extent of damage
- d. Match objects by size, shape, color and significant markings
- e. Classify objects by size, shape, color and significant markings
- f. Determine direction, duration, and intensity of sounds, sightings and smells
- g. Infer from sights, sounds, touch, smells, or tastes to determine a course of action

62E Heavy Construction Equipment Operator

BSEP I

NUMERATION/PLACE VALUE

NT

1. NUMBERING AND COUNTING

- a. Match numerals with word names and models
- b. Write numerals one through N in sequential order from any starting point
- c. State what numeral comes after, before, or between any two given numerals
- d. Select the numeral which is greater/lesser from a set of numerals
- e. Identify an object with a specified ordinal position
- f. Write or state the place value of a particular digit, whole or decimal number
- g. Round off a number to a specified place, whole or decimal
- h. Count by ones, twos, fives, tens, etc. backward or forward (skip counting)
- i. Match numbers with points or intervals on a number line (positive (+) or negative (-) values)

UNITS OF MEASUREMENT

2. LINEAR, WEIGHT, AND VOLUME MEASURES

- a. Name the markings on a linear scale
- b. Differentiate units of measure and equivalents in the English and metric system
- c. Use a ruler, yardstick, meter stick or scale to measure lengths of objects or distances
- d. Identify measures of ounce, pound, gram
- e. Identify measures of pints, quarts, gallons, liters
- f. Use a scale which is not numerically calibrated
- g. Estimate measures of varying lengths, dimensions or weights

3. DEGREE MEASURES

- a. Identify degree or mil as a unit in determining direction, distance or temperature
- b. Estimate the measure of a given angle not greater than 180^{0}
- c. Interpret bearings, azimuth and other contexts in which the measure of an angle may range from 0^{0} to 360^{0}/0 to 6400 mils

4. TIME TELLING MEASURES

- a. Use a 24 hour or digital clock to tell time
- b. Name intervals and tell time in hours, minutes, and seconds
- c. Estimate time in seconds, minutes, and parts of an hour
- d. Identify calendar units and arrange them in Julian style
- e. Convert time into hours and tenths of hours
- f. Compute time using Greenwich Mean Time (GMT) as a basis for establishing zones and distances

NT

5. GAUGE MEASURES

- a. Identify the unit of measurement found on an instrument
- b. Interpret the number, word, symbol from a display read-out
- c. Recognize a "reading" from a gauge with color divisions
- d. Recognize positive (+) and negative (-) demarcation on a scale
- e. Select hand(s) from a multi-scale gauge
- f. Match a gauge reading to a specification using numbered or labeled intervals
- g. Interpret gauge readings from an unnumbered/unmarked interval
- h. Interpret a gauge reading which is fluctuating or momentarily sustained
- i. Match specifications of required measures by manipulation, alignment or maintenance

VISUAL/SPATIAL RELATIONSHIPS

6. SPATIAL

- a. Identify directions that tools, hardware, or components may be moved
- b. Manipulate objects to align, match, mate, make parallel, be perpendicular or be at an angle
- c. Interpret spatial relationships of figures and objects from 2 dimensional drawings, pictures, or photographs
- d. Relate geometric symbols and graphic representations to actual systems, subsystems and components

GEOMETRY

7. LINES

- a. Identify and name points, lines, rays, and segments
- b. Identify intersecting lines, parallel lines, and line segments
- c. Define and identify perpendicular lines
- d. Identify congruent segments

8. PLANES

- a. Identify and name plane geometric figures
- b. List the characteristics of geometric figures
- c. Classify figures according to the number or measure of its sides or angles
- d. Identify figures which posses similarities
- e. Identify figures which may be parallel, perpendicular or congruent

9. ANGLES AND TRIANGLES

- a. Identify and name the different kinds of angles and triangles, with their corresponding figures
- b. Identify vertical, adjacent, complementary or supplementary angles
- c. Classify triangles according to their sides or angle size
- d. Identify altitudes and medians of triangles or the bisector of an angle
- e. Name an angle by using letters, a number, or a single letter

NT

10 SOLIDS

- a Recognize and match the names of solids with their corresponding figures

11 TERMINOLOGY

- a Identify technical words associated with geometric figures
- b Interpret meaning of terms derived from spatial orientation

COMPUTE OR PERFORM

12 ADDITION AND SUBTRACTION

- a Add or subtract whole numbers, without carrying or borrowing
- b Add or subtract whole numbers, carrying and borrowing
- c Add and subtract, borrowing and carrying with mixed numbers (whole and decimals)
- d Add or subtract positive (+) and negative (-) numbers, using a number line to arrive at a solution
- e Add or subtract to find correct time (24 hr. clock) using hours or minutes
- f Add or subtract various increments on gauges, dials, or any other measuring instrument
- g Add or subtract time, linear, dry, liquid or degree measures requiring regrouping
- h Estimate a sum or difference

13 MULTIPLICATION AND DIVISION

- a. Multiply and divide whole numbers
- b. Multiply and divide mixed numbers (whole and decimals)
- c Divide a number with decimals in both divisor and dividend
- d. Multiply and divide integers, both positive (+) and negative (-), and assign proper sign to product or quotient
- e. Estimate a product or quotient

14. FRACTIONS/DECIMALS

- a. Subdivide whole objects or a set of objects into halves (1/2), thirds (1/3), fourths (1/4), eighths (1/8)
- b. Reduce fractions to lowest terms
- c Convert fractions (proper and improper) to decimal equivalents, and vice versa, using a table, chart or gauge
- d Compute equivalent value of fractions, decimals, percents, and mixed numbers to lowest terms
- e Add and subtract fractions, with same or different denominators
- f Multiply and divide fractions with and without whole numbers
- g Estimate a fractional sum, product or quotient

NT

15 GEOMETRY

- a. Draw geometric figures, plane and solid
- b Match geometric figures with word names, equivalent measures
- c. Label all parts of geometric figures using mathematical and characteristic designators
- d. Use a protractor to measure angles, make geometrical constructions
- e. Construct perpendicular on a line segment, bisector of an angle
- f. Compute the perimeter and area of any figure
- g Compute the circumference and area of a circle
- h Compute the area and volume of any solid figure
- i. Use formulas in solving problems involving geometric figures
- j. Solve problems and interpret spatial relationships of figures, symbols, and objects from 2 dimensional displays

16. COMBINATION OF PROCESSES

- a Identify median and mode
- b. Compute averages
- c Solve problems combining all processes using whole, mixed numbers and fractions
- d. Solve problems, combining all processes, involving units of measurement
- e. Interpret information from charts, number lines, scales and graphs to solve arithmetic problems
- f. Solve conversion problems of linear (metric and English) liquid, weight, and temperature (F^{O} or C^{O}) measures
- g. Solve problems involving ratio and proportion
- h. Solve word problems where any mathematical process may occur

17. GRAPHING IN THE COORDINATE PLANE

- a. Identify coordinates of a point in any grid system
- b. Identify points on a line graph
- c Match a graph with its equation

18. ALGEBRA

- a. Solve simple algebraic equations with one unknown
- b. Recognize and derive equivalent algebraic expressions
- c Evaluate powers and estimate roots

19. TRIGONOMETRY

- a. Use tables of trigonometric functions
- b. Use tables of logarithms to solve problems
- c. Solve geometric problems using trigonometric functions
- d Use trigonometric ratios to solve problems

CONTENT READING

NT

25. PROCEDURAL DIRECTIONS

- a. Identify factual details or specifications that are found within a statement or written selection
- b. Select parts of text and visual materials to complete a task activity
- c. Follow highly detailed, step by step directions in order to accomplish a sequence of task activities
- d. Determine the essential message of a paragraph or section of written material
- e. Infer from a written source, which does not explicitly provide required information, in order to make a decision
- f. Synthesize information from written sources which contributes to the completion of a task activity

26. VOCABULARY

- a. Recognize common words and their meanings
- b. Recognize task related words with technical meanings
- c. Identify the correct meaning of a word from the context of a sentence
- d. Recognize the meaning of common contractions, abbreviations and acronyms
- e. Determine the meaning of figurative, idiomatic, and technical terms by using context clues or by using a reference source(s)

INFORMATION ACCESS

27. REFERENCE SKILLS

- a. Locate a *Technical Manual, Field Manual or any related* source document by code number and title
- b. Alphabetize words or topics to locate information
- c. Use the table of contents, index, system or sub system heading, appendix and glossary to locate information
- d. Locate the page, title, paragraph, figure, or chart needed to answer a question or to solve a problem
- e. Determine, after scanning or skim-reading, whether the information is relevant
- f. Cross-reference within and across source documents to select information needed to perform a routine
- g. Organize information from multiple sources into a sequenced series of events

28. TABLES/CHARTS

- a. Obtain a fact or specification from a two column table or chart to find information
- b. Obtain a fact or specification from an intersection of a row by column table or chart
- c. Use a complex table or chart requiring cross referencing within or in combination with text material outside the chart
- d. Apply information from tables and charts for locating malfunctions, or for selecting a course of action

VISUAL AIDS

NT

29. ILLUSTRATIONS

- a. Identify details, labels, numbers, and parts from an illustration or picture
- b. Identify parts or details according to a key or legend
- c. Interpret a drawing which shows a cross sectional view of an object for assembly, disassembly
- d. Interpret a three dimensional projection or exploded view of object(s) for assembly, disassembly, or position in system or sub system
- e. Follow illustrations, or photographs, arranged in a sequential order, as a guide
- f. Integrate information from various sources to select a course of action

30. FLOW CHARTS

- a. Use a simple linear path of an organizational chart to list events in sequential order
- b. Use a linear path of a flow chart to provide visual and textual directions to a procedure, to arrive at decision points, and to provide alternate paths in problem-solving
- c. Translate the significance of the symbols into physical activities

31. SCHEMATICS

- a. Isolate each major section or entity presented in a schematic diagram
- b. Identify the components within each entity
- c. Trace connections in an integrated circuit from their origin to another point within or from one entity to another
- d. Isolate a problem component in a schematic and trace it to components believed to cause the problem
- e. Interpret symbols to indicate direction of flow, test points, components and diagrammatic decision points

WRITTEN COMMUNICATION

32. FORMS

- a. Locate the block on a form to enter the appropriate information
- b. Transfer a number, code, date, figure or related data from equipment or written sources onto an appropriate section of the form
- c. Write the name of the organization, responsible personnel, disposition of the part or equipment, and nomenclature, in appropriate sections of the form
- d. Write a descriptive account of an activity or transaction performed
- e. Use a completed form to locate or compare information

33. NOTE-TAKING

- a. Distinguish between essential and non-essential details during the note taking process
- b. Record details without misinterpreting the intent of either written material or an interview
- c. Rewrite all recorded details in sentence form
- d. Organize all sentences into paragraphs

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34 OUTLINING (topic or sentence)

- a. Distinguish between major and subordinate topics
- b. Generate titles for each major topic selected
- c. Use phrases or sentences to provide subordinate details under each major topic
- d. Alternate, indent numbers and letters to establish a hierarchy

35. REPORT WRITING

- a. State the intent or objective(s) of the report
- b. Describe the parameters of the event or situation
- c. Distinguish between relevent and irrelevent details
- d. Sequence events in the order they have occurred
- e. State general impressions of events described
- f. Select examples that will clarify major issues presented in the report
- g. Examine opposing points of view in the report
- h. Summarize the major points developed in the report
- i. Justify an action taken and give reasons for rejecting alternatives

36 EDITING

- a. Spell frequently used words correctly
- b. Spell task-related words correctly
- c. Identify words that need to be capitalized
- d. Correct all misspelled words with or without the use of a reference source
- e. Apply all rules for end marks, commas, and apostrophes
- f. Apply common rules of grammar
- g. Rewrite the paragraph by stating the main idea in the first sentence, and restructuring the sentences for coherence
- h. Appraise an entire written communication and make adjustments to improve clarity

VERBAL COMMUNICATION

37. TYPE

- a. Individual – a person working on a task and communicating with another when assistance is needed or when a supervisory decision is needed
- b. Instruction – a task activity requiring communication between an instructor, an individual or small group where the purpose is to give facts or rules to inform or guide
- c. Tutor – interaction takes place between two persons where one is instructing and the other is doing the task
- d. Peer Group (less than 10) – all members engage in an activity where one person assumes a leadership role and communicates to others what is to be done
- e. Interview – a person communicating with another about his activities, opinions, or subject expertise for the purpose of using the information in a task
- f. Briefing – communicating final instructions to others or giving an account in summary
- g. Counsel – communicating together to exchange ideas or opinions to recommend, give or take advice, or to arrive at an acceptance of a plan or decision
- h. Command – communicate to others an order or action to be taken where a person has a position of authority

4/23/82

NT

38. CHARACTERISTICS

- a. Enunciate clearly, using the proper rate of speech
- b. Use technical vocabulary suitable to the task and level of the person
- c. Determine the appropriate amount of information to communicate
- d. Interpret figurative or idiomatic language by reference to its use in context
- e. Follow highly detailed, step-by-step directions
- f. Solicit feedback to confirm the accurate reception of the communication
- g. Recognize when a low key, informal dialogue is suitable
- h. Recognize when direct verbal commands are necessary
- i. Recognize when a prescribed series of verbal interactions is required to coordinate a group effort
- j. Recognize when the situation will require a structured, preplanned method of presentation

39. BARRIERS

- a. Recognize the need for clear, concise directions in order to avoid language or word-meaning differences
- b. Recognize personality factors and inter-personal relationships that may exist
- c. Recognize feedback as a means of communicating more effectively and increasing task competence

SAFETY/SECURITY

40. PRECAUTIONS

- a. Use common knowledge to avoid hazards in order to prevent injury to self or equipment
- b. Apply preventive measures prior to task performance to minimize any potential safety or security problem
- c. Select an appropriate course of action in the event of an emergency

PERCEPTUAL

41. RECOGNITION

- a. Identify similarities and differences between and among objects
- b. Use body language (motions, gestures, postures) to communicate or signal
- c. Determine the presence of a defect or extent of damage
- d. Match objects by size, shape, color and significant markings
- e. Classify objects by size, shape, color and significant markings
- f. Determine direction, duration, and intensity of sounds, sightings and smells
- g. Infer from sights, sounds, touch, smells, or tastes to determine a course of action

NUMERATION/PLACE VALUE

NT

1 NUMBERING AND COUNTING

- a Match numerals with word names and models
- b Write numerals one through N in sequential order from any starting point
- c State what numeral comes after, before, or between any two given numerals
- d Select the numeral which is greater/lesser from a set of numerals
- e Identify an object with a specified ordinal position
- f Write or state the place value of a particular digit, whole or decimal number
- g Round off a number to a specified place, whole or decimal
- h Count by ones, twos, fives, tens, etc. backward or forward (skip counting)
- i Match numbers with points or intervals on a number line (positive (+) or negative (-) values)

UNITS OF MEASUREMENT

2 LINEAR, WEIGHT, AND VOLUME MEASURES

- a. Name the markings on a linear scale
- b Differentiate units of measure and equivalents in the English and metric system
- c. Use a ruler, yardstick, meter stick or scale to measure lengths of objects or distances
- d Identify measures of ounce, pound, gram
- e. Identify measures of pints, quarts, gallons, liters
- f. Use a scale which is not numerically calibrated
- g Estimate measures of varying lengths, dimensions or weights

3 DEGREE MEASURES

- a. Identify degree or mil as a unit in determining direction, distance or temperature
- b. Estimate the measure of a given angle not greater than 180°
- c. Interpret bearings, azimuth and other contexts in which the measure of an angle may range from 0° to 360°/0 to 6400 mils

4 TIME-TELLING MEASURES

- a. Use a 24-hour or digital clock to tell time
- b Name intervals and tell time in hours, minutes, and seconds
- c. Estimate time in seconds, minutes, and parts of an hour
- d. Identify calendar units and arrange them in Julian style
- e Convert time into hours and tenths of hours
- f Compute time using Greenwich Mean Time (GMT) as a basis for establishing zones and distances

NT

5 GAUGE MEASURES

- a Identify the unit of measurement found on an instrument
- b Interpret the number, word, symbol from a display read out
- c. Recognize a "reading" from a gauge with color divisions
- d. Recognize positive (+) and negative ( ) demarcation on a scale
- e Select band(s) from a multi-scale gauge
- f. Match a gauge reading to a specification using numbered or labeled intervals
- g. Interpret gauge readings from an unnumbered/unmarked interval
- h. Interpret a gauge reading which is fluctuating or momentarily sustained
- i. Match specifications of required measures by manipulation, alignment or maintenance

VISUAL/SPATIAL RELATIONSHIPS

6. SPATIAL

- a. Identify directions that tools, hardware, or components may be moved
- b. Manipulate objects to align, match, mate, make parallel, be perpendicular or be at an angle
- c. Interpret spatial relationships of figures and objects from 2-dimensional drawings, pictures, or photographs
- d. Relate geometric symbols and graphic representations to actual systems, subsystems and components

GEOMETRY

7 LINES

- a. Identify and name points, lines, rays, and segments
- b. Identify intersecting lines, parallel lines, and line segments
- c. Define and identify perpendicular lines
- d. Identify congruent segments

8. PLANES

- a. Identify and name plane geometric figures
- b. List the characteristics of geometric figures
- c. Classify figures according to the number or measure of its sides or angles
- d Identify figures which possess similarities
- e. Identify figure which may be parallel, perpendicular or congruent

9. ANGLES AND TRIANGLES

- a Identify and name the different kinds of angles and triangles, with their corresponding figures
- b. Identify vertical, adjacent, complementary or supplementary angles
- c. Classify triangles according to their sides or angle size
- d. Identify altitudes and medians of triangles or the bisector of an angle
- e Name an angle by using letters, a number, or a single letter

NT

10. SOLIDS

- a. Recognize and match the names of solids with their corresponding figures

11 TERMINOLOGY

- a. Identify technical words associated with geometric figures
- b. Interpret meaning of terms derived from spatial orientation

COMPUTE OR PERFORM

12. ADDITION AND SUBTRACTION

- a. Add or subtract whole numbers, without carrying or borrowing
- b. Add or subtract whole numbers, carrying and borrowing
- c. Add and subtract, borrowing and carrying with mixed numbers (whole and decimals)
- d. Add or subtract positive (+) and negative (-) numbers, using a number line to arrive at a solution
- e. Add or subtract to find correct time (24 hr. clock) using hours or minutes
- f Add or subtract various increments on gauges, dials, or any other measuring instrument
- g. Add or subtract time, linear, dry, liquid or degree measures requiring regrouping
- h. Estimate a sum or difference

13. MULTIPLICATION AND DIVISION

- a. Multiply and divide whole numbers
- b Multiply and divide mixed numbers (whole and decimals)
- c. Divide a number with decimals in both divisor and dividend
- d Multiply and divide integers, both positive (+) and negative (-), and assign proper sign to product or quotient
- e. Estimate a product or quotient

14. FRACTIONS/DECIMALS

- a. Subdivide whole objects or a set of objects into halves (1/2), thirds (1/3), fourths (1/4), eighths (1/8)
- b. Reduce fractions to lowest terms
- c Convert fractions (proper and improper) to decimal equivalents, and vice versa, using a table, chart or gauge
- d. Compute equivalent value of fractions, decimals, percents, and mixed numbers to lowest terms
- e Add and subtract fractions, with same or different denominators
- f. Multiply and divide fractions with and without whole numbers
- g. Estimate a fractional sum, product, or quotient

NT

15. GEOMETRY

- a. Draw geometric figures, plane and solid
- b. Match geometric figures with word names, equivalent measures
- c. Label all parts of geometric figures using mathematical and characteristic designators
- d. Use a protractor to measure angles, make geometrical constructions
- e. Construct perpendicular on a line segment, bisector of an angle
- f. Compute the perimeter and area of any figure
- g Compute the circumference and area of a circle
- h. Compute the area and volume of any solid figure
- i. Use formulas in solving problems involving geometric figures
- j. Solve problems and interpret spatial relationships of figures, symbols, and objects from 2-dimensional displays

16. COMBINATION OF PROCESSES

- a. Identify median and mode
- b. Compute averages
- c. Solve problems combining all processes using whole, mixed numbers and fractions
- d. Solve problems, combining all processes, involving units of measurement
- e Interpret information from charts, number lines, scales and graphs to solve arithmetic problems
- f. Solve conversion problems of linear (metric and English) liquid, weight, and temperature (F° or C°) measures
- g. Solve problems involving ratio and proportion
- h. Solve word problems where any mathematical process may occur

17. GRAPHING IN THE COORDINATE PLANE

- a Identify coordinates of a point in any grid system
- b. Identify points on a line graph
- c. Match a graph with its equation

18. ALGEBRA

- a. Solve simple algebraic equations with one unknown
- b Recognize and derive equivalent algebraic expressions
- c. Evaluate powers and estimate roots

19 TRIGONOMETRY

- a. Use tables of trigonometric functions
- b Use tables of logarithms to solve problems
- c. Solve geometric problems using trigonometric functions
- d. Use trigonometric ratios to solve problems

CONTENT READING

NT

25 PROCEDURAL DIRECTIONS

- a. Identify factual details or specifications that are found within a statement or written selection
- b. Select parts of text and visual materials to complete a task activity
- c. Follow highly detailed, step by step directions in order to accomplish a sequence of task activities
- d. Determine the essential message of a paragraph or section of written material
- e. Infer from a written source, which does not explicitly provide required information, in order to make a decision
- f. Synthesize information from written sources which contributes to the completion of a task activity

26 VOCABULARY

- a. Recognize common words and their meanings
- b. Recognize task related words with technical meanings
- c. Identify the correct meaning of a word from the context of a sentence
- d. Recognize the meaning of common contractions, abbreviations and acronyms
- e. Determine the meaning of figurative, idiomatic, and technical terms by using context clues or by using a reference source(s)

INFORMATION ACCESS

27 REFERENCE SKILLS

- a. Locate a Technical Manual, Field Manual or any related source document by code number and title
- b. Alphabetize words or topics to locate information
- c. Use the table of contents, index, system or sub-system heading, appendix and glossary to locate information
- d. Locate the page, title, paragraph, figure, or chart needed to answer a question or to solve a problem
- e. Determine, after scanning or skim-reading, whether the information is relevant
- f. Cross-reference within and across source documents to select information needed to perform a routine
- g. Organize information from multiple sources into a sequenced series of events

28. TABLES/CHARTS

- a. Obtain a fact or specification from a two-column table or chart to find information
- b. Obtain a fact or specification from an intersection of a row by column table or chart
- c. Use a complex table or chart requiring cross referencing within or in combination with text material outside the chart
- d. Apply information from tables and charts for locating malfunctions, or for selecting a course of action

VISUAL AIDS

NT

29 ILLUSTRATIONS

- a. Identify details, labels, numbers, and parts from an illustration or picture
- b. Identify parts or details according to a key or legend
- c. Interpret a drawing which shows a cross sectional view of an object for assembly, disassembly
- d. Interpret a three dimensional projection or exploded view of object(s) for assembly, disassembly, or position in system or sub system
- e. Follow illustrations, or photographs, arranged in a sequential order, as a guide
- f. Integrate information from various sources to select a course of action

30. FLOW CHARTS

- a. Use a simple linear path of an organizational chart to list events in sequential order
- b. Use a linear path of a flow chart to provide visual and textual directions to a procedure, to arrive at decision points, and to provide alternate paths in problem-solving
- c. Translate the significance of the symbols into physical activities

31. SCHEMATICS

- a. Isolate each major section or entity presented in a schematic diagram
- b. Identify the components within each entity
- c. Trace connections in an integrated circuit from their origin to another point within or from one entity to another
- d. Isolate a problem component in a schematic and trace it to components believed to cause the problem
- e. Interpret symbols to indicate direction of flow, test points, components and diagrammatic decision points

WRITTEN COMMUNICATION

32. FORMS

- a. Locate the block on a form to enter the appropriate information
- b. Transfer a number, code, date, figure or related data from equipment or written sources onto an appropriate section of the form
- c. Write the name of the organization, responsible personnel, disposition of the part or equipment, and nomenclature, in appropriate sections of the form
- d. Write a descriptive account of an activity or transaction performed
- e. Use a completed form to locate or compare information

33. NOTE-TAKING

- a. Distinguish between essential and non-essential details during the note taking process
- b. Record details without misinterpreting the intent of either written material or an interview
- c. Rewrite all recorded details in sentence form
- d. Organize all sentences into paragraphs

NT

34. OUTLINING (topic or sentence)

- a. Distinguish between major and subordinate topics
- b. Generate titles for each major topic selected
- c. Use phrases or sentences to provide subordinate details under each major topic
- d. Alternate, indent numbers and letters to establish a hierarchy

35. REPORT WRITING

- a. State the intent or objective(s) of the report
- b. Describe the parameters of the event or situation
- c. Distinguish between relevant and irrelevant details
- d. Sequence events in the order they have occurred
- e. State general impressions of events described
- f. Select examples that will clarify major issues presented in the report
- g. Examine opposing points of view in the report
- h. Summarize the major points developed in the report
- i. Justify an action taken and give reasons for rejecting alternatives

36. EDITING

- a. Spell frequently used words correctly
- b. Spell task-related words correctly
- c. Identify words that need to be capitalized
- d. Correct all misspelled words with or without the use of a reference source
- e. Apply all rules for end marks, commas, and apostrophes
- f. Apply common rules of grammar
- g. Rewrite the paragraph by stating the main idea in the first sentence, and restructuring the sentences for coherence
- h. Appraise an entire written communication and make adjustments to improve clarity

VERBAL COMMUNICATION

37. TYPE

- a. Individual - a person working on a task and communicating with another when assistance is needed or when a supervisory decision is needed
- b. Instruction - a task activity requiring communication between an instructor, an individual or small group where the purpose is to give facts or rules to inform or guide
- c. Tutor - interaction takes place between two persons where one is instructing and the other is doing the task
- d. Peer Group (less than 10) – all members engage in an activity where one person assumes a leadership role and communicates to others what is to be done
- e. Interview - a person communicating with another about his activities, opinions, or subject expertise for the purpose of using the information in a task
- f. Briefing - communicating final instructions to others or giving an account in summary
- g. Counsel - communicating together to exchange ideas or opinions to recommend, give or take advice, or to arrive at an acceptance of a plan or decision
- h. Command - communicate to others an order or action to be taken where a person has a position of authority

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NT

38. CHARACTERISTICS

- a. Enunciate clearly, using the proper rate of speech
- b. Use technical vocabulary suitable to the task and level of the person
- c. Determine the appropriate amount of information to communicate
- d. Interpret figurative or idiomatic language by reference to its use in context
- e. Follow highly detailed, step-by-step directions
- f. Solicit feedback to confirm the accurate reception of the communication
- g. Recognize when a low-key, informal dialogue is suitable
- h. Recognize when direct verbal commands are necessary
- i. Recognize when a prescribed series of verbal interactions is required to coordinate a group effort
- j. Recognize when the situation will require a structured, preplanned method of presentation

39. BARRIERS

- a. Recognize the need for clear, concise directions in order to avoid language or word-meaning differences
- b. Recognize personality factors and inter-personal relationships that may exist
- c. Recognize feedback as a means of communicating more effectively and increasing task competence

SAFETY/SECURITY

40 PRECAUTIONS

- a. Use common knowledge to avoid hazards in order to prevent injury to self or equipment
- b. Apply preventive measures prior to task performance to minimize any potential safety or security problem
- c. Select an appropriate course of action in the event of an emergency

PERCEPTUAL

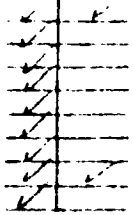
41. RECOGNITION

- a. Identify similarities and differences between and among objects
- b. Use body language (motions, gestures, postures) to communicate or signal
- c. Determine the presence of a defect or extent of damage
- d. Match objects by size, shape, color and significant markings
- e. Classify objects by size, shape, color and significant markings
- f. Determine direction, duration, and intensity of sounds, sightings and smells
- g. Infer from sights, sounds, touch, smells, or tastes to determine a course of action

NUMERATION/PLACE VALUE

NT

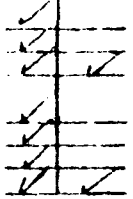
1 NUMBERING AND COUNTING



a. Match numerals with word names and models
b. Write numerals one through N in sequential order from any starting point
c. State what numeral comes after, before, or between any two given numerals
d. Select the numeral which is greater/lesser from a set of numerals
e. Identify an object with a specified ordinal position
f. Write or state the place value of a particular digit whole or decimal number
g. Round off a number to a specified place, whole or decimal
h. Count by ones, twos, fives, tens, etc. backward or forward (skip counting)
i. Match numbers with points or intervals on a number line (positive (+) or negative ( ) values)

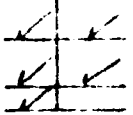
UNITS OF MEASUREMENT

2 LINEAR, WEIGHT AND VOLUME MEASURES



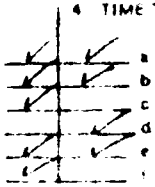
a. Name the markings on a linear scale
b. Differentiate units of measure and equivalents in the English and metric system
c. Use a ruler, yardstick, meter stick or scale to measure lengths of objects or distances
d. Identify measures of ounce, pound, gram
e. Identify measures of pints, quarts, gallons, liters
f. Use a scale which is not numerically calibrated
g. Estimate measures of varying lengths, dimensions or weights

3 DEGREE MEASURES



a. Identify degree or mil as a unit in determining direction, distance or temperature
b. Estimate the measure of a given angle not greater than 180°
c. Interpret bearings, azimuth and other contexts in which the measure of an angle may range from 0° to 360°/0 to 6400 mils

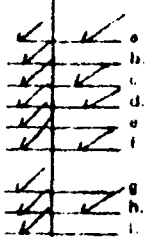
4 TIME TELLING MEASURES



a. Use a 24-hour or digital clock to tell time
b. Name intervals and tell time in hours, minutes, and seconds
c. Estimate time in seconds, minutes, and parts of an hour
d. Identify calendar units and arrange them in Julian style
e. Convert time into hours and tenths of hours
f. Compute time using Greenwich Mean Time (GMT) as a basis for establishing zones and distances

NT

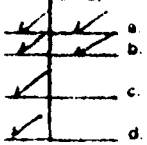
5 GAUGE MEASURES



a. Identify the unit of measurement found on an instrument
b. Interpret the number, word, symbol from a display read out
c. Recognize a "reading" from a gauge with color divisions
d. Recognize positive (+) and negative ( ) demarcation on a scale
e. Select band(s) from a multi-scale gauge
f. Match a gauge reading to a specification using numbered or labeled intervals
g. Interpret gauge readings from an unnumbered/unmarked interval
h. Interpret a gauge reading which is fluctuating or momentarily sustained
i. Match specifications of required measures by manipulation alignment or maintenance

VISUAL/SPATIAL RELATIONSHIPS

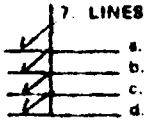
6 SPATIAL



a. Identify directions that tools, hardware, or components may be moved
b. Manipulate objects to align, match, mate, make parallel, be perpendicular or be at an angle
c. Interpret spatial relationships of figures and objects from 2 dimensional drawings, pictures, or photographs
d. Relate geometric symbols and graphic representations to actual systems subsystems and components

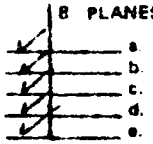
GEOMETRY

7 LINES



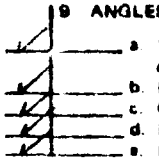
a. Identify and name points, lines, rays, and segments
b. Identify intersecting lines, parallel lines, and line segments
c. Define and identify perpendicular lines
d. Identify congruent segments

8 PLANES



a. Identify and name plane geometric figures
b. List the characteristics of geometric figures
c. Classify figures according to the number or measure of its sides or angles
d. Identify figures which posess similarities
e. Identify figures which may be parallel, perpendicular or congruent

9 ANGLES AND TRIANGLES



a. Identify and name the different kinds of angles and triangles, with their corresponding figures
b. Identify vertical, adjacent, complementary or supplementary angles
c. Classify triangles according to their sides or angle-size
d. Identify altitudes and medians of triangles or the bisector of an angle
e. Name an angle by using letters, a number, or a single letter

NT

10. SOLIDS

- a. Recognize and match the names of solids with their corresponding figures

11. TERMINOLOGY

- a. Identify technical words associated with geometric figures
- b. Interpret meaning of terms derived from spatial orientation

COMPUTE OR PERFORM

12. ADDITION AND SUBTRACTION

- a. Add or subtract whole numbers, without carrying or borrowing
- b. Add or subtract whole numbers, carrying and borrowing
- c. Add and subtract, borrowing and carrying with mixed numbers (whole and decimals)
- d. Add or subtract positive (+) and negative (-) numbers, using a number line to arrive at a solution
- e. Add or subtract to find correct time (24 hr. clock) using hours or minutes
- f. Add or subtract various increments on gauges, dials, or any other measuring instrument
- g. Add or subtract time, linear, dry, liquid or degree measures requiring regrouping
- h. Estimate a sum or difference

13. MULTIPLICATION AND DIVISION

- a. Multiply and divide whole numbers
- b. Multiply and divide mixed numbers (whole and decimals)
- c. Divide a number with decimals in both divisor and dividend
- d. Multiply and divide integers, both positive (+) and negative (-), and assign proper sign to product or quotient
- e. Estimate a product or quotient

14. FRACTIONS/DECIMALS

- a. Subdivide whole objects or a set of objects into halves (1/2), thirds (1/3), fourths (1/4), eighths (1/8)
- b. Reduce fractions to lowest terms
- c. Convert fractions (proper and improper) to decimal equivalents, and vice versa, using a table, chart or gauge
- d. Compute equivalent value of fractions, decimals, percents, and mixed numbers to lowest terms
- e. Add and subtract fractions, with same or different denominators
- f. Multiply and divide fractions with and without whole numbers
- g. Estimate a fractional sum, product, or quotient

NT

15. GEOMETRY

- a. Draw geometric figures, plane and solid
- b. Match geometric figures with word names, equivalent measures
- c. Label all parts of geometric figures using mathematical and characteristic designators
- d. Use a protractor to measure angles, make geometrical constructions
- e. Construct perpendicular on a line segment, bisector of an angle
- f. Compute the perimeter and area of any figure
- g. Compute the circumference and area of a circle
- h. Compute the area and volume of any solid figure
- i. Use formulas in solving problems involving geometric figures
- j. Solve problems and interpret spatial relationships of figures, symbols, and objects from 2-dimensional displays

16. COMBINATION OF PROCESSES

- a. Identify median and mode
- b. Compute averages
- c. Solve problems combining all processes using whole, mixed numbers and fractions
- d. Solve problems, combining all processes, involving units of measurement
- e. Interpret information from charts, number lines, scales and graphs to solve arithmetic problems
- f. Solve conversion problems of linear (metric and English) liquid, weight, and temperature (F° or C°) measures
- g. Solve problems involving ratio and proportion
- h. Solve word problems where any mathematical process may occur

17 GRAPHING IN THE COORDINATE PLANE

- a. Identify coordinates of a point in any grid system
- b. Identify points on a line graph
- c Match a graph with its equation

18. ALGEBRA

- a. Solve simple algebraic equations with one unknown
- b Recognize and derive equivalent algebraic expressions
- c. Evaluate powers and estimate roots

19. TRIGONOMETRY

- a. Use tables of trigonometric functions
- b. Use tables of logarithms to solve problems
- c. Solve geometric problems using trigonometric functions
- d. Use trigonometric ratios to solve problems

CONTENT READING

NT

25 [illegible] DIRECTIONS

- a [illegible] facts, ideas or specifications in a section (within a statement or written selection)
- b Select parts of text and visual materials to accomplish a task activity
- c Follow highly detailed, step by step directions in order to accomplish a sequence of task activities
- d Determine the essential message of a paragraph or section of written material
- e Infer from a written source, which does not explicitly provide required information, in order to make a decision
- f Synthesize information from written sources which contributes to the completion of a task activity

26 VOCABULARY

- a Recognize common words and their meanings
- b Recognize task related words with technical meanings
- c Identify the correct meaning of a word from the context of a sentence
- d Recognize the meaning of common contractions, abbreviations and acronyms
- e Determine the meaning of figurative, idiomatic, and technical terms by using context clues or by using a reference source(s)

INFORMATION ACCESS

27 REFERENCE SKILLS

- a Locate a Technical Manual, Field Manual or any related source document by code number and title
- b Alphabetize words or topics to locate information
- c Use the table of contents, index, system or sub system heading, appendix and glossary to locate information
- d Locate the page, title, paragraph, figure, or chart needed to answer a question or to solve a problem
- e Determine, after scanning or skim-reading, whether the information is relevant
- f Cross reference within and across source documents to select information needed to perform a routine
- g Organize information alone from multiple sources into a sequenced series of events

28 TABLES/CHARTS

- a [illegible] fact or specification from a two column table or chart to find its application
- b [illegible] fact or specification from an intersection of a row by column table or chart
- c [illegible] a table or chart requiring cross referencing within or the combination with [illegible] material outside the chart
- d Apply information from tables and charts for locating malfunctions, or for [illegible] courses of action

4 of 12

VISUAL AIDS

NT

29 ILLUSTRATIONS

- a Identify objects, labels, numbers, and parts from the most appropriate [illegible]
- b Identify parts or details according to a key or legend
- c Interpret a drawing which shows a cross sectional view of an object for assembly, disassembly
- d Interpret a three dimensional projection or exploded view of objects for assembly, disassembly, or position in system or sub system
- e Follow illustrations, or photographs, arranged in a sequence [illegible]
- f Integrate information from various sources to select a course of action

30 FLOW CHARTS

- a Use a simple linear path of an organizational chart to list events or [illegible] order
- b Use a linear path of a flow chart to provide visual and textual direction to a procedure, to arrive at decision points, and to provide alternatives in problem-solving
- c Translate the significance of the symbols into physical activities

31 SCHEMATICS

- a Isolate each major section or entity presented in a schematic diagram
- b Identify the components within each entity
- c Trace connections in an integrated circuit from their origin to and [illegible] within or from one entity to another
- d Isolate a problem component in a schematic and trace it to components [illegible] to cause the problem
- e Interpret symbols to indicate direction of flow, test points, components, and diagrammatic decision points

WRITTEN COMMUNICATION

32 FORMS

- a Locate the block on a form to enter the appropriate information
- b Transfer a number, code, date, figure or related data from source [illegible] written sources onto an appropriate section of the form
- c Write the name of the organization, responsible personnel, disposition [illegible] part or equipment, and nomenclature, in appropriate sections of the form
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6x12 Utility Helicopter Repairer

BSEP 1

NUMERATION/PLACE VALUE

NT

1 NUMBER RECOGNITION

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UNITS OF MEASUREMENT

2 LINEAR, WEIGHT, AND VOLUME MEASURES

- a Name the markings on a linear scale
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- a Use a 24 hour or digital clock to tell time
- b Name intervals and tell time in hours, minutes, and seconds
- c Estimate time in seconds, minutes, and parts of an hour
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- c Recognize a "reading" from a gauge with color divisions
- d Recognize positive (+) and negative (-) denominations on a scale
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- i Match specifications of required measures by manipulation, alignment or maintenance

VISUAL/SPATIAL RELATIONSHIPS

6 SPATIAL

- a Identify directions that tools, hardware, or components may be moved
- b Manipulate objects to align, match, mate, make parallel, be perpendicular or be at an angle
- c Interpret spatial relationships of figures and objects from 2 dimensional drawings, pictures or photographs
- d Relate geometric symbols and graphic representations to actual systems, subsystems and components

GEOMETRY

7 LINES

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- c Define and identify perpendicular lines
- d Identify congruent segments

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- c Classify figures according to the number or measure of its sides or angles
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NT

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- a. Recognize and match the names of solids with their corresponding figures

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- a. Identify technical words associated with geometric figures
- b. Interpret meaning of terms derived from spatial orientation

COMPUTE OR PERFORM

12 ADDITION AND SUBTRACTION

- a. Add or subtract whole numbers, without carrying or borrowing
- b. Add or subtract whole numbers, carrying and borrowing
- c. Add and subtract, borrowing and carrying with mixed numbers (whole and decimals)
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- h. Estimate a sum or difference

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- a. Multiply and divide whole numbers
- b. Multiply and divide mixed numbers (whole and decimals)
- c. Divide a number with decimals in both divisor and dividend
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- e. Estimate a product or quotient

14 FRACTIONS/DECIMALS

- a. Subdivide whole objects or a set of objects into halves (1/2), thirds (1/3), fourths (1/4), eighths (1/8)
- b. Reduce fractions to lowest terms
- c. Convert fractions (proper and improper) to decimal equivalents, and vice versa, using a table, chart or gauge
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- g. Estimate a fractional sum, product, or quotient

NT

15 GEOMETRY

- a. Draw geometric figures, plane and solid
- b. Match geometric figures with word names, equivalent measures
- c. Label all parts of geometric figures using mathematical and characteristic designators
- d. Use a protractor to measure angles, make geometrical constructions
- e. Construct perpendicular or a line segment, bisector of an angle
- f. Compute the perimeter and area of any figure
- g. Compute the circumference and area of a circle
- h. Compute the area and volume of any solid figure
- i. Use formulas in solving problems involving geometric figures
- j. Solve problems and interpret spatial relationships of figures, symbols and objects from 2 dimensional displays

16. COMBINATION OF PROCESSES

- a. Identify median and mode
- b. Compute averages
- c. Solve problems combining all processes using whole, mixed numbers and fractions
- d. Solve problems, combining all processes, involving units of measurement
- e. Interpret information from charts, number lines, scales and graphs to solve arithmetic problems
- f. Solve conversion problems of linear (metric and English) liquid, weight, and temperature (F^{O} or C^{O}) measures
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17 GRAPHING IN THE COORDINATE PLANE

- a. Identify coordinates of a point in any grid system
- b. Identify points on a line graph
- c. Match a graph with its equation

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- a. Solve simple algebraic equations with one unknown
- b. Recognize and derive equivalent algebraic expressions
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19. TRIGONOMETRY

- a. Use tables of trigonometric functions
- b. Use tables of logarithms to solve problems
- c. Solve geometric problems using trigonometric functions
- d. Use trigonometric ratios to solve problems

NT

25 [illegible]

- a [illegible]
- b [illegible]
- c [illegible]
- d [illegible]
- e Determine the essential message of a paragraph or section of written material
- f Infer from a written source which does not explicitly provide required information in order to make a decision
- g Synthesize information from written sources which contributes to the completion of a task activity

26 VOCABULARY

- a Recognize common words and their meanings
- b Recognize task related words with technical meanings
- c Identify the correct meaning of a word from the context of a sentence
- d Recognize the meaning of common contractions, abbreviations and acronyms
- e Determine the meaning of figurative, idiomatic, and technical terms by using context clues or by using a reference source(s)

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- f Cross reference within and across source documents to select information needed to perform a routine
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28 TABLES/CHARTS

- a Obtain a fact or specification from a two column table or chart to find information
- b Obtain a fact or specification from an intersection of a row by column table or chart
- c Use a complex table or chart requiring cross referencing within or in combination with text material outside the chart
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29 ILLUSTRATIONS

- a Identify details, labels, numbers, and parts from an illustration or picture
- b Identify parts or details according to a key or legend
- c Interpret a drawing which shows a cross sectional view of an object for assembly/disassembly
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- a Use a simple linear path of an organizational chart to list events in sequential order
- b Use a linear path of a flow chart to provide visual and textual directions to a procedure, to arrive at decision points, and to provide alternate paths to problem solving
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- a Isolate each major section or entity presented in a schematic diagram
- b Identify the components within each entity
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WRITTEN COMMUNICATION

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- a Locate the block on a form to enter the appropriate information
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- a. Distinguish between essential and non essential details during the note taking process
- b Record details without misinterpreting the intent of either written material or an interview
- c Rewrite all recorded details in sentence form
- d Organize all sentences into paragraphs

NT

34 OUTLINING (topic or sentence)

- a Distinguish between major and subordinate topics
- b Generate titles for each major topic selected
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35 REPORT WRITING

- a State the intent or objective(s) of the report
- b Describe the parameters of the event or situation
- c Distinguish between relevant and irrelevant details
- d Sequence events in the order they have occurred
- e State general impressions of events described
- f Select examples that will clarify major issues presented in the report
- g Examine opposing points of view in the report
- h Summarize the major points developed in the report
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- a Spell frequently used words correctly
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- c Identify words that need to be capitalized
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VERBAL COMMUNICATION

37 TYPE

- a. Individual — a person working on a task and communicating with another when assistance is needed or when a supervisory decision is needed
- b Instruction — a task activity requiring communication between an instructor, an individual or small group where the purpose is to give facts or rules to inform or guide
- c Tutor — interaction takes place between two persons where one is instructing and the other is doing the task
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- f Briefing — communicating final instructions to others or giving an account in summary
- g Counsel — communicating together to exchange ideas or opinions to recommend, give or take advice, or to arrive at an acceptance of a plan or decision
- h Command — communicate to others an order or action to be taken where a person has a position of authority

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NT

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- a Enunciate clearly, using the proper rate of speech
- b Use technical vocabulary suitable to the task and level of the person
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- b Recognize personality factors and interpersonal relationships that may exist
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- a. Use common knowledge to avoid hazards in order to prevent injury to self or equipment
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- a Identify similarities and differences between and among objects
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- d Match objects by size, shape, color and significant markings
- e Classify objects by size, shape, color and significant markings
- f Determine direction, duration, and intensity of sounds, sightings and smells
- g Infer from sights, sounds, touch, smells, or tastes to determine a course of action
- h. Interpret Codes & Symbols

BSEP I

NUMERATION/PLACE VALUE

NT

1 NUMBERING AND COUNTING

- a Match numerals with word names and models
- b Write numerals one through N in sequential order from any starting point
- c State what numeral comes after, before, or between any two given numerals
- d Select the numeral which is greater/lesser from a set of numerals
- e Identify an object with a specified ordinal position
- f Write or state the place value of a particular digit in whole or decimal number
- g Round off a number to a specified place, whole or decimal
- h Count by ones, twos, fives, tens, etc., backward or forward (skip counting)
- i Match numbers with points or intervals on a number line (positive (+) or negative (-) values)

UNITS OF MEASUREMENT

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- a Name the markings on a linear scale
- b Differentiate units of measure and equivalents in the English and metric system
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- c Interpret bearings, azimuth and other contexts in which the measure of an angle may range from 0° to 360°/0 to 6400 mils

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- a Use a 24-hour or digital clock to tell time
- b Name intervals and tell time in hours, minutes, and seconds
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- f Compute time using Greenwich Mean Time (GMT) as a basis for establishing zones and distances

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- c Recognize a "reading" from a gauge with color divisions
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VISUAL/SPATIAL RELATIONSHIPS

6 SPATIAL

- a Identify directions that tools, hardware or components may be moved
- b Manipulate objects to align, match, mate, make parallel, be perpendicular or be at an angle
- c Interpret spatial relationships of figures and objects from 2 dimensional drawings, pictures, or photographs
- d Relate geometric symbols and graphic representations to actual systems, subsystems and components

GEOMETRY

7. LINES

- a Identify and name points, lines, rays, and segments
- b Identify intersecting lines, parallel lines, and line segments
- c Define and identify perpendicular lines
- d Identify congruent segments

8. PLANES

- a Identify and name plane geometric figures
- b List the characteristics of geometric figures
- c Classify figures according to the number or measure of its sides or angles
- d. Identify figures which possess similarities
- e. Identify figures which may be parallel, perpendicular or congruent

9 ANGLES AND TRIANGLES

- a. Identify and name the different kinds of angles and triangles, with their corresponding figures
- b Identify vertical, adjacent, complementary or supplementary angles
- c. Classify triangles according to their sides or angle-size
- d. Identify altitudes and medians of triangles or the bisector of an angle
- e Name an angle by using letters, a number, or a single letter

NT

10 SOLIDS

- a. Recognize and match the names of solids with their corresponding figures

11 TERMINOLOGY

- a. Identify technical words associated with geometric figures
- b. Interpret meaning of terms derived from spatial orientation

COMPUTE OR PERFORM

12 ADDITION AND SUBTRACTION

- a. Add or subtract whole numbers, without carrying or borrowing
- b. Add or subtract whole numbers, carrying and borrowing
- c. Add and subtract, borrowing and carrying with mixed numbers (whole and decimals)
- d. Add or subtract positive (+) and negative (-) numbers, using a number line to arrive at a solution
- e. Add or subtract to find correct time (24 hr. clock) using hours or minutes
- f. Add or subtract various increments on gauges, dials, or any other measuring instrument
- g. Add or subtract time, linear, dry, liquid or degree measures requiring regrouping
- h. Estimate a sum or difference

13 MULTIPLICATION AND DIVISION

- a. Multiply and divide whole numbers
- b. Multiply and divide mixed numbers (whole and decimals)
- c. Divide a number with decimals in both divisor and dividend
- d. Multiply and divide integers, both positive (+) and negative (-), and assign proper sign to product or quotient
- e. Estimate a product or quotient

14 FRACTIONS/DECIMALS

- a. Subdivide whole objects or a set of objects into halves (1/2), thirds (1/3), fourths (1/4), eighths (1/8)
- b. Reduce fractions to lowest terms
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NT

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- a. Draw geometric figures, plane and solid
- b. Match geometric figures with word names, equivalent measures
- c. Label all parts of geometric figures using mathematical and characteristic designators
- d. Use a protractor to measure angles, make geometrical constructions
- e. Construct perpendicular on a line segment, bisector of an angle
- f. Compute the perimeter and area of any figure
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- h. Compute the area and volume of any solid figure
- i. Use formulas in solving problems involving geometric figures
- j. Solve problems and interpret spatial relationships of figures, symbols, and objects from 2 dimensional displays

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- a. Identify median and mode
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CONTENT READING

NT

25 PROCEDURAL DIRECTIONS

- a Identify factual details or specifications that are found within a statement or written selection
- b Select parts of text and visual materials to complete a task activity
- c Follow highly detailed, step by step directions in order to accomplish a sequence of task activities
- d Determine the essential message of a paragraph or section of written material
- e Infer from a written source, which does not explicitly provide required information, in order to make a decision
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c Use the table of contents, index, system or sub-system heading, appendix and glossary to locate information
d Locate the page, title, paragraph, figure, or chart needed to answer a question or to solve a problem
e Determine, after scanning or skim-reading, whether the information is relevant
f Cross reference within and across source documents to select information needed to perform a routine
g Organize information from multiple sources into a sequenced series of events

28 TABLES/CHARTS

a Obtain a fact or specification from a two column table or chart to find information
b Obtain a fact or specification from an intersection of a row by column table or chart
c Use a complex table or chart requiring cross referencing within or in combination with text material outside the chart
d Apply information from tables and charts for locating malfunctions or for selecting courses of action

NT

29 ILLUSTRATIONS

a Identify details, labels, numbers, and parts from an illustration
b Identify parts or details according to a key or legend
c Interpret a drawing which shows a cross sectional view of an object assembly disassembly
d Interpret a three dimensional perspective or exploded view of an object assembly, disassembly, or position in system or sub system
e Follow illustrations, or photographs arranged in a sequence
f Integrate information from various sources to select a course of action

30 FLOW CHARTS

a Use a simple linear path of an organizational chart to list events in order
b Use a linear path of a flow chart to provide visual and textual directions to a procedure, to arrive at decision points, and to provide alternate courses in problem solving
c Translate the significance of the symbols into physical activities

31 SCHEMATICS

a Isolate each major section or entity presented in a schematic diagram
b Identify the components within each entity
c Trace connections in an integrated circuit from their origin to a point within or from one entity to another
d Isolate a problem component in a schematic and trace it to components to be tested to cause the problem
e Interpret symbols to indicate direction of flow, test points, [illegible] diagrammatic decision points

WRITTEN COMMUNICATION

32 FORMS

a Locate the block on a form to enter the appropriate information
b Transfer a number, code, date, figure or related data from equipment written sources onto an appropriate section of the form
c Write the name of the organization, responsible personnel, date, part or equipment and nomenclature, in appropriate sections of the form
d Write a descriptive account of an activity or transaction performed
e Use a completed form to locate or compare information

33 NOTE-TAKING

a Distinguish between essential and non essential details during the process
b Record details without misinterpreting the intent of either oral or written an interview
c Rewrite all recorded details in sentence form
d Organize all sentences into paragraphs

NT

34 OUTLINING (topic or sentence)

- a Distinguish between major and subordinate topics
- b Generate title for each major topic selected
- c Use phrases or sentences to provide subordinate details under each major topic
- d Alternate indent numbers and letters to establish a hierarchy

35 REPORT WRITING

- a State the intent or objective(s) of the report
- b Describe the parameters of the event or situation
- c Distinguish between relevant and irrelevant details
- d Sequence events in the order they have occurred
- e State general impressions of events described
- f Select examples that will clarify major issues presented in the report
- g Examine opposing points of view in the report
- h Summarize the major points developed in the report
- i Justify an action taken and give reasons for rejecting alternatives

36 EDITING

- a Spell frequently used words correctly
- b Spell task related words correctly
- c Identify words that need to be capitalized
- d Correct all misspelled words with or without the use of a reference source
- e Apply all rules for end marks, commas and apostrophes
- f Apply common rules of grammar
- g Rewrite the paragraph by stating the main idea in the first sentence, and restructuring the sentences for coherence
- h Appraise an entire written communication and make adjustments to improve clarity

VERBAL COMMUNICATION

37 TYPE

- a Individual – a person working on a task and communicating with another when assistance is needed or when a supervisory decision is needed
- b Instruction – a task activity requiring communication between an instructor, an individual or small group where the purpose is to give facts or rules to inform or guide
- c Tutor – interaction takes place between two persons where one is instructing and the other is doing the task
- d Peer Group (less than 10) – all members engage in an activity where one person assumes a leadership role and communicates to others what is to be done
- e Interview – a person communicating with another about his activities, opinions, or subject expertise for the purpose of using the information in a task
- f Briefing – communicating final instructions to others or giving an account or summary
- g Counsel – communicating together to exchange ideas or opinions to recommend, give or take advice, or to arrive at an acceptance of a plan or decision
- h Command – communicate to others an order or action to be taken where a person has a position of authority

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NT

38 CHARACTERISTICS

- a Enunciate clearly, using the proper rate of speech
- b Use technical vocabulary suitable to the task and level of the person
- c Determine the appropriate amount of information to communicate
- d Interpret figurative or idiomatic language by reference to its use in context
- e Follow highly detailed, step by step directions
- f Solicit feedback to confirm the accurate reception of the communication
- g Recognize when a low-key, informal dialogue is suitable
- h Recognize when direct verbal commands are necessary
- i Recognize when a prescribed series of verbal interactions is required to coordinate a group effort
- j Recognize when the situation will require a structured, preplanned method of presentation

39 BARRIERS

- a Recognize the need for clear, concise directions in order to avoid language or word meaning differences
- b Recognize personality factors and inter personal relationships that may exist
- c Recognize feedback as a means of communicating more effectively and increasing task competence

SAFETY/SECURITY

40 PRECAUTIONS

- a Use common knowledge to avoid hazards in order to prevent injury to self or equipment
- b Apply preventive measures prior to task performance to minimize any potential safety or security problem
- c Select an appropriate course of action in the event of an emergency

PERCEPTUAL

41 RECOGNITION

- a Identify similarities and differences between and among objects
- b Use body language (motions, gestures, postures) to communicate or signal
- c Determine the presence of a defect or extent of damage
- d Match objects by size, shape, color and significant markings
- e Classify objects by size, shape, color and significant markings
- f Determine direction, duration, and intensity of sounds, sightings and smells
- g Infer from sights, sounds, touch, smells, or tastes to determine a course of action
- h. Interpret Codes & Symbols

BSEP I

NUMERATION/PLACE VALUE

NT

1 NUMBERING AND COUNTING

- a. Match numerals with word names and models
- b. Write numerals one through N in sequential order from any starting point
- c. State what numeral comes after, before, or between any two given numerals
- d. Select the numeral which is greater/lesser from a set of numerals
- e. Identify an object with a specified ordinal position
- f. Write or state the place value of a particular digit (whole or decimal number)
- g. Round off a number to a specified place (whole or decimal)
- h. Count by ones, twos, fives, tens, etc. backward or forward (skip counting)
- i. Match numbers with points or intervals on a number line (positive (+) or negative (-) values)

UNITS OF MEASUREMENT

2 LINEAR, WEIGHT, AND VOLUME MEASURES

- a. Name the markings on a linear scale
- b. Differentiate units of measure and equivalents in the English and metric systems
- c. Use a ruler, yardstick, meter stick or scale to measure lengths of objects or distances
- d. Identify measures of ounce, pound, gram
- e. Identify measures of pints, quarts, gallons, liters
- f. Use a scale which is not numerically calibrated
- g. Estimate measures of varying lengths, dimensions or weights

3 DEGREE MEASURES

- a. Identify degree or mil as a unit in determining direction, distance or temperature
- b. Estimate the measure of a given angle not greater than 180°
- c. Interpret bearings, azimuth and other contexts in which the measure of an angle may range from 0° to 360°/0 to 6400 mils

4 TIME TELLING MEASURES

- a. Use a 24 hour or digital clock to tell time
- b. Name intervals and tell time in hours, minutes, and seconds
- c. Estimate time in seconds, minutes, and parts of an hour
- d. Identify calendar units and arrange them in Julian style
- e. Express time in hours and tenths of hours
- f. Compute time using Greenwich Mean Time (GMT) as a basis for establishing zone time differences

4/23/82

NT

5 GAUGE MEASURES

- a. Identify the unit of measurement found on an instrument
- b. Interpret the number, word, symbol from a display, readout
- c. Recognize a "reading" from a gauge with color divisions
- d. Recognize positive (+) and negative (-) deflections from a scale
- e. Select hand(s) from a multi-scale gauge
- f. Match a gauge reading to a specification using numbered or labeled intervals
- g. Interpret gauge readings from an unlabeled/unmarked interval
- h. Interpret a gauge reading which is fluctuating or momentarily stationary
- i. Match specifications of required measures by manipulation, alignment or maintenance

VISUAL/SPATIAL RELATIONSHIPS

8 SPATIAL

- a. Identify directions that tools, hardware or components may be moved
- b. Manipulate objects to align, match, mate, make parallel, be perpendicular or be at an angle
- c. Interpret spatial relationships of figures and objects from 2 dimensional drawings, pictures or photographs
- d. Relate geometric symbols and graphic representations to actual systems, subsystems and components

GEOMETRY

7 LINES

- a. Identify and name points, lines, rays, and segments
- b. Identify intersecting lines, parallel lines, and line segments
- c. Define and identify perpendicular lines
- d. Identify congruent segments

8 PLANES

- a. Identify and name plane geometric figures
- b. List the characteristics of geometric figures
- c. Classify figures according to the number of measures of its sides or angles
- d. Identify figures which possess similarities
- e. Identify figures which may be parallel, perpendicular or congruent

9 ANGLES AND TRIANGLES

- a. Identify and name the different kinds of angles and triangles, with their corresponding figures
- b. Identify vertical, adjacent, complementary, or supplementary angles
- c. Classify triangles according to their sides or angle size
- d. Identify altitudes and medians of triangles or the bisector of an angle
- e. Name an angle by using letters, a number, or a single letter

NT

10 SOLIDS

a Recognize and match the names of solids with their corresponding figures

11 TERMINOLOGY

a Identify technical words associated with geometric figures

b Interpret meaning of terms derived from spatial orientation

COMPUTE OR PERFORM

12 ADDITION AND SUBTRACTION

a Add or subtract whole numbers, without carrying or borrowing

b Add or subtract whole numbers, carrying and borrowing

c Add and subtract, borrowing and carrying with mixed numbers (whole and decimals)

d Add or subtract positive (+) and negative (-) numbers, using a number line to arrive at a solution

e Add or subtract to find correct time (24 hr. clock) using hours or minutes

f Add or subtract various increments on gauges, dials, or any other measuring instrument

g Add or subtract time, linear, dry, liquid or degree measures requiring regrouping

h Estimate a sum or difference

13 MULTIPLICATION AND DIVISION

a Multiply and divide whole numbers

b Multiply and divide mixed numbers (whole and decimals)

c Divide a number with decimals in both divisor and dividend

d Multiply and divide integers, both positive (+) and negative (-), and assign proper sign to product or quotient

e Estimate a product or quotient

14 FRACTIONS/DECIMALS

a Subdivide whole objects or a set of objects into halves (1/2), thirds (1/3), fourths (1/4), eighths (1/8)

b Reduce fractions to lowest terms

c Convert fractions (proper and improper) to decimal equivalents, and vice versa, using a table, chart or gauge

d Compute equivalent value of fractions, decimals, percents, and mixed numbers to lowest terms

e Add and subtract fractions, with same or different denominators

f Multiply and divide fractions with and without whole numbers

g Estimate a fractional sum, product, or quotient

NT

15 GEOMETRY

a Draw geometric figures, plane and solid

b Match geometric figures with *word names, equivalent measures*

c Label all parts of geometric figures using mathematical and characteristic designators

d Use a protractor to measure angles, make geometrical constructions

e Construct perpendicular on a line segment, bisector of an angle

f Compute the perimeter and area of any figure

g Compute the circumference and area of a circle

h Compute the area and volume of any solid figure

i Use formulas in solving problems involving geometric figures

j Solve problems and interpret spatial relationships of figures, symbols, and objects from 2 dimensional displays

16. COMBINATION OF PROCESSES

a Identify median and mode

b Compute averages

c Solve problems combining all processes using whole, mixed numbers and fractions

d Solve problems, combining all processes involving units of measurement

e Interpret information from charts, number lines, scales and graphs to solve arithmetic problems

f Solve conversion problems of linear (metric and English) liquid, weight and temperature (F° or C°) measures

g Solve problems involving *ratio and proportion*

h Solve word problems where any mathematical process may be used

17 GRAPHING IN THE COORDINATE PLANE

a Identify coordinates of a point in any grid system

b Identify points on a line graph

c Match a graph with its equation

18 ALGEBRA

a Solve simple algebraic equations with one unknown

b Recognize and derive equivalent algebraic expressions

c Evaluate powers and estimate roots

19 TRIGONOMETRY

a Use tables of trigonometric functions

b Use tables of logarithms to solve problems

c Solve geometric problems using trigonometric functions

d Use trigonometric ratios to solve problems

NT

[illegible] SEQUENTIAL DIRECTIONS

- a Identify factual details or specifications that are found within a statement or written selection
- b Select parts of text and visual materials to complete a task activity
- c Follow highly detailed, step by step directions in order to accomplish a sequence of task activities
- d Determine the essential message of a paragraph or section of written material
- e Infer from a written source, which does not explicitly provide required information, in order to make a decision
- f Synthesize information from written sources which contributes to the completion of a task activity

26 VOCABULARY

- a Recognize common words and their meanings
- b Recognize task related words with technical meanings
- c Identify the correct meaning of a word from the context of a sentence
- d Recognize the meaning of common contractions, abbreviations and acronyms
- e Determine the meaning of figurative, idiomatic, and technical terms by using context clues or by using a reference source(s)

INFORMATION ACCESS

27 REFERENCE SKILLS

- a Locate a Technical Manual, Field Manual or any related source document by code number and title
- b Alphabetize words or topics to locate information
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- a Identify details, labels, numbers, and parts from an illustration or picture
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- d Interpret a three dimensional projection or exploded view of object(s) for assembly, disassembly, or position in system or sub-system
- e Follow illustrations, or photographs, arranged in a sequential order, as a guide
- f Integrate information from various sources to select a course of action

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- a Use a simple linear path of an organizational chart to list events in sequential order
- b Use a linear path of a flow chart to provide visual and textual directions to a procedure, to arrive at decision points, and to provide alternate paths in problem solving
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31 SCHEMATICS

- a Isolate each major section or entity presented in a schematic diagram
- b Identify the components *within* each entity
- c Trace connections in an integrated circuit from their origin to another point within or from one entity to another
- d Isolate a problem component in a schematic and trace it to components believed to cause the problem
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WRITTEN COMMUNICATION

32 FORMS

- a Locate the block on a form to enter the appropriate information
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- a Distinguish between essential and non-essential details during the note taking process
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- g Examine opposing points of view in the report
- h Summarize the major points developed in the report
- i Justify an action taken and give reasons for rejecting alternatives

16 EDITING

- a Spell frequently used words correctly
- b Spell task related words correctly
- c Identify words that need to be capitalized
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- e Apply all rules for end marks, commas and apostrophes
- f Apply common rules of grammar
- g Rewrite the paragraph by stating the main idea in the first sentence and restructuring the sentences for coherence
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VERBAL COMMUNICATION

37 TYPE

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- f Reading - communicating final instructions to others or giving an account in summary
- g Counsel - communicating together to exchange ideas or opinions to recommend, give or take advice, or to arrive at an acceptance of a plan or decision
- h Command - communicate to others an order or action to be taken where a person has a position of authority

4/23/82

NT

38 CHARACTERISTICS

- a Enunciate clearly, using the proper rate of speech
- b Use technical vocabulary suitable to the task and level of the person
- c Determine the appropriate amount of information to communicate
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SAFETY/SECURITY

40 PRECAUTIONS

- a Use common knowledge to avoid hazards in order to prevent injury to self or equipment
- b Apply preventive measures prior to task performance to minimize any potential safety or security problem
- c Select an appropriate course of action in the event of an emergency

PERCEPTUAL

41 RECOGNITION

- a Identify similarities and differences between and among objects
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- e Classify objects by size, shape, color and significant markings
- f Determine direction, duration, and intensity of sounds, sightings and smells
- g Infer from sights, sounds, touch, smells, or tastes to determine a course of action

NUMERATION/PLACE VALUE

NT

1 NUMBERING AND COUNTING

- a Match numerals with word names and model
- b Write numerals one through N in sequential order from any starting point
- c State what numeral comes after, before, or between any two given numerals
- d Select the numeral which is greater/lesser from a set of numerals
- e Identify an object with a specified ordinal position
- f Write or state the place value of a particular digit, whole or decimal number
- g Round off a number to a specified place, whole or decimal
- h Count by ones, twos, fives, tens, etc. backward or forward (skip counting)
- i Match numbers with points or intervals on a number line (positive (+) or negative (-) values)

UNITS OF MEASUREMENT

2 LINEAR, WEIGHT, AND VOLUME MEASURES

- a Name the markings on a linear scale
- b Differentiate units of measure and equivalents in the English and metric system
- c *Use a ruler, yardstick, meter stick or scale to measure* lengths of objects or distances
- d Identify measures of ounce, pound, gram
- e Identify measures of pints, quarts, gallons, liters
- f Use a scale which is not numerically calibrated
- g Estimate measures of varying lengths, dimensions or weights

3 DEGREE MEASURES

- a Identify degree or mil as a unit in determining direction, distance or temperature
- b Estimate the measure of a given angle not greater than 180°
- c Interpret bearings, azimuth and other contexts in which the measure of an angle may range from 0° to 360°/0 to 6400 mils

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- a Use a 24 hour or digital clock to tell time
- b Name intervals and tell time in hours, minutes, and seconds
- c Estimate time in seconds, minutes, and parts of an hour
- d Identify calendar units and arrange them in Julian style
- e Convert time into hours and tenths of hours
- f Compute time using Greenwich Mean Time (GMT) as a basis for establishing [illegible] and distances

NT

5 GAUGE MEASURES

- a Identify the unit of measurement found on an instrument
- b Interpret the number, word, symbol from a display read out
- c Recognize a "reading" from a gauge with color division
- d Recognize positive (+) and negative (-) demarcation on a scale
- e Select band(s) from a multi scale gauge
- f Match a gauge reading to a specification using numbered or labeled intervals
- g Interpret gauge readings from an unnumbered/unmarked interval
- h Interpret a gauge reading which is fluctuating or momentarily sustained
- i Match specifications of required measure by manipulation, alignment or maintenance

VISUAL/SPATIAL RELATIONSHIPS

6 SPATIAL

- a Identify directions that tools, hardware, or components may be moved
- b Manipulate objects to align, match, mate, make parallel, be perpendicular to be at an angle
- c Interpret spatial relationships of figures and objects from 2 dimensional drawings, *pictures, or photographs*
- d Relate geometric symbols and graphic representations to actual systems, subsystems and components

GEOMETRY

7 LINES

- a Identify and name points, lines, rays, and segments
- b Identify intersecting lines, parallel lines, and line segments
- c Define and identify perpendicular lines
- d Identify congruent segments

8 PLANES

- a Identify and name plane geometric figures
- b. List the characteristics of geometric figures
- c. Classify figures according to the number or measure of its sides or angles
- d Identify figures which possess similarities
- e. Identify figures which may be parallel, perpendicular or congruent

9 ANGLES AND TRIANGLES

- a Identify and name the different kinds of angles and triangles, with their corresponding figures
- b Identify vertical, adjacent, complementary, or supplementary angles
- c Classify triangles according to their sides or angle size
- d Identify altitudes and medians of triangles or the bisector of an angle
- e. Name an angle by using letters, a number, or a single letter

NT

10 SOLIDS

- a. Recognize and match the names of solids with their corresponding figures

11 TERMINOLOGY

- a. Identify technical words associated with geometric figures
- b. Interpret meaning of terms derived from spatial orientation

COMPUTE OR PERFORM

12 ADDITION AND SUBTRACTION

- a. Add or subtract whole numbers, without carrying or borrowing
- b. Add or subtract whole numbers, carrying and borrowing
- c. Add and subtract, borrowing and carrying with mixed numbers (whole and decimals)
- d. Add or subtract positive (+) and negative (-) numbers, using a number line to arrive at a solution
- e. Add or subtract to find correct time (24 hr. clock) using hours or minutes
- f. Add or subtract various increments on gauges, dials, or any other measuring instrument
- g. Add or subtract time, linear, dry, liquid or degree measures requiring regrouping
- h. Estimate a sum or difference

13. MULTIPLICATION AND DIVISION

- a. Multiply and divide whole numbers
- b. Multiply and divide mixed numbers (whole and decimals)
- c. Divide a number with decimals in both divisor and dividend
- d. Multiply and divide integers, both positive (+) and negative (-), and assign proper sign to product or quotient
- e. Estimate a product or quotient

14 FRACTIONS/DECIMALS

- a. Subdivide whole objects or a set of objects into halves (1/2), thirds (1/3), fourths (1/4), eighths (1/8)
- b. Reduce fractions to lowest terms
- c. Convert fractions (proper and improper) to decimal equivalents, and vice versa, using a table, chart or gauge
- d. Compute equivalent value of fractions, decimals, percents, and mixed numbers to lowest terms
- e. Add and subtract fractions, with same or different denominators
- f. Multiply and divide fractions with and without whole numbers
- g. Estimate a fractional sum, product or quotient

NT

15 GEOMETRY

- a. Draw geometric figures, plane and solid
- b. Match geometric figures with word names, equivalent measures
- c. Label all parts of geometric figures using mathematical and characteristic designators
- d. Use a protractor to measure angles, make geometrical constructions
- e. Construct perpendicular on a line segment, bisector of an angle
- f. Compute the perimeter and area of any figure
- g. Compute the circumference and area of a circle
- h. Compute the area and volume of any solid figure
- i. Use formulas in solving problems involving geometric figures
- j. Solve problems and interpret spatial relationships of figures, symbols, and objects from 2-dimensional displays

16. COMBINATION OF PROCESSES

- a. Identify median and mode
- b. Compute averages
- c. Solve problems combining all processes using whole, mixed numbers and fractions
- d. Solve problems, combining all processes involving units of measurement
- e. Interpret information from charts, number lines, scales and graphs to solve arithmetic problems
- f. Solve conversion problems of linear (metric and English) liquid, weight, and temperature (F^{o} or C^{o}) measures
- g. Solve problems involving ratio and proportion
- h. Solve word problems where any mathematical process may occur

17 GRAPHING IN THE COORDINATE PLANE

- a. Identify coordinates of a point in any grid system
- b. Identify points on a line graph
- c. Match a graph with its equation

18 ALGEBRA

- a. Solve simple algebraic equations with one unknown
- b. Recognize and derive equivalent algebraic expressions
- c. Evaluate powers and estimate roots

19 TRIGONOMETRY

- a. Use tables of trigonometric functions
- b. Use tables of logarithms to solve problems
- c. Solve geometric problems using trigonometric functions
- d. Use trigonometric ratios to solve problems

CONTENT READING

NT

25 PROCEDURAL DIRECTIONS

- a Identify factual details or specifications that are found within a statement or written selection
- b Select parts of text and visual materials to complete a task activity
- c Follow highly detailed, step by step directions in order to accomplish a sequence of task activities
- d Determine the essential message of a paragraph or section of written material
- e Infer from a written source which does not explicitly provide required information, in order to make a decision
- f Synthesize information from written sources which contributes to the completion of a task activity

26 VOCABULARY

- a Recognize common words and their meanings
- b Recognize task related words with technical meaning
- c Identify the correct meaning of a word from the context of a sentence
- d Recognize the meaning of common contractions, abbreviations and acronyms
- e Determine the meaning of figurative, idiomatic, and technical terms by using context clues or by using a reference source(s)

INFORMATION ACCESS

27 REFERENCE SKILLS

- a Locate a Technical Manual, Field Manual or any related source document by code number and title
- b Alphabetize words or topics to locate information
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- a Obtain a fact or specification from a two column table or chart to find information
- b Obtain a fact or specification from an intersection of a row by column table or chart
- c Use complex table or chart requiring cross referencing within or in combination with text material outside the chart
- d Apply information from tables and charts for locating malfunctions, or for [illegible]

VISUAL AIDS

NT

29 ILLUSTRATIONS

- a Identify details, labels, numbers, and parts from an illustration or picture
- b Identify parts or details according to a key or legend
- c Interpret a drawing which shows a cross sectional view of a subject for assembly, disassembly
- d Interpret a three dimensional projection or exploded view of object(s) for assembly, disassembly, or position in system or sub system
- e Follow illustrations, or photographs, arranged in a sequential order as a guide
- f Integrate information from various sources to select a course of action

30 FLOW CHARTS

- a Use a simple linear path of an organizational chart to list events in sequential order
- b Use a linear path of a flow chart to provide visual and textual directions to a procedure, to arrive at decision points, and to provide alternate paths in problem solving
- c Translate the significance of the symbols into physical activities

31 SCHEMATICS

- a Isolate each major section or entity presented in a schematic diagram
- b Identify the components within each entity
- c Trace connections in an integrated circuit from their origin to another point within or from one entity to another
- d Isolate a problem component in a schematic and trace it to components believed to cause the problem
- e Interpret symbols to indicate direction of flow, test points, components and diagrammatic decision points

WRITTEN COMMUNICATION

32 FORMS

- a Locate the block on a form to enter the appropriate information
- b Transfer a number, code, date, figure or related data from equipment or written sources onto an appropriate section of the form
- c Write the name of the organization, responsible personnel, disposition of the part or equipment, and nomenclature, in appropriate sections of the form
- d Write a descriptive account of an activity or transaction performed
- e Use a completed form to locate or compare information

33 NOTE-TAKING

- a Distinguish between essential and non essential details during the note taking process
- b Record details without misinterpreting the intent of either written material or an interview
- c Rewrite all recorded details in sentence form
- d Organize all sentences into paragraphs

NT

34 OUTLINING (topic or sentence)

- a Distinguish between major and subordinate topics
- b Generate titles for each major topic selected
- c Use phrases or sentences to provide subordinate details under each major topic
- d Alternate, indent numbers and letters to establish a hierarchy

35 REPORT WRITING

- a State the intent or objective(s) of the report
- b Describe the parameters of the event or situation
- c Distinguish between relevant and irrelevant details
- d Sequence events in the order they have occurred
- e State general impressions of events described
- f Select examples that will clarify major issues presented in the report
- g Examine opposing points of view in the report
- h Summarize the major points developed in the report
- i Justify an action taken and give reasons for rejecting alternatives

36 EDITING

- a Spell frequently used words correctly
- b Spell task related words correctly
- c Identify words that need to be capitalized
- d Correct all misspelled words with or without the use of a reference source
- e Apply all rules for end marks, commas and apostrophes
- f Apply common rules of grammar
- g Rewrite the paragraph by stating the main idea in the first sentence, and restructuring the sentences for coherence
- h Appraise an entire written communication and make adjustments to improve clarity

VERBAL COMMUNICATION

37 TYPE

- a Individual — a person working on a task and communicating with another when assistance is needed or when a supervisory decision is needed
- b Instruction — a task activity requiring communication between an instructor, an individual or small group where the purpose is to give facts or rules to inform or guide
- c Tutor — interaction takes place between two persons where one is instructing and the other is doing the task
- d Peer Group (less than 10) — all members engage in an activity where one person assumes a leadership role and communicates to others what is to be done
- e Interview — a person communicating with another about his activities, opinions or subject expertise for the purpose of using the information in a task
- f Briefing — communicating final instructions to others or giving an account in summary
- g Counsel — come or testify together to exchange ideas or opinions to recommend, give or take advice, or to arrive at an acceptance of a plan or decision
- h Command — communicate to others an order or action to be taken where a person has a position of authority

4/23/82

NT

38 CHARACTERISTICS

- a Enunciate clearly using the proper rate of speech
- b Use technical vocabulary suitable to the task and level of the person
- c Determine the appropriate amount of information to communicate
- d Interpret figurative or idiomatic language by reference to its use in context
- e Follow highly detailed step by step directions
- f Solicit feedback to confirm the accurate reception of the communication
- g Recognize when a low key, informal dialogue is suitable
- h Recognize when direct verbal commands are necessary
- i Recognize when a prescribed series of verbal interactions is required to coordinate a group effort
- j Recognize when the situation will require a structured, preplanned method of presentation

39 BARRIERS

- a Recognize the need for clear, concise directions in order to avoid language or word-meaning differences
- b Recognize personality factors and interpersonal relationships that may exist
- c Recognize feedback as a means of communicating more effectively and increasing task competence

SAFETY/SECURITY

40 PRECAUTIONS

- a Use common knowledge to avoid hazards in order to prevent injury to self or equipment
- b Apply preventive measures prior to task performance to minimize any potential safety or security problem
- c Select an appropriate course of action in the event of an emergency

PERCEPTUAL

41 RECOGNITION

- a Identify similarities and differences between and among objects
- b Use body language (motions, gestures, postures) to communicate or signal
- c Determine the presence of a defect or extent of damage
- d Match objects by size, shape, color and significant markings
- e Classify objects by size, shape, color and significant markings
- f Determine direction, duration, and intensity of sounds, sightings and smells
- g Infer from sights, sounds, touch, smells, or tastes to determine a course of action

NUMERATION/PLACE VALUE

NT

1 NUMBERING AND COUNTING

- a Match numerals with word names and models
- b Write numerals one through N in sequential order from any starting point
- c State what numeral comes after, before, or between any two given numerals
- d Select the numeral which is greater/lesser from a set of numerals
- e Identify an object with a specified ordinal position
- f Write or state the place value of a particular digit, whole or decimal number
- g Round off a number to a specified place, whole or decimal
- h Count by ones, twos, fives, tens, etc. backward or forward (skip counting)
- i Match numbers with points or intervals on a number line (positive (+) or negative (-) values)

UNITS OF MEASUREMENT

2 LINEAR, WEIGHT, AND VOLUME MEASURES

- a Name the markings on a linear scale
- b Differentiate units of measure and equivalents in the English and metric system
- c Use a ruler, yardstick, meter stick or scale to measure lengths of objects or distances
- d Identify measures of ounce, pound, grain
- e Identify measures of pints, quarts, gallons, liters
- f Use a scale which is not numerically calibrated
- g Estimate measures of varying lengths, dimensions or weights

3 DEGREE MEASURES

- a Identify degree or mil as a unit in determining direction, distance or temperature
- b Estimate the measure of a given angle not greater than 180°
- c Interpret bearings, azimuth and other contexts in which the measure of an angle may range from 0° to 360°/0 to 6400 mils

4 TIME TELLING MEASURES

- a Use a 24 hour or digital clock to tell time
- b Name intervals and tell time in hours, minutes, and seconds
- c Estimate time in seconds, minutes, and parts of an hour
- d Identify calendar units and arrange them in Julian style
- e Convert time into hours and tenths of hours
- f Compute time using Greenwich Mean Time (GMT) as a basis for establishing zones and distances

NT

5 GAUGE MEASURES

- a Identify the unit of measurement found on an instrument
- b Interpret the number, word, symbol from a display read out
- c Recognize a "reading" from a gauge with color divisions
- d Recognize positive (+) and negative (-) denomination on a scale
- e Select band(s) from a multi scale gauge
- f Match a gauge reading to a specification using numbered or labeled intervals
- g Interpret gauge readings from an unnumbered/unmarked interval
- h Interpret a gauge reading which is fluctuating or momentarily sustained
- i Match specifications of required measures by manipulation, alignment or maintenance

VISUAL/SPATIAL RELATIONSHIPS

6 SPATIAL

- a Identify direction that tools, hardware, or components may be moved
- b Manipulate objects to align, match, mate, make parallel, be perpendicular or be at an angle
- c Interpret spatial relationships of figures and objects from 2 dimensional drawings, pictures, or photographs
- d Relate geometric symbols and graphic representations to actual systems, subsystems and components

GEOMETRY

7 LINES

- a. Identify and name points, lines, rays and segments
- b. Identify intersecting lines, parallel lines and line segments
- c. Define and identify perpendicular lines
- d. Identify congruent segments

8 PLANES

- a. Identify and name plane geometric figures
- b. List the characteristics of geometric figures
- c Classify figures according to the number or measure of its sides or angles
- d. Identify figures which possess similarities
- e. Identify figures which may be parallel, perpendicular or congruent

9 ANGLES AND TRIANGLES

- a. Identify and name the different kinds of angles and triangles, with their corresponding figures
- b Identify vertical, adjacent, complementary or supplementary angles
- c. Classify triangles according to their sides or angle size
- d Identify altitudes and medians of triangles or the bisector of an angle
- e Name an angle by using letters, a number, or a single letter

NT

10 SOLIDS

- ___ a. Recognize and match the names of solids with their corresponding figures

11 TERMINOLOGY

- ___ a. Identify technical words associated with geometric figures
- ___ b. Interpret meaning of terms derived from spatial orientation

COMPUTE OR PERFORM

12 ADDITION AND SUBTRACTION

- ___ a. Add or subtract whole numbers, without carrying or borrowing
- ___ b. Add or subtract whole numbers, carrying and borrowing
- ___ c. Add and subtract, borrowing and carrying with mixed numbers (whole and decimals)
- ___ d. Add or subtract positive (+) and negative (-) numbers, using a number line to arrive at a solution
- ___ e. Add or subtract to find correct time (24 hr. clock) using hours or minutes
- ___ f. Add or subtract various increments on gauges, dials, or any other measuring instrument
- ___ g. Add or subtract time, linear, dry, liquid or degree measures requiring regrouping
- ___ h. Estimate a sum or difference

13 MULTIPLICATION AND DIVISION

- ___ a. Multiply and divide whole numbers
- ___ b. Multiply and divide mixed numbers (whole and decimals)
- ___ c. Divide a number with decimals in both divisor and dividend
- ___ d. Multiply and divide integers, both positive (+) and negative (-), and assign proper sign to product or quotient
- ___ e. Estimate a product or quotient

14. FRACTIONS/DECIMALS

- ___ a. Subdivide whole objects or a set of objects into halves (1/2), thirds (1/3), fourths (1/4), eighths (1/8)
- ___ b. Reduce fractions to lowest terms
- ___ c. Convert fractions (proper and improper) to decimal equivalents, and vice versa, using a table, chart or gauge
- ___ d. Compute equivalent value of fractions, decimals, percents, and mixed numbers to lowest terms
- ___ e. Add and subtract fractions, with same or different denominators
- ___ f. Multiply and divide fractions with and without whole numbers
- ___ g. Estimate a fractional sum, product, or quotient

NT

15 GEOMETRY

- ___ a. Draw geometric figures, plane and solid
- ___ b. Match geometric figures with word names, equivalent measures
- ___ c. Label all parts of geometric figures using mathematical and characteristic designators
- ___ d. Use a protractor to measure angles, make geometrical constructions
- ___ e. Construct perpendicular on a line segment, bisector of an angle
- ___ f. Compute the perimeter and area of any figure
- ___ g. Compute the circumference and area of a circle
- ___ h. Compute the area and volume of any solid figure
- ___ i. Use formulas in solving problems involving geometric figures
- ___ j. Solve problems and interpret spatial relationships of figures, symbols, and objects from 2 dimensional displays

16 COMBINATION OF PROCESSES

- ___ a. Identify median and mode
- ___ b. Compute averages
- ___ c. Solve problems combining all processes using whole numbers, decimals and fractions
- ___ d. Solve problems, combining all processes, involving units of measurement
- ___ e. Interpret information from charts, number lines, scales and graphs to solve arithmetic problems
- ___ f. Solve conversion problems of linear (metric and English) liquid, weight, and temperature (F° or C°) measures
- ___ g. Solve problems involving ratio and proportion
- ___ h. Solve word problems where any mathematical process may occur

17. GRAPHING IN THE COORDINATE PLANE

- ___ a. Identify coordinates of a point in any grid system
- ___ b. Identify points on a line graph
- ___ c. Match a graph with its equation

18. ALGEBRA

- ___ a. Solve simple algebraic equations with one unknown
- ___ b. Recognize and derive equivalent algebraic expressions
- ___ c. Evaluate powers and estimate roots

19 TRIGONOMETRY

- ___ a. Use tables of trigonometric functions
- ___ b. Use tables of logarithms to solve problems
- ___ c. Solve geometric problems using trigonometric functions
- ___ d. Use trigonometric ratios to solve problems

CONTENT READING

NT

25 PROCEDURAL DIRECTIONS

- a Identify tasks, activity, or event statements that are found in a chronological sequence
- b Select tools, test and equipment materials to complete a task activity
- c Follow highly detailed, specific step-by-step instructions in order to accomplish a portion of task activities
- d Determine the exact meaning of a paragraph or sentence of written statements
- e Infer from a written source which does not explicitly provide required information in order to make a decision
- f Synthesize information from written sources which contributes to the completion of a task activity

26 VOCABULARY

- a Recognize common words and their meanings
- b Recognize task related words with technical meanings
- c Identify the correct meaning of a word from the context of a sentence
- d Recognize the meaning of common contractions, abbreviations and acronyms
- e Determine the meaning of figurative, idiomatic, and technical terms by using context clues or by using a reference source(s)

INFORMATION ACCESS

27 REFERENCE SKILLS

- a Locate a Technical Manual, Field Manual or any related source document by code number and title
- b Alphabetize words or topics to locate information
- c Use the table of contents, index, system or sub system heading, appendix and glossary to locate information
- d Locate the page, title, paragraph, figure or chart needed to answer a question or to solve a problem
- e Determine, after scanning or skim reading, whether the information is relevant
- f Cross reference within and across source documents to select information needed to perform a routine
- g Organize information from multiple sources into a sequenced series of events

28 TABLES/CHARTS

- a Obtain a fact or specification from a two column table or chart to find information
- b Obtain a fact or specification from an intersection of a row by column table or chart
- c Use a complex table or chart requiring cross referencing within or in combination with text material outside the chart
- d Apply information from tables and charts for locating malfunctions, or for determining courses of action

VISUAL AIDS

NT

29 DESIGNATIONS

- a Identify details, labels, numbers, and parts from [illegible]
- b Identify process details [illegible] key or legend
- c Interpret a drawing which shows a cross sectional view of an object for assembly/disassembly
- d Interpret a three dimensional projection as depicted on a work [illegible] assembly/disassembly, as pertains to systems or subsystems
- e Follow illustrations, or photographs and get a perspective of [illegible]
- f Integrate information from [illegible] sources to select a course of action

30 FLOW CHARTS

- a Use a simple linear path of an organizational chart to determine [illegible] order
- b Use a linear path of a flow chart to provide visual aid to steps/directions in a procedure, to arrive at decision points, and to provide alternate paths in problem solving
- c Translate the significance of the symbols into physical activities

31 SCHEMATICS

- a Isolate each major section or entity presented in a schematic diagram
- b Identify the components within each entity
- c Trace connections in an integrated circuit from their origin to another point within or from one entity to another
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- a Locate the block on a form to enter the appropriate information
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NUMERATION/PLACE VALUE

NT

1 NUMERATION AND COUNTING

- a Match numerals to sets, words, points and marks
- b Write numerals to the right (N) or sequential order to or by starting point
- c State what comes next, before or between (by two's, three's, etc.)
- d Select the numeral which is greater, lesser from a set of numerals
- e Identify an object with a specified ordinal position
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- b Differentiate units of measure and equivalents in the English and metric system
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4/23/82

NT

5 GAUGE MEASURES

- a *Identify the unit of measurement found on an instrument*
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- a Identify directions that tools, hardware or components may be moved
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- c Define and identify perpendicular lines
- d *Identify congruent segments*

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- a Identify and name plane geometric figures
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- d Identify altitudes and medians of triangles or the bisector of an angle
- e Name an angle by using letters, a number, or a single letter

NT

10 SYMBOLS

a [illegible] the symbols and matching [illegible] with their corresponding figures

9 TERMINOLOGY

a [illegible] terms associated with [illegible]

b [illegible] of [illegible] derived from spatial orientation

COMPUTE OR PERFORM

12 ADDITION AND SUBTRACTION

a Add or subtract whole numbers without carrying or borrowing

b Add or subtract whole numbers, carrying and borrowing

c Add and subtract borrowing and carrying with mixed numbers (whole and decimals)

d Add or subtract positive (+) and negative (-) numbers using a number line to arrive at a solution

e Add or subtract to find correct time (24 hr. clock) using hours or minutes

f Add or subtract various increments on gauges, dials or any other measuring instrument

g Add or subtract time, linear, dry, liquid or degree measures requiring regrouping

h Estimate a sum or difference

11 MULTIPLICATION AND DIVISION

a Multiply and divide whole numbers

b Multiply and divide mixed numbers (whole and decimals)

c Divide a number with decimals in both divisor and dividend

d Multiply and divide integers both positive (+) and negative (-), and assign proper sign to product or quotient

e Estimate a product or quotient

14 FRACTIONS/DECIMALS

a Subdivide whole objects or a set of objects into halves (1/2), thirds (1/3), fourths (1/4), eighths (1/8)

b Reduce fractions to lowest terms

c Convert fractions (proper and improper) to decimal equivalents and vice versa, using a table, chart or gauge

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NT

15 GEOMETRY

a Draw geometric figures, plane and solid

b Match geometric figures with word names, equivalent measures

c Label all parts of geometric figures using mathematical symbols to designators

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i Use formulas in solving problems involving geometric figures

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b Recognize and derive equivalent algebraic expressions

c Evaluate powers and estimate roots

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a Use tables of trigonometric functions

b Use tables of logarithms to solve problems

c Solve geometric problems using trigonometric functions

d Use trigonometric ratios to solve problems

CONTENT READING

NT

[illegible]

VOCABULARY

a. Recognize common words and their meanings
b. Recognize task related words with technical meanings
c. Identify the correct meaning of a word from the context of a sentence
d. Recognize the meaning of common contractions, abbreviations and acronyms
e. Determine the meaning of figurative, idiomatic, and technical terms by using context clues or by using a reference source(s)

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b. Obtain a fact or specification from an intersection of a row by column table or chart
c. Locate a complex table or chart requiring cross referencing within or in combination with text material outside the chart
d. Apply information from tables and charts for locating malfunctions, or for determining courses of action

4.1 (b).

VISUAL AIDS

NT

[illegible]

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a. Use a simple linear path of an organizational chart to list events or steps in order
b. Use a linear path of a flow chart to provide visual and textual directions to a procedure, to arrive at decision points, and to provide alternate paths in problem solving
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a. Isolate each separate section or entity presented in a schematic diagram
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d. Isolate a problem component in a schematic and trace it to components involved to cause the problem
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a. Locate the block on a form to enter the appropriate information
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a. Distinguish between essential and non-essential details during the note taking process
b. Record details without misinterpreting the intent of either written material or an interview
c. Rewrite all recorded details in sentence form
d. Organize all sentences into paragraphs

NT

[illegible]

35 ORGANIZING (paragraphs)

- a Organize into several major and subordinate topics
- b Select and title topics appropriately
- c Use paragraphs to provide substantiate details and [illegible]
- d Arrange outlines using titles and letters to establish a hierarchy

36 REPORT WRITING

- a State the purpose (objective) of the report
- b Describe the parameters of the event or situation
- c Distinguish between relevant and irrelevant details
- d Sequence events as they have occurred
- e State general impressions of events described
- f Select examples that will clarify major issues presented in the report
- g Express opposing points of view in the report
- h Summarize the major points developed in the report
- i Identify an action taken and give reasons for rejecting alternatives

37 EDITING

- a Spell frequently used words correctly
- b Spell task related words correctly
- c Identify words that need to be capitalized
- d Correctly spelled words with or without the use of a reference source
- e Apply all rules for end marks, commas and apostrophes
- f Apply rules of grammar
- g Rewrite the paragraph by stating the main idea in the first sentence and restructuring the sentences for coherence
- h Appraise an existing written communication and make adjustments to improve clarity

VERBAL COMMUNICATION

47 TYPE

- a Individual [illegible] working on a task and communicating with another when assistance is needed or when a supervisory decision is needed
- b Instruction [illegible] a task activity requiring communication between an instructor and individual or small group where the purpose is to give facts or rules to enforce or guide
- c Tutor [illegible] interaction takes place between two persons where one is instructing and the other is doing the task
- d Peer Group [illegible] to 10) all members engage in an activity where one person assumes a leadership role and communicates to others what is to be done
- e Interview [illegible] a person communicating with another about his activities, opinions or subject expertise for the purpose of using the information in a task
- f Briefing [illegible] instructions to others or giving an account in summary
- g Conference [illegible] together to exchange ideas or opinions to reach a decision, give or take advice or to arrive at an acceptance of a plan or decision
- h Command [illegible] to others an order or action to be taken where a person has a position of authority

4/21/82

NT

38 CHARACTERISTICS

- a Enunciate clearly using the proper rate of speech
- b Use technical vocabulary suitable to the task and level of the person
- c Determine the appropriate amount of information to communicate
- d Interpret figurative or idiomatic language by reference to its literal meaning
- e Follow lightly detailed, step by step directions
- f Solicit feedback to confirm the accurate reception of the communication
- g Recognize when a low key, informal dialogue is suitable
- h Recognize when direct verbal commands are necessary
- i Recognize when a prescribed series of verbal interactions is required to coordinate a group effort
- j Recognize when the situation will require a structured, preplanned method of presentation

39 BARRIERS

- a Recognize the need for clear, concise directions in order to avoid language or word meaning differences
- b Recognize personality factors and interpersonal relationships that may exist
- c Recognize feedback as a means of communicating more effectively and increasing task competence

SAFETY/SECURITY

40 PRECAUTIONS

- a Use common knowledge to avoid hazards in order to prevent injury to self or equipment
- b Apply preventive measures prior to task performance to minimize any potential safety or security problem
- c Select an appropriate course of action in the event of an emergency

PERCEPTUAL

41 RECOGNITION

- a Identify similarities and differences between or among objects
- b Use body language (motions, gestures, postures) to communicate a signal
- c Determine the presence of a defect or extent of damage
- d Match objects by size, shape, color and significant markings
- e Classify objects by size, shape, color and significant marking
- f Determine direction, duration and intensity of sounds, sightings, etc., cues
- g Infer from sights, sounds, touch, smells or tastes to determine a course of action

STEP I

NUMERATION/PLACE VALUE

NT

1 NUMBERING AND COUNTING

- a Match numerals with word names and models
- b Write numerals one through N in sequential order from any starting point
- c State what numeral comes after, before, or between any two given numerals
- d Select the numeral which is greater/lesser from a set of numerals
- e Identify an object with a specified ordinal position
- f Write or state the place value of a particular digit, whole or decimal number
- g Round off a number to a specified place, whole or decimal
- h Count by ones, twos, fives, tens, etc. backward or forward (skip counting)
- i Match numbers with points or intervals on a number line (positive (+) or negative (-) values)

UNITS OF MEASUREMENT

2 LINEAR, WEIGHT, AND VOLUME MEASURES

- a Name the markings on a linear scale
- b Differentiate units of measure and equivalents in the English and metric system
- c Use a ruler, yardstick, meter stick or scale to measure lengths of objects or distances
- d Identify measures of ounce, pound, gram
- e Identify measures of pints, quarts, gallons, liters
- f Use a scale which is not numerically calibrated
- g Estimate measures of varying lengths, dimensions or weights

3 DEGREE MEASURES

- a Identify degree or mil as a unit in determining direction, distance or temperature
- b Estimate the measure of a given angle not greater than 180°
- c Interpret bearings, azimuth, and other contexts in which the measure of an angle may range from 0° to 360°/0 to 6400 mils

4 TIME TELLING MEASURES

- a Use a 24 hour or digital clock to tell time
- b Name intervals and tell time in hours, minutes and seconds
- c Estimate time in seconds, minutes, and parts of an hour
- d Identify calendar units and arrange them in Julian style
- e Convert time into hours and tenths of hours
- f Coordinate time using Greenwich Mean Time (GMT) as a basis for establishing zones and distances

NT

5 GAUGE MEASURES

- a Identify the unit of measurement found on an instrument
- b Interpret the number, word, symbol from a display read out
- c Recognize a "reading" from a gauge with color divisions
- d Recognize positive (+) and negative (-) demarcation on a scale
- e Select band(s) from a multi-scale gauge
- f Match a gauge reading to a specification using numbered or labeled intervals
- g Interpret gauge readings from an unnumbered/unmarked interval
- h Interpret a gauge reading which is fluctuating or momentarily sustained
- i Match specifications of required measures by manipulation, alignment or maintenance

VISUAL/SPATIAL RELATIONSHIPS

6 SPATIAL

- a Identify directions that tools, hardware, or components may be moved
- b Manipulate objects to align, match, mate, make parallel, be perpendicular or be at an angle
- c Interpret spatial relationships of figures and objects from 2 dimensional drawings, pictures, or photographs
- d Relate geometric symbols and graphic representations to actual systems subsystems and components

GEOMETRY

7 LINES

- a. Identify and name points, lines, rays, and segments
- b. Identify intersecting lines, parallel lines, and line segments
- c Define and identify perpendicular lines
- d. Identify congruent segments

8 PLANES

- a Identify and name plane geometric figures
- b. List the characteristics of geometric figures
- c Classify figures according to the number or measure of its sides or angles
- d. Identify figures which posses similarities
- e Identify figures which may be parallel, perpendicular or congruent

9. ANGLES AND TRIANGLES

- a. Identify and name the different kinds of angles and triangles, with their corresponding figures
- b Identify vertical, adjacent, complementary or supplementary angles
- c Classify triangles according to their sides or angle size
- d. Identify altitudes and medians of triangles or the bisector of an angle
- e Name an angle by using letters, a number, or a single letter

NT

10 SOLIDS

- a Recognize and match the names of solids with their corresponding figures

11 TERMINOLOGY

- a Identify technical words associated with geometric figures
- b Interpret meaning of terms derived from spatial orientation

COMPUTE OR PERFORM

12 ADDITION AND SUBTRACTION

- a Add or subtract whole numbers, without carrying or borrowing
- b Add or subtract whole numbers, carrying and borrowing
- c Add and subtract, borrowing and carrying with mixed numbers (whole and decimals)
- d Add or subtract positive (+) and negative (-) numbers, using a number line to arrive at a solution
- e Add or subtract to find correct time (24 hr. clock) using hours or minutes
- f Add or subtract various increments on gauges, dials, or any other measuring instrument
- g Add or subtract time, linear, dry, liquid or degree measures requiring regrouping
- h Estimate a sum or difference

13 MULTIPLICATION AND DIVISION

- a Multiply and divide whole numbers
- b Multiply and divide mixed numbers (whole and decimals)
- c Divide a number with decimals in both divisor and dividend
- d Multiply and divide integers, both positive (+) and negative (-), and assign proper sign to product or quotient
- e Estimate a product or quotient

14 FRACTIONS/DECIMALS

- a Subdivide whole objects or a set of objects into halves (1/2), thirds (1/3) fourths (1/4), eighths (1/8)
- b Reduce fractions to lowest terms
- c Convert fractions (proper and improper) to decimal equivalents, and vice versa using a table, chart or gauge
- Compute equivalent value of fractions, decimals, percents, and mixed numbers to lowest terms
- e Add and subtract fractions, with same or different denominators
- f Multiply and divide fractions with and without whole numbers
- g Estimate a fractional sum, product, or quotient

NT

15 GEOMETRY

- a Draw geometric figures, plane and solid
- b. Match geometric figures with word names, equivalent measures
- c Label all parts of geometric figures using mathematical and characteristic designators
- d. Use a protractor to measure angles, make geometrical constructions
- e. Construct perpendicular on a line segment, bisector of an angle
- f Compute the perimeter and area of any figure
- g. Compute the circumference and area of a circle
- h Compute the area and volume of any solid figure
- i Use formulas in solving problems involving geometric figures
- j Solve problems and interpret spatial relationships of figures, symbols and objects from 2 dimensional displays

16 COMBINATION OF PROCESSES

- a Identify median and mode
- b Compute averages
- c Solve problems combining all processes using whole, mixed numbers and fractions
- d Solve problems, combining all processes, involving units of measurement
- e Interpret information from charts, number lines, scales and graphs to solve arithmetic problems
- f. Solve conversion problems of linear (metric and English) liquid, weight, and temperature (F^{O} or C^{O}) measures
- g Solve problems involving ratio and proportion
- h Solve word problems where any mathematical process may occur

17 GRAPHING IN THE COORDINATE PLANE

- a Identify coordinates of a point in any grid system
- b Identify points on a line graph
- c Match a graph with its equation

18 ALGEBRA

- a Solve simple algebraic equations with one unknown
- b Recognize and derive equivalent algebraic expressions
- c Evaluate powers and estimate roots

19 TRIGONOMETRY

- a Use tables of trigonometric functions
- b Use tables of logarithms to solve problems
- c Solve geometric problems using trigonometric functions
- d Use trigonometric ratios to solve problems

CONTENT READING

NT

25 PROCEDURAL DIRECTIVES

- a Identify facts or details of specifications that are found within a written and/or written selection
- b Select parts of text and visual materials to complete a task activity
- c Follow highly detailed, step by step directions in order to accomplish a sequence of task activities
- d Determine the essential message of a paragraph or section of written material
- e Infer from a written source which does not explicitly provide required information in order to make a decision
- f Synthesize information from written sources which contributes to the completion of a task activity

26 VOCABULARY

- a Recognize common words and their meanings
- b Recognize task related words with technical meanings
- c Identify the correct meaning of a word from the context of a sentence
- d Recognize the meaning of common contractions, abbreviations and acronyms
- e Determine the meaning of figurative, idiomatic, and technical terms by using context clues or by using a reference source(s)

INFORMATION ACCESS

27 REFERENCE SKILLS

- a Locate a Technical Manual, Field Manual or any related source document by code number and title
- b Alphabetize words or topics to locate information
- c Use the table of contents, index, system or sub-system heading, appendix and glossary to locate information
- d Locate the page, title, paragraph, figure, or chart needed to answer a question or to solve a problem
- e Determine, after scanning or skim-reading, whether the information is relevant
- f Cross reference within and across source documents to select information needed to perform a routine
- g Organize information from multiple sources into a sequenced series of events

28 TABLES/CHARTS

- a Obtain a fact or specification from a two-column table or chart to find information
- b Obtain a fact or specification from an intersection of a row by column table or chart
- c Use a complex table or chart requiring cross referencing within or in combination with text material outside the chart
- d Apply information from tables and charts for locating malfunctions, or for selecting a course of action

VISUAL AIDS

NT

29 ILLUSTRATIONS

- a Identify details, labels, functions, and parts from an illustration of a system
- b Identify parts or details according to a key or legend
- c Interpret a drawing which shows a cross section or view of an object for assembly, disassembly
- d Interpret a three dimensional pictorial or exploded view of object(s) for assembly, disassembly of associated system or sub-system
- e Follow illustrations or photographs arranged in a sequential order as a guide
- f Integrate information from various sources to select a course of action

30 FLOW CHARTS

- a Use a simple linear path of an organizational chart to find events in their correct order
- b Use a linear path of a flow chart to provide visual and textual clues to a procedure to arrive at decision points and to provide direction and guidance in problem solving
- c Translate the significance of the symbols on a flow chart

31 SCHEMATICS

- a Isolate and major sections of a schematic
- b Identify the components within each section
- c Trace the path of a signal from one point to another within or from one section to another
- d Isolate a problem component on a schematic and trace the signal to and from the relevant to cause the problem
- e Interpret symbols to indicate direction of flow, test points, and diagrammatic decision points

WRITTEN COMMUNICATION

32 FORMS

- a Locate the block on a form to enter the appropriate information
- b Transfer a number, code, date, figure or related data from equipment or written sources onto an appropriate section of the form
- c Write the name of the organization responsible personnel, symptoms of the part or equipment, and nonverbal cause, in appropriate sections of the form
- d Write a descriptive account of an activity or transaction
- e Use a completed form to locate or compare information

33 NOTE TAKING

- a Distinguish between essential and nonessential details during the note taking process
- b Record details without distorting the content of either written material or an interview
- c Rewrite all recorded details in brief, concise form
- d Organize all sentences into paragraphs

NT

34 OUTLINING (topic or sentence)

- a. Distinguish between major and subordinate topics
- b. Generate titles for each major topic selected
- c. Use phrases or sentences to provide subordinate details under each major topic
- d. Alternate, indent numbers and letters to establish a hierarchy

35 REPORT WRITING

- a. State the intent or objective(s) of the report
- b. Describe the parameters of the event or situation
- c. Distinguish between relevant and irrelevant details
- d. Sequence events in the order they have occurred
- e. State general impressions of events described
- f. Select examples that will clarify major issues presented in the report
- g. Examine opposing points of view in the report
- h. Summarize the major points developed in the report
- i. Justify an action taken and give reasons for rejecting alternatives

36 EDITING

- a. Spell frequently used words correctly
- b. Spell task related words correctly
- c. Identify words that need to be capitalized
- d. Correct all misspelled words with or without the use of a reference source
- e. Apply all rules for end marks, commas, and apostrophes
- f. Apply common rules of grammar
- g. Rewrite the paragraph by stating the main idea in the first sentence, and restructuring the sentences for coherence
- h. Appraise an entire written communication and make adjustments to improve clarity

VERBAL COMMUNICATION

37 TYPE

- a. Individual – a person working on a task and communicating with another when assistance is needed or when a supervisory decision is needed
- b. Instruction – a task activity requiring communication between an instructor, an individual or small group where the purpose is to give facts or rules to inform or guide
- c. Tutor – interaction takes place between two persons where one is instructing and the other is doing the task
- d. Peer Group (less than 10) – all members engage in an activity where one person assumes a leadership role and communicates to others what is to be done
- e. Interview – a person communicating with another about his activities, opinions, or subject expertise for the purpose of using the information in a task
- f. Briefing – communicating final instructions to others or giving an account in summary
- g. Counsel – communicating together to exchange ideas or opinions to recommend, give or take advice, or to arrive at an acceptance of a plan or decision
- h. Command – communicate to others an order or action to be taken where a person has a position of authority

4/23/82

NT

38 CHARACTERISTICS

- a. Enunciate clearly, using the proper rate of speech
- b. Use technical vocabulary suitable to the task and level of the person
- c. Determine the appropriate amount of information to communicate
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- e. Follow highly detailed, step-by-step directions
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PERCEPTUAL

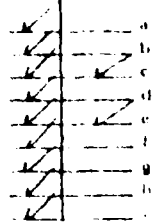
41 RECOGNITION

- a. Identify similarities and differences between and among objects
- b. Use body language (motions, gestures, postures) to communicate or signal
- c. Determine the presence of a defect or extent of damage
- d. Match objects by size, shape, color and significant markings
- e. Classify objects by size, shape, color and significant markings
- f. Determine direction, duration, and intensity of sounds, sightings and smells
- g. Infer from sights, sounds, touch, smells, or tastes to determine a course of action
- h. Interpret Codes or Symbols

NUMERATION/PLACE VALUE

NT

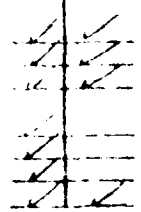
1 NUMBERING AND COUNTING



a. Match numerals with word names and models
b. Write numerals one through N in sequential order from any starting point
c. State what numeral comes after, before, or between any two given numerals
d. Select the numeral which is greater/lesser from a set of numerals
e. Identify an object with a specified ordinal position
f. Write or state the place value of a particular digit, whole or decimal number
g. Round off a number to a specified place, whole or decimal
h. Count by ones, twos, fives, tens, etc., backward or forward (skip counting)
i. Match numbers with points or intervals on a number line (positive (+) or negative (-) values)

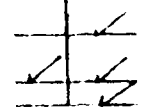
UNITS OF MEASUREMENT

2 LINEAR, WEIGHT, AND VOLUME MEASURES



a. Name the markings on a liquid scale
b. Differentiate units of measure and equivalents in the English and metric system
c. Use a ruler, yardstick, meter stick or scale to measure lengths of objects or distances
d. Identify measures of ounce, pound, gram
e. Identify measures of pints, quarts, gallons, liters
f. Use a scale which is not numerically calibrated
g. Estimate measures of varying lengths, dimensions or weights

3 DEGREE MEASURES



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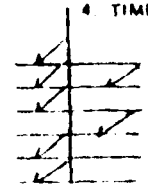
b. Estimate the measure of a given angle not greater than 180°
c. Interpret bearings, azimuth and other contexts in which the measure of an angle may range from 0° to 360°/0 to 6400 mils

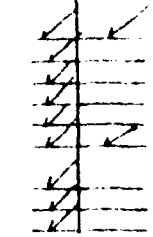
4 TIME TELLING MEASURES



a. Use a 24 hour or digital clock to tell time
b. Name intervals and tell time in hours, minutes, and seconds
c. Estimate time in seconds, minutes, and parts of an hour
d. Identify calendar units and arrange them in Julian style
e. Convert time into hours and tenths of hours
f. Compute time using Greenwich Mean Time (GMT) as a basis for establishing zones and distances

NT

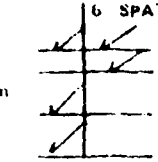
5 GAUGE MEASURES



a. Identify the unit of measurement found on an instrument
b. Interpret the number, word, symbol from a display read out
c. Recognize a "reading" from a gauge with color divisions
d. Recognize positive (+) and negative (-) demarcation on a scale
e. Select band(s) from a multi scale gauge
f. Match a gauge reading to a specification using numbered or labeled intervals
g. Interpret gauge readings from an unnumbered/unmarked interval
h. Interpret a gauge reading which is fluctuating or momentarily sustained
i. Match specifications of required measures by manipulation, alignment or maintenance

VISUAL/SPATIAL RELATIONSHIPS

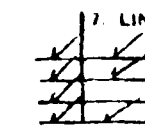
6 SPATIAL



a. Identify directions that tools, hardware, or components may be moved
b. Manipulate objects to align, match, mate, make parallel, be perpendicular or be at an angle
c. Interpret spatial relationships of figures and objects from 2 dimensional drawings, pictures, or photographs
d. Relate geometric symbols and graphic representations to actual systems, subsystems and components

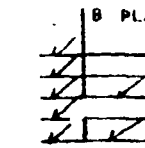
GEOMETRY

7. LINES



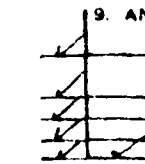
a. Identify and name points, lines, rays, and segments
b. Identify intersecting lines, parallel lines, and line segments
c. Define and identify perpendicular lines
d. Identify congruent segments

8 PLANES



a. Identify and name plane geometric figures
b. List the characteristics of geometric figures
c. Classify figures according to the number or measure of its sides or angles
d. Identify figures which possess similarities
e. Identify figures which may be parallel, perpendicular or congruent

9. ANGLES AND TRIANGLES



a. Identify and name the different kinds of angles and triangles, with their corresponding figures
b. Identify vertical, adjacent, complementary or supplementary angles
c. Classify triangles according to their sides or angle size
d. Identify altitudes and medians of triangles or the bisector of an angle
e. Name an angle by using letters, a number, or a single letter

NT

10 SOLIDS

- a. Recognize and match the names of solids with their corresponding figures

11. TERMINOLOGY

- a. Identify technical words associated with geometric figures
- b. Interpret meaning of terms derived from spatial orientation

COMPUTE OR PERFORM

12. ADDITION AND SUBTRACTION

- a. Add or subtract whole numbers, without carrying or borrowing
- b. Add or subtract whole numbers, carrying and borrowing
- c. Add and subtract, borrowing and carrying with mixed numbers (whole and decimals)
- d. Add or subtract positive (+) and negative (-) numbers, using a number line to arrive at a solution
- e. Add or subtract to find correct time (24 hr. clock) using hours or minutes
- f. Add or subtract various increments on gauges, dials, or any other measuring instrument
- g. Add or subtract time, linear, dry, liquid or degree measures requiring regrouping
- h. Estimate a sum or difference

13. MULTIPLICATION AND DIVISION

- a. Multiply and divide whole numbers
- b. Multiply and divide mixed numbers (whole and decimals)
- c. Divide a number with decimals in both divisor and dividend
- d. Multiply and divide integers, both positive (+) and negative (-), and assign proper sign to product or quotient
- e. Estimate a product or quotient

14. FRACTIONS/DECIMALS

- a. Subdivide whole objects or a set of objects into halves (1/2), thirds (1/3), fourths (1/4), eighths (1/8)
- b. Reduce fractions to lowest terms
- c. Convert fractions (proper and improper) to decimal equivalents, and vice versa, using a tab e, chart or gauge
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- g. Estimate a fractional sum, product, or quotient

NT

15 GEOMETRY

- a. Draw geometric figures, plane and solid
- b. Match geometric figures with word names, equivalent measures
- c. Label all parts of geometric figures using mathematical and characteristic designators
- d. Use a protractor to measure angles, make geometrical constructions
- e. Construct perpendicular on a line segment, bisector of an angle
- f. Compute the perimeter and area of any figure
- g. Compute the circumference and area of a circle
- h. Compute the area and volume of any solid figure
- i. Use formulas in solving problems involving geometric figures
- j. Solve problems and interpret spatial relationships of figures, symbols, and objects from 2-dimensional displays

16. COMBINATION OF PROCESSES

- a. Identify median and mode
- b. Compute averages
- c. Solve problems combining all processes using whole, mixed numbers and fractions
- d. Solve problems, combining all processes, involving units of measurement
- e. Interpret information from charts, number lines, scales and graphs to solve arithmetic problems
- f. Solve conversion problems of linear (metric and English) liquid, weight, and temperature (F^{o} or C^{o}) measures
- g. Solve problems involving ratio and proportion
- h. Solve word problems where any mathematical process may occur

17. GRAPHING IN THE COORDINATE PLANE

- a. Identify coordinates of a point in any grid system
- b. Identify points on a line graph
- c. Match a graph with its equation

18. ALGEBRA

- a. Solve simple algebraic equations with one unknown
- b. Recognize and derive equivalent algebraic expressions
- c. Evaluate powers and estimate roots

19 TRIGONOMETRY

- a. Use tables of trigonometric functions
- b. Use tables of logarithms to solve problems
- c. Solve geometric problems using trigonometric functions
- d. Use trigonometric ratios to solve problems

CONTENT READING

NT

25. PROCEDURAL DIRECTIONS

- a. Identify factual details or specifications that are found within a statement or written selection
- b. Select parts of text and visual materials to complete a task activity
- c. Follow highly detailed, step by step directions in order to accomplish a sequence of task activities
- d. Determine the essential message of a paragraph or section of written material
- e. Infer from a written source, which does not explicitly provide required information, in order to make a decision
- f. Synthesize information from written sources which contributes to the completion of a task activity

26. VOCABULARY

- a. Recognize common words and their meanings
- b. Recognize task related words with technical meanings
- c. Identify the correct meaning of a word from the context of a sentence
- d. Recognize the meaning of common contractions, abbreviations and acronyms
- e. Determine the meaning of figurative, idiomatic, and technical terms by using context clues or by using a reference source(s)

INFORMATION ACCESS

27. REFERENCE SKILLS

- a. Locate a Technical Manual, Field Manual or any related source document by code number and title
- b. Alphabetize words or topics to locate information
- c. Use the table of contents, index, system or sub-system heading, appendix and glossary to locate information
- d. Locate the page, title, paragraph, figure, or chart needed to answer a question or to solve a problem
- e. Determine, after scanning or skim reading, whether the information is relevent
- f. Cross reference within and across source documents to select information needed to perform a routine
- g. Organize information from multiple sources into a sequenced series of events

28. TABLES/CHARTS

- a. Obtain a fact or specification from a two-column table or chart to find information
- b. Obtain a fact or specification from an intersection of a row by column table or chart
- c. Use a complex table or chart requiring cross referencing within or in combination with text material outside the chart
- d. Apply information from tables and charts for locating malfunctions, or for selecting a course of action

VISUAL AIDS

NT

29. ILLUSTRATIONS

- a. Identify details, labels, numbers, and parts from an illustration or picture
- b. Identify parts or details according to a key or legend
- c. Interpret a drawing which shows a cross sectional view of an object for assembly, disassembly
- d. Interpret a three dimensional projection or exploded view of object(s) for assembly, disassembly, or position in system or sub system
- e. Follow illustrations, or photographs, arranged in a sequential order, as a guide
- f. Integrate information from various sources to select a course of action

30. FLOW CHARTS

- a. Use a simple linear path of an organizational chart to list events in sequential order
- b. Use a linear path of a flow chart to provide visual and textual direction to a procedure, to arrive at decision points, and to provide alternate paths in problem solving
- c. Translate the significance of the symbols into physical activities

31. SCHEMATICS

- a. Isolate each major section or entity presented in a schematic diagram
- b. Identify the components within each entity
- c. Trace connections in an integrated circuit from their origin to another point within or from one entity to another
- d. Isolate a problem component in a schematic and trace it to components believed to cause the problem
- e. Interpret symbols to indicate direction of flow, test points, components and diagrammatic decision points

WRITTEN COMMUNICATION

32. FORMS

- a. Locate the block on a form to enter the appropriate information
- b. Transfer a number, code, date, figure or related data from equipment or written sources onto an appropriate section of the form
- c. Write the name of the organization, responsible personnel, disposition of the part or equipment, and nomenclature, in appropriate sections of the form
- d. Write a descriptive account of an activity or transaction performed
- e. Use a completed form to locate or compare information

33. NOTE-TAKING

- a. Distinguish between essential and non-essential details during the note taking process
- b. Record details without misinterpreting the intent of either written material or an interview
- c. Rewrite all recorded details in sentence form
- d. Organize all sentences into paragraphs

NT

34 OUTLINING (topic or sentence)

- a. Distinguish between major and subordinate topics
- b. Generate rules for each major topic selected
- c. Use phrases or sentences to provide subordinate details under each major topic
- d. Alternate, indent numbers and letters to establish a hierarchy

35 REPORT WRITING

- a. State the intent or objective(s) of the report
- b. Describe the parameters of the event or situation
- c. Distinguish between relevant and irrelevant details
- d. Sequence events in the order they have occurred
- e. State general impressions of events described
- f. Select examples that will clarify major issues presented in the report
- g. Examine opposing points of view in the report
- h. Summarize the major points developed in the report
- i. Justify an action taken and give reasons for rejecting alternatives

36 EDITING

- a. Spell frequently used words correctly
- b. Spell task related words correctly
- c. Identify words that need to be capitalized
- d. Correct all misspelled words with or without the use of a reference source
- e. Apply all rules for end marks, commas, and apostrophes
- f. Apply common rules of grammar
- g. Rewrite the paragraph by stating the main idea in the first sentence, and restructuring the sentences for coherence
- h. Appraise an entire written communication and make adjustments to improve clarity

VERBAL COMMUNICATION

37 TYPE

- a. Individual — a person working on a task and communicating with another when assistance is needed or when a supervisory decision is needed
- b. Instruction — a task activity requiring communication between an instructor, an individual or small group where the purpose is to give facts or rules to inform or guide
- c. Tutor — interaction takes place between two persons where one is instructing and the other is doing the task
- d. Peer Group (less than 10) — all members engage in an activity where one person assumes a leadership role and communicates to others what is to be done
- e. Interview — a person communicating with another about his activities, opinions, or subject expertise for the purpose of using the information in a task
- f. Briefing — communicating final instructions to others or giving an account or summary
- g. Counsel — communicating together to exchange ideas or opinions to recommend, give or take advice, or to arrive at an acceptance of a plan or decision
- h. Command — communicate to others an order or action to be taken where a person has a position of authority

NT

38. CHARACTERISTICS

- a. Enunciate clearly, using the proper rate of speech
- b. Use technical vocabulary suitable to the task and level of the person
- c. Determine the appropriate amount of information to communicate
- d. Interpret figurative or idiomatic language by reference to its use in context
- e. Follow highly detailed, step-by-step directions
- f. Solicit feedback to confirm the accurate reception of the communication
- g. Recognize when a low-key, informal dialogue is suitable
- h. Recognize when direct verbal commands are necessary
- i. Recognize when a prescribed series of verbal interactions is required to coordinate a group effort
- j. Recognize when the situation will require a structured, preplanned method of presentation

39 BARRIERS

- a. Recognize the need for clear, concise directions in order to avoid language or word meaning differences
- b. Recognize personality factors and interpersonal relationships that may exist
- c. Recognize feedback as a means of communicating more effectively and increasing task competence

SAFETY/SECURITY

40 PRECAUTIONS

- a. Use common knowledge to avoid hazards in order to prevent injury to self or equipment
- b. Apply preventive measures prior to task performance to minimize any potential safety or security problem
- c. Select an appropriate course of action in the event of an emergency

PERCEPTUAL

41 RECOGNITION

- a. Identify similarities and differences between and among objects
- b. Use body language (motions, gestures, postures) to communicate or signal
- c. Determine the presence of a defect or extent of damage
- d. Match objects by size, shape, color and significant markings
- e. Classify objects by size, shape, color and significant markings
- f. Determine direction, duration, and intensity of sounds, sightings and smells
- g. Infer from sights, sounds, touch, smells, or tastes to determine a course of action
- h. Interpret codes or symbols

NUMERATION/PLACE VALUE

NT

1 NUMBERING AND COUNTING

- a Match numerals with word names and models
- b Write numerals one through N in sequential order from any starting point
- c State what numeral comes after, before, or between any two given numerals
- d Select the numeral which is greater/lesser from a set of numerals
- e Identify an object with a specified ordinal position
- f Write or state the place value of a particular digit whole or decimal number
- g Round off a number to a specified place, whole or decimal
- h Count by ones, twos, fives, tens, etc. backward or forward (skip counting)
- i Match numbers with points or intervals on a number line (positive (+) or negative (-) values)

UNITS OF MEASUREMENT

2 LINEAR, WEIGHT, AND VOLUME MEASURES

- a Name the markings on a linear scale
- b Differentiate units of measure and equivalents in the English and metric system
- c Use a ruler, yardstick, meter stick or scale to measure lengths of objects or distances
- d Identify measures of ounce, pound, gram
- e Identify measures of pints, quarts, gallons, liters
- f Use a scale which is not numerically calibrated
- g Estimate measures of varying lengths, dimensions or weights

3 DEGREE MEASURES

- a Identify degree or mil as a unit in determining direction, distance or temperature
- b Estimate the measure of a given angle not greater than 180°
- c Interpret bearings, azimuth and other contexts in which the measure of an angle may range from 0° to 360°/0 to 6400 mils

4 TIME TELLING MEASURES

- a Use a 24 hour or digital clock to tell time
- b Name intervals and tell time in hours, minutes, and seconds
- c Estimate time in seconds, minutes, and parts of an hour
- d Identify calendar units and arrange them in Julian style
- e Convert time into hours and tenths of hours
- f Relate time using Greenwich Mean Time (GMT) as a basis for establishing [illegible] and distances

NT

5 GAUGE MEASURES

- a Identify the unit of measurement found on an instrument
- b Interpret the number, word, symbol from a display read out
- c Recognize a "reading" from a gauge with color divisions
- d Recognize positive (+) and negative (-) demarcation on a scale
- e Select band(s) from a multi-scale gauge
- f Match a gauge reading to a specification using numbered or labeled intervals
- g Interpret gauge readings from an unnumbered/unmarked interval
- h Interpret a gauge reading which is fluctuating or momentarily sustained
- i Match specific types of required measures by manipulation, alignment or maintenance

VISUAL/SPATIAL RELATIONSHIPS

6 SPATIAL

- a Identify directions that tools, hardware, or components may be moved
- b Manipulate objects to align, match, mate, make parallel, be perpendicular or be at an angle
- c Interpret spatial relationships of figures and objects from 2 dimensional drawings, pictures, or photographs
- d Relate geometric symbols and graphic representations to actual systems subsystems and components

GEOMETRY

7 LINES

- a Identify and name points, lines, rays, and segments
- b Identify intersecting lines, parallel lines, and line segments
- c Define and identify perpendicular lines
- d. Identify congruent segments

8 PLANES

- a Identify and name basic geometric figures
- b. List the characteristics of geometric figures
- c. Classify figures according to the number or measure of its sides or angles
- d. Identify figures which possess similarities
- e. Identify figures which may be parallel, perpendicular or congruent

9 ANGLES AND TRIANGLES

- a Identify and name the different kinds of angles and triangles, with their corresponding figures
- b Identify vertical, adjacent, complementary or supplementary angles
- c Classify triangles according to their sides or angle size
- d Identify altitudes and medians of triangles or the bisector of an angle
- e Name an angle by using letters, a number, or a single letter

NT

10 SOLIDS

- a Recognize and match the names of solids with their corresponding figures

11. TERMINOLOGY

- a Identify technical words associated with geometric figures
- b Interpret meaning of terms derived from spatial orientation

COMPUTE OR PERFORM

12 ADDITION AND SUBTRACTION

- a. Add or subtract whole numbers, without carrying or borrowing
- b Add or subtract whole numbers, carrying and borrowing
- c Add and subtract, borrowing and carrying with mixed numbers (whole and decimals)
- d Add or subtract positive (+) and negative (-) numbers, using a number line to arrive at a solution
- e Add or subtract to find correct time (24 hr. clock) using hours or minutes
- f Add or subtract various increments on gauges, dials, or any other measuring instrument
- g Add or subtract time, linear, dry, liquid or degree measures requiring regrouping
- h Estimate a sum or difference

13 MULTIPLICATION AND DIVISION

- a. Multiply and divide whole numbers
- b Multiply and divide mixed numbers (whole and decimals)
- c Divide a number with decimals in both divisor and dividend
- d Multiply and divide integers, both positive (+) and negative (-), and assign proper sign to product or quotient
- e Estimate a product or quotient

14 FRACTIONS/DECIMALS

- a. Subdivide whole objects or a set of objects into halves (1/2), thirds (1/3), fourths (1/4), eighths (1/8)
- b Reduce fractions to lowest terms
- c Convert fractions (proper and improper) to decimal equivalents, and vice versa, using a tally, chart or gauge
- d Compute equivalent value of fractions, decimals, percents, and mixed numbers to lowest terms
- e Add and subtract fractions, with same or different denominators
- f Multiply and divide fractions with and without whole numbers
- g Estimate a fractional sum, product, or quotient

NT

15 GEOMETRY

- a Draw geometric figures, plane and solid
- b Match geometric figures with word names, equivalent measures
- c Label all parts of geometric figures using mathematical and characteristic designators
- d Use a protractor to measure angles, make geometrical constructions
- e. Construct perpendicular on a line segment, bisector of an angle
- f Compute the perimeter and area of any figure
- g Compute the circumference and area of a circle
- h. Compute the area and volume of any solid figure
- i Use formulas in solving problems involving geometric figures
- j Solve problems and interpret spatial relationships of figures, symbols, and objects from 2-dimensional displays

16. COMBINATION OF PROCESSES

- a. Identify median and mode
- b Compute averages
- c Solve problems combining all processes using whole, mixed numbers and fractions
- d Solve problems, combining all processes, involving units of measurement
- e Interpret information from charts, number lines, scales and graphs to solve arithmetic problems
- f Solve conversion problems of linear (metric and English) liquid, weight, and temperature (F^{o} or C^{o}) measures
- g. Solve problems involving ratio and proportion
- h. Solve word problems where any mathematical process may occur

17. GRAPHING IN THE COORDINATE PLANE

- a Identify coordinates of a point in any grid system
- b Identify points on a line graph
- c. Match a graph with its equation

18. ALGEBRA

- a Solve simple algebraic equations with one unknown
- b Recognize and derive equivalent algebraic expressions
- c Evaluate powers and estimate roots

19 TRIGONOMETRY

- a Use tables of trigonometric functions
- b Use tables of logarithms to solve problems
- c. Solve geometric problems using trigonometric functions
- d Use trigonometric ratios to solve problems

N1

[illegible]

- [illegible] a. Distinguish between major and subordinate topics
- [illegible] b. Generate titles for each major topic selected
- [illegible] c. Use phrases or sentences to provide subordinate details under each major topic
- [illegible] d. Arrange ordered numbers and letters to establish a hierarchy

35 REPORT WRITING

- a. State the intent or objective(s) of the report
- b. Describe the parameters of the event or situation
- c. Distinguish between relevant and irrelevant details
- d. Sequence events in the order they have occurred
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- f. Select examples that will clarify major issues presented in the report
- g. Examine opposing points of view in the report
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- i. Justify an action taken and give reasons for rejecting alternatives

36 EDITING

- a. Spell frequently used words correctly
- b. Spell task related words correctly
- c. Identify words that need to be capitalized
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- f. Apply common rules of grammar
- g. Rewrite the paragraph by stating the main idea in the first sentence, and restructuring the sentences for coherence
- h. Appraise an entire written communication and make adjustments to improve clarity

VERBAL COMMUNICATION

37 TYPE

- a. Individual – a person working on a task and communicating with another when assistance is needed or when a supervisory decision is needed
- b. Instruction – a task activity requiring communication between an instructor, an individual or small group where the purpose is to give facts or rules to inform or guide
- c. Tutor – interaction takes place between two persons where one is instructing and the other is doing the task
- d. Peer Group (less than 10) – all members engage in an activity where one person assumes a leadership role and communicates to others what is to be done
- e. Interview – a person communicating with another about his activities, opinions or subject expertise for the purpose of using the information in a task
- f. Briefing – communicating final instructions to others or giving an account of [illegible]
- g. Conference – communicating together to exchange ideas or opinions to [illegible] give or take advice, or to arrive at or acceptance of a plan or decision
- h. Command – communicate to others an order or action to be taken where [illegible] exercise of authority

4/23/87

N1

38 CHARACTERISTICS

- a. Enunciate clearly, using the proper rate of speech
- b. Use technical vocabulary suitable to the task and level of the person
- c. Determine the appropriate amount of information to communicate
- d. Interpret figurative or idiomatic language by reference to its use in context
- e. Follow highly detailed, step by step directions
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SAFETY/SECURITY

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PERCEPTUAL

41. RECOGNITION

- a. Identify similarities and differences between and among objects
- b. Use body language (motions, gestures, postures) to communicate or signal
- c. Determine the presence of a defect or extent of damage
- d. Match objects by size, shape, color and significant markings
- e. Classify objects by size, shape, color and significant markings
- f. Determine direction, duration, and intensity of sounds, sightings and smells
- g. Infer from sights, sounds, touch, smells, or tastes to determine a course of action
- h. Interpret codes & symbols

CONTENT READING

NT

25 PROCEDURAL DIRECTIONS

- a Identify factual details or specifications that are found within a statement or written selection
- b Select parts of text and visual materials to complete a task activity
- c Follow highly detailed, step-by step directions in order to accomplish a sequence of task activities
- d Determine the essential message of a paragraph or section of written material
- e Infer from a written source, which does not explicitly provide required information, in order to make a decision
- f Synthesize information from written sources which contributes to the completion of a task activity

26 VOCABULARY

- a Recognize common words and their meanings
- b Recognize task related words with technical meanings
- c Identify the correct meaning of a word from the context of a sentence
- d Recognize the meaning of common contractions, abbreviations and acronyms
- e Determine the meaning of figurative, idiomatic and technical terms by using context clues or by using a reference source(s)

INFORMATION ACCESS

27 REFERENCE SKILLS

- a Locate a Technical Manual, Field Manual or any related source document by code number and title
- b Alphabetize words or topics to locate information
- c Use the table of contents, index, system or sub system heading, appendix and glossary to locate information
- d Locate the page, title, paragraph, figure, or chart needed to answer a question or to solve a problem
- e Determine, after scanning or skim reading, whether the information is relevant
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- g Organize information from multiple sources into a sequenced series of events

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- a Obtain a fact or specification from a two column table or chart to find information
- b Obtain a fact or specification from an intersection of a row by column table or chart
- c Use a complex table or chart requiring cross referencing within or in combination with text material outside the chart
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VISUAL AIDS

NT

29 ILLUSTRATIONS

- a Identify details, labels, numbers, and parts from an illustration or picture
- b Identify parts or details according to a key or legend
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- f Integrate information from various sources to select a course of action

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- a Use a simple linear path of an organizational chart to list events in sequential order
- b Use a linear path of a flow chart to provide visual and textual directions to a procedure, to arrive at decision points, and to provide alternate paths in problem-solving
- c Translate the significance of the symbols into physical activities

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- a Isolate each major section or entity presented in a schematic diagram
- b Identify the components within each entity
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- d Isolate a problem component in a schematic and trace it to components believed to cause the problem
- e Interpret symbols to indicate direction of flow, test points, components and diagrammatic decision points

WRITTEN COMMUNICATION

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- a Locate the block on a form to enter the appropriate information
- b Transfer a number, code, date, figure or related data from equipment or written sources onto an appropriate section of the form
- c Write the name of the organization responsible personnel, disposition of the part or equipment, and nomenclature, in appropriate sections of the form
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- e Use a completed form to locate or compare information

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- a Distinguish between essential and non essential details during the note taking process
- b Record details without misinterpreting the intent of either written material or an interview
- c Rewrite all recorded details or sentence form
- d Organize all sentences into paragraphs

AIT Administrative Specialist

BSEP 4

NUMERATION/PLACE VALUE

NT

1 NUMBERING AND COUNTING

- a Match numerals with word names and models
- b Write numerals one through N in sequential order from any starting point
- c State what numeral comes after, before, or between any two given numerals
- d Select the numeral which is greater/lesser from a set of numerals
- e Identify an object with a specified ordinal position
- f Write or state the place value of a particular digit, whole or decimal number
- g *Round off a number to a specified place, whole or decimal*
- h Count by ones, twos, fives, tens, etc., backward or forward (skip counting)
- i Match numbers with points or intervals on a number line (positive (+) or negative (-) values)

UNITS OF MEASUREMENT

2 LINEAR, WEIGHT, AND VOLUME MEASURES

- a Name the markings on a linear scale
- b Differentiate units of measure and equivalents in the English and metric systems
- c Use a ruler, yardstick, meter stick or scale to measure lengths of objects or distances
- d Identify measures of ounce, pound, gram
- e Identify measures of pints, quarts, gallons, liters
- f Use a scale which is not numerically calibrated
- g *Estimate measures of varying lengths, dimensions or weights*

3 DEGREE MEASURES

- a Identify *degree or mil* as a unit in determining direction, distance or temperature
- b Estimate the measure of a given angle not greater than 180°
- c Interpret bearings, azimuth and other contexts in which the measure of an angle may range from 0° to 360°/0 to 6400 mils

4 TIME TELLING MEASURES

- a *Use a 24 hour or digital clock to tell time*
- b Name intervals and tell time in hours, minutes, and seconds
- c Estimate time in seconds, minutes, and parts of an hour
- d Identify calendar units and arrange them in Julian style
- e Convert time into hours and tenths of hours
- f Convert time using Greenwich Mean Time (GMT) as a basis for establishing [illegible] distance

5 GAUGE MEASURES

- a Identify the unit of measurement found on an instrument
- b Interpret the number, word symbol from a display readout
- c *Recognize a "reading" from a gauge with color divisions*
- d Recognize positive (+) and negative (-) deflections on a scale
- e Select band(s) from a multi-scale gauge
- f Match a gauge reading to a specific value using numbered or labeled intervals
- g Interpret gauge readings to nearest numbered/or marked interval
- h Interpret a gauge reading which is fluctuating or momentarily sustained
- i Match specifications of equipment measured by manipulation, alignment or maintenance

VISUAL/SPATIAL RELATIONSHIPS

6 SPATIAL

- a Identify direction that tools, hardware, or components may be moved
- b Manipulate objects to align, match, mate, make parallel, be perpendicular or be at an angle
- c Interpret spatial relationships of figures and objects from 2 dimensional drawings, pictures, or photographs
- d Relate geometric symbols and graphic representations to actual systems, subsystems and components

GEOMETRY

7 LINES

- a. Identify and name points, lines, rays, and segments
- b Identify intersecting lines, parallel lines, and line segments
- c. *Define and identify perpendicular lines*
- d Identify congruent segments

8 PLANES

- a. Identify and name plane geometric figures
- b Use the characteristics of geometric figures
- c. Classify figures according to the number or measure of its sides or angles
- d. Identify figures which possess similarities
- e Identify figures which may be parallel, perpendicular or congruent

9 ANGLES AND TRIANGLES

- a Identify and name the different kinds of angles and triangles, with their corresponding figures
- b Identify vertical, adjacent, complementary or supplementary Angles
- c Classify triangles according to their sides or angle size
- d Identify altitudes and medians of triangles or the bisector of an angle
- e Name an angle by using letters, a number, or a single letter

4/22/82

NT

10 SOLIDS

- a. Recognize and match the names of solids with their corresponding figures

11 TERMINOLOGY

- a. Identify technical words associated with geometric figures
- b. Interpret meaning of terms derived from spatial orientation

COMPUTE OR PERFORM

12 ADDITION AND SUBTRACTION

- a. Add or subtract whole numbers, without carrying or borrowing
- b. Add or subtract whole numbers, carrying and borrowing
- c. Add and subtract, borrowing and carrying with mixed numbers (whole and decimals)
- d. Add or subtract positive (+) and negative (-) numbers, using a number line to arrive at a solution
- e. Add or subtract to find correct time (24 hr. clock) using hours or minutes
- f. Add or subtract various increments on gauges, dials, or any other measuring instrument
- g. Add or subtract time, linear, dry, liquid or degree measures requiring regrouping
- h. Estimate a sum or difference

13 MULTIPLICATION AND DIVISION

- a. Multiply and divide whole numbers
- b. Multiply and divide mixed numbers (whole and decimals)
- c. Divide a number with decimals in both divisor and dividend
- d. Multiply and divide integers, both positive (+) and negative (-), and assign proper sign to product or quotient
- e. Estimate a product or quotient

14 FRACTIONS/DECIMALS

- a. Subdivide whole objects or a set of objects into halves (1/2), thirds (1/3), fourths (1/4), eighths (1/8)
- b. Reduce fractions to lowest terms
- c. Convert fractions (proper and improper) to decimal equivalents, and vice versa, using a table, chart or gauge
- d. Compute equivalent value of fractions, decimals, percents, and mixed numbers to lowest terms
- e. Add and subtract fractions with same or different denominators
- f. Multiply and divide fractions with and without whole numbers
- g. Estimate a fractional sum, product, or quotient

NT

15 GEOMETRY

- a. Draw geometric figures, plane and solid
- b. Match geometric figures with word names, equivalent measures
- c. Label all parts of geometric figures using mathematical and characteristic designators
- d. Use a protractor to measure angles, make geometrical constructions
- e. Construct perpendicular on a line segment, bisector of an angle
- f. Compute the perimeter and area of any figure
- g. Compute the circumference and area of a circle
- h. Compute the area and volume of any solid figure
- i. Use formulas in solving problems involving geometric figures
- j. Solve problems and interpret spatial relationships of figures, symbols, and objects from 2 dimensional displays

16. COMBINATION OF PROCESSES

- a. Identify median and mode
- b. Compute averages
- c. Solve problems combining all processes using whole, mixed numbers and fractions
- d. Solve problems, combining all processes, involving units of measurement
- e. Interpret information from charts, number lines, scales and graphs to solve arithmetic problems
- f. Solve conversion problems of linear (metric and English) liquid, weight, and temperature (F^{O} or C^{O}) measures
- g. Solve problems involving ratio and proportion
- h. Solve word problems where any mathematical process may occur

17. GRAPHING IN THE COORDINATE PLANE

- a. Identify coordinates of a point in any grid system
- b. Identify points on a line graph
- c. Match a graph with its equation

18. ALGEBRA

- a. Solve simple algebraic equations with one unknown
- b. Recognize and derive equivalent algebraic expressions
- c. Evaluate powers and estimate roots

19 TRIGONOMETRY

- a. Use tables of trigonometric functions
- b. Use tables of logarithms to solve problems
- c. Solve geometric problems using trigonometric functions
- d. Use trigonometric ratios to solve problems

CONTENT READING

NI

25 PROCEDURAL DIRECTIONS

- a. Identify factual data or specifications that are found within a statement or written selection
- b. Select parts of text and visual materials to complete a task activity
- c. Follow highly detailed, step by step directions in order to accomplish a sequence of task activities
- d. Determine the essential message of a paragraph or section of written material
- e. Infer from a written source, which does not explicitly provide required information, in order to make a decision
- f. Synthesize information from written sources which contributes to the completion of a task activity

26 VOCABULARY

- a. Recognize common words and their meanings
- b. Recognize task related words with technical meaning
- c. Identify the correct meaning of a word from the context of a sentence
- d. Recognize the meaning of common contractions, abbreviations and acronyms
- e. Determine the meaning of figurative, idiomatic, and technical terms by using context clues or by using a reference source(s)

INFORMATION ACCESS

27 REFERENCE SKILLS

- a. Locate a Technical Manual, Field Manual or any related source document by code number and title
- b. Alphabetize words or topics to locate information
- c. Use the table of contents, index, system or sub-system heading, appendix and glossary to locate information
- d. Locate the page, title, paragraph, figure, or chart needed to answer a question or to solve a problem
- e. Determine, after scanning or skim-reading, whether the information is relevant
- f. Cross reference within and across source documents to select information needed to perform a routine
- g. Organize information from multiple sources into a sequenced series of events

28 TABLES/CHARTS

- a. Obtain a fact or specification from a two column table or chart to find information
- b. Obtain a fact or specification from an intersection of a row by column table or chart
- c. Use a complex table or chart requiring cross referencing within or in combination with text material outside the chart
- d. Apply information from tables or charts for locating malfunctions, or for [illegible] of action

VISUAL AIDS

NI

29 ILLUSTRATIONS

- a. Identify details, labels, numbers, and parts from an illustration or picture
- b. Identify parts or details according to a key or legend
- c. Interpret a drawing which shows a cross sectional view of an object for assembly, disassembly
- d. Interpret a three dimensional projection or exploded view of object(s) for assembly, disassembly, or position in system or sub-system
- e. Follow illustrations, or photographs, arranged in a sequential order, as a guide
- f. Integrate information from various sources to select a course of action

30 FLOW CHARTS

- a. Use a simple linear path of an organizational chart to list events in a [illegible] order
- b. Use a linear path of a flow chart to provide visual and textual directions to a procedure, to arrive at decision points, and to provide alternate paths in problem solving
- c. Translate the significance of the symbols into physical activities

31 SCHEMATICS

- a. Isolate each major section or entity presented in a schematic diagram
- b. Identify the components within each entity
- c. Trace connections in an integrated circuit from their origin to another point within or from one entity to another
- d. Isolate a problem component in a schematic and trace it to components believed to cause the problem
- e. Interpret symbols to indicate direction of flow, test points, components and diagrammatic decision points

WRITTEN COMMUNICATION

32 FORMS

- a. Locate the block on a form to enter the appropriate information
- b. Transfer a number, code, date, figure or related data from equipment or written sources onto an appropriate section of the form
- c. Write the name of the organization, responsible personnel, disposition of the part or equipment, and nomenclature, in appropriate sections of the form
- d. Write a descriptive account of an activity or transaction performed
- e. Use a completed form to locate or compare information

33 NOTE TAKING

- a. Distinguish between essential and non essential details during the [illegible] process
- b. Record details without misinterpreting the intent of audio, written, [illegible] an interview
- c. Rewrite all recorded details in sentence form
- d. Organize all sentences into paragraphs

NT

34 OUTLINING (topic or sentence)

- a Distinguish between major and subordinate topics
- b Generate titles for each major topic selected
- c Use phrases or sentences to provide subordinate details under each major topic
- d Alternate, indent numbers and letters to establish a hierarchy

35 REPORT WRITING

- a State the intent or objective(s) of the report
- b Describe the parameters of the event or situation
- c Distinguish between relevant and irrelevant details
- d Sequence events in the order they have occurred
- e State general impressions of events described
- f Select examples that will clarify major issues presented in the report
- g Examine opposing points of view in the report
- h Summarize the major points developed in the report
- i Justify an action taken and give reasons for rejecting alternatives

36 EDITING

- a Spell frequently used words correctly
- b Spell task related words correctly
- c Identify words that need to be capitalized
- d Correct all misspelled words with or without the use of a reference source
- e Apply all rules for end marks, commas, and apostrophes
- f Apply common rules of grammar
- g Rewrite the paragraph by stating the main idea in the first sentence, and restructuring the sentences for coherence
- h Appraise an entire written communication and make adjustments to improve clarity

VERBAL COMMUNICATION

37 TYPE

- a Individual - a person working on a task and communicating with another when assistance is needed or when a supervisory decision is needed
- b Instruction - a task activity requiring communication between an instructor, an individual or small group where the purpose is to give facts or rules to inform or guide
- c Tutor - interaction takes place between two persons where one is instructing and the other is doing the task
- d Peer Group (less than 10) - all members engage in an activity where one person assumes a leadership role and communicates to others what is to be done
- e Interview - a person communicating with another about his activities, opinions or subject expertise for the purpose of using the information in a task
- f Briefing - communicating final instructions to others or giving an account in summary
- g Counsel - communicating together to exchange ideas or opinions to recommend, give or take advice, or to arrive at an acceptance of a plan or decision
- h Command - communicate to others an order or action to be taken where a person has a position of authority

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NT

38 CHARACTERISTICS

- a Enunciate clearly, using the proper rate of speech
- b Use technical vocabulary suitable to the task and level of the person
- c Determine the appropriate amount of information to communicate
- d Interpret figurative or idiomatic language by reference to its use in context
- e Follow highly detailed, step-by-step directions
- f Solicit feedback to confirm the accurate reception of the communication
- g Recognize when a low-key, informal dialogue is suitable
- h Recognize when direct verbal commands are necessary
- i Recognize when a prescribed series of verbal interactions is required to coordinate a group effort
- j Recognize when the situation will require a structured, preplanned method of presentation

39 BARRIERS

- a Recognize the need for clear, concise directions in order to avoid language or word-meaning differences
- b Recognize personality factors and inter personal relationships that may exist
- c Recognize feedback as a means of communicating more effectively and increasing task competence

SAFETY/SECURITY

40 PRECAUTIONS

- a Use common knowledge to avoid hazards in order to prevent injury to self or equipment
- b Apply preventive measures prior to task performance to minimize any potential safety or security problem
- c Select an appropriate course of action in the event of an emergency

PERCEPTUAL

41 RECOGNITION

- a Identify similarities and differences between and among objects
- b Use body language (motions, gestures, postures) to communicate or signal
- c Determine the presence of a defect or extent of damage
- d Match objects by size, shape, color and significant markings
- e Classify objects by size, shape, color and significant markings
- f Determine direction, duration, and intensity of sounds, sightings and smells
- g Infer from sights, sounds, touch, smells, or tastes to determine a course of action
- h. Interpret codes and symbols

NUMERATION/PLACE VALUE

NT

1. NUMBERING AND COUNTING

- a. Match numerals with word names and models
- b. Write numerals one through N in sequential order from any starting point
- c. State what numeral comes after, before, or between any two given numerals
- d. Select the numeral which is greater/lesser from a set of numerals
- e. Identify an object with a specified ordinal position
- f. Write or state the place value of a particular digit, whole or decimal number
- g. Round off a number to a specified place, whole or decimal
- h. Count by ones, twos, fives, tens, etc. backward or forward (skip counting)
- i. Match numbers with points or intervals on a number line (positive (+) or negative (-) values)

UNITS OF MEASUREMENT

2. LINEAR, WEIGHT, AND VOLUME MEASURES

- a. Name the markings on a linear scale
- b. Differentiate units of measure and equivalents in the English and metric system
- c. Use a ruler, yardstick, meter stick or scale to measure lengths of objects or distances
- d. Identify measures of ounce, pound, gram
- e. Identify measures of pints, quarts, gallons, liters
- f. Use a scale which is not numerically calibrated
- g. Estimate measures of varying lengths, dimensions or weights

3. DEGREE MEASURES

- a. Identify degree or mil as a unit in determining direction, distance or temperature
- b. Estimate the measure of a given angle not greater than 180°
- c. Interpret bearings, azimuth and other contexts in which the measure of an angle may range from 0° to 360°/0 to 6400 mils

4. TIME TELLING MEASURES

- a. Use a 24 hour or digital clock to tell time
- b. Name intervals and tell time in hours, minutes, and seconds
- c. Estimate time in seconds, minutes, and parts of an hour
- d. Identify calendar units and arrange them in Julian style
- e. Convert time into hours and tenths of hours
- f. Compute time using Greenwich Mean Time (GMT) as a basis for establishing [illegible] distances

NT

5. GAUGE MEASURES

- a. Identify the unit of measurement found on an instrument
- b. Interpret the number, word, symbol from a display read-out
- c. Recognize a "reading" from a gauge with color divisions
- d. Recognize positive (+) and negative (-) demarcation on a scale
- e. Select band(s) from a multi-scale gauge
- f. Match a gauge reading to a specification using numbered or labeled intervals
- g. Interpret gauge readings from an unnumbered/unmarked interval
- h. Interpret a gauge reading which is fluctuating or momentarily sustained
- i. Match specifications of required measures by manipulation, alignment or maintenance

VISUAL/SPATIAL RELATIONSHIPS

6. SPATIAL

- a. Identify directions that tools, hardware, or components may be moved
- b. Manipulate objects to align, match, mate, make parallel, be perpendicular or be at an angle
- c. Interpret spatial relationships of figures and objects from 2-dimensional drawings (pictures, or photographs)
- d. Relate geometric symbols and graphic representations to actual systems subsystems and components

GEOMETRY

7. LINES

- a. Identify and name points, lines, rays, and segments
- b. Identify intersecting lines, parallel lines, and line segments
- c. Define and identify perpendicular lines
- d. Identify congruent segments

8. PLANES

- a. Identify and name plane geometric figures
- b. List the characteristics of geometric figures
- c. Classify figures according to the number or measure of its sides or angles
- d. Identify figures which possess similarities
- e. Identify figures which may be parallel, perpendicular or congruent

9. ANGLES AND TRIANGLES

- a. Identify and name the different kinds of angles and triangles, with their corresponding figures
- b. Identify vertical, adjacent, complementary, or supplementary angles
- c. Classify triangles according to their sides or angle size
- d. Identify altitudes and medians of triangles or the bisector of an angle
- e. Name an angle by using letters, a number, or a single letter

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NT

10 SOLIDS

- a. Recognize and match the names of solids with their corresponding figures

11 TERMINOLOGY

- a. Identify technical words associated with geometric figures
- b. Interpret meaning of terms derived from spatial orientation

COMPUTE OR PERFORM

12 ADDITION AND SUBTRACTION

- a. Add or subtract whole numbers, without carrying or borrowing
- b. Add or subtract whole numbers, carrying and borrowing
- c. Add and subtract, borrowing and carrying with mixed numbers (whole and decimals)
- d. Add or subtract positive (+) and negative (-) numbers, using a number line to arrive at a solution
- e. Add or subtract to find correct time (24 hr. clock) using hours or minutes
- f. Add or subtract various increments on gauges, dials or any other measuring instrument
- g. Add or subtract time, linear, dry, liquid or degree measures requiring regrouping
- h. Estimate a sum or difference

13 MULTIPLICATION AND DIVISION

- a. Multiply and divide whole numbers
- b. Multiply and divide mixed numbers (whole and decimals)
- c. Divide a number with decimals in both divisor and dividend
- d. Multiply and divide integers, both positive (+) and negative (-) and assign proper sign to product or quotient
- e. Estimate a product or quotient

14 FRACTIONS/DECIMALS

- a. Subdivide whole objects or a set of objects into halves (1/2), thirds (1/3), fourths (1/4), eighths (1/8)
- b. Reduce fractions to lowest terms
- c. Convert fractions (proper and improper) to decimal equivalents, and vice versa, using a table, chart or gauge
- d. Compute equivalent value of fractions, decimals, percents and mixed numbers to lowest terms
- e. Add and subtract fractions with same or different denominators
- f. Multiply and divide fractions with and without whole numbers
- g. Estimate a fractional sum, product, or quotient

NT

15. GEOMETRY

- a. Draw geometric figures, plane and solid
- b. Match geometric figures with word names, equivalent measures
- c. Label all parts of geometric figures using mathematical and characteristic designators
- d. Use a protractor to measure angles, make geometrical constructions
- e. Construct perpendicular on a line segment, bisector of an angle
- f. Compute the perimeter and area of any figure
- g. Compute the circumference and area of a circle
- h. Compute the area and volume of any solid figure
- i. Use formulas in solving problems involving geometric figures
- j. Solve problems and interpret spatial relationships of figures, symbols, and objects from 2-dimensional displays

16. COMBINATION OF PROCESSES

- a. Identify median and mode
- b. Compute average
- c. Solve problems combining all processes using whole, mixed numbers and fractions
- d. Solve problems, combining all processes, involving units of measurement
- e. Interpret information from charts, number lines, scales and graphs to solve arithmetic problems
- f. Solve conversion problems of linear (metric and English) liquid, weight and temperature (F^0 or C^0) measures
- g. Solve problems involving ratio and proportion
- h. Solve word problems where any mathematical process may occur

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- a. Identify coordinates of a point in any grid system
- b. Identify points on a line graph
- c. Match a graph with its equation

18 ALGEBRA

- a. Solve simple algebraic equations with one unknown
- b. Recognize and derive equivalent algebraic expressions
- c. Evaluate powers and estimate roots

19 TRIGONOMETRY

- a. Use tables of trigonometric functions
- b. Use tables of logarithms to solve problems
- c. Solve geometric problems using trigonometric functions
- d. Use trigonometric ratios to solve problems

CONTENT READING

NT

25 PROCEDURAL DIRECTIONS

- a Identify factual details or specifications that are found within a statement or written selection
- b Select parts of text and visual materials to complete a task activity
- c Follow highly detailed, step by step directions in order to accomplish a sequence of task activities
- d Determine the essential message of a paragraph or section of written material
- e Infer from a written source, which does not explicitly provide required information, in order to make a decision
- f Synthesize information from written sources which contributes to the completion of a task activity

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- a Recognize common words and their meanings
- b Recognize task related words with technical meanings
- c Identify the correct meaning of a word from the context of a sentence
- d Recognize the meaning of common contractions, abbreviations and acronyms
- e Determine the meaning of figurative, idiomatic, and technical terms by using context clues or by using a reference source(s)

INFORMATION ACCESS

27 REFERENCE SKILLS

- a Locate a Technical Manual, Field Manual or any related source document by code number and title
- b Alphabetize words or topics to locate information
- c Use the table of contents, index, system or sub system heading, appendix and glossary to locate information
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- g Organize information from multiple sources into a sequenced series of events

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- a Obtain a fact or specification from a two-column table or chart to find information
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VISUAL AIDS

NT

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31 SCHEMATICS

- a. Isolate each major section or entity presented in a schematic diagram
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WRITTEN COMMUNICATION

32 FORMS

- a. Locate the block on a form to enter the appropriate information
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NT

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VERBAL COMMUNICATION

37 TYPE

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NT

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- c. Select an appropriate course of action in the event of an emergency

PERCEPTUAL

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- a. Identify similarities and differences between and among objects
- b. Use body language (motions, gestures, postures) to communicate or signal
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- e. Classify objects by size, shape, color and significant markings
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TEQ Journalist

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NUMERATION/PLACE VALUE

NT

1 NUMBERING AND COUNTING

- a Match numerals with word names and models
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UNITS OF MEASUREMENT

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- a Name the markings on a linear scale
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NT

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- a Identify the unit of measurement found on an instrument
- b. Interpret the number, word, symbol from a display read out
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VISUAL/SPATIAL RELATIONSHIPS

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- a. Identify directions that tools, hardware, or components may be moved
- b Manipulate objects to align, match, mate, make parallel, be perpendicular or be at an angle
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GEOMETRY

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- a. Identify and name points, lines, rays, and segments
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- a. Identify and name plane geometric figures
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- a. Identify and name the different kinds of angles and triangles with their corresponding figures
- b. Identify vertical, adjacent, complementary or supplementary angles
- c. Classify triangles according to their sides or angle-size
- d. Identify altitudes and medians of triangles or the bisector of an angle
- e. Name an angle by using letters, a number, or a single letter

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NT

10 SOLIDS

- a Recognize and match the names of solids with their corresponding figures

11 TERMINOLOGY

- a Identify technical words associated with geometric figures
- b Interpret meaning of terms derived from spatial orientation

COMPUTE OR PERFORM

12 ADDITION AND SUBTRACTION

- a Add or subtract whole numbers, without carrying or borrowing
- b Add or subtract whole numbers, carrying and borrowing
- c Add and subtract, borrowing and carrying with mixed numbers (whole and decimals)
- d Add or subtract positive (+) and negative (-) numbers, using a number line to arrive at a solution
- e Add or subtract to find correct time (24 hr. clock) using hours or minutes
- f Add or subtract various increments on gauges, dials, or any other measuring instrument
- g Add or subtract time, linear, dry, liquid or degree measures requiring regrouping
- h Estimate a sum or difference

13 MULTIPLICATION AND DIVISION

- a Multiply and divide whole numbers
- b Multiply and divide mixed numbers (whole and decimals)
- c Divide a number with decimals in both divisor and dividend
- d Multiply and divide integers, both positive (+) and negative (-), and assign proper sign to product or quotient
- e Estimate a product or quotient

14 FRACTIONS/DECIMALS

- a Subdivide whole objects or a set of objects into halves (1/2), thirds (1/3), fourths (1/4), eighths (1/8)
- b Reduce fractions to lowest terms
- c Convert fractions (proper and improper) to decimal equivalents, and vice versa, using a table, chart or gauge
- d Compute equivalent value of fractions, decimals, percents, and mixed numbers to lowest terms
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- f Multiply and divide fractions with and without whole numbers
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NT

15 GEOMETRY

- a. Draw geometric figures, plane and solid
- b Match geometric figures with word names, equivalent measures
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- d Use a protractor to measure angles, make geometrical constructions
- e. Construct perpendicular on a line segment, bisector of an angle
- f Compute the perimeter and area of any figure
- g. Compute the circumference and area of a circle
- h. Compute the area and volume of any solid figure
- i. *Use formulas in solving problems involving geometric figures*
- j Solve problems and interpret spatial relationships of figures, symbols, and objects from 2 dimensional displays

16. COMBINATION OF PROCESSES

- a. Identify median and mode
- b *Compute averages*
- c Solve problems combining all processes using whole, mixed numbers and fractions
- d. Solve problems, combining all processes, involving units of measurement
- e. Interpret information from charts, number lines, scales and graphs to solve arithmetic problems
- f Solve conversion problems of linear (metric and English) liquid, weight and temperature (F° or C°) measures
- g. Solve problems involving ratio and proportion
- h. Solve word problems where any mathematical process may occur

17. GRAPHING IN THE COORDINATE PLANE

- a Identify coordinates of a point in any grid system
- b. Identify points on a line graph
- c Match a graph with its equation

18 ALGEBRA

- a Solve simple algebraic equations with one unknown
- b. Recognize and derive equivalent algebraic expressions
- c. Evaluate powers and estimate roots

19 TRIGONOMETRY

- a Use tables of trigonometric functions
- b Use tables of logarithms to solve problems
- c. Solve geometric problems using trigonometric functions
- d *Use trigonometric ratios to solve problems*

CONTENT READING

NT

25 PROCEDURAL DIRECTIONS

- a Identify factual details or specifications that are found within a statement or written selection
- b Select parts of text and visual materials to complete a task activity
- c Follow highly detailed, step by step directions in order to accomplish a sequence of task activities
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- e Infer from a written source, which does not explicitly provide required information, in order to make a decision
- f Synthesize information from written sources which contributes to the completion of a task activity

26 VOCABULARY

- a Recognize common words and their meanings
- b Recognize task *related words* with technical meanings
- c Identify the correct meaning of a word from the context of a sentence
- d Recognize the meaning of common contractions, abbreviations and acronyms
- e Determine the meaning of figurative, idiomatic, and technical terms by using *context clues* or by using a reference source(s)

INFORMATION ACCESS

27 REFERENCE SKILLS

- a Locate a Technical Manual, Field Manual or any related source document by code number and title
- b Alphabetize words or topics to locate information
- c Use the table of contents, index, system or sub-system heading, appendix and glossary to locate information
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- e Determine, after scanning or skim reading, whether the information is relevant
- f Cross-reference within and across source documents to select information needed to perform a routine
- g Organize information from multiple sources into a sequenced series of events

28 TABLES/CHARTS

- a Locate a fact or specification from a two-column table or chart to find information
- b Locate a fact or specification from an intersection of a row by column table or chart
- c Use complex table or chart requiring cross referencing within or in combination with text material outside the chart
- d Apply information from tables and charts for locating malfunctions or for selecting a course of action

VISUAL AIDS

NT

29 ILLUSTRATIONS

- a Identify details, labels, numbers, and parts from an illustration or picture
- b Identify parts or details according to a key or legend
- c Interpret a drawing which shows a cross sectional view of an object for assembly, disassembly
- d Interpret a three dimensional projection or exploded view of object(s) for assembly, disassembly, or position in system or sub system
- e Follow illustrations, or photographs, arranged in a sequential order, as a guide
- f Integrate information from various sources to select a course of action

30 FLOW CHARTS

- a Use a simple linear path of an organizational chart to list events in sequential order
- b Use a linear path of a flow chart to provide visual and textual directions to a procedure, to arrive at decision points, and to provide alternate paths in problem solving
- c Translate the significance of the symbols into physical actions

31 SCHEMATICS

- a Isolate each major section or entity presented in a schematic diagram
- b Identify the components within each entity
- c Trace connections in an integrated circuit from their origin to another point within or from one entity to another
- d Isolate a problem component in a schematic and trace it to components believed to cause the problem
- e Interpret symbols to indicate direction of flow, test points, components and diagrammatic decision points

WRITTEN COMMUNICATION

32 FORMS

- a. Locate the block on a form to enter the appropriate information
- b. Transfer a number, code, date, figure or related data from equipment or written sources onto an appropriate section of the form
- c. Write the name of the organization, responsible personnel, description of the part or equipment, and nomenclature in appropriate sections of the form
- d. Write a descriptive account of an activity or transaction performed
- e. Use a completed form to locate or compare information

33. NOTE-TAKING

- a Distinguish between essential and non essential details during the note taking process
- b Record details without misinterpreting the intent of either written or verbal information
- c Rewrite all recorded details in sentence form
- d Organize all sentences into paragraphs

NT

34 OUTLINING (topic or sentence)

- a Distinguish between major and subordinate topics
- b Generate titles for each major topic selected
- c Use phrases or sentences to provide subordinate details under each major topic
- d Alternate, indent numbers and letters to establish a hierarchy

35 REPORT WRITING

- a State the intent or objective(s) of the report
- b Describe the parameters of the event or situation
- c Distinguish between relevant and irrelevant details
- d Sequence events in the order they have occurred
- e State general impressions of events described
- f Select examples that will clarify major issues presented in the report
- g Examine opposing points of view in the report
- h Summarize the major points developed in the report
- i Justify an action taken and give reasons for rejecting alternatives

36 EDITING

- a Spell frequently used words correctly
- b Spell task related words correctly
- c Identify words that need to be capitalized
- d Correct all misspelled words with or without the use of a reference source
- e Apply all rules for end marks, commas, and apostrophies
- f Apply common rules of grammar
- g Rewrite the paragraph by stating the main idea in the first sentence and restructuring the sentences for coherence
- h Appraise an entire written communication and make adjustments to improve clarity

VERBAL COMMUNICATION

37 TYPE

- a Individual — a person working on a task and communicating with another when assistance is needed or when a supervisory decision is needed
- b Instruction — a task activity requiring communication between an instructor, an individual or small group where the purpose is to give facts or rules to inform or guide
- c Tutor — interaction takes place between two persons where one is instructing and the other is doing the task
- d Peer Group (less than 10) — all members engage in an activity where one person assumes a leadership role and communicates to others what is to be done
- e Interview — a person communicating with another about his activities, opinions, or subject expertise for the purpose of using the information in a task
- f Briefing — communicating final instructions to others or giving an account in summary
- g Counsel — communicating together to exchange ideas or opinions to recommend, give or take advice, or to arrive at an acceptance of a plan or decision
- h Command — communicate to others an order or action to be taken where a person has a position of authority

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NT

38 CHARACTERISTICS

- a Enunciate clearly, using the proper rate of speech
- b. Use technical vocabulary suitable to the task and level of the person
- c. Determine the appropriate amount of information to communicate
- d. Interpret figurative or idiomatic language by reference to its use in context
- e. Follow highly detailed, step-by-step directions
- f. Solicit feedback to confirm the accurate reception of the communication
- g Recognize when a low key, informal dialogue is suitable
- h. Recognize when direct verbal commands are necessary
- i Recognize when a prescribed series of verbal interactions is required to coordinate a group effort
- j. Recognize when the situation will require a structured, preplanned method of presentation

39 BARRIERS

- a Recognize the need for clear, concise directions in order to avoid language or word-meaning differences
- b. Recognize personality factors and interpersonal relationships that may exist
- c Recognize feedback as a means of communicating more effectively and increasing task competence

SAFETY/SECURITY

40 PRECAUTIONS

- a. Use common knowledge to avoid hazards in order to prevent injury to self or equipment
- b Apply preventive measures prior to task performance to minimize any potential safety or security problem
- c Select an appropriate course of action in the event of an emergency

PERCEPTUAL

41 RECOGNITION

- a. Identify similarities and differences between and among objects
- b Use body language (motions, gestures, postures) to communicate or signal
- c. Determine the presence of a defect or extent of damage
- d. Match objects by size, shape, color and significant markings
- e Classify objects by size, shape, color and significant markings
- f Determine direction, duration, and intensity of sounds, sights, or smells
- g Infer from sights, sounds, touch, smells, or tastes to determine a course of action
- h. Interpret codes & symbols

NUMERATION/PLACE VALUE

NT

1. NUMBERING AND COUNTING

- a. Match numerals with word names and models
- b. Write numerals one through N in sequential order from any starting point
- c. State what numeral comes after, before, or between any two given numbers
- d. Select the numeral which is greater/lesser from a set of numerals
- e. Identify an object with a specified ordinal position
- f. Write or state the place value of a particular digit, whole or decimal number
- g. Round off a number to a specified place, whole or decimal
- h. Count by units, twos, fives, tens etc. backward or forward (skip counting)
- i. Match numbers with points or intervals on a number line (positive (+) or negative (-) values)

UNITS OF MEASUREMENT

2. LINEAR WEIGHT AND VOLUME MEASURES

- a. Name the markings on a linear scale
- b. Differentiate units of measure and equivalents in the English and metric system
- c. Use a ruler, yardstick, meter stick or scale to measure lengths of objects or distances
- d. Identify measures of ounce, pound, gram
- e. Identify measures of pints, quarts, gallons, liters
- f. Use a scale which is not numerically calibrated
- g. Estimate measures of varying lengths, dimensions or weights

3. DEGREE MEASURES

- a. Identify degree or mil as a unit in determining direction, distance or temperature
- b. Estimate the measure of a given angle not greater than 180^0
- c. Interpret bearings, azimuth and other contexts in which the measure of an angle may range from 0^0 to 360^0/0 to 6400 mils

4. TIME TELLING MEASURES

- a. Use a 24-hour or digital clock to tell time
- b. Name intervals and tell time in hours, minutes, and seconds
- c. Estimate time in seconds, minutes and parts of an hour
- d. Identify calendar units and arrange them in Julian style
- e. Convert time into hours and fractions of hours
- f. Compute time using Greenwich Mean Time (GMT) as a basis for establishing zones and distances

NT

5. GAUGE MEASURES

- a. Identify the unit of measurement found on an instrument
- b. Interpret the number word symbol from a display read out
- c. Recognize a "reading" from a gauge with color divisions
- d. Recognize positive (+) and negative (-) deviations on a scale
- e. Select band(s) from a multi scale gauge
- f. Match a gauge reading to a specification using numbered or labeled intervals
- g. Interpret gauge readings from an unnumbered/unmarked interval
- h. Interpret a gauge reading which is fluctuating or momentarily unstable
- i. Match specifications of required measures by manipulation, alignment or maintenance

VISUAL/SPATIAL RELATIONSHIPS

8. SPATIAL

- a. Identify directions that tools, hardware, or components may be moved
- b. Manipulate objects to align, match, mate, make parallel, be perpendicular to or be at an angle
- c. Interpret spatial relationships of figures and objects from 2 dimensional drawings, pictures, or photographs
- d. Relate geometric symbols and graphic representations to actual systems, subsystems and components

GEOMETRY

7. LINES

- a. Identify and name points, lines, rays, and segments
- b. Identify intersecting lines, parallel lines, and line segments
- c. Define and identify perpendicular lines
- d. Identify congruent segments

8. PLANES

- a. Identify and name plane geometric figures
- b. List the characteristics of geometric figures
- c. Classify figures according to the number or measure of its sides or angles
- d. Identify figures which possess similarities
- e. Identify figures which may be parallel, perpendicular or congruent

9. ANGLES AND TRIANGLES

- a. Identify and name the different kinds of angles and triangles, with the corresponding figures
- b. Identify vertical, adjacent, complementary or supplementary angles
- c. Classify triangles according to their sides or angle size
- d. Identify altitudes and medians of triangles or the bisector of an angle
- e. Name an angle by using letters, a number or a single letter

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NT

10 SOLIDS

- a. Recognize and match the names of solids with their corresponding figures

11 TERMINOLOGY

- a. Identify technical words associated with geometric figures
- b. Interpret meaning of terms derived from spatial orientation

COMPUTE OR PERFORM

12 ADDITION AND SUBTRACTION

- a. Add or subtract whole numbers without carrying or borrowing
- b. Add or subtract whole numbers, carrying and borrowing
- c. Add and subtract, borrowing and carrying with mixed numbers (whole and decimals)
- d. Add or subtract positive (+) and negative (-) numbers, using a number line to arrive at a solution
- e. Add or subtract to find correct time (24 hr. clock) using hours or minutes
- f. Add or subtract various increments on gauges, dials, or any other measuring instrument
- g. Add or subtract time, linear, dry, liquid or degree measures requiring regrouping
- h. Estimate a sum or difference

13 MULTIPLICATION AND DIVISION

- a. Multiply and divide whole numbers
- b. Multiply and divide mixed numbers (whole and decimals)
- c. Divide a number with decimals in both divisor and dividend
- d. Multiply and divide integers, both positive (+) and negative (-), and assign proper sign to product or quotient
- e. Estimate a product or quotient

14 FRACTIONS/DECIMALS

- a. Subdivide whole objects or a set of objects into halves (1/2), thirds (1/3), fourths (1/4), eighths (1/8)
- b. Reduce fractions to lowest terms
- c. Convert fractions (proper and improper) to decimal equivalents, and vice versa, using a table, chart or gauge
- d. Compute equivalent value of fractions, decimals, percents, and mixed numbers to lowest terms
- e. Add and subtract fractions with same or different denominators
- f. Multiply and divide fractions with and without whole numbers
- g. Estimate a fractional sum, product, or quotient

NT

15 GEOMETRY

- a. Draw geometric figures, plane and solid
- b. Match geometric figures with word names, equivalent measures
- c. Label all parts of geometric figures using mathematical and characteristic designators
- d. Use a protractor to measure angles, make geometrical constructions
- e. Construct perpendicular on a line segment, bisector of an angle
- f. Compute the perimeter and area of any figure
- g. Compute the circumference and area of a circle
- h. Compute the area and volume of any solid figure
- i. Use formulas in solving problems involving geometric figures
- j. Solve problems and interpret spatial relationships of figures, symbols, and objects from 2-dimensional displays

16. COMBINATION OF PROCESSES

- a. Identify median and mode
- b. Compute averages
- c. Solve problems combining all processes using whole, mixed numbers and fractions
- d. Solve problems, combining all processes, involving units of measurement
- e. Interpret information from charts, number lines, scales and graphs to solve arithmetic problems
- f. Solve conversion problems of linear (metric and English) liquid, weight, and temperature (F^{o} or C^{o}) measures
- g. Solve problems involving ratio and proportion
- h. Solve word problems where any mathematical process may occur

17. GRAPHING IN THE COORDINATE PLANE

- a. Identify coordinates of a point in any grid system
- b. Identify points on a line graph
- c. Match a graph with its equation

18 ALGEBRA

- a. Solve simple algebraic equations with one unknown
- b. Recognize and derive equivalent algebraic expressions
- c. Evaluate powers and estimate roots

19. TRIGONOMETRY

- a. Use tables of trigonometric functions
- b. Use tables of logarithms to solve problems
- c. Solve geometric problems using trigonometric functions
- d. Use trigonometric ratios to solve problems

CONTENT READING

N1

25 PROCEDURAL DIRECTIONS

- a Identify technical details or specifications that are found within a statement or written selection
- b Select parts of text and visual materials to complete a task activity
- c Follow highly detailed step by step directions in order to accomplish a sequence of task activities
- d Determine the essential message of a paragraph or section of written material
- e Infer from a written source which does not explicitly provide required information, in order to make a decision
- f Synthesize information from written sources which contributes to the completion of a task activity

26 VOCABULARY

- a Recognize common words and their meanings
- b Recognize task related words with technical meanings
- c Identify the correct meaning of a word from the context of a sentence
- d Recognize the meaning of common contractions, abbreviations and acronyms
- e Determine the meaning of figurative, idiomatic, and technical terms by using context clues or by using a reference source(s)

INFORMATION ACCESS

27 REFERENCE SKILLS

- a Locate a Technical Manual, Field Manual or any related source document by code number and title
- b Alphabetize words or topics to locate information
- c Use the table of contents, index, system or sub system heading, appendix and glossary to locate information
- d Locate the page, title, paragraph, figure, or chart needed to answer a question or to solve a problem
- e Determine, after scanning or skim reading, whether the information is relevant
- f Cross reference within and across source documents to select information needed to perform a routine
- g Organize information from multiple sources into a sequenced series of events

28 TABLES/CHARTS

- a Locate a fact or specification from a two column table or chart to find information
- b Locate a fact or specification from the intersection of a row by column table or chart
- c Use a simple table or chart requiring cross referencing within or in combination with numerical values on the chart
- d Apply information from tables and charts for locating malfunctions, or for [illegible]

VISUAL AIDS

N1

29 ILLUSTRATIONS

- a Identify details, labels, numbers, and parts from an illustration or picture
- b Identify parts or details according to a key or legend
- c Interpret a drawing which shows a cross sectional view of an object for assembly, disassembly
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- a Use a simple linear path of an organizational chart to list events in sequential order
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- c Translate the significance of the symbols into physical activities

31 SCHEMATICS

- a Isolate each major section or entity presented in a schematic diagram
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- a. Locate the block on a form to enter the appropriate information
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- a Distinguish between essential and non-essential details during the note taking process
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VT

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- d. Alternate indent numbers and letters to establish a hierarchy

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- a. State the intent or objective(s) of the report
- b. Describe the parameters of the event or situation
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- f. Select examples that will clarify major issues presented in the report
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- h. Summarize the major points developed in the report
- i. Justify an action taken and give reasons for rejecting alternatives

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- a. Spell frequently used words correctly
- b. Spell task-related words correctly
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- g. Rewrite the paragraph by stating the main idea in the first sentence, and restructuring the sentences for coherence
- h. Appraise an entire written communication and make adjustments to improve clarity

VERBAL COMMUNICATION

37 TYPE

- a. *Individual* - *a person working on a task and communicating with another when assistance is needed or when a supervisory decision is needed*
- b. Instruction - a task activity requiring communication between an instructor, an individual or small group where the purpose is to give facts or rules to inform or guide
- c. Tutor - interaction takes place between two persons where one is instructing and the other is doing the task
- d. Peer Group (less than 10) - all members engage in an activity where one person assumes a leadership role and communicates to others what is to be done
- e. Interview - a person communicating with another about his activities, opinions, or subject expertise for the purpose of using the information in a task
- f. Briefing - communicating final instructions to others or giving an account or summary
- g. Counsel - communicating together to exchange ideas or opinions to recommend, give or take advice, or to arrive at an acceptance of a plan or decision
- h. Command - communicate to others an order or action to be taken where a person has a position of authority

NT

38 CHARACTERISTICS

- a. Enunciate clearly, using the proper rate of speech
- b. Use technical vocabulary suitable to the task and level of the person
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- b. *Recognize personality factors and interpersonal relationships that may exist*
- c. Recognize feedback as a means of communicating more effectively and increasing task competence

SAFETY/SECURITY

40 PRECAUTIONS

- a. Use common knowledge to avoid hazards in order to prevent injury to self or equipment
- b. Apply preventive measures prior to task performance to minimize any potential safety or security problem
- c. Select an appropriate course of action in the event of an emergency

PERCEPTUAL

41 RECOGNITION

- a. Identify similarities and differences between and among objects
- b. Use body language (motions, gestures, postures) to communicate or signal
- c. Determine the presence of a defect or extent of damage
- d. Match objects by size, shape, color and significant markings
- e. Classify objects by size, shape, color and significant markings
- f. Determine direction, duration, and intensity of sounds, sightings and smells
- g. Infer from sights, sounds, touch, smells, or tastes to determine a course of action

NUMERATION/PLACE VALUE

NT

1 NUMBERING AND COUNTING

- a Match numerals with word names and models
- b Write numerals one through N in sequential order from any starting point
- c State what numeral comes after, before, or between any two given numerals
- d Select the numeral which is greater/lesser from a set of numerals
- e Identify an object with a specified ordinal position
- f Write or state the place value of a particular digit, whole or decimal number
- g Round off a number to a specified place, whole or decimal
- h Count by ones, twos, fives, tens, etc., backward or forward (skip counting)
- i Match numbers with points or intervals on a number line (positive (+) or negative (-) values)

UNITS OF MEASUREMENT

2 LINEAR, WEIGHT, AND VOLUME MEASURES

- a Name the markings on a linear scale
- b Differentiate units of measure and equivalents in the English and metric system
- c Use a ruler, yardstick, meter stick or scale to measure lengths of objects or distances
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- b Estimate the measure of a given angle not greater than 180°
- c Interpret bearings, azimuth and other contexts in which the measure of an angle may range from 0° to 360°/0 to 6400 mils

4 TIME TELLING MEASURES

- a Use a 24 hour or digital clock to tell time
- b Name intervals and tell time in hours, minutes, and seconds
- c Estimate time in seconds, minutes, and parts of an hour
- d Identify calendar units and arrange them in Julian style
- e Convert time into hours and tenths of hours
- f Compute [illegible] using Greenwich Mean Time (GMT) as a basis for establishing [illegible] and distances

NT

5 GAUGE MEASURES

- a Identify the unit of measurement found on an instrument
- b Interpret the numeral, word, symbol from a display read out
- c *Recognize a "reading" from a gauge with color divisions*
- d Recognize positive (+) and negative (-) demarcation on a scale
- e Select band(s) from a multi scale gauge
- f. Match a gauge reading to a specification using numbered or labeled intervals
- g Interpret gauge readings from an unnumbered/unmarked interval
- h *Interpret a gauge reading which is fluctuating or momentarily sustained*
- i. Match specifications of required measures by manipulation, alignment or maintenance

VISUAL/SPATIAL RELATIONSHIPS

8 SPATIAL

- a. Identify directions that tools, hardware, or components may be moved
- b Manipulate objects to align, match, mate, make parallel, be perpendicular or be at an angle
- c Interpret spatial relationships of figures and objects from 2-dimensional drawings, pictures, or photographs
- d. Relate geometric symbols and graphic representations to actual systems, subsystems and components

GEOMETRY

7 LINES

- a Identify and name points, lines, rays, and segments
- b. Identify intersecting lines, parallel lines, and line segments
- c Define and identify perpendicular lines
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- a. Identify and name plane geometric figures
- b List the characteristics of geometric figures
- c Classify figures according to the number or measure of its sides or angles
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- e. Identify figures which may be parallel, perpendicular or congruent

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- b Identify vertical, adjacent, complementary or supplementary angles
- c. Classify triangles according to their sides or angle-size
- d. Identify altitudes and medians of triangles or the bisector of an angle
- e Name an angle by using letters, a number, or a single letter

4 [illegible] 92

NT

10 SOLIDS

- a. Recognize and match the names of solids with their corresponding figures

11 TERMINOLOGY

- a. Identify technical words associated with geometric figures
- b. Interpret meaning of terms derived from spatial orientation

COMPUTE OR PERFORM

12 ADDITION AND SUBTRACTION

- a. Add or subtract whole numbers, without carrying or borrowing
- b. Add or subtract whole numbers, carrying and borrowing
- c. Add and subtract, borrowing and carrying with mixed numbers (whole and decimals)
- d. Add or subtract positive (+) and negative (-) numbers, using a number line to arrive at a solution
- e. Add or subtract to find correct time (24 hr. clock) using hours or minutes
- f. Add or subtract various increments on gauges, dials, or any other measuring instrument
- g. Add or subtract time, linear, dry, liquid or degree measures requiring regrouping
- h. Estimate a sum or difference

13 MULTIPLICATION AND DIVISION

- a. Multiply and divide whole numbers
- b. Multiply and divide mixed numbers (whole and decimals)
- c. Divide a number with decimals in both divisor and dividend
- d. Multiply and divide integers, both positive (+) and negative (-), and assign proper sign to product or quotient
- e. Estimate a product or quotient

14. FRACTIONS/DECIMALS

- a. Subdivide whole objects or a set of objects into halves (1/2), thirds (1/3), fourths (1/4), eighths (1/8)
- b. Reduce fractions to lowest terms
- c. Convert fractions (proper and improper) to decimal equivalents, and vice versa, using a table, chart or gauge
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NT

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- a. Draw geometric figures, plane and solid
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- e. Interpret information from charts, number lines, scales and graphs to solve arithmetic problems
- f. Solve conversion problems of linear (metric and English) liquid, weight, and temperature (F° or C°) measures
- g. Solve problems involving ratio and proportion
- h. Solve word problems where any mathematical process may occur

17. GRAPHING IN THE COORDINATE PLANE

- a. Identify coordinates of a point in any grid system
- b. Identify points on a line graph
- c. Match a graph with its equation

18 ALGEBRA

- a. Solve simple algebraic equations with one unknown
- b. Recognize and derive equivalent algebraic expressions
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19 TRIGONOMETRY

- a. Use tables of trigonometric functions
- b. Use tables of logarithms to solve problems
- c. Solve geometric problems using trigonometric functions
- d. Use trigonometric ratios to solve problems

CONTENT READING

NT

25 PROCEDURAL DIRECTIONS

- a Identify factual details or specifications that are found within a statement or written selection
- b Select parts of text and visual materials to complete a task activity
- c Follow highly detailed step by step directions in order to accomplish a sequence of task activities
- d Determine the essential message of a paragraph or section of written material
- e Infer from a written source, which does not explicitly provide required information, in order to make a decision
- f Synthesize information from written sources which contributes to the completion of a task activity

26 VOCABULARY

- a Recognize common words and their meanings
- b Recognize task-related words with technical meanings
- c Identify the correct meaning of a word from the context of a sentence
- d Recognize the meaning of common contractions, abbreviations and acronyms
- e Determine the meaning of figurative, idiomatic, and technical terms by using context clues or by using a reference source(s)

INFORMATION ACCESS

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- a Locate a Technical Manual, Field Manual or any related source document by code number and title
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- f Cross reference within and across source documents to select information needed to perform a routine
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28 TABLES/CHARTS

- a Obtain a fact or specification from a two-column table or chart to find information
- b Obtain a fact or specification from an intersection of a row by column table or chart
- c Use a complex table or chart requiring cross referencing within or in combination with text material outside the chart
- d Apply information from tables and charts for locating malfunctions, or for selecting a course of action

VISUAL AIDS

NT

29 ILLUSTRATIONS

- a Identify details, labels, numbers, and parts from an illustration or picture
- b Identify parts or details according to a key or legend
- c Interpret a drawing which shows a cross sectional view of an object for assembly, disassembly
- d Interpret a three dimensional projection or exploded view of object(s) for assembly, disassembly, or position in system or sub system
- e Follow illustrations, or photographs, arranged in a sequential order, as a guide
- f Integrate information from various sources to select a course of action

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- a Use a simple linear path of an organizational chart to list events in sequential order
- b Use a linear path of a flow chart to provide visual and textual directions to a procedure, to arrive at decision points, and to provide alternate paths in problem solving
- c Translate the significance of the symbols into physical activities

31 SCHEMATICS

- a Isolate each major section or entity presented in a schematic diagram
- b Identify the components within each entity
- c Trace connections in an integrated circuit from their origin to another point within or from one entity to another
- d Isolate a problem component in a schematic and trace it to components believed to cause the problem
- e Interpret symbols to indicate direction of flow, test points, components and diagrammatic decision points

WRITTEN COMMUNICATION

32 FORMS

- a Locate the block on a form to enter the appropriate information
- b Transfer a number, code, date, figure or related data from equipment or written sources onto an appropriate section of the form
- c Write the name of the organization responsible personnel, disposition of the part or equipment, end nomenclature, in appropriate sections of the form
- d Write a descriptive account of an activity or transaction performed
- e Use a completed form to locate or compare information

33 NOTE TAKING

- a Distinguish between essential and non essential details during the note taking process
- b Record details without misinterpreting the intent of either written materials or an interview
- c Rewrite all recorded details in sentence form
- d Organize all sentences into paragraphs

NT

34 OUTLINING (topic or sentence)

- a. Distinguish between major and subordinate topics
- b. Generate titles for each major topic selected
- c. Use phrases or sentences to provide subordinate details under each major topic
- d. Alternate, indent numbers and letters to establish a hierarchy

35 REPORT WRITING

- a. State the intent or objective(s) of the report
- b. Describe the parameters of the event or situation
- c. Distinguish between relevant and irrelevant details
- d. Sequence events in the order they have occurred
- e. State general impressions of events described
- f. Select examples that will clarify major issues presented in the report
- g. Examine opposing points of view in the report
- h. Summarize the major points developed in the report
- i. Justify an action taken and give reasons for rejecting alternatives

36 EDITING

- a. Spell frequently used words correctly
- b. Spell task related words correctly
- c. Identify words that need to be capitalized
- d. Correct all misspelled words with or without the use of a reference source
- e. Apply all rules for end marks, commas, and apostrophes
- f. Apply common rules of grammar
- g. Rewrite the paragraph by stating the main idea in the first sentence, and restructuring the sentences for coherence
- h. Appraise an entire written communication and make adjustments to improve clarity

VERBAL COMMUNICATION

37 TYPE

- a. Individual – a person working on a task and communicating with another when assistance is needed or when a supervisory decision is needed
- b. Instruction – a task activity requiring communication between an instructor, an individual or small group where the purpose is to give facts or rules to inform or guide
- c. Tutor – interaction takes place between two persons where one is instructing and the other is doing the task
- d. Peer Group (less than 10) – all members engage in an activity where one person assumes a leadership role and communicates to others what is to be done
- e. Interview – a person communicating with another about his activities, opinions, or subject expertise for the purpose of using the information in a task
- f. Briefing – communicating final instructions to others or giving an account in summary
- g. Counsel – communicating together to exchange ideas or opinions to recommend, give or take advice, or to arrive at an acceptance of a plan or decision
- h. Command – communicate to others an order or action to be taken where a person has a portion of authority

4/23/82

NT

38 CHARACTERISTICS

- a. Enunciate clearly, using the proper rate of speech
- b. Use technical vocabulary suitable to the task and level of the person
- c. Determine the appropriate amount of information to communicate
- d. Interpret figurative or idiomatic language by reference to its use in context
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- f. Solicit feedback to confirm the accurate reception of the communication
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- i. Recognize when a prescribed series of verbal interactions is required to coordinate a group effort
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39 BARRIERS

- a. Recognize the need for clear, concise directions in order to avoid language or word-meaning differences
- b. Recognize personality factors and inter-personal relationships that may exist
- c. Recognize feedback as a means of communicating more effectively and increasing task competence

SAFETY/SECURITY

40 PRECAUTIONS

- a. Use common knowledge to avoid hazards in order to prevent injury to self or equipment
- b. Apply preventive measures prior to task performance to minimize any potential safety or security problem
- c. Select an appropriate course of action in the event of an emergency

PERCEPTUAL

41 RECOGNITION

- a. Identify similarities and differences between and among objects
- b. Use body language (motions, gestures, postures) to communicate or signal
- c. Determine the presence of a defect or extent of damage
- d. Match objects by size, shape, color and significant markings
- e. Classify objects by size, shape, color and significant markings
- f. Determine direction, duration, and intensity of sounds, sightings and smells
- g. Infer from sights, sounds, touch, smells, or tastes to determine a course of action

NUMERATION/PLACE VALUE

NT

1 NUMBERING AND COUNTING

- a Match numerals with word names and models
- b Write numerals one through N in sequential order from any starting point
- c State what numeral comes after, before, or between any two given numerals
- d Select the numeral which is greater/lesser from a set of numerals
- e Identify an object with a specified ordinal position
- f Write or state the place value of a particular digit, whole or decimal number
- g Round off a number to a specified place, whole or decimal
- h Count by ones, twos, fives, tens, etc., backward or forward (skip counting)
- i Match numbers with points or intervals on a number line (positive (+) or negative (-) values)

UNITS OF MEASUREMENT

2 LINEAR, WEIGHT, AND VOLUME MEASURES

- a Name the markings on a linear scale
- b Differentiate units of measure and equivalents in the English and metric system
- c Use a ruler, yardstick, meter stick or scale to measure lengths of objects or distances
- d Identify measures of ounce, pound, gram
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- a Identify degree or mil as a unit in determining direction, distance or temperature
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- c Interpret bearings, azimuth and other contexts in which the measure of an angle may range from 0° to 360°/0 to 6400 mils

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- a Identify the unit of measurement found on an instrument
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- c Recognize a "reading" from a gauge with color divisions
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- h Interpret a gauge reading which is fluctuating or momentarily sustained
- i Match specifications of required measures by manipulation of ginnent or maintenance

VISUAL/SPATIAL RELATIONSHIPS

6 SPATIAL

- a Identify directions that tools, hardware, or components may be moved
- b Manipulate objects to align, match, mate, make parallel, be perpendicular or be at an angle
- c Interpret spatial relationships of figures and objects from 2-dimensional *drawings, pictures, or photographs*
- d Relate geometric symbols and graphic representations to actual systems subsystems and components

GEOMETRY

7 LINES

- a Identify and name points, lines, rays, and segments
- b Identify intersecting lines, parallel lines, and line segments
- c Define and identify perpendicular lines
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8 PLANES

- a Identify and name plane geometric figures
- b List the characteristics of geometric figures
- c Classify figures according to the number or measure of its sides or angles
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- a Identify and name the different kinds of angles and triangles, with the corresponding figures
- b Identify vertical, adjacent, complementary or supplementary angles
- c Classify triangles according to their sides or angle size
- d Identify altitudes and medians of triangles, or the bisector of an angle
- e Name an angle by using letters, a number or a single letter

NT

10 SOLIDS

- a. Recognize and match the names of solids with their corresponding figures

11 TERMINOLOGY

- a. Identify technical words associated with geometric figures
- b. Interpret meaning of terms derived from spatial orientation

COMPUTE OR PERFORM

12 ADDITION AND SUBTRACTION *In hexadecimal only

- a Add or subtract whole numbers, without carrying or borrowing *
- b Add or subtract whole numbers, carrying and borrowing *
- c. Add and subtract, borrowing and carrying with mixed numbers (whole and decimals)
- d. Add or subtract positive (+) and negative ( ) numbers, using a number line to arrive at a solution
- e. Add or subtract to find correct time (24 hr. clock) using hours or minutes
- f. Add or subtract various increments on gauges, dials, or any other measuring instrument
- g Add or subtract time, linear, dry, liquid or degree measures requiring regrouping
- h. Estimate a sum or difference

13. MULTIPLICATION AND DIVISION

- a. Multiply and divide whole numbers
- b Multiply and divide mixed numbers (whole and decimals)
- c Divide a number with decimals in both divisor and dividend
- d. Multiply and divide integers, both positive (+) and negative ( ), and assign proper sign to product or quotient
- e. Estimate a product or quotient

14. FRACTIONS/DECIMALS

- a. Subdivide whole objects or a set of objects into halves (1/2), thirds (1/3), fourths (1/4), eighths (1/8)
- b Reduce fractions to lowest terms
- c Convert fractions (proper and improper) to decimal equivalents, and vice versa, using a table, chart or gauge
- d Compute equivalent value of fractions, decimals, percents, and mixed numbers to lowest terms
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NT

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- a Draw geometric figures, plane and solid
- b. Match geometric figures with word names, equivalent measures
- c. Label all parts of geometric figures using mathematical and characteristic designators
- d. Use a protractor to measure angles, make geometrical constructions
- e. Construct perpendicular on a line segment, bisector of an angle
- f Compute the perimeter and area of any figure
- g. Compute the circumference and area of a circle
- h Compute the area and volume of any solid figure
- i. Use formulas in solving problems involving geometric figures
- j Solve problems and interpret spatial relationships of figures, symbols, and objects from 2 dimensional displays

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- a. Identify median and mode
- b. Compute averages
- c. Solve problems combining all processes using whole, mixed numbers and fractions
- d. Solve problems, combining all processes, involving units of measurement
- e. Interpret information from charts, number lines, scales and graphs to solve arithmetic problems
- f Solve conversion problems of linear (metric and English) liquid, weight, and temperature (F° or C°) measures
- g. Solve problems involving ratio and proportion
- h. Solve word problems where any mathematical process may occur

17. GRAPHING IN THE COORDINATE PLANE

- a. Identify coordinates of a point in any grid system
- b Identify points on a line graph
- c Match a graph with its equation

18. ALGEBRA

- a. Solve simple algebraic equations with one unknown
- b. Recognize and derive equivalent algebraic expressions
- c Evaluate powers and estimate roots

19 TRIGONOMETRY

- a Use tables of trigonometric functions
- b Use tables of logarithms to solve problems
- c Solve geometric problems using trigonometric functions
- d Use trigonometric ratios to solve problems

CONTENT READING

NT

25 PROCEDURAL DIRECTIONS

- a Identify factual details or specifications that are found within a statement or written selection
- b Select parts of text and visual materials to complete a task activity
- c Follow highly detailed, step by step directions in order to accomplish a sequence of task activities
- d Determine the essential message of a paragraph or section of written material
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- a Recognize common words and their meanings
- b Recognize task related words with technical meanings
- c Identify the correct meaning of a word from the context of a sentence
- d Recognize the meaning of common contractions, abbreviations and acronyms
- e Determine the meaning of figurative, idiomatic, and technical terms by using context clues or by using a reference source(s)

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- a Locate a Technical Manual, Field Manual or any related source document by code number and title
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- a Use a simple linear path of an organizational chart to list events in sequential order
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- a Identify directions that tools, hardware, or components may be moved
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GEOMETRY

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- a. Recognize and match the names of solids with their corresponding figures

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- a. Identify technical words associated with geometric figures
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- a. Use tables of trigonometric functions
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NT

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- a. Locate the block on a form to enter the *appropriate information*
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- a. Distinguish between essential and non-essential details during the note taking process
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- c Rewrite all recorded details in sentence form
- d Organize all sentences into paragraphs

NT

34 OUTLINING (topic or sentence)

- a Distinguish between major and subordinate topics
- b Generate titles for each major topic selected
- c Use phrases or sentences to provide subordinate details under each major topic
- d Alternate, indent numbers and letters to establish a hierarchy

35 REPORT WRITING

- a State the intent or objective(s) of the report
- b Describe the parameters of the event or situation
- c Distinguish between relevant and irrelevant details
- d Sequence events in the order they have occurred
- e State general impressions of events described
- f Select examples that will clarify major issues presented in the report
- g Examine opposing points of view in the report
- h Summarize the major points developed in the report
- i Justify an action taken and give reasons for rejecting alternatives

36 EDITING

- a Spell frequently used words correctly
- b Spell task-related words correctly
- c Identify words that need to be capitalized
- d Correct all misspelled words with or without the use of a reference source
- e Apply all rules for end marks, commas, and apostrophes
- f Apply common rules of grammar
- g Rewrite the paragraph by stating the main idea in the first sentence, and restructuring the sentences for coherence
- h Appraise an entire written communication and make adjustments to improve clarity

VERBAL COMMUNICATION

37 TYPE

- a Individual – a person working on a task and communicating with another when assistance is needed or when a supervisory decision is needed
- b Instruction – a task activity requiring communication between an instructor, an individual or small group where the purpose is to give facts or rules to inform or guide
- c Tutor – interaction takes place between two persons where one is instructing and the other is doing the task
- d Peer Group (less than 10) – all members engage in an activity where one person assumes a leadership role and communicates to others what is to be done
- e Interview – a person communicating with another about his activities, opinions, or subject expertise for the purpose of using the information in a task
- f Briefing – communicating final instructions to others or giving an account in summary
- g Counsel – communicating together to exchange ideas or opinions to recommend, give or take advice, or to arrive at an acceptance of a plan or decision
- h Command – communicate to others an order or action to be taken where a person has a position of authority

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NT

38 CHARACTERISTICS

- a Enunciate clearly, using the proper rate of speech
- b Use technical vocabulary suitable to the task and level of the person
- c Determine the appropriate amount of information to communicate
- d Interpret figurative or idiomatic language by reference to its use in context
- e Follow highly detailed, step-by-step directions
- f Solicit feedback to confirm the accurate reception of the communication
- g Recognize when a low key, informal dialogue is suitable
- h Recognize when direct verbal commands are necessary
- i Recognize when a prescribed series of verbal interactions is required to coordinate a group effort
- j Recognize when the situation will require a structured, preplanned method of presentation

39 BARRIERS

- a Recognize the need for clear, concise directions in order to avoid language or word-meaning differences
- b Recognize personality factors and inter personal relationships that may exist
- c Recognize feedback as a means of communicating more effectively and increasing task competence

SAFETY/SECURITY

40 PRECAUTIONS

- a Use common knowledge to avoid hazards in order to prevent injury to self or equipment
- b Apply preventive measures prior to task performance to minimize any potential safety or security problem
- c Select an appropriate course of action in the event of an emergency

PERCEPTUAL

41 RECOGNITION

- a Identify similarities and differences between and among objects
- b Use body language (motions, gestures, postures) to communicate or signal
- c Determine the presence of a defect or extent of damage
- d Match objects by size, shape, color and significant markings
- e Classify objects by size, shape, color and significant markings
- f Determine direction, duration, and intensity of sounds, sightings and smells
- g Infer from sights, sounds, touch, smells, or tastes to determine a course of action

NUMERATION/PLACE VALUE

NT

1 NUMBERING AND COUNTING

- a Match numerals with word names and models
- b Write numerals one through N in sequential order from any starting point
- c State what numeral comes after, before, or between any two given numerals
- d Select the numeral which is greater/lesser from a set of numerals
- e Identify an object with a specified ordinal position
- f Write or state the place value of a particular digit, whole or decimal number
- g Round off a number to a specified place, whole or decimal
- h Count by ones, twos, fives, tens, etc. backward or forward (skip counting)
- i Match numbers with points or intervals on a number line (positive (+) or negative (-) values)

UNITS OF MEASUREMENT

2 LINEAR, WEIGHT, AND VOLUME MEASURES

- a Name the markings on a linear scale
- b Differentiate units of measure and equivalents in the English and metric system
- c Use a ruler, yardstick, meter stick or scale to measure lengths of objects or distances
- d Identify measures of ounce, pound, gram
- e Identify measures of pints, quarts, gallons, liters
- f Use a scale which is not numerically calibrated
- g Estimate measures of varying lengths, dimensions or weights

3 DEGREE MEASURES

- a Identify degree or mil as a unit in determining direction, distance or temperature
- b Estimate the measure of a given angle not greater than 180^{0}
- c Interpret bearings, azimuth and other contexts in which the measure of an angle may range from 0^{0} to 360^{0}/0 to 6400 mils

4 TIME TELLING MEASURES

- a Use a 24 hour or digital clock to tell time
- b Name letters and tell time in hours, minutes, and seconds
- c Estimate time in seconds, minutes, and parts of an hour
- d Identify [illegible] and arrange them in Julian style
- e [illegible] to hours and tenths of hours
- f [illegible] Greenwich Mean Time (GMT) as a basis for establishing [illegible]

NT

5 GAUGE MEASURES

- a Identify the unit of measurement found on an instrument
- b Interpret the number, word, symbol from a display, read out
- c Recognize a "reading" from a gauge with color divisions
- d Recognize positive (+) and negative (-) demarcation on a scale
- e Select band(s) from a multi scale gauge
- f. Match a gauge reading to a specification using numbered or labeled intervals
- g Interpret gauge readings from an unnumbered/unmarked interval
- h Interpret a gauge reading which is fluctuating or momentarily sustained
- i Match specifications of required measures by manipulation, alignment or *maintenance*

VISUAL/SPATIAL RELATIONSHIPS

6 SPATIAL

- a. Identify directions that tools, hardware or components may be moved
- b. Manipulate objects to align, match, mate, make parallel, be perpendicular or be at an angle
- c Interpret spatial relationships of figures and objects from 2 dimensional *drawings, pictures, or photographs*
- d. Relate geometric symbols and graphic representations to actual systems subsystems and components

GEOMETRY

7 LINES

- a. Identify and name points, lines, rays, and segments
- b Identify intersecting lines, parallel lines, and line segments
- c. Define and identify perpendicular lines
- d Identify congruent segments

8. PLANES

- a Identify and name plane geometric figures
- b List the characteristics of geometric figures
- c Classify figures according to the number or measure of its sides or angles
- d. Identify figures which possess similarities
- e. Identify figures which may be parallel, perpendicular or congruent

9 ANGLES AND TRIANGLES

- a Identify and name the different kinds of angles and triangles, with the corresponding figures
- b. Identify vertical, adjacent, complementary, or supplementary angles
- c. Classify triangles according to their sides or size
- d Identify altitudes and medians of triangles and bisector of an angle
- e. Name an angle by using letters, a number or a single letter

NT

...OS

a. Recognize and match the names of solids with their corresponding figures

...TERMINOLOGY

a. Identify mathematical words associated with geometric figures
b. Interpret meaning of terms derived from spatial orientation

COMPUTE OR PERFORM

12. ADDITION AND SUBTRACTION

a. Add or subtract whole numbers, without carrying or borrowing
b. Add or subtract whole numbers, carrying and borrowing
c. Add and subtract, borrowing and carrying with mixed numbers (whole and decimals)
d. Add or subtract positive (+) and negative (-) numbers, using a number line to arrive at a solution
e. Add or subtract to find correct time (24 hr. clock) using hours or minutes
f. Add or subtract various increments on gauges, dials, or any other measuring instrument
g. Add or subtract time, linear, dry, liquid or degree measures requiring regrouping
h. Estimate a sum or difference

13. MULTIPLICATION AND DIVISION

a. Multiply and divide whole numbers
b. Multiply and divide mixed numbers (whole and decimals)
c. Divide a number with decimals in both divisor and dividend
d. Multiply and divide integers, both positive (+) and negative (-), and assign proper sign to product or quotient
e. Estimate a product or quotient

14. FRACTIONS/DECIMALS

a. Subdivide whole objects or a set of objects into halves (1/2), thirds (1/3), fourths (1/4), eighths (1/8)
b. Reduce fractions to lowest terms
c. Convert fractions (proper and improper) to decimal equivalents, and vice versa, using a table, chart or gauge
d. Compute equivalent value of fractions, decimals, percents, and mixed numbers to lowest terms
e. Add and subtract fractions, with same or different denominators
f. Multiply and divide fractions with and without whole numbers
g. Estimate a fractional sum, product or quotient

16. GEOMETRY

a. Draw geometric figures, plane and solid
b. Match geometric figures with word names, equivalent measures
c. Label all parts of geometric figures using mathematical and characteristic designators
d. Use a protractor to measure angles, make geometrical constructions
e. Construct perpendicular on a line segment, bisector of an angle
f. Compute the perimeter and area of any figure
g. Compute the circumference and area of a circle
h. Compute the area and volume of any solid figure
i. Use formulas in solving problems involving geometric figures
j. Solve problems and interpret spatial relationships of figures, symbols, and objects from 2-dimensional displays

18. COMBINATION OF PROCESSES

a. Identify median and mode
b. Compute averages
c. Solve problems combining all processes using whole, mixed numbers and fractions
d. Solve problems, combining all processes, involving units of measurement
e. Interpret information from charts, number lines, scales and graphs to solve arithmetic problems
f. Solve conversion problems of linear (metric and English) liquid, weight, and temperature (F° or C°) measures
g. Solve problems involving ratio and proportion
h. Solve word problems where any mathematical process may occur

17. GRAPHING IN THE COORDINATE PLANE

a. Identify coordinates of a point in any grid system
b. Identify points on a line graph
c. Match a graph with its equation

18. ALGEBRA

a. Solve simple algebraic equations with one unknown
b. Recognize and derive equivalent algebraic expressions
c. Evaluate powers and estimate roots

19. TRIGONOMETRY

a. Use tables of trigonometric functions
b. Use tables of logarithms to solve problems
c. Solve geometric problems using trigonometric functions
d. Use trigonometric ratios to solve problems

CONTENT READING

NT

25. PROCEDURAL DIRECTIONS

- a. Identify factual details or specifications that are found within a statement or written selection
- b. Select parts of text and visual materials to complete a task activity
- c. Follow highly detailed, step-by-step directions in order to accomplish a sequence of task activities
- d. Determine the essential message of a paragraph or section of written material
- e. Infer from a written source, which does not explicitly provide required information, in order to make a decision
- f. Synthesize information from written sources which contributes to the completion of a task activity

26. VOCABULARY

- a. Recognize common words and their meanings
- b. Recognize task related words with technical meanings
- c. Identify the correct meaning of a word from the context of a sentence
- d. Recognize the meaning of common contractions, abbreviations and acronyms
- e. Determine the meaning of figurative, idiomatic, and technical terms by using context clues or by using a reference source(s)

INFORMATION ACCESS

27. REFERENCE SKILLS

- a. Locate a Technical Manual, Field Manual or any related source document by code number and title
- b. Alphabetize words or topics to locate information
- c. Use the table of contents, index system or sub-system heading, appendix and glossary to locate information
- d. Locate the page, title, paragraph, figure, or chart needed to answer a question or to solve a problem
- e. Determine, after scanning or skim-reading, whether the information is relevant
- f. Cross reference within and across source documents to select information needed to perform a routine
- g. Organize information from multiple sources into a sequenced series of events

28. TABLES/CHARTS

- a. Obtain a fact or specification from a two column table or chart to find information
- b. Obtain a fact or specification from an intersection of a row by a column table or chart
- c. Use a complex table or chart requiring cross referencing within or in combination with data found outside the chart
- d. Apply information from tables and charts for locating malfunctions, or for [illegible] of action

VISUAL AIDS

NT

29. ILLUSTRATIONS

- a. Identify details, labels, numbers, and parts from an illustration or picture
- b. Identify parts or details according to a key or legend
- c. Interpret a drawing which shows a cross sectional view of an object for assembly, disassembly
- d. Interpret a three dimensional projection or exploded view of object(s) for assembly, disassembly, or position in system or sub system
- e. Follow illustrations, or photographs, arranged in a sequential order, as a guide
- f. Integrate information from various sources to select a course of action

30. FLOW CHARTS

- a. Use a simple linear path of an organizational chart to list events in sequential order
- b. Use a linear path of a flow chart to provide visual and textual direction to a procedure, to arrive at decision points, and to provide alternate paths in problem-solving
- c. Translate the significance of the symbols into physical activities

31. SCHEMATICS

- a. Isolate each major section or entity presented in a schematic diagram
- b. Identify the components within each entity
- c. Trace connections in an integrated circuit from their origin to another point within or from one entity to another
- d. Isolate a problem component in a schematic and trace it to components believed to cause the problem
- e. Interpret symbols to indicate direction of flow, test points, components and diagrammatic decision points

WRITTEN COMMUNICATION

32. FORMS

- a. Locate the block on a form to enter the appropriate information
- b. Transfer a number, code, date, figure or related data from equipment or written sources onto an appropriate section of the form
- c. Write the name of the organization, responsible personnel, description of the part or equipment, and nomenclature, in appropriate sections of the form
- d. Write a descriptive account of an activity or transaction performed
- e. Use a completed form to locate or compare information

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- b Apply preventive measures prior to task performance to minimize any potential safety or security problem
- c. Select an appropriate course of action in the event of an emergency

PERCEPTUAL

41. RECOGNITION

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- c. Determine the presence of a defect or extent of damage
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- e Classify objects by size, shape, color and significant markings
- f Determine direction, duration, and intensity of sounds, sightings and smells
- g. Infer from sights, sounds, touch, smells, or tastes to determine a course of action

NUMERATION/PLACE VALUE

NT

1. NUMBERING AND COUNTING

- a. Match numerals with word names and models
- b. Write numerals one through N in sequential order from any starting point
- c. State what numeral comes after, before, or between any two given numerals
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- i. Match numbers with points or intervals on a number line (positive (+) or negative (-) values)

UNITS OF MEASUREMENT

2. LINEAR, WEIGHT, AND VOLUME MEASURES

- a. Name the markings on a linear scale
- b. Differentiate units of measure and equivalents in the English and metric system
- c. Use a ruler, yardstick, meter stick or scale to measure lengths of objects or distances
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- a. Identify degree or mil as a units in determining direction, distance or temperature
- b. Estimate the measure of a given angle not greater than 180°
- c. Interpret bearings, azimuth and other contexts in which the measure of an angle may range from 0° to 360°/0 to 6400 mils

4. TIME TELLING MEASURES

- a. Use a 24 hour or digital clock to tell time
- b. Name intervals and tell time in hours, minutes, and seconds
- c. Estimate time in seconds, minutes, and parts of an hour
- d. Identify calendar units and arrange them in Julian style
- e. Convert time in hours and tenths of hours
- f. Compute time using Greenwich Mean Time (GMT) as a basis for establishing zone [illegible]

NT

5. GAUGE MEASURES

- a. Identify the unit of measurement found on an instrument
- b. Interpret the number, word, symbol from a display read-out
- c. Recognize a "reading" from a gauge with color divisions
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VISUAL/SPATIAL RELATIONSHIPS

6. SPATIAL

- a. Identify directions that tools, hardware, or components may be moved
- b. Manipulate objects to align, match, mate, make parallel, be perpendicular or be at an angle
- c. Interpret spatial relationships of figures and objects from 2 dimensional drawings, pictures, or photographs
- d. Relate geometric symbols and graphic representations to actual systems subsystems and components

GEOMETRY

7. LINES

- a. Identify and name points, lines, rays, and segments
- b. Identify intersecting lines, parallel lines, and line segments
- c. Define and identify perpendicular lines
- d. Identify congruent segments

8. PLANES

- a. Identify and name plane geometric figures
- b. List the characteristics of geometric figures
- c. Classify figures according to the number or measure of its sides or angles
- d. Identify figures which possess similarities
- e. Identify figures which may be parallel, perpendicular or congruent

9. ANGLES AND TRIANGLES

- a. Identify and name the different kinds of angles and triangles, with their corresponding figures
- b. Identify vertical, adjacent, complementary or supplementary angles
- c. Classify triangles according to their sides or angle size
- d. Identify altitudes and medians of triangles or the bisector of an angle
- e. Name an angle by using letters, a number, or a single letter

NT

10 SOLIDS

- a. Recognize and match the names of solids with their corresponding figures

11 TERMINOLOGY

- a. Identify technical words associated with geometric figures
- b. Interpret meaning of terms derived from spatial orientation

COMPUTE OR PERFORM

12 ADDITION AND SUBTRACTION

- a. Add or subtract whole numbers, without carrying or borrowing
- b. Add or subtract whole numbers, carrying and borrowing
- c. Add and subtract, borrowing and carrying with mixed numbers (whole and decimals)
- d. Add or subtract positive (+) and negative (-) numbers, using a number line to arrive at a solution
- e. Add or subtract to find correct time (24 hr. clock) using hours or minutes
- f. Add or subtract various increments on gauges, dials, or any other measuring instrument
- g. Add or subtract time, linear, dry, liquid or degree measures requiring regrouping
- h. Estimate a sum or difference

13 MULTIPLICATION AND DIVISION

- a. Multiply and divide whole numbers
- b. Multiply and divide mixed numbers (whole and decimals)
- c. Divide a number with decimals in both divisor and dividend
- d. Multiply and divide integers, both positive (+) and negative (-), and assign proper sign to product or quotient
- e. Estimate a product or quotient

14 FRACTIONS/DECIMALS

- a. Subdivide whole objects or a set of objects into halves (1/2), thirds (1/3), fourths (1/4), eighths (1/8)
- b. Reduce fractions to lowest terms
- c. Convert fractions (proper and improper) to decimal equivalents, and vice versa, using a table, chart or gauge
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- e. Add and subtract fractions, with same or different denominators
- f. Multiply and divide fractions with and without whole numbers
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NT

15. GEOMETRY

- a. Draw geometric figures, plane and solid
- b. Match geometric figures with word names, equivalent measures
- c. Label all parts of geometric figures using mathematical and characteristic designators
- d. Use a protractor to measure angles, make geometrical constructions
- e. Construct perpendicular on a line segment, bisector of an angle
- f. Compute the perimeter and area of any figure
- g. Compute the circumference and area of a circle
- h. Compute the area and volume of any solid figure
- i. Use formulas in solving problems involving geometric figures
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16. COMBINATION OF PROCESSES

- a. Identify median and mode
- b. Compute averages
- c. Solve problems combining all processes using whole, mixed numbers and fractions
- d. Solve problems, combining all processes, involving units of measurement
- e. Interpret information from charts, number lines, scales and graphs to solve arithmetic problems
- f. Solve conversion problems of linear (metric and English) [illegible], weight, and temperature (F^{O} or C^{O}) measures
- g. Solve problems involving ratio and proportion
- h. Solve word problems where any mathematical process may occur

17. GRAPHING IN THE COORDINATE PLANE

- a. Identify coordinates of a point in any grid system
- b. Identify points on a line graph
- c. Match a graph with its equation

18 ALGEBRA

- a. Solve simple algebraic equations with one unknown
- b. Recognize and derive equivalent algebraic expressions
- c. Evaluate powers and estimate roots

19 TRIGONOMETRY

- a. Use tables of trigonometric functions
- b. Use tables of logarithms to solve problems
- c. Solve geometric problems using trigonometric functions
- d. Use trigonometric ratios to solve problems

CONTENT READING

NT

29 PROCEDURAL DIRECTIONS

- a Identify factual details or specifications that are found within a statement or written selection
- b Select parts of text and visual materials to complete a task activity
- c Follow highly detailed, step by step directions in order to accomplish a sequence of task activities
- d Determine the essential message of a paragraph or section of written material
- e Infer from a written source, which does not explicitly provide required information, in order to make a decision
- f Synthesize information from written sources which contributes to the completion of a task activity

28 VOCABULARY

- a Recognize common words and their meanings
- b Recognize task related words with technical meanings
- c Identify the correct meaning of a word from the context of a sentence
- d Recognize the meaning of common contractions, abbreviations and acronyms
- e Determine the meaning of figurative, idiomatic, and technical terms by using context clues or by using a reference source(s)

INFORMATION ACCESS

27 REFERENCE SKILLS

- a Locate a Technical Manual, Field Manual or any related source document by code number and title
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- d Locate the page, title, paragraph, figure, or chart needed to answer a question or to solve a problem
- e Determine, after scanning or skim reading, whether the information is relevant
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28 TABLES/CHARTS

- a Obtain a fact or specification from a two column table or chart to find information
- b Obtain a fact or specification from an intersection of a row by column table or chart
- c Use a complex table or chart requiring cross referencing within or in combination with text material outside the chart
- d Apply information from tables and charts for locating malfunctions or for [illegible]

VISUAL AIDS

NT

30 ILLUSTRATIONS

- a Identify details, labels, numbers, and parts from an illustration or picture
- b Identify parts or details according to a key or legend
- c Interpret a drawing which shows a cross sectional view of an object for assembly, disassembly
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- e Follow illustrations, or photographs, arranged in a sequential order, as a guide
- f Integrate information from various sources to select a course of action

30 FLOW CHARTS

- a Use a simple linear path of an organizational chart to list events in sequential order
- b Use a linear path of a flow chart to provide visual and textual directions to a procedure, to arrive at decision points, and to provide alternate paths in problem solving
- c Translate the significance of the symbols into physical activities

31 SCHEMATICS

- a. Isolate each major section or entity presented in a schematic diagram
- b. Identify the components within each entity
- c. Trace connections in an integrated circuit from their origin to another point within or from one entity to another
- d. Isolate a problem component in a schematic and trace it to components believed to cause the problem
- e. Interpret symbols to indicate direction of flow, test points, components and diagrammatic decision points

WRITTEN COMMUNICATION

32 FORMS

- a. Locate the block on a form to enter the appropriate information
- b Transfer a number, code, date, figure or related data from equipment or written sources onto an appropriate section of the form
- c. Write the name of the organization, responsible personnel, disposition of the part or equipment, and nomenclature, in appropriate sections of the form
- d Write a descriptive account of an activity or transaction performed
- e Use a completed form to locate or compare information

33 NOTE-TAKING

- a Distinguish between essential and non essential details during the note taking process
- b Record details without misinterpreting the intent of either written source or an interview
- c Rewrite all recorded details in sentence form
- d Organize all sentences into paragraphs

NT

34 OUTLINING (topic or sentence)

- a. Distinguish between major and subordinate topics
- b. Generate titles for each major topic selected
- c. Use phrases or sentences to provide subordinate details under each major topic
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- a. State the intent or objective(s) of the report
- b. Describe the parameters of the event or situation
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- f. Select examples that will clarify major issues presented in the report
- g. Examine opposing points of view in the report
- h. Summarize the major points developed in the report
- i. Justify an action taken and give reasons for rejecting alternatives

36. EDITING

- a. Spell frequently used words correctly
- b. Spell task-related words correctly
- c. Identify words that need to be capitalized
- d. Correct all misspelled words with or without the use of a reference source
- e. Apply all rules for end marks, commas, and apostrophes
- f. Apply common rules of grammar
- g. Rewrite the paragraph by stating the main idea in the first sentence, and restructuring the sentences for coherence
- h. Appraise an entire written communication and make adjustments to improve clarity

VERBAL COMMUNICATION

37 TYPE

- a. Individual - a person working on a task and communicating with another when assistance is needed or when a supervisory decision is needed
- b. Instruction - a task activity requiring communication between an instructor, an individual or small group where the purpose is to give facts or rules to inform or guide
- c. Tutor - interaction takes place between two persons where one is instructing and the other is doing the task
- d. Peer Group (less than 10) - all members engage in an activity where one person assumes a leadership role and communicates to others what is to be done
- e. Interview - a person communicating with another about his activities, opinions, or subject expertise for the purpose of using the information in a task
- f. Briefing - communicating final instructions to others or giving an account in summary
- g. Counsel - communicating together to exchange ideas or opinions to recommend, give or take advice, or to arrive at an acceptance of a plan or decision
- h. Command - communicate to others an order or action to be taken where a person has a position of authority

NT

38 CHARACTERISTICS

- a. Enunciate clearly, using the proper rate of speech
- b. Use technical vocabulary suitable to the task and level of the person
- c. Determine the appropriate amount of information to communicate
- d. Interpret figurative or idiomatic language by reference to its use in context
- e. Follow highly detailed, step by step directions
- f. Solicit feedback to confirm the accurate reception of the communication
- g. Recognize when a low-key, informal dialogue is suitable
- h. Recognize when direct verbal commands are necessary
- i. Recognize when a prescribed series of verbal interactions is required to coordinate a group effort
- j. Recognize when the situation will require a structured, preplanned method of presentation

39. BARRIERS

- a. Recognize the need for clear, concise directions in order to avoid language or word-meaning differences
- b. Recognize personality factors and inter-personal relationships that may exist
- c. Recognize feedback as a means of communicating more effectively and increasing task competence

SAFETY/SECURITY

40. PRECAUTIONS

- a. Use common knowledge to avoid hazards in order to prevent injury to self or equipment
- b. Apply preventive measures prior to task performance to minimize any potential safety or security problem
- c. Select an appropriate course of action in the event of an emergency

PERCEPTUAL

41. RECOGNITION

- a. Identify similarities and differences between and among objects
- b. Use body language (motions, gestures, postures) to communicate or signal
- c. Determine the presence of a defect or extent of damage
- d. Match objects by size, shape, color and significant markings
- e. Classify objects by size, shape, color and significant markings
- f. Determine direction, duration, and intensity of sounds, sightings and smells
- g. Infer from sights, sounds, touch, smells, or tastes to determine a course of action

76W Petroleum Supply Specialist

BSEP I & II

NUMERATION/PLACE VALUE

NT

1 NUMBERING AND COUNTING

- a Match numerals with word names and models
- b Write numerals one through N in sequential order from any starting point
- c State what numeral comes after, before, or between any two given numerals
- d Select the numeral which is greater/lesser from a set of numerals
- e Identify an object with a specified ordinal position
- f Write or state the place value of a particular digit, whole or decimal number
- g Round off a number to a specified place, whole or decimal
- h Count by ones, twos, fives, tens, etc. backward or forward (skip counting)
- i Match numbers with points or intervals on a number line (positive (+) or negative (-) values)

UNITS OF MEASUREMENT

2 LINEAR, WEIGHT, AND VOLUME MEASURES

- a Name the markings on a linear scale
- b Differentiate units of measure and equivalents in the English and metric system
- c Use a ruler, yardstick, meter stick or scale to measure lengths of objects or distances
- d Identify measures of ounce, pound, grain
- e Identify measures of pints, quarts, gallons, liters
- f Use a scale which is not numerically calibrated
- g Estimate measures of varying lengths, dimensions or weights

3 DEGREE MEASURES

- a Identify degree or mil as a unit in determining direction, distance or temperature
- b Estimate the measure of a given angle not greater than 180°
- c Interpret bearings, azimuth and other contexts in which the measure of an angle may range from 0° to 360°/0 to 6400 mils

4 TIME TELLING MEASURES

- a Use a 24 hour or digital clock to tell time
- b Name intervals and tell time in hours, minutes, and seconds
- c Estimate time to seconds, minutes, and parts of an hour
- d Identify calendar units and arrange them in Julian style
- e Convert time into hours and tenths of hours
- f Compute time using Greenwich Mean Time (GMT) as a basis for establishing zone and [illegible]

NT

6 GAUGE MEASURES

- a Identify the unit of measurement found on an instrument
- b Interpret the number, word, symbol from a display readout
- c Recognize a "reading" from a gauge with color divisions
- d. Recognize positive (+) and negative (-) demarcation on a scale
- e Select band(s) from a multi-scale gauge
- f Match a gauge reading to a specification using numbered or labeled intervals
- g Interpret gauge readings from an unnumbered/unmarked interval
- h Interpret a gauge reading which is fluctuating or momentarily sustained
- i. Match specifications of required measures by manipulation, alignment or maintenance

VISUAL/SPATIAL RELATIONSHIPS

6 SPATIAL

- a. Identify directions that tools, hardware, or components may be moved
- b. Manipulate objects to align, match, mate, make parallel, be perpendicular or be at an angle
- c Interpret spatial relationships of figures and objects from 2-dimensional drawings, pictures, or photographs
- d. Relate geometric symbols and graphic representations to actual systems, subsystems and components

GEOMETRY

7. LINES

- a. Identify and name points, lines, rays, and segments
- b Identify intersecting lines, parallel lines, and line segments
- c Define and identify perpendicular lines
- d. Identify congruent segments

8. PLANES

- a Identify and name plane geometric figures
- b. List the characteristics of geometric figures
- c. Classify figures according to the number or measure of its sides or angles
- d. Identify figures which possess similarities
- e. Identify figures which may be parallel, perpendicular or congruent

9 ANGLES AND TRIANGLES

- a. Identify and name the different kinds of angles and triangles, with their corresponding figures
- b. Identify vertical, adjacent, complementary or supplementary angles
- c. Classify triangles according to their sides or angle size
- d. Identify altitudes and medians of triangles or the bisector of an angle
- e. Name an angle by using letters, a number, or a single letter

NT

10 SOLIDS

- a. Recognize and match the names of solids with their corresponding figures

11 TERMINOLOGY

- a. Identify technical words associated with geometric figures
- b. Interpret meaning of terms derived from spatial orientation

COMPUTE OR PERFORM

12 ADDITION AND SUBTRACTION

- a. Add or subtract whole numbers, without carrying or borrowing
- b. Add or subtract whole numbers, carrying and borrowing
- c. Add and subtract, borrowing and carrying with mixed numbers (whole and decimals)
- d. Add or subtract positive (+) and negative (-) numbers, using a number line to arrive at a solution
- e. Add or subtract to find correct time (24 hr. clock) using hours or minutes
- f. Add or subtract various increments on gauges, dials, or any other measuring instrument
- g. Add or subtract time, linear, dry, liquid or degree measures requiring regrouping
- h. Estimate a sum or difference

13 MULTIPLICATION AND DIVISION

- a. Multiply and divide whole numbers
- b. Multiply and divide mixed numbers (whole and decimals)
- c. Divide a number with decimals in both divisor and dividend
- d. Multiply and divide integers, both positive (+) and negative (-), and assign proper sign to product or quotient
- e. Estimate a product or quotient

14 FRACTIONS/DECIMALS

- a. Subdivide whole objects or a set of objects into halves (1/2), thirds (1/3), fourths (1/4), eighths (1/8)
- b. Reduce fractions to lowest terms
- c. Convert fractions (proper and improper) to decimal equivalents, and vice versa, using a table, chart or gauge
- d. Compute equivalent value of fractions, decimals, percents, and mixed numbers to lowest terms
- e. Add and subtract fractions, with same or different denominators
- f. Multiply and divide fractions with and without whole numbers
- g. Estimate a fractional sum, product, or quotient

NT

15 GEOMETRY

- a. Draw geometric figures, plane and solid
- b. Match geometric figures with word names, equivalent measures
- c. Label all parts of geometric figures using mathematical and characteristic designators
- d. Use a protractor to measure angles, make geometrical constructions
- e. Construct perpendiculars on a line segment, bisector of an angle
- f. Compute the perimeter and area of any figure
- g. Compute the circumference and area of a circle
- h. Compute the area and volume of any solid figure
- i. Use formulas in solving problems involving geometric figures
- j. Solve problems and interpret spatial relationships of figures, symbols, and objects from 2-dimensional displays

16. COMBINATION OF PROCESSES

- a. Identify median and mode
- b. Compute averages
- c. Solve problems combining all processes using whole, mixed numbers and fractions
- d. Solve problems, combining all processes, involving units of measurement
- e. Interpret information from charts, number lines, scales and graphs to solve arithmetic problems
- f. Solve conversion problems of linear (metric and English) liquid, weight and temperature (F^{O} or C^{O}) measures
- g. Solve problems involving ratio and proportion
- h. Solve word problems where any mathematical process may occur

17. GRAPHING IN THE COORDINATE PLANE

- a. Identify coordinates of a point in any grid system
- b. Identify points on a line graph
- c. Match a graph with its equation

18. ALGEBRA

- a. Solve simple algebraic equations with one unknown
- b. Recognize and derive equivalent algebraic expressions
- c. Evaluate powers and estimate roots

19. TRIGONOMETRY

- a. Use tables of trigonometric functions
- b. Use tables of logarithms to solve problems
- c. Solve geometric problems using trigonometric functions
- d. Use trigonometric ratios to solve problems

CONTENT READING

NT

25 PROCEDURAL DIRECTIONS

- a Identify factual details or specifications that are found within a statement or written selection
- b Select parts of text and visual materials to complete a task activity
- c Follow highly detailed, step by step directions in order to accomplish a sequence of task activities
- d Determine the essential message of a paragraph or section of written material
- e Infer from a written source, which does not explicitly provide required information, in order to make a decision
- f Synthesize information from written sources which contributes to the completion of a task activity

26 VOCABULARY

- a Recognize common words and their meanings
- b Recognize task related words with technical meanings
- c Identify the correct meaning of a word from the context of a sentence
- d Recognize the meaning of common contractions, abbreviations and acronyms
- e Determine the meaning of figurative, idiomatic, and technical terms by using context clues or by using a reference source(s)

INFORMATION ACCESS

27 REFERENCE SKILLS

- a Locate a Technical Manual, Field Manual or any related source document by code number and title
- b Alphabetize words or topics to locate information
- c Use the table of contents, index, system or sub system heading, appendix and glossary to locate information
- d Locate the page, title, paragraph, figure, or chart needed to answer a question or to solve a problem
- e Determine, after scanning or skim reading, whether the information is relevant
- f Cross reference within and across source documents to select information needed to perform a routine
- g Organize information from multiple sources into a sequenced series of events

28 TABLES/CHARTS

- a Obtain a [illegible] specification from a two column table or chart to find information
- b Obtain a [illegible] specification from an intersection of a row by column table or chart
- c Use multiple table or chart requiring cross-referencing within or in combination with [illegible] outside the chart
- d Apply [illegible] to isolate the cause for faulty malfunctions, or for [illegible]

VISUAL AIDS

NT

29 ILLUSTRATIONS

- a Identify details, labels, numbers, and parts from an illustration or picture
- b Identify parts or details according to a key or legend
- c Interpret a drawing which shows a cross sectional view of an object for assembly, disassembly
- d Interpret a three dimensional projection or exploded view of object(s) for assembly, disassembly, or position in system or sub system
- e Follow illustrations, or photographs arranged in a sequential order, as a guide
- f Integrate information from various sources to select a course of action

30 FLOW CHARTS

- a Use a simple linear path of an organizational chart to list events in sequential order
- b Use a linear path of a flow chart to provide visual and textual directions to a procedure to arrive at decision points, and to provide alternate paths in problem solving
- c Translate the significance of the symbols into physical activities

31 SCHEMATICS

- a Isolate each major section or entity presented in a schematic diagram
- b Identify the components within each entity
- c Trace connections in an integrated circuit from their origin to another point within or from one entity to another
- d Isolate a problem component in a schematic and trace it to components believed to cause the problem
- e Interpret symbols to indicate direction of flow, test points, components, and diagrammatic decision points

WRITTEN COMMUNICATION

32 FORMS

- a Locate the block on a form to enter the appropriate information
- b Transfer a number, code, date, figure or related data from equipment or written sources onto an appropriate section of the form
- c Write the name of the organization, responsible personnel, disposition of the part or equipment, and nomenclature, in appropriate sections of the form
- d Write a descriptive account of an activity or transaction performed
- e Use a completed form to locate or compare information

33 NOTE TAKING

- a Distinguish between essential and non essential details during the note taking process
- b Record details without misinterpreting the intent of either written material or an interview
- c Rewrite all recorded details in sentence form
- d Organize all sentences into paragraphs

NT

34 OUTLINING (topic or sentence)

- a. Distinguish between major and subordinate topics
- b. Generate titles for each major topic selected
- c. Use phrases or sentences to provide subordinate details under each major topic
- d. Alternate, indent numbers and letters to establish a hierarchy

35 REPORT WRITING

- a. State the intent or objective(s) of the report
- b. Describe the parameters of the event or situation
- c. Distinguish between relevant and irrelevant details
- d. Sequence events in the order they have occurred
- e. State general impressions of events described
- f. Select examples that will clarify major issues presented in the report
- g. Examine opposing points of view in the report
- h. Summarize the major points developed in the report
- i. Justify an action taken and give reasons for rejecting alternatives

36 EDITING

- a. Spell frequently used words correctly
- b. Spell task-related words correctly
- c. Identify words that need to be capitalized
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4/23/82

NT

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- e. Classify objects by size, shape, color and significant markings
- f. Determine direction, duration, and intensity of sounds, sightings and smells
- g. Infer from sights, sounds, touch, smells, or tastes to determine a course of action

NUMERATION/PLACE VALUE

NT

1 NUMBERING AND COUNTING

- a Match numerals with word names and models
- b Write numerals one through N in sequential order from any starting point
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2 LINEAR, WEIGHT, AND VOLUME MEASURES

- a Name the markings on a linear scale
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- a Identify degree or mil as a unit in determining direction, distance or temperature
- b Estimate the measure of a given angle not greater than 180°
- c Interpret bearings, azimuth and other contexts in which the measure of an angle may range from 0° to 360°/0 to 6400 mils

4 TIME TELLING MEASURES

- a Use a 24 hour or digital clock to tell time
- b Name intervals and tell time in hours, minutes, and seconds
- c Estimate time in seconds, minutes, and parts of an hour
- d Identify, records, write and arrange them in dozen style
- e Convert time into hours and tenths of hours
- f Convert time using Greenwich Mean Time (GMT) as a basis for establishing [illegible]

NT

5 GAUGE MEASURES

- a Identify the unit of measurement found on an instrument
- b. Interpret the number, word, symbol from a display read out
- c Recognize a "reading" from a gauge with color divisions
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- e Select band(s) from a multi scale gauge
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- h Interpret a gauge reading which is fluctuating or momentarily sustained
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VISUAL/SPATIAL RELATIONSHIPS

6. SPATIAL

- a Identify directions that tools, hardware or components may be moved
- b. Manipulate objects to align, match, mate, make parallel, be perpendicular or to at an angle
- c Interpret spatial relationships of figures and objects from 2 dimensional drawings, pictures, or photographs
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GEOMETRY

7. LINES

- a. Identify and name points, lines, rays and segments
- b. Identify intersecting lines, parallel lines, and line segments
- c Define and identify perpendicular lines
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- b. List the characteristics of geometric figures
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- d. Identify figures which possess similarities
- e. Identify figures which may be parallel, perpendicular or congruent

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- a. Identify and name the different kinds of angles and triangles, with their corresponding figures
- b. Identify vertical, adjacent, complementary & supplementary angles
- c. Classify triangles according to their sides or angle size
- d Identify altitudes and medians of triangles or the bisector of an angle
- e Name an angle by using letters, a number or a single letter

NT

10 SOLIDS

___ a. Recognize and match the names of solids with their corresponding figures

11 TERMINOLOGY

___ a. Identify technical words associated with geometric figures
___ b. Interpret the meaning of terms derived from spatial orientation

COMPUTE OR PERFORM

12 ADDITION AND SUBTRACTION

___ a. Add or subtract whole numbers, without carrying or borrowing
___ b. Add or subtract whole numbers, carrying and borrowing
___ c. Add and subtract, borrowing and carrying with mixed numbers (whole and decimals)
___ d. Add or subtract positive (+) and negative (-) numbers, using a number line to arrive at a solution
___ e. Add or subtract to find correct time (24 hr. clock) using hours or minutes
___ f. Add or subtract various increments on gauges, dials, or any other measuring instrument
___ g. Add or subtract time, linear, dry, liquid or degree measures requiring regrouping
___ h. Estimate a sum or difference

13 MULTIPLICATION AND DIVISION

___ a. Multiply and divide whole numbers
___ b. Multiply and divide mixed numbers (whole and decimals)
___ c. Divide a number with decimals in both divisor and dividend
___ d. Multiply and divide integers, both positive (+) and negative (-), and assign proper sign to product or quotient
___ e. Estimate a product or quotient

14 FRACTIONS/DECIMALS

___ a. Subdivide whole objects or a set of objects into halves (1/2), thirds (1/3), fourths (1/4), eighths (1/8)
___ b. Reduce fractions to lowest terms
___ c. Convert fractions (proper and improper) to decimal equivalents, and vice versa, using a table, chart or gauge
___ d. Compute equivalent value of fractions, decimals, percents, and mixed numbers to lowest terms
___ e. Add and subtract fractions, with same or different denominators
___ f. Multiply and divide fractions with and without whole numbers
___ g. Estimate a fractional sum, product or quotient

NT

15 GEOMETRY

___ a. Draw geometric figures, plane and solid
___ b. Match geometric figures with word names, equivalent measures
___ c. Label all parts of geometric figures using mathematical and characteristic designators
___ d. Use a protractor to measure angles, make geometrical constructions
___ e. Construct perpendicular on a line segment, bisector of an angle
___ f. Compute the perimeter and area of any figure
___ g. Compute the circumference and area of a circle
___ h. Compute the area and volume of any solid figure
___ i. Use formulas in solving problems involving geometric figures
___ j. Solve problems and interpret spatial relationships of figures, symbols, and objects from 2-dimensional displays

16 COMBINATION OF PROCESSES

___ a. Identify median and mode
___ b. Compute averages
___ c. Solve problems combining all processes using whole, mixed numbers and fractions
___ d. Solve problems, combining all processes, involving units of measurement
___ e. Interpret information from charts, number lines, scales and graphs to solve arithmetic problems
___ f. Solve conversion problems of linear (metric and English) liquid, weight, and temperature (F^{O} or C^{O}) measures
___ g. Solve problems involving ratio and proportion
___ h. Solve word problems where any mathematical process may occur

17 GRAPHING IN THE COORDINATE PLANE

___ a. Identify coordinates of a point in any grid system
___ b. Identify points on a line graph
___ c. Match a graph with its equation

18 ALGEBRA

___ a. Solve simple algebraic equations with one unknown
___ b. Recognize and derive equivalent algebraic expressions
___ c. Evaluate powers and estimate roots

19 TRIGONOMETRY

___ a. Use tables of trigonometric functions
___ b. Use tables of logarithms to solve problems
___ c. Solve geometric problems using trigonometric functions
___ d. Use trigonometric ratios to solve problems

CONTENT READING

NT

26. PROCEDURAL DIRECTIONS

- a. Identify factual details or specifications that are found within a statement or written selection
- b. Select portions of text and visual materials to complete a task activity
- c. Follow highly detailed, step by step directions in order to accomplish a sequence of task activities
- d. Determine the essential message of a paragraph or section of written material
- e. Infer from a written source which does not explicitly provide required information, in order to make a decision
- f. Synthesize information from written sources which contributes to the completion of a task activity

27. VOCABULARY

- a. Recognize common words and their meanings
- b. Recognize task related words with technical meanings
- c. Identify the correct meaning of a word from the context of a sentence
- d. Recognize the meaning of common contractions, abbreviations and acronyms
- e. Determine the meaning of figurative, idiomatic, and technical terms by using context clues or by using a reference source(s)

INFORMATION ACCESS

27. REFERENCE SKILLS

- a. Locate a Technical Manual, Field Manual or any related source document by code number and title
- b. Alphabetize words or topics to locate information
- c. Use the table of contents, index, system or sub system heading, appendix and glossary to locate information
- d. Locate the page, title, paragraph, figure, or chart needed to answer a question or to solve a problem
- e. Determine, after scanning or skim-reading, whether the information is relevant
- f. Cross reference within and across source documents to select information needed to perform a function
- g. Organize information from multiple sources into a sequenced series of events

28. TABLES/CHARTS

- a. Obtain a fact or specification from a two-column table or chart to find information
- b. Obtain a fact or specification from an intersection of a row by column table or chart
- c. Use a single table or chart requiring cross referencing within or in combination with text and other source documents
- d. Analyze [illegible] and charts for locating functions, or for [illegible]

VISUAL AIDS

NT

29. ILLUSTRATIONS

- a. Identify details, labels, numbers, and parts from an illustration or picture
- b. Identify parts or details according to a key or legend
- c. Interpret a drawing which shows a cross section or view of an object for assembly, disassembly
- d. Interpret a three dimensional projection or exploded view of objects(s) for assembly, disassembly, or position in system or sub system
- e. Follow illustrations, or photographs, arranged in a sequential order, as a guide
- f. Integrate information from various sources to select a course of action

30. FLOW CHARTS

- a. Use a simple linear path of an organizational chart to list events in sequential order
- b. Use a linear path of a flow chart to provide visual and textual directions to a procedure, to arrive at decision points, and to provide alternate paths in problem solving
- c. Translate the significance of the symbols into physical activities

31. SCHEMATICS

- a. Isolate each major section or entity presented in a schematic diagram
- b. Identify the components within each entity
- c. Trace connections in an integrated circuit from their origin to another point within or from one entity to another
- d. Isolate a problem component in a schematic and trace it to components believed to cause the problem
- e. *Interpret symbols to indicate direction of flow, test points, components and diagrammatic decision points*

WRITTEN COMMUNICATION

32. FORMS

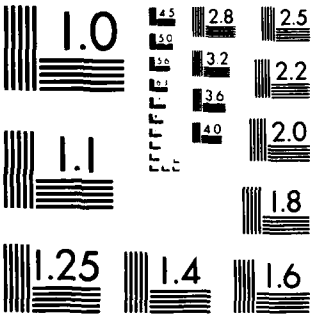
- a. Locate the block on a form to enter the appropriate information
- b. Transfer a number, code, date, figure or related data from equipment or written sources onto an appropriate section of the form
- c. Write the name of the organization, responsible personnel, disposition of the part or equipment, and nomenclature, in appropriate sections of the form
- d. Write a descriptive account of an activity or transaction performed
- e. Use a completed form to locate or complete information

33. NOTE TAKING

- a. Distinguish between essential and non-essential details during the note taking process
- b. Record details without misinterpreting the intent of either written material or an interview
- c. Rewrite all recorded details in sentence form
- d. Organize all sentences into paragraphs

AD-A143 593 NEEDS ASSESSMENT TO DEFINE THE TRAINING REQUIREMENTS 7/7
FOR A BASIC SKILLS E..(U) RCA SERVICE CO CHERRY HILL NJ
APR 84 DABT60-81-C-0017

UNCLASSIFIED F/G 5/9 NL



MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS 1963 A

NT

34 OUTLINING (topic or sentence)

- a. Distinguish between major and subordinate topics
- b Generate titles for each major topic selected
- c Use phrases or sentences to provide subordinate details under each major topic
- d. Alternate, indent numbers and letters to establish a hierarchy

35. REPORT WRITING

- a. State the intent or objective(s) of the report
- b. Describe the parameters of the event or situation
- c Distinguish between relevant and irrelevant details
- d Sequence events in the order they have occurred
- e. State general impressions of events described
- f Select examples that will clarify major issues presented in the report
- g Examine opposing points of view in the report
- h. Summarize the major points developed in the report
- i. Justify an action taken and give reasons for rejecting alternatives

36. EDITING

- a. Spell frequently used words correctly
- b. Spell task-related words correctly
- c. Identify words that need to be capitalized
- d Correct all misspelled words with or without the use of a reference source
- e. Apply all rules for end marks, commas, and apostrophes
- f. Apply common rules of grammar
- g. Rewrite the paragraph by stating the main idea in the first sentence, and restructuring the sentences for coherence
- h. Appraise an entire written communication and make adjustments to improve clarity

VERBAL COMMUNICATION

37. TYPE

- a Individual – a person working on a task and communicating with another when assistance is needed or when a supervisory decision is needed
- b. Instruction – a task activity requiring communication between an instructor, an individual or small group where the purpose is to give facts or rules to inform or guide
- c. Tutor – interaction takes place between two persons where one is instructing and the other is doing the task
- d. Peer Group (less than 10) – all members engage in an activity where one person assumes a leadership role and communicates to others what is to be done
- e Interview – a person communicating with another about his activities, opinions, or subject expertise for the purpose of using the information in a task
- f Briefing – communicating final instructions to others or giving an account in summary
- g Counsel – communicating together to exchange ideas or opinions to recommend, give or take advice, or to arrive at an acceptance of a plan or decision
- h. Command – communicate to others an order or action to be taken where a person has a position of authority

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NT

38. CHARACTERISTICS

- a. Enunciate clearly, using the proper rate of speech
- b Use technical vocabulary suitable to the task and level of the person
- c. Determine the appropriate amount of information to communicate
- d. Interpret figurative or idiomatic language by reference to its use in context
- e. Follow highly detailed, step by step directions
- f. Solicit feedback to confirm the accurate reception of the communication
- g. Recognize when a low-key, informal dialogue is suitable
- h Recognize when direct verbal commands are necessary
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- j. Recognize when the situation will require a structured, preplanned method of presentation

39. BARRIERS

- a Recognize the need for clear, concise directions in order to avoid language or word-meaning differences
- b Recognize personality factors and interpersonal relationships that may exist
- c. Recognize feedback as a means of communicating more effectively and increasing task competence

SAFETY/SECURITY

40. PRECAUTIONS

- a. Use common knowledge to avoid hazards in order to prevent injury to self or equipment
- b Apply preventive measures prior to task performance to minimize any potential safety or security problem
- c. Select an appropriate course of action in the event of an emergency

PERCEPTUAL

41 RECOGNITION

- a. Identify similarities and differences between and among objects
- b. Use body language (motions, gestures, postures) to communicate or signal
- c. Determine the presence of a defect or extent of damage
- d. Match objects by size, shape, color and significant markings
- e Classify objects by size, shape, color and significant markings
- f. Determine direction, duration, and intensity of sounds, sightings and smells
- g. Infer from sights, sounds, touch, smells, or tastes to determine a course of action

NUMERATION/PLACE VALUE

NT

1 NUMBERING AND COUNTING

- a Match numerals with word names and models
- b Write numerals one through N in sequential order from any starting point
- c State what numeral comes after, before, or between any two given numerals
- d Select the numeral which is greater/lesser from a set of numerals
- e Identify an object with a specified ordinal position
- f Write or state the place value of a particular digit, whole or decimal number
- g Round off a number to a specified place, whole or decimal
- h Count by ones, twos, fives, tens, etc. backward or forward (skip counting)
- i Match numbers with points or intervals on a number line (positive (+) or negative (-) values)

UNITS OF MEASUREMENT

2 LINEAR, WEIGHT, AND VOLUME MEASURES

- a. Name the markings on a linear scale
- b. Differentiate units of measure and equivalents in the English and metric system
- c. Use a ruler, yardstick, meter stick or scale to measure lengths of objects or distances
- d Identify measures of ounce, pound, gram
- e. Identify measures of pints, quarts, gallons, liters
- f Use a scale which is not numerically calibrated
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3 DEGREE MEASURES

- a. Identify degree or mil as a unit in determining direction, distance or temperature
- b Estimate the measure of a given angle not greater than 180°
- c Interpret bearings, azimuth and other contexts in which the measure of an angle may range from 0° to 360°/0 to 6400 mils

4 TIME TELLING MEASURES

- a Use a 24 hour or digital clock to tell time
- b. Name intervals and tell time in hours, minutes, and seconds
- c. Estimate time in seconds, minutes, and parts of an hour
- d Identify, calculate units and arrange them in Julian style
- e Convert time into hours and tenths of hours
- f Compute time using Greenwich Mean Time (GMT) as a basis for establishing zones and distances

NT

6 GAUGE MEASURES

- a Identify the unit of measurement found on an instrument
- b. Interpret the number, word, symbol from a display read-out
- c. Recognize a "reading" from a gauge with color divisions
- d Recognize positive (+) and negative (-) demarcation on a scale
- e Select band(s) from a multi scale gauge
- f. Match a gauge reading to a specification using numbered or labeled intervals
- g Interpret gauge readings from an unnumbered/unmarked interval
- h. Interpret a gauge reading which is fluctuating or momentarily sustained
- i Match specifications of required measures by manipulation, alignment or maintenance

VISUAL/SPATIAL RELATIONSHIPS

8. SPATIAL

- a Identify direction that tools, hardware, or components may be moved
- b Manipulate objects to align, match, mate, make parallel, be perpendicular or be at an angle
- c Interpret spatial relationships of figures and objects from 2-dimensional drawings, pictures, or photographs
- d. Relate geometric symbols and graphic representations to actual systems, subsystems and components

GEOMETRY

7. LINES

- a. Identify and name points, lines, rays, and segments
- b. Identify intersecting lines, parallel lines, and line segments
- c. Define and identify perpendicular lines
- d. Identify congruent segments

8. PLANES

- a. Identify and name plane geometric figures
- b List the characteristics of geometric figures
- c. Classify figures according to the number or measure of its sides or angles
- d. Identify figures which possess similarities
- e. Identify figures which may be parallel, perpendicular or congruent

9. ANGLES AND TRIANGLES

- a. Identify and name the different kinds of angles and triangles, with their corresponding figures
- b Identify vertical, adjacent, complementary or supplementary angles
- c. Classify triangles according to their sides or angle-size
- d. Identify altitudes and medians of triangles or the bisector of an angle
- e Name an angle by using letters, a number, or a single letter

NT

10 SOLIDS

- a Recognize and match the names of solids with their corresponding figures

11 TERMINOLOGY

- a. Identify technical words associated with geometric figures
- b. Interpret meaning of terms derived from spatial orientation

COMPUTE OR PERFORM

12 ADDITION AND SUBTRACTION

- a. Add or subtract whole numbers, without carrying or borrowing
- b. Add or subtract whole numbers, carrying and borrowing
- c. Add and subtract, borrowing and carrying with mixed numbers (whole and decimals)
- d. Add or subtract positive (+) and negative ( ) numbers, using a number line to arrive at a solution
- e Add or subtract to find correct time (24 hr. clock) using hours or minutes
- f Add or subtract various increments on gauges, dials, or any other measuring instrument
- g Add or subtract time, linear, dry, liquid or degree measures requiring regrouping
- h Estimate a sum or difference

13 MULTIPLICATION AND DIVISION

- a. Multiply and divide whole numbers
- b. Multiply and divide mixed numbers (whole and decimals)
- c Divide a number with decimals in both divisor and dividend
- d Multiply and divide integers, both positive (+) and negative ( ), and assign proper sign to product or quotient
- e. Estimate a product or quotient

14 FRACTIONS/DECIMALS

- a Subdivide whole objects or a set of objects into halves (1/2), thirds (1/3), fourths (1/4), eighths (1/8)
- b. Reduce fractions to lowest terms
- c. Convert fractions (proper and improper) to decimal equivalents, and vice versa, using a table, chart or gauge
- d. Compute equivalent value of fractions, decimals, percents, and mixed numbers to lowest terms
- e Add and subtract fractions, with same or different denominators
- f Multiply and divide fractions with and without whole numbers
- g Estimate a fractional sum, product, or quotient

NT

15 GEOMETRY

- a. Draw geometric figures, plane and solid
- b Match geometric figures with word names, equivalent measures
- c. Label all parts of geometric figures using mathematical and characteristic designators
- d. Use a protractor to measure angles, make geometrical constructions
- e. Construct perpendicular on a line segment, bisector of an angle
- f. Compute the perimeter and area of any figure
- g. Compute the circumference and area of a circle
- h Compute the area and volume of any solid figure
- i Use formulas in solving problems involving geometric figures
- j. Solve problems and interpret spatial relationships of figures, symbols, and objects from 2-dimensional displays

16. COMBINATION OF PROCESSES

- a. Identify median and mode
- b Compute averages
- c. Solve problems combining all processes using whole, mixed numbers and fractions
- d. Solve problems, combining all processes, involving units of measurement
- e. Interpret information from charts, number lines, scales and graphs to solve arithmetic problems
- f. Solve conversion problems of linear (metric and English) liquid, weight, and temperature (F° or C°) measures
- g. Solve problems involving ratio and proportion
- h. Solve word problems where any mathematical process may occur

17. GRAPHING IN THE COORDINATE PLANE

- a. Identify coordinates of a point in any grid system
- b Identify points on a line graph
- c. Match a graph with its equation

18. ALGEBRA

- a. Solve simple algebraic equations with one unknown
- b. Recognize and derive equivalent algebraic expressions
- c. Evaluate powers and estimate roots

19. TRIGONOMETRY

- a Use tables of trigonometric functions
- b Use tables of logarithms to solve problems
- c. Solve geometric problems using trigonometric functions
- d Use trigonometric ratios to solve problems

CONTENT READING

NT

25 PROCEDURAL DIRECTIONS

- a Identify factual details or specifications that are found within a statement or written selection
- b Select parts of text and visual materials to complete a task activity
- c Follow highly detailed, step by step directions in order to accomplish a sequence of task activities
- d Determine the essential message of a paragraph or section of written material
- e Infer from a written source, which does not explicitly provide required information, in order to make a decision
- f Synthesize information from written sources which contributes to the completion of a task activity

26 VOCABULARY

- a Recognize common words and their meanings
- b Recognize task related words with technical meanings
- c Identify the correct meaning of a word from the context of a sentence
- d. Recognize the meaning of common contractions, abbreviations and acronyms
- e Determine the meaning of figurative, idiomatic, and technical terms by using context clues or by using a reference source(s)

INFORMATION ACCESS

27 REFERENCE SKILLS

- a Locate a Technical Manual, Field Manual or any related source document by code number and title
- b Alphabetize words or topics to locate information
- c. Use the table of contents, index, system or sub-system heading, appendix and glossary to locate information
- d Locate the page, title, paragraph, figure, or chart needed to answer a question or to solve a problem
- e. Determine, after scanning or skim-reading, whether the information is relevant
- f Cross-reference within and across source documents to select information needed to perform a routine
- g Organize information from multiple sources into a sequenced series of events

28 TABLES/CHARTS

- a. Obtain a fact or specification from a two column table or chart to find information
- b Obtain a fact or specification from an intersection of a row by column table or chart
- c. Use a complex table or chart requiring cross referencing within or in combination with text material outside the chart
- d. Apply information from tables and charts for locating malfunctions, or for selecting course of action

VISUAL AIDS

NT

29 ILLUSTRATIONS

- a Identify details, labels, numbers, and parts from an illustration or picture
- b Identify parts or details according to a key or legend
- c Interpret a drawing which shows a cross sectional view of an object for assembly, disassembly
- d. Interpret a three dimensional projection or exploded view of object(s) for assembly, disassembly, or position in system or sub-system
- e Follow illustrations, or photographs, arranged in a sequential order, as a guide
- f Integrate information from various sources to select a course of action

30. FLOW CHARTS

- a. Use a simple linear path of an organizational chart to list events in sequential order
- b. Use a linear path of a flow chart to provide visual and textual directions to a procedure, to arrive at decision points, and to provide alternate paths in problem solving
- c Translate the significance of the symbols into physical activities

31. SCHEMATICS

- a. Isolate each major section or entity presented in a schematic diagram
- b. Identify the components within each entity
- c. Trace connections in an integrated circuit from their origin to another point within or from one entity to another
- d. Isolate a problem component in a schematic and trace it to components believed to cause the problem
- e. Interpret symbols to indicate direction of flow, test points, components and diagrammatic decision points

WRITTEN COMMUNICATION

32. FORMS

- a. Locate the block on a form to enter the appropriate information
- b Transfer a number, code, date, figure or related data from equipment or written sources onto an appropriate section of the form
- c. Write the name of the organization, responsible personnel, disposition of the part or equipment, and nomenclature, in appropriate sections of the form
- d. Write a descriptive account of an activity or transaction performed
- e. Use a completed form to locate or compare information

33. NOTE TAKING

- a Distinguish between essential and non essential details during the note taking process
- b Record details without misinterpreting the intent of either written material or an interview
- c Rewrite all recorded details in sentence form
- d. Organize all sentences into paragraphs

NT

34. OUTLINING (topic or sentence)

- a. Distinguish between major and subordinate topics
- b. Generate titles for each major topic selected
- c. Use phrases or sentences to provide subordinate details under each major topic
- d. Alternate, indent numbers and letters to establish a hierarchy

35. REPORT WRITING

- a. State the intent or objective(s) of the report
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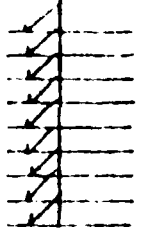
- d. Match objects by size, shape, color and significant markings
- e. Classify objects by size, shape, color and significant markings
- f. Determine direction, duration, and intensity of sounds, sightings and smells
- g. Infer from sights, sounds, touch, smells, or tastes to determine a course of action
- h. Interpret codes & symbols

NUMERATION/PLACE VALUE

NT

1. NUMBERING AND COUNTING



a. Match numerals with word names and models
b. Write numerals one through N in sequential order from any starting point
c. State what numeral comes after, before, or between any two given numerals
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i. Match numbers with points or intervals on a number line (positive (+) or negative (-) values)

UNITS OF MEASUREMENT

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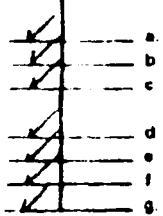
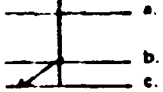


a. Name the markings on a linear scale
b. Differentiate units of measure and equivalents in the English and metric system
c. Use a ruler, yardstick, meter stick or scale to measure lengths of objects or distances
d. Identify measures of ounce, pound, gram
e. Identify measures of pints, quarts, gallons, liters
f. Use a scale which is not numerically calibrated
g. Estimate measures of varying lengths, dimensions or weights

3. DEGREE MEASURES



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b. Estimate the measure of a given angle not greater than 180°
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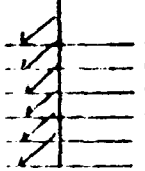
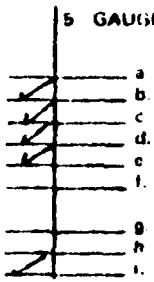
4. TIME-TELLING MEASURES



a. Use a 24-hour or digital clock to tell time
b. Name intervals and tell time in hours, minutes, and seconds
c. Estimate time in seconds, minutes, and parts of an hour
d. Identify calendar units and arrange them in Julian style
e. Convert time into hours and tenths of hours
f. Compute time using Greenwich Mean Time (GMT) as a basis for establishing zones and distances

NT

5. GAUGE MEASURES



a. Identify the unit of measurement found on an instrument
b. Interpret the number, word, symbol from a display read out
c. Recognize a "reading" from a gauge with color divisions
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e. Select band(s) from a multi-scale gauge
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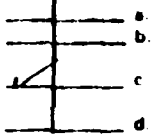
i. Match specifications of required measures by manipulation, alignment or maintenance

VISUAL/SPATIAL RELATIONSHIPS

6. SPATIAL



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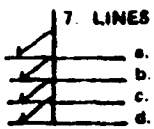
d. Relate geometric symbols and graphic representations to actual systems, subsystems and components

GEOMETRY

7. LINES



a. Identify and name points, lines, rays, and segments
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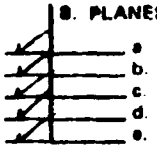
c. Define and identify perpendicular lines
d. Identify congruent segments

8. PLANES



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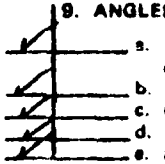

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NT

10 SOLIDS

- a. Recognize and match the names of solids with their corresponding figures

11. TERMINOLOGY

- a. Identify technical words associated with geometric figures
- b Interpret meaning of terms derived from spatial orientation

COMPUTE OR PERFORM

12. ADDITION AND SUBTRACTION

- a. Add or subtract whole numbers, without carrying or borrowing
- b Add or subtract whole numbers, carrying and borrowing
- c. Add and subtract, borrowing and carrying with mixed numbers (whole and decimals)
- d. Add or subtract positive (+) and negative (-) numbers, using a number line to arrive at a solution
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- b. Use tables of logarithms to solve problems
- c. Solve geometric problems using trigonometric functions
- d Use trigonometric ratios to solve problems

CONTENT READING

NT

26 PROCEDURAL DIRECTIONS

- a Identify factual details or specifications that are found within a statement or written selection
- b Select parts of text and visual materials to complete a task activity
- c Follow highly-detailed, step-by-step directions in order to accomplish a sequence of task activities
- d Determine the essential message of a paragraph or section of written material
- e Infer from a written source, which does not explicitly provide required information, in order to make a decision
- f Synthesize information from written sources which contributes to the completion of a task activity

26 VOCABULARY

- a Recognize common words and their meanings
- b Recognize task related words with technical meanings
- c Identify the correct meaning of a word from the context of a sentence
- d Recognize the meaning of common contractions, abbreviations and acronyms
- e Determine the meaning of figurative, idiomatic, and technical terms by using context clues or by using a reference source(s)

INFORMATION ACCESS

27. REFERENCE SKILLS

- a Locate a Technical Manual, Field Manual or any related source document by code number and title
- b Alphabetize words or topics to locate information
- c Use the table of contents, index, system or sub-system heading, appendix and glossary to locate information
- d Locate the page, title, paragraph, figure, or chart needed to answer a question or to solve a problem
- e Determine, after scanning or skim-reading, whether the information is relevant
- f Cross-reference within and across source documents to select information needed to perform a routine
- g Organize information from multiple sources into a sequenced series of events

28 TABLES/CHARTS

- a Obtain a fact or specification from a two-column table or chart to find information
- b Obtain a fact or specification from an intersection of a row by column table or chart
- c Use a complex table or chart requiring cross-referencing within or in combination with text material outside the chart
- d Apply information from tables and charts for locating malfunctions, or for selecting a course of action

VISUAL AIDS

NT

29 ILLUSTRATIONS

- a Identify details, labels, numbers, and parts from an illustration or picture
- b Identify parts or details according to a key or legend
- c Interpret a drawing which shows a cross-sectional view of an object for assembly, disassembly
- d Interpret a three dimensional projection or exploded view of object(s) for assembly, disassembly, or position in system or sub-system
- e Follow illustrations, or photographs, arranged in a sequential order, as a guide
- f Integrate information from various sources to select a course of action

30 FLOW CHARTS

- a. Use a simple linear path of an organizational chart to list events in sequential order
- b Use a linear path of a flow chart to provide visual and textual directions to a procedure, to arrive at decision points, and to provide alternate paths in problem-solving
- c. Translate the significance of the symbols into physical activities

31. SCHEMATICS

- a. Isolate each major section or entity presented in a schematic diagram
- b. Identify the components within each entity
- c. Trace connections in an integrated circuit from their origin to another point within or from one entity to another
- d. Isolate a problem component in a schematic and trace it to components believed to cause the problem
- e. Interpret symbols to indicate direction of flow, test points, components and diagrammatic decision points

WRITTEN COMMUNICATION

32. FORMS

- a. Locate the block on a form to enter the appropriate information
- b. Transfer a number, code, date, figure or related data from equipment or written sources onto an appropriate section of the form
- c. Write the name of the organization, responsible personnel, disposition of the part or equipment, and nomenclature, in appropriate sections of the form
- d. Write a descriptive account of an activity or transaction performed
- e. Use a completed form to locate or compare information

33. NOTE-TAKING

- a Distinguish between essential and non-essential details during the note taking process
- b. Record details without misinterpreting the intent of either written material or an interview
- c Rewrite all recorded details in sentence form
- d. Organize all sentences into paragraphs

NT

34 OUTLINING (topic or sentence)

- a Distinguish between major and subordinate topics
- b Generate titles for each major topic selected
- c. Use phrases or sentences to provide subordinate details under each major topic
- d. Alternate, indent numbers and letters to establish a hierarchy

35 REPORT WRITING

- a State the intent or objective(s) of the report
- b. Describe the parameters of the event or situation
- c Distinguish between relevant and irrelevant details
- d. Sequence events in the order they have occurred
- e State general impressions of events described
- f. Select examples that will clarify major issues presented in the report
- g. Examine opposing points of view in the report
- h. Summarize the major points developed in the report
- i Justify an action taken and give reasons for rejecting alternatives

36. EDITING

- a. Spell frequently used words correctly
- b. Spell task-related words correctly
- c Identify words that need to be capitalized
- d Correct all misspelled words with or without the use of a reference source
- e Apply all rules for end marks, commas, and apostrophes
- f Apply common rules of grammar
- g Rewrite the paragraph by stating the main idea in the first sentence, and restructuring the sentences for coherence
- h. Appraise an entire written communication and make adjustments to improve clarity

VERBAL COMMUNICATION

37. TYPE

- a. Individual - a person working on a task and communicating with another when assistance is needed or when a supervisory decision is needed
- b Instruction - a task activity requiring communication between an instructor, an individual or small group where the purpose is to give facts or rules to inform or guide
- c. Tutor - interaction takes place between two persons where one is instructing and the other is doing the task
- d. Peer Group (less than 10) – all members engage in an activity where one person assumes a leadership role and communicates to others what is to be done
- e. Interview – a person communicating with another about his activities, opinions, or subject expertise for the purpose of using the information in a task
- f Briefing - communicating final instructions to others or giving an account in summary
- g Counsel - communicating together to exchange ideas or opinions to recommend, give or take advice, or to arrive at an acceptance of a plan or decision
- h Command - communicate to others an order or action to be taken where a person has a position of authority

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NT

38. CHARACTERISTICS

- a Enunciate clearly, using the proper rate of speech
- b Use technical vocabulary suitable to the task and level of the person
- c. Determine the appropriate amount of information to communicate
- d. Interpret figurative or idiomatic language by reference to its use in context
- e. Follow highly detailed, step-by step directions
- f. Solicit feedback to confirm the accurate reception of the communication
- g Recognize when a low-key, informal dialogue is suitable
- h. Recognize when direct verbal commands are necessary
- i. Recognize when a prescribed series of verbal interactions is required to coordinate a group effort
- j. Recognize when the situation will require a structured, preplanned method of presentation

39. BARRIERS

- a. Recognize the need for clear, concise directions in order to avoid language or word-meaning differences
- b. Recognize personality factors and inter-personal relationships that may exist
- c. Recognize feedback as a means of communicating more effectively and increasing task competence

SAFETY/SECURITY

40. PRECAUTIONS

- a. Use common knowledge to avoid hazards in order to prevent injury to self or equipment
- b. Apply preventive measures prior to task performance to minimize any potential safety or security problem
- c. Select an appropriate course of action in the event of an emergency

PERCEPTUAL

41. RECOGNITION

- a. Identify similarities and differences between and among objects
- b. Use body language (motions, gestures, postures) to communicate or signal
- c. Determine the presence of a defect or extent of damage
- d. Match objects by size, shape, color and significant markings
- e Classify objects by size, shape, color and significant markings
- f. Determine direction, duration, and intensity of sounds, sightings and smells
- g. Infer from sights, sounds, touch, smells, or tastes to determine a course of action

NUMERATION/PLACE VALUE

NT

1 NUMBERING AND COUNTING

- a. Match numerals with word names and models
- b. Write numerals one through N in sequential order from any starting point
- c. State what numeral comes after, before, or between any two given numerals
- d. Select the numeral which is greater/lesser from a set of numerals
- e. Identify an object with a specified ordinal position
- f. Write or state the place value of a particular digit, whole or decimal number
- g. Round off a number to a specified place, whole or decimal
- h. Count by ones, twos, fives, tens, etc. backward or forward (skip counting)
- i. Match numbers with points or intervals on a number line (positive (+) or negative (-) values)

UNITS OF MEASUREMENT

2. LINEAR, WEIGHT, AND VOLUME MEASURES

- a. Name the markings on a linear scale
- b. Differentiate units of measure and equivalents in the English and metric system
- c. Use a ruler, yardstick, meter stick or scale to measure lengths of objects or distances
- d. Identify measures of ounce, pound, gram
- e. Identify measures of pints, quarts, gallons, liters
- f. Use a scale which is not numerically calibrated
- g. Estimate measures of varying lengths, dimensions or weights

3. DEGREE MEASURES

- a. Identify degree or mil as a unit in determining direction, distance or temperature
- b. Estimate the measure of a given angle not greater than 180°
- c. Interpret bearings, azimuth and other contexts in which the measure of an angle may range from 0° to 360°/0 to 6400 mils

4. TIME TELLING MEASURES

- a. Use a 24 hour or digital clock to tell time
- b. Name intervals and tell time in hours, minutes, and seconds
- c. Estimate time in seconds, minutes, and parts of an hour
- d. Identify calendar units and arrange them in Julian style
- e. Convert time into hours and tenths of hours
- f. Compute time using Greenwich Mean Time (GMT) as a basis for establishing zones and distances

NT

6 GAUGE MEASURES

- a. Identify the unit of measurement found on an instrument
- b. Interpret the number, word, symbol from a display read-out
- c. Recognize a "reading" from a gauge with color divisions
- d. Recognize positive (+) and negative (-) demarcation on a scale
- e. Select hand(s) from a multi-scale gauge
- f. Match a gauge reading to a specification using numbered or labeled intervals
- g. Interpret gauge readings from an unnumbered/unmarked interval
- h. Interpret a gauge reading which is fluctuating or momentarily sustained
- i. Match specifications of required measures by manipulation, alignment or maintenance

VISUAL/SPATIAL RELATIONSHIPS

8. SPATIAL

- a. Identify directions that tools, hardware, or components may be moved
- b. Manipulate objects to align, match, mate, make parallel, be perpendicular or be at an angle
- c. Interpret spatial relationships of figures and objects from 2 dimensional drawings, pictures, or photographs
- d. Relate geometric symbols and graphic representations to actual systems, subsystems and components

GEOMETRY

7. LINES

- a. Identify and name points, lines, rays, and segments
- b. Identify intersecting lines, parallel lines, and line segments
- c. Define and identify perpendicular lines
- d. Identify congruent segments

8. PLANES

- a. Identify and name plane geometric figures
- b. List the characteristics of geometric figures
- c. Classify figures according to the number or measure of its sides or angles
- d. Identify figures which possess similarities
- e. Identify figures which may be parallel, perpendicular or congruent

9 ANGLES AND TRIANGLES

- a. Identify and name the different kinds of angles and triangles, with their corresponding figures
- b. Identify vertical, adjacent, complementary or supplementary angles
- c. Classify triangles according to their sides or angle-size
- d. Identify altitudes and medians of triangles or the bisector of an angle
- e. Name an angle by using letters, a number, or a single letter

NT

10. SOLIDS

- a. Recognize and match the names of solids with their corresponding figures

11. TERMINOLOGY

- a. Identify technical words associated with geometric figures
- b. *Interpret meaning of terms derived from spatial orientation*

COMPUTE OR PERFORM

12. ADDITION AND SUBTRACTION

- a. Add or subtract whole numbers, without carrying or borrowing
- b. Add or subtract whole numbers, carrying and borrowing
- c. Add and subtract, borrowing and carrying with mixed numbers (whole and decimals)
- d. Add or subtract positive (+) and negative (-) numbers, using a number line to arrive at a solution
- e. Add or subtract to find correct time (24 hr. clock) using hours or minutes
- f. Add or subtract various increments on gauges, dials, or any other measuring instrument
- g. Add or subtract time, linear, dry, liquid or degree measures requiring regrouping
- h. Estimate a sum or difference

13. MULTIPLICATION AND DIVISION

- a. Multiply and divide whole numbers
- b. Multiply and divide mixed numbers (whole and decimals)
- c. Divide a number with decimals in both divisor and dividend
- d. Multiply and divide integers, both positive (+) and negative (-), and assign proper sign to product or quotient
- e. Estimate a product or quotient

14. FRACTIONS/DECIMALS

- a. Subdivide whole objects or a set of objects into halves (1/2), thirds (1/3), fourths (1/4), eighths (1/8)
- b. Reduce fractions to lowest terms
- c. Convert fractions (proper and improper) to decimal equivalents, and vice versa, using a table, chart or gauge
- d. Compute equivalent value of fractions, decimals, percents, and mixed numbers to lowest terms
- e. *Add and subtract fractions, with same or different denominators*
- f. Multiply and divide fractions with and without whole numbers
- g. Estimate a fractional sum, product, or quotient

NT

15. GEOMETRY

- a. Draw geometric figures, plane and solid
- b. Match geometric figures with word names, equivalent measures
- c. Label all parts of geometric figures using mathematical and characteristic designators
- d. Use a protractor to measure angles, make geometrical constructions
- e. Construct perpendicular on a line segment, bisector of an angle
- f. Compute the perimeter and area of any figure
- g. Compute the circumference and area of a circle
- h. Compute the area and volume of any solid figure
- i. Use formulas in solving problems involving geometric figures
- j. Solve problems and interpret spatial relationships of figures, symbols, and objects from 2-dimensional displays

16. COMBINATION OF PROCESSES

- a. Identify median and mode
- b. Compute averages
- c. Solve problems combining all processes using whole, *mixed numbers and fractions*
- d. Solve problems, combining all processes, involving units of measurement
- e. Interpret information from charts, number lines, scales and graphs to solve arithmetic problems
- f. Solve conversion problems of linear (metric and English) liquid, weight, and temperature (F^0 or C^0) measures
- g. Solve problems involving ratio and proportion
- h. Solve word problems where any mathematical process may occur

17. GRAPHING IN THE COORDINATE PLANE

- a. Identify coordinates of a point in any grid system
- b. Identify points on a line graph
- c. Match a graph with its equation

18. ALGEBRA

- a. Solve simple algebraic equations with one unknown
- b. Recognize and derive equivalent algebraic expressions
- c. Evaluate powers and estimate roots

19. TRIGONOMETRY

- a. Use tables of trigonometric functions
- b. Use tables of logarithms to solve problems
- c. Solve geometric problems using trigonometric functions
- d. Use trigonometric ratios to solve problems

CONTENT READING

NT

25 PROCEDURAL DIRECTIONS

- a. Identify factual details or specifications that are found within a statement or written selection
- b. Select parts of text and visual materials to complete a task activity
- c. Follow highly detailed, step by step directions in order to accomplish a sequence of task activities
- d. Determine the essential message of a paragraph or section of written material
- e. Infer from a written source, which does not explicitly provide required information, in order to make a decision
- f. Synthesize information from written sources which contributes to the completion of a task activity

26 VOCABULARY

- a. Recognize common words and their meanings
- b. Recognize task related words with technical meanings
- c. Identify the correct meaning of a word from the context of a sentence
- d. Recognize the meaning of common contractions, abbreviations and acronyms
- e. Determine the meaning of figurative, idiomatic, and technical terms by using context clues or by using a reference source(s)

INFORMATION ACCESS

27 REFERENCE SKILLS

- a. Locate a Technical Manual, Field Manual or any related source document by code number and title
- b. Alphabetize words or topics to locate information
- c. Use the table of contents, index, system or sub system heading, appendix and glossary to locate information
- d. Locate the page, title, paragraph, figure, or chart needed to answer a question or to solve a problem
- e. Determine, after scanning or skim reading, whether the information is relevant
- f. Cross reference within and across source documents to select information needed to perform a routine
- g. Organize information from multiple sources into a sequenced series of events

28 TABLES/CHARTS

- a. Obtain a fact or specification from a two-column table or chart to find information
- b. Obtain a fact or specification from an intersection of a row by column table or chart
- c. Use a complex table or chart requiring cross referencing within or in combination with text material outside the chart
- d. Apply information from tables and charts for locating malfunctions, or for selecting a course of action

VISUAL AIDS

NT

29 ILLUSTRATIONS

- a. Identify details, labels, numbers, and parts from an illustration or picture
- b. Identify parts or details according to a key or legend
- c. Interpret a drawing which shows a cross sectional view of an object for assembly, disassembly
- d. Interpret a three dimensional projection or exploded view of object(s) for assembly, disassembly, or position in system or sub-system
- e. Follow illustrations, or photographs, arranged in a sequential order, as a guide
- f. Integrate information from various sources to select a course of action

30 FLOW CHARTS

- a. Use a simple linear path of an organizational chart to list events in sequential order
- b. Use a linear path of a flow chart to provide visual and textual directions to a procedure, to arrive at decision points, and to provide alternate paths in problem solving
- c. Translate the significance of the symbols into physical activities

31 SCHEMATICS

- a. Isolate each major section or entity presented in a schematic diagram
- b. Identify the components within each entity
- c. Trace connections in an integrated circuit from their origin to another point within or from one entity to another
- d. Isolate a problem component in a schematic and trace it to components believed to cause the problem
- e. Interpret symbols to indicate direction of flow, test points, components and diagrammatic decision points

WRITTEN COMMUNICATION

32 FORMS

- a. Locate the block on a form to enter the appropriate information
- b. Transfer a number, code, date, figure or related data from equipment or written sources onto an appropriate section of the form
- c. Write the name of the organization, responsible personnel, disposition of the part or equipment, and nomenclature, in appropriate sections of the form
- d. Write a descriptive account of an activity or transaction performed
- e. Use a completed form to locate or compare information

33. NOTE-TAKING

- a. Distinguish between essential and non essential details during the note taking process
- b. Record details without misinterpreting the intent of either written material or an interview
- c. Rewrite all recorded details in sentence form
- d. Organize all sentences into paragraphs

NT

34. OUTLINING (topic or sentance)

- a. Distinguish between major and subordinate topics
- b. Generate titles for each major topic selected
- c. Use phrases or sentences to provide subordinate details under each major topic
- d. Alternate, indent numbers and letters to establish a hierarchy

35. REPORT WRITING

- a. State the intent or objective(s) of the report
- b. Describe the parameters of the event or situation
- c. Distinguish between relevant and irrelevant details
- d. Sequence events in the order they have occurred
- e. State general impressions of events described
- f. Select examples that will clarify major issues presented in the report
- g. Examine opposing points of view in the report
- h. Summarize the major points developed in the report
- i. Justify an action taken and give reasons for rejecting alternatives

36. EDITING

- a. Spell frequently used words correctly
- b. Spell task-related words correctly
- c. Identify words that need to be capitalized
- d. Correct all misspelled words with or without the use of a reference source
- e. Apply all rules for end marks, commas, and apostrophes
- f. Apply common rules of grammar
- g. Rewrite the paragraph by stating the main idea in the first sentence, and restructuring the sentences for coherence
- h. Appraise an entire written communication and make adjustments to improve clarity

VERBAL COMMUNICATION

37. TYPE

- a. Individual – a person working on a task and communicating with another when assistance is needed or when a supervisory decision is needed
- b. Instruction – a task activity requiring communication between an instructor, an individual or small group where the purpose is to give facts or rules to inform or guide
- c. Tutor – interaction takes place between two persons where one is instructing and the other is doing the task
- d. Peer Group (less than 10) - all members engage in an activity where one person assumes a leadership role and communicates to others what is to be done
- e. Interview – a person communicating with another about his activities, opinions, or subject expertise for the purpose of using the information in a task
- f. Briefing – communicating final instructions to others or giving an account in summary
- g. Counsel – communicating together to exchange ideas or opinions to recommend, give or take advice, or to arrive at an acceptance of a plan or decision
- h. Command - communicate to others an order or action to be taken where a person has a position of authority

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NT

38. CHARACTERISTICS

- a. Enunciate clearly, using the proper rate of speech
- b. Use technical vocabulary suitable to the task and level of the person
- c. Determine the appropriate amount of information to communicate
- d. Interpret figurative or idiomatic language by reference to its use in context
- e. Follow highly detailed, step-by-step directions
- f. Solicit feedback to confirm the accurate reception of the communication
- g. Recognize when a low-key, informal dialogue is suitable
- h. Recognize when direct verbal commands are necessary
- i. Recognize when a prescribed series of verbal interactions is required to coordinate a group effort
- j. Recognize when the situation will require a structured, preplanned method of presentation

39. BARRIERS

- a. Recognize the need for clear, concise directions in order to avoid language or word-meaning differences
- b. Recognize personality factors and inter-personal relationships that may exist
- c. Recognize feedback as a means of communicating more effectively and increasing task competence

SAFETY/SECURITY

40. PRECAUTIONS

- a. Use common knowledge to avoid hazards in order to prevent injury to self or equipment
- b. Apply preventive measures prior to task performance to minimize any potential safety or security problem
- c. Select an appropriate course of action in the event of an emergency

PERCEPTUAL

41 RECOGNITION

- a. Identify similarities and differences between and among objects
- b. Use body language (motions, gestures, postures) to communicate or signal
- c. Determine the presence of a defect or extent of damage
- d. Match objects by size, shape, color and significant markings
- e. Classify objects by size, shape, color and significant markings
- f. Determine direction, duration, and intensity of sounds, sightings and smells
- g. Infer from sights, sounds, touch, smells, or tastes to determine a course of action

95B Military Police

BSEP 1

NUMERATION/PLACE VALUE

NT

1 NUMBERING AND COUNTING

- a. Match numerals with word names and models
- b. Write numerals one through N in sequential order from any starting point
- c. State what numeral comes after, before, or between any two given numerals
- d. Select the numeral which is greater/lesser from a set of numerals
- e. Identify an object with a specified ordinal position
- f. Write or state the place value of a particular digit, whole or decimal number
- g. Round off a number to a specified place, whole or decimal
- h. Count by ones, twos, fives, tens, etc. backward or forward (skip counting)
- i. Match numbers with points or intervals on a number line (positive (+) or negative (-) values)

UNITS OF MEASUREMENT

2 LINEAR, WEIGHT, AND VOLUME MEASURES

- a. Name the markings on a linear scale
- b. Differentiate units of measure and equivalents in the English and metric system
- c. Use a ruler, yardstick, meter stick or scale to measure lengths of objects or distances
- d. Identify measures of ounce, pound, gram
- e. Identify measures of pints, quarts, gallons, liters
- f. Use a scale which is not numerically calibrated
- g. Estimate measures of varying lengths, dimensions or weights

3. DEGREE MEASURES

- a. Identify degree or mil as a unit in determining direction, distance or temperature
- b. Estimate the measure of a given angle not greater than 180°
- c. Interpret bearings, azimuth and other contexts in which the measure of an angle may range from 0° to 360°/0 to 6400 mils

4. TIME-TELLING MEASURES

- a. Use a 24-hour or digital clock to tell time
- b. Name intervals and tell time in hours, minutes, and seconds
- c. Estimate time in seconds, minutes, and parts of an hour
- d. Identify calendar units and arrange them in Julian style
- e. Convert time into hours and tenths of hours
- f. Compute time using Greenwich Mean Time (GMT) as a basis for establishing zones and distances

NT

6 GAUGE MEASURES

- a. Identify the unit of measurement found on an instrument
- b. Interpret the number, word, symbol from a display read-out
- c. Recognize a "reading" from a gauge with color divisions
- d. Recognize positive (+) and negative (-) demarcation on a scale
- e. Select band(s) from a multi scale gauge
- f. Match a gauge reading to a specification using numbered or labeled intervals
- g. Interpret gauge readings from an unnumbered/unmarked interval
- h. Interpret a gauge reading which is fluctuating or momentarily sustained
- i. Match specifications of required measures by manipulation, alignment or maintenance

VISUAL/SPATIAL RELATIONSHIPS

6. SPATIAL

- a. Identify directions that tools, hardware, or components may be moved
- b. Manipulate objects to align, match, mate, make parallel, be perpendicular or be at an angle
- c. Interpret spatial relationships of figures and objects from 2-dimensional drawings, pictures, or photographs
- d. Relate geometric symbols and graphic representations to actual systems, subsystems and components

GEOMETRY

7. LINES

- a. Identify and name points, lines, rays, and segments
- b. Identify intersecting lines, parallel lines, and line segments
- c. Define and identify perpendicular lines
- d. Identify congruent segments

8 PLANES

- a. Identify and name plane geometric figures
- b. List the characteristics of geometric figures
- c. Classify figures according to the number or measure of its sides or angles
- d. Identify figures which possess similarities
- e. Identify figures which may be parallel, perpendicular or congruent

9. ANGLES AND TRIANGLES

- a. Identify and name the different kinds of angles and triangles, with their corresponding figures
- b. Identify vertical, adjacent, complementary or supplementary angles
- c. Classify triangles according to their sides or angle-size
- d. Identify altitudes and medians of triangles or the bisector of an angle
- e. Name an angle by using letters, a number, or a single letter

NT

10. SOLIDS

- a. Recognize and match the names of solids with their corresponding figures

11. TERMINOLOGY

- a. Identify technical words associated with geometric figures
- b. Interpret meaning of terms derived from spatial orientation

COMPUTE OR PERFORM

12. ADDITION AND SUBTRACTION

- a. Add or subtract whole numbers, without carrying or borrowing
- b. Add or subtract whole numbers, carrying and borrowing
- c. Add and subtract, borrowing and carrying with mixed numbers (whole and decimals)
- d. Add or subtract positive (+) and negative (-) numbers, using a number line to arrive at a solution
- e. Add or subtract to find correct time (24 hr. clock) using hours or minutes
- f. Add or subtract various increments on gauges, dials, or any other measuring instrument
- g. Add or subtract time, linear, dry, liquid or degree measures requiring regrouping
- h. Estimate a sum or difference

13. MULTIPLICATION AND DIVISION

- a. Multiply and divide whole numbers
- b. Multiply and divide mixed numbers (whole and decimals)
- c. Divide a number with decimals in both divisor and dividend
- d. Multiply and divide integers, both positive (+) and negative (-), and assign proper sign to product or quotient
- e. Estimate a product or quotient

14. FRACTIONS/DECIMALS

- a. Subdivide whole objects or a set of objects into halves (1/2), thirds (1/3), fourths (1/4), eighths (1/8)
- b. Reduce fractions to lowest terms
- c. Convert fractions (proper and improper) to decimal equivalents, and vice versa, using a table, chart or gauge
- d. Compute equivalent value of fractions, decimals, percents, and mixed numbers to lowest terms
- e. Add and subtract fractions, with same or different denominators
- f. Multiply and divide fractions with and without whole numbers
- g. Estimate a fractional sum, product, or quotient

NT

15. GEOMETRY

- a. Draw geometric figures, plane and solid
- b. Match geometric figures with word names, equivalent measures
- c. Label all parts of geometric figures using mathematical and characteristic designators
- d. Use a protractor to measure angles, make geometrical constructions
- e. Construct perpendicular on a line segment, bisector of an angle
- f. Compute the perimeter and area of any figure
- g. Compute the circumference and area of a circle
- h. Compute the area and volume of any solid figure
- i. Use formulas in solving problems involving geometric figures
- j. Solve problems and interpret spatial relationships of figures, symbols, and objects from 2-dimensional displays

16. COMBINATION OF PROCESSES

- a. Identify median and mode
- b. Compute averages
- c. Solve problems combining all processes using whole, mixed numbers and fractions
- d. Solve problems, combining all processes, involving units of measurement
- e. Interpret information from charts, number lines, scales and graphs to solve arithmetic problems
- f. Solve conversion problems of linear (metric and English) liquid, weight, and temperature (F° or C°) measures
- g. Solve problems involving ratio and proportion
- h. Solve word problems where any mathematical process may occur

17. GRAPHING IN THE COORDINATE PLANE

- a. Identify coordinates of a point in any grid system
- b. Identify points on a line graph
- c. Match a graph with its equation

18. ALGEBRA

- a. Solve simple algebraic equations with one unknown
- b. Recognize and derive equivalent algebraic expressions
- c. Evaluate powers and estimate roots

19. TRIGONOMETRY

- a. Use tables of trigonometric functions
- b. Use tables of logarithms to solve problems
- c. Solve geometric problems using trigonometric functions
- d. Use trigonometric ratios to solve problems

CONTENT READING

NT

25 PROCEDURAL DIRECTIONS

- a Identify factual details or specifications that are found within a statement or written selection
- b Select parts of text and visual materials to complete a task activity
- c Follow highly detailed, step-by step directions in order to accomplish a sequence of task activities
- d Determine the essential message of a paragraph or section of written material
- e Infer from a written source, which does not explicitly provide required information, in order to make a decision
- f Synthesize information from written sources which contributes to the completion of a task activity

26 VOCABULARY

- a Recognize common words and their meanings
- b Recognize task related words with technical meanings
- c Identify the correct meaning of a word from the context of a sentence
- d Recognize the meaning of common contractions, abbreviations and acronyms
- e Determine the meaning of figurative, idiomatic, and technical terms by using context clues or by using a reference source(s)

INFORMATION ACCESS

27. REFERENCE SKILLS

- a Locate a Technical Manual, Field Manual or any related source document by code number and title
- b Alphabetize words or topics to locate information
- c Use the table of contents, index, system or sub-system heading, appendix and glossary to locate information
- d Locate the page, title, paragraph, figure, or chart needed to answer a question or to solve a problem
- e Determine, after scanning or skim-reading, whether the information is relevant
- f Cross-reference within and across source documents to select information needed to perform a routine
- g Organize information from multiple sources into a sequenced series of events

28 TABLES/CHARTS

- a Obtain a fact or specification from a two column table or chart to find information
- b. Obtain a fact or specification from an intersection of a row by column table or chart
- c Use a complex table or chart requiring cross referencing within or in combination with text material outside the chart
- d Apply information from tables and charts for locating malfunctions, or for selecting a course of action

VISUAL AIDS

NT

29 ILLUSTRATIONS

- a Identify details, labels, numbers, and parts from an illustration or picture
- b Identify parts or details according to a key or legend
- c Interpret a drawing which shows a cross-sectional view of an object for assembly, disassembly
- d Interpret a three dimensional projection or exploded view of object(s) for assembly, disassembly, or position in system or sub-system
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- f Integrate information from various sources to select a course of action

30 FLOW CHARTS

- a Use a simple linear path of an organizational chart to list events in sequential order
- b Use a linear path of a flow chart to provide visual and textual directions to a procedure, to arrive at decision points, and to provide alternate paths in problem-solving
- c. Translate the significance of the symbols into physical activities

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- a. Isolate each major section or entity presented in a schematic diagram
- b. Identify the components within each entity
- c Trace connections in an integrated circuit from their origin to another point within or from one entity to another
- d Isolate a problem component in a schematic and trace it to components believed to cause the problem
- e. Interpret symbols to indicate direction of flow, test points, components and diagrammatic decision points

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32. FORMS

- a. Locate the block on a form to enter the appropriate information
- b. Transfer a number, code, date, figure or related data from equipment or written sources onto an appropriate section of the form
- c Write the name of the organization, responsible personnel, disposition of the part or equipment, and nomenclature, in appropriate sections of the form
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- a. Distinguish between essential and non-essential details during the note taking process
- b. Record details without misinterpreting the intent of either written material or an interview
- c. Rewrite all recorded details in sentence form
- d Organize all sentences into paragraphs

NT

34 OUTLINING (topic or sentence)

- a. Distinguish between major and subordinate topics
- b. Generate titles for each major topic selected
- c Use phrases or sentences to provide subordinate details under each major topic
- d. Alternate, indent numbers and letters to establish a hierarchy

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- a. State the intent or objective(s) of the report
- b. Describe the parameters of the event or situation
- c Distinguish between relevant and irrelevant details
- d Sequence events in the order they have occurred
- e. State general impressions of events described
- f Select examples that will clarify major issues presented in the report
- g. Examine opposing points of view in the report
- h. Summarize the major points developed in the report
- i. Justify an action taken and give reasons for rejecting alternatives

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- a. Spell frequently used words correctly
- b. Spell task-related words correctly
- c. Identify words that need to be capitalized
- d. Correct all misspelled words with or without the use of a reference source
- e Apply all rules for end marks, commas, and apostrophes
- f Apply common rules of grammar
- g. Rewrite the paragraph by stating the main idea in the first sentence, and restructuring the sentences for coherence
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37 TYPE

- a. Individual – a person working on a task and communicating with another when assistance is needed or when a supervisory decision is needed
- b. Instruction – a task activity requiring communication between an instructor, an individual or small group where the purpose is to give facts or rules to inform or guide
- c. Tutor – interaction takes place between two persons where one is instructing and the other is doing the task
- d Peer Group (less than 10) – all members engage in an activity where one person assumes a leadership role and communicates to others what is to be done
- e. Interview – a person communicating with another about his activities, opinions, or subject expertise for the purpose of using the information in a task
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- h Command – communicate to others an order or action to be taken where a person has a position of authority

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NT

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- a. Use common knowledge to avoid hazards in order to prevent injury to self or equipment
- b. Apply preventive measures prior to task performance to minimize any potential safety or security problem
- c. Select an appropriate course of action in the event of an emergency

PERCEPTUAL

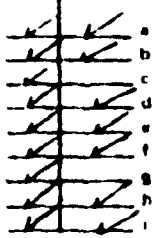
41. RECOGNITION

- a Identify similarities and differences between and among objects
- b. Use body language (motions, gestures, postures) to communicate or signal
- c Determine the presence of a defect or extent of damage
- d. Match objects by size, shape, color and significant markings
- e Classify objects by size, shape, color and significant markings
- f. Determine direction, duration, and intensity of sounds, sightings and smells
- g Infer from sights, sounds, touch, smells, or tastes to determine a course of action
- h. Interpret Codes & Symbols

NUMERATION/PLACE VALUE

NT

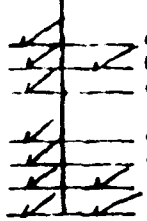
1 NUMBERING AND COUNTING



a. Match numerals with word names and models
b. Write numerals one through N in sequential order from any starting point
c. State what numeral comes after, before, or between any two given numerals
d. Select the numeral which is greater/lesser from a set of numerals
e. Identify an object with a specified ordinal position
f. Write or state the place value of a particular digit, whole or decimal number
g. Round off a number to a specified place, whole or decimal
h. Count by ones, twos, fives, tens, etc backward or forward (skip counting)
i. Match numbers with points or intervals on a number line (positive (+) or negative ( ) values)

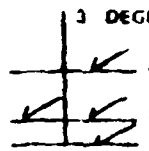
UNITS OF MEASUREMENT

2 LINEAR, WEIGHT, AND VOLUME MEASURES



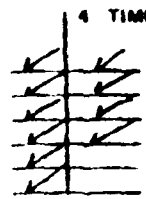
a. Name the markings on a linear scale
b. Differentiate units of measure and equivalents in the English and metric system
c. Use a ruler, yardstick, meter stick or scale to measure lengths of objects or distances
d. Identify measures of ounce, pound, gram
e. Identify measures of pints, quarts, gallons, liters
f. Use a scale which is not numerically calibrated
g. Estimate measures of varying lengths, dimensions or weights

3 DEGREE MEASURES



a. Identify degree or mil as a unit in determining direction, distance or temperature
b. Estimate the measure of a given angle not greater than 180°
c. Interpret bearings, azimuth and other contexts in which the measure of an angle may range from 0° to 360°/0 to 8400 mils

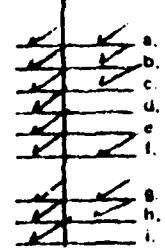
4 TIME-TELLING MEASURES



a. Use a 24-hour or digital clock to tell time
b. Name intervals and tell time in hours, minutes, and seconds
c. Estimate time in seconds, minutes, and parts of an hour
d. Identify calendar units and arrange them in Julian style
e. Convert time into hours and tenths of hours
f. Compute time using Greenwich Mean Time (GMT) as a basis for establishing zones and distances

NT

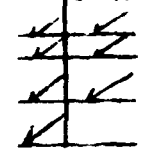
b. GAUGE MEASURES



a. Identify the unit of measurement found on an instrument
b. Interpret the number, word, symbol from a display read out
c. Recognize a "reading" from a gauge with color divisions
d. Recognize positive (+) and negative (-) demarcation on a scale
e. Select band(s) from a multi-scale gauge
f. Match a gauge reading to a specification using numbered or labeled intervals
g. Interpret gauge readings from an unnumbered/unmarked interval
h. Interpret a gauge reading which is fluctuating or momentarily sustained
i. Match specifications of required measures by manipulation, alignment or maintenance

VISUAL/SPATIAL RELATIONSHIPS

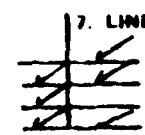
6 SPATIAL



a. Identify directions that tools, hardware, or components may be moved
b. Manipulate objects to align, match, mate, make parallel, be perpendicular or be at an angle
c. Interpret spatial relationships of figures and objects from 2-dimensional drawings, pictures, or photographs
d. Relate geometric symbols and graphic representations to actual systems, subsystems and components

GEOMETRY

7. LINES



a. Identify and name points, lines, rays, and segments
b. Identify intersecting lines, parallel lines, and line segments
c. Define and identify perpendicular lines
d. Identify congruent segments

8. PLANES

a. Identify and name plane geometric figures
b. List the characteristics of geometric figures
c. Classify figures according to the number or measure of its sides or angles
d. Identify figures which possess similarities
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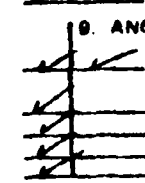

a. Identify and name the different kinds of angles and triangles, with their corresponding figures
b. Identify vertical, adjacent, complementary or supplementary angles
c. Classify triangles according to their sides or angle-size
d. Identify altitudes and medians of triangles or the bisector of an angle
e. Name an angle by using letters, a number, or a single letter

NT

10. SOLIDS

- a. Recognize and match the names of solids with their corresponding figures

11. TERMINOLOGY

- a. Identify technical words associated with geometric figures
- b. Interpret meaning of terms derived from spatial orientation

COMPUTE OR PERFORM

12. ADDITION AND SUBTRACTION

- a. Add or subtract whole numbers, without carrying or borrowing
- b. Add or subtract whole numbers, carrying and borrowing
- c. Add and subtract, borrowing and carrying with mixed numbers (whole and decimals)
- d. Add or subtract positive (+) and negative (-) numbers, using a number line to arrive at a solution
- e. Add or subtract to find correct *time (24 hr. clock) using hours or minutes*
- f. Add or subtract various increments on gauges, dials, or any other measuring instrument
- g. Add or subtract time, linear, dry, liquid or degree measures requiring regrouping
- h. Estimate a sum or difference

13. MULTIPLICATION AND DIVISION

- a. Multiply and divide whole numbers
- b. Multiply and divide mixed numbers (whole and decimals)
- c. Divide a number with decimals in both divisor and dividend
- d. Multiply and divide integers, both positive (+) and negative (-), and assign proper sign to product or quotient
- e. Estimate a product or quotient

14. FRACTIONS/DECIMALS

- a. Subdivide whole objects or a set of objects into halves (1/2), thirds (1/3), fourths (1/4), eighths (1/8)
- b. Reduce fractions to lowest terms
- c. Convert fractions (proper and improper) to decimal equivalents, and vice versa, using a table, chart or gauge
- d. Compute equivalent value of fractions, decimals, percents, and mixed numbers to lowest terms
- e. Add and subtract fractions, with same or different denominators
- f. Multiply and divide fractions with and without whole numbers
- g. Estimate a fractional sum, product, or quotient

NT

15. GEOMETRY

- a. Draw geometric figures, plane and solid
- b. Match geometric figures with word names, equivalent measures
- c. Label all parts of geometric figures using mathematical and characteristic designators
- d. Use a protractor to measure angles, make geometrical constructions
- e. Construct perpendicular on a line segment, bisector of an angle
- f. Compute the perimeter and area of any figure
- g. Compute the circumference and area of a circle
- h. Compute the area and volume of any solid figure
- i. Use formulas in solving problems involving geometric figures
- j. Solve problems and interpret spatial relationships of figures, symbols, and objects from 2-dimensional displays

16. COMBINATION OF PROCESSES

- a. Identify median and mode
- b. Compute averages
- c. Solve problems combining all processes using whole, mixed numbers and fractions
- d. Solve problems, combining all processes, involving units of measurement
- e. Interpret information from charts, number lines, scales and graphs to solve arithmetic problems
- f. Solve conversion problems of linear (metric and English) liquid, weight, and temperature (F° or C°) measures
- g. Solve problems involving ratio and proportion
- h. Solve word problems where any mathematical process may occur

17. GRAPHING IN THE COORDINATE PLANE

- a. Identify coordinates of a point in any grid system
- b. Identify points on a line graph
- c. Match a graph with its equation

18. ALGEBRA

- a. Solve simple algebraic equations with one unknown
- b. Recognize and derive equivalent algebraic expressions
- c. Evaluate powers and estimate roots

19. TRIGONOMETRY

- a. Use tables of trigonometric functions
- b. Use tables of logarithms to solve problems
- c. Solve geometric problems using trigonometric functions
- d. Use trigonometric ratios to solve problems

CONTENT HEADING

NT

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968 Intelligence Analyst

BSEP I

NUMERATION/PLACE VALUE

NT

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NT

10 SOLIDS

- a. Recognize and match the names of solids with their corresponding figures

11. TERMINOLOGY

- a. Identify technical words associated with geometric figures
- b. Interpret meaning of terms derived from spatial orientation

COMPUTE OR PERFORM

12 ADDITION AND SUBTRACTION

- a. Add or subtract whole numbers, without carrying or borrowing
- b. Add or subtract whole numbers, carrying and borrowing
- c. Add and subtract, borrowing and carrying with mixed numbers (whole and decimals)
- d. Add or subtract positive (+) and negative (-) numbers, using a number line to arrive at a solution
- e. Add or subtract to find correct time (24 hr. clock) using hours or minutes
- f. Add or subtract various increments on gauges, dials, or any other measuring instrument
- g. Add or subtract time, linear, dry, liquid or degree measures requiring regrouping
- h. Estimate a sum or difference

13. MULTIPLICATION AND DIVISION

- a. Multiply and divide whole numbers
- b. Multiply and divide mixed numbers (whole and decimals)
- c. Divide a number with decimals in both divisor and dividend
- d. Multiply and divide integers, both positive (+) and negative (-), and assign proper sign to product or quotient
- e. Estimate a product or quotient

14. FRACTIONS/DECIMALS

- a. Subdivide whole objects or a set of objects into halves (1/2), thirds (1/3), fourths (1/4), eighths (1/8)
- b. Reduce fractions to lowest terms
- c. Convert fractions (proper and improper) to decimal equivalents, and vice versa, using a table, chart or gauge
- d. Compute equivalent value of fractions, decimals, percents, and mixed numbers to lowest terms
- e. Add and subtract fractions, with same or different denominators
- f. Multiply and divide fractions with and without whole numbers
- g. Estimate a fractional sum, product, or quotient

NT

15. GEOMETRY

- a. Draw geometric figures, plane and solid
- b. Match geometric figures with word names, equivalent measures
- c. Label all parts of geometric figures using mathematical and characteristic designators
- d. Use a protractor to measure angles, make geometrical constructions
- e. Construct perpendicular on a line segment, bisector of an angle
- f. Compute the perimeter and area of any figure
- g. Compute the circumference and area of a circle
- h. Compute the area and volume of any solid figure
- i. Use formulas in solving problems involving geometric figures
- j. Solve problems and interpret spatial relationships of figures, symbols, and objects from 2-dimensional displays

16. COMBINATION OF PROCESSES

- a. Identify median and mode
- b. Compute averages
- c. Solve problems combining all processes using whole, mixed numbers and fractions
- d. Solve problems, combining all processes, involving units of measurement
- e. Interpret information from charts, number lines, scales and graphs to solve arithmetic problems
- f. Solve conversion problems of linear (metric and English) liquid, weight, and temperature (F° or C°) measures
- g. Solve problems involving ratio and proportion
- h. Solve word problems where any mathematical process may occur

17. GRAPHING IN THE COORDINATE PLANE

- a. Identify coordinates of a point in any grid system
- b. Identify points on a line graph
- c. Match a graph with its equation

18. ALGEBRA

- a. Solve simple algebraic equations with one unknown
- b. Recognize and derive equivalent algebraic expressions
- c. Evaluate powers and estimate roots

19. TRIGONOMETRY

- a. Use tables of trigonometric functions
- b. Use tables of logarithms to solve problems
- c. Solve geometric problems using trigonometric functions
- d. Use trigonometric ratios to solve problems

NT

34 OUTLINING (topic or sentence)

- a. Distinguish between major and subordinate topics
- b. Generate titles for each major topic selected
- c. Use phrases or sentences to provide subordinate details under each major topic
- d. Alternate, indent numbers and letters to establish a hierarchy

35 REPORT WRITING

- a. State the intent or objective(s) of the report
- b. Describe the parameters of the event or situation
- c. Distinguish between relevant and irrelevant details
- d. Sequence events in the order they have occurred
- e. State general impressions of events described
- f. Select examples that will clarify major issues presented in the report
- g. Examine opposing points of view in the report
- h. Summarize the major points developed in the report
- i. Justify an action taken and give reasons for rejecting alternatives

36 EDITING

- a. Spell frequently used words correctly
- b. Spell task-related words correctly
- c. Identify words that need to be capitalized
- d. Correct all misspelled words with or without the use of a reference source
- e. Apply all rules for end marks, commas, and apostrophes
- f. Apply common rules of grammar
- g. Rewrite the paragraph by stating the main idea in the first sentence, and restructuring the sentences for coherence
- h. Appraise an entire written communication and make adjustments to improve clarity

VERBAL COMMUNICATION

37 TYPE

- a. Individual - a person working on a task and communicating with another when assistance is needed or when a supervisory decision is needed
- b. Instruction – a task activity requiring communication between an instructor, an individual or small group where the purpose is to give facts or rules to inform or guide
- c. Tutor – interaction takes place between two persons where one is instructing and the other is doing the task
- d. Peer Group (less than 10) – all members engage in an activity where one person assumes a leadership role and communicates to others what is to be done
- e. Interview – a person communicating with another about his activities, opinions, or subject expertise for the purpose of using the information in a task
- f. Briefing – communicating final instructions to others or giving an account in summary
- g. Counsel – communicating together to exchange ideas or opinions to recommend, give or take advice, or to arrive at an acceptance of a plan or decision
- h. Command – communicate to others an order or action to be taken where a person has a position of authority

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38 CHARACTERISTICS

- a. Enunciate clearly, using the proper rate of speech
- b. Use technical vocabulary suitable to the task and level of the person
- c. Determine the appropriate amount of information to communicate
- d. Interpret figurative or idiomatic language by reference to its use in context
- e. Follow highly detailed, step by step directions
- f. Solicit feedback to confirm the accurate reception of the communication
- g. Recognize when a low key, informal dialogue is suitable
- h. Recognize when direct verbal commands are necessary
- i. Recognize when a prescribed series of verbal interactions is required to coordinate a group effort
- j. Recognize when the situation will require a structured, preplanned method of presentation

39. BARRIERS

- a. Recognize the need for clear, concise directions in order to avoid language or word meaning differences
- b. Recognize personality factors and inter personal relationships that may exist
- c. Recognize feedback as a means of communicating more effectively and increasing task competence

SAFETY/SECURITY

40. PRECAUTIONS

- a. Use common knowledge to avoid hazards in order to prevent injury to self or equipment
- b. Apply preventive measures prior to task performance to minimize any potential safety or security problem
- c. Select an appropriate course of action in the event of an emergency

PERCEPTUAL

41. RECOGNITION

- a. Identify similarities and differences between and among objects
- b. Use body language (motions, gestures, postures) to communicate or signal
- c. Determine the presence of a defect or extent of damage
- d. Match objects by size, shape, color and significant markings
- e. Classify objects by size, shape, color and significant markings
- f. Determine direction, duration, and intensity of sounds, sightings and smells
- g. Infer from sights, sounds, touch, smells, or tastes to determine a course of action
- h. Interpret codes & symbols

CONTENT READING

NT

25 PROCEDURAL DIRECTIONS

- a Identify factual details or specifications that are found within a statement or written selection
- b Select parts of text and visual materials to complete a task activity
- c Follow highly detailed, step-by-step directions in order to accomplish a sequence of task activities
- d Determine the essential message of a paragraph or section of written material
- e Infer from a written source, which does not explicitly provide required information, in order to make a decision
- f Synthesize information from written sources which contributes to the completion of a task activity

26 VOCABULARY

- a Recognize common words and their meanings
- b Recognize task related words with technical meanings
- c Identify the correct meaning of a word from the context of a sentence
- d Recognize the meaning of common contractions, abbreviations and acronyms
- e Determine the meaning of figurative, idiomatic, and technical terms by using context clues or by using a reference source(s)

INFORMATION ACCESS

27 REFERENCE SKILLS

- a Locate a Technical Manual, Field Manual or any related source document by code number and title
- b Alphabetize words or topics to locate information
- c Use the table of contents, index, system or sub system heading, appendix and glossary to locate information
- d Locate the page, title, paragraph, figure, or chart needed to answer a question or to solve a problem
- e Determine, after scanning or skim reading, whether the information is relevant
- f Cross-reference within and across source documents to select information needed to perform a routine
- g Organize information from multiple sources into a sequenced series of events

28 TABLES/CHARTS

- a Obtain a fact or specification from a two column table or chart to find information
- b Obtain a fact or specification from an intersection of a row by column table or chart
- c Use a complex table or chart requiring cross referencing within or in combination with text material outside the chart
- d Apply information from tables and charts for locating malfunctions or for selecting a course of action

VISUAL AIDS

NT

29 ILLUSTRATIONS

- a Identify details, labels, numbers, and parts from an illustration or picture
- b Identify parts or details according to a key or legend
- c Interpret a drawing which shows a cross-sectional view of an object for assembly, disassembly
- d Interpret a three dimensional projection or exploded view of object(s) for assembly, disassembly, or position in system or sub-system
- e Follow illustrations, or photographs, arranged in a sequential order as a guide
- f Integrate information from various sources to select a course of action

30 FLOW CHARTS

- a Use a simple linear path of an organizational chart to list events in sequential order
- b Use a linear path of a flow chart to provide visual and textual directions to a procedure, to arrive at decision points, and to provide alternate paths in problem solving
- c Translate the significance of the symbols into physical activities

31 SCHEMATICS

- a Isolate each major section or entity presented in a schematic diagram
- b Identify the components within each entity
- c Trace connections in an integrated circuit from their origin to another point within or from one entity to another
- d Isolate a problem component in a schematic and trace it to components believed to cause the problem
- e Interpret symbols to indicate direction of flow, test points, components and diagrammatic decision points

WRITTEN COMMUNICATION

32 FORMS

- a Locate the block on a form to enter the appropriate information
- b Transfer a number, code, date, figure or related data from equipment or written sources onto an appropriate section of the form
- c Write the name of the organization, responsible personnel, disposition of the part or equipment, and nomenclature, in appropriate sections of the form
- d Write a descriptive account of an activity or transaction performed
- e Use a completed form to locate or compare information

33 NOTE TAKING

- a Distinguish between essential and non-essential details during the note taking process
- b Record details without misinterpreting the intent of either written material or an interview
- c Rewrite all recorded details in sentence form
- d Organize all sentences into paragraphs

END