



**Career
Essentials:
Assessments**

Career Essentials: Assessments

Teacher Preparation Guide For Use with the Career Essentials: Assessments

*Discover, Develop and Validate Students'
Knowledge and Skill*

MARINE SERVICE

TECHNOLOGY ASSESSMENT

Introduction to the Career Essentials: Assessments

The Career Essentials: Assessments can help both students and teachers discover students' occupational strengths. By implementing the Career Essentials: Assessments, students and teachers can collaboratively develop a life-long learning plan to validate and enhance students' skills and knowledge. Assessment data results are beneficial for students, teachers and administrators in validating student learning, and improving programs and their accountability.

This teacher preparation guide is a tool developed for instructors to help students capitalize on their unique strengths, which can improve individual student performance and provide a clear way forward for student success.

The Career Essentials: Assessments Teacher Preparation Guide provides an easy-to-follow road map to implement the Career Essentials: Assessments. The guide is not meant to be curriculum nor should it replace that which already exists. It provides specific information regarding the Career Essentials: Assessments so teachers can identify existing curriculum areas that may need additional emphasis.

The guide ultimately helps teachers provide students with learning opportunities. Its goal is for students to become comfortable and successful with the Career Essentials: Assessments.

Inside the guide, teachers will find:

- Major content areas of the assessment
- A blueprint of the assessment competency areas
- A checklist of the various competency areas within the assessment
- Access to a trade- or technical-specific online 10-question demo assessment
- Resources used for the assessment development
- Access to an employability skills based, online 10-question practice assessment to help students navigate the assessment system

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What are Career Essentials: Assessments?

Career Essentials: Assessments are online assessments that evaluate technical and employability skills and knowledge. They are the way ahead for the next generation of our American workforce, and they help candidates validate their technical skills and knowledge to potential employers. They also help local instructors demonstrate the value of their programs, while supporting local industries with a pool of potential employees that has been tested by a system they can trust.

Each assessment was developed by a panel of industry, high school and college/postsecondary subject matter experts (SMEs) using national technical standards. Career Essentials: Assessments were created by industry to ensure relevance to entry-level skills, meet Perkins IV accountability requirements and provide certificates to students who achieve industry-defined scores. They ensure your students are workforce ready.

Career Essentials: Assessments incorporate photographs, videos, animations and illustrations to ensure clarity for each technical question. Drag-and-drop and multiple-choice questions appeal to visual and kinesthetic learners and test content knowledge rather than test-taking abilities. Even simple multiple-choice questions are brought to life through pictures and animations.

Assessments are available in more than 40 trade, industrial and technical areas. A rigorous and educationally sound process captures critical competencies, standards and criteria as defined by industry.

Academic core and critical skill areas also exist in each assessment. State-level academic curriculum specialists identified connections to national academic standards.

Each one-hour assessment includes 50 questions. Under the supervision of a proctor, the integrity of each test is ensured by offering multiple unique versions of the assessment, which

For complete information regarding the Career Essentials: Assessments and to see all assessment areas, please visit the website at: www.careeressentials.org

measure the same core and critical competencies. Even within the same version, questions and answers are displayed in varying orders to prevent test takers from copying others. The Career Essentials: Assessments are designed to be user-friendly and intuitive for students.

Using the Career Essentials: Assessments

Every classroom is unique. You can use the Career Essentials: Assessments in a way that best suits your program and students. The following directions are SkillsUSA's suggested and preferred method to implement the assessments so that your students gain the most from the results.

The most important step in the Career Essentials: Assessments process is to select the correct assessment for your students. You are key to the selection process. Without your involvement, the wrong assessment may be selected. Assessment titles do not provide enough information for proper selection. Review the various assessment categories that best correspond to your program.

Next, look at each of the assessment titles within the category and the corresponding blueprint. The blueprint will tell you which competencies and subjects are addressed in the assessment.

Cross-walk the various blueprints with your classroom curriculum. The assessment blueprint will show what's emphasized and how competencies are weighed. Please remember the Career Essentials: Assessments are based on national industry standards, so the assessment may not perfectly align with the existing curriculum. Content may need to be added or emphasized to better prepare students for the Career Essentials: Assessments.

Once you have selected the assessment that best fits your program, administer that Career Essentials: Assessments at the beginning of your students' final program year. This could be considered a pre-test.

Assessment results are available as soon as your student completes the assessment. The report provides you with a gap analysis to identify your students' learning needs according to each competency area within the assessment. Dynamic reports compare your students' performance to the current state and national averages. Reports also enable you to track a student's progress on an individual basis. The assessment pre-testing results provide you with a benchmark for your students and identify student learning gaps. This data may help you adjust your own curriculum and identify areas that may need more or less emphasis. The data can be shared with students so everyone can focus on learning areas that need improvement during the school year.

Then, at the end of the school year or program semester, administer your specific Career Essentials: Assessments a second time as a post-test.

Use post-test data to improve or adjust curriculum once again for your next program year. This way, curriculum adjustments are made using the student testing data rather than arbitrarily making adjustments.

This pre- and post-test process is a "win-win" situation for the teacher and especially the student! To ensure a quality process, SkillsUSA is ready to help at any time.

Preparing Students for the Career Essentials: Assessments

Provide each student with a copy of their trade- or technical-specific Career Essentials: Assessments Blueprint. Do this at the beginning of your course. Review and discuss the blueprint with your class, providing insight on the assessment weighting and what is emphasized.

Have students discuss how they can assist each other to prepare for the assessment.

Place the Career Essentials: Assessments Blueprint on the classroom wall. The blueprint will help students focus on the appropriate course content areas that align with the assessment. It will also help everyone to be aware of the program's goals and expectations.

The Career Essentials: Assessments at a Glance

- **Select the correct assessment title. *Do not* have someone select the assessment for you, as there may be several titles that may relate to your program**
- **Review the assessment blueprint that best aligns with your existing curriculum**
- **Identify gaps in your curriculum, and use additional resources to enhance or align the curriculum**
- **Share the assessment blueprint with the students so everyone is aware of the expectation**
- **Have your students take the assessment at the beginning of their final program year as a pre-test**
- **Use pre-test data to identify learning gaps or strengths of individual students or the class**
- **Remediate the students using the data analysis from pre-test to enhance, emphasize and adjust learning objectives**
- **Have your students take the assessment a second time (as a post-test) at the end of the program year to determine learning gains/gaps**
- **Use post-test data to improve or adjust curriculum for your next program year**

Administer the Career Essentials: Assessments as a pre-test to identify student gaps. If possible, pre-test your students at the beginning of their final program year to identify learning gaps both individually and as a class. The data will provide an excellent “road map” to prepare students to take the assessment again (post-test) at the end of the program. Using the data, tailor the instruction to better prepare your students.

Use the Career Essentials: Assessments competency areas checksheets included in this guide to encourage class discussion and help students identify strengths and weaknesses.

Use the pre-test data to ascertain problematic learning areas. Have students identify discussion topics based on the various competency areas and their pre-test data results. Exercises, demonstrations and even questions can be developed by the students using their textbooks or other resources listed in this guide.

Assign homework that aligns to the assessment blueprint. Focus on a competency area within the assessment. Using the checksheets in this guide, have students develop questions and potential answers using the resources identified when developing the assessment. Use the questions for class discussion or “quiz bowl” activities.

Have students take the Career Essentials: Assessments trade- or technical-specific online 10-question demo assessment. This could be a homework assignment or done in class 30 days prior to taking the assessment the second time (as a post-test). This not only will provide students with specific sample questions and potential answers, but it will also allow students to experience the online system again and become more familiar with the types of questions they may encounter when taking the actual assessment.

Following the demo assessment, discuss the experience students had. What question(s) did

they not understand? Did they have difficulty navigating the online system? This experience will help students be more comfortable and confident when taking the final assessment.

Discuss as a class or individually with students which question(s) were difficult. Facilitate a discussion to glean more information regarding why certain answers were wrong. Offer techniques students can use to better determine correct answers.

Workplace-Ready Skills

Through the Career Essentials: Assessments, you have the option for your students take an Employability Assessment. This assessment tests a student’s workplace-ready skills such as communication, teamwork, time management and more. It can be used for any student in any occupational area as a practice test or a separate assessment.

If you use the Employability Assessment as a practice test have students take it in class. Not only can the Employability Assessment help students become familiar with the navigational tools of the assessment system, but it can also measure and make your students aware of another important skill set. It may also help them become comfortable in the testing environment.

See the Career Essentials: Assessments website for more information: www.careeressentials.org

The Employability Assessment is *not* intended to familiarize students with the Marine Service Technology assessment content.

Please note: For all Career Essentials: Assessments to be valid, instructors cannot be present in the room where their students will be taking the test. A proctor is required. Proctors can be other instructors, a school administrator or school counselor.

Assessment Competency Areas

Career Essentials: Assessments Marine Service Technology Assessment covers 12 major technical competency areas (unit areas). In the online assessment, these 12 competencies are tested with 50 interactive, multiple-choice items. Each competency area has a different number of items. The chart lists the major technical competency areas and the percentage of the assessment in each one.

Technical Competency Areas for Marine Service Technology

Competency	Percentage of Area Assessment
Demonstrate general shop practices	2%
Utilize marine engine components and theory of operation	20%
Display knowledge of industry standards related to engine installations	8%
Exhibit knowledge of marine electrical systems	26%
Utilize knowledge of marine fuel system services	8%
Demonstrate knowledge of marine cooling systems	6%
Apply knowledge of lubrication systems	2%
Exhibit knowledge of gear drive systems; inboard and outboard	8%
Service and repair boat and trailer rigging	2%
Service and repair marine sanitation systems	6%
Demonstrate knowledge of marine	

materials, composites, woodworking and metalworking	6%
Model proper customer service/employability skills	6%

Academic Core and Critical Skill Areas

Academic core and critical skill areas also exist in each assessment. The SkillsUSA national technical committee identified that the following academic skills are embedded in the Marine Service Technology training program and assessment:

Math Skills

- Use fractions to solve practical problems
- Use proportions and ratios to solve practical problems
- Simplify numerical expressions
- Solve practical problems involving percents
- Measure angles
- Find surface area and perimeter of two-dimensional objects
- Find volume and surface area of three-dimensional objects
- Make predictions using knowledge of probability
- Make comparisons, predictions and inferences using graphs and charts
- Solve problems using proportions, formulas and functions
- Find slope of a line

Science Skills

- Use knowledge of mechanical, chemical and electrical energy
- Use knowledge of temperature scales, heat and heat transfer
- Use knowledge of speed, velocity and acceleration
- Use knowledge of Newton’s laws of motion
- Use knowledge of work, force, mechanical advantage, efficiency and power
- Use knowledge of simple machines, compound machines, powered vehicles, rockets and restraining devices

- Use knowledge of principles of electricity and magnetism
- Use knowledge of static electricity, current electricity and circuits
- Use knowledge of magnetic fields and electromagnets
- Use knowledge of motors and generators

Language Arts Skills

- Provide information in conversations and in group discussions
- Provide information in oral presentations
- Demonstrate use of verbal communication skills: word choice, pitch, feeling, tone and voice
- Demonstrate use of nonverbal communication skills: eye contact, posture and gestures using interviewing techniques to gain information
- Demonstrate comprehension of a variety of informational texts
- Use text structures to aid comprehension
- Understand source, viewpoint and purpose of texts
- Organize and synthesize information for use in written and oral presentations
- Demonstrate knowledge of appropriate reference materials
- Use print, electronic databases and online resources to access information in books and articles

Connections to National Standards

State-level academic curriculum specialists identified the following connections to national academic standards.

Math Standards

- Numbers and operations
- Algebra
- Geometry
- Measurement
- Data analysis and probability
- Problem solving
- Communication
- Connections

- Representation

Source: NCTM Principles and Standards for School Mathematics. To view high school standards, visit: www.nctm.org/standards/content.aspx?id=16909.

Science Standards

- Understands relationships among organisms and their physical environment
- Understands the structure and properties of matter
- Understands the sources and properties of energy
- Understands forces and motion
- Understands the nature of scientific inquiry

Source: McREL compendium of national science standards. To view and search the compendium, visit: www2.mcrel.org/compendium/.

Language Arts Standards

- Students read a wide range of print and nonprint texts to build an understanding of texts, of themselves and of the cultures of the United States and the world; to acquire new information; to respond to the needs and demands of society and the workplace; and for personal fulfillment. Among these texts are fiction and nonfiction, classic and contemporary works
- Students apply a wide range of strategies to comprehend, interpret, evaluate and appreciate texts. They draw on their prior experience, their interactions with other readers and writers, their knowledge of word meaning and of other texts, their word identification strategies, and their understanding of textual features (e.g., sound-letter correspondence, sentence structure, context, graphics)
- Students adjust their use of spoken, written and visual language (e.g., conventions, style, vocabulary) to communicate effectively

with a variety of audiences and for different purposes

- Students use a variety of technological and information resources (e.g., libraries, databases, computer networks, video) to gather and synthesize information and to create and communicate knowledge
- Students use spoken, written and visual language to accomplish their own purposes (e.g., for learning, enjoyment, persuasion and the exchange of information)

Source: IRA/NCTE Standards for the English Language Arts. To view the standards, visit: www.readwritethink.org/standards/index.html.

Student Tools:

Access Directions for the Trade- or Technical-Specific Online 10-Item Demo Assessment

Have your students copy and paste this link www.careeressentials.org/assessments/demo-our-assessments into their browser. The sample programmatic questions will give you and your students an idea of the types of questions on the assessment and how the questions are generally written.

Student Tools:

Test-Taking Reminders

Encourage your students to have good study habits. Below are basic reminders to better prepare students for life-long learning and workplace success. You may want to have this discussion at the beginning of the year to encourage students to incorporate these strategies.

- Develop a regular study schedule
- Identify a specific location to study
- Always take notes while studying in class or on your own
- Take short breaks during your study session
- Perform “mini-testing” to make sure you understand and comprehend the program concepts
- Join small study groups to help focus on the program content
- If you need special assistance in testing, tell your teacher or counselor so they can make accommodations.

Student Testing Tips

The most important tip for your students is to be prepared mentally and physically for the testing session. Make sure to tell them to get plenty of rest and eat healthy. Suggest they wear comfortable and appropriate clothing to the testing session. If they are able to bring items to the testing session, such as a non-programmable calculator, make sure they have the items ready the night before. Have students check our website at www.careeressentials.org/wp-content/uploads/2017/07/Permitted-Testing-Tools-Aids.pdf for permitted tools or job aids that can be used during testing. The more organized they are before the testing period, the more relaxed they will be during the actual testing session.

Encourage your students to be relaxed and positive. If they begin to panic during the testing, suggest they take some deep breaths to relax and think positive thoughts.

Do not rush through the questions. Instruct your students to read the question and potential answers thoroughly. Tell them to make sure they know exactly what the question is asking before answering. Let them know that if they are unsure, they can mark the question and return to it. Other questions may have clues to the correct answer.

Use process of elimination. If your students are not sure of the correct answer, tell them to study the potential answers and eliminate the ones that they know are not correct.

If all else fails, tell students to *guess*. After they have exhausted all options, tell them to take their best guess at the correct answer. If they have studied the content area, they may intuitively know the correct answer. The Career Essentials: Assessments system does not penalize students for guessing and they may guess correctly!

Student Tools:

Marine Service Technology Blueprint and Competency Area Knowledge Checksheets

The next section provides the assessment blueprint and detailed topics within each competency area covered within the Marine Service Technology assessment. Photocopy and share the following blueprints and checksheets with your students so they can better prepare for each of the competency areas within the Marine Service Technology assessment.

Summary and Quick Glance Testing Reminders

The Career Essentials: Assessments process is designed for program and curriculum improvement. This is a continuous improvement process to better meet the educational needs of your students by strategically using data results.

Advanced planning and preparation is a key component in implementing this process. Below we have attempted to summarize the steps in the suggested Career Essentials: Assessments implementation pre- and post-test process.

- Identify the correct assessment for your program
 - Share the selected assessment blueprint with your students, parents, advisory board members and others. Place the blueprint on the classroom wall
 - Pre-test your students at the beginning of their final programmatic year
 - Use the data results to identify “learning gaps”
 - Share the pre-test data with the student(s)
 - Tailor learning experiences to meet student needs and supplement current curriculum
 - Develop homework assignments around the competency knowledge checksheets located in this guide
 - Have students take the demo 10-question practice test 30 days prior to the post-test
- For students that need more time in the actual testing environment, use the Employability Assessment to review navigational tools and to make students more comfortable in the testing lab
 - Finally, review the blueprint and knowledge checksheets in totality before taking the post-test to ensure students are aware of the expectation

Using the above steps, you and your students should see improvement in the post-test assessment score report and a percentage of knowledge gained.

Marine Service Technology Blueprint

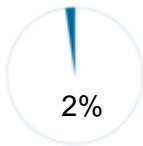
This Blueprint contains the subject matter content of this Career Essentials Assessment.

Note: To fully prepare for **Marine Service Technology** SkillsUSA Championships contest, refer to the current year's SkillsUSA Championships Technical Standard, now included with your SkillsUSA Professional Membership. If you need help in accessing this benefit, contact the SkillsUSA Membership Office at 1-800-355-8422.

Standards and Competencies

Competencies are weighted throughout the assessment. The percent shown is the weight of the competency. There are 50 questions per assessment.

Demonstrate general shop practices



- ∞ Establish proper shop safety tool and equipment procedures
- ∞ Apply MSDS and procedures specific to the workplace environment
- ∞ Recognize and utilize proper personnel protection related to marine service and repair procedures
- ∞ Follow HAZMAT storage and disposal requirements

Utilize marine engine components and theory of operation



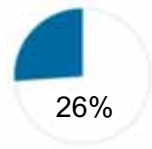
- ∞ Apply knowledge of four-cycle gasoline-fueled engines:
 - Employ the principles of operation of a four-stroke gasoline-fueled engine
 - Identify internal components of a typical marinized four-cycle gasoline-fueled engine and describe how the components interact during the four cycles
- ∞ Demonstrate knowledge of four-stroke diesel engines.
 - Differentiate between the diesel and gasoline-fueled four-cycle
 - Differentiate between compression ignitions and spark ignitions
 - Perform valve adjustment procedures on overhead valve and pushrod engine
 - Perform valve adjustment on overhead cam engine
 - Utilize precision measuring instruments such as micrometers, dial indicators, vernier calipers and feeler gauges
- ∞ Understand two-cycle outboard engines.
 - Demonstrate principles of operation of a two-stroke outboard engine
 - Identify internal components of a typical two-stroke outboard engine and describe how the components interact with each other to achieve proper engine operation

Display knowledge of industry standards related to engine installations



- ∞ Identify relevant American Boat and Yacht Council Standards as they apply to inboard engine installations. Specifically, these are engine control systems, belt guards and oil sump design, and fuel and exhaust system requirements recommended by the ABYC and the U.S. Code of Federal Regulations (CFRs)

Exhibit knowledge of marine electrical systems



- ∞ Apply basic electrical theory, circuit design and application
- ∞ Use a digital multi-meter (DMM) to perform electrical troubleshooting procedures such as voltage and amperage measurements, as well as to test for electrical continuity and measure electrical resistance values
- ∞ Follow electrical system installation requirements as recommended by the ABYC and mandated by the U.S. Coast Guard's CFR specific to recreational boats, particularly in regard to battery installations, over-current protection requirements, ignition protection requirements and accepted wire sizing techniques for both AC and DC marine systems
- ∞ Terminate wire connections using the proper techniques
- ∞ Demonstrate knowledge of ABYC requirements for proper wire support and chafe protection
- ∞ Demonstrate circuit troubleshooting procedures
 - Examine engine starting systems
 - Assess battery condition
 - Monitor engine ignition system
 - Check battery charging systems
- ∞ Read and utilize wiring diagrams and follow troubleshooting flow charts to diagnose electrical system problems

Utilize knowledge of marine fuel system services



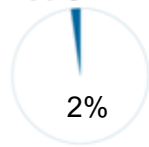
- ∞ Identify fuel system components and their functions in the system
 - Disassemble, clean and replace, and adjust standard carburetor internal components associated with an overhaul
 - Perform fuel system pressure tests on both carbureted and fuel injected fuel systems
 - Properly mix fuel stabilization additives and prepare fuel systems for extended lay-up

Demonstrate knowledge of marine cooling systems



- ∞ Identify raw water and closed cooling system component functions on a variety of marinized engines
- ∞ Access water pump assemblies on outboard and inboard/outboard engines
- ∞ Remove service and install water pumps on same
- ∞ Overhaul a conventional raw water pump on an inboard engine assembly
- ∞ Identify the need for sacrificial anodes in raw water cooling systems
- ∞ Identify correct procedures for cooling system anode selection and replacement
- ∞ Determine engine coolant condition and freeze level protection level
- ∞ Differentiate between ethylene glycol and propylene glycol anti-freeze and where each must be used
- ∞ Identify heat exchanger design and service procedures
- ∞ Replace and properly adjust engine drive belts, both v and serpentine types
- ∞ Determine proper thermostat operation and replacement if required
- ∞ Utilize an infrared heat sensing gun to track coolant flow through engine and heat exchangers and explain temperature readings as they relate to the cooling system's condition
- ∞ Pressure test cooling systems and coolant recovery container caps to locate potential leaks and proper pressure rating of container caps

Apply knowledge of lubrication systems



- ∞ Classify engine oil ratings as established by the American Petroleum Institute (API)
- ∞ Determine engine oil quantity and type recommended using engine workshop manuals
- ∞ Change engine oil and filter following manufacturer's recommendations for the engine
- ∞ Determine maintenance interval adjustments or excessive component wear by an analysis of a lubrication lab
 - Interpret an oil analysis report and describe potential internal component faults to both engines and gear units

Exhibit knowledge of gear drive systems, inboard and outboard



- ∞ Demonstrate knowledge of power flow through a manual inboard engine reverse gear assembly in both forward and reverse operation
- ∞ Explain why gear ratios vary from one installation to another
- ∞ Distinguish between gear and bearing types and the advantages/ disadvantages of different types in torque and load handling capabilities
- ∞ Demonstrate knowledge of inboard engine propeller shaft alignment techniques and acceptable tolerances based on engine shaft sizes
- ∞ Relate knowledge of power flow through an outboard engine from power head to propeller
- ∞ Disassemble and reassemble an outboard engine lower unit/drive assembly using manufacturer-supplied special tools and manuals
- ∞ Take measurements using precision measurement tools such as dial indicators and micrometers according to manufacturer workshop manual instructions
- ∞ Contrast a power flow through a typical inboard/outboard upper and lower unit drive assembly
- ∞ Perform pressure and vacuum tests to an IO gear drive unit to determine seal integrity
- ∞ Disassemble and reassemble an IO drive assembly following correct manufacturer procedures and using manufacturer supplied special tools and manuals

Service and repair boat and trailer rigging



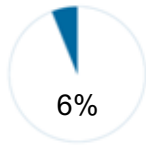
- ∞ Properly wire boat trailer and connect to various vehicle types
- ∞ Establish trailer tongue weight and match to vehicle capacity
- ∞ Service trailer wheel bearings and ensure proper lubrication
- ∞ Service trailer braking systems

Service and repair marine sanitation systems



- ∞ Identify marine sanitation system types and their application in accordance with EPA standards and regional laws
- ∞ Identify pump types used in marine sanitation systems and the advantages and disadvantages of each type for a specific application
- ∞ Disassemble and reassemble a typical marine head piston type pump system and replace key pump components as needed
- ∞ Demonstrate knowledge of typical type-3 marine sanitation system installation including all components such as through-hull valves, anti-siphon valves and holding tanks

Demonstrate knowledge of marine materials, composites, woodworking and metalworking



- ∞ Identify modern composite materials used in boat construction and repair
 - Identify composite cloth material types (fiberglass, Kevlar, carbon fiber) and the application of each in marine construction or repair procedures
 - Identify the characteristics of the various cloth materials used in laminate construction and repair
- ∞ Distinguish between three primary resin types (polyester, vinylester, epoxy) and the characteristics of each as they apply to specific applications
 - Practice safe storage and use of the various resin types
 - Recognize catalization procedures for the various resin types and the use of ratios and proportions for mixing of same to ensure proper curing and pot life while working
 - Identify core materials used in composite construction and the advantages/disadvantages of each type for a given application
- ∞ Recognize various marine woods used in marine construction and the characteristics of each type for a specific application
- ∞ Identify proper hand and power tools used to cut and shape marine woods, as well as safety practices specific to each of the tools commonly used such as table saws, band saws, jig saws and power sanding equipment
- ∞ Measure properly in order to build small wooden cabinets and shelving as is common to marine applications
- ∞ Identify safe and effective use of metal working equipment such as drill presses, band saws, hand drills and taps and die sets used for threading metal
- ∞ Demonstrate knowledge of marine metal applications and the susceptibility of common stainless steel, aluminum, mild steel and bronze metals to various types of corrosion such as crevice, poultice, galvanic and stray current

Model proper customer service/employability skills



- ∞ Recognize proper boat care while conducting service procedures
- ∞ Demonstrate basic warranty procedures related to dealer installed equipment
- ∞ Complete a standard work order form and gather necessary service related information before work is performed
- ∞ Communicate effectively in written and verbal form with customers relative to service procedures either recommended or performed
- ∞ Demonstrate professionalism in appearance (proper attire) and work habits such as promptness and adhering to a schedule and deadlines

Demonstrate professional development skills in a simulated customer-service or employment situation. Examples may include:

- ∞ Job interview
- ∞ Customer service scenario
- ∞ Communications
- ∞ Decision making, problem solving and/or critical thinking

Committee Identified Academic Skills

The SkillsUSA national technical committee has identified that the following academic skills are embedded in the marine service technology training program and assessment:

Math Skills

- Use fractions to solve practical problems
- Use proportions and ratios to solve practical problems
- Simplify numerical expressions
- Solve practical problems involving percents
- Measure angles

- Find surface area and perimeter of two- dimensional objects
- Find volume and surface area of three- dimensional objects
- Make predictions using knowledge of probability
- Make comparisons, predictions and inferences using graphs and charts
- Solve problems using proportions, formulas and functions
- Find slope of a line

Science Skills

- Use knowledge of mechanical, chemical and electrical energy
- Use knowledge of temperature scales, heat and heat transfer
- Use knowledge of speed, velocity and acceleration
- Use knowledge of Newton's laws of motion
- Use knowledge of work, force, mechanical advantage, efficiency and power
- Use knowledge of simple machines, compound machines, powered vehicles, rockets and restraining devices
- Use knowledge of principles of electricity and magnetism
- Use knowledge of static electricity, current electricity and circuits
- Use knowledge of magnetic fields and electromagnets
- Use knowledge of motors and generators

Language Arts Skills

- Provide information in conversations and in group discussions
- Provide information in oral presentations
- Demonstrate use of verbal communication skills: word choice, pitch, feeling, tone and voice
- Demonstrate use of nonverbal communication skills: eye contact, posture and gestures using interviewing techniques to gain information
- Demonstrate comprehension of a variety of informational texts
- Use text structures to aid comprehension
- Understand source, viewpoint and purpose of texts
- Organize and synthesize information for use in written and oral presentations
- Demonstrate knowledge of appropriate reference materials
- Use print, electronic databases and online resources to access information in books and articles

Connections to National Standards

State-level academic curriculum specialists identified the following connections to national academic standards.

Math Standards

- Numbers and operations
- Algebra
- Geometry
- Measurement
- Data analysis and probability
- Problem solving
- Communication
- Connections
- Representation

Source: NCTM Principles and Standards for School Mathematics. To view high school standards, visit: <http://www.nctm.org/standards/content.aspx?id=16909>.

Science Standards

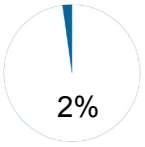
- Understands relationships among organisms and their physical environment
- Understands the structure and properties of matter
- Understands the sources and properties of energy
- Understands forces and motion
- Understands the nature of scientific inquiry

Source: McREL compendium of national science standards. To view and search the compendium, visit: www.mcrel.org/standards-benchmarks/.

Language Arts Standards

- Students read a wide range of print and nonprint texts to build an understanding of texts, of themselves and of the cultures of the United States and the world; to acquire new information; to respond to the needs and demands of society and the workplace; and for personal fulfillment. Among these texts are fiction and nonfiction, classic and contemporary works
- Students apply a wide range of strategies to comprehend, interpret, evaluate and appreciate texts. They draw on their prior experience, their interactions with other readers and writers, their knowledge of word meaning and of other texts, their word identification strategies, and their understanding of textual features (e.g., sound-letter correspondence, sentence structure, context, graphics)
- Students adjust their use of spoken, written and visual language (e.g., conventions, style, vocabulary) to communicate effectively with a variety of audiences and for different purposes
- Students use a variety of technological and information resources (e.g., libraries, databases, computer networks, video) to gather and synthesize information and to create and communicate knowledge
- Students use spoken, written and visual language to accomplish their own purposes (e.g., for learning, enjoyment, persuasion and the exchange of information)

Source: IRA/NCTE Standards for the English Language Arts. To view the standards, visit: www.readwritethink.org/standards/index.html.



Review Dates:

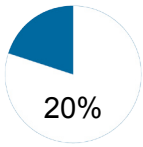
Competency Area 1: Demonstrate general shop practices

Knowledge Check

How well do you know how to:

	Very Well	Somewhat Well	Not Well
1. Establish proper shop safety tool and equipment procedures?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Apply MSDS and procedures specific to the workplace environment?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Recognize and utilize proper personnel protection related to marine service and repair procedures?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. Follow HAZMAT storage and disposal requirements?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Areas I Need To Review:

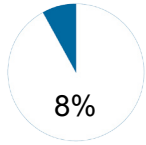


Competency Area 2: Utilize marine engine components and theory of operation

Knowledge Check

How well do you know how to:	Very Well	Somewhat Well	Not Well
1. Apply knowledge of four-cycle gasoline-fueled engines?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Employ the principles of operation of a four-stroke gasoline-fueled engine?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Identify internal components of a typical marinized four-cycle gasoline-fueled engine and describe how the components interact during the four cycles?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. Demonstrate knowledge of four-stroke diesel engines?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. Differentiate between the diesel and gasoline-fueled four-cycle?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. Differentiate between compression ignitions and spark ignitions?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. Perform valve adjustment procedures on overhead valve and pushrod engine?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. Perform valve adjustment on overhead cam engine?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9. Utilize precision measuring instruments such as micrometers, dial indicators, vernier calipers and feeler gauges?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10. Understand two-cycle outboard engines?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11. Demonstrate principles of operation of a two-stroke outboard engine?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12. Identify internal components of a typical two-stroke outboard engine and describe how the components interact with each other to achieve proper engine operation?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Areas I Need To Review:



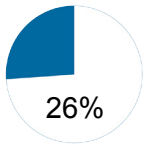
Review Dates:

Competency Area 3: Display knowledge of industry standards related to engine installations

Knowledge Check

How well do you know how to:	Very Well	Somewhat Well	Not Well
1. Identify relevant American Boat and Yacht Council Standards (ABYC) as they apply to inboard engine installations? Specifically, these are engine control systems, belt guards and oil sump design and fuel and exhaust system requirements recommended by the ABYC and the U.S. Code of Federal Regulations (CFRs) ?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Areas I Need To Review:



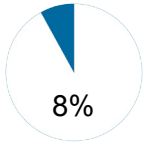
Review Dates:

Competency Area 4: Exhibit knowledge of marine electrical systems

Knowledge Check

How well do you know how to:	Very Well	Somewhat Well	Not Well
1. Apply basic electrical theory, circuit design and application?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Use a digital multi-meter (DMM) to perform electrical troubleshooting procedures such as voltage and amperage measurements, as well as to test for electrical continuity and measure electrical resistance values?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Follow electrical system installation requirements as recommended by the ABYC and mandated by the U.S. Coast Guard's CFR specific to recreational boats, particularly in regard to battery installations, over-current protection requirements, ignition protection requirements and accepted wire sizing techniques for both AC and DC marine systems?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. Terminate wire connections using the proper techniques?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. Demonstrate knowledge of ABYC requirements for proper wire support and chafe protection?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. Demonstrate circuit troubleshooting procedures?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. Examine engine starting systems?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. Assess battery condition?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9. Monitor engine ignition system?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10. Check battery charging systems?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11. Read and use wiring diagrams and follow troubleshooting flow charts to diagnose electrical system problems?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Areas I Need To Review:



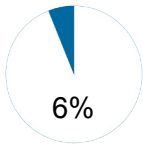
Review Dates:

Competency Area 5: Use knowledge of marine fuel system services

Knowledge Check

How well do you know how to:	Very Well	Somewhat Well	Not Well
1. Identify fuel system components and their functions in the system?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Disassemble, clean and replace and adjust standard carburetor internal components associated with an overhaul?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Perform fuel system pressure tests on both carbureted and fuel injected fuel systems?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. Properly mix fuel stabilization additives and prepare fuel systems for extended lay-up?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Areas I Need To Review:



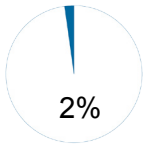
Review Dates:

Competency Area 6: Demonstrate knowledge of marine cooling systems

Knowledge Check

How well do you know how to:	Very Well	Somewhat Well	Not Well
1. Identify raw water and closed cooling system component functions on a variety of marinized engines?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Access water pump assemblies on outboard and inboard/outboard engines?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Remove service and install water pumps on same?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. Overhaul conventional raw water pump on an inboard engine assembly?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. Identify the need for sacrificial anodes in raw water cooling systems?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. Identify correct procedures for cooling system anode selection and replacement?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. Determine engine coolant condition and freeze level protection level?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. Differentiate between ethylene glycol and propylene glycol anti-freeze and where each must be used?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9. Identify heat exchanger design and service procedures?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10. Replace and properly adjust engine drive belts, both v and serpentine types?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11. Determine proper thermostat operation and replacement if required?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12. Utilize an infrared heat sensing gun to track coolant flow through engine and heat exchangers and explain temperature readings as they relate to the cooling system's condition?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13. Pressure test cooling systems and coolant recovery container caps to locate potential leaks and proper pressure rating of container caps?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Areas I Need To Review:



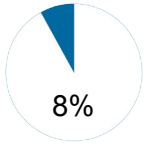
Review Dates:

Competency Area 7: Apply knowledge of lubrication systems

Knowledge Check

How well do you know how to:	Very Well	Somewhat Well	Not Well
1. Classify engine oil ratings as established by the American Petroleum Institute (API)?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Determine engine oil quantity and type recommended using engine workshop manuals?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Change engine oil and filter following manufacturer's recommendations for the engine?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. Determine maintenance interval adjustments or excessive component wear by an analysis of a lubrication lab?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. Interpret an oil analysis report and describe potential internal component faults to both engines and gear units?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Areas I Need To Review:



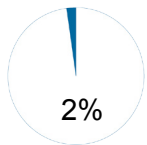
Review Dates:

**Competency Area 8: Exhibit knowledge of gear drive systems;
inboard and outboard**

Knowledge Check

How well do you know how to:	Very Well	Somewhat Well	Not Well
1. Demonstrate knowledge of power flow through a manual inboard engine reverse gear assembly in both forward and reverse operation?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Explain why gear ratios vary from one installation to another?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Distinguish between gear and bearing types and the advantages/disadvantages of different types in torque and load handling capabilities?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. Demonstrate knowledge of inboard engine propeller shaft alignment techniques and acceptable tolerances based on engine shaft sizes?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. Relate knowledge of power flow through an outboard engine from power head to propeller?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. Disassemble and reassemble an outboard engine lower unit/drive assembly using manufacturer-supplied special tools and manuals?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. Take measurements using precision measurement tools such as dial indicators and micrometers according to manufacturer workshop manual instructions?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. Contrast a power flow through a typical inboard/outboard upper and lower unit drive assembly?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9. Perform pressure and vacuum tests to an IO gear drive unit to determine seal integrity?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10. Disassemble and reassemble an IO drive assembly following correct manufacturer procedures and using manufacturer supplied special tools and manuals?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Areas I Need To Review:



Review Dates:

Competency Area 9: Service and repair boat and trailer rigging

Knowledge Check

How well do you know how to:

1. Properly wire boat trailer and connect to various vehicle types?

Very Well

Somewhat Well

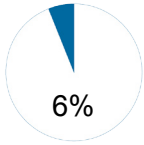
Not Well

2. Establish trailer tongue weight and match to vehicle capacity?

3. Service trailer wheel bearings and ensure proper lubrication?

4. Service trailer braking systems?

Areas I Need To Review:



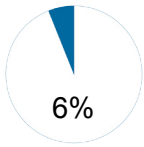
Review Dates:

Competency Area 10: Service and repair marine sanitation systems

Knowledge Check

How well do you know how to:	Very Well	Somewhat Well	Not Well
1. Identify marine sanitation system types and their application in accordance with EPA standards and regional laws?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Identify pump types used in marine sanitation systems and the advantages and disadvantages of each type for a specific application?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Disassemble and reassemble a typical marine head piston type pump system and replace key pump components as needed?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. Demonstrate knowledge of typical type-3 marine sanitation system installation including all components such as through-hull valves, anti-siphon valves and holding tanks?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Areas I Need To Review:



Review Dates:

Competency Area 11: Demonstrate knowledge of marine materials, composites, woodworking and metalworking

Knowledge Check

How well do you know how to:	Very Well	Somewhat Well	Not Well
1. Identify modern composite materials used in boat construction and repair?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Identify composite cloth material types (fiberglass, Kevlar, carbon fiber) and the application of each in marine construction or repair procedures?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Identify the characteristics of the various cloth materials used in laminate construction and repair?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. Distinguish between three primary resin types (polyester, vinyl ester, epoxy) and the characteristics of each as they apply to specific applications?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. Practice safe storage and use of the various resin types?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. Recognize catalization procedures for the various resin types and the use of ratios and proportions for mixing of same to ensure proper curing and pot life while working?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. Identify core materials used in composite construction and the advantages/disadvantages of each type for a given application?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. Recognize various marine woods used in marine construction and the characteristics of each type for a specific application?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9. Identify proper hand and power tools used to cut and shape marine woods, as well as safety practices specific to each of the tools commonly used such as table saws, band saws, jig saws and power sanding equipment?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

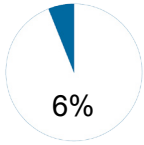
Review Dates:

Competency Area 11: Demonstrate knowledge of marine materials, composites, woodworking and metalworking (*continued*)

Knowledge Check

How well do you know how to:	Very Well	Somewhat Well	Not Well
10. Measure properly in order to build small wooden cabinets and shelving as is common to marine applications?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11. Identify safe and effective use of metal working equipment such as drill presses, ban saws, hand drills and taps and die sets used for threading metal?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12. Demonstrate knowledge of marine metal applications and the susceptibility of common stainless steel, aluminum, mild steel and bronze metals to various types of corrosion such as crevice, poultice, galvanic and stray current?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Areas I Need To Review:



Review Dates:

Competency Area 12: Model proper customer service/employability skills

Knowledge Check

How well do you know how to:	Very Well	Somewhat Well	Not Well
1. Recognize proper boat care while conducting service procedures?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Demonstrate basic warranty procedures related to dealer installed equipment?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Complete a standard work order form and gather necessary service related information before work is performed?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. Communicate effectively in written and verbal form with customers relative to service procedures either recommended or performed?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. Demonstrate professionalism in appearance (proper attire) and work habits such as promptness and adhering to a schedule and deadlines?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Areas I Need To Review:

Helpful Tips and Reminders for Students

Access Directions to the Trade- or Technical-Specific Online 10-question Demo Assessment

Access the Web link www.careeressentials.org/assessments/demo-our-assessments/ with your browser. The sample programmatic questions will help give you an idea of the types of questions on the assessment and how they are generally written.

Test-Taking Reminders

Implementing good study habits is essential for any test or class. Below are basic reminders to better prepare you for life-long learning and workplace success. Incorporate these strategies into your everyday habits.

- Develop a regular study schedule
- Identify a specific location to study
- Always take notes while studying in class or on your own
- Take short breaks during your study session
- Perform “mini-testing” to make sure you understand and comprehend the program concepts
- Join small study groups to help focus on the program content
- If you need special assistance in testing, tell your teacher or counselor so he or she can make accommodations

Student Testing Tips

The most important tip for you is to be prepared mentally and physically for the testing session. Make sure to get plenty of rest and eat healthy. Wear comfortable and appropriate clothing to the testing session. Find out if you can bring items to the testing session, such as a non-programmable calculator, and make sure you have the items ready the night before. Check the website at www.careeressentials.org/wp-content/uploads/2017/07/Permitted-Testing-Tools-Aids.pdf for permitted tools or job aids that can be used during testing. The more organized you are before the testing period, the more relaxed you will be during the actual testing session.

Be relaxed and positive. If you begin to panic during the testing, take some deep breaths to relax, and think positive thoughts.

Do not rush through the questions. Read the question and potential answers thoroughly. Make sure you know exactly what the question is asking before answering. If you are unsure, note the question and return to it. Other questions may have clues to the correct answer. Use process of elimination. If you are not sure of the correct answer, study the potential answers and eliminate the ones that you know are not correct.

If all else fails – *guess*. After you have exhausted all options, take your best guess at the correct answer. If you have studied the content area, you may intuitively know the correct answer. The Career Essentials: Assessments does not penalize you for guessing, and you may guess correctly!

Sample Assessment Questions

Sample Questions

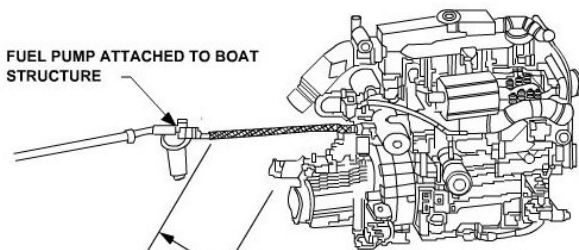
The following questions are examples of the types of questions you may see within the assessment test. The questions could be in the form of a video clip, drop and drag, sequential or a typical multiple choice.

Marine Service Technology Test Questions

- 1) The device that must be installed in the raw water discharge hose ahead of the mixing elbow is:
 - A. Waterlift Chamber
 - B. Siphon Break
 - C. Drain
 - D. Riser

Answer: B

- 2) The correct dimension for the spacing between the engine's electric fuel supply pumps and the engine, according to ABYC standards is



- A. 12 inches minimum
- B. 24 inches maximum
- C. 12 inches maximum
- D. 24 inches minimum

Answer: C

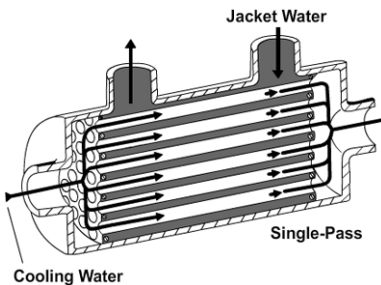
- 3) A technician is winterizing a potable water system. Which type of antifreeze should s/he use?
 - A. Propylene Glycol
 - B. Ethylene Glycol
 - C. Methyl Ethyl Glycol
 - D. Chlorine and Beach Water

Answer: A

- 4) As part of a new trailer's pre-delivery inspection, it is important to insure that:
- A. The wheels are matched in size to the tow vehicle.
 - B. The trailer galvanization meets MIL-spec.
 - C. The trailer tongue weight exceeds tow vehicle specifications.
 - D. The wheels are torqued to specifications.

Answer: D

- 5) In a heat exchanger, coolant and water, or oil, may flow in opposite directions. Why might this be necessary?



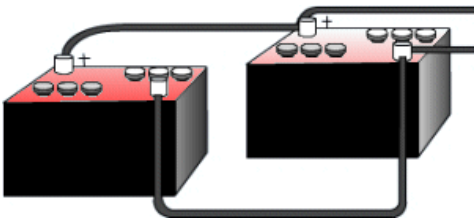
- A. To enhance heat transfer from one fluid to another
- B. To maintain system pressure
- C. To ensure proper freeze protection
- D. To enhance corrosion protection

Answer: A

- 6) There are two popular EFI systems used on 4-cycle marine engines, multi-port and throttle body. The essential difference between the two is:
- A. Throttle body provides an injector for each cylinder.
 - B. Multi-port provides an injector for each cylinder.
 - C. Throttle body is insensitive to manifold pressure.
 - D. Multi-port is insensitive to manifold pressure.

Answer: B

7) Connecting batteries as shown in the image is often done to increase battery:



- A. Capacity.
- B. Conductance.
- C. Specific gravity.
- D. Voltage.

Answer: A

Resources

Additional Resources

Below are resources that will be helpful in preparing for the Assessments which were created based on industry standards nationwide. Use the Career Essentials: Assessments Blueprint as a guideline for competencies tested. Use the resources below to find curriculum or additional study guides for industry standards.

Marine Service Technology Resources:

www.careeressentials.org/assessments/assessment-resources/