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LETTER OF PROMULGATION FOR NAVEDTRA 142

1. The Naval Education and Training (NAVEDTRA) M-142 series of manuals has been extensively revised. This revision merges the Ready Relevant Learning process, the Naval Education and Training Command (NETC) End-to-End process, and the OPNAV acquisition process into one Navy Training Process (NTP). The NTP is more agile, relies on type commanders to push training requirements to NETC, and eliminates a multitude of outdated and often conflicting policy and guidance.

2. The NAVEDTRA 142 series of manuals define the NTP and provide fundamental direction for the development of curricula, the delivery of instruction, and the management and evaluation of training programs, within NETC.

3. This publication is a major change and should be read in its entirety.

4. This publication is available electronically at: https://netc.navy.mil/Resources/NETC-Directives/.

5. NETC N71 solicits any comments and recommendations to improve the NAVEDTRA 142 series of manuals through the following link: https://flankspeed.sharepoint-mil.us/sites/MYNAVYHR_NETC/N7/Lists/ChngRqstForm/AllItems.aspx or comments may be submitted to netc-n7@us.navy.mil.

6. Reviewed and approved.

J. J. CZEREWKO

Navy Training Process

Phase IV: Course Fielding Volume II – Testing Manual

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Record of Changes

Number and Description of Change:	Entered By:	Date:

Foreword

Naval Education and Training Series Manuals:

The Naval Education and Training (NAVEDTRA) M-142 series of manuals provide policy and guidance within the Naval Education and Training Command (NETC) for the development of curricula, delivery of instruction, and management and evaluation of training programs. This manual supersedes the following documents:

- NAVEDTRA 132 Navy School Testing Program Management

Scope:

The Navy Training Process (NTP) – Phase IV Course Fielding Vol II Testing Manual establishes policy and guidance for managing training materials and programs and requires all training activities to conduct a quality testing program. This manual provides information and guidance in the design, development, implementation, management, sustainment, and analysis of testing programs and materials throughout NETC.

The guidelines set forth in this series of manuals are not intended to conflict with any higher-level authority policies or procedures. In instances where there appears to be a conflict or disagreement, please notify NETC N71, Training Standard Branch. NETC N71 solicits any comments and recommendations to improve the NAVEDTRA M-142 series of manuals through the following link: https://flankspeed.sharepoint-mil.us/sites/MYNAVYHR_NETC/N7/Lists/ChngRqstForm/AllItems.aspx or comments may be submitted to netc-n7@us.navy.mil. This manual is intended for use by military, civil service, and contractor personnel engaged in the development and modification of Navy training materials.

NOTE: All links in this manual must be copied and pasted into a browser to access the document being referenced.

Contractual Use of this Manual:

Throughout the NAVEDTRA M-142 series, examples are provided to illustrate and clarify points being discussed. It is important to note in the case of an item identified as an "example," this item is not intended to be copied exactly in all situations, but rather

provided to help clarify the information being discussed. The content for items shown as examples are representative and may be tailored by the user for specific situations. Table 1 provides the meanings of various words that may be used in this manual.

Table 1: Guidance Terms

Term	Meaning
Must	**This action, behavior, or construct is required by the guidelines.**
Will	**This denotes a required action in the future.**
May	**This action, behavior, or construct is permitted; however, it is discretionary, not required.**
Can	**This refers to the inherent behavior of software and/or computer languages. Do not use to mean that an action, behavior, or construct is permissible or allowed by the guidelines.**
Must not	**This action, behavior, or construct is prohibited by the guidelines.**
Should	**This suggests that something is proper, reasonable, or the best thing to do.**

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https://flankspeed.sharepoint-mil.us/sites/MYNAVYHR_NETC/N7/1424%20Vol%20II/Forms/AllItems.aspx

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Acronym List

Acronym	Description
APL	Affective Proficiency Level
ARB	Academic Review Board
ASVAB	Armed Services Vocational Aptitude Battery
CCA	Curriculum Control Authority
CCMM	Course Curriculum Model Manager
CD	Curriculum Developer
CDS	Curriculum Data System
CeTARS	Corporate Enterprise Training Activity Resource Systems
CIN	Course Identification Number
CMS	Course Master Schedule
CO	Commanding Officer
COI	Curriculum Outline of Instruction
CS	Course Supervisor
CWC	Continue with Class
DC	Direct Current
DET	Detachment
DOT	Director of Training
EO	Enabling Objective
FCR	Formal Course Review
FTS	Field Training Specialist
FLSO	Field Learning Standards Officer
IFIT	Instructor Facilitated Interactive Training
IG	Instructor Guide
IMSO	International Military Student Officer
IST	In-Service Training
IT	Information Technology
KPL	Knowledge Proficiency Level
KSA	Knowledge Skills Attitudes (Abilities)
KSATR	Knowledge Skills Abilities Tools and Resources
KTAG	Knowledge Test Administrator's Guide
KTDW	Knowledge Test Design Worksheet
KTIW	Knowledge Test Item Worksheet
LAS	Learning Assessment System
LC	Learning Center
LMS	Learning Management System

LO	Learning Objective
LS	Learning Site
LSO	Learning Standards Officer
NAVEDTRA	Naval Education and Training
NAVMAC	Navy Manpower Analysis Center
NEC	Navy Enlisted Classification
NETC	Naval Education and Training Command
NMT	Navy Military Training
NTP	Navy Training Process
OCCSTD	Occupational Standard
OIC	Officer in Charge
ORA	Objective Rating Analysis
ORM	Operational Risk Management
PADDIE+M	Plan, Analyze, Design, Develop, Implement, Evaluate + Maintain
PEVT	Personnel Event
PII	Personally Identifiable Information
PTAG	Performance Test Administrator's Guide
PQS	Personnel Qualification Standard
RTM	Rate Training Manual
SAT	Satisfactory
S:I	Student-to-Instructor (Ratio)
SCO	Student Control Office(r)
SDIT	Self-Directed Interactive Training
SG	Student Guide
SIS	Student Information System
SME	Subject Matter Expert
SPL	Skill Proficiency Level
SYSCOM	Systems Command
TA	Task Analysis
TO	Terminal Objective
TTA	Training Task Analysis
TTE	Technical Training Equipment
TTL	Training Task List
TQI	Total Quality Indicator
UNSAT	Unsatisfactory

CHAPTER 1
NAVY SCHOOL TESTING PROGRAM

1.0. Introduction. The purpose of a Navy school testing program is to assess the student's ability to perform and/or comprehend the objectives of a course. It is also used to determine the effectiveness of the curriculum. As set forth in this manual, a testing plan, test administrator's guides, and a remediation program are required for each course of instruction. Concepts and guidelines pertaining to a quality testing program, outlined in this manual, are not necessarily the ideas and opinions of the author but are shared opinions of many authors of testing publications considered experts in evaluation strategies.

When appropriate, training will be focused on immersive, hands-on learning, allowing Sailors to complete "reps and sets" of required tasks to develop and enhance mental muscle memory including reducing latency, skill decay, and demonstrating proficiency. Developed from the science of learning, practical application, and repetition of tasks are critical to both knowledge and skill retention. Training is designed to continuously challenge Sailors through increasing difficulty, culminating in a capstone event when feasible. Embedded assessment tools allow responsive feedback to students. There are multiple techniques, such as Interleaving, which instructional designers and instructors can use to improve the transfer of knowledge and skills. See Chapter 3, Test Categories, Test Types, and How Tests are Referenced for more details.

1.1. Testing Program. At a minimum, the Navy school testing program is designed to achieve the following goals:

a. Measure the student's ability to comprehend (knowledge) learning objectives (LO) and perform (skill) LOs.

b. Identify students who are having trouble mastering LOs.

c. Provide feedback to students on their achievement of all LOs.

d. Motivate students for effective learning and reinforcement of knowledge and skills.

e. Provide feedback on instructor and curriculum effectiveness to improve the instructional program.

1.2. Testing Program Roles and Responsibilities. An effective NETC testing program relies on individuals understanding and executing their responsibilities. Each person assigned to these roles has a significant impact on the effectiveness of testing programs within NETC.

1.2.1. NETC Headquarters

a. **Commander, NETC.** Provides policy and guidance for the NETC School Testing Program.

b. **Director, Training and Development Division (N7).** Provides oversight for the policy and guidance of the Navy School Testing Program and monitors learning center (LC) compliance with the program.

c. **Training Standards (N71).** Ensures NETC LCs and learning sites (LS) comply with the Navy School Testing Program and that policy and guidance are current.

1.2.2. Naval Education and Training Command Learning Centers. Titles for the different LC/LS categories of personnel listed below are generic and do not dictate organizational structure. The actual structure of the organization and the titles of the positions will vary by command.

a. **Commanding Officer (CO)**

(1) Serves as Curriculum Control Authority (CCA), see NAVEDTRA M-142.4 Volume I for more information.

(2) Directs and approves LS testing program(s).

(3) Resolves differences between Course Curriculum Model Manager (CCMM) and other LSs.

b. **Director of Training (DOT)**

(1) Ensure testing programs are conducted.

(2) Monitors total quality indicator (TQI) trends and recommends corrective action to the CO.

(3) Coordinates Learning Assessment System (LAS) accounts and trouble tickets.

c. **Learning Standards Officer (LSO)**

(1) Monitors performance of NETC's testing program TQIs of tests, test-item analyses, and remediation programs.

(2) Determines TQI trends and recommends corrective action to the DOT.

(3) Provides professional direction in designing test(s) to assess student achievement of LOs, reviewing test plans, developing test(s) and test items, overseeing the testing process, and overseeing test and test-item analysis.

1.2.3. Naval Education and Training Command Learning Sites. Encompasses detachments (DET) and commands: Depending on the LC, the following officials may be assigned similar responsibilities in support of the LSs testing program. The final decision regarding roles and responsibilities is at the discretion of the CCA.

a. **CO/Officer in Charge (OIC)**

(1) Implements and ensures the effectiveness of the testing program.

(2) Designates testing officer(s).

b. **CCMM.** Functions can be retained by CCA or delegated to a LS particularly if multiple LSs teach the same course.

(1) Approves tests prepared during course development.

(2) Maintains master test-item bank.

(3) Maintains test, test-item analysis data, and TQI report and provides to LC LSO as required.

(4) Reviews proposed test item changes; forwards change proposal to LSO for possible inclusion in the master test-item bank.

(5) Provides LS with testing plan, test(s), scoring criteria, and test administrator's guides.

(6) Provides LS with updated versions of testing program materials.

c. **Testing Officer**

(1) Manages the testing program.

(2) Provides test material(s) and test administration details to include providing guidance on check-out and check-in procedures.

(3) Oversees grading of tests.

(4) Secures test material(s) and maintains test banks.

(5) Coordinates and manages test changes or revisions.

(6) Responsible for test quality control in conjunction with Field LSO

(FLSO)/Field Training Specialist (FTS).

(7) Performs test and test-item analysis; provides summary reports of testing information in the TQI report to the course's CCMM.

(8) Conducts in-service training (IST) in testing areas.

(9) In conjunction with curriculum developers (CD), performs the actions listed below as the CD duties.

(10) In conjunction with course supervisor (CS), performs the actions listed below as the CS duties.

d. **FLSO/FTS**

(1) Provides guidance to CD during development, revision, or changes of testing program materials.

(2) Validates and verifies initial test-item bank(s) and testing plan.

(3) Responsible for test quality control in conjunction with testing officer.

(4) Reviews test items submitted and approves or rejects items for possible inclusion into the master test-item bank.

(5) Reviews data from test and test item analyses to ensure validity. In conjunction with testing officer provides summary reports of testing information in the TQI report to the course's CCMM.

(6) Approves test administrator's guide(s) and grading criteria.

e. **CS.** In conjunction with the testing officer:

(1) Ensures proper test administration and security of test materials.

(2) Monitors and validates test-item bank currency.

(3) Monitors, performs, and validates test and test-item analysis, forwarding findings to the CCMM.

(4) Ensures test bank synchronization with alternate LSs.

f. **CD**

(1) Designs and develops testing plan, test administrator's guide(s), grading criteria, tests, and test items in conjunction with subject matter experts (SME).

(2) Develops test items in the current approved NETC LAS defined in NAVEDTRA M-142.5.

CHAPTER 2
TEST DEVELOPMENT PREPARATION

2.0. Introduction. One of the most crucial events in training occurs when a student's knowledge comprehension and/or ability to perform a skill is assessed. If the student is assessed as having successfully completed a course and is sent to the Fleet, there will be a strong performance expectation based on the school attended. If the school's assessment is either unreliable or invalid, it creates the possibility that a student has completed training that will not meet Fleet expectations. The result is the Fleet loses confidence in NETC's training. Thus, the fulcrum that balances NETC's credibility is test reliability and validity. Validity is whether a test measures what it is designed to measure while reliability refers to the consistency of the measurement. Test reliability and validity are achieved by developing tests that are properly designed to measure the desired training skill and knowledge outcomes and then monitoring them. If tests are improperly designed and/or improperly monitored, the threats to test reliability and validity are real.

2.1. Testing Plan. A course's testing program is outlined in a testing plan. The testing plan provides documentation of the test procedures for a course. A testing plan must be maintained current, accurate, and be approved by the CCA or CCMM for each course. Appendix C provides an example of a testing plan. The testing plan often starts as a draft that is used in conjunction with content development processes during new course development and is finalized as an element of the course pilot. The draft testing plan includes the listing of the types and general placement of the various quizzes, tests, practical exercises, etc., in the course and will help in developing the draft course master schedule (CMS).

2.2. Testing Domain. There are two testing domains that are identified by knowledge, skills, and attitudes (abilities) (KSA). The acronym KSA has two meanings in common use. Both identify "K" as knowledge and "S" as skill as the first two descriptors. The difference being that some define "A" as ability and others as attitude. The use of "ability" is generally used when the purpose is the decomposition of work, and the use of "attitude" is a learning interpretation. NETC believes that part of the training mission includes teaching knowledge, skills, and attitudes. Attitude is an essential part of the affective domain of learning and an essential part of the learning process, attitudes influence learners' motivation, engagement, and application of knowledge and skills. Certainly, efforts toward "Sailorization" are an attempt to instill this latter component. This manual focuses on technical training assessment. While it is difficult to isolate the attitude domain effects and assess them in a valid and reliable manner, the concepts

presented in this manual are applicable to all domains. See NAVEDTRA M-142.2 for more information on the domain.

2.3. Course Source Data. To ensure that a test is both reliable and valid, CDs must be fully informed by all course source data. The first step in collecting data is to check the curriculum data system (CDS) for current task analysis (TA) data. All courses require an approved TA. If TA data is not available, then CDs will bridge the absence of TA data using data elements from a combination of: Occupational Standards (OCCSTD), training task list (TTL), curriculum outline of instruction (COI), and other source material. These items should exist for an approved course that may not have an approved TA. The risk in using this bridge is that there is no empirical linkage between all data elements. This is an acceptable practice while TA databases mature. Whenever new training requirements are identified, a TA will be conducted using the CDS. Refer to NAVEDTRA M-142.2 for further guidance. The following is a brief discussion of each data source:

2.3.1. Occupational Standards. These standards are the minimum capabilities that the Navy expects and requires of individuals within each rating. Standards are generally expressed in terms of task statements, and they represent the minimum skills and knowledge needed to accomplish those tasks. A list of OCCSTDs is published quarterly by the Navy Manpower Analysis Center (NAVMAC), NAVPERS 18068F Volume 1. OCCSTDs form the foundation for the training of all Navy enlisted personnel. NETC develops the delivery method for approved OCCSTDs, in the form of: A-School selected E-4 OCCSTDs, Personnel Qualification Standards (PQS), and Rate Training Manuals (RTM) which are rating specific. Refer to NAVPERS 18068F Volume 1 and OPNAVINST 1223.1E for detailed guidance.

2.3.2. Task Analysis. When a TA (previously known as the job, duty, TA) has been performed, work is decomposed (broken down) to the task level (and may be further decomposed to the sub-task and step level, if required); this is the starting point for developing courses and tests. Data associated with the task includes:

a. The condition, which describes the circumstances under which the behavior will be performed.

b. The verb, including an object, which provides context for the task and specifies the nature of behavior required.

c. The standard, the criteria to which the behavior will be performed.

Additionally, Training TA (TTA) data further contextualizes circumstances that directly relate to training and assessment. The TA process will vastly enhance CDs' ability to construct reliable and valid tests.

2.3.3. Training Task List. TA data is the source of data used to develop TTLs; refer to NAVEDTRA M-142.2 for more information. TTLs are outputs of the TA and are used to create LOs. This document contains a list of duties and tasks that will be used to build a course. Each duty and task are listed with its source document (reference) and is identified with either a knowledge or skill level. A TTL can exist for an approved course that does not have an approved TA but when a revision to the course is required a TA must be completed.

2.3.4. Curriculum Outline of Instruction. The COI contains a course's terminal and enabling LOs, derived from the job's, duties, and tasks respectively. The COI also provides the course's sequence (order in which LOs are taught). LOs are arranged in a logical clustering and teaching sequence to produce the most effective learning in the shortest time possible.

Once the course's source data is collected, the data elements are in place, with analysis by CDs, to design and develop tests to assess the student's achievement of desired training outcomes. The minimum source data necessary to design and develop tests is described below:

a. **Duty and Task Statements.** Duty and task statements specify the work to be performed at the duty and task level. Duty and task statements may be found in one of two locations. If a TA has been performed, the duty and task statements will be found in CDS. If no TA data exists, refer to a TTL or existing COI for these statements.

b. **Task Levels.** Task levels are used to identify a task as either a knowledge, skill, or attitude. These categories are listed in a TTL or existing COI and are referred to as “levels.”

c. **Terminal Objective.** Terminal objectives (TO) describe what the student must achieve to successfully complete the course of instruction. These LOs are derived from one or more duties from a TTL. TOs will be the same as those contained in the COI.

d. **Enabling Objective.** Enabling objectives (EO) are testable and describe what the student may accomplish at any point in the course, after receiving the appropriate training. EOs are derived from one or more tasks from a TTL. Two or more EOs are associated with a TO in a COI.

e. **Knowledge.** Knowledge refers to an understanding of facts, concepts, processes, procedures, or principles relating to a particular subject area and

applied directly to the performance of a function. The required knowledge for each task is captured in the task's Knowledge, Skill, Ability, Tools, and Resources (KSATR) in CDS.

f. **Skill.** Skill refers to the ability to perform a job-related activity that contributes to the effective performance of a task. Skills are the proficiencies needed to perform a task and describe what the student must do. The required skill for each task is captured in the task's KSATR in CDS.

g. **Ability.** Ability refers to an enduring attribute of the individual that influences performance and enables the performance of tasks. The required ability for each task is captured in the task's KSATR in CDS.

h. **Condition.** A condition identifies the circumstances under which the behavior is demonstrated. When determining the condition(s), consider the performance support, student guide (SG), publication, schematic, tool, etc., that is given to the student to complete the behavior. Conditions must be written to include, in sufficient detail, any safety, environmental, or related conditions which apply to the action. The condition defines aiding and limiting factors imposed upon the student. Training must be as realistic as possible and replicate the working environment when possible. Conditions are found in the COI. The authoritative source for task conditions is CDS.

i. **Behavior (verb and object to be acted upon).** A behavior is a KSA that is observable and measurable. When stating the behavior in an LO, action verbs must be used to reduce ambiguity. Action verbs are observable and measurable. The behavior part of the LO states what a student must do to demonstrate that they have learned a specific skill or knowledge.

j. **Standard.** A standard measures a training output. A standard defines the criteria for acceptable performance in terms of completeness, time, quantity, quality, or accuracy. Standards are found in a COI. The authoritative source for task standards is CDS. The standard “with 100% accuracy” may be used for knowledge LOs only if no other more specific standard can be applied. This standard is not the same as the testing assessment standard or score. A passing test score is often less than 100%, e.g., a 70% passing grade. However, we do not want the student to only know 70% of the objective. “In accordance with applicable instructions” is not an acceptable standard. “In accordance with publication XYZ” can be used if no other more specific standard can be applied and students know where to locate the manual.

k. **TTA Data.** TTA Data is a detailed description of important task elements identified during a TA and recorded in the CDS. Refer to NAVEDTRA M-142.2 for additional information. TTA data includes:

(1) **Safety Hazard Severity.** This is a qualitative measure of the potential consequences resulting from item failure or the potential consequences resulting from failure to observe proper safety procedures.

(2) **Criticality of Performance.** Addresses the need for selecting tasks for training that are essential to job performance, even though the tasks may not be performed frequently. Criticality is a measure of how essential a task is to job performance.

(3) **Task Delay Tolerance.** This is a measure of how much time can elapse between the time that the need for task performance becomes evident and the time that actual performance must begin.

(4) **Frequency of Performance.** This is a measure of how often the task is performed.

(5) **Probability of Inadequate Performance.** This is a measure of how often a task is performed in a non-acceptable manner. The criterion for probability of inadequate performance is used to ensure that training is given to those essential tasks that job incumbents frequently perform poorly.

(6) **Difficulty of Performance.** This refers to the time, effort, and assistance required to achieve performance proficiency.

(7) **Task Learning Difficulty.** This refers to the difficulty of instructing and learning the task. Some tasks are so easy that they can be readily learned on the job. On the other extreme, some tasks are so complicated that a Sailor can perform them adequately only after lengthy, formal training.

(8) **Percent Performing.** This is the percentage of Sailors who perform the task and points to the need for training tasks that are most often performed on the job.

(9) **Percent of Time Spent on Performance.** This refers to the percentage of time spent performing a task. It is a criterion that points to a need for providing training to assist job incumbents in efficient performance of those tasks on which they spend the most time.

(10) **Immediacy of Performance for the Task.** This refers to the time interval between completion of training and performance of the task on the job and has some significance in selecting tasks for training. A factor for selecting tasks for training is whether or not there is a high probability of the graduate encountering the task on the job soon after completing training. Consider the predicted or measured amount of decay of the skill that will take place during the time interval.

2.4. Utilization of Course Source Data. Source data is the foundation for every decision associated with a course, from its design and development to every resource required to deliver the training. Source data will be used to develop duty and task statements, LOs (terminal and enabling), and the sequence in which the LOs for the new or revised course will be taught and tested. CDs must begin thinking about test design and development as LOs are being written. Development of the course's instructor guide (IG), SG, and tests largely occur simultaneously. Thus, developing a test requires a great deal of thought and consideration, during course development. Appendix G provides examples and explanations of a test design process.

Not all the data elements listed above will be used in test design, but they will play a part in course design. The minimum data elements used in test design are identified in Chapter 6, Performance Test Design and Development and Chapter 8, Knowledge Test Design and Development. These elements will be used to determine LO criticality and the proficiency level to which each LO needs to be tested. This will match the proficiency level to which the LO is taught. CDs must use LO criticality to help determine which LOs must be assessed to determine student achievement. Determining the level of proficiency to which each test needs to be designed enables CDs to determine optimal test instrument(s) and grading criteria.

NOTE: All assessments used to determine student achievement will be identified in the course's testing plan.

2.5. Skill and Knowledge Proficiency Levels. To ensure that the correct level of proficiency is trained to and then assessed, NETC has established the following skill proficiency levels (SPL) and knowledge proficiency levels (KPL):

2.5.1. Skill Proficiency Levels. There have been many theories developed to describe the teaching of skills (psychomotor domain). Dave (1970) identified five major categories of the Taxonomies of the Psychomotor Domain as Imitation, Manipulation, Precision, Articulation, and Naturalization, where the skills start low and progress to more sophisticated skills. Using Dave's (1970) five categories the following descriptions are what will be used in performance test development.

a. **SPL1 – Imitation.** Instructors share essential information about a skill, such as facts, background information, safety considerations, etc. Then the skill is broken down into small steps and demonstrated by the instructor. The student is then allowed to reenact or copy the skill. The expectation is that the student can perform the task but is not proficient and requires supervision. The attributes are that this work will require corrective action, and excessive time will be required to complete the task.

b. **SPL2 – Manipulation.** The student performs the task using written or verbal instruction. The student is able to ask questions, receive feedback, and practice the task. The expectation is that the student can perform the task but may require additional repetitions or time on task to achieve expert proficiency and requires limited supervision. The attributes are that this work may, but generally will not, require corrective action and time on task will be within established standards.

c. **SPL3 – Precision.** During training the student develops proficiency that they are able to perform the skill reliably independent of help. The skill is performed without assistance or instruction. When students reach this level, they are able to demonstrate the skill to others and may be considered craftsmen. The expectation is that the student can perform the task with a craftsman's proficiency without supervision. The attributes are speed, accuracy, and precision.

d. **SPL4 – Articulation.** During training the student adapts or integrates expertise to satisfy new concepts. The expectation is that the student can relate and combine associated activities to meet dynamic requirements. The attributes are integrate, adapt, develop, and approve. For example, the Sailor modifies a skill or a product to meet a new situation.

e. **SPL5 – Naturalization.** During training the student demonstrates automated, unconscious mastery of activity and skills. The expectation is that the student defines an approach and strategy to meet strategic objectives. The attributes are design, specify, and invent. For example, the Sailor is expected to perform several steps without reference, understanding the consequences a subsequent step has on future outcomes.

2.5.2. Knowledge Proficiency Levels. The KPLs are based upon Bloom's Revised Taxonomy (Anderson & Krathwohl, 2001). Increasing in ability, there are six categories, Remember, Understand, Apply, Analyze, Evaluate, and Create, however the highest two levels, evaluate and create have been combined into KPL 5. Using Bloom's Revised

Taxonomy, the following descriptions are what will be used in knowledge test development.

a. **KPL1 – Remember.** The expectation is that the student can recall facts, terms, and basic concepts. An example of a KPL1 "knowledge" test item is: Provide the missing information in the following statement - A M60 Machine Gun on full auto, is capable of firing .... rounds a minute. An example of a KPL1 "comprehension" test item is - State the number of sustained firing rounds that a M60 Machine Gun can support?

b. **KPL2 – Understand.** The expectation is that the student can show their understanding of facts or ideas by interpreting data, stating main ideas, giving descriptions, or comparing data.

c. **KPL3 – Apply.** The expectation is that the student can apply their knowledge of facts and concepts to solve problems in new situations.

d. **KPL4 – Analyze.** The expectation is that the student can examine information and separate it into components by identifying motives or causes. Students will be able to make references and identify evidence to support generalizations.

e. **KPL5 – Evaluate/Create.** The Navy combines evaluate and create into one level. The expectation is that the student can present ideas and make judgments about the value of ideas or work. Students can compile information into new patterns or propose different solutions to troubleshoot and solve problems.

2.6. Affective Proficiency Levels. Teaching in the affective domain is required to facilitate development in the values, ethics, aesthetics, and feelings of social work students (Anderson & Krathwohl, 2001). It is arguably the most complicated type of teaching as it integrates cognition, behavior, and feelings. Affective learning is demonstrated by behaviors indicating attitudes of awareness, interest, attention, concern, ability to listen and respond in interactions with others, and ability to demonstrate those attitudinal characteristics or values. See NAVEDTRA M-142.2 for a list of verbs to use for this domain. Using Krathwohl's taxonomy, the five major categories are listed from the simplest affective proficiency level (APL)-1 to the most complex APL-5:

a. **Receiving (APL-1).** To receive is to be attentive and ready to read and listen to receive knowledge. This could be reading an article, paper, or book. It could also involve listening to a podcast, lecture, or watching a video.

b. **Responding (APL-2).** To respond is to actively respond, participate and engage in the learning process. This involves writing essays or assignments, problem-solving, presenting, asking questions, and taking part in dialogue and discussion.

c. **Valuing (APL-3).** To find value in one's learning is to be motivated to learn. Here one would reflect, express opinions, and actively debate. This includes initiating or demonstrating learning beyond participation. Examples are "demonstrate belief in the democratic process" or "show the ability to solve problems."

d. **Organization (APL-4).** To organize is to analyze, integrate and compare, and ordering values according to priorities. You might use graphs to analyze and compare spreadsheets to classify and report or use conceptual mind-maps. Examples include "Defend the need for balance between freedom and responsibility" or "Accept professional ethical standards."

e. **Characterization (APL-5).** To characterize is to control your outcomes and behaviors. You may take a critical and reflective approach or get involved in group or team collaboration. Instructional objectives are concerned with the student's general patterns of adjustment (personal, social, and emotional). Examples include "Influence cooperation in group activities" or "Revises judgments and changes behavior in light of new evidence."

CHAPTER 3
TEST CATEGORIES, TEST TYPES, AND HOW TESTS ARE REFERENCED

3.0. Introduction. There is a need to measure students' ability to perform skills and their knowledge comprehension by using the right test category and best test type. This determination is made during the test design phase. Once tests are designed, they must be piloted prior to use in a course. It is important to consider aspects of learning science in course design such as retrieval practice, spaced practice, interleaving, and elaboration (Van Schaack, 2021). These practices help with student retention of course material and results in better overall test scores.

a. **Retrieval Practice –** Instructors should use several low-stakes oral and written quizzes throughout their lessons that will encourage students to retrieve information from memory.

b. **Spaced Practice –** Rather than having students try to cram during long study sessions, it is better to use spaced practice to distribute study time over several short periods. This will help students produce better long-term memory.

c. **Interleaving –** Rather than teach each topic by itself, utilize interleaving to weave in material and problems from previous training material, to help improve the transfer of knowledge and skills.

d. **Dual Coding –** Students process information verbally and visually. Images on slides should be described by instructors rather than being read from the slides.

e. **Concrete Examples –** Instructors should use real-world examples to explain abstract ideas to make those ideas easier to understand, remember, and use.

f. **Elaboration –** Have instructors utilize questions that start with "How, Why, and What" to help students relate new training material to material they already know. This will make the new information more memorable.

3.1. Test Categories. Test categories consist of the following:

a. **Pretest.** A pretest is administered at the beginning of a course and prior to instruction. Pretests should not be reviewed with students and may be used in the following ways:

(1) **Training Effectiveness.** Comparing the results of a pretest with a post-test that is the same or a similar test helps determine the effectiveness of instruction.

(2) **Acceleration.** A pretest may be used to determine a student's potential for acceleration through a course or unit of instruction. The pretest is similar to the existing course or unit test and is designed to assess mastery of the LOs. For example, students who took a pretest answered 24 of 25 algebra items correctly. It may be cost effective to accelerate the students through this portion of training and move them on to the next unit or module.

(3) **Prerequisite.** A pretest is used to assess prerequisite skills and/or knowledge necessary to meet entry-level requirements. For example, if a student is required to have knowledge of electricity and electronics prior to attending the Fire Control Technician A-School, a pretest may be administered to determine if the student possesses sufficient knowledge of these topics.

b. **Quiz.** This is a short test used by instructors to assess achievement (understanding) of recently taught material. A quiz can be embedded into the courseware as a knowledge check or developed as a standalone quiz. It can be used to focus students on the material and may or may not be part of their grades. If included in their grades, they must be standardized and included in the testing plan.

c. **Progress Test.** This test assesses skill and/or knowledge LOs. A progress test is normally administered for every 40-50 periods of instructional material. How often a test is given may vary based on the complexity of the material. For example, it may be necessary to assess complex material in small blocks of instruction. In this case, progress tests may be administered more frequently than once a week. Administering tests too frequently may cause students to rely on short-term memorization and not comprehension. Incorporating retrieval practice and interleaving in course material will help strengthen student retention of the material covered.

d. **Comprehensive Test.** A comprehensive test is normally given at the end of instruction or after large blocks of instruction to measure mastery of the critical objectives in the course or to measure retention of previously tested material. The two types of comprehensive tests are discussed below:

(1) **Within-Course Comprehensive Test.** This type of test may be administered for a course that is complex and where it may not be practical to administer a single final comprehensive test. For example, if a

course is 10 weeks long, it may be appropriate to administer two within-course comprehensive tests rather than one final comprehensive test.

(2) **Final Comprehensive Test.** This test is given at the end of a course and may serve as a post-test to determine knowledge gain and training effectiveness. This test will be cumulative and used to measure mastery of LOs and particularly critical LOs.

e. **Oral Test.** This test is normally administered by a board (panel) of evaluators. The student is asked to respond to questions orally in front of the board. Oral tests are best used to assess a student's comprehensive understanding of the skills necessary, stated verbally, to perform a job, duty, or task. A rubric will be developed and used to ensure that all students are assessed to the same standards. The following guidelines should be considered when determining the need for an oral test:

(1) Student-to-Instructor (S:I) Ratio/Class Size: If the S:I ratio is greater than 10:1 or if the class size is greater than 20, an oral test may not be feasible due to time constraints. Ideally, oral tests should only be used with small groups of students.

(2) Environmental Limitations: Oral tests should not be used in environments where distractions could interfere or if space limitations prohibit testing where other students can overhear questions and answers.

f. **Essay Test.** An essay is generally administered when a holistic assessment of student comprehension is necessary. Rubrics will be developed and used to ensure students are assessed in a similar manner. A canned or model response may also be included to assist the administrator with grading.

3.2. Test Types

a. **Open Book Test.** This type of test is appropriate whenever the use of technical documentation is routine in on-the-job situations; it evaluates the student's ability to utilize technical documentation during task performance. This is a common test type for performance tests since most technical tasks are performed with the technical reference in hand.

b. **Closed Book Test.** This type of test is used when the knowledge being tested is normally required in on-the-job situations without reference to technical documentation. This test is appropriate when a student's mastery requires performance without documentation such as during an initial action for a casualty.

3.3. Performance Test Instruments. The three test instruments that can be used to assess the student's performance of LOs are product, process, and combination. Each test instrument has a different purpose, discussed below:

a. **Product.** A product is an observable result, something that can be seen, heard, or touched. A solder joint is a product because you can see and touch it. A completed form is a product because it is tangible. Product performance test items place importance on the final product or result. They also require the students to use a job sheet and to:

(1) Complete a form to be compared to a completed document.

(2) Build or make an item, the dimensions of which will be measured against a standard or tolerance.

(3) Build or make an item to perform a certain function.

(4) Assemble or connect equipment to perform a certain function.

(5) Finish the task within a given time.

(6) Perform in the presence of the instructor or assessor. Product performance testing is possible when the LO specifies a product that can be assessed to the presence or absence of certain characteristics such as sound, texture, or appearance. An example would be to construct a box sill floor frame to within one-eighth inch of the required dimensions. The final product would be graded for conformity to the given specifications.

b. **Process.** A process consists of step-by-step procedures required to produce a product or complete a task. Process performance test instruments measure well-defined steps that a student must integrate or sequentially perform for the process to be done correctly. They also require the students to use a job sheet and to:

(1) Comply with safety precautions.

(2) Correctly utilize the correct tools and equipment.

(3) Demonstrate all essential steps and factors required for successful performance of the behavior.

(4) Perform all steps within a given time frame.

(5) Perform all steps under the observation of the instructor or assessor.

Process performance testing is appropriate when the process and the product are the same thing, or there is a process, but safety, high cost, or other constraints prevent the product from being measured. The LO specifies a sequence of steps that can be observed. There may be a product but critical points in the process must be performed correctly to prevent the possibility of damage (safety) to personnel or equipment. An example would be to measure a crankshaft journal for wear, taper, and out-of-roundness where exact measurements require that the measuring process be followed precisely.

c. **Combination (Product and Process).** This performance test instrument is concerned with an observable result and the step-by-step process leading to the result. Combination product and process test instruments incorporate the requirements of the two types of test instruments described above and are appropriate when:

(1) Both the product and process are important to the final result or are required to avoid hazards to personnel or equipment.

(2) Safety considerations almost always dictate the operation or maintenance of a device (process) which must be done in a certain way and the outcome (product) is just as important to successful job performance.

3.4. Knowledge Test Instruments. Can take one of several formats which are dependent on curriculum design and are related to the KPL the student is expected to achieve. True/False test items or any test instruments that result in a 50/50 guess will not be utilized as they do not reflect that a student has achieved the objective being tested. Below is a description of knowledge test items:

a. **Multiple-Choice.** These test items are the most commonly featured test instruments in Instructor Facilitated Interactive Training (IFIT) and Self-directed Interactive Training (SDIT). The student is generally tasked to select the correct answer from a group of responses with three to four incorrect answers, referred to as distractors. Multiple-choice test items can be very challenging to construct properly during development, requiring SME and test developer's attention to detail. Test-item analysis is critical to ensure that multiple-choice test items remain aligned to LOs and are not compromised over time.

b. **Matching/Hotspot/Drag and Drop.** These test items are generally the hardest to construct. Matching test items are defined as two lists of connected words, phrases, pictures, or symbols. Every item in one list is paired with at

least one item in the other list. Students must match elements on one list, with the associated element from the other list based upon specific instructions. This can also be referred to as a hotspot or drag and drop question. A student would use the mouse to drag an answer (response) to the premise (question) for instance in matching the use of a system or tool to a process.

c. **Completion/Fill-in-the-Blank.** These test items are free response test items in which the student must supply the missing information from memory. For completion test items, students provide required answers such as part names, procedural steps, etc. The advantage of completion test items over multiple-choice test items is that they require more than simple recognition of information.

d. **Labeling/Ranking/Identification.** Labeling, ranking, or identification test items are used to measure a student's ability to recall facts and label parts in pictures, schematics, diagrams, or drawings. This form of test item is most often used to measure recognition of equipment components or other concrete objects. Students may be required to utilize a drop-down menu with possible responses, type in a response number or letter next to the premise (ranking/fill-in-the-blank) or drag a response to a hotspot. For more details, see Section 4.3 Matching/Labeling/Identification/Hotspot/Drag and Drop Test Items.

e. **Numeric.** A numeric test question results in a numeric answer, such as a number or range of numbers.

f. **Oral Test.** While an Oral Test can be considered a category of test due to its specific method of administration (see Section 3.1 Test Categories) it can also be a knowledge test instrument because the questions asked orally can be designed to assess a student's comprehension and recall of knowledge.

g. **Essay Test.** While an Essay Test can be a category of test because it requires a specific type of response (see Section 3.1 Test Categories), it is also a knowledge test instrument because the essay prompts are designed to assess a student's in-depth understanding and ability to synthesize knowledge.

3.5. Performance and Knowledge Test Pilots. Test pilots provide an initial assessment of test reliability and validity. These events allow training professionals to make corrective adjustments before collecting data from the target population during a

course pilot. Once a performance or knowledge test has been developed, a review process will be performed as outlined below:

a. If possible, identify a group of students who are in the end stages of completing instruction in the same or similar material and test this group under actual test conditions with the caveat that test results will not be used in their final grade or course standings.

b. CDs will develop a test critique form that students will use to critique the assessment they just piloted.

c. The CDs and CCMM can adjust the test as warranted.

d. The CCMM submits the test and associated test administrator's guide to the testing officer for approval prior to the course pilot.

e. Review the test results using test-item analysis guidelines in Chapter 11, Test Item Analysis.

3.6. Criterion- and Norm-Referenced Testing. To evaluate a student's performance and/or knowledge, testing must be referenced to a standard or compared to the group. There are numerous ways to reference testing, but NETC has adopted the use of criterion-referenced and norm-referenced testing. The CD will decide which method is appropriate for each test instrument. The following is a description of each type:

a. **Criterion-Referenced Test.** This test assesses whether the student has achieved a specified level of knowledge or skill against a standard. Most test instruments written are criterion-referenced tests. An example is a test that establishes a minimum score.

b. **Norm-Referenced Test.** This test yields an estimate of the position of the tested student in a predefined population, with respect to the trait being measured. The importance is the relation to the group as much as the score achieved. It sorts students in relation to knowledge of the material measured by the test or the skill being assessed as related to the overall predefined population knowledge/score achievement. An example would be the Navy's advancement exams.

CHAPTER 4
TEST INSTRUMENTS

4.0. Introduction. The analysis of the course source data helps determine the best test instrument(s) to assess the desired skill and knowledge training outcomes. The following information provides a description of the test instruments used in knowledge and performance tests. The names for the types of test questions may vary slightly depending on what LAS within the learning management system (LMS) is chosen to reside in the information technology (IT) modernization effort known as the Learning Stack. In the case that the LAS is not available for a given test, the LS must have a backup plan such as using paper-based tests. This may require test questions to be written a little differently than what is in the LAS. When considering the type of test to create, it is important to estimate the amount of time required to answer the questions, which can vary greatly between the types of questions.

a. **Performance Test Instruments.** These tests are developed using job sheets. Problem sheets are not normally used for performance assessments but may be used to evaluate achievement of critical cognitive skills and less critical LOs.

b. **Knowledge Test Instruments.** The approved NETC LAS must be used to develop knowledge tests. Question types (matching, multiple-choice, drag and drop, hotspot, fill-in-the-blank, numeric, ranking, etc.) reflect the accepted and current capabilities of the LAS. A good practice is to write a minimum of three questions per EO, with five questions preferred. Base the number of questions per EO on the criticality of the objective. Higher criticality objectives should have more questions built. More questions may be required when factoring in module level and cumulative post-tests. This helps build a test bank that an LAS can use to randomly generate tests.

c. **Job Sheets.** Job sheets direct students in the step-by-step performance of a practical task they will encounter in their job assignment. Job sheets provide a means for students to apply the knowledge they obtain during instruction to perform a task. Job sheets will be developed and used as the basis for measuring the student's ability to perform duties or tasks. Job sheets support product, process, and combination performance tests.

d. **Problem Sheets.** Problem sheets present practical problems requiring analysis and decision making similar to those encountered on the job. The problem sheet is an effective means of emphasizing the fundamentals of logical thinking. It also helps students learn to solve problems and gain

practice in applying their knowledge to practical situations. Each problem sheet provides a clear statement of the problem, the conditions and parameters affecting the problem, and the directions and procedures for the solution to the problem. Problem sheets are normally not used as a means of testing but can be used for paperwork troubleshooting when the equipment is not available. They can also be used to assess the achievement of critical cognitive skills and less critical knowledge and skill LOs. If a drawing and/or diagram is required, it will be included as part of the problem sheet rather than using a diagram sheet.

e. **Assignment Sheets.** Assignment sheets are designed to direct the study or homework efforts of students. Assignment sheets are normally used to prepare the student for lesson topics and laboratory or practical exercises before they are presented by the instructor or occur in the course. Assignment sheets are normally not used for assessment; however, they may be used to test less critical knowledge LOs.

4.1. Multiple-Choice Test Items. The following guidelines for multiple-choice test item writing will help ensure effective communication between the student and the CD. Multiple-choice test items consist of:

a. The stem contains the problem statement. It is the portion of a multiple-choice question that poses a problem.

b. The question has a list of possible answers, with typically only one correct answer. The plausible, but incorrect answers are known as “distractors.” A distractor is used to determine if a student can identify the correct answer from among the distractors.

c. Depending on the technology used in the administration of tests, one or more answers can be correct. If multiple correct answers are expected, the stem must indicate that all correct answers are to be selected (e.g., select two…). Do not use “all of the above” or “none of the above” as possible solutions. Under no circumstances will all the alternative answers be correct.

d. For questions with a single correct answer, there are generally four possible answers: the correct answer and three distractors.

e. The nature of the content being tested must be considered when determining the number of possible distractors.

4.1.1. Multiple-Choice Test Item Formats. CDs may construct multiple-choice test items either as questions or incomplete statements using the "standard" or "except" formats.

a. **Standard Format.** This format is straightforward and the easiest to develop. Use the standard format when the desire is to have students select the correct answer(s) from the distractors.

EXAMPLE

Question: During a system verification test, which component supplies voltages for TVC position sensor tracking?

a. Minus 20 VDC precision power supply.
b. Self-test DC reference power supply.
c. TVC position sensor AC/DC converter.
d. Missile command module.

b. **Except Format.** This format is used when there are three or more equally correct answers. This format requires students to recognize which answers are correct and select the one that is incorrect. Always capitalize and bold or underline the word "**EXCEPT**" in the stem. This format is to be used sparingly (no more than 10 percent of the test bank).

EXAMPLE

Question: A specific torquing pattern and associated torque values can be found in the Ships Inertial Navigation System Technical Manual for all of the following assemblies or components **EXCEPT:**

a. An azimuth synchro assembly mounted to the stem.
b. A velocity meter mounted to the platform.
c. A replacement gyroscope mounted to the stable platform.
d. A platform stem mounted to the bedplate.

4.1.2. Guidelines for Stem Construction. Use the following guidelines for stem construction:

a. Include all information, conditions, assumptions, and details required to correctly answer the question.

b. Phrase the stem positively instead of negatively. If a negative must be used, it must be capitalized and bolded or underlined so that the student will notice it and interpret the test item correctly.

c. Word the stem clearly and unambiguously so that only the intended answer(s) is (are) correct.

d. Include words, phrases, etc., that pertain to all possible answers in the stem, rather than repeating them in each answer.

e. Omit information not essential to the interpretation of the test item unless the identification of relevant information within a broader field of available data is part of the LO.

f. Reference any needed illustration by figure number unless the illustration is adjacent to the question.

g. End test items in the form of questions with a question mark.

h. Place the completion position (blank) of an incomplete statement test item near or at the end of the stem for an open-stem format question.

i. Use only one completion position (blank) in a stem.

j. Use stems prepared in question form rather than incomplete statement form except when it would make the test item grammatically clumsy or difficult to understand.

k. Test only one idea or central thought in a test item.

l. If a term is only used once, it is spelled out and the acronyms is not cited.

m. If an acronym is widely used in the fleet or was frequently used during the delivery of the course material that supports the test (e.g., CNO, SCIF, COMSEC, XML, NALCOMIS, etc.), citing only the acronym is acceptable.

n. Consistency is the key. The CCMM must set the convention early to ensure test developers understand in order to preclude rework.

4.1.3. Multiple-Choice Stem Formats. Closed or open stems are the two formats for multiple-choice test items.

a. **Closed Stem Format.** Items take the form of a question or incomplete statement. They begin with a capital letter and end with a period or question mark.

EXAMPLE

Question: What action is required to remove a hinged type 2 module on the MTRE Mk 7 Mod 2/4?

a. Disconnect plates from the type 2 module.
b. Insert “T” handles into quick release fasteners.
c. Remove all type 3 modules and connectors.
d. Rotate hold down clamps to vertical positions.

Potential advantages of multiple-choice closed stem test items as questions are the stem must state the problem clearly and the possibility of giving students grammatical clues is reduced. A potential disadvantage is that lengthier answers may be required. The following example shows a multiple-choice closed stem test item as an incomplete statement (fill-in-the-blank).

EXAMPLE

Question: The setting of the AN/ABC-3Q flip-flop _____ indicates that intent-to-fire has been energized.

a. B43
b. C21
c. C24
d. D32

A potential advantage of multiple-choice closed stem test items as an incomplete statement is they are easier to write than the closed stem as a question format. The completion position appears within the stem. Potential disadvantages are this type of question encourages memorization and the taking of test items verbatim from course material. Hence, use them sparingly (no more than 10 percent of the test bank). A blank, seven underscores (“_”), is recommend for use to indicate where the incomplete portion of the stem lies.

b. **Open Stem Format.** Test items are in the form of an incomplete statement with no ending punctuation until the stem is completed by the answer which includes the correct ending punctuation. Each solution provides a seemingly logical conclusion to the stem. Because this format is typically easier to write, the CD needs to carefully think about the question before developing the answers to avoid illogical and unrelated choices. Generally, the less similar choices are in content, the easier it is for students to select the correct choice. The following example shows a multiple-choice open stem test item as an incomplete statement.

EXAMPLE

Question: When crimping both a stranded and a solid wire in the same contact, the solid wire's position in relation to the stranded wire is _____

a. Above it.
b. Below it.
c. Beside it.
d. Diagonal to it.

A potential advantage of multiple-choice open stem test items is that open stem items are easier to write than closed stem test items. Potential disadvantages of multiple-choice open stem test items are there is a tendency to avoid thinking about the question before the answers are developed which can result in illogical and unrelated answers and the less similar the answers are in content, the easier it becomes for students to select the correct answer.

c. **Guidelines for Constructing Answers and Distractors.** Use the following guidelines when constructing multiple-choice questions:

(1) Test items must have only one correct answer unless the stem clearly states that multiple answers are allowed. For test items with multiple correct answers, clearly indicate that multiple answers may apply by identifying how many answers to select such as, "Select two operational uses of the XYZ platform." Do not state multiple answers may apply if there is only one answer. Do not use "Select all that apply." This doesn't identify how many answers to select. If there are more than two correct answers rewrite the question, so the student selects the one wrong answer as a solution.

(2) Use vocabulary that is familiar or can be explained within the limits of the test item.

(3) Express all possible answers and distractors in similar form and of approximately the same length and complexity.

(4) Avoid using negative wording in answers; if they must be used, highlight negative wording by making the word(s) boldface and in all capital letters.

(5) Punctuation of answers must conform grammatically with the structure of the stem.

(6) When the stem is a question and the answers are complete sentences, begin the answer with a capital letter and end it with a period.

(7) When the stem is a question and the answers are incomplete sentences, begin the answer with a capital letter and end it without ending punctuation.

(8) When the stem is an incomplete sentence with the response (blank) position at the end of the stem, begin the answer with lower case letters, except for proper nouns, and end with a period.

(9) When the stem is an incomplete sentence each of the answers will be worded so that it forms a logical sentence, when written into the incomplete position (blank).

(10) Distractors must be meaningful and not subject to elimination by the student because they are irrelevant or unrelated to the question.

(11) Distractors must be plausible and closely related to the correct answer but clearly incorrect and should fit well with the stem. The more closely related the distractors are to the correct answer, the more difficult it is for students to select the correct answer without knowing the course material.

(12) The difficulty of the test item will depend largely upon the distractors.

(13) A good technique for developing distractors is to base them on common misconceptions by students and inexperienced job incumbents or on common incorrect calculations, manipulations, terms, symbols, etc.

(14) An additional technique for developing distractors is to modify the correct answer to make it incorrect.

(15) Do not use interrelated answers, such as C is true if A and B are false.

(16) Do not use specific determinations such as always, never, etc., unless knowledge of the applicability or inapplicability of these absolutes is part of what is being tested.

(17) Do not use “all of the above” or “none of the above” answers as these are poor question answers and do not identify that the student understands the LO.

(18) The position of the correct answer among all answers must be determined by a random selection process to avoid any patterns which may bias the test. The LAS will have the capability for random selection.

Have a balanced number of As, Bs, Cs, and Ds as the correct answer.

(19) For multiple-choice test items that involve numerical (or other logical order) answers, arrange them in ascending or descending order. If electronic testing is used, disable the shuffle feature for the alternatives to ensure that the pattern is not altered.

EXAMPLE

Question: Choose ALL the ship classes that are equipped with a hull-mounted sonar system.

a. USS TICONDEROGA Class CGs
b. USS AVENGER MCMs
c. USS WHIDBEY ISLAND LSDs
d. USS VIRGINIA Class SSNs

d. **Common errors in Multiple-Choice Test Item Development.** Avoid the following common errors when developing multiple-choice test items. The error is underlined.

(1) Do not use similar wording in the stem and only the correct answer, as it suggests the correct answer.

EXAMPLE

Question: What is the purpose of the MARDAN maintenance test set?

a. Monitors the C.P. operations
b. Furnishes power to MARDAN
c. Functions as a running time meter
d. <u>Provides static testing of MARDAN</u>

(2) Do not state the correct answer in greater detail than the distractors as it will often cue which answer is correct.

EXAMPLE

Question: When all weapon power is removed from the PIP, which statement is true?

a. All power is lost to the MCC equipment.
b. The MCC equipment is furnished power from NAV via the MSR.
c. The DCCs have heater power applied.
d. <u>Power from the ship control center may be present in MCC since it only goes through the SHIP JP</u>.

(3) Do not use two or more answers or distractors that have the same or nearly the same meaning as it eliminates them as useful answers and reduces the number of realistic answers.

EXAMPLE

Question: What is the final step in performing post maintenance checks?

a. Secure the front panel to the chassis.
b. Make sure the front panel is secure.
c. Set manual test switch to "OFF."
d. Rerun the diagnostic tests.

In this example, answers (a) and (b) have the same meaning, so that either answer would be correct.

Question: What is the final step in performing post maintenance checks?

a. Perform diagnostic tests to verify the fault is corrected.
b. Make sure the front panel is secure.
c. Set manual test switch to "OFF."
d. Rerun the diagnostic tests.

In this example, answers (a) and (d) have the same meaning, so that they could both be eliminated.

(4) Do not use answers that are included or over lapses with information that is cited in other alternatives.

EXAMPLE

Question: What are the permissible operating times for the pressurization and compensation blow valve to roll from shut to open?

a. 1 to 3 seconds
b. 1 to 4 seconds
c. 4 to 6 seconds
d. 9 to 11 seconds

In this example, answer (b) includes answer (a). If answer (b) is correct, then so is answer (a).

4.2. True/False Test Items. True/False or any other type of question that results in a 50/50 guess **must not be used**, such as a multiple-choice question with only one answer and one distracter to choose from. These are poor question types and do not identify that the student understands the LO.

4.3. Matching/Labeling/Identification/Hotspot/Drag and Drop Test Items.

Constructing matching test items can be challenging. These items consist of two lists containing related words, phrases, images, or symbols. The first column presents the premise (e.g., question/problem, definitions, or descriptions), while the second contains the corresponding responses (e.g., answers, terms, or images). Clear instructions in the question stem guide students on how to match items correctly by providing directional text to the student on how to match the items in the two columns and must specify if responses are used only once, more than once, or not at all. The construction and look and feel of the test item will differ depending on the authoring tool used (e.g., paper-based or software). Students may be required to drag and drop the response to the premise, utilize a drop-down menu with the possible responses, type in a response number or letter next to the premise (Fill-in-the-Blank), or drag a response to a hotspot. These test items are used to measure the student's ability to recall facts and label parts in pictures, schematics, diagrams, or drawings. This test item is often used to measure recognition of equipment components or other concrete objects. A hotspot question type presents an image that can be interacted with. The student would select the area of the image to answer the question. A drag and drop question type requires the student to drag and drop answer options into a specific location or order. These test items are particularly effective for subjects with parallel concepts, such as terms and definitions, pictures and labels, causes and effects, scenarios and responses, or symbols and their meanings. While primarily designed to assess recognition, well-crafted matching items can also evaluate comprehension and application.

4.3.1. Matching test item guidelines. Follow these guidelines when developing matching test items:

a. Use single words, numbers, codes, symbols, or short phrases in the response list.

b. When feasible, make all responses relate to the premise; this helps prevent elimination of unrelated answers.

c. Place both columns entirely on the same page/screen.

d. In the LAS, activate the shuffle features (unless the alternatives contain numbers or other logical order).

e. Each premise should have only one correct response/answer.

f. Specify in the directions how often the students may use the responses as the correct response. Avoid a one-to-one correlation between the number of responses and premises.

EXAMPLE

Question: Using the appropriate Navy technical manual, match the circuit element listed in Column B to the signal it generates in Column A. In Column A use the drop-down menu associated with each premise to select the correct response. You may only use each response once.

NOTE: This type of test item format can be set up in various ways depending on the authoring tool utilized. The response drop down could be to the right of the premise. The response dropdown will have just the letters associated with the response.

Column A		Column B
1. Response	DATA CHK NOT OK	a. B10
2. Response	DATA CHK OK	b. B13
3. Response	DRY RUN	c. B46
4. Response	EQ CONT RST 2	d. B47
5. Response	DATA CHK REQ	e. B49
6. Response	DATA CHK ALM	f. C30
		g. C45

4.3.2. Labeling Test Item Construction Guidelines. Observe the following guidelines to develop these types of test items:

a. Make all sketches, drawings, or illustrations clear and of sufficient size, using actual unit parts if possible.

b. Provide sufficient information to indicate what the equipment is, and which part is to be labeled.

c. The parts to be labeled or identified must be clearly pointed out by using lines or arrows.

d. Ensure that only one definite answer is possible.

e. Use numbers for the labels to avoid conflicts with the letter choices, A., B., C., and D.

f. If letters are used for the labels, they should correspond EXACTLY with the letter choices.

g. The graphic and question must be on the same page.

4.3.3. Labeling Test Item Example. The following is an example of a labeling test item (See Figure 4-1).

EXAMPLE

Question: Identify the six items of a computer workstation identified by arrows. Type your answers into the arrows.

Figure 4-1: Labeling Test Item (Example)

4.4. Short Answer/Completion Test Items. These test items are free-response items in which the student must supply the missing information from memory. The student must provide required answers such as part names, procedural steps, etc. The advantage of completion test items over multiple-choice test items is that they require more than simple recognition of information. Completion test items eliminate the possibility of guessing. Completion test items are easy to construct, and they are useful in situations in which students must write a computational equation, define terms, list part names and functions, etc. The disadvantage to completion test items is that they are more difficult to score and must be justified by grading criteria.

a. **Completion Test Item Development Guidelines.** Observe the following guidelines when developing completion test items:

(1) Word the test item clearly and comprehensively enough to allow the student to answer correctly.

(2) Make sure the missing segment of the test item is important, such as a key element of a process, parts of an assembly, or a method of repairing equipment.

(3) Do not omit too many words, or the test item will become unclear and force students to guess.

(4) Make sure the response position appears near or at the end of the stem. Test items with the response position near the beginning are harder to read and generally take longer to answer.

(5) Provide sufficient space in the response area for students to enter their entire response.

(6) Use a direct question to test for comprehension of technical terms or knowledge of definitions.

(7) Do not make the correct answer a "give-away" word that could be guessed by students who do not really know the information. Additionally, avoid giving grammatical cues or other cues to the correct answer.

(8) Avoid using stems as test items copied directly from the curriculum.

(9) Develop grading criteria that lists all acceptable answers to the test item.

(10) Have SMEs determine the acceptable answers.

b. **Completion Test Item Format:** CDs can develop completion test items using three basic formats:

(1) Students supply the word or phrase that completes the statement.

EXAMPLE

The station clock and time display are used to check performance of _____ of the designated register. (The student provides the phrase "the individual stages" to complete the sentence.)

(2) Students provide a definition, term, formula, or similar response to a specific question.

EXAMPLE

What is the name of the unit that detects angular motion and supplies an output through precession? _____

(3) Students supply a list of procedures, steps, parts, and so forth, from memory. This type of test item may be expressed in question or statement form. See below:

EXAMPLE (QUESTION FORM)

What are the steps, in order, for performing a test sample on the hydraulic servicing unit? _____

EXAMPLE (STATEMENT FORM)

List the steps, in order, for placing the Chemical Warfare Directional Detector in stowage. _____

4.5. Essay Test Items. These test items require students to answer a question with a written response. Use essays to test the student's ability to organize data and express thoughts clearly in writing. Do not use them to test recall. Essays can involve a relatively subjective grading process since many factors may enter into the correctness of a response. Thus, it is required that a rubric or model be developed to objectively assess the student's written response. The disadvantage to essay test items is that they are time consuming and difficult to grade. The essay must be graded by an individual knowledgeable in the subject area using a model developed by SMEs.

a. **Essay Test Item Format.** Use essay questions to assess learning of a comparatively large body of information, as well as individual elements within that body. Use the following guidelines for formatting essay test items:

(1) State clearly and precisely what type of response is required.

(2) Limits for the response must be identified by specifying what major points students should address. Limits include the length of their response and the time allowed to respond.

EXAMPLE

Compare the gas turbine and the 600-PSI steam propulsion plant. Your discussion should include descriptions of the major components of each system. Limit your essay length to two (2) pages. You will have one (1) hour to complete this essay. Partial credit will be given.

b. **Essay Test Item Categories.** The following are categories of responses for an essay test item that a CD may want to use:

(1) Compare or contrast items and/or procedures.

(2) Provide a decision for or against a system or equipment operation.

(3) Relationship such as cause and effect.

(4) Illustration (sketch) of principles learned.

(5) Statement of the purpose in the selection of a method or technique.

(6) Criticism of the adequacy or correctness of a diagram or procedure.

(7) Discussion of primary, alternate, or emergency procedures.

(8) Explanation or definition of tasks.

(9) Observation from an illustration or operation.

(10) Evaluation of the appropriateness of a process or procedure.

4.6. Oral Test Items. These are similar to essay test items in that they allow the student freedom to organize and express their thoughts. The risk of this freedom of expression is that subjectivity may be introduced into assessment of the student's knowledge. Historically, oral test items have been included in remediation such as Academic Review Boards (ARB) and remediation for failed objectives. It is critically important that a rubric or model be developed to objectively assess the student's oral response. Oral test items can assess the student's broad understanding, and through follow-on questioning, their detailed understanding on specific objectives. The disadvantage of oral test items is that the evaluator may be unduly influenced by the student's mannerisms rather than the communicated knowledge therefore, oral tests are very challenging to administer to a large group of students. Oral test items must be graded by a SME, using a model developed by SMEs. Oral test items are not recommended for large groups.

4.7. Case Study Test Items. These test items can be used to pose a complex issue when a comprehensive understanding of the material is required. The student's analysis of the question must use cognitive abilities to synthesize and evaluate the issue to provide an answer that is observable and measurable in meeting the LO. One unique advantage of case studies is that they reinforce learning. The challenge is that development and assessment require great care. Additionally, if the required response is a written paper, this test item is labor intensive to assess. A rubric will be required to objectively assess the written responses.

4.7.1. Case Study Test Item Response Alternative. An alternative approach to a written response for a case study is to have students respond to multiple-choice test items. This approach is viable even when testing for synthesis and evaluation.

4.7.2. Case Study Test Format. Case studies should be based on practical scenarios in the real world. Case studies can deal with very complex issues and weave in numerous points requiring consideration and analysis. There is no single best format for a case study. Most commonly it is a narrative requiring KPL 4 - Analyze. The following is an example of a case study narrative that could be used to achieve KPL 5 - Evaluate/ Create assessment.

EXAMPLE

Question: You are a Chief Petty Officer, recently assigned to a ship. A young Sailor you supervise, who is obviously very upset, approaches and requests your advice. The Sailor does not want to discuss the matter publicly and suggests that you meet privately. You ask the nature of the problem, and the young Sailor seems extremely embarrassed and refuses to tell you about their problem (you have heard rumors that the Sailor has had extreme financial problems in the past). What do you do?

If the response is open ended, a rubric and grading scale are required. It will be difficult and time consuming to grade an involved written response to the ambiguous situation posed above. However, it is still possible to tap into synthesis and evaluation using an easy to grade format such as a multiple-choice test item.

CHAPTER 5
GRADING AND GRADING CRITERIA

5.0. Introduction. Grading is an important element in test design. When grading most knowledge tests (except essay, oral, and case studies), it is possible to objectively assess student answers using a scoring guide. Performance assessments, however, have a subjective component that must be addressed. To overcome this subjectivity, it is necessary to develop grading criteria that can be used to assess the student's performance.

5.1. Grading. The purpose of a grading system is to measure the student's achievement of the LO(s). It also provides a quantitative measure of achievement. NETC mandates the use of two course grading systems in order to standardize grading and enable reasonable comparisons about training outcomes.

a. **Satisfactory (SAT) or Unsatisfactory (UNSAT) Grading.** This grading method utilizes a dichotomous grading system, also termed pass or fail. Either the student has reached the minimum standards and passes, or the student fails to meet the standards and fails. It makes no distinction between students, nor indicates a level of achievement or quality. Therefore, this grading method will only be used for activities that do not count toward the final grade (e.g., homework).

b. **Percentage Grading.** This grading method will be used for all other graded events that count toward final course grades. This does not mean that this score must be used for all within-course scoring. It may not be appropriate for homework grades and must be adjusted for other within-course measures such as quizzes. Final course grades will be reported as a percentage reflecting the amount of material successfully mastered. If there are multiple components that make up the course grade they must be weighted appropriately, included in the final grade computation, and described in the testing plan. Even though the CCA makes the final determination about grade computations towards the final grade, for A and C Schools, performance tests administered within a course are to count for 60 percent or more toward the final grade.

5.1.1. Minimum Passing Grades

a. **Performance Test:** The minimum passing grade for a performance test is based on a rubric/guideline that will be discussed later in more detail. The SME and testing officer prepare the grading criteria at the time the

performance test is developed. For performance grading systems, each task on the job sheet is assigned a point value, based on task criticality. The total number of points will equal 100 indicating the task performance fully satisfied specified criteria. An alternative is to start the grading at 100 and deduct specified points for each error as it relates to criticality. To determine the minimum passing grade, SMEs and the testing officer will identify the job sheet steps, and/or rubric, and grading criteria to identify items which must be accomplished to meet the minimum skill proficiency. The numerical value associated with these steps represents the minimum passing grade for the test. If the grading is SAT/UNSAT, the minimum acceptable skill must still be determined. For example, a performance test has seven tasks graded SAT/UNSAT. The number of SAT steps must be specified to achieve the minimum acceptable skill level.

b. **Knowledge Test.** The minimum passing grade for a knowledge test is determined by a panel of SMEs and the testing officer. It is established after test items are developed and the test is designed. If possible, the SMEs who determine the minimum passing grade will be different from the SMEs who designed the test and developed the test items. The CD is responsible for test design and test item development, which occur during course development or a revision project. To determine the maximum raw score for a knowledge test, add the total possible score if the student answers all items in the test correctly. To determine the minimum raw score for passing a test, SMEs decide how many questions a student must answer correctly to indicate the minimum acceptable knowledge in each area of the test. These minimums DO NOT have to match the course or test passing grade. A course or test passing score can be 70%, but an individual testing area could be 1 of 2 (50%), 2 of 3 (66%), 3 of 4 (75%), 3 of 5 (60%), 4 of 5 (80%), or 2 of 2 (100%). As a general rule, all test items concerned with safety must be answered without error. In the case of an essay or oral test, enter the number of points needed in each area of the test to consider the student's answer satisfactory as 7 out of 10 points based on the rubric. The sum of the minimums needed to pass each area of the test provides the minimum raw score for passing the test. When this minimum passing raw score is divided by the number of items possible, it gives the minimum passing percentage for this test.

   (1) Testing areas can be weighted to ensure student comprehension of the most important objectives. This weighting can be done by having more questions for the testing area or offering questions with greater value for

the testing area. For example, matching and completion test items are more difficult than multiple-choice items. Essay test items are far harder than all of the other test items. See Appendix H for examples on how weighting can be used to calculate the final grade and weight individual test items.

(2) It is preferable that knowledge test passing percentages correspond with or are slightly above the course passing grade to avoid problems in computing final course grades. To adjust a test passing grade, add or remove questions, or adjust the weighting of essay or oral questions.

c. **Practical Work.** These grades are derived from day-to-day assignments. Practical work may be in the form of labs, homework assignments, and/or in-class assignments. While practical work grades may be used in calculating the student's grade, they are normally limited to 10% of the overall course grade.

d. **Course.** The minimum passing score for a course is established after SMEs have reviewed the testing instruments for validity. Based on the percentage score, the minimum passing grade for a NETC course will not be lower than 63%. The CCA may establish a minimum passing grade for a course that is higher than 63%. Care must be taken when using SAT or UNSAT for performance tests if numerical grades are assigned to knowledge tests. If this occurs the students' grade for the course may be based solely on knowledge. This may not provide a realistic picture of the graduate.

NOTE: All students in the following schools will have a final score assigned measuring the students' achievement of the LO(s):

- Initial Skill Training (A1) – Enlisted A-School
- Initial Skill Training (A2) – Officer
- Initial Skill Training (A3) – Enlisted A-School and/or A-School Pipeline Course that award a NEC or MOS
- Initial Skill Training (AP) – Enlisted Preparatory (excluding courses that are 5 instructional days or less)
- Skill Progression Training (C1) – Enlisted Navy Enlisted Classification (NEC) Awarding
- Skill Progression Training (C2) – Naval Officer Billet Classification
- Pipeline, Umbrella Segment Skill Progression Training (G1) – Enlisted

- Pipeline, Umbrella Segment Skill Progression Training (G2) – Officer

e. Other courses of instruction are encouraged, but not required, to assign a final score. This score must be a numeric (decimal permitted) value between "0" and "100" (inclusive), with "0" representing a failure to complete any graduation requirements and "100" reflecting the best performance possible against all course LOs. The methodology for the calculation of a final score between the two extremes is left to the discretion of the LC/LS. Scores will be input into the current NETC student information system (SIS).

5.2. Grading Scales. The use of a grading scale provides an understanding of the grades assigned to a student. Scales apply to knowledge and performance tests. Grading scales may be included with grading criteria or provided separately. Table 2 is a grading scale example with a minimum passing grade of 63. If the minimum grade is greater than 63, the ranges require adjustment:

Table 2: Grading Scale (Example)

RANGE	MEANING
90 – 100	Superior understanding or performance. Graduates in this category are able to perform quickly and efficiently with little or no supervision.
80 – 89	Above standard understanding or performance. Graduates are able to perform efficiently with little supervision.
70 – 79	Acceptable understanding or performance. Graduates' complete assignments with minor errors. Supervision is required.
63 – 69	Minimally acceptable understanding or performance. Additional instruction is normally required along with close supervision.
0 – 62	Unsatisfactory understanding or performance. Students are unable to meet minimum standards.

5.3. Performance Test Grading Criteria Guidelines. The following guidelines will be considered when developing grading criteria for performance tests.

a. **Product Performance Tests.** When a product trait is either present or absent and can be measured by checking SAT or UNSAT, a checklist may be the best to use. When product quality can vary from high to low, adequate to inadequate, good to bad, or some other range, a rubric will be used. Whether a checklist or rubric is chosen will depend upon the particular situation and the developer's discretion. For some situations, CDs might use a checklist,

and others might use a rubric. Using a combination of them might be the most appropriate.

b. **Process Performance Tests.** When a step is either done or not done and can be measured by checking SAT or UNSAT, a checklist may be the best to use. When performance of a step can vary from high to low, best to worst, good to bad, or some other range, a rubric will be used. A rubric may also be the best to use when a step has more than two possible outcomes. Whether a checklist or rubric is chosen will depend upon the particular situation and the developer's discretion. For some situations, CDs might use a checklist, and others might use a rubric. Sometimes using a combination of them might be the most appropriate thing to do.

NOTE: It is important to define checklist steps and rubric decisions precisely. Properly constructed grading criteria help remove instructor subjectivity from the grading process.

c. **Use of Knowledge Test Items in a Performance Test.** When using knowledge test items in a performance test, indicate the correct response and how many points will be deducted for an incorrect response. If knowledge test items are included as part of a performance test, they will not constitute a major portion of the student's overall grade.

d. **Performance Test Grading Criteria Factors.** The following list of important grading criteria needs to be considered for performance tests.

(1) Compliance with required safety precautions.

(2) Correct operation of equipment after completed assembly.

(3) Physical testing of the finished job.

(4) Time required completing the job.

(5) Skill in using tools.

(6) Care and use of the equipment.

5.4. Knowledge Test Grading Criteria Guidelines. When grading test items that have a single answer, grading criteria are straight forward: Students receive full credit for the correct answer. If there are essay, case study, and/or oral test items, a rubric or checklist is required to objectively assess the student's response(s).

a. Ensure the rubric/checklist identifies all the essential information students must provide in their essay, case study, or oral response.

b. Ensure the rubric/checklist promotes objective scoring of the test item by establishing a standard or model answer or parameters from which to judge all others.

c. Ensure the grading criteria provides the information to identify how much each test item or part of each test item is worth. For example, a total essay may receive 10 points: 5 points for identifying the correct steps in a process and 5 points for listing the steps in the correct order. List common misconceptions and/or errors that could be reflected in answers and indicate how many points will be lost for making those errors.

5.5. Rubrics. Rubrics are a set of criteria and standards linked to the LO(s) and are used to assess a student's performance on papers, projects, essays, labs, and other assignments. Safety objectives will be included within scoring rubrics as applicable. Rubrics reduce scoring ambiguity. Rubrics can be used to assess a student's ability to perform a skill or be used in conjunction with a job sheet. Rubrics are most commonly used to assess skill performance, but are also recommended for oral, essay, and case study knowledge test items. The basic model for a rubric is illustrated in Table 3. Rubrics have great utility in subjective testing as they are designed to provide objective guidelines to assess the student's skill or knowledge comprehension.

a. **Product Rubric.** It is used when the student produces a product. The process is not being assessed, only the outcome. The specified criteria should be the same as the student used during practice. Product rubrics are effective when:

(1) The rubric is used because direct student observation is impractical.

(2) The process is irrelevant to the outcome, for example, the student's thought process is not important for an essay.

(3) The standards have more than two elements; binary outcomes are covered by checklists.

(4) The product has several attributes that contribute to its quality.

b. **Process Rubric.** The top row of the Performance Process Rubric (Example), Table 4, contains these quality measures: Well below the Standard, Working towards the Standard, At the Standard, and Working beyond the Standard. In the left-hand column are the tasks the students are expected to produce or perform consisting of listening to others, generating/sharing ideas, remaining

on task, role and responsibility, and assisting others. Each cell in the table contains the description of the performance quality at each level of mastery for the tasks.

Table 3: Solder Joint Performance Rubric (Example)

Element	Below Standard	At Standard	Above Standard			
Possible Score	**1**	**2**	**3**	**Raw Score**	**Weight**	**Score**
Joint Shape	Convex joint.	Concave joint.			x3.5	
Component Post Coverage	Less than 1/4 component post covered with solder.	1/4 to 2/3 component post covered with solder.	2/3 to 3/4 component post covered with solder.		x3.5	
Pad Coverage	Solder covers less than 1/2 of pad or solder extends beyond pad.	Solder covers 1/2 to 3/4 of pad.	Solder covers 3/4 to 100% of pad.		x4.0	
Finish	Cloudy rough finish.	Smooth finish.	Shiny finish.		x6.0	
Visual	≥ 3 fractures under 12x magnification.	1 or 2 fractures under 12x magnification.	No fractures under 12x magnification.		x5.0	
Connection	Component post not soldered to pad or component wiggles when agitated.	Component post soldered to pad or component may wiggle when agitated.	Component post soldered to pad or component does not wiggle when agitated.		x7.5	
Electrical Resistance	Resistance pad to post >100ohm.	Resistance pad to post 10 – 100 ohms.	Resistance pad to post <10ohm.		x7.5	
Total						

Table 4: Format for a Performance Process Rubric (Example)

Level Three Rubric for Assessment	(1 pt) Well below the standard	(2 pts) Working towards the Standard	(3 pts) At the Standard	(4 pts) Working beyond the Standard
Listening to Others	• Focuses on own ideas or task without attending to other's suggestions.	• Sometimes acknowledges others by taking turns to listen and speak.	• Acknowledges others by taking turns to listen and speak.	• Acknowledges other's ideas and suggestions and asks follow-up questions.
Generating/Sharing Ideas	• Offers no ideas to team.	• Has difficulty adding ideas.	• Contributes a range of ideas.	• Contributes a range of ideas and is able to discuss these with the teams.
Remaining onTask	• Needs to be redirected to the task by instructor or other members of the team.	• Requires some assistance to complete the task.	• Completes the task within the expected timeframe.	• Completes work within the expected timeframe. • Manages time effectively.
Role and Responsibility	• With instructor guidance students understand and perform various roles within the team. • With instructor guidance students can explain and evaluate their individual contribution to the team.	• With instructor guidance students understand and perform various roles within the team. • With some instructor guidance students can explain and evaluate their individual contribution to the team.	• Understands and performs various roles within the team. • Students can explain and evaluate their individual contribution to the team. • Students can describe and evaluate the team progress towards the goals.	• Students work effectively in teams to take on a variety of roles to work towards a common goal. • Students can explain and evaluate their individual contribution. • Students can explain the team's progress.
Assisting Others	• Shows no evidence of helping others. • Doesn't acknowledge other's contributions. • Focuses only on their own task. • Requires instructor intervention when encountering difficulty.	• At times shows evidence of helping others. • At times acknowledges other's contributions. • Seeks assistance when encountering difficulty.	• Assists others within the group • Is positive in their interactions within the group. • Perseveres when encountering difficulty but seeks advice to resolve ongoing problems.	• Is able to offer and receive support and assistance from others. • Uses strategies and perseveres when encountering difficulties.

Students	Student A				Student B				Student C				Student D			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Listening to Others																
Generating/Sharing Ideas																
Remaining on Task																
Role and Responsibility																
Assisting Others																

c. **Knowledge Assessment Rubric.** A typical grading rubric format would, as in the example provided in Table 5, list the tasks the students are expected to produce or perform in the left column (Completed Paper, Quality of Information, and Bibliography). The rubric indicates point values assigned to each performance level on the top row. Qualitative measures such as

excellent, acceptable, and incomplete may also be included in the top row. Each cell in the table contains the quality standard for the measurement of the task being completed. The test's grade is determined by totaling the grade assigned for the level of skill achieved by the student for each task. In this instance, a grading scale would not be required, as it is included as part of the rubric.

Table 5: Format for a Knowledge Assessment Rubric (Example)

	Excellent (3 pts)	Acceptable (2 pts)	Incomplete (1 pt)	Total
Completed Paper	Complete sentences: All questions answered, basic information; three interesting facts; personal thoughts; two sources.	All questions answered, basic information; three interesting facts; two sources; personal thoughts missing.	All questions NOT answered OR missing information OR less than two sources.	
Information Quality	Thoughtful answers that show interesting and personal thoughts on what was learned; presented in student's own words and in complete sentences.	Information presented in own words and complete sentences; basic information provided but without thoughtful comments OR some information misunderstood.	Answers lacking substance OR incorrect information; sentence structure prevents gleaning student understanding; information "copied" directly from the source.	
Bibliography	Contains all bibliographic information in the correct format and in the correct order.	Contains all bibliographic information; Information format or order is not correct.	Bibliography missing information.	

5.6. Checklists. These are used in performance tests to determine how well the student performs or comprehends the LOs being assessed. Checklists describe in detail what constitutes satisfactory and unsatisfactory skill or knowledge. Figure 5-1 is an example of a performance test checklist.

a. The following checklist design guidelines help in designing checklists to measure skill comprehension.

   (1) Process test checklists describe the correct procedure, including the following:

   - Number of points each step or group of steps is worth.
   - Number of points to be deducted for specific errors.
   - Number of trials allowed per step or group of steps.
   - Procedural steps that, if performed improperly, cause student failure and test stoppage.

   (2) Product test checklists describe the characteristics of a good product, including:

   - Point value assigned to each characteristic.
   - Number of points to be deducted for specific errors.
   - Number of trials allowed for each product.
   - Any omitted characteristic that is cause for failure.

b. Use the following checklist layout guidelines to include, as appropriate:

   (1) List the steps or knowledge checks to be evaluated.

   (2) When it is impossible to evaluate each step separately, review the job sheet and, where possible, group individual steps into like areas and evaluate them as one step.

   (3) Each step or group of steps will be numbered.

   (4) Briefly describe the evaluation procedures.

   (5) Indicate critical steps or knowledge checks.

   (6) Provide space for comments or a description of errors.

   (7) Include space for required administrative information (e.g., name, class, beginning and end time, score, etc.).

   (8) Personal information must be consistent with personally identifiable information (PII) directives.

5.7. Cheating. Cheating can be defined as any dishonest or deceptive behavior intended to gain an unfair advantage or to misrepresent one's own or another's performance, abilities, or knowledge. This can include such actions as:

a. Copying someone else's work or answers during an assignment or exam.

b. Using unauthorized materials or devices during an assessment.

c. Plagiarizing or presenting someone else's work or ideas as one's own.

d. Collaborating on assignments or exams when it is not allowed.

e. Falsifying or altering academic records or data.

f. Impersonating another student or having someone else complete work on one's behalf.

5.7.1. Cheating is never acceptable. If a student is caught cheating, the student will be given a zero on the assessment and will be recommended for disciplinary action.

Performance Test Checklist
For Job Sheet X-X-X

Title: Measuring a Crankshaft Journal
Student Name and Rate _____
Instructor/Evaluator _____
Date _____ Time Started _____ Time Completed _____
Test instructions: This test evaluates the use of measuring tools. Observe student taking measurements indicated. Watch for correct application of tools, and the ability to interpret/record tool readings. If unsafe practices are observed, **STOP THE TEST.** All recorded measurements for this Job Sheet must be +/- 0.0001" of journal proof dimensions. Mark each measurement as SAT or UNSAT. If UNSAT, comment as to why.

1. Measure and record outer end of journal.
   - a. Correct measuring tool use (SAT) (UNSAT) (3 pts)
   - b. Vertical dimension (SAT) (UNSAT) (1 pt)
   - c. Horizontal dimension (SAT) (UNSAT) (1 pt)

Comment: _____

2. Measure and record center of journal.
   - a. Correct measuring tool use (SAT) (UNSAT) (3 pts)
   - b. Vertical dimension (SAT) (UNSAT) (1 pt)
   - c. Horizontal dimension (SAT) (UNSAT) (1 pt)

Comment: _____

3. Measure and record inner end of journal.
   - a. Correct measuring tool use (SAT) (UNSAT) (3 pts)
   - b. Vertical dimension (SAT) (UNSAT) (1 pt)
   - c. Horizontal dimension (SAT) (UNSAT) (1 pt)

Comment: _____

Figure 5-1: Performance Test Checklist (Example)

CHAPTER 6
PERFORMANCE TEST DESIGN AND DEVELOPMENT

6.0. Introduction. CDs must begin thinking about test design as LOs are being written. Development of the IG, SG, and tests, to a large extent occur simultaneously. Thus, test design requires a great deal of thought and consideration during course development. Testing programs cannot overcome poorly written LOs. Therefore, as LOs are being written, it is important to consider what information will be tested, when it will be tested, and how it will be tested. This is test design.

a. Performance tests are sample work situations designed to assess a student's knowledge and skill to perform a task by using actual equipment or training devices. To achieve this, test instruments (job sheets) and grading criteria tools (checklists, rubrics, and grading scales) need to be designed and developed. A reliable and valid test can be achieved only through good test design, piloting, and test-item analysis. Performance tests are designed and developed before knowledge tests, so the knowledge components of performance tests are known when preparing knowledge tests.

b. Performance test design, within NETC, requires that the CD use the SPLs of "imitation, manipulation, precision, articulation, and naturalization," to define the desired skill outcome (Dave, 1970). See section 2.5.1 Skill Proficiency Levels for more details. The benefit of "proficiency level" identification is that it will enable the CD to target the training intervention and assessment strategy.

6.1. Performance Test Constraint Consideration. Requirement sponsors approve training solutions. Based upon this approval a determination is made whether actual or simulated equipment will be used to practice and demonstrate a skill. This will be determined prior to test design.

a. During test design, CDs will weigh the risk to safety of personnel and the risk of damage to equipment. Time constraints must also be considered.

b. If space for performance testing is limited, it may not be possible to conduct performance tests. Simulation or written performance tests can alleviate this situation to some degree, although this is not desirable.

c. If equipment or training devices are not available to conduct performance testing, try to construct paper-based test situations that allow judgment to be

made on the student's ability to perform the objective. Troubleshooting problems and scenarios requiring written responses may be adequate but use them sparingly.

d. Ensure the chosen solution allows for adequate practice, remediation, and testing.

6.2. Performance Test Design Guidelines. These guidelines need to be considered by CDs before and during performance test design:

a. Conduct operational risk management (ORM).

b. Consider maximum student loading and minimizing bottlenecks.

c. Tests should be sequenced so the student has sufficient time to practice the skill.

d. More frequent testing is warranted if critical skills must be assessed before new skills are taught.

e. Frequent testing is appropriate when the student must be given time to develop skills which can only be attained by laboratory practice sessions or if significant preparation outside the classroom is required.

f. Performance testing should fall between 51 to 100% of total testing time.

g. Time to set up the test scenario (lab, practical, etc.) along with time allocated for taking, reviewing, and grading the test will be considered.

h. The CMS will only reflect the time allocated for students to take a test and review the results.

i. Periodic reviews will be conducted of the technical training equipment (TTE) by CS, instructors, and the applicable systems command (SYSCOM).

j. Technical documentation will be reviewed by a group of at least three SMEs to determine if it is adequate to support the desired skill outcomes.

k. Analysis of each task's condition will determine if technical documentation must be available during the test.

l. Technical documentation must be provided if it will be used during on-the-job performance, as defined in the task's condition.

m. When on-the-job performance of a task is without reference to technical documentation, the test must do likewise.

n. When injury or equipment damage is a possibility while conducting a test, a knowledge test will be given prior to the test to ensure the procedural steps and safety precautions are known and understood by the student.

o. When a student is assessed during team performance, they may be assessed individually or assessed as a team using a job sheet, checklist, and/or rubric to ensure objectivity.

6.3. Performance Test Design Process. Test design consists of six steps that need to be performed in the sequence listed below to design and develop reliable and valid performance tests to measure students' achievement of the desired training outcome properly and consistently.

a. Determine skill LO criticality.

b. Verify performance test placement.

c. Determine performance test category.

d. Determine performance test type.

e. Assign performance test proficiency level.

f. Determine test instrument and grading criteria.

After completing these steps, job sheets and a Performance Test Administrator's Guide (PTAG) can be developed.

6.3.1. Determine Skill LO Criticality. Performance test design begins with determining the criticality of each skill LO. This process determines which LOs to assess through formal testing and which LOs will be assessed by informal testing. At the completion of this step, how each LO will be assessed is determined. Analysis of training task data, discussed in Chapter 2, Test Development Preparation provides the information to identify critical factors which determine LO criticality. The following criticality factors are recommended; CDs and SMEs will determine the factors that have the greatest impact on skill development.

a. Application of Skill – How important is the skill regarding its application to actual job performance?

b. Difficulty of Skill – What is the level of difficulty of the skill required to perform the task?

c. Relationship of Skill EO to TO – To what degree is the Skill EO related to the TO?

d. Frequency of Skill – How often is the Sailor expected to execute the task?

The following is a recommended process to determine LO criticality. A detailed example can be located in Appendix G.

e. Each critical factor will be assigned one of three levels (e.g., high – 3, moderate – 2, and low – 1).

(1) Application of Skill:

- **High - 3.** Skill is very important to job performance.
- **Moderate - 2.** Skill influences job performance.
- **Low - 1.** Skill has little influence on job performance.

(2) Difficulty of Skill:

- **High - 3.** Skill requires detailed knowledge and skill to perform properly.
- **Moderate - 2.** Skill requires moderate knowledge and skill to perform properly.
- **Low - 1.** Skill requires basic knowledge and skill to perform properly.

(3) Relationship of Skill EO to TO:

- **High - 3.** Skill EO is a very important part of the TO.
- **Moderate - 2.** Skill EO is closely related to the TO.
- **Low - 1.** Skill EO is indirectly and somewhat related to the TO.

f. The three criticality factors above will be used to determine which objectives will be tested. Several SMEs should independently rate the objectives. They should look at a group of LOs, such as all the LOs for a week, rather than an individual LO when rating. This ensures each objective's importance within the instruction is balanced in comparison with other objectives (e.g., "building" objectives used later within higher objectives).

g. Safety is always a factor, and LOs that contain "safety" concerns (tasks that are considered high risk or dangerous to personnel and/or equipment) will be rated high.

h. Generally, objectives rated higher will be formally tested while lower rated objectives may or may not be formally tested.

i. Testing of LOs may be achieved by testing individual EOs by themselves, testing closely related EOs as a group, or splitting an EO into parts to test selected parts.

6.3.2. Determine Performance Test Placement. During the development of the CMS, a decision is made about test placement. There must be a valid reason for administering a test such as reducing the possibility of student injury and/or equipment damage; determining if the desired level of proficiency has been achieved; determining within-the-course or final comprehension grades; assigning rank-order to a class; for motivational purposes; or ensuring that students are completing homework assignments. Verify that no additional tests are required by answering the following questions. Answering a question with "yes" means a test may be needed. Is there a need to determine:

a. What does the student know before presenting additional instruction?

b. How well did the student learn the material just taught?

c. Whether the student has acquired prerequisite skills or knowledge before being allowed to progress further in the course, particularly to the next lesson topic or to go into a performance lab?

d. If the student requires remedial instruction before being allowed to progress further in the course or go to the laboratory?

6.3.3. Determine Performance Test Category. After verifying test placement, it is now possible to determine the category for each performance test. Based upon the placement of the desired performance test and the purpose of the test, choose the correct category of test from the list below. See Section 3.1 Test Categories for a detailed test category description.

a. Pretest

b. Quiz

c. Progress Test

d. Comprehensive Test

6.3.4. Determine Performance Test Type. Deciding the performance test type is the next step. Tests are either an open book or a closed book; a detailed description can be located in Section 3.2 Test Types.

6.3.5. Assign Performance Test Proficiency Level. After determining the test type, it is necessary to assign the level of skill proficiency to which each LO will be tested, as determined by the requirement sponsor. This will be the same level as which the LO is taught.

a. The SPL is assigned by using course source data elements from the TA: condition, action verb (behavior), and standard.

b. Descriptions of the five attributes SPL1 through SPL5 can be located in Section 2.5.1. SPLs.

c. These attributes provide the data necessary for CDs to assign the SPL for the course and LO testing. The goal is to match what is done on the job as closely as possible; allow technical documentation use if done on the job; test for knowledge of safety by recall or observance; and test for time if it is important on the job. Align each LO to be tested to the appropriate level of proficiency.

6.3.6. Determine Test Instrument and Grading Criteria. The final step in performance test design is to identify the best test instrument and grading criteria (scoring tools) to use for each performance test. Deciding which performance test instrument involves determining if the performance test is a product, process, or combination of the two. Section 3.3 discussed the three performance test instruments. The desired level of skill proficiency for the LOs will be used to identify the best test instrument and grading criteria. Tests may be constructed using one or more test instruments and grading criteria listed below. Grading criteria must contain a grading scale. Consider the following when selecting a performance test instrument:

a. Test for the product if the objective contains a specific standard that the product must meet.

b. Test for the process if the objective has specific standards that must be adhered to, including safety procedures, time standards, a specific order the steps need to be performed in, or when diagnosis is important (e.g., if it is important to know when or where errors occur).

c. If either a product or process can be measured, select the one that is easiest to measure, using the following guidelines:

(1) Time or number of personnel required to conduct the performance test.

(2) Whether the product can be tested without examining the process?

(3) Whether errors made early in the process might prove to be costly or dangerous?

NOTE: It may be useful to administer a knowledge test that replicates (on paper) performance of the process or construction of the product before the student performs the task.

In extreme situations, a knowledge test may be used in place of a product, process, or combination (proficiency level 1) performance test. This is permissible only when facilities, equipment, or material do not support a performance test. Any substitution of a knowledge test for a performance test must be noted in the testing plan, with an explanation.

6.3.7. Performance Test Development. Once performance test design is complete, performance test development can begin. Using the decisions made in the design process, develop test instruments (job sheet or problem sheet) and grading criteria (checklist, rubric, or scoring guide) to administer and grade each performance test identified for the course. When developing the test instrument and the grading criteria for each test, reference the appropriate chapters in this document for development guidelines and the correct layout and format for each item. When developing a test instrument, ensure the items listed in Section 3.3 Performance Test Instruments are addressed within them, as appropriate.

a. **Product Performance Tests.** This test type places importance on the final product or result.

b. **Process Performance Tests.** This test type is developed to measure well-defined steps which the student must integrate or sequentially perform for the process to be done correctly.

c. **Combination (Product and Process Performance Tests).** This performance test is concerned with both an observable result and the step-by-step process leading to the result. Use the appropriate items listed in Section 3.3, with the guidelines and layout discussed in Chapter 4, Test Instruments, to build job sheets and problem sheets.

6.3.8. Verify Performance Test Readiness/Validity. Tests or test items will be piloted (test-driven) before being administered. This effort allows programs to make corrective adjustments before collecting data from the target population. Determining test readiness is a multi-step process. At a minimum:

a. For test content validity, have at least three SMEs review the test to ensure a proper assessment of the LO(s). Select SMEs who did not participate in

constructing the test if possible. The CD creates a SME test critique form (see example in Appendix I). The SME critique form will include the following data and questions at a minimum:

(1) Does the test's cover sheet contain the title of the test, date of the review, name of the reviewer (SME), rate and rank of reviewer, and SME years of experience in subject matter?

(2) Are the test instructions clear and easy to understand?

(3) Is the test technically accurate?

(4) Are the job steps complete and easy to understand?

(5) Does the test assess achievement of the LO(s)?

(6) Is the test level of difficulty appropriate?

(7) Is the test's grammar correct?

(8) Do you have suggestions to improve the test?

b. Begin by identifying a number of students who are in the end stages of completing instruction in the same or very similar material. Test this group under actual test conditions with the caveat that their test results will not be used in their final grade or course standings. The CD creates a student test critique form and has the students complete it after they take the test. When performing the critique, students will be given a copy of the test they took to recall test items. The student test critique form must include, at a minimum, the following data, and questions:

(1) Does the test's cover sheet contain the title of the test, the name of the student, and the date?

(2) Were test instructions clear and easy to understand?

(3) Was the test reflective of the material taught?

(4) Was the test level of difficulty appropriate?

(5) Do you have suggestions to improve the test?

c. The final step is to review each student's results of the test. Are the results similar? Look at test steps that were not performed correctly. Look at steps that were performed correctly. Do you see patterns of behavior? For example, does everyone perform or fail to perform the steps correctly? What do patterns of the students' responses lead you to conclude? In performance tests where safety is an issue, every safety-related step must be performed

correctly. Thus, examine each test to ensure that 100% of the students performed safety-related steps correctly. If there are any instances where a student did not perform the steps correctly, there could be an issue with the test instrument, test administrator's guide, or both.

d. Pilot testing, or test driving the test, provides valuable feedback regarding corrections that must be made to the test before administering it to a class for grading purposes (e.g., course pilot). If there is a great deal of negative feedback, it may be necessary to reevaluate the test. If this is the case, administer another pilot to a sample group of students. The process of validation is an iterative process and continues after the test moves from the pilot phase to actual testing. Test analysis will provide continuous feedback on test performance. It is critical that CSs and testing officers monitor tests for any indicators that suggest compromises to test reliability or validity.

CHAPTER 7
PERFORMANCE TEST ADMINISTRATION

7.0. Introduction. A PTAG is required to administer a performance test. The PTAG provides detailed instructions for both the administrator and the student on how each test is to be administered, to include establishing test conditions.

7.1. Elements of the Performance Test Administrator's Guide. The PTAG provides administrators (proctors) of tests with guidance for preparing the test area, administering the test, and then securing the test and the test area. A PTAG will consist of a cover page, instructions to the administrator, test instrument, grading criteria, instructions to the student, and performance record sheet. An example is provided in Appendix D. The following list of elements is comprehensive and may not be necessary for every performance test. The following is a description of each element:

a. **Cover Page.** The cover page must include:

(1) "Performance Test Administrator's Guide" and on the next line "for."

(2) Course title, followed on the next line by the course identification number (CIN).

(3) Performance test's test number followed by the name of the task to be performed.

(4) Month and year the PTAG was developed and or approved.

(5) Security classification, if applicable, which must appear on each page of the test administrator's guide, including the cover page.

b. **Instructions to the Administrator.** The following are guidelines and information, if pertinent, for the performance test that will be included in the instructions to the administrator. An example of an instruction to the administrator is provided in Figure 7-1.

(1) A brief description of the task to be performed.

(2) Instructions on any safety and other special precautions or procedures that may be applicable.

(3) Required tools, test equipment, and training material including applicable job sheets by title and number.

(4) Specific instructions describing how to set up the equipment or laboratory configuration.

(5) Specific instructions on what assistance the administrator may provide or any special tasks, steps, or actions the administrator is to perform and when.

(6) Instructions on the use of knowledge test items (written and/or oral), if applicable.

(7) Guidance on the actions to be taken in the event that the student does not perform as required.

(8) The allocated time limit for individual student tests and any effect time spent on the test has on the grade.

(9) Directions on when to present instructions to the student.

c. **Test Instrument.** The test instrument must include:

(1) List the job or problem sheet(s) or knowledge test.

(2) List and number the steps, or group of steps, to be evaluated. This list will be consistent with the job sheet.

(3) Provide the step description, describing the type of instrument, checklist or grading, and which steps are critical.

(4) Description indicating the most common errors students might make in completing the step(s).

d. **Grading Criteria.** Provide grading criteria and a scoring guide to describe how each step or group of steps is to be graded and how the final grade is determined. Grading criteria may be provided by a checklist or rubric and will be included in the PTAG. Examples of various ways that grading criteria may be provided are shown in Figures 7-2 through 7-5.

Instructions to the Administrator

1. The student will be performing the _____ task(s). The following tools and test equipment are required:

   a.

   b.

   c.

2. Preset the following controls on the _____.

   a. Remove part no.___ from the___ and replace with the faulted part.

   b.

   c.

3. State the following special procedures to the student:

   a. Briefly describe the task and its relationship to the objective.

   b. State any special safety precautions/procedures that may be applicable.

   c. Provide additional information specific to the test.

4. Orally quiz the student on applicable safety precautions using questions from the evaluation checklist.

5. If the student fails a critical step remediate by _____.

Figure 7-1: Instructions to the Administrator (Example)

Performance Test Grading Criteria for Job Sheet 10-3-2

Title: Construct a Box Sill Floor Frame

Grading Criteria is **SAT** or **UNSAT** based on a numerical threshold.

A numeric value must be assigned to each evaluated step.

*A safety violation will stop the performance test and the Administrator will immediately provide remediation. Safety violations which may have led to an injury or damage to equipment will result in an UNSAT performance and failure of the test.

Any product dimension within 1/8” of specification	= -0 points
Any product dimension 3/16” out of specification	= -5 points
Any product dimension more than 3/16” out of specification	= -10 points
Each noted occurrence of improper tool usage	= -5 points

* = Critical Step

All students start with 100 points. Minimum passing score is 75 points.

Figure 7-2: Performance Test Grading Criteria (Example)

Performance Test Grading Criteria for Job Sheet 2-6-4

Title: Measuring a Crankshaft Journal

Grading criteria for Job Sheet 2-6-4 is SAT or UNSAT. There is no product created by the student during this performance test. The sequence in which measurements are taken during this test are not as important as the correct use of the measuring tools, accuracy of the measurements, and interpretation of tool readings.

A numeric score is derived from the following:

All students start the test with 100 points.

Ten (10) points are deducted for any recorded measurement that exceeds Journal proof dimensions by +/- 0.0001” and results in an UNSAT for that measurement. Comments to aid remediation are required for each UNSAT marked.

A score of 80 points or above is SATISFACTORY completion of the test.

Procedures: Steps 1, 2, and 3 relate to measurement techniques, tool reading, and safe practices. Three or more incorrect readings result in failure of the test.

Safe practices are mandated. If unsafe practices are observed, the instructor has two options:

1. Interrupt the test and correct the student. Make an appropriate comment on the Job Sheet checklist.

2. If a safety violation warrants; **STOP THE TEST AND PROCEED IN ACCORDANCE WITH SCHOOL DIRECTIVES**. This results in an immediate test failure.

Figure 7-3: Performance Test Job Sheet Grading Criteria (Example)

Performance Test Checklist Grading Criteria for Job Sheet 2-6-4

Title: Measuring a Crankshaft Journal

Student Name and Rate _____

Instructor/Evaluator _____

Date _____ Time Started _____ Time Completed _____

Test instructions: This test evaluates procedures and the use of measuring tools. Observe student taking measurements indicated. Watch for correct application of tools and the ability to interpret/record tool readings. Observe that student uses correct methods to move heavy parts. If unsafe practices are observed, **STOP THE TEST**.

All recorded measurements for this Job Sheet must be +/- 0.0001" of journal proof dimensions. Mark each measurement as SAT or UNSAT. If UNSAT, comment as to why.

1. Measure and record outer end of journal.

    a. Vertical dimension (SAT) (UNSAT)

    b. Horizontal dimension (SAT) (UNSAT)

Comment: _____

_____

2. Measure and record center of journal.

    a. Vertical dimension (SAT) (UNSAT)

    b. Horizontal dimension (SAT) (UNSAT)

Comment: _____

_____

3. Measure and record inner end of journal.

    a. Vertical dimension (SAT) (UNSAT)

    b. Horizontal dimension (SAT) (UNSAT)

Comment: _____

_____

Final Grade (circle one): SAT UNSAT

Figure 7-4: Performance Test Checklist Grading Criteria (Example)

Performance Test Grading Criteria for Job Sheet 10-3-2

Title: Construct a Box Sill Floor Frame

Student Name and Rate _____

Instructor/Evaluator _____

Date _____ Time Started _____ Time Completed _____

Item No.	Step/Description/Observation	Deduct
1.	Marked and cut all sill plates squarely to proper length within 1/8."	0, -5, -10
2.	Installed sill plates within 1 /8" of specified location, ensuring they are square and level.	0, -5, -10
3.	Laid out header joints for floor joists 16" on center, within 1/8."	0, -5, -10
4.	Measured, marked, and squarely cut each joist to specified length, within 1/8."	0, -5, -10
5.	Aligned header and floor joists (crown up) within 1 /8" of specified location and height.	0, -5, -10
6.	Snapped chalk line across floor joists on centerline of building, within 1/8."	0, -5, -10
7.	Placed and secure bridging staggered 11/2" off center, within 1/9."	0, -5, -10
8.	Installed subfloor with joists staggered and butted tightly on center of the joists driven flush with the surface.	0, -5, -10
9.	Subfloor nailed 8" on center, with nails driven flush with the surface	0, -5, -10
10.	Used all tools and materials properly.	0, -5, -10

Critical - OBSERVED ALL SAFETY PRECAUTIONS

Test procedure: Observe student during construction. Comment on safety observance and use of tools, as appropriate. Take measurements upon completion of project and grade per Job Sheet 10-3-2 Grading Criteria.

Figure 7-5: Performance Test Grading Criteria (Example)

e. **Instructions to the Student**. Will include any of the following, as they pertain. An example of instructions for the student is provided in Figure 7-6.

(1) Safety precautions that must be observed, with specific warnings about any unusual conditions that exist.

(2) An explanation of the job tasks to be performed and exactly what the student is required to do.

(3) List of tools, test equipment, and materials required for performing the test.

(4) Special precautions or procedures.

(5) Performance considerations, such as instructor check points throughout the test, and any other considerations.

(6) The level of assistance permitted.

(7) Information on how the grade will be determined, including critical steps which may result in mandatory test failure.

(8) Allocated time for the test and its importance to the student's test grade.

(9) Relationship of the test to the skill objective being tested.

(10) The consequences of cheating.

f. **Performance Record Sheet**. A performance record sheet is used for administrative information, (name, rate, class number, beginning and ending test times, score, etc.). If automated record keeping support is provided this sheet may not be required.

NOTE: Ensure the appropriate controls and administrative requirements for PII are exercised per NETCINST 5211.2E and DoDI 5200.48.

Instructions to the Student

1. Present the following to the student:

a. This is a performance test for the _____. The test will consist of _____ tasks and you will have _____ amount of time to complete it. Prior to beginning each task, you will be given an explanation of the task, what to do, and the time limit for each.

b. All test equipment, tools, and materials are available to you. You must determine what is needed for each task.

c. You may be required to leave the area after each task if additional preparation is required for the next task.

d. You will be evaluated on your performance and your practice of safety precautions. The administrator will intervene to prevent or correct a violation of any safety precautions.

e. You will not be assisted with your performance. The administrator may intervene after a task begins in order to correct a critical procedural error.

f. The requirements may be restated or explained at your request. Do your best. If you cannot perform the task, inform the administrator.

g. You will be observed closely. Try not to let this interfere with your performance. All critical steps must be performed correctly. Some steps will be scored on a “yes or no” basis and some will be scored with a grade.

h. Cheating is never acceptable. If you are caught cheating, you will be given a zero on the test and will be recommended for disciplinary action.

2. Ensure that the student understands all of the above items before proceeding to the first problem.

Figure 7-6: Instructions to the Student (Example)

CHAPTER 8
KNOWLEDGE TEST DESIGN AND DEVELOPMENT

8.0. Introduction. Knowledge tests are needed to assess a student's ability to recognize, recall, or comprehend facts, procedures, rules, principles, theories, or concepts that are required to perform a skill. Knowledge tests have importance because they measure a student's ability to understand knowledge components that support performance of a skill. Knowledge tests should be designed during course development or the revision process. Student knowledge assessments may consist of oral or written tests.

a. Knowledge tests are developed after performance tests, so that the knowledge components required by the skill are known before designing and developing knowledge tests. Knowledge test design consists of determining what information will be tested, when it will be tested, and how it will be tested.

b. Knowledge tests use the following test items: multiple-choice, matching, drag and drop, fill-in-the-blank, hotspot, numeric, ranking, essay, labeling, oral, and case studies. Problem sheets and assignment sheets can also be used. Knowledge test items are assembled into a test-item bank.

8.1. Knowledge Test Placement Considerations. The following list provides information on when to conduct knowledge tests during a course:

a. Conduct a test to reduce the possibility of student injury and/or equipment damage; a knowledge test allows a judgment to be made that the student is adequately prepared for a performance event.

b. Conduct a test for grading purposes.

c. Conduct a test to assign rank-order to a class of students.

d. Conduct a test for motivational purposes.

e. Conduct a test to ensure that students are doing their homework assignments.

f. Some form of test will be administered about every 40-50 periods of instruction.

g. More frequent testing is warranted if critical knowledge must be assessed before new knowledge is taught.

h. All tests will be sequenced so that the student has sufficient time to study the material before the test. As a rule, the minimum time provided will be at least one overnight period.

i. Tests will be scheduled early on the instructional day, when feasible.

8.2. Knowledge Test Design Guidelines. CDs will consider the following guidelines when designing knowledge tests. These guidelines will help CDs in deciding what information to test, how much time to devote to knowledge testing, where to locate each test within the course, and the purpose of each test.

a. Identify what knowledge is critical to on-the-job performance and build tests around this knowledge.

b. Attempt to use a form of knowledge test that closely matches how the knowledge is used on-the-job.

c. Tests are usually developed to assess mastery of a group of EOs but may cover a single EO especially if the section is a long one.

d. Time allowed for the administration of knowledge tests is usually limited to 5-10% of the total instructional time.

8.3. Knowledge Test Design Process. The knowledge test design process consists of the following six steps that need to be performed in sequence to design and develop tests properly and consistently.

a. Determine knowledge LO criticality.

b. Verify knowledge test placement.

c. Determine knowledge test category.

d. Determine knowledge test type.

e. Assign the knowledge test proficiency level.

f. Determine the test instrument and grading criteria.

After completing the test design steps listed above, Knowledge Test Administrator's Guides (KTAG) and a testing plan can be developed for the course. These items are discussed in Chapter 9, Knowledge Test Administration and Chapter 10, Testing Plan and Testing Program Administration.

8.4. Determine Knowledge Learning Objective Criticality. Knowledge test design begins with determining the criticality of each knowledge LO. This process determines which LOs to assess through formal or informal testing. Analysis of task data (discussed in Chapter 2, Test Development Preparation) provides the information for determining LO

criticality. The following criticality factors are recommended to be used. Other criticality factors may be used.

a. Application of Knowledge – How important is the knowledge with regard to its application to actual job performance?

b. Detail of Knowledge – What is the level of detailed knowledge required to perform the task?

c. Relationship of Knowledge EO to TO – To what degree is the knowledge EO related to the TO?

Additional fields, such as frequency, may be considered by CDs. The following is a recommended process to determine LO criticality.

a. **LO Criticality.** Each critical factor will be assigned one of three levels (e.g., high - 3, moderate - 2, and low - 1).

(1) Application of knowledge to job performance:

- **High - 3.** The Knowledge is essential for successful job performance.
- **Moderate - 2.** The Knowledge influences job performance.
- **Low - 1.** The Knowledge has little direct influence on job performance.

(2) Detail of knowledge required:

- **High - 3.** Considerable detailed knowledge is necessary for proper job to performance.
- **Moderate - 2.** Some detailed knowledge is necessary for satisfactory job performance.
- **Low - 1.** Just limited or basic knowledge is required for job performance.

(3) Relationship of knowledge EO to TO:

- **High - 3.** Knowledge EO is a very important part of TO.
- **Moderate - 2.** Knowledge EO closely related to TO.
- **Low - 1.** Knowledge EO indirectly and somewhat related to TO.

b. **Discussion of Criticality Factors.** The three criticality factors above will be used to determine which objectives will be tested. A number of SMEs should independently rate the objectives. They should look at a group of LOs, such as all the LOs for a week, rather than an individual LO when rating. This

ensures each objective's importance within the instruction is balanced in comparison with other objectives (e.g., "building" objectives used later within higher objectives). This is an iterative process and will be revisited during course development and course maintenance actions.

c. **Safety** is always a critical factor and LOs that contain "safety" concerns (knowledge that is essential to reduce risk or prevent personal or equipment damage) will be rated high.

d. **Use of Criticality Factor Scores.** As a general "rule of thumb," objectives rated higher should be formally tested while lower rated objectives may or may not be formally tested.

e. **Rank Order or Group LOs.** Place LOs in a list ranging from most critical to least critical (highest to lowest score). If a course has 20 LOs, rank them from 20 (highest criticality) to 1 (lowest criticality). Group LOs within three categories of criticality, highly critical, critical, and least critical. Highly critical LOs must be formally tested. Least critical LOs may be informally tested by other means, such as practical work.

f. **Testing of LO(s) may be achieved by:**

(1) Testing an individual EO by themselves.

(2) Splitting an EO into parts to test selected parts.

(3) Testing closely related EOs as a group which equals a TO.

An example of criticality factor scores and testing of LOs is discussed in more detail in Appendix G.

8.5. Verify Knowledge Test Placement. During the development of the CMS a decision is made about test placement in the course. Verify that no additional tests are required by answering the following questions. Answering a question "yes" means a test is possible. Is there a need to determine:

a. What does the student know before presenting additional instruction?

b. How well has the student learned the material just taught?

c. If the student has acquired certain prerequisite skills or knowledge before being allowed to progress further in the course (e.g., to the next lesson topic or into a performance lab)?

d. If the student requires remedial instruction before being allowed to progress further in the course?

8.6. Determine Knowledge Test Category. After determining test placement, it is now possible to determine the category for each knowledge test. Based upon the placement of the desired knowledge test and the purpose of the test, choose the correct category of test from the list below. Test categories are discussed in Chapter 3, Test Categories, Test Types, And How Tests Are Referenced.

a. Pretest

b. Quiz

c. Progress Test

d. Comprehensive Test

e. Oral Test

f. Essay Test

8.7. Determine Knowledge Test Type. Deciding the knowledge test type is the next step. The two types of knowledge tests are open book and closed book. Use the following descriptions to help determine the test type to use:

a. **Open Book Test.** An open book test evaluates the student's ability to locate and record information using technical documentation. Open book tests are used whenever the on-the-job situation requires the use of technical documentation.

b. **Closed Book Test.** A closed book test is used when the knowledge being tested is normally required on-the-job without reference to technical documentation.

8.8. Assign Knowledge Test Proficiency Level. Following test type identification, it is necessary to assign the level of knowledge proficiency to which the LO will be tested, as determined by the requirement sponsor. This will be the same level as which the LO is taught. The KPL is assigned by using the course source data elements from the TA: condition, behavior (action verb), and standard. See Section 2.5.2. Knowledge Proficiency Levels. The attributes are:

a. **KPL 1 – Remember**

(1) Test instruments include multiple-choice, matching, completion, labeling test items, assignment sheets, and problem sheets.

(2) Tools to establish grading criteria include scoring guide, checklist (oral test).

b. **KPL 2 – Understand**

(1) Test instruments include multiple-choice, matching, completion, labeling test items, assignment sheets, and problem sheets.

(2) Tools to establish grading criteria include scoring guide, checklist (oral test).

c. **KPL 3 – Apply**

(1) Test instruments include multiple-choice, matching, completion, oral, and essay test items.

(2) Tools to establish grading criteria include scoring guide, checklist, and rubric.

d. **KPL 4 – Analyze**

(1) Test instruments include multiple-choice, matching, completion, oral, and essay test items.

(2) Tools to establish grading criteria include scoring guide, checklist, and rubric.

e. **KPL 5 – Evaluate/Create**

(1) Test instruments include multiple-choice, essay, oral, and case study test items.

(2) Tools to establish grading criteria include scoring guide and rubric.

Once each LO has been aligned to a level of knowledge proficiency, the CD will be able to identify the best test instrument and grading criteria to use.

NOTE: Even though a variety of test item types can be used to assess the same KPL, test items are not equal in difficulty. For example, multiple-choice items can be used for KPL 1 through KPL 5; matching can also be offered for KPL 1 through KPL 4.

Multiple choice ≠ to completion: The advantage of completion test items over multiple - choice test items is that they require more than simple recognition of information. Completion test items eliminate the possibility of guessing.

Multiple choice ≠ to matching: Matching questions require the student to analyze each option rather than choose one correct answer. Matching ≠ to completion: Completion test items eliminate the possibility of guessing.

8.9. Determine Test Instrument and Grading Criteria. The final step in knowledge test design is to identify the best test instrument and grading criteria to use for each knowledge test in order to create a reliable and valid test. The desired level of knowledge proficiency for the LOs, determined in the previous step, will be used to identify the best test instrument and grading criteria. Tests may be constructed using one or more of the test instruments and grading criteria listed below, for each proficiency level. If the grading criterion does not contain a grading scale, one will need to be developed.

8.10. Knowledge Test Development. Once knowledge test design is complete, test development can begin. Using the decisions made in the design process, develop test instruments (multiple-choice, matching, drag and drop, fill-in-the-blank, hotspot, numeric, ranking, essay, labeling, oral, and case study test items; assignment and problem sheets) and grading criteria (scoring guide and rubric) to administer and grade each knowledge test. When developing test instrument(s) and grading criteria refer to Chapter 4, Test Instruments and Chapter 5, Grading and Grading Criteria, respectively.

8.11. Knowledge Test Development Guidelines. There is not any established formula for determining the most appropriate number of test items required or weighting for essay or oral tests for any given LOs. The priority ordered guidelines below are factors to consider.

a. **Criticality of the Objective.** When both critical and less critical LOs are measured on the same test, the critical LO(s) will have more items or weighting to ensure the test reflects the critical aspects of the course.

b. **Complexity of Material.** As the complexity of the material increases, the number or weighting of test items used to test the material will also increase to ensure understanding.

c. **Instructional Time Allotted to Present Material.** If more than one LO is tested in the same test, of similar criticality and complexity, the number of test items or weight will be reflective of the amount of instructional time that was devoted to each. For example, if most of the material covers one objective, then most of the test items will cover that objective. This ensures that the emphasis on the test is the same as the emphasis in the classroom.

The testing of higher-level objectives implicitly includes the testing of supporting EOs and satisfies testing requirements for those objectives.

8.12. Knowledge Test Development Process. After the test items are written, perform the steps listed below, in the sequence provided, to develop knowledge tests.

a. **Verify Content Validity of Test Items.** Content validity (also termed face

validity) of test items means that the test item must be technically correct, it must measure the appropriate LO at the appropriate proficiency level, and it must be constructed properly. To establish the validity of an item, the developer and two additional SMEs will, if possible, review each test item for validity. It is recommended that the test item be reviewed for clarity and formatting by at least two outside readers even if they are not SMEs. In addition, the testing officer will review each test item to detect errors other than those technical in nature. Finally, the Test Item must be approved by the CCMM or CCA. To document the test item review, the following will be contained on paperwork being used to verify content validation. An example of one such form, the Knowledge Test Item Worksheet (KTIW) is shown in Figure 8-1 and in Appendix G. See Figure 8-2 for an example of a Test Item Review Checklist.

(1) The course title, number and lesson topic.

(2) The objective(s) to which the test item is linked.

(3) The criticality of the objective(s).

(4) Where the test item is covered in the IGs.

(5) The reference(s) (e.g., NSTM, SIB, DC BOOK, etc.) will be noted below the question on the form and in the KTAG to assist the instructor during test review. A copy of the page(s) from the hard reference may be attached to aid in this review.

(6) If the question is open book or closed book.

(7) The type of question.

(8) The complete question must be shown as it will be presented on the test with any figures or drawings needed. If the question takes more space, expand the box, or attach any additional pages needed.

(9) Each test item must meet test item construction guidelines.

(10) Signature blocks for developers, reviewers, and approvers.

Example: Knowledge Test Item Worksheet

Course Title: Basic Electricity			Course #: A-652-0033
Lesson Topic Title: Analyzing Transistor Circuits			
Part: 3	Sec./Unit: 3	Obj No: 4.5	DP/IG Page: 3-14
Obj Crit.: 8.8	Closed Book ☐ Open Book ☒		PP Slide: 57
Developer: EM2 Jones	Outside Readers		Ref & Page/Paragraph No. NEETS MODULE 8 page 3 – 7
Reviewer: EM1 Smith	1. GSE2 Blank		
Reviewer: EMC Watts	2. GSE1 Hawk		

Item Type: (Check one)

☒Multiple-Choice ☐Matching ☐Completion ☐ Essay/Oral ☐Case Study

Test Item: 4. (EO 4.5) If a positive input is applied to the base of transistor Q1, the Q output will be ____ and the Q(not) output will be ____

	Q	$\overline{Q}$ / Q(not)
a.	negative	negative.
b.	positive	negative.
c.	positive	positive.
d.	negative	positive. *

REF: NEETS MODULE 8 page 3 – 7

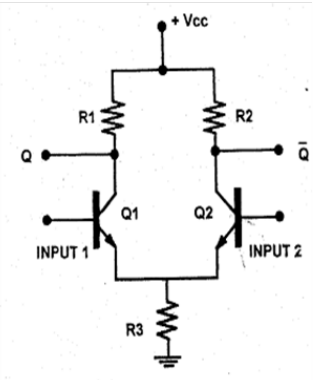

Figure 8-1: Knowledge Test Item Worksheet (Example)

KNOWLEDGE TEST ITEM CHECKLIST

NOTE: Any check in the "NO" column invalidates the version of the test item shown on the reverse side.

	YES	NO
1. Is the item technically correct, free of jargon, and is the correct response keyed?	_√_	___
2. Does the item have a direct content match with the objective it is designed to measure?	_√_	___
3. Does the item measure a critical knowledge element of a task associated with a learning objective?	_√_	___
4. If memorization of the knowledge being tested is required for competent performance on the job, is the item identified as a closed-book item?	_√_	___
5. When the knowledge being tested is normally "looked up" during performance of on-the-job tasks, is the item identified either as an open-book test item or is essential reference material provided with the test item, e.g., drawing, diagram, table, graph, etc.?	_√_	___
6. Is the item written at the appropriate knowledge level?	_√_	___
7. Are all words spelled correctly and is punctuation correct?	_√_	___
8. Is the item grammatically consistent, and correct?	_√_	___
9. For its type, does the test item meet recommended format and construction guidelines?	_√_	___

Figure 8-2: Knowledge Test Item Review Checklist (Example)

b. **Assemble the Knowledge Test.** Once content validity of the test items is established, the next step is to develop a design for each knowledge test in the course, as discussed below. Select test items from the test-item bank that fit the desired test design. In Section 8.4 Determine Knowledge LO Criticality the LO(s) were rated, and a determination was made as to which objectives would be tested on each knowledge test. Now a test design is created to show how those objectives will be tested (individually, split, or grouped) in a knowledge test and how many questions will be needed in each testing area. An example of one type of knowledge test design work sheet is discussed and shown in Table 6.

(1) Review the objectives to be tested and place them in the order in which they will be tested (e.g., ascending order by objective number or in the order in which they were taught).

(2) Decide how each EO is to be tested (e.g., individually, split, or grouped, as needed for testing purposes). This will form testing areas (these testing areas are sometimes called testing objectives and are discussed in more detail in Appendix G). Word each testing area as needed to better describe what and how each area is to be tested (e.g., the testing area may group three objectives and/or the student can use the technical manual to answer the question). At this time an EO's verb may be changed to "identify" for matching, "recall" for fill-in-the-blank, "retrieve" for open book, or "describe" for an essay or oral tests.

(3) Determine the number of questions to ask in each testing area and the number of questions that need to be correct in each testing area. Generally, the more critical an objective is, a greater number of questions should be in its testing area. This determination then establishes a blueprint for all versions of this test. This blueprint is very important because it will determine how the students perform in each testing area and allow another version of the test to be used for any retesting.

(4) Take the test item sheets and group them in each testing area according to the above test design.

(a) If the test-item bank does not contain an adequate number of test items more test items that match the test design must be generated.

(b) Place the questions in each testing area from the easiest to the most difficult.

(c) Each version of the test must have a similar number of question types (e.g., multiple-choice, matching, etc.) with at least 75% of the test questions different from other test versions.

(d) The difficulty of the questions in each testing area (LO) must be equal in difficulty for each version of the test. Referring to Table 6, if version A tests objective 1.1 with two matching test items, then version B must also test objective 1.1 with two matching test items. Versions are unequal when version A tests objective 1.1 with two matching test items and version B tests objective 1.1 with one multiple-choice test item and one matching test item.

(e) Care must be taken to make sure that none of the questions give away the answer to another question on that same version of the test.

(5) The next step is to review the test for validity.

Table 6: Test Assembly Worksheet Matrix (Example)

Module	Lesson	Section	Terminal Objective	Enabling Objective	Question Number	Question Format
01	01	01	1.0	1.1	1	Matching
01	01	01	1.0	1.1	2	Matching
01	01	02	1.0	1.2	3	Multiple Choice
01	01	02	1.0	1.2	4	Multiple Choice
01	01	03	1.0	1.3	5	Multiple Choice
01	01	04	1.0	1.4	6	Multiple Choice
01	01	04	1.0	1.5	7	Multiple Choice
01	02	01	2.0	2.1	8	Completion
01	02	02	3.0	3.1	9	Completion
01	02	02	3.0	3.2	10	Completion

g. **Verify Knowledge Test Validity.** Establishing test item validity does not ensure test validity. Establishing test validity requires test-item analysis, discussed in Chapter 11, Test and Test-Item Analysis. If the test has not actually been administered, it will be piloted to generate analysis data. This must be done manually since most LASs will ignore test items with small numbers. This effort allows programs to make corrective adjustments before using the test to assess knowledge and assign grades. Determining the validity of the test is a two-step process. First, at least three SMEs will review

the test to verify content validity. The next step is to administer the test and examine the results (test and test-item analysis). The test will be administered to two groups, SMEs and students.

(1) When possible, have at least three SMEs review the test and select SMEs that did not participate in constructing the test. This will ensure a proper assessment of the LO(s). Develop a SME test critique form and include completed critiques in the testing plan. The SME critique form must include at a minimum, the following data, and questions:

(a) Cover sheet: test title, date of the review, name of the reviewer (SME), rate and rank of reviewer, and SME years of experience in subject matter.

(b) Were test instructions clear?

(c) Were test instructions easy to understand?

(d) Was the test technically accurate?

(e) Were test items clear?

(f) Were test items easy to understand?

(g) Did the test provide a good assessment of achievement of the LO(s)?

(h) Was the test level of difficulty appropriate?

(i) Was the test's grammar correct?

(j) Do you have suggestions to improve the test?

(2) Next, administer the test to a group of students. The students must be at a point in training when the test would be used for assessment purposes. When students participate in pilot testing results may not be used in their grading or assessment. Develop a student test critique form. Students completing the critique will be given a copy of the pilot test as a reference. Summarize the critique information and include it in the testing plan. The student test critique form must include at a minimum, the following data and questions:

(a) Cover sheet: test title, student name, and date.

(b) Were test instructions clear?

(c) Were test instructions easy to understand?

(d) Were test questions clear?

(e) Were test questions easy to understand?

(f) Did test questions contain cues that helped you answer them?

(g) Were there test questions that aided you in answering other test questions?

(h) Was the test reflective of the material taught?

(i) Was the test level of difficulty appropriate?

(j) Do you have suggestions to improve the test?

(3) Pilot testing will provide feedback on corrections that must be made to the test before administering it to a class for grading purposes. If there is a great deal of negative feedback, it may be necessary to reevaluate the test or change test items. If this is the case, administer another pilot to a sample group of students. The process of validation is an iterative process and continues after the test moves from the pilot phase to actual testing. Test and test-item analysis will provide continuous feedback on test performance. It is critical that CSs monitor tests and test items for any indicators that suggest compromises to test reliability or validity.

(4) Once a test and test items have been validated, the process of generating new test items continues. To accomplish this, ensure that each test item has content validity, as discussed in this chapter prior to being administered to students. A good method of administering new test items is to systematically append to an existing version of a test, not to exceed 10 to 15% of the actual test item count. If this is done, the new test items must not be used in the calculation of a grade or score. Rather the new test items along with the other test items will be subjected to test-item analysis to ensure new test items correlate positively with test items already proven valid for the domain of knowledge being tested.

NOTE: Test-item analysis is collected through enough administrations of the test item to provide sufficient confidence to include the test item in the test-item bank. A considerable bank of new test items of proven value can be developed in this manner in a relatively short time.

h. **Establish a Grade for the Knowledge Test.** While the minimum passing grade for a course is based on the grading percentage, the minimum passing grade for a knowledge test is determined by a panel of at least three SMEs, when possible and is established after the test is designed and the test items are developed. SMEs who determine the minimum passing grade for a test

should be different from the SMEs that designed the test and developed the test items. Refer to the process to establish a grade for a knowledge test described in Chapter 5, Grading and Grading Criteria.

i. **Develop Different Knowledge Tests.** Multiple test versions (at least three) are necessary for retesting, variety, and to prevent test compromise. Unless a test question is deemed one that falls within the parameters of mandatory test delivery, such as a test question that provides strong evidence of learner understanding (e.g., safety or security related), each test version must have unique questions for each LO assessed. A test is considered a different version if at least 75% of the test questions are different from other test versions. The CCA is the final adjudicating authority to determine if a question is unique.

(1) The test's design is important when constructing additional versions of a test. Each version of a test must contain the same number of questions per objective, level of difficulty, and measure the same LOs at the same proficiency level.

(2) To protect the integrity of the tests and uphold sound test-item analysis data, test versions will be used in a random manner that eventually ends up with equal usage. In addition, the instructor must not be privy to the version being administered until the instructor checks out the test booklets for use or is told which version will be assigned via automated means. A senior course official, such as the CS, can assign the version. This prevents any possibility that the instructor "teaches to the test" (e.g., teaching to the questions on one version).

(3) A student must be given a different version of the test when retesting. This can be done via random test generation in the LAS or by issuing a different version of the test for a paper-based test. Most software programs ignore retests in their test analysis; so, it is important for test analysis to rotate through usage of the different versions over time.

(4) LCs will determine the actual number of versions needed beyond the requirement of two. The number of different versions of a test will depend upon the number of classes in session. For testing systems which do not recognize letters, identify different versions of the exams with a number (1, 2, etc.).

CHAPTER 9
KNOWLEDGE TEST ADMINISTRATION

9.0. Introduction. Administering knowledge tests require strict adherence to standards addressed in the testing plan and/or KTAG. The instructions provide detailed procedures for preparing the test area, administering the test, and then securing the test. They also include directions on grading and provide specific directions to the student. If different tests are administered exactly the same, they may be covered as appendixes to the testing plan or via a single KTAG. There are a number of different elements necessary to provide good, detailed instructions to the test administrator (proctor) that should be included in a KTAG, but the determination of what needs to be included will be determined by the CD. NETC directs the use of the LAS to administer knowledge tests, however if it is not available test booklets containing test questions and answer sheets may be required as a backup solution.

9.1. Knowledge Test Administration Guidelines. Ensure the process of administering knowledge tests is properly and consistently performed.

a. Test administrators (proctors) will administer tests in compliance with approved testing guidance whether contained in a testing plan or KTAG. The administration of the test can be achieved through two different methods:

   (1) The preferred method is to have an instructor other than the instructor assigned to teach the course administer (proctor) the test.

   (2) Another method is to have a test administered (proctored) by a person assigned to the training command.

b. During the administration of the test, precautions must be taken to minimize the possibility of test compromise. If using paper-based tests, they must never leave the control of the test administrator. The test administrator must be alert during the exam for instances of cheating.

c. After the test has been graded (either by the proctor or the LAS), an instructor certified to teach the course will conduct a test review. Reviews will differ depending on the test instrument. If a paper-based test is conducted students should get their test booklet and answer sheet back for the review. This will help them understand what EOs they may have missed and allow them to ask questions. The review is necessary to correct misunderstandings the students may have. The following guidelines apply:

(1) After the test is graded, review the test in general with the class. Accomplish this by discussing the areas of LO(s) most frequently missed by the students. If time does not allow, at least review the questions that 50% or more of the class missed.

(2) When only one or two students miss an item, the LO associated with the missed item(s) may be reviewed in class or individually depending on the situation and time available.

9.2. Knowledge Test Administrators Guide. May consist of the following elements: cover page, instructions to the administrator, test instrument, grading criteria, and instructions to the student. An example of a KTAG is located in Appendix E. The following is a description of each element.

a. **Cover Page** will include:

(1) The phrase "Knowledge Test Administrator's Guide" and on the next line “for.”

(2) Course title, followed on the next line by: CIN.

(3) Knowledge test's test number.

(4) Month and year the guide is developed.

(5) Security classification if applicable must appear on each page of the guide, including the cover page.

b. **Instructions to the Administrator.** The following list of topics, if pertinent to the knowledge test, will be included in the instructions to the administrator. An example of instructions to the administrator is provided in Appendix F.

(1) How to prepare the test area.

(2) Special instructions to give students.

(3) Time allotted for the test.

(4) What to do upon completion of the test.

(5) How to record test results.

(6) How to secure the test area.

(7) Test remediation and re-testing.

c. **Test Description.** The test instrument(s) that will be used for the test will be identified in this element. Identification means the type of test items used for the knowledge test. The test instrument(s) for a knowledge test include

multiple-choice, completion, drag-and-drop, fill-in-the-blank, hotspot, matching, essay, oral, labeling, case study, problem sheet, and assignment sheet test items. This list is not exhaustive. These test instruments may be part of the testing plan or included in other tools such as a test booklet that will accompany each administrator's guide in the event the LAS is not available for testing.

d. **Grading Criteria.** Will describe how each question or group of questions is graded. Grading criteria can be established using a checklist or scoring guide. If the knowledge test contains essay or case study test items, a rubric will be used for scoring a student's response.

9.3. Student Test Package. Student test booklets, if utilizing paper-based tests, will be controlled and will contain:

a. **Cover Page.** The security classification, if applicable, must appear on the page.

b. **Instructions to the Student.** Provide information about the test and how to take the test. Figure 9-1 provides an example which should include:

(1) A description of the test.

(2) Directions on how to fill out the answer sheet's administration data if resorting to paper-based tests. Otherwise, the LAS will capture the needed data.

(3) Correct handling of test answer sheets (if utilized) and test support materials.

(4) Time allocated for the test and its importance to the test grade.

(5) The level of assistance permitted.

(6) The consequences of cheating.

c. **Test Questions.** All test questions will be numbered.

d. **Separate Answer Sheet.** Answer sheets are not required if the students are using the LAS or are required to enter their answers in the test booklet. Answer sheets, if utilized, will be destroyed after review, remediation, and recording of grades in student records.

NOTE: Ensure the appropriate controls and administrative requirements for PII are exercised per NETCINST 5211.2E and DoDI 5200.48.

Instructions to the Student

1. Do not bring your cell phone or any video recording device into the examination area. If you are found to have one in your possession, your test will be confiscated, you will be given a zero for the test, and you will be escorted from the examination area. Disciplinary action will be taken.
2. Provide instructions on administrative data depending on the type of test given (electronic, paper based, scantron). Name, rate, class number, and date.
3. A score of XX% is required to pass the test. You will have XX minutes to complete the test.
4. There will be no talking during the test nor are you permitted to leave your seat without permission. If you have a question, raise your hand and the proctor will come to you.
5. (Modify according to the type of test given.) If you cheat during this test, your test booklet, answer sheet, and all scratch paper will be confiscated. You will receive a zero as your grade. Disciplinary action will be taken.
6. Read each test question carefully. Choose the answer you believe to be correct. There is only one correct answer to every test item (unless noted).
7. Provide information on how to select the correct answer depending on the method of testing. Elaborate on how to change an answer if that is a possibility.
8. **DO NOT MAKE ANY STRAY MARKS ON SCANTRON, EXAMINATION PAGES, OR IN TEST BOOKLET.** (Modify based on testing method.)
9. When you have finished your test, turn in the test booklet, answer sheet (if required), and all scratch paper to the proctor. You may then quietly leave the room or remain at you seat while the proctor scores your answer sheet (If the test is not machine scored). Do not discuss or attempt to record questions or answers while waiting to return to the classroom. Discovery of such actions will be considered to be cheating, and disciplinary action will be taken. There will be a review of the test following administration and subsequent grading of the exam.
10. If you have any questions regarding these instructions, notify the proctor immediately. **(NOTE: These instructions should be modified to reflect the type of test given)**

Figure 9-1: Instructions to the Student (Example)

CHAPTER 10
TESTING PLAN AND TESTING PROGRAM ADMINISTRATION

10.0. Introduction. This chapter describes the testing plan for a course of instruction and the administrative processes and procedures required to ensure a reliable and valid testing program. See Figure 10-1 for an example of the Testing Plan Flowchart.

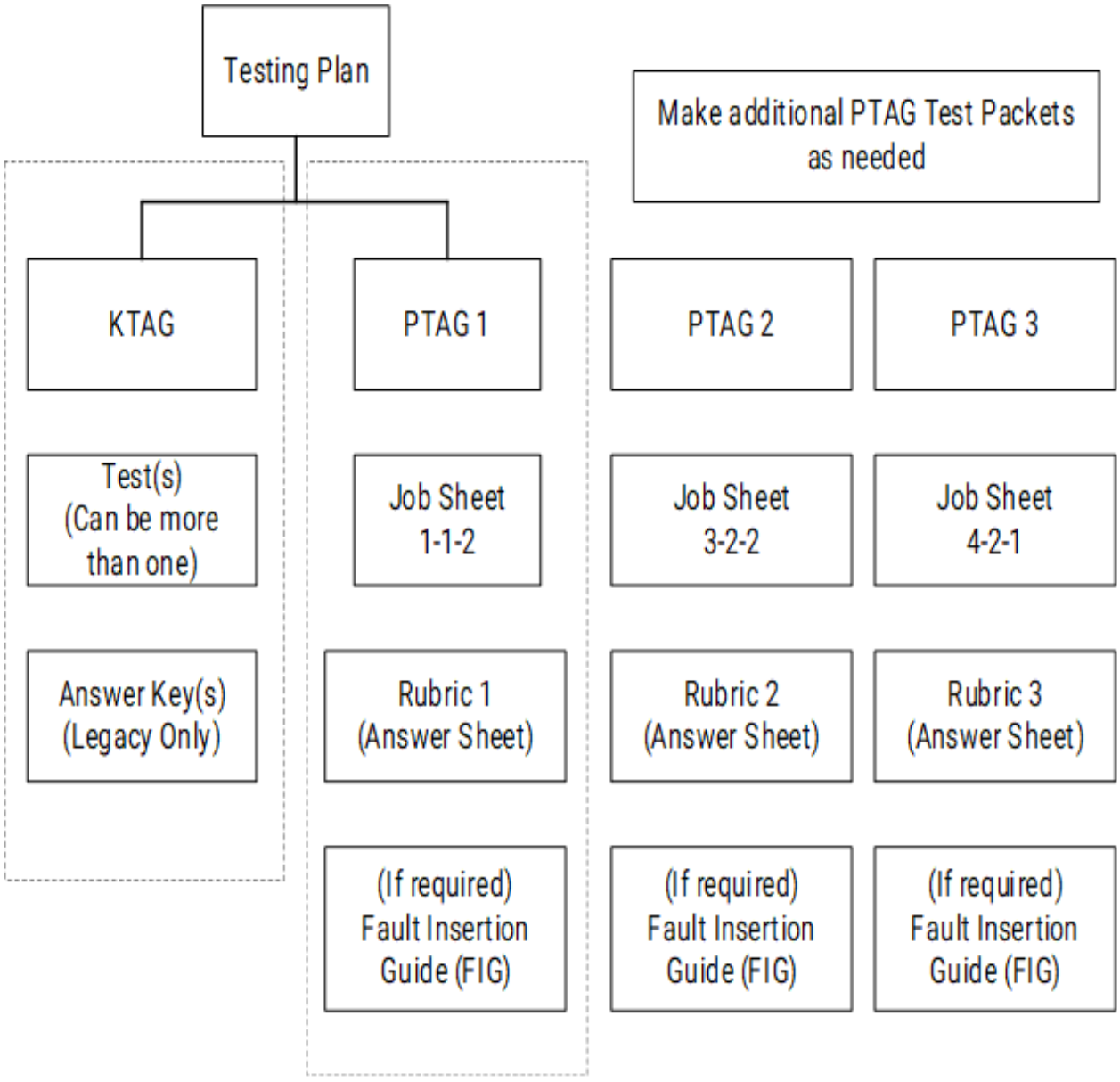

Figure 10-1: Testing Plan Flowchart (Example)

10.1. Testing Program Administration. The administration of a testing program includes organizing, controlling, managing, and preserving test materials. Testing program administration includes the following: testing plan, testing constraints, test-item bank, test security, test administration (giving and collecting tests), grading, test review, and pilot testing. It is the testing officer's responsibility to ensure oversight of each element listed above.

a. **Testing Constraints.** Any situation that restricts or prevents complete testing of the LOs is a testing constraint. LS, LC, and NETC Headquarters personnel, as appropriate, must immediately address each constraint and develop a course of action to mitigate or eliminate the constraint, if possible. Testing constraints can take many forms, which include manpower, equipment, space, facilities, etc. If a course of instruction has a testing constraint(s), they will be recorded in the course testing plan.

b. **Test-Item bank.** A test-item bank is generally an electronic repository of test items. The master test-item bank contains knowledge test items approved by the CCMM and, in some cases, the CCA for use in a course. The test-item bank is prepared and validated during course development or course maintenance. Developing a test bank in version format, using Word, serves three purposes:

    (1) It provides feedback, editing, spellchecking, etc., which are far more efficient and accurate than other applications.

    (2) The developer can confidently copy and paste the stems and alternatives into an automated application, knowing there are no typos, grammar issues, etc.

    (3) Once the answer keys are developed and approved, it is simple to make a copy of the bank and sanitize the document, so answers are no longer known by the test taker. Once printed, this version provides a paper-based backup test.

c. **Test Material Security.** Test materials will be accounted for at all times. Test materials include test-item banks, copies of the tests, answer keys, computers containing testing materials, test item analyses containing test items and/or answers, and any diagram, formula sheet, etc., used by students when taking a test. Test materials must be controlled in the following manner:

(1) Paper-based test materials will be stored in a locked container in an area accessible to authorized instructional staff personnel only. When test materials are removed, an accountability system will be established so that an accurate, enduring inventory system of all tests can be maintained.

(2) Digital test materials on a network need to be secured via permissions and/or passwords. A computer having test items stored on a hard drive must be in an area accessible to designated testing personnel only and password protected.

(3) Regardless of classification, tests are to be handled in an accountable manner. If the test contains classified material, the test will be classified, and the material handled in accordance with the applicable security classification.

(4) Performance tests and materials will be controlled in the same manner.

(5) If test compromise does occur, the compromised test will not be used again until all classes onboard at the time of the test compromise have graduated.

(6) A duplicate set of testing materials will be maintained in a separate location in the same manner as described above.

(7) When mailing testing materials, a record of receipts, OPNAV Form 5511/10, S/N 0107-LF-008-8000, will be included. The receiving activity will sign and return the form to the sender.

(8) When emailing test materials, emails must be encrypted, and digital signatures must be used.

d. **Test Administration.** Written guidelines are developed for the administration of both performance and knowledge tests. The written guidelines are in the form of test administrator's guides. PTAGs are described in Chapter 7 - Performance Test Administration, and KTAGs are described in Chapter 9 - Knowledge Test Administration. Proper test administration is the responsibility of every individual who has any role in the administration of performance and knowledge tests. Under no circumstances will any guidelines established for test administration be changed without the approval of the FLSO/FTS as determined by the CCA. During the administration of a test, every precaution must be taken to minimize the possibility of test compromise.

e. **Grading.** Grading of performance and knowledge tests may be the most important element of a testing program. Thus, it is not only extremely important that a testing program's tests be reliable and valid, but it is equally important that the grading criteria and way of grading be standardized, consistent, defendable, repeatable, and fair (objective). Grading tests will occur immediately following a test.

f. **Test Review.** A test review with students will take place immediately following each performance and knowledge test. It is important to provide students with immediate feedback after a test, to give them their grade, and review the test. Accomplish this by discussing the areas of an LO(s) most frequently missed by students. The review is also an opportunity for students to ask questions about items or steps (procedures) of a performance test that they did not understand.

g. **Test Pilots.** Test Pilots (when possible) will provide feedback on corrections that must be made to the test before administering it to a class for grading purposes. If there is a great deal of negative feedback, it may be necessary to re-evaluate the test or change test items. If this is the case, administer another pilot to a sample group of students. The process of validation is an iterative process and continues after the test moves from the pilot phase to actual testing. Test and test-item analysis will provide continuous feedback on test performance. It is critical that CSs monitor tests and test items for any indicators that suggest compromises to test reliability or validity.

h. **Electronic Testing.** Electronic testing is being used by many NETC training activities. When possible NETC training activities will use the approved LAS to conduct testing. Activities that are reliant on electronic testing will ensure they maintain a means to assess student performance in the event the LAS supporting electronic testing fails.

10.2. Testing Plan. The testing program will be outlined in a course testing plan. The terms “formal and informal testing” are defined as: formal testing is a test that is graded and is used in the calculation of a student’s final grade while informal testing may or may not be graded, however it will not be used in the calculation of the student’s final grade. The testing plan will identify all formal and informal testing and provides documentation of the test procedures for a course. A current course testing plan is required and will be maintained for each course and be approved by the CCMM or CCA. Each testing plan will include the following areas and content:

a. **Cover Page** will include:

(1) The phrase "Testing Plan" and on the next line “for.”

(2) Course title, followed on the next line by: CIN.

(3) “PREPARED FOR” and on the next line, LC name and address.

(4) “PREPARED BY” and on the next line, CCMM name and address.

(5) Month and year the guide is developed.

(6) Security classification if applicable must appear on each page of the testing plan, including the cover page.

(7) Each page should be numbered and dated.

b. **Test Development**

(1) General statement that all tests are criterion-referenced, which means that each test is designed to measure the student’s acquired skills and knowledge, against criteria specified by the LOs.

(2) LO criticality is determined by SMEs.

(3) Each test is designed to measure critical LOs that describe required skills and knowledge.

(4) Skill and knowledge tests are constructed based on test design worksheets, showing how these objectives are to be tested.

(5) Test questions are developed on KTIWs which are used to create a test bank.

c. **Minimum Passing grade for course.** State the minimum passing grade for the course.

d. **Tests and Test Methods**

(1) General discussion of test categories and graded homework in the course, i.e., Quizzes, Knowledge Tests, Performance Tests, etc.

(2) Discussion of performance and knowledge test instruments used in the course.

(3) Include a discussion about whether or not a retest is required when the students do not meet minimum passing grade for that test.

(4) Discussion on how the test will be reviewed by the instructor.

(5) Discussion of any testing constraints.

e. **Test Administration.** General discussion of test administration. More details on test administration should be in the PTAG and KTAG.

f. **Remediation and Retesting**

(1) Description of course remediation process discussed in detail in Chapter 12, Remediation Program.

(2) Retest procedures which will include requirements to address:

(a) When an exam is passed but one or more critical objectives is failed.

(b) If the passing score or criteria are different than that for the original exam, it will be stated.

g. **Test Security Policies and Procedures**

(1) State the classification of the testing material. Handle all tests based on the classification of the material.

(2) Provide specific handling and stowage requirements and procedures to prevent compromise.

h. **Test and Test-Item Analysis**

(1) Discussion of general test and test-item analysis.

(2) Discussion of when and how test-item analysis will be done.

(3) Test-item analysis must be treated like a test if it shows the correct answers to the test questions and is in fact an answer key.

i. **Testing Schedule**

(1) A list of the tests by test number, type of test, the objectives each test covers, and time allotted to administer and review the test.

(2) Test schedule must align with the CMS.

j. **Grading and Weighting Criteria**

(1) A list of each test with its weight (percentage) in the course in a simple form that allows one to manually calculate the student's final grade. For more information refer to Appendix H.

(2) If a course is SAT or UNSAT: state, the numerical value of the student grade that will be reported.

(3) Provide rationale to determine successful course completion.

CHAPTER 11
TEST ITEM ANALYSIS

11.0. Introduction. In Chapters 2 through 10, the concepts, guidelines, considerations, tools, and formats for designing and developing performance and knowledge tests have been described. Tests and test items are prepared during course development and revision projects. Before tests and test items are implemented into a course, they are reviewed for content validity. However, to determine statistical validity after test items are in use, test and test-item analysis techniques are required. The techniques discussed in this chapter are widely accepted and generally used in test-item analysis. Other forms of test-item analysis are available depending upon the application used or the sophistication of the analyst. The three types of analyses discussed and required for use are: difficulty index (P), discrimination index (d), and effectiveness of alternatives. Each analysis technique will be discussed in the paragraphs that follow. Additional means to identify flawed tests and test items are also discussed in this chapter. This chapter addresses areas to investigate, beyond the test, should analysis indicate there is an issue. Completion of the test-item analysis will be recorded. Because test-item analysis data may contain the test key; ensure proper security measures are in place.

11.1. Test-Item Analysis Guidelines. Procedures may vary between courses, but the following general guidelines apply.

a. Analyses are conducted from student answer sheets. The recommended sample size is 100. Smaller sample sizes will be necessary when class size and number of course convening's dictate. Since variability is more profound in small samples, be mindful when analyzing small samples, such as a C-School. When the answer sheets have been collected, conduct the analysis manually or with computer assistance utilizing the NETC LAS. See Appendix G for amplification or other analysis tools with prior NETC approval.

b. Record the date that the test was administered. This information may be maintained manually or using an automated program. Historical data is used to study trends in order to make decisions about test items over time. For example, if the difficulty index of the test item suddenly changes, testing personnel will investigate possible causes for the change. If the difficulty index of a test item has changed to indicate diminished difficulty, it may have been compromised. If an easy item suddenly becomes very difficult, it may mean instructors are not teaching effectively or the student's prerequisite knowledge is not sufficient.

c. The frequency with which analysis is conducted may vary. While 100 answer sheets are the recommended number to use for analysis, this may not always be possible or practical.

d. If a course has a high student throughput, conducting an analysis for every 100 answer sheets may be too time consuming. If this occurs, testing personnel may be able to conduct a monthly analysis until the items are considered stable. Once stable, the analysis can be conducted on a quarterly basis. The use of automated analysis will reduce workload for courses with high throughput.

e. If a course has a low student throughput, it may take several years to collect 100 answer sheets. For courses with low student throughput, the entire sample may be used to calculate the difficulty index, discrimination index, and effectiveness of the alternatives. These courses may also use the 50% missed rule. With this method, each test item that is missed by 50% of the students is reviewed for possible problem areas.

f. Test-item analysis is a feedback loop to monitor test performance over time. If a change in a trend is identified appropriate action(s) will be taken.

g. If a test item is revised, analysis of that test item must be performed as if it is a new test item. Future analysis of the revised test item will allow adjustments as necessary.

h. After the test items are analyzed, the next step is to make decisions based on the data. See Section 11.3, Post Test-item Analysis Considerations for more details.

11.2. Techniques for Test-Item Analysis. There are three techniques recommended for test-item analysis: difficulty index, discrimination index, and effectiveness of alternatives. The following paragraphs provide a description of each technique.

11.2.1. Difficulty Index (P). A calculation of the difficulty of the test item. If the item does not have the correct degree of difficulty, then it will not effectively differentiate. The acceptable range of difficulty for technical training is 0.50 to 0.90 for a test in which 63% is passing. If the minimum passing score is higher (e.g., 70/75/80%), the acceptable range will be adjusted (e.g., between 0.60 to 0.95).

a. To calculate the difficulty index (P), take the complete sample and use the following guidelines:

(1) Count the total number of correct answers (Nc) and divide by the total number of students taking the test (N).

(2) For test items that can award partial credit (Nc), sum the student scores and divide by the number of students taking the test item (N).

(3) The formula P = Nc / N results in a proportion or decimal (P) that becomes the index of item difficulty.

(4) The higher the index, the easier the item. If the item is answered correctly by everyone, the index would be 1.00. If no one answered it correctly, the index would be 0.00. For 150 answer sheets, where 100 answers were correct, the difficulty index would be as follows:

P = 100/150 = 0.66

(5) Based on the limits, this item would be considered acceptable.

b. Sometimes a difficulty of 1.00 may be desirable. This normally occurs in the area of safety where the goal is for everyone to answer the item correctly.

11.2.2. Discrimination Index (d). Compares the performance of otherwise high achieving and low achieving students on a specific test item. The main use of the discrimination index is to note questions that may be misleading or have more than one correct answer.

a. **Calculation of the Discrimination Index.** There are two ways to calculate the discriminationi. Both ways look at the high and low achieving students which are generally defined as the upper and lower 27% based upon the test's scores.

(1) **Use of Decimal Percentages.** With this method, the discrimination index is the difference between the percentage of points achieved on the test item by the high achieving students (H%) and the percentage of points achieved on the test item by the low achieving students (L%).

For example. We are analyzing 130 tests. 130 * 0.27 = 35.1, so the 35 top performing students and the 35 poorest performing students on this test will have their answers to the specific test item analyzed. Let's say our test item under consideration was a 15-point essay question. If the top performing group achieved a total (e.g., sum) of 451.5 (partial credit awarded) out of the possible 525 points this group could have gotten (15 points * 35 in the group = 525), then their H% = 451.5/525 = 0.86 x 100 = 86%. If the bottom group scored a total of 357 points on the question, then L% = 357/525 = 0.68 x 100 = 68%.

The question's discrimination index, d = H% - L% = 86% – 68% = 18% / 100 = 0.18.

(2) **Use of Numbers.** This technique only works where student answers are assessed as only all right or all wrong – no partial credit. Start by arranging the students with the highest overall scores at the top (descending). Then count the number of students in the upper half (50%) and the lower half (50%) who got the question correct. To find discrimination index (d), subtract the number of students in the lower group (Lc) who got the question correct from the number of students in the higher group (Hc) who got the question correct. Finally, divide that result by the number of students in the groups. Table 7 shows an example of a class with 10 students (5 in the upper half and 5 in the lower half).

Table 7: Use of Numbers (Example)

Test Item	# Correct (Hc)	# Correct (Lc)	Discrimination Index (d)
Question 1	5	5	0.0
Question 2	0	4	-0.8
Question 3	5	2	0.6

For example, (Question 3): d = Hc – Lc = 5 – 2 = 3 / 5 = 0.6

- For question 1 if 5 of 5 students in the lower group and 5 of 5 students in the upper group answered the question correctly, the discrimination index is 0.0.
- For question 2 if 4 of 5 students in the lower group and 0 of 5 students in the upper group answered the question correctly, the discrimination index is -0.8.
- For question 3 if 2 of 5 students in the lower group and 5 of 5 students in the upper group answered the question correctly, the discrimination index is 0.6.
- You expect higher achieving students to answer a question correctly more often than lower achieving students. If true, this would result in a positive d between 0 and 1. If you determine that lower achieving students answered the question correctly more often than the higher achieving students, this will result in a negative d between -1 and 0.

- CSs may determine what is desirable for their course (e.g., 0.0 – 0.25 is weak discrimination and above 0.25 is stronger discrimination). If the result is a negative d than the question is likely misleading or has discriminators that may also be correct. Figure 11-1 shows an example of an acceptable and satisfactory discrimination index.

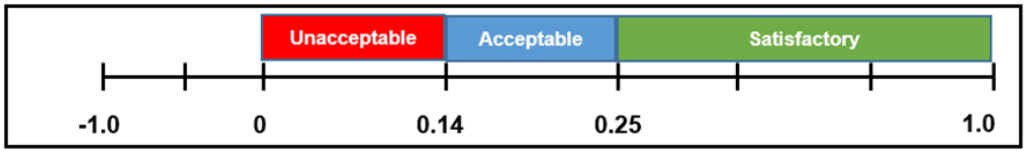

Figure 11-1: Discrimination Index (Example)

11.2.3. Effectiveness of Alternatives. The effectiveness of alternatives is used for multiple-choice test items.

a. The multiple-choice test item is only as good as its alternatives. If the incorrect alternatives are illogical, not plausible, or absurd, the student may be able to select the correct response without knowing the material.

b. The Effectiveness of Alternatives shows the number of students selecting each alternative within the high and low score groups. The steps are as follows (this is often done by an LAS):

(1) After sorting the answer sheets from highest to lowest score, select the highest and lowest scoring 27% percent of students.

(2) Count the number of students in each group (41) that selected each alternative. For example, refer to Table 8, below in which “b*” is the correct answer.

Table 8: Effectiveness of Alternatives (Example)

Question 1	(a)	(b)*	(c)	(d)	Total
High 27%	0	18	16	7	41
Low 27%	1	12	14	14	41

(3) Alternative "a" may need to be improved. It is ineffective as an alternative since it was selected by only 1 of 82 students and none of the high scoring group.

(4) Alternative "c" is deceiving to both groups. It may be an alternate correct answer. This item can be improved by making this response less plausible.

11.3. Post Test-Item Analysis Considerations. After the test items are analyzed, the next step is to make decisions based on the data.

a. First, determine which items do not fall into the acceptable ranges of the indexes below. Each item is then reviewed by asking several questions:

   (1) Is the test question aligned to LOs?

   (2) Is the answer correctly keyed?

   (3) Do grading criteria accommodate all acceptable answers?

   (4) Is the question clear to the student?

b. If the test item is determined to be sound, the next step is to review the instructional material.

   (1) Is the information correct?

   (2) Does the material in the SG support the information in the IG?

   (3) Does the information in the technical manual support the material in the IG?

c. If the instructional material is correct, evaluate the classroom instruction.

   (1) Was the material taught correctly?

   (2) Did the student receive practice prior to testing?

   (3) Was there adequate time allowed for review and summary of the material?

   (4) How effective was the instructor in the delivery?

   (5) Can the poor performance of the test item be tracked to a specific instructor?

d. Once all the information has been reviewed, three possible actions may occur.

   (1) The test, instructional materials, and/or CMS may require a change.

   (2) Some areas may be corrected through instructor IST. This can be technical or technique in nature.

   (3) No change is made until more data is collected.

e. Job sheets, essays, and case study test instruments almost always require a checklist, grading scale, and/or rubric. First, check the reliability of the grading scale. Once it is determined that the checklist, grading scale, and/or rubric is reliable, student responses can be analyzed. One problem with

checklists, grading scales, and rubrics is that different raters often make different judgments about the same performance. These differences or grading errors can be classified into four categories:

(1) **Error of Standards.** Errors are sometimes made because of differences in different raters' standards. If rating is done without any specified standards, there may be as many different standards as there are observers. This is why it is important that grading scales, checklists, and rubrics be "anchored" with descriptions of the behaviors for each value on the grading scale. The more complete these descriptions are, the better the inter-rater reliability.

(2) **Error of Halo.** A rater's ratings may be biased because they allow their general impression of a student to influence their judgment. This results in a shift of the rating and is known as a "halo" effect. If a rater is favorably impressed, the shift is toward the high end of the scale. If the rater is unfavorably impressed, the shift is toward the low end. This type of error frequently goes undetected unless it is extreme. It is therefore a difficult error to overcome. Error of Halo is reduced by reminding each rater that they are judging specific performances and must not take into consideration their overall impression of the student.

(3) **Logical Error.** A logical error may occur when a rater uses a series of grading scales. When a rater tends to give similar grades on scales that are not necessarily related, they are making a logical error. The way to minimize logical errors is to make clear the distinctions among different performances or aspects of a product that are to be measured. Again, behavioral "anchors" help.

(4) **Error of Central Tendency.** An error of central tendency is demonstrated when different raters tend to rate most students near the middle of a scale. If a scale has seven points and there are a large number of "4s" from the raters, they may be making this error. One way to counter this is to use scales with an even number of points (so there is no middle point). Also, behavioral "anchors" help.

f. Grading scales and rubrics are used in tests that involve decisions that are more complicated than "SAT or UNSAT." It is important that different raters use the scale in the same way.

Table 9: Rubric Score Results (Example)

	Rater #1	Rater #2	Rater #3	Rater #4
Item #1	4	4	4	4
Item #2	3	4	4	3
Item #3	2	1	2	1
Item #4	2	4	1	4
Item #5	3	4	4	4

(1) Using the example in Table 9 and by looking across a row, the scores that the different raters gave each student can be compared. For item 1, there is perfect agreement among raters. For items 2, 3, and 5, there is some disagreement and for item 4, there is considerable disagreement. A good guideline is that, if most raters agree and the raters who disagree are only off by one point on a scale, the grading scale is reliable. However, if there is no majority agreement or if raters differ by 2 or more points on the scale, a review is necessary. The grading scale or rubric must be checked to make sure that the "anchoring" statements are as clear as possible and the instructions to scorers will be checked to make sure they are not misleading some of the raters. Do this with the raters because they can state their interpretation of the test instructions.

(2) Checklists will be treated in the same way as grading scales and rubrics, except there are only two possible scores, SAT or UNSAT. Again, different raters will be compared with each other to determine if there is substantial disagreement. If so, the checklist and instructions for scorers will be reviewed.

(3) Since essay and case study test items are best scored using checklists, grading scales, and/or rubrics for major points in the answers, the procedures described above are applicable.

11.4. Test-Item Analysis for Selected Response Items. Analyzing the individual test item is only part of the analysis process. Individual test items may appear acceptable, but when placed together on the test, they may not accomplish what the test was intended to do. This section provides some guidelines to consider when conducting test analysis.

a. Content validity is achieved when a test measures the achievement of objectives. Tests must have content validity prior to conducting test-item analysis.

b. Validation requires a list of the number, type, and knowledge levels for all test items in a course. If a test was designed properly, there is a greater chance that the test has content validity and is therefore measuring the objectives of the course to the level identified. Reviewing the test design periodically is another method to evaluate the effectiveness of the test.

11.5. Cueing for Test Item Review. So far, statistical methods for "flagging" items that may be flawed have been described. There are other, less formal, follow-up methods for reviewing items, which can be used to correct these flaws. These methods are discussed below.

a. **Feedback from students.** Feedback can be extremely useful in identifying flaws during pilot testing. Interviews with students and reviewing student critique forms after the pilot test may be illuminating. When interviewing, have students "walk through" their thinking as they respond to items. Note difficulties with instructions or with test items, time pressures, problems with equipment or facilities, misunderstandings of standards or scoring, and other points of confusion. Conduct this review orally with individual students, because it is possible to ask follow-up questions to pinpoint the source of problems. Use of student critique forms must be a standard procedure in the pilot test process.

b. **Peer Review.** Another useful technique is to have experienced CDs review the test items.

c. **Review by Test Evaluator.** The LS or DET FLSO/FTS, and/or testing officer are responsible for quality control. They will have their own procedures for review and revision of tests and their own sets of criteria that tests must meet.

d. **Review by SMEs.** Always obtain and retain reviews of your test items by SMEs. They must be asked to check the items for technical accuracy and to note items that are confusing or misleading.

e. **Review of Practice Test Items.** If practice test items completed by instructed students are available, they can be used to help review test items. Since practice test items should be similar or identical to the test items, performance on practice test items can be compared to performance on related test items. If there are major differences between performance on practice and related test items, the items will be reviewed using the procedures described in this section.

f. **Additional Considerations:** Some additional things to look for are inadequate instruction, long delays between initial training and testing (which could result in knowledge decay), practice items and test items that are inconsistent, and inappropriate sequencing of instruction, such that practice items occur before a proper instructional foundation has been laid.

11.6. Test-Item Analysis Total Quality Indicators. TQIs will be recorded for each course's testing program to help determine trends, including a summary of student performance. This may be compiled by objective, test, module, section, etc., and may contain the following information:

a. Number of attempts/retakes.

b. Number of students with passing scores.

c. Average score.

d. Number of students successful on the first attempt.

e. Summary of the results of the test-item analysis.

f. Summary may include the number of courses conducting test-item analysis, the frequency of the analysis, problems encountered of a general nature and actions taken.

11.7. Automated Test-Item Analysis. NETC's goal is that tests and test item analyses be an automated process which will greatly improve the analyses. NETC's LAS provides an automated analysis capability.

11.8. Course Maintenance. Course maintenance is a term used to describe a process of making corrections to a course. The Plan, Analyze, Design, Develop, Implement, Evaluate and Maintain (PADDIE+M) process, course development, modernization, acquisition, and pilot are defined in NAVEDTRA M-142.3, and course assessment and sustainment are defined in NAVEDTRA M-142.5. Regarding testing, course maintenance starts after the test-item analysis has identified changes required to the course testing materials. Input or feedback from other source(s) (e.g., publication updates, equipment modifications, etc.) can also drive changes to the course testing materials. Testing program maintenance includes, but is not limited to:

a. Test-item analysis.

b. Publication updates or equipment modifications.

c. Instructor feedback or evaluation.

d. Student end-of-course reaction surveys.

CHAPTER 12
REMEDIATION PROGRAM

12.0. Introduction. The primary goal of all Navy instruction is to enable students to meet the objectives of training to better serve the Fleet and America. Remediation is necessary because not all students will accomplish critical LOs or understand the material during normal classroom time. When this occurs, the student's instructor must intervene as soon as possible to identify and address the obstacle preventing the student from succeeding. A remediation program's primary goal is to motivate and assist students in achieving the critical LOs of a course by providing additional instructional study time. The intent of remediation programs is to motivate students by providing structured opportunities to address their weaknesses, get personalized support, and to experience a sense of accomplishment. A second goal is to remove barriers to learning. Because students learn in different ways, it may be necessary to use different methods of remediation to realize the most effective results.

12.1. Remediation Program Guidelines. Remediation is a plan to identify and address problems a student may be facing in their training. Remediation is sometimes necessary because not all students will accomplish critical LOs or understand the material during normal classroom time. Remediation is designed to assist students who need extra help grasping key concepts or accomplishing critical learning/performance objectives. Remediation programs have two goals. The primary goal of remediation is to motivate and assist students in achieving the critical LOs of a course by providing additional instruction, study time, and practice. The second goal of remediation is to remove barriers to learning. The following guidelines apply to the development and implementation of a remediation program.

a. Remediation programs will address common instructional challenges such as:

   (1) Poor student performance on any formal assessment instrument (pretests, tests, homework, labs, etc.).

   (2) Formal or informal determination that a student is struggling with achievement of one or more LOs.

   (3) What to do when a student does not successfully complete remediation.

   (4) Whether/how ARB procedures apply to the course.

b. Remediation may be assigned for several reasons; the common element is that an instructor determines that the student is at risk for not achieving course LOs.

c. Remediation can be recommended by an instructor and approved by the CS or directed by an ARB.

d. Remediation may be voluntary or mandatory.

e. Remediation occurs outside the normal training day.

f. Remediation will be used to assist and motivate students in the learning process.

g. Remediation will not be used for disciplinary purposes. When students placed in remediation are made to feel like failures or see remediation as a form of punishment, remediation may become ineffective. Remediation will be presented in a positive manner.

h. Instructors will approach remediation as a means to provide additional help for those students that need or request it.

i. Remediation is an important part of a student's success, therefore instructors (SMEs) in the subject area that a student is having difficulty will be present during remediation.

j. Remediation and retesting procedures will be described in each course's testing plan.

12.2. Remediation Program Roles and Responsibilities. The following is a list of NETC's LS, DET, and participating activity remediation program roles and responsibilities. This list is not directive in nature as some LSs will not have the personnel to fill all these positions. This is an example that can be determined by the CCA.

a. CO/OIC

(1) Manage remediation programs.

(2) Manage ARBs.

b. FLSO/FTS

(1) Establish policy and guidance for remediation programs.

(2) Monitor remediation program effectiveness.

c. CS

(1) Implement and sustain the remediation program.

(2) Execute command guidance on the remediation program.

(3) Ensure that a SME, in the subject area that is causing the student problems, is available during remediation.

(4) Ensure policies on convening ARBs are followed.

(5) Assign ARB membership and roles.

(6) Recommend approval/disapproval of ARB recommendations and forwards to the chain-of-command.

(7) Implement the results of the ARB.

d. Instructor

(1) Conduct remediation for students.

(2) Recommend students for ARB/remediation to CS.

(3) Serve as a SME during remediation, as determined by the CS.

(4) Serve as an ARB member, if designated by the CS.

e. ARB. Refer to Section 12.11.

(1) Determine the reason for the student's problems in learning the material.

(2) If the reasons are non-academic, refer the student to help for those problems.

(3) Determine the method of remediation necessary for the student to successfully complete the LO.

(4) Provide recommendations for the student's remediation and retest, and whether the student will continue with the class, be set back, or dropped and re-classified.

12.3. Student Counseling. Counseling must be instituted in A and C-Schools and will include counseling for performance and personal problems.

As an instructor, it is crucial to implement the Navy's Warrior Toughness program into your classroom environment when giving informal coaching, mentoring, and counseling. It is also important to note that you must uphold these areas in your own life as well. Again, you are the example, make sure you reiterate to the student the importance of training to be prepared, how to properly execute, and how to properly reflect. You can incorporate these principles as part of your informal coaching and counseling of students.

12.3.1. Training to be prepared. If the student is struggling in other areas besides training, make sure to ask them what they are doing to take care of themselves. Are they exercising to energize their mind body, and spirit? Students need to be fit, if not, they will likely struggle in other areas of their life and other areas of their health.

It is also crucial to create a training environment that emulates the actual job environment as closely as possible, and if not, the context is highlighted and the importance of seeing the link is stressed. As has been discussed a lot in this manual, it is important to set an example for students. You want them to see you as the textbook example of what "right" embodies.

12.3.2. How to properly execute the job. When you are teaching your students, make sure to instruct them on how to consistently adapt to the demands of the job they are being trained to do. Remember, as the instructor, you have been identified as a SME. You also want to leverage your real-world experience to describe what the students need to do to maintain situational awareness when carrying out the duties of their job.

12.3.3. How to properly reflect. As an instructor, you must encourage your students to always reflect and engage in the metacognitive process (in other words, think about their own thought processes). Help them understand their thought process if they are not understanding a topic.

12.3.4. Counseling

a. Preventative counseling helps to solve a problem before it results in reduced learning capacity or course failure. Preventative counseling may recommend remediation and, in some cases, an initial academic setback for a student who is having difficulty achieving the LOs.

b. Preventative counseling requires early identification of personal and performance problems and the instructor's awareness of available resources. During the student's training, the instructor must be proactive in the identification of student problems. Every effort will be made to:

(1) Review Armed Services Vocational Aptitude Battery (ASVAB) test scores.

(2) Review records for previous training difficulties.

(3) Determine the level of prerequisite knowledge and evaluate the student's ability in note taking, study habits, and testing skills.

(4) Identify any motivation issues that may exist. Talk to the student to identify the specifics of the problem.

c. As the course progresses, performance counseling may be required to prevent difficulties that could lead to being dropped from the course. The instructor must be aware of such things as:

(1) Inconsistent study habits.

(2) Poor performance on tests.

(3) Declining grades.

(4) Lack of motivation.

(5) Inappropriate conduct (e.g., sleeping in class, excessive tardiness, failure to complete assignments, and lack of attention to classroom or lab activities)

d. Each LS will establish guidelines for the identification and resolution of student difficulties. The other aspect of preventative counseling is the counseling of personal problems that impair the student's ability to concentrate on the job of learning. When a personal problem is suspected, the instructor will:

(1) Talk to the student to identify the specifics of the problem.

(2) If unable to assist the student, refer the student to another agency via the chain of command.

(3) Follow-up on the student's status.

e. Instructors are not trained to counsel students on serious personal problems. Problems of a serious nature must be referred to special counseling programs such as a Navy Chaplain, Navy Fleet and Family Support Center, Drug and Alcohol Counselors, Red Cross, or Navy and Marine Corps Relief Society.

f. In any type of counseling situation, instructors must establish an atmosphere that encourages the student to seek help when problems occur.

g. The instructor must make the students aware of the proper chain of command when seeking assistance for their problems.

h. Instructors will conduct counseling sessions with the students as soon as problems or potential problems occur. Often students will respond favorably to an encouraging word or a clarification of training materials.

i. Each counseling session will be recorded in the student's record.

12.4. Class Remediation. A test review with the students will take place immediately following each performance and knowledge test. It is important to provide students with immediate test feedback and give them their grade prior to reviewing the test. The review is a metacognitive opportunity for the students to ask questions about the test items or steps in a procedure that they did not understand or that they forgot to execute (or executed incorrectly).

When reviewing tests, do not review specific test items and their respective answers. This would compromise the security of the test. Instead, review the results of the test. Remember that test items are linked to LOs, so focus on review of LOs and not specific test items.

12.5. Remediation Methods. Three types of remediation are available to instructors. The type of remediation is determined by the magnitude of assistance the student needs. Methods used are largely dependent upon the degree of assistance a student may need to demonstrate the requisite skill or knowledge. All remediation methods direct student action(s) to correct the deficiencies, established timeframes to complete the action(s), and identify SME engagement opportunities.

a. **Targeted Remediation.** When a student is having difficulty in accomplishing an objective and/or understanding the material within the prescribed course schedule, remediation targeted to correct the demonstrated weakness using directed study, computer-based instruction, and/or lab material may be sufficient.

b. **Scalable Remediation.** When a student is having difficulty in accomplishing several objectives or understanding the material for a major portion of a course a broader method is necessary. This method will use a total recall approach, employing tools such as text, flash cards, lab material, and SME question and answer sessions. This remediation method is broader than targeted remediation and takes more time to accomplish but it is likely to be more effective for students with difficulties on multiple objectives.

c. **Iterative Remediation.** When a student is in jeopardy of not completing a course due to extreme difficulty in accomplishing objectives or understanding the material for a major portion of a course, a more exhaustive approach is necessary. The tools applied in scalable remediation are applied in an iterative manner such that the student has more opportunities to understand course material. This method takes significant time and SME involvement.

12.6. Remediation Strategies. Not only is it important to know what to look for, it is also crucial to quickly intervene when you notice a student struggling. These two abilities are

secrets to every successful remediation. There are triggers that will alert you to the need for intervention. Be ready to act when you see any of the following behaviors from your students:

a. Failure to respond in class.

b. Constantly asking classmates for help.

c. Failing informal quizzes.

d. Not completing homework assignments at all or not completing them correctly.

Because students learn in different ways and each situation is unique, you may need to use a variety of remediation methods to help your students achieve the critical learning or performance objectives. Common remediation techniques include additional study, various forms of practice, and special presentations.

12.7. Remediation Considerations and Techniques. While remediation is a necessary element in training, to be effective it must be aligned to the students' needs with consideration to the course schedule. The time spent on remediation is based on the student's needs and remediation method. Students may spend one hour to several hours in remediation. Instructors, CSs, and ARBs must consider how fast new material is introduced in the course. Fast-paced courses require a correspondingly aggressive remediation process. It may be necessary to remediate the same day as a test failure with a retest prior to the next instructional day to ensure the student does not fall behind. This is not conducive to long-term retention. Refer to Section 3.0 for techniques to increase retention such as interleaving to weave in material and problems from previous training material, to help improve the transfer of knowledge and skills.

a. **Remediation Environment.** The remediation environment structure must be formal, with established written guidelines for a student on specific study areas. A quiz may be administered during remediation to evaluate student performance. Grades on a quiz may be recorded in the student's record but will not be part of their course grade.

b. **Determining When to Assign Remediation.** Determining when a student is assigned remediation is an LS responsibility; however, typically it results from a student counseling session. Before assigning remediation, the student's difficulty must be determined to select an appropriate remediation method.

c. **Teaching Techniques for Remediation.** Because students and situations are unique, LC and LS training staff must be creative in providing remediation. The

following are examples of different teaching techniques that may be used during remediation:

(1) **Self-study remediation packages.** Packages may be developed that contain additional problems, readings, or questions for the student to answer. This type of remediation material will be developed for areas that have historically exhibited a high failure rate. For example, if students normally have difficulty with transistor theory, additional remedial materials must be developed to provide specific areas of study for students.

(2) **Mini lectures.** Lectures may be prepared for the areas of the course with high failure rates and delivered to students. They are not a re-teach of the lesson but rather short lessons on very specific subject matter presented by instructors certified to teach the material.

(3) **Video lessons.** Videos may be created for use by students during remediation. This does not mean that an entire course can be placed on video. These videos allow students to stop and rewind the video as needed to follow along. Lessons that are videoed will be those that historically cause the students difficulty. When this method is used, the videos will be cataloged so students can find the specific area needed for remediation.

(4) **Flashcards.** Flashcards may be created for use by students during remediation. Flashcards can be electronic, in an app, or hard copy, and are useful when trying to learn the meaning of terms, facts, and mnemonics (a device used to assist in memorization of strings of information (e.g., PADDIE+M)). While flashcards are good means or remembering terms and definitions, they are not beneficial for learning complex concepts.

(5) **Quiet study.** Quiet study is best suited for students with good study habits who have little difficulty in attaining the LOs. Normally this type of remediation is used for students that are capable of self-directed study and will need little help from the instructor.

(6) **Computer Based Training.** Computers and other electronic devices may be used to provide additional instruction and/or practice. These devices do not replace an instructor in the remediation process. Instructors must be available to make decisions on what materials will be used for remediation and to clarify or augment the electronically delivered remediation. An example of this technology is computer-based scenarios and troubleshooting simulations.

12.8. Retesting. To complete remediation for a test or critical objective failure, students must successfully complete a retest. As with remediation, retesting procedures are also affected by the criticality of the objectives. Retests may cover the portion of the test the student had difficulty with or the entire test, depending on the appropriate situation. The following guidelines assist CSs/Instructors in preparing retests targeted to the area(s) where the student is having difficulty to ensure that they understand the material before proceeding with a course.

a. Retesting will occur as soon as possible after remediation. Prolonging the completion of remediation and retesting may cause the student unnecessary difficulties with new lesson material. Retesting may take the form of a written or an oral retest. The decision is based on the individual situation and is at the discretion of the LSO/FLSO/FTS depending on LS manning or CCA direction. An alternate version of the test will be used.

b. When a test falls on the last day of training and remediation is not possible, students will be administered a retest of the material either orally or by written test. If the retest is failed, the A or C-School student will be referred to an ARB. For all other types of courses, supervisory personnel above the immediate instructor will make the recommendation to dismiss, setback, or graduate the student.

   (1) If it is determined that the student has failed to achieve the course objectives, the student will not be given credit for completion of the course and will be considered an academic drop.

   (2) Documentation must be made in the member's service record indicating the student attended training and whether they did or did not graduate.

c. The CCA/CCMM and FLSO/FTS are responsible for the development of procedures for remediation and retesting. If a student fails the retest, further interventions may be prescribed, or you may need to try different teaching methods. All remediation and retesting procedures will be described in the testing plan for the course.

12.9. Setbacks. A setback occurs when a student is unable to complete remediation and the training in the designated time allotted for a course. Because setbacks are costly, they must be granted only after other methods of remediation have been

attempted and/or there is an indication that a setback is in the best interest of the Navy and the student.

a. Academic setbacks for A and C-School students will be approved by the CO/OIC as a result of a preventative counseling session and only after lesser methods of remediation and retesting have been used with inadequate results. Subsequent academic setbacks will occur only because of an ARB recommendation. All decisions to academically setback a student from other type courses (e.g., D and G) will be based on a decision by the LS's CO/OIC. Students designated as academic setbacks should normally be set back to the portion of the course for which they have not achieved the LO(s). If, because of scheduling the course, they must be set back further and may repeat some items, it may be helpful but their original grades for those areas will stand.

b. Non-academic setbacks may occur when the student is unable to complete the material due to illness or special circumstances outside the control of the course or student. The decision to set back non-academically is an LS training director decision and is approved by the LS CO/OIC. If the decision is to set back, the LS training director will also decide if an ARB must be held to determine any academic impact.

c. LS CO/OIC, FLSO/FTS, and CSs are responsible for evaluating the causes of setbacks and taking action to lower this rate without lowering training standards.

d. When a student is setback, the CS will inform student control so the appropriate personnel event (PEVT) code can be found or used to support the student control office (SCO) for input into the current NETC SIS.

e. If a student in a high-risk course is set back due to a medical problem, which may result in future problems while in training, procedures will be in place to notify the instructor(s) of the medical problem.

12.10. Drop from Training and Attrite. CCMMs, training directors, FLSOs/FTSs, CSs, and LSOs are responsible for tracking and evaluating the causes for drops from training and attrition from the Navy. If through the monitoring process, it is determined that drops from training or attrition is a problem, a training analysis will be conducted by designated LS/LC personnel and reported to the LC DOT.

a. Academic drops or non-graduates occur when a student is unable to achieve the LOs because of an academic problem, such as lack of classroom or

laboratory ability. Decisions to academically drop a student will be because of an ARB action. For further details, refer to Section 12.11, ARB in this manual.

b. Non-academic drops or non-graduates are based on administrative decisions that are not a result of academic performance. The convening of an ARB is not required. Examples of non-academic drops include administrative, disciplinary, motivational, medical, physical, fraudulent enlistment, and convenience of the government. For some non-academic drops, a higher authority will direct the action.

c. Disenrollment or non-graduation is based on administrative decisions beyond the control of the LS and are a result of higher authority direction or pre-service conditions. Examples of disenrollment include deactivation of a class or course, rating or program conversion, incomplete training as requested by the member's command or higher authority, and the inability to meet prerequisites (medical, physical, academic, and/or security).

d. Attrition is defined as a loss to the Navy. Sailors who are disenrolled, reclassified, or reassigned are not considered attrition. A Sailor will be coded as "attrite" only after official notification is received to that effect.

NOTE: NETCINST 1500.13F provides specific guidance concerning Page 13 service record entries for students dropped from high-risk training and provides guidelines concerning student monitoring criteria following a drop on request action.

e. When a student is dropped from training or attrited from the Navy, the appropriate CS will inform student control so the appropriate PEVT code can be used to support the SCO for input into the NETC approved SIS. The SCO is responsible for ensuring timely updates to disposition codes when final disposition becomes known.

f. As with setbacks, a drop from training and attrition is costly. Every effort will be made to maintain drops from training as low as possible without lowering training standards. NETC N7 will monitor drop from training and attrition trends, both academic and non-academic.

g. Total drops from training, attrition, and setback rates for a course will be analyzed and summarized as a TQI.

12.11. Academic Review Board. Despite our best efforts, learning does not always occur as intended. Some learners have obstacles in their progress that take specific processes to uncover. The ARB process handles non-disciplinary problems related to a student's

academic progress. The ARB is often the last chance that Navy instructors have to keep students in the course and enable them to successfully meet the learning and performance objectives and graduate from the course. The ARB is designed to identify whether a student can satisfactorily complete the training. Knowing the purpose and operation of the ARB will help Navy instructors utilize it to best serve the needs of both the student and the Navy. The ARB is an extension of the student-counseling and remediation programs. It is based upon the philosophy that decisions concerning the student's disposition in training are better arrived at by a group acting together as a board rather than by an individual acting alone. The following guidelines will be followed for ARBs:

a. ARBs will be established at all training activities that conduct A or C-School training. Training activities that provide other types of training will establish ARBs as directed by the CO or OIC.

b. ARBs will be convened when other means of academic counseling, remediation, and an initial academic setback have failed to improve student performance. The initial academic setback may result from an academic counseling session and be recommended by the CS. Additional academic setbacks must be recommended by the ARB and approved by the LS chain of command as directed by the CCA. Examples of when an ARB may be necessary include the following:

   (1) Student's performance is below expected academic progress.

   (2) Student’s course average falls below the minimum passing grade.

   (3) Student is unable to achieve the objectives after counseling, remediation, retesting, and an initial academic setback.

   (4) Student fails to achieve the objectives after an academic setback on those same objectives.

c. Students will continue with class until an ARB decision has been made or recommendation approved.

d. Students enrolled in Class A and C-Schools will be academically dropped from training only because of an ARB recommendation.

e. Administrative procedures resulting in automatic drops or setbacks are not authorized. If an ARB is convened for test failure, the student will be remediated and retested on failed material prior to the convening of an ARB.

f. Possible ARB decisions include:

(1) Continue with Class (CWC) - allows a continuation of training in the present class with or without remediation.

(2) Setback allows an extension of training with or without remediation. Test scores and interviews should indicate an ability to achieve the LOs after repeating the portion of the training that was not successfully completed. If remediation can be achieved in any way other than setback, it will be considered first.

(3) Drop from training - results in a recommendation for disposition.

(a) When recommending a drop from training, the student must demonstrate unwillingness or an inability to continue the training.

(b) Attention must be given to the student's desire and eligibility for reclassification when the board makes the decision to recommend drop from training.

(c) All ARB recommendations for reclassification or attrition must be forwarded to the CO or OIC for final approval.

g. All ARB recommendations for international military students will be referred to the International Military Student Officer (IMSO).

12.11.1. Academic Review Board Procedures. Standardized procedures for conducting ARBs are essential to protect an individual’s right of privacy and fundamental fairness, to ensure accurate and complete records are kept, and to ensure that the best decisions concerning a student's academic progress in a training program are made.

a. The goals of an ARB include:

(1) Help students solve problems that may prevent successful completion of training.

(2) Determine which students are unable and/or unwilling to complete training.

(3) Make recommendations concerning their findings.

b. All ARBs will be composed of a chairman and at least two additional members. For commands with only one or two assigned instructors on location, establish a partnership with other local training commands to support the ARB. The recommendation from an ARB is a consensus from its members.

c. The chairperson will appoint one of the members to serve as recorder. The recorder will be responsible for completing the necessary paperwork.

d. For international students the IMSO will be a member of the board.

e. Other ARB members may be chosen from instructional personnel.

f. At least one ARB member is a certified instructor in the area in which the student is having difficulty.

g. Supervisory personnel who have command designated authority for approval or disapproval of ARB recommendations may not sit as members of the ARB.

h. Membership need not be permanent, but all members must meet the following requirements:

(1) Complete IST for ARB.

(2) Understand the activity's policy for drop from training, attrition, and pipeline management.

i. Duties of an ARB include:

(1) Review information contained in the student's performance records prior to the ARB (e.g., Corporate Enterprise Training Activity Resource Systems).

(2) Scores, course test records, counseling sheets, previous Navy training records, and Navy military training (NMT) records).

(3) Conduct an ARB interview with the student.

(4) Make recommendations for disposition and any necessary corrective action based on group consensus.

(5) Complete necessary administrative actions.

j. When conducting an ARB, the following procedures will be adhered to:

(1) All procedures will be conducted with respect for the privacy of the student.

(2) While the ARB is a serious, official board, the members will exhibit a presence that is cordial and supportive.

(3) All participants will be seated, and the proceedings will be conducted in an open and professional manner. The board chairman will explain to the student that the board has been convened to help the student

determine why they are having difficulty. Once the cause has been identified, the board and the student, working together, will develop a plan for success.

(4) The chairman will also inform the student that they have the right and duty to speak.

(5) Before a decision concerning the student can be made, the ARB will review records and interview the student to find information such as: area of difficulty, type and result of remediation applied, student attitude and personal problems.

(6) To avoid excessive notes being taken by the recorder, the student may provide written responses to typical questions asked during an ARB prior to convening the board (e.g., Why are you having difficulty? Where are you having problems? Are there any personal problems that are preventing you from doing your job? Do you want to remain in this course?). The board may then discuss these with the student. The board is not limited to these questions.

(7) In addition to questions of a personal nature, the board will assess the student's academic performance by asking questions specifically related to the course material. Since the board is tasked with looking at academic issues, it is important to know just how much difficulty the student is having and where that difficulty is occurring. Test scores do not always indicate the student's level of expertise.

(8) The chairman will make clear to the student what the recommendation is, what consequences may result from the approval of that recommendation, and what actions are expected of the student.

(9) The student will be given the opportunity to make a written statement. If the student does not wish to make a written statement, the student will sign a statement to that effect.

k. For A and C school students taught by civilian instructors, the NMT personnel will be notified prior to convening the ARB. This allows NMT personnel time to provide input to the board.

l. When an ARB is convened, all proceedings will be documented. Documentation will include an ARB Record and, if appropriate, a Student Drop Record. The ARB Record is a locally developed form that contains the following minimum information:

(1) Student data (name and rate).

(2) Course data.

(3) Board action data (CWC with or without remediation, set back, drop from training).

(4) Signatures of board members.

(5) Final action taken with signature of authority.

(6) Title and date of final approving officer.

(7) Student signature line.

NOTE: Ensure the appropriate controls and administrative requirements for PII are exercised per NETCINST 5211.2E and DoDI 5200.48.

APPENDIX A
BIBLIOGRAPHY

Anderson, L. W., & Krathwohl, D. R. (2001). *A taxonomy for learning, teaching, and assessing: A revision of Bloom's taxonomy*. Addison Wesley Longman, Inc.

Dave, R. H. (1970). *Psychomotor levels. In R.J. Armstrong (Ed.), Developing and writing educational objectives (pp. 33-34)*. Tucson AZ: Educational Innovators Press.

Van Schaack, A. (2021, November 19). Practical Application of Learning Science: A Handbook for Naval Instructors.

APPENDIX B
REFERENCES

REFERENCE	TITLE
DoDI 5200.48	Controlled Unclassified Information
NAVEDTRA M-142.2	NTP Phase II Requirements Development
NAVEDTRA M-142.3	NTP Phase III Course Development, Modernization, Acquisition, and Pilot
NAVEDTRA M-142.4 Vol I	NTP Phase IV Course Fielding - Volume I Navy School Management
NAVEDTRA M-142.5	NTP Phase V Assessment and Sustainment
NAVPERS 18068F Volume I	Navy Enlisted OCCSTD
NETCINST 1500.13F	NETC High and Moderate-Risk Training Safety Program
NETCINST 5211.2E	NETC Privacy Act Program
OPNAVINST 1223.1E	Navy Enlisted Occupational Classification System

APPENDIX C
TESTING PLAN (EXAMPLE)

Testing Plan

for

(COURSE LONG TITLE)

U-ABC-1000 (Identify course identification number (CIN) plus revision or change)

(This is an example of a testing plan that can be modified to meet course requirements)

PREPARED FOR

(Learning center (LC) name and address)

PREPARED BY

(Course curriculum model manager (CCMM) name and address)

Date (Month Year)

FOREWORD

Changes and/or deviation from this testing plan are not authorized without approval of the LC which is the Curriculum Control Authority for this course of instruction. Site-specific changes (site augments) or deviations from the approved course master schedule (CMS) or curriculum outline of instruction (COI) as outlined within the training course control document (TCCD) will be forwarded to the (LC) learning standards officer via the designated CCMM for approval prior to implementation.

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Appendix A: Knowledge Test Administrator’s Guide

Appendix B: Performance Test Administrator’s Guide

1. **Purpose**

   a. This testing plan establishes procedures which will be used to evaluate a student's attainment of the course learning objectives (LO). This will be accomplished by evaluating student achievement through both knowledge and performance tests.

   b. This testing plan lists the materials developed, testing methodology, and identifies the LOs being measured to support this course of instruction. It specifies the passing or failing criteria and how those scores are documented.

   c. All tests will be administered in accordance with the approved CMS.

   d. Testing is also used to diagnose curriculum effectiveness. All test scores will be recorded and retained on file within the class convening record for future reference, historical data, statistical analysis, along with monitoring each student's academic progress.

2. **Testing Plan**

Section 1: Course Data

Course Authorization to Teach
CMS
Completed Formal Course Review (FCR) Testing Program Checklist

Section 2: Course Roles and Responsibilities

CCMM Letter of Designation
Course Supervisor (CS) Letter of Designation

Section 3: Course Waivers

Naval Education and Training Command (NETC) N7 Waivers
Waivers for Change in Role Assignments
Site Augmentation Plan

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Rationale for Rubrics
Final Grading and Weight Criteria
Satisfactory (SAT)/Unsatisfactory (UNSAT) Rationale

Section 8: Remediation

Course Remediation Process
Academic Review Board (ARB) procedures

Section 9: Test and Test-Item Analysis

Test and Test-Item Analysis Results
Test-Item Bank Maintenance Procedures
Subject Matter Expert (SME) Test Critique Forms
Summation of Test Critique Forms
Student Course Critique Forms

Section 10: Documentation

Summary of Technical Documentation Reviews and Changes

List of Enclosures:

CS Letter of Designation
PTAG
KTAG
Test and Test-Item Analysis Results
Summation of Test Critique Forms

Section 1: Course Data

Course Letter of Promulgation
See signed (Course CIN) Authorization to Teach Letter in TCCD tab of Course Audit Trail.

CMS
See approved (Course CIN) TCCD, Annex B in TCCD tab of Course Audit Trail.

Completed FCR Testing Program Checklist
See FCR tab of Course Audit Trail.

Section 2: Course Roles and Responsibilities

CCMM Letter of Designation
See TCCD tab of Course Audit Trail:

The approved (course CIN) TCCD, page 5 indicates (learning site (LS)) as the CCMM. (Center) is in the process of determining policy and procedures for issuing CCMM letters of designation. Currently they are not issued to a LS unless the CCMM designation is changing from what was recorded in the approved TCCD.

CS Letter of Designation
See Enclosure (1) of this Testing Plan.

Section 3: Course Waivers

NETC N7 Waivers
There are no NETC N7 waivers assigned or issued for this course.

Waivers for Change in Role Assignments
There are no waivers for change in role assignments assigned or issued for this course.

Site Augmentation Plan
A Site Augmentation Plan is not applicable for this course.

Section 4: Test Development

Source Data
The following documents were used as source data to develop Comprehensive Test 1 (Knowledge):

1. List Publication Number, Title
2. List Publication Number, Title

The following documents were used as source data to develop Comprehensive Test 2 (Performance):

1. List Publication Number, Title
2. List Publication Number, Title
3. List Type Commanders Instructions (as required)
4. Maintenance Cards

Section 5: Test Administration

Testing Constraints

Testing constraints are any situation that compromises testing of the LOs. Training managers must immediately address each constraint and develop a course of action to mitigate the constraint, lessen the constraint, or eliminate it. Testing constraints can take many forms, which include manpower, equipment, space, facilities, etc. If a COI has a testing constraint(s), they will be recorded in the course's testing plan.

Live firefighting exercises cannot be conducted during periods of excessive heat, high winds, rain, and thunderstorm conditions.

Academic acceleration: Due to the technical nature of specific equipment, hands-on training, and safety concerns, no acceleration is permitted for any segment of the course.

PTAG

See Enclosure (2) of this Testing Plan.

KTAG

See Enclosure (3) of this Testing Plan.

Section 6: Course Test and Test Type

Test Schedule

	HOUR 1	HOUR 2	HOUR 3	HOUR 4	HOUR 5	HOUR 6	HOUR 7	HOUR 8
DAY 1								
DAY 2								
DAY 3								
DAY 4								
DAY 5								TEST 1
DAY 6	TEST 2							

Formal Tests

	TEST CATEGORY	TYPE & INSTRUMENT	TEST METHOD	PRI DELIVERY	SEC DELIVERY
1	COMPREHENSIVE (Knowledge)	CLOSED BOOK Multiple Choice	Criterion Referenced	LAS Online Testing	Paper Testing (Location of backup test materials)
2	COMPREHENSIVE (Performance)	PROCESS Job Sheet 1-1-1	Criterion Referenced (Team Grade)	Instructor Facilitated	N/A

NOTE TO AUTHOR OF TESTING PLAN: For Test Category, use either Pretest, Progress, or Comprehensive. Specify underneath Test Category whether the test is Knowledge or Performance. For Test Type, use either Open or Closed Book for Knowledge Tests. Use either Process, Product, or Combination for Performance Tests. Specify underneath Test Type, the type of test instrument being used. If further clarification is needed for development in any area of this testing plan, refer to NAVEDTRA M-142.4 Volume II. DELETE THIS PARAGRAPH WHEN SUBMITTING TESTING PLAN FOR APPROVAL.

The NETC approved Learning Assessment System (LAS) is the primary means of test administration for the knowledge test. In a scenario where the LAS is not available, paper tests will be administered. Tests are controlled and therefore copies are not included in this testing plan.

Informal Tests

There are no informal tests in this course.

Instructional Sheets

NAVEDTRA M-142.4 Volume II identifies problem, assignment, and job sheets. While it is permitted to create additional instructional sheets, there are none for this course.

Statement of Logic for Test Type Selection

Knowledge Test - CLOSED BOOK EXAMPLE: The test in this course is “closed book.” The purpose of this course is to provide (list type of student) with sufficient knowledge and skills to perform as (list the job the students will be assigned to).

When the students begin to fulfill their roles, they will be expected to recall and recognize (from memory) details of the systems, publications, and procedures regarding the roles and responsibilities of those whom they will be leading.

It is logical to test these students with a closed book test to gauge their achievement and preparedness for their new role.

Performance Test - PROCESS EXAMPLE: The test type for the 1 Comprehensive Performance test is a PROCESS. This test type selection was made because the

team/students are not required to build or assemble a product but are tested only in their ability to follow a process.

Section 7: Grading

Minimum Passing Grade

The minimum passing grade for this course is XX%.

Rationale for Comprehensive Test

There are no progress tests in this course because the course is only one-week long. It is expected that the students will be able to retain the information being learned within the week.

Furthermore, there is no particular module or lesson that is dependent on mastery of another module or lesson. All topics can be learned and tested at one time, providing an overall measure of student achievement.

Grading Checklists/Scoring Guides

COMPREHENSIVE TEST 2 (PERFORMANCE) SCORING GUIDE			
INSTRUCTOR:	**CLASS #**	**DATE**	
INSTRUCTIONS: All classes will execute Phase 1 AND either Phase 2 or Phase 3 as applicable. For each step that the team adequately performs, indicate PASS by placing a check in the PASS column and circling the associated point value. For each safety violation there will be a 5-point deduction; circle as appropriate for scoring.			
PHASE I		**PASS**	**VALUE**
SCENE LEADER	Maintained control of scene.		**5**
SCENE LEADER	Knowledgeable and aggressive.		**2**
SCENE LEADER	Communications and reports.		**3**
MFVV	Proper approach to A/C.		**4**
MFVV	Proper nursing procedures.		**2**
MFVV	Effective and aggressive hand line operation.		**2**
MFVV	Communications and reports.		**2**
MFVV	Hand on bail.		**-5**
MFVV	Shut off hand line after agent test.		**-5**
MFVV	Driver failed to set parking brake.		**-5**
MFVV	Any solid stream from hand line.		**-5**
MFVV	Driver moved MFFV after complete stop.		**-5**
RESCUE	Safe ejection seat (if applicable).		**2**
RESCUE	Shutdown engine.		**2**
RESCUE	Removed face/oxygen mask.		**2**
RESCUE	Removed seat restraint equipment.		**2**
RESCUE	Hands on windscreen (F/A-18).		**2**
RESCUE	Hands on ejection seat prior to safe tying seat.		**-5**
RESCUE	Excessive contact with pilot.		**-5**
RESCUE	Forklift parking brake not set.		**-5**

RESCUE	Responded with improper PPE.		**-5**
OVERHAUL	Responded in proper PPE.		**10**
OVERHAUL	Tested agent prior to entering scene.		**5**
OVERHAUL	Grounded fire bottle when activating.		**5**
PHASE I POINT TOTAL			**__ of 50**
PHASE II		**PASS**	**VALUE**
ORGANIZATION	Responded in proper PPE.		**10**
ORGANIZATION	Scene leader identified.		**5**
ORGANIZATION	Excess personnel removed from scene.		**5**
PROCEDURES	Aircraft secured to deck (chocks, chains, downlocks).		**10**
PROCEDURES	Forklift/fingerboom positioned at structural pt of A/C w safety present.		**3**
PROCEDURES	Chains slacked prior to lifting aircraft.		**3**
PROCEDURES	Dolly properly positioned/secured to the deck.		**3**
PROCEDURES	Aircraft secured to dolly.		**3**
PROCEDURES	Rig checked.		**2**
PROCEDURES	Setup FOD walk down.		**2**
PROCEDURES	Mattresses protected leading edge.		**2**
PROCEDURES	Properly used crash handling tie downs.		**2**
PROCEDURES	Touched A/C before it was secured to deck.		**-5**
PROCEDURES	Dragged chain hooks on deck.		**-5**
PROCEDURES	Hands were in pinch points.		**-5**
PROCEDURES	Personnel were in pinch points.		**-5**
PROCEDURES	Personnel did not adhere to Stand Clear call.		**-5**
PHASE II POINT TOTAL			**__ of 50**
PHASE III		**PASS**	**VALUE**
ORGANIZATION	Responded in proper PPE.		**10**
ORGANIZATION	Scene leader identified.		**5**
ORGANIZATION	Excess personnel removed from scene.		**5**
PROCEDURES	Aircraft secured to deck (chocks, chains, downlocks).		**10**
PROCEDURES	Moved crash crane with safeties present.		**3**
PROCEDURES	Crash forklift properly positioned with safety.		**3**
PROCEDURES	Rig checked, after taking tension.		**3**
PROCEDURES	Chains slacked prior to taking tension of aircraft.		**3**
PROCEDURES	Properly secured tag/stabilizing lines to aircraft.		**2**
PROCEDURES	Scene leader checked winds-over-deck prior to hoisting.		**2**
PROCEDURES	Removed tie down chains ONLY, prior to lifting.		**2**
PROCEDURES	Set up FOD walk down.		**2**
PROCEDURES	Touched A/C before it was secured to deck.		**-5**

PROCEDURES	Knees were on deck or aircraft.		**-5**
PROCEDURES	Hands were in pinch points.		**-5**
PROCEDURES	Excessive time in pinch points.		**-5**
PROCEDURES	Improperly installed manufacturer's sling (if attempted to take tension).		**-5**
PROCEDURES	Personnel did not adhere to Stand Clear call.		**-5**
PHASE III POINT TOTAL			**__ of 50**
FINAL TEAM SCORE			**___ of 100**

Answer Keys

Answer keys are needed and required when administering paper tests for reference during grading, remediation, and test reviews.

Instructors **will not** print additional answer keys from the LAS. The master paper answer key is kept secured and is checked out and in, along with the tests. It will only be used when paper testing.

When students have tested online, instructors will utilize the LAS for test answers.

Rubrics

There are no rubrics in this course.

NOTE TO AUTHOR OF TESTING PLAN: For an example of a rubric, please see the PTAG template. DELETE THIS PARAGRAPH WHEN SUBMITTING TESTING PLAN FOR APPROVAL.

Rationale for Rubrics

There are no rubrics in this course.

Final Grading and Weight Criteria

	TEST CATEGORY	OBJECTIVES TESTED	WEIGHT	MIN PASSING	SCORING METHOD	REMARKS
1	COMPREHENSIVE (Knowledge)	**1.1 – 1.15**	50%	75%	PERCENTAGE	
2	COMPREHENSIVE (Performance)	**1.3, 1.4, 1.7-1.10, 1.13, 1.15**	50%	75%	PERCENTAGE	

SAT/UNSAT Rationale

This course is not graded as SAT/UNSAT.

Section 8: Remediation

Course Remediation Process

For procedures and methods on counseling, setbacks, and drops, refer to (list NETC/LC/LS instruction).

Remediation is required when a student does not accomplish critical LOs or understand the material during normal classroom time. Remediation's primary goal is to motivate and assist students in achieving the critical LOs of a course by providing additional instructional study time.

A second goal of remediation is to remove barriers to learning. Because students learn in different ways, it may be necessary to use different methods of remediation to realize the most effective results.

a. **Informal Remediation:**

(1) Criteria:
(a) Student fails less-critical objectives.
(b) Student requests voluntary remediation.

(2) Procedure – instructor provides on-the-spot remediation and/or additional study materials deemed appropriate.

b. **Formal Remediation:**

(1) Criteria:
(a) Student fails a test.
(b) Student fails a critical objective.
(c) Student performance is below the expected academic progress.

(2) Procedure:
(a) Remediation is provided outside normal training hours in a designated classroom on the same day test failure occurred.
(b) A certified instructor re-teaches lesson material for the failed objectives in a mini-lecture format.
(c) Student is re-tested the following day, outside of normal classroom hours, and using a different version of the test.
(d) Regardless of passing re-test score, the student will receive the minimum passing grade.
(e) Students failing any re-test are referred to an ARB.

c. **Preventive counseling** will be instituted in A and C - schools and should include counseling for performance and personal problems. Preventive counseling is designed to provide help to solve a problem before it results in reduced learning capacity or course failure.

It is the duty of all staff members to be aware of their roles and responsibilities as counselors. Preventive counseling requires the early identification of personal or performance problems and the instructor's awareness of available resources. During the student's training, the instructor must be PROACTIVE in the identification of student problems. The instructor must be aware of such things as:

(1) Inconsistent study habits.
(2) Poor performance on tests.
(3) Declining grades.
(4) Lack of motivation.
(5) Inappropriate conduct (e.g., sleeping in class, excessive tardiness, failure to complete assignments, or lack of attention to classroom or lab activities).

The other method of preventive counseling is the **counseling of personal problems** that impair the student's ability to concentrate on the job of learning. When a personal problem is suspected, the instructor will:

(1) Talk to the student to identify the specifics of the problem.
(2) If unable to assist the student, refer to another agency via the chain of command.
(3) Follow-up on the student's status.

Instructors are not trained to counsel students on serious personal problems. Problems of a serious nature must be referred to special counseling programs such as Navy Chaplain, Navy Fleet and Family Support Center, Drug/Alcohol Counselors, Red Cross, or Navy and Marine Corps Relief Society.

In any type of counseling situation, instructors must establish an atmosphere that encourages the student to seek help when problems occur. The instructor must make the students aware of the proper chain of command when seeking assistance to their problems. Instructors will conduct counseling sessions with the students as soon as problems or potential problems occur. Often students will respond favorably to an encouraging word or a clarification of training materials. Each counseling session will be recorded in the student's record.

d. **Setbacks:** A setback occurs when a student is unable to complete the training in the designated time. Setbacks are classified as either academic or non-academic, in addition to increasing the student's pipeline. Because setbacks are costly, they must be granted only after all other forms of remediation have been exhausted and when there is an indication that a setback is in the best interest of the military and the student.

e. **Academic setbacks** for A and C-School students may be initially granted by the CS as a result of a preventative counseling session and only after all means of remediation and retesting have been used with inadequate results. Subsequent academic setbacks will occur only because of an ARB's recommendation.

   Students designated as academic setbacks will be allowed to repeat only that portion of a course for which they have failed to achieve the objective(s).

f. **Non-academic setbacks** may occur when the student is unable to complete the material due to illness or special circumstances outside the control of the course or student. The decision to set back non-academically is a management decision.

   When a student is set back, the CS will inform student control so the appropriate personnel event (PEVT) code can be found/used to support the student control officer for input into the approved NETC student information system (SIS).

   If a student in a high-risk course is set back due to a medical problem, which may result in future problems while in training, the instructor will be notified as soon as possible.

g. **Drop from Training/Attrition:** Every effort will be made to help students succeed. However, there are times when the student is clearly unsuited, unable, and/or unwilling to complete the course. If this occurs, the student is dropped from training. Students dropped from training may be classified as an academic drop, non-academic drop, or disenrollment. Students who are discharged from the Navy will be classified as attrites.

h. **Academic drops** occur when a student is unable to achieve the LOs because of an academic problem, such as lack of classroom ability or lack of laboratory ability. Decisions to academically drop an A or C - school student will be because of an ARB action. All decisions for academically dropping a student from other courses will be based on a decision by supervisory personnel above the level of the immediate instructor.

i. **Non-academic drops** are based on administrative decisions that are not a result of academic performance. Examples of non-academic drops include administrative, disciplinary, motivational, medical, death, physical, fraudulent enlistment, and convenience of the government. For some non-academic drops, higher authority directs the action. For non-academic drops, the convening of an ARB is not required.

j. **Disenrollment** is based on administrative decisions beyond the control of the training activity that are a result of higher authority direction or pre-service conditions. Examples of disenrollment include cancellation of a class or course, rating or program conversion, incomplete training as requested by member's command or higher authority, inability to meet prerequisites (medical, physical, academic, and/or security).

When a student is dropped from training or attrited from the Navy, the appropriate CS must inform student control so the appropriate PEVT code can be used to support the student control officer for input into SIS. The student control officer is responsible for ensuring timely update to the disposition codes when final disposition becomes known.

ARB procedures

The ARB process provides formalized procedures in handling non-disciplinary problems related to a student's academic progress. **The ARB is an integral part of the student-counseling program**. It is based upon the philosophy that decisions concerning a student's disposition in training are better arrived at by group acting together as a board rather than by an individual acting alone.

ARBs will be convened when all other means of academic counseling, remediation, and an initial academic setback have failed to improve student performance. The initial academic setback may result from an **academic counseling** session and be directed by the CS. Additional academic setbacks must be directed by the ARB. Examples of when an ARB may be necessary include the following:

a. Student’s course average falls below minimum passing grade.
b. Student is unable to achieve the objectives after counseling, remediation, retesting, and an initial academic setback.
c. Student's performance is below expected academic progress.

d. Student's course average falls below minimum passing grade.
e. Student is unable to achieve the objectives after counseling, remediation, retesting, and an initial academic setback.
f. Student's performance is below expected academic progress.
g. Student fails to achieve the objectives after an academic setback on those same objectives.
h. Students will continue with class until an ARB decision has been made.
i. All students enrolled in Class A and C schools will be academically dropped from training only because of an ARB recommendation.

Possible ARB decisions include:

a. **Continue with Class (CWC)** - allows a continuation of training in the present class with or without remediation. A CWC recommendation requires that the test records and the interview show clear evidence that the student can pass the course if allowed to continue. The ARB will decide if remediation is necessary for the student to continue and set the remediation requirement. The remediation requirement will identify specific areas of study and indicate the time the student is to stay in the remediation program.

b. **Set-back** - allows an extension of training with or without remediation. When the ARB recommends a setback, the records must indicate the student is motivated to remain in training. The test scores and interviews must indicate an ability to achieve the objectives after repeating the portion of the training that was failed. Students will be set back only over the material they have failed. If remediation can be achieved in any way other than setback, it will be considered first.

c. **Drop from training** - results in a recommendation for disposition. When recommending a drop from training, the student must demonstrate unwillingness or an inability to continue the training. Attention must be given to the student's desire and eligibility for reclassification when the board makes the decision to recommend drop from training.

An ARB will be conducted per NAVEDTRA M-142.4 Volume II.

Additionally, the following local procedures apply and referenced forms are located on the (LC/LS) shared drive.

Qualification to be an ARB member or chairperson will be documented in instructor records using an ARB qualification sheet. Drop approval authority is delegated to training department head. The ARB chairperson will be designated in writing by the

applicable training department head. The person designated must be a certified instructor. The minimum ARB consists of three qualified members; a chairman and two additional members, with at least one being qualified in subject matter, and another assigned (by chairman) as a recorder. The designated recorder, a voting member, will ensure all pertinent questions and answers are recorded to justify the recommend-dations made by the ARB.

To ensure standardized proceedings are adhered to while conducting the ARB, it is recommended that each course maintain an ARB folder containing opening remarks and standard questions to present to the student during the course of the interview.

The ARB record will be used to document all ARB. A student permanent drop form will be completed for all students recommended by an ARB for a drop from training or who are administratively dropped. The Student/Instructor Questionnaire will be used by instructional personnel to provide readily accessible data concerning personnel in his/her class.

Section 9: Test and Test-Item Analysis

Test and Test-Item Analysis Results

See enclosure (4) of this Testing Plan.

Test-Item bank Maintenance Procedures

The test-item bank is maintained in the LAS. Specific procedures for making modifications to test items can be found in the LAS help menu.
Modifications to test items will only be made as a result of course maintenance or test-item analysis.

SME Test Critique Forms

The testing officer will ensure SMEs pilot new test items utilizing a SME Test Critique Form.

Summation of Test Critique Forms

See enclosure (5) of this Testing Plan.

Student Reaction Surveys

Student reaction surveys are kept on file for seven years. They are located in (fill in location - Building 3921, Room 218, file cabinets labeled “XXX” and “XXX”). They are maintained by the CS/or a statement that they are maintained in the LA.

Section 10: Documentation

Summary of Technical Documentation Reviews and Changes

There have been no technical reviews or changes for the publications used to create tests for this course.

Add pages for the following enclosures:

COURSE SUPERVISOR LETTER OF DESIGNATION
FOR (Course CIN)
(LONG TITLE OF COURSE)

PERFORMANCE TEST ADMINISTRATOR'S GUIDE
FOR (Course CIN)
(LONG TITLE OF COURSE)

KNOWLEDGE TEST ADMINISTRATOR'S GUIDE
FOR (Course CIN)
(LONG TITLE OF COURSE)

TEST AND TEST-ITEM ANALYSIS RESULTS
FOR (Course CIN)
(LONG TITLE OF COURSE)

SUMMATION OF TEST CRITIQUE FORMS
FOR (Course CIN)
(LONG TITLE OF COURSE)

APPENDIX D
PERFORMANCE TEST ADMINISTRATOR'S GUIDE (EXAMPLE)

Performance Test Administrator's Guide
for
(COURSE LONG TITLE)
U-ABC-1000 (identify course identification number plus revision or change)

(This is an example of a Performance Test Administrator's Guide (PTAG) that can be modified to meet testing requirements)

JOB SHEET #-#-# AND TITLE (PROGRESS TEST #)

Date (Month Year)

(Security Classification if required)

Instructions to the Administrator

Brief description of the task to be performed

Students will be evaluated on their ability to:

1. Use a numbered list if you desire to break down the sub-tasks for this part.
2. If not, then just provide a narrative format above by finishing the sentence and adding what you need to add.

Safety Precautions

Write a narrative of unique safety precautions that are associated with this particular performance test. (Re-write or delete this introduction sentence to suit the PTAG.)

1. Or use a numbered list if that works better for this part.
2. Or use a combination of both a narrative and a list.

Environment

Describe the environment and location.

Equipment/Training Materials Required

1. Using a numbered list usually works best for this part.

Special Instructions

Describe any special instructions that the instructor will need to know. These instructions can be in regard to any of the following. (Re-write or delete this introduction sentence to suit the PTAG.)

1. Special preparation considerations.
2. Special execution considerations.
3. Special post-execution considerations.
4. Parts of an evolution that may require specific situational awareness.
5. Common errors in execution of the performance test.
6. Guidance on actions to be taken in the event that a student does not perform as required.
7. Allocated time limits per class or student.
8. Special clean-up/securing procedures.
9. Test compromise prevention and actions.

Test Instrument

See Enclosure (X) of the Testing Plan, Job Sheet 1-2-3-4.

Grading Criteria

Minimum Passing Grade

The minimum passing grade for this test is XX%.

Grading Checklist/Scoring Guide

This is a product/process/combination (select one) type performance test. Students will be assessed by using the following Grading Checklist/Scoring Guide. Usually process or combination type tests will use a grading checklist or scoring guide to determine student achievement. NOTE TO DEVELOPER: use the associated Job Sheet to create this grading checklist/scoring guide.

Mark any critical steps with asterisks. Make the attempt to determine failure by assigning applicable point values that would bring score low enough for failure. This may not always be possible.

OR type: There is no grading checklist or scoring guide for this performance test.

PROGRESS TEST X (PERFORMANCE) SCORING GUIDE					
INSTRUCTOR:			**CLASS #**		**DATE**
INSTRUCTIONS: Check PASS or FAIL for each step or check as appropriate. Total all points on passed steps/checks for student test score.					
	STEP or CHECK	**PASS**	**FAIL**	**REMARKS**	**POINT VALUE**
1	Inspect XYZ (process step)				**10 PTS**
2	Measure ABC (process step)				**10 PTS**
3	*Replace DEF (process step)				**40 PTS**
4	Repair GHI (process step)				**10 PTS**
5	Adjust JKL (process step)				**10 PTS**
6	Product Complete? (product step)				**10 PTS**
7	Product Works? (product step)				**10 PTS**
STUDENT				**PT TOTAL**	

Rubrics

This is a product/process/combination (select one) type performance test. Students will be assessed by using the following rubric. Usually, product type tests use rubrics to determine student achievement. However, if a process or combination test has steps that can vary in quality, a rubric would be appropriate.

PROGRESS TEST X (PERFORMANCE) GRADING RUBRIC				
INSTRUCTOR:		**CLASS #**	**DATE**	
INSTRUCTIONS: Circle appropriate point values for each category of the performance test. Calculate the total values for student test score.				
	FULL CREDIT Complete Accurate	**PARTIAL CREDIT** Partially Complete and/or Partially Accurate	**NO CREDIT** Incomplete and/or Inaccurate	
Template	**8**	**6** or **4**	**2** or **0**	
Remarks:				
Markings	**20**	**16** or **12**	**6** or **0**	
Remarks:				
Lighting	**20**	**16** or **12**	**6** or **0**	
Remarks:				
Staking	**15**	**11** or **7**	**4** or **0**	
Remarks:				
***Assets**	**32**	**22** or **18**	**8** or **0**	
Remarks:				
Legible	**5**	**3**	**0**	
Remarks:				
STUDENT			**PT TOTAL**	

Rationale for Rubrics

Explain rationale for rubric design, or type: There is no rubric for this test.

Final Grading and Weight Criteria

This performance test accounts for XX% of final grade. Minimum passing grade for the course is 70% for A School or 75% for all other schools.

Satisfactory (SAT)/Unsatisfactory (UNSAT) Rationale

If this test has no scoring guide/grading checklist or rubric but counts as a part of course final grade, provide a rationale for satisfactory performance of test. This will likely be based on participation or attendance. Otherwise, type: This test is not graded as SAT/UNSAT.

Instructions to the Student

1. All applicable safety precautions must be followed. Any safety violations result in a failure. These violations include:
   a. Violation a
   b. Violation b
   c. Violation c
2. These job steps are the same as XYZ practice lab. You are allowed to utilize the equipment/materials listed in your job sheet.
3. You will be evaluated on the accuracy and completion of each job step.
4. You must score a XX% to pass this test.
5. If you fail the test, you will be formally remediated the day of the test failure, after normal class hours.
6. Any test failure will result in a retest, outside of normal class hours on the day following test failure.
7. You will have XX minutes/hours to complete this test.
8. If you have questions, raise your hand and an administrator will come to you.
9. Do not leave the test area without permission from the instructor.
10. If you are caught cheating, you will receive a zero as your grade and disciplinary action will be taken.

Performance Record Sheet

The performance record sheet is optional for the PTAG. This is an optional page. Create this if it will be useful to capture all student test scores in one place for entry into the learning assessment system gradebook.

PROGRESS TEST X (PERFORMANCE)			
INSTRUCTOR:		**CLASS #**	**DATE**
STUDENT NAME	**SCORE**	**INSTRUCTOR REMARKS**	

APPENDIX E
KNOWLEDGE TEST ADMINISTRATOR'S GUIDE (EXAMPLE)

Knowledge Test Administrator's Guide
for
[Course Name]
[Course Identification Number]

[Version]

(This is an example of a Knowledge Test Administrator's Guide that can be modified to meet testing requirements.)

[Date]

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Instructions to the Administrator

Corporate Enterprise Training Activity Resource Systems (CeTARS) Online Testing:

a. Prior

(1) Testing officer will log on to CeTARS via: https://main.prod.cetars.training.navy.mil/cetars/main.html, select the course master schedule link.

(a) Select **Assign On-Line Exams** from the test bank menu.

(b) Select a course (U-ABE-1000) from the drop-down menu.

(c) Click the **Select Course** button (only applicable if you have access to more than 1 course.)

(d) Select the class from the drop-down menu.

(e) Click the **Select Class** button.

(f) Click the **Continue** button.

(g) Click the **Add Students/Exam** button.

(h) Click the **Select All** link to select all students or click in the check box of the individual students to add.

(i) Select the exam from the drop-down menu.

(j) Click in the check box (es) of version to assign.

(k) Select the exam start and end time (times optional).

(l) Click the **Validate Assignments** button.

(m) Select any students who have version issues and repeat steps h-l (only applicable if you must reassign a test for a prior failure).

(n) Click the **Add Selected Students** button.

(o) Click the **Save** button.

(p) Assign Exam/Students complete.

(2) The instructor will cover or remove all training aids that could assist the students in answering the test items.

b. During

(1) Completely read/discuss “Instructions to the Student” with the class.

(2) Do not leave students unattended at any time while administering the test.

(3) Advise students of the time they have remaining, at 30 minutes and 5 minutes.

(4) If student is caught cheating, refer to training officer for possible disciplinary action.

c. After

(1) Ensure students are completely logged off.

(2) Review the test with students.

(3) Evaluate any test items challenged by the students.

LAS Online Testing:

a. Prior

(1) Testing officer will log on to LAS via: https://las.netc.ncdc.navy.mil, select "**LAS QMOP (PROD) 2019**."

(a) Select **Groups** from the **People** drop-down menu.

(b) Check the box next to the **Group Name** or **Subgroup Name.**

(c) Select the **Schedule** from the left-hand menu.

(d) Select **Add Assessments**.

(e) Locate the applicable assessment and select **Add**, then **Done.**

(f) Click the **Next** button.

(g) Create a **Schedule name** or leave as-is (by default, schedule name will be the same as the assessment name).

(h) Choose scheduling criteria (limit attempts, limit days between retakes, set access period, require monitoring, etc.). Click the **Next** button.

(i) Visually confirm that the group selected is correct (leave e-mail broadcast box unchecked). Click the **Finish** button.

(2) The instructor will cover or remove all training aids that could assist the students in answering the test items.

b. During

(1) Completely read/discuss "Instructions to the Student" with the class.

(2) Do not leave students unattended at any time while administering the test.

(3) Advise students of the time they have remaining, at 30 minutes and 5 minutes.

(4) If student is caught cheating, refer to training officer for possible disciplinary action.

c. After

(1) Ensure students are completely logged off.

(2) Review the test with students.

(3) Evaluate any test items challenged by the students.

Paper Testing:

a. Prior

(1) Check out test. Contact testing officer to provide the test(s) required.

(a) The testing officer will sign out the Master Tests Compact Disc in the Master Tests logbook.

(b) Once the password protected compact disc has been obtained the testing officer will print the required tests.

(c) Serialize each test (e.g., 1 of 25, 2 of 25, etc.).

(d) Testing officer will return the password protected Master Test Compact Disc to its secure location and complete the entry on the Master Test Compact Disc Log.

(e) Fill out the log out section of the Paper Test Accountability Log.

1. The instructor must inventory and sign legibly for the tests and ensure that all tests and all their pages are accounted for and in serial number order.

2. Tests will be hand carried to the assigned classroom for testing and inventoried prior to handing out to students.

NOTE: The preferred method is to have the test administered by an instructor that was not the lead instructor for the present class.

(2) The instructor must cover or remove all training aids that could assist the students in answering the test items.

b. During:

(1) Pass out all required test materials to students.

(2) Completely read/discuss “Instructions to the Student” with the class.

(3) Do not leave students unattended at any time while administering the test.

(4) Advise students of the time they have remaining, at 30 minutes and 5 minutes.

(5) If student is caught cheating, refer to training officer for possible disciplinary action.

c. After:

(1) Collect and inventory all testing materials to include scratch paper, ensuring that all tests and their pages are accounted for and in serial number order.

(2) Check the test for any possible marks made by the students.

(3) Return the tests to the testing officer for grading.

(4) Once graded review the test with students. Evaluate any test items challenged by the students.

(5) Tests will be returned to the testing officer.

(6) The instructor will complete the check in section of the Paper Test Accountability Log.

(7) The testing officer will maintain the test in a secure location until the grades can be entered into CeTARS.

(8) Once the grades have been entered into CeTARS the paper tests will be shredded for security of the test.

Instructions to the Student

CeTARS Online Testing:

a. This is a multiple-choice test.

b. You will have one hour to complete the test.

c. Clear your desk of all unrelated testing materials.

d. There will be no talking during the test.

e. Do not leave your assigned seat without permission.

f. If you have a question, raise your hand and an administrator will come to you.

g. If you are caught cheating, you will receive a zero as your grade, and disciplinary action will be taken.

h. Read each test item carefully. Choose the answer you believe to be correct. There is only one correct answer to every test item.

i. Log on to CeTARS online testing module by:

(1) Insert military identification (ID) card into common access card reader (CAC).

(2) Log into the computer:

(a) Click on the start tab.

(b) Click on all programs.

(c) Click on “1Weblinks.”

(d) Click “No” on windows explorer pop-up box.

(e) Click “allow once” on pop-up blocker.

(f) Click login with CAC then click OK.

(g) Click on Department of Defense (DoD) cert.

(h) Read the DoD notice and consent banner and click the OK button.

(i) Read exam instructions and then click the begin exam button.

(j) Select the desired answer(s) to the question(s).

(k) Click the previous/next buttons to navigate questions.

(l) Upon answering the final question of the exam, the last question window will pop up. Click the OK then the status button to review the exam.

(m) When ready to grade the exam, click the **Submit Exam** button.

(n) Click the **Submit Exam/Grade Exam** buttons to continue with the grading process.

(o) Click the **Exit** button to exit exam.

(3) Exit room quietly, until instructed to come back by instructor.

j. Students caught cheating will be given a zero on the test and referred to the training officer for possible disciplinary action.

LAS Online Testing:

a. This is a multiple-choice test.

b. You will have one hour to complete the test.

c. Clear your desk of all unrelated testing materials.

d. There will be no talking during the test.

e. Do not leave your assigned seat without permission.

f. If you have a question, raise your hand and an administrator will come to you.

g. If you are caught cheating, you will receive a zero as your grade, and disciplinary action will be taken.

h. Read each test item carefully. Choose the answer you believe to be correct. There is only one correct answer to every test item.

i. Log on to the LAS by:

(1) Insert military ID card into CAC reader.

(2) Log into the computer.

(3) Open Microsoft Edge (or Google Chrome).

(4) Navigate to https://las.netc.ncdc.navy.mil.

(a) Click login with CAC.

(b) If given an option, select "**LAS Participant QMOP (PROD) 2019**."

(c) Up to five tabs will be displayed (exams, tests, quizzes, surveys, reports).

(d) Click the **Start** button next to the available exam (or test) that corresponds to today's examination (if no tabs are shown or today's exam is not listed, notify your instructor).

(e) Select the desired answer(s) to the question(s).

(f) Click the **Previous/Next** buttons to navigate questions.

(g) Once all questions are answered, Click the **Submit** button in the lower right-hand corner of the exam (If any questions were not answered, a warning prompt will pop up notifying the student that questions left blank are on the verge of being submitted for grading).

(5) To view your grade, click on the **Reports** tab.

(a) Click **View Reports**.

(b) Leave filters as-is and click **See list of results.**

(c) The Transcript Report will display with a listing of assessment completions and scores for each.

(d) Click the **X** button to close the browser.

(6) Exit room quietly, until instructed to come back by instructor.

j. Students caught cheating will be given a zero on the test and referred to the training officer for possible disciplinary action.

Paper Testing:

a. This is a multiple-choice test.

b. You will have one hour to complete the test.

c. Clear your desk of all unrelated testing materials.

d. There will be no talking during the test.

e. Do not leave your assigned seat without permission.

f. If you have a question, raise your hand and an administrator will come to you.

g. If you are caught cheating, you will receive a zero as your grade, and disciplinary action will be recommended.

h. Read each test item carefully. Choose the answer you believe to be correct. There is only one correct answer to every test item.

i. Print name, rate, class number, and date on answer sheet.

j. Read each test item carefully. Choose the answer you believe to be correct. There is only one correct answer to every test item.

k. Darken the appropriate circle on your answer sheet for each test item. If you wish to change your answer, erase the unwanted answer, and darken in the appropriate circle.

l. When you have finished, turn in the test booklet, answer sheet and any other testing materials to the instructor. Quietly leave the room while the instructor scores your answer sheet.

m. DO NOT WRITE OR MAKE ANY STRAY MARKS IN YOUR TEST BOOKLET.

n. Avoid stray marks on the answer sheet.

o. The passing grade for this course is 70 and will be determined by the percentage scored on the final test.

Procedures for Test Failures

Test Failures:

a. Students failing the test will be remediated and tested on the same day.

b. Remediation and retesting procedures are described in Course Testing Plan, section 8.

Test Security and Compromise Prevention

During the Test:

a. The student/instructor ratio for this test is 25/1.

b. The instructor(s) will be in the classroom to observe students while testing.

Completion of Test:

a. Students will stay clear of testing area until the instructor has received and inventoried all the test booklets and has authorized admittance into the classroom.

b. The test and answer sheet will be turned into the administrator for inventory.

Test Compromise:

a. When reviewing the test with students, DO NOT bring the master copy of the test to the classroom.

b. Do not leave students unattended at any time while administering the test.

c. Tests must never leave the custody of the instructor.

d. When a compromise is suspected, the compromised test version will not be used again until all classes onboard at the time of compromise have graduated.

e. Every precaution must be taken to minimize the possibility of a test compromise.

f. If a test is unaccounted for, that test version will not be used for the next 6 months, and another test will need to be re-written to take its place in the interim time period.

APPENDIX F
TEST INSTRUCTIONS FOR THE ADMINISTRATOR/PROCTOR (EXAMPLE)

1. **Prior to the start of testing:**

   a. Ensure all students have turned in their cell phones, recording, or videoing devices. No such devices will be allowed in the testing area.

   b. Make copies of the examination that is to be administered (one copy for each student) and place a test number on each copy in the top right-hand corner (e.g., 1, 2, 3, etc.). This is to ensure security and prevent compromise of the tests. Also, this is for future reference in the event a discrepancy is discovered or identified by the student on a specific test/exam. Each test will have one of six variations of color cover sheet. Though the tests provided to the students will be the same version, the appearance of the multi-colored top sheets gives the impression of six different versions. The instructor's response to student(s) questions about the different colors will be that each color represents a different version. Additionally, the instructor will ensure that specific test questions and answers are not covered during the review process prior to taking the test.

      (1) Test materials provided to the students will not in any manner reflect which version of the test is being administered. The student should only see the multi-colored top sheet and the test number in the top right-hand corner. No other type of wording, coding, marks, or other indicators must appear on the test.

      (2) Cover or remove all training aids that could assist the student in answering test items.

      (3) Have students clear their desks/tables of all unrelated material.

      (4) Provide pencils and scratch paper if necessary.

      (5) Read the test instructions to the students.

      (6) Carry out any other local instructions as necessary.

      (7) When the student provides their answer sheet and test book to the proctor, they must submit all scratch paper and notes written during the examination. Student will then depart the room to an instructor prearranged waiting area.

(8) Test books will be collected by the proctor who will ensure accountability. One test of each colored cover sheet used during the test will be retained by the instructor to assist in the review process later. All other test books must be immediately returned to their safe repository.

c. The proctor answer key for the test that was administered must not be in the same room prior to, during, or following administration of the test. The proctor answer key will be kept in a separate and secured room. Following completion of the test the proctor must collect all testing material (NOT the student), and grading of the tests will be conducted in a secure area away from students.

d. Test Security and Cheating – Proctor will carefully monitor students while testing to prevent test material compromise and to assist students as necessary if they experience difficulty in understanding a test question. Students discovered cheating during the examination will have all test materials confiscated and receive a grade of zero on the test. Furthermore, they will be subject to an Academic Review (ARB). If the ARB finds evidence of cheating (preponderance is all that is needed), the ARB will remove the student from the course as an administrative action. Further disciplinary measures will be at the discretion of the commanding officer and/or parent command.

2. **Administering Tests:** Students must obtain a minimum score of XX% on each knowledge test.

   a. Students will be allowed XX minutes to complete a XX-question test: Each examination question will be worth X-percentage points.

   b. Students will be allowed X hours to complete a XX-question test: Each examination question will be worth X-percentage point.

3. **Upon completion of the knowledge test (examination):** Following administration and subsequent grading of the exam, the proctor will review the test with the examinees. To reduce the chance of test compromise; prior to commencement of the review process, instructors will ensure all possible methods of recording answers are not available to the students. This will include, but is not limited to, clearing the student's desk of pen, pencil, paper, recording devices, and any other method of collecting answers. During this review process answers to those questions which meet the 50% criteria as explained in paragraph (2) below will be made available to the students.

(1) Do not provide a test book to the student. However, the proctor may return the student answer sheets to facilitate the review process.

(2) The proctor will perform a test question analysis for each item. The proctor will only review those questions which were missed by 50% or more of the class.

(3) Carry out any other local instructions as necessary.

(4) Following the review process, the proctor (NOT the student), will collect and inventory all testing material and answer sheets prior to students departing the classroom.

(5) Secure all testing materials in a locked container to prevent compromise.

(6) Any notes taken by students during the test review either by pen and pencil, recording, or electronically will be confiscated by the proctor and given to the course supervisor (CS). The CS and chain of command will determine if further action is required.

4. **Test Remediation and Re-Testing:**

a. Remediation for students is initially performed at the class level during the instructor facilitated examination review process. Answers to all knowledge test items will be made available to the entire class during the examination review process, which will be conducted immediately following administration and subsequent grading of the written exam. The instructor will review each test question with the class and provide explanation for the correct response. Specific problem areas that the general student body experienced will be explained or clarified at this time.

b. After the examination review process, any student who obtained a score below the minimum passing score of XX% will be subject to immediate oral remediation by a staff instructor in a private setting (one-on-one). Following this oral remediation, the lead instructor and CS will decide (based on the oral remediation) if a written retest is required. This determination will be based around the critical learning objectives and the student's level of knowledge as assessed during the oral remediation process. If the lead instructor and CS determine that a written retest is necessary, the student will be afforded the opportunity to study/review course material (if they desire) prior to administering the remediation test (retest).

c. Following remediation and sufficient study/review of course material, the student will be retested using a different version of the knowledge test (e.g., if test version “A” was administered to the class, then test version “B” or “C” will be used for retesting). Only one retest will be administered to any one student. Upon completion of the retest, the instructor will review the test with the student and clarify incorrect responses.

NOTE: Only a maximum score of XX% will be awarded for any remediation test (retest), regardless of the students passing score on the retest.

d. As determined by the CS; if a student fails to attain a passing grade on a retest (second written examination), the student will be subject to an academic setback or ARB to determine if the student will continue the course or be dismissed as a non-graduate.

APPENDIX G
TEST DESIGN AND BLUEPRINT (EXAMPLE)

Introduction: The procedures and forms provided in this appendix have been used to develop and validate many tests. They are provided just as an example of one system. Course designers may change or modify these procedures and forms as needed as long as those procedures and forms meet the requirements of this manual. The term "Blueprinting" is used to show how one starts with the course objectives and develops a blueprint for the tests in a new course. The result is that every knowledge test question or skill test job sheet can be tied directly back to the course objectives which in turn should be tied to the training task list (TTL). If a course already exists, which often is the case, the procedures and forms can still be used to "Back Blueprint" the course and improve the testing. This is covered under paragraph 2 below. In addition to the basic forms needed, additional forms for making changes or doing inspections are provided.

Procedures for Designing Knowledge and Skill Tests for a New Course

1. **Rate Learning Ojectives (LO) (Determine the Criticality of Course Objectives)**

   a. The course objectives must have been developed from and tied to a TTL. A good way of documenting this is to place the related TTL line item in parenthesis after each course objective.

   b. The system discussed below works equally well with task based curriculum based on a TTL. It is very important that test development goes together with curriculum development. When developing a course, you must know what will be tested so the curriculum is developed at the right level. At times, such coordination may show a problem with the course objectives and changes can then be easily made.

   c. At the beginning of course development, a group of subject matter experts (SME) will determine when and how the students will be evaluated by creating a preliminary course master schedule (CMS) and a preliminary testing plan.

   d. The SMEs must also rate the objectives, as discussed below, to help both in curriculum development and test development.

   e. In test development this rating will help to make decisions about which knowledge and skill LOs will be tested and how they will be tested. This process is necessary because most courses test too many LOs in knowledge tests. The resulting test design makes the tests too long, tests basic concepts that are also

being tested at a higher level later in the course, and results in too few questions on critical (important) objectives.

f. For existing courses, the test bank of questions and skill tests may also help in determining the criticality of the objectives. The more questions there are on an objective the more likely its criticality rating will be high and if there are not any questions on an objective its criticality will likely be low. Existing skill tests likely indicate the objectives it covers will be high. This will be discussed in detail later under section 2, Design of Knowledge Tests Using Knowledge Test Design Worksheets (KTDW).

g. To determine which LOs will be tested, the first step of this procedure is to identify critical LOs by completing the objective rating forms for the enabling objective (EO) or terminal objective (TO) of the course as shown below. A blank form is shown at the end of this appendix. This process is normally carried out by SMEs and curriculum developers who are either responsible for the design of the course, or who are assigned as instructors for the course.

NOTE: For this discussion the LOs will consist of TOs and EOs that support the TOs.

h. Skill objectives should have an "S" after the objective number, so they are properly noted.

i. Every knowledge and skill objective will, at a minimum, be rated according to the following three characteristics: level of application, level of detail/difficulty, and relationship to the TO. Additional characteristics may also be used as determined by the supervisors (e.g., "frequency").

(1) **Level of Application of Knowledge or Skill:** How important is the knowledge or skill regarding its application to actual job performance?

	Value	
High:	3	The knowledge or skill is definitely used during job performance. Need-to-know.
Moderate:	2	The knowledge or skill influences job performance.
Low:	1	The knowledge or skill has little direct influence on job performance. Nice-to-know.

(2) **Level of Detail of Knowledge/Difficulty of Skill:** What is the level of detailed knowledge/difficulty of the skill required to perform the task? (NOTE: When the task being considered requires a high level of knowledge or is difficult to perform the level of detailed knowledge/difficulty is greater.)

	Value	
High:	3	Considerable detailed knowledge or level of skill is required.
Moderate:	2	Some detailed knowledge or level of skill is required.
Low:	1	Only basic knowledge or skill required. Not difficult mentally or manually.

(1) **Relationship to TO:** To what degree is the knowledge or skill EO related to the TO?

	Value	
Directly related:	3	The EO is directly related to the TO.
Moderately related:	2	The EO is moderately related to the TO.
Indirectly related:	1	The EO is indirectly related to the TO.

j. The total of these three characteristics is added for each SME, giving a value between 3.0 and 9.0. The criticality for each objective is calculated by averaging all the SME's rating of the objective (sum of values divided by number of SMEs who rated it) and should be rounded off to one decimal place. This will then show the difference between an objective rated 6.5 (that could be rounded to 7) and 7.4 (that could be rounded to 7). Later, when evaluating which objectives to test, it would be obvious the 7.4 objective would have priority over a 6.5 objective. These ratings are not "written in stone". If later, it is determined an objective's rating should be changed, then change it. If reviews of the overall ratings show that the values were all too high or too low, change them. This is only a first cut at determining the relative importance of the course's objectives. Common sense and logic need to be applied as the course and tests are developed.

k. **CAUTION.** SMEs should not look just at individual LOs to rate them. Realistic ratings can be derived only when groups of LOs are considered, such as all LOs for one week. Every objective is important as it is being taught, but when "building" objectives later are used within higher objectives the building objectives should be rated lower when all of the week's objectives are rated (e.g., the definitions and units of current, voltage, and resistance are important when taught but these are used at a higher level when analyzing electrical circuits and need not be tested separately).

l. **Use of Criticality Factors.** As a general "rule of thumb", every objective rated 8.0 to 9.0 must be formally tested, objectives rated 7.5 to 7.9 should be formally tested, and objectives rated 6.5 to 7.5 may or may not be formally tested. Logically, an objective rated 7.4 has a much better chance of being formally tested than an objective rated 6.5. As a "general rule" higher rated objectives will have more questions about them then lower rated objectives on the tests.

m. Objectives rated below 6.5 are important to show the "logic" of the learning process for the knowledge or skill to be learned and, as a consequence, they must not be ignored. They may be "important" early in the week before higher rated objectives are covered. Such objectives may be covered in quizzes, homework, etc., which may or may not be a small part of the student's grade.

n. A typical example to show how the criticality rating is determined for one EO under TO 3.0 is shown below:

TO: 3.0 Analyze the operation of direct current (DC) series circuits to understand the tasks or functions relative to basic electricity.

EO: 3.5 Given written problems and diagrams with two of the three values provided analyze DC series & parallel circuits by solving problems for unknown values of current, voltage, or resistance to 100% accuracy. (It is helpful to place a summary of the EO as shown in the form below.)

OBJECTIVE RATING FORM

Objective No. & Summary	SME	Rating of Knowledge/Skill Objective			Total
		Application	Detail / Difficulty	Relation to TO	
EO 3.5 Analyze DC series & parallel circuits for I, V, or R given 2 of 3 values	EM2 Gray	3	3	3	9
	EM2 Even	3	3	3	9
	EM1 White	3	3	3	9
	EM1 Anne	3	2	3	8
				Total	35
				Average	8.8

o. For each LO of the course, the result of this procedure is entered on the Objective Rating Analysis (ORA) form. An example of a partially completed ORA form is shown below:

OBJECTIVE RATING ANALYSIS				
Course Title: Basic Electricity			**CIN:** A-652-0033	
Reviewed By: EM1 Gray		**Dept:** Engineering	**Date:** 7 Nov 2022	
Approved By: EMC White		**Dept:** Engineering	**Date:** 8 Nov 2022	
Lesson	**Section**	**Objective**	**Summary of Objectives**	**Rating**
1	1	3.3	Identify basic units & symbols of DC electricity	6.0
1	1	3.4	Identify basic electrical laws of DC ckts	6.2
1	1	3.5S	Analyze DC series & parallel ckts for I, V, or R	8.8
1	1	3.6S	Perform basic measurements on DC ckts	9.0

NOTE: Objectives 3.3 and 3.4 are rated low and are used at a higher level in Objective 3.5; so, they need not be individually tested in a knowledge test. They could be covered in a quiz or homework earlier in the week, before objective 3.5 is taught.

NOTE: Objectives 3.5 and 3.6 are skill objectives so there is an "S" after the number e.g., "3.6S").

NOTE: After filling out the ORA, it is important to review the ratings of the overall course to see if they tend to be too high or too low. Some SMEs think everything they teach is important and rate everything as 9's. This defeats the purpose of rating the objectives. If this happens, the SMEs need to adjust their ratings before proceeding.

NOTE: The rating of objectives for curriculum development and testing development are the same. It is important both to stress the same objectives in teaching and in testing. Testing will stress the more critical objectives. In curriculum development, time often is required for "building" objectives to gain the basic knowledge to support the later more critical objectives; so, time alone does not equate to importance, but the instructor's presentation should make what is most important clear to the students.

2. **Design of KTDWs –** A preliminary test plan and CMS must have been completed, indicating how the course objectives will be tested by knowledge and skill tests. For each knowledge test prepare a "blueprint" using a locally created KTDWs. During this process, testing objectives, which are discussed below, are created by completing the following steps:

   Step 1: Enter the course title and course identification number information required in the top two blocks of the KTDW.

Step 2: Decide how the EO(s) are going to be tested and become testing objectives: Individually, group of similar objectives, or split.

Step 3: Enter identifying data for the critical EO(s) in the first two columns left of each testing objective.

a. In the first two columns of the worksheet, enter the number of the EO(s), and the criticality rating for each objective the testing objective is going to measure.

b. If EOs are to be combined, list each one and its respective criticality.

c. If one EO is to be split into two or more testing objectives, enter it with a letter, a, b, c, etc., after it with its criticality (3.5a, 3.5b, and 3.5c). In the case of an electrical course in which the objective is to solve for current, voltage, or resistance, the letters "I, V, and R" could be used.

Step 4: Draft a Testing Objective:

a. In the third column of the worksheet, draft a testing objective based on step 3 above.

(1) The testing objective adds details and can correspond to a single EO, split a single EO into parts, or combine closely related EOs.

(2) Related objectives can be combined into one testing objective in order to have enough questions in the area. Combining closely related LOs is especially important when highly rated objectives are written in such detail that only a few questions can be written for them.

(3) If objective 3.5, were not split into three testing objectives, a computer-generated random test could select fifteen questions solving for just one value, current. The splitting of the objective ensures that there will be five questions on each parameter (I, R, and V).

(4) For an oral or essay test, it is even more important to describe the level of detail expected in the answer in the testing objective. A question asking a student to describe the basic steam cycle could require a simple answer of generation phase, expansion phase, condensation phase, and feed phase or could take a half hour to answer if it is desired for the student to describe each component in the cycle and how it works.

a. When working with testing objectives, the following factors should be considered:

(1) Each testing objective will be designed to measure one EO, a group of closely related EOs, or a part of an EO with higher criticality.

(2) The testing objective must contain a verb that precisely describes the behavior to be demonstrated by the student. At this time an EO's verb may be changed to "identify" for matching, "recall" for fill-in-the-blank, "retrieve" for open book, or "describe" for essay or oral tests.

(3) The testing objective will include the condition(s) under which the behavior will be demonstrated. May be aiding, limiting, or both. For example, the student may use a technical manual (open book) to answer questions.

(4) If review questions are desired for a test, they must be included as testing objectives on the KTDW, normally at the end. Review testing areas will likely contain a group of the most highly rated EOs.

b. When developing testing objectives, do **NOT** use verbs that are highly specific, such as "Match" or "Select" (statements). These words describe testing behaviors rather than on-the-job behaviors to be demonstrated by the students. (These verbs are also limiting, because test items used to measure such objectives can only be of the type specified by the verb.)

Step 5: Determine the type and number of test items required to measure each testing objective.

a. Enter the type of each test item, using the following codes:

(1) CO: Completion (Fill-in-the-Blank)

(2) ES: Essay/Short answer

(3) MA: Matching

(4) MC: Multiple-Choice

(5) OR: Oral

NOTE: Each objective must be assessed in the same manner and at the same level of difficulty.

b. Enter the number of questions (or question point "value" for essay or oral tests) required to measure each testing objective. Generally, the more critical the LO is, the more questions should be asked about it or the "value" it should be given. When all the worksheets for a test have been completed, this total will determine the maximum possible score for the test.

Step 6: Determine minimum passing score for each testing objective and for the knowledge test.

a. Determine the minimum number of items which must be answered correctly (or points needed for essay or oral tests) for the student to "pass" each testing objective. This **DOES NOT** have to match the course or test passing grade. A course or test passing grade can be 70%, but an individual testing objective could be 1 of 2 (50%); 2 of 3 (66%); 3 of 4 (75%); 3 of 5 (60%), 4 of 5 (80%), or 2 of 2 (100%). As a general rule, all test items concerned with safety should be answered without error. In the case of an essay or oral test, enter the number of points needed to consider the student's answer satisfactory as 7 out of 10 points based on a grading guide or rubric.

b. Add the numbers in the Min. No. Correct column and enter the total in the space at the bottom of the worksheet. When all the worksheets for a test have been completed, the total in the Min. No. Correct column will determine the minimum passing raw score for the test. When this minimum passing raw score is divided by the number of items, it provides the minimum passing percentage for the test. This percentage should correspond with or be slightly above the course passing grade if possible.

Step 7: Determine the number of items for the test bank.

a. Since there will be at least two or more versions of the test, calculate the number of items needed for each testing objective and enter this data in the test bank column of the worksheet. Avoid repeating the same question on other versions of the test.

b. When completed, the KTDW becomes a "blueprint" which must be followed to prepare other versions of the test.

c. **CAUTION:** Versions of a test, in which identical questions are in different order or just having the question's distracters in different order, are **NOT** acceptable.

Step 8: Develop a conversion table for the test. Adjust the number of questions in each testing objective in the KTDW to create a test that has a very simple conversion table (e.g., if a course's passing grade is 70%, make a 50-question test with the minimum question correct being 35; so, each question is worth 2 points). (Or make a 40-question test that requires 28 questions correct, etc.) If the total number of questions the KTDW adds up to 49 questions just add one more question in one of the most critical areas to make the total 50. A second way to do this is to make each question worth the same value, even if it is not an even number (e.g., if one requires 20 questions correct out of 30, each question is worth 3.333). Again, a simple conversion table can be made. Many computer testing programs do this automatically.

Step 9: Have the KTDW reviewed by the course supervisor (CS) and signed by the authorizing authority.

3. **Knowledge Test Item Worksheets (KTIW)**

   a. The next step in these procedures is to complete KTIWs for each test item approved for use on knowledge tests to measure the critical LOs of the course (refer to Figure 8-1 or Figure G-1 at the end of the appendix).

   b. Fill in the information needed at the top of the KTIW.

   c. Each item must be tied to the actual reference(s) (e.g., NSTM, SIB, DC Book, etc.). If there is more than one possible reference, all will be listed. (This is important because technical manuals are sometimes lacking facts in the first section but are much more exacting later). With open book tests, a student may use the wording in the first section and get the question wrong. If this is the case, these problems must be pointed out to the students during the course. Then the question either should not be used or the students must be cautioned that the answers should not be based on general statements in the first section, but on the more exacting statements in the detailed sections of the technical manual.) Ensure that a copy of the page from the actual reference(s) be attached to the KTIW to aid those reviewing and approving the item

   d. Each item must be tied to the instructor guide (IG) and/or interactive multi-media Instruction (IMI). This is very important during the initial creation of the test items, to make sure they are covered in the IG and/or IMI. But with time this often is less meaningful as the IG page numbers and/or IMI slide numbers change. Just a simple change in spacing or font, going from a normal page to

landscape, or adding something to the IG or IMI could affect this. It is too much administrative work to keep this current on the paper KTIWs. Instead, ensure the copy of the page from the original IG or slide from the original IMI is attached to the KTIW to aid those reviewing and approving the item.

e. The test question is then entered on the KTIW.

(1) Place the EO before each question.

(2) Care must be taken that each distracter is a plausible answer or represents a logical or mathematical mistake a student could make. The development of good distracters is the hardest part in the development of good multiple-choice questions. Taking one alternating current electrical circuit and changing a resistor's value in it to four different values (1, 2, 5, and 10 ohms) and making the distracters correspond to each of these four values is useless as four questions, because the student cannot come up with any of the wrong distracters. Each distracter must correspond to a logical or mathematical mistake the student could make (e.g., invert Ohm's law, a decimal place error, confusion between inductors and capacitors, forget 2 or pi in the calculations, etc.).

(3) A copy of any diagram or media associated with the question must be included with the KTIW.

(4) The actual reference(s) should be stated just below the question to make it easier to place them with the question in the KTAG.

f. When completed, each test item entered on a KTIW must be reviewed for content validity and technical accuracy by other SMEs, and for readability by others and the CS. When the test item satisfies all the questions on the checklist on the reverse side of the form, the testing officer will sign the KTIW, and the item should be approved for use by the approving authority.

CAUTION: Questions that just jumble the distracters are NOT satisfactory as different questions.

g. The loose KTIW pages can then be used to arrange the questions for each testing objective in the tests and for each version of the test, like dealing out cards. The pages can be shuffled between the test versions to make sure that one question is not testing the same concept as another on the test, that one

question does not give away the answer to another question on the same test, that there are similar number of question types on each test, and that the tests are of about equal difficulty, etc.

h. At this time the questions can be entered electronically into the approved NETC LAS question bank. Enter the questions in the order that they appear on each version of the test to make finding the question easier in the future (e.g., if there are five questions on each of three versions of the test, questions 1-5 should be entered in order in version one, 6-10 in version two, and 11-15 in version three). When entering the questions, place the EO in front of them and the hard reference either below the stem or below the last distracter; so, these items will be maintained with each question and appear if the test is printed or saved to a file.

i. Once all the questions from the KTIWs have been entered electronically into the LAS question bank and paper (backup) and on-line tests created (with the hard references noted in the administrator guides), the KTIWs lose some of their usefulness, especially after time and changes are made to the questions, IG, or IMI. After a period of time, some courses shred the KTIWs, using the questions in the LAS, the references in the administrative guides, and a file of exam correction sheets to monitor changes.

j. Assemble the paper backup tests, making sure to number and date all pages in the footers. This will make it easier in the future when changes are made to the test pages.

4. **New or Revised Test Question Submission Worksheet**

a. Once test questions are created and in use, problems may be found in the wording or content of the questions. These problems may be identified by later test-item analysis or just noted by the instructor and/or students.

b. Half the time the problem is NOT with the test question, but with the IG, IMI, or instructor presentation that is not conveying the desired knowledge to the students. In this case corrections must be made to whatever is causing the problem. A minor change, such as a correction in grammar or spelling is not a real revision and may not require a detailed review, but care must be taken that the change is made in all the appropriate places (administrator guide, student tests, LAS, etc.) If the problem is with the question, a new or revised Test Question Submission Worksheet (Figure G-2) must be filled out and submitted (shown at the end of this section). It is very important that the submitter both

verifies the accuracy of the correction by citing the reference(s) (NSTM, SIB, technical manual, etc.) and verifies that the material covered by the question is correctly presented in the IG and/or IMI. To help with this as the proposed change is reviewed by others, a copy of reference's page, IG page, and/or IMI slide will be attached to the worksheet. Also, if a new question is replacing the old one, the originator must make sure it is not too similar to or gives away the answer to another question on the test version in which it will be used. Any diagram or media associated with the question must be included with the worksheet.

c. When updating the pages in the paper backup tests with the new question, make sure the new page(s) are dated with the change date in the footer. Often changes are minor, and it is hard later to make sure each page of a test is current without a lot of effort. Dating the pages in the footer with the change date eliminates this problem.

Example: Knowledge Test Item Worksheet			
Course Title:			Course #:
Lesson Topic Title:			
Part:	Sec/Unit:	Obj No:	DP/IG Page:
Obj Crit:	Closed Book ☐	Open Book ☐	PP Slide:
Developer:	Outside Readers		Ref & Page/Paragraph No.
Reviewer:	1.		
Reviewer:	2.		
Item Type: (Check one) Multiple-Choice ☐ Matching ☐ Completion ☐ Essay/Oral ☐ Case Study ☐ Test Item:			

Figure G-1: Knowledge Test Item Worksheet (Example)

NEW OR REVISED TEST QUESTION SUBMISSION WORKSHEET

TRAINING DIVISION:	COURSE IDENTIFICATION NUMBER (CIN):	MODULE/UNIT NUMBER:	TEST NUMBER:	VERSION NUMBER:
DATE:	TESTING OFFICER NAME:			

QUESTION #1

OBJECTIVE NO:	QUESTION NUMBER:	RATIONALE FOR CHANGE:
(ORIGINAL) QUESTION		
ORIGINAL OPTIONS (*correct answer)	1	
	2	
	3	
	4	
(REVISED) QUESTION		
REVISED OPTIONS (* correct answer)	1	
	2	
	3	
	4	

QUESTION #2

OBJECTIVE NO:	QUESTION NUMBER:	RATIONALE FOR CHANGE:
(ORIGINAL) QUESTION		
ORIGINAL OPTIONS (*correct answer)	1	
	2	
	3	
	4	
(REVISED) QUESTION		
REVISED OPTIONS (* correct answer)	1	
	2	
	3	
	4	

NOTE: Each Test Question Submission Worksheet shall only have a maximum of two (2) questions considered for revision, both of which shall be from the same module, test, and version. If only one (1) question was decided to be submitted for revision, then place N/A on lower half headers.

Figure G-2: New or Revised Test Question Submission Worksheet (Example)

NEW OR REVISED TEST QUESTION SUBMISSION WORKSHEET

INSTRUCTIONS: Questions that are submitted for revision shall be verified by at least two (2) subject matter experts (SME) on the topic and must pass all criteria listed below. If one criteria has been deemed by SME to not have been met by the proposed change return worksheet to the Testing Officer and suggest a recommendation to be considered.

SME #1 NAME:		RANK:	RATE/MOS:	REVISED QUESTION 1		REVISED QUESTION 2	
				YES	NO	YES	NO
CRITERIA	Valid and taught in Lesson Plan and Trainee Guide.						
	Question is clear and concise.						
	Relates to objective.						
	Only 1 correct answer.						
	Distractors plausible.						
	No clues in question.						
	Not too easy, not too hard.						
SME #1 SIGNATURE:				DATE:			

SME #2 NAME:		RANK:	RATE/MOS:	REVISED QUESTION 1		REVISED QUESTION 2	
				YES	NO	YES	NO
CRITERIA	Valid and taught in Lesson Plan and Trainee Guide.						
	Question is clear and concise.						
	Relates to objective.						
	Only 1 correct answer.						
	Distractors plausible.						
	No clues in question.						
	Not too easy, not too hard.						
SME #2 SIGNATURE:				DATE:			

ROUTING

POSITIONS	NAME	SIGNATURE	DATE
TESTING OFFICER			
COURSE SUPERVISOR			
FIELD TRAINING SPECIALIST			

NOTE: Once proposed changes have been fully approved, ensure to archive this worksheet in your course's Test Item Analysis Binder. Target a specific class to pilot the test with changed questions and perform a critique on new/revised test items to decide whether to keep or revise the changes.

Figure G-2: New or Revised Test Question Submission Worksheet (Example)

APPENDIX H
TEST WEIGHTING (EXAMPLE)

1. Test weighting uses a mathematical formula to give more importance to assessments or test items. A percentage is assigned to various assessments or test items based on the importance that knowledge or skill has to success on the job. Weighting is a way of recognizing that not all assessments are equal in value.
2. Start with 100 points (100%) and then allocate a portion to each assessment that you have. For example, 20 points or 20% to assignments, 25 points or 25% to quiz 1, and 55 points or 55% or to practical applications for a total of 100 points or 100%.
3. To calculate each student's score, divide their score by the total points available for that event. Then multiply each score by its respective weight. Finally, add the weighted scores to obtain their final grade.

	Raw Score	Possible Score	Percentage	Weight	Score
Assignments	9	10	90	20%	18
Quiz 1	40	50	80	25%	20
Practical Applications	72	100	72	55%	40
				Final Score	78

Table XX: Weighting Test Scores (Example)

4. The student above received 9/10 on the assignment, 40/50 on quiz 1, and 72/100 on the practical application. Their weighted score would be (9/10 x 0.2 + 40/50 x 0.25 + 72/100 x 0.55) = 18 + 20 + 40 = 78 points out of 100 for the course.
5. This same concept can be applied to individual tests to weigh test questions.

APPENDIX I
SUBJECT MATTER EXPERT TEST REVIEW (EXAMPLE)

Subject Matter Expert Test Review

Knowledge/Performance

Course Identification Number: _____ Test/Version Number: _____

RATE/RANK/NAME: _____

Date: _____ Years of Experience in Subject Matter: _____

Directions: Complete this form at the end of each test and submit it to the course supervisor. Answer the following questions with a YES/NO response:

Were test instructions clear and easy to understand?

YES/NO

Was the test technically accurate?

YES/NO

Were the job steps complete and easy to understand (Performance Test only)?

YES/NO/NA

Did the test provide a good assessment of achievement of the learning objective(s)?

YES/NO

Was the test level of difficulty appropriate?

YES/NO

Was the test's grammar correct?

YES/NO

Do you have suggestions to improve the test?

YES/NO

If so, please list those suggestions in the space provided below.

Comments and/or suggestions:

_____

_____

_____

_____

_____

_____