

Power Equipment Technology Blueprint

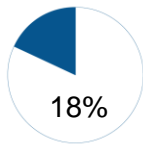
This Blueprint contains the subject matter content for the Career Essentials - Assessment.

Note: To fully prepare for the [Power Equipment 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 Customer Care Team at 844-875-4557 or customercare@skillsusa.org.

Standards and Competencies

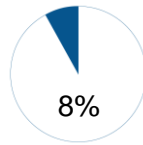
Competencies are weighted throughout the assessment. The percent shown is the weight of the competency. There are 50 questions per assessment.

Test and repair ignition and charging systems in a shop situation to manufacturer's specifications. (both 2 and 4 stroke)



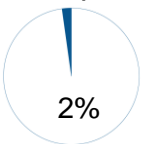
- Describe/EXPLAIN components of an ignition system
- Properly disassemble ignition system
- Properly inspect and test ignition components
- Test performance of coil/ignition modules
- Repair and replace electronic ignition components
- Test and troubleshoot equipment-related switches and harnesses
- Test and troubleshoot stators, regulators and any related wiring harnesses

Test and repair fuel systems in a shop situation to manufacturer's specifications. (both 2 and 4 stroke except 2.4...solenoids)



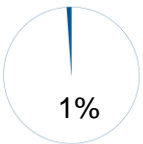
- Explain components of a fuel system
- Inspect, service, repair, and adjust carburetors, gaseous fuel regulators, and mixers
- Inspect, clean and replace filters
- Inspect, service and repair fuel tanks, fuel pumps and solenoids
- Test equipment-related fuel tanks, lines and related systems

Test and repair governor systems in a shop situation to manufacturer's specifications. (primarily 4 stroke)



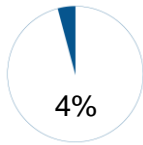
- Explain the primary types of governor systems
- Inspect, service, and reassemble governors
- Explain which governor system components cause engines to increase or decrease RPMs

Inspect and adjust starter systems in a shop situation to manufacturer's specifications. (both 2 and 4 cycle)



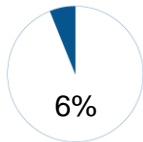
- Recognize components of a starter system
- Inspect, service, and adjust various starting systems
- Use provided wiring schematics to test and troubleshoot a starter system (primarily 4 stroke)
- Inspect and test cooling systems in a shop situation to manufacturer's specifications.

Inspect and service lubricating systems in a shop situation to manufacturer's specifications (both 2 and 4 stroke)



- Explain the various styles and types of lubrication systems
- Check oil and/or fuel/oil mixture levels
- Use required tools to check oil pressurized systems
- Explain the purposes of various grades of oils
- Identify proper grade of oil in engines/equipment (need to differentiate Qs by 2 and 4 stroke)

Inspect and service valves in a shop situation to manufacturer's specifications (4 stroke only)



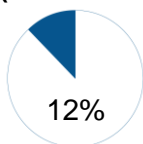
- Identify and the primary types and styles of valve train components used most commonly by manufacturers (IDENTIFY, DESCRIBE OR EXPLAIN?)
- Inspect and service valve train components
- Explain the importance of proper sealing of valve components

Inspect and service exhaust systems in a shop situation to manufacturer's specifications (both 2 and 4 stroke)



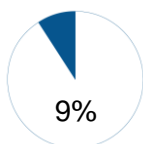
- Identify the primary types of exhaust systems
- Explain how exhaust systems relate to the engine and or equipment
- Inspect and service exhaust components
- Demonstrate the procedures for testing for exhaust system compliance to EPA and/or other emission requirements/standards (edit and keep)

Test and repair engine block components in a shop situation to manufacturer's specifications (Both 2 and 4 stroke)



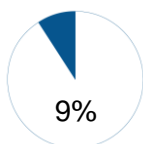
- Explain necessary service procedures needed for engine block components
- Identify needed repairs to given engine block components
- Complete service and repair procedures on engine block components. This could include disassembling the engine and inspecting and measuring crankshafts, connecting rod bearings, journals, cylinders, piston and rings. (Both 2 and 4 stroke)
- Complete repairs to correct torque of critical fasteners.
- Replace gaskets and/or seals

Demonstrate diagnostic and failure analysis in a shop situation to manufacturer's specifications.



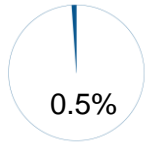
- Demonstrate the proper use of specialized, diagnostic tools including: compression gauge, leak down testers, and voltmeters/multimeters
- Test crankcase vacuum (primarily 2 stroke)
- Test compression
- Analyze failed engine components to correctly determine the type of failure
- Determine best method to repair failed engine components

Demonstrate appropriate, commonly-accepted procedures in a shop situation.



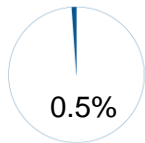
- Demonstrate the proper techniques in the care and use of tools and equipment.
- Demonstrate ability to work accurately with precision instruments
- Use proper safety procedures
- Use service manuals and/or bulletins.
- Give a verbal response to a customer and/or customer-related problematic question
- Prep equipment for delivery in a given scenario

Demonstrate appropriate, commonly-accepted business operation skills in a shop situation.



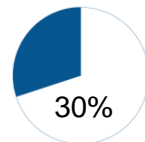
- Look up correct part number by using paper, micro-fiche and/or electronic means
 - Prepare a shop repair ticket.
- Operate equipment within equipment manufacturer's guidelines

Inspect and service transmission/powertrain components in a shop situation to manufacturer's specifications.



- State the theory of transmission
- Disassemble power train components
- Assemble power train components
- Inspect, diagnose and correct a potential problem

Show understanding of general competencies required for power equipment technology.



- Show reading and comprehension of informational texts
- Describe basic 2 and 4 stroke theory
- Describe electrical theory
- Describe carburetion theory and other related fuel systems
- Read and follow schematics for electrical
- Communicate effectively to others in through oral and written communications
- Demonstrate basic computer skills.

Additional Resources and Notes

Additional source material can be found on the manufacturers' Web sites, through the local central distributors, dealers or manufacturers within each state. Those manufacturers are:

- Briggs & Stratton Corp: www.briggsandstratton.com
- Kohler Engines: www.kohlerengines.com, www.kohlerplus.com
- Tecumseh Product: www.tecumsehproducts.com
- Shindiawa: www.shindiawa.com
- MTD: www.mtdproducts.com
- Simplicity: www.simplicity.com
- Miller Welders: www.millerwelds.com
- John Deere: www.johndeere.com

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 power equipment technology training program and assessment:

Math Skills

- Use proportions and ratios to solve practical problems
- Use scientific notation
- Solve practical problems involving percents
- Measure angles



Career Essentials: Assessments

- 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
- Organize and describe data using matrixes
- Find slope of a line

Science Skills

- Plan and conduct a scientific investigation
- Use knowledge of patterns of cellular organization (cells, tissues, organs, systems)
- Describe basic needs of organisms
- Describe and recognize elements, compounds, mixtures, acids, bases and salts
- Describe and recognize solids, liquids and gases
- Describe characteristics of types of matter based on physical and chemical properties
- Use knowledge of classification of elements as metals, metalloids and nonmetals
- Describe and demonstrate simple compounds (formulas and the nature of bonding)
- Understand Law of Conservation of Matter and Energy
- Predict chemical changes to matter (types of reactions, reactants and products; and balanced equations)
- Use knowledge of potential and kinetic energy
- Use knowledge of mechanical, chemical and electrical energy
- Use knowledge of heat, light and sound energy
- Use knowledge of temperature scales, heat and heat transfer
- Use knowledge of sound and technological applications of sound waves
- Use knowledge of the nature and technological applications of light
- 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, such as word choice, pitch, feeling, tone and voice
- Demonstrate use of nonverbal communication skills, such as eye contact, posture and gestures using interviewing techniques to gain information
- Analyze mass media messages
- Demonstrate comprehension of a variety of informational texts
- Use text structures to aid comprehension
- Identify words and phrases that signal an author's organizational pattern 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
- Demonstrate narrative writing
- Demonstrate persuasive writing
- Demonstrate informational writing
- Edit writing for correct grammar, capitalization, punctuation, spelling, sentence structure and paragraphing



Connections to National Standards

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

Math Standards

- Numbers and operations
- Measurement
- Problem solving
- Reasoning and proof
- 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 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 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 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.