NOCTI

Teacher Credential Blueprint

Small Engine Technology

Code: 5477 Version: 01

General Assessment Information

Blueprint Contents

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Test Type: The Small Engine Technology assessment is included in NOCTI's Teacher assessment battery. Teacher assessments measure an individual's technical knowledge and skills in a proctored proficiency examination format. These assessments are used in a large number of states as part of the teacher licensing and/or certification process, assessing competency in all aspects of a particular industry. NOCTI Teacher tests typically offer both a written and performance component that must be administered at a NOCTI-approved Area Test Center. Teacher assessments can be delivered in an online or paper/pencil format.

Revision Team: The assessment content is based on input from subject matter experts representing the following states: Michigan, New York, Pennsylvania, and Texas.

CIP Code

47.0606- Small Engine Mechanics and Repair Technology/Technician

Learning that works for America CTE™

Career Cluster - Transportation, Distribution, and Logistics

O*NET™ in*it

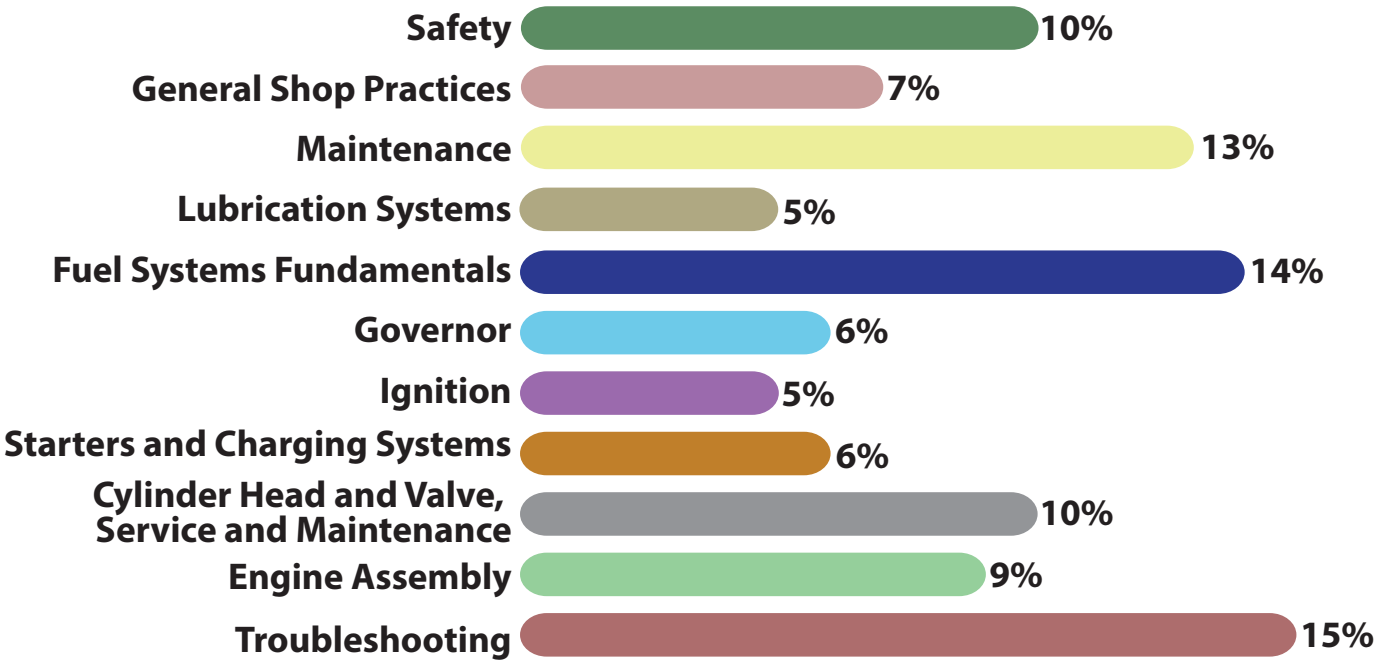
49-3053.00- Outdoor Power Equipment and Other Small Engine Mechanics

Written Assessment

NOCTI written assessments consist of questions to measure an individual's factual theoretical knowledge.

Administration Time: 3 hours
Number of Questions: 181
Number of Sessions: This assessment may be administered in one, two, or three sessions.

Areas Covered



Specific Standards and Competencies Included in this Assessment

Safety

- Identify and test equipment safety devices
- Demonstrate proper techniques for using hand tools (e.g., torque wrenches)
- Demonstrate proper techniques for operating power tools and machinery
- Demonstrate proper handling, containment, and cleanup of hazardous materials (e.g., SDS)
- Demonstrate proper usage of personal protective equipment (PPE)
- Demonstrate safe operation of small engines and equipment

General Shop Practices

- Locate parts and equipment information using printed and electronic media
- Write a parts and labor invoice
- Calculate materials mark-up, labor time, and sales tax
- Demonstrate timekeeping and parts usage on worksheet and job ticket

Maintenance

- Identify and perform manufacturer's recommended service procedures
- Inspect, test, and adjust safety-stop devices
- Inspect and service intake and exhaust systems
- Identify, inspect, and service PTO and drive train (e.g., belts, blades, spindles)
- Identify, inspect, and service cooling system components (e.g., air and liquid cooled)
- Adjust levers and controls

Lubrication Systems

- Inspect and service engine lubrication system including breathers, filters, and strainers
- Identify types of lubricating mechanisms
- Identify proper types of oil and lubricants

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Specific Standards and Competencies (continued)

Fuel System Fundamentals

- Inspect fuel tank, lines, and filters
- Identify and service fuel delivery system components, including carburetor and fuel injection systems
- Adjust and service fuel system controls and linkages
- Explain fuel injection theory
- Explain carburetor theory
- Inspect and service air filtration system
- Disassemble, clean, inspect, and reassemble carburetor (e.g., float bowl)

Governor

- Identify governor parts, functions, and types
- Inspect, service, and adjust governor
- Identify governor-related problems

Ignition

- Explain ignition theory and coil output
- Identify, inspect, test, and adjust ignition components
- Disassemble, service, and reassemble ignition system and/or components

Starters and Charging Systems

- Identify, inspect, and test charging and starting systems
- Service and repair charging and starting systems
- Inspect and perform battery service

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Specific Standards and Competencies (continued)

Cylinder Head and Valve, Service and Maintenance

- Explain theory of compression
- Perform compression test and cylinder leak-down test
- Remove, inspect, reinstall, and adjust valves
- Inspect and measure valve guides and valve stems
- Remove, inspect, and reinstall cylinder head to manufacturer's specifications

Engine Assembly

- Identify correct timing of crankshaft, camshaft, gears, and flywheel
- Identify, inspect, and measure crankshaft, camshaft, gears, and flywheel
- Identify, inspect, and measure piston, rings, and cylinder
- Identify, inspect, and measure bearing clearances and journal sizes of the crankshaft and connecting rod
- Identify proper usage of gaskets and sealants

Troubleshooting

- Troubleshoot ignition system problems
- Troubleshoot starting and charging system problems
- Troubleshoot cooling system problems
- Troubleshoot fuel system problems
- Troubleshoot lubrication system problems
- Troubleshoot compression problems related to cylinder head and valves
- Troubleshoot low power and rough running conditions

Sample Questions

A fuse protects the circuit from damage due to

A. low amperage
B. excessive voltage
C. low voltage
D. excessive amperage

The function of a breather is to vent the crankcase

A. pressure
B. elevation
C. oil
D. efficiency

The EFI System refers to the

A. Engine Fouling Intake
B. Equal Flame Indicator
C. Exhaust Flow Indicator
D. Electronic Fuel Injection

What type of governor is activated by the air from a flywheel?

A. mechanical
B. centrifugal
C. pneumatic
D. electrical

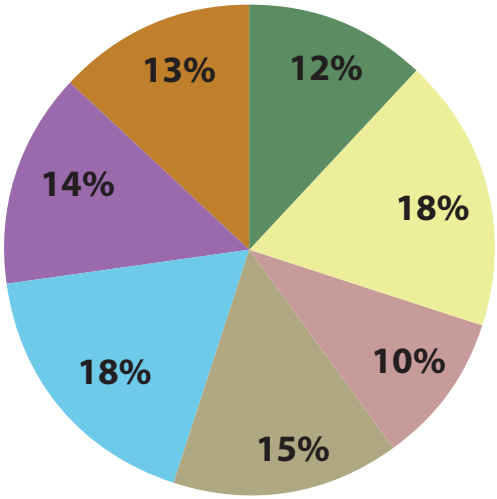
Voltage is defined as

A. rate of flow
B. electrical pressure
C. resistance
D. current flow

Performance Assessment

NOCTI performance assessments allow individuals to demonstrate their acquired skills by completing actual jobs using the tools, materials, machines, and equipment related to the technical area.

Administration Time: 3 hours and 10 minutes
Number of Jobs: 7



Areas Covered:

12% Start and Adjust Engine
Participant will locate loose engine parts, determine proper oil and fuel level, and then start the engine. After starting, participant will check, adjust, and record the idle and high-speed rpms.

18% Ignition Service
Participant will test the engine ignition system, disassemble the ignition system, inspect, and clean engine components, locate, indicate condition of flywheel key, and record manufacturer specifications, reinstall ignition components, notify evaluator to check work, reassemble remaining parts, and recheck engine for spark.

10% Mechanical and Electrical Measurement of Parts
Participant will locate the recommended specifications and record, measure the components listed, record measurements, and record findings. Next, the participant will use the multimeter to take and record electrical measurements for components, including continuity status for interlock switch and ignition switch, voltage of lawn mower battery, polarity of diode, and finally notify evaluator to check work.

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Areas Covered (continued)

15% Valve Service
Participant will measure and record valve lash, remove and inspect cylinder head and gasket, remove valves, inspect seats, stems, faces, and guides, use manual to locate recommended specifications and record, measure and record findings, install valves, check and record intake valve lash, record cylinder head torque specifications, then install cylinder head and gasket, to specified torque.

18% Carburetor Service
Participant will disassemble and inspect a float-type carburetor, obtain the float setting and reassemble the carburetor to specifications. Participant will disassemble and inspect a diaphragm carburetor, check the operating condition of the parts, reassemble the carburetor to specification making sure to set the metering lever height.

14% Invoicing Parts
Participant will look up cost of four engine parts, calculate the mark up price of each part, and complete an invoice that includes labor and sales tax.

13% Manual Starter Service
Participant will disassemble a starter, inspect the parts, record findings then reassemble the starter replacing any defective parts, so the starter is fully functional.

Sample Job

Carburetor Service

Maximum Time: 45 minutes

Participant Activity: Participant will disassemble and inspect a float-type carburetor using appropriate hand tools, obtain the float setting and reassemble the carburetor to specifications. Participant will disassemble and inspect a diaphragm carburetor, check the operating condition of the parts, reassemble the carburetor to specification making sure to set the metering lever height.