

| Week                                                     | Standards                                                             | Learning Objective                                                                                                                                                                | Key Vocabulary                                                                                                                                                                                                                                                                                                                                           | Instructional Resources                                                                                                                          |
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| <b>Unit 1- General Small Gas Engine Safety and Tools</b> |                                                                       |                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                  |
| 1-2                                                      | <b>PA Task List: 402</b><br>Demonstrate safety rules and regulations. | Identify small gas engine shop safety practices<br><br>Inspect and use Personal Protection Equipment (PPE) daily.<br><br>Maintain proper organization and operation of work area. | PPE: Personal Protective Equipment<br>OSHA: Occupational Safety and Health Administration<br>National Fire Protection Association<br>Fire extinguisher<br>Metric Standard<br>Socket (Ratchet) Wrench<br>Phillips head Screwdriver<br>Mallet<br>Needle Nose Pliers<br>Flat Head Screwdriver<br>Sockets Set<br>Wrench Set<br>Nut Driver Set<br>Drift Punch | PPE<br><br>Presentation<br><br>Safety Notes/Worksheet<br><br><i>Small Engines, Briggs and Stratton Book</i><br><br>Shop Tools<br><br>Safety Test |

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| <b>Unit 2- Engine Operations</b> |                                                                                        |                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                   |
| 3                                | <b>PST.03.01.02.a.</b><br>Describe the characteristics of internal combustion engines. | Describe the difference between 2 stroke and 4 stroke engines<br><br>Display the difference between a two stroke and 4 stroke engine.<br><br>Define small gas engine vocabulary terms.<br><br>Explain the difference between internal and external combustion engines. | Engine<br>External Combustion Engine<br>Internal Combustion Engine<br>Four-Stroke Cycle Engine<br>Two-Stroke Cycle Engine<br>Crankshaft Orientation<br>Air-Cooled Engine<br>Liquid-Cooled Engine<br>British Thermal Unit (BTU)<br>Calorie<br>Force<br>Torque<br>Stroke<br>Work<br>Power<br>Horsepower<br>Intake Stroke<br>Compression Stroke<br>Power Stroke<br>Exhaust Stroke<br>Multi Cylinder Engines | Engine Operation Project Guidelines<br><br>Engine Operations Presentation<br><br>Ipad<br><br>2 stroke/ 4 stroke Worksheet<br><br>Internal/External Combustions Worksheet<br><br><i>Small Engines, Briggs and Stratton Book</i><br><br>Vocab Sheet |
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| <b>Unit 3- Measuring</b>      |                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                 |                                                                                                                                                                    |
| 4                             | <b>PA Task List: 406</b><br>Perform calculations and measurements used in agricultural technology                                                                                                            | Demonstrate how to read a ruler.<br><br>Demonstrate how to read a dial caliper.<br><br>Demonstrate how to read a micrometer.                                                                                                                                                                                                                                                                                                                                                                                      | Micrometer<br>Tape Measure<br>Dial Caliper<br>Telescoping Gauge                                                                                 | Measuring Worksheets<br>iPad<br>Measuring Video<br>Measuring Presentation<br>Objects for measuring                                                                 |
| <b>Unit 4- Engine Systems</b> |                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                 |                                                                                                                                                                    |
| 5-6                           | <b>PST.03.01.01.a.</b><br>Identify components of internal combustion engines.<br><br><b>PST.03.01.01.b.</b><br>Demonstrate how the components of internal combustion engines work together during operation. | Describe the Fuel System.<br>Identify parts of the fuel system.<br>Describe the Compression System.<br>Identify parts of the compression system.<br>Describe the Ignition System.<br>Identify parts of the ignition system.<br>Describe the Lubrication System.<br>Identify parts of the lubrication system.<br>Describe the Cooling System.<br>Identify parts of the cooling system.<br>Describe the Governor System.<br>Identify parts of the governor system.<br>Explain how the engine systems work together. | Lubrication<br>Coolant<br>Governor<br>Compression<br>Ignition<br>Wiper Ring<br>Compression Ring<br>Oil Ring<br>Bernoulli's Principle<br>Venturi | Engine System Presentations<br><br>Notes/Worksheets<br><br><i>Small Engines, Briggs and Stratton Book</i><br><br>Engine System Quizzes<br><br>Demonstrating Engine |

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| <b>Unit 5- Disassemble Engine and Part ID</b> |                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                          |
| 7-12                                          | <p><b>PA Task List: 410</b><br/>Utilize a variety of technical sources (e.g., owner/operator manuals, internet resources, and journals within applications of mechanical technology).</p> <p><b>PA Task List: 404</b><br/>Exhibit positive safety attitudes and responsibilities.</p> | <p>Disassemble an engine.</p> <p>Calculate engine measurement specifications.</p> <p>Demonstrate how to use tools properly.</p> <p>Identify parts of an engine.</p> <p>Illustrate small gas engine parts.</p> <p>Analyze the disassembly process of a small gas engine by completing a packet.</p> <p>Collaborate with a partner to disassemble and assemble a small gas engine.</p> <p>Demonstrate how to properly use PPE.</p> <p>Demonstrate how to take proper pictures of the engine disassembly.</p> | <p>Piston Ring Expander<br/>Piston Ring Condenser<br/>Valve Spring Compressor<br/>Flywheel Holder<br/>Gear Puller<br/>Flywheel Strap<br/>Spark Plug Gap Gauge<br/>Feeler Gauge Telescoping Gauge<br/>Gasket<br/>Spark Plug Socket<br/>Muffler<br/>Throttle Cover<br/>Fuel Line<br/>Carburetor<br/>Air Filter<br/>Governor Linkage<br/>Blower Shroud<br/>Magnet<br/>Flywheel<br/>Flywheel Nut<br/>Valve Cover<br/>Cylinder Head<br/>Head Gasket<br/>Intake Valve<br/>Exhaust Valve<br/>Rocker Arm<br/>Pushrod<br/>Valve Spring<br/>Rocker Arm Stud<br/>Crankcase Cover<br/>Crankshaft<br/>Camshaft<br/>Timing Gear<br/>Tappets<br/>Crankpin Journal<br/>PTO Journal<br/>Magnet<br/>Bearing<br/>Cylinder<br/>Piston<br/>Piston Rings<br/>Piston Pin<br/>Engine Displacement<br/>Cylinder Bore<br/>Engine Stroke</p> | <p>Briggs and Stratton 130G00 Engine</p> <p>Engine Cart</p> <p>Briggs and Stratton 130G00 Repair Manual</p> <p>Briggs and Stratton 130G00 Parts Illustrated</p> <p>SGE Disassembly Worksheet</p> <p>Cardboard</p> <p>Marker</p> <p>Tape</p> <p>Toolbox with tools</p> <p>Part ID Test</p> <p>iPad for pictures</p> <p>Safety Glasses</p> |

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| <b>Unit 6- Assemble Engine</b>         |                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                             |                                                                                                    |                                                                                                                                                                                                                                                                                             |
| 13-16                                  | <b>PA Task List: 405</b><br>Maintain and service mechanical systems<br><br><b>PST.03.01.02.c.</b><br>Repair internal combustion engines.                                            | Assemble an engine.<br><br>Torque bolts to proper engine specifications.<br><br>Demonstrate how to use tools properly.<br><br>Analyze the assembly process of a small gas engine by completing a packet.<br>Analyze reference images to correctly identify and assemble parts of an engine. | Parts (same as above)<br>Torque Wrench<br>Foot-lbs<br>Inch-lbs<br>Armature Air Gap<br>Star Pattern | SGE Assembly Worksheet<br><br>Torquing Bolts Worksheet<br><br>Briggs and Stratton 130G00 Engine<br><br>Engine Cart<br>Briggs and Stratton 130G00 Repair Manual<br><br>Briggs and Stratton 130G00 Parts Illustrated<br><br>Toolbox with tools<br><br>iPad for pictures<br><br>Safety Glasses |
| <b>Unit 7- Troubleshooting Engines</b> |                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                             |                                                                                                    |                                                                                                                                                                                                                                                                                             |
| Week 17                                | <b>PST.03.01.01.c.</b><br>Evaluate service and repair needs for internal combustion engines using a variety of performance tests (e.g., manuals, computer-based diagnostics, etc.). | Demonstrate how to troubleshoot issues with a small gas engine.<br><br>Identify 5 issues in a troubleshooting scenario.<br><br>Describe the issues found on a small gas engine.<br><br>Record issues by completing a job sheet.<br><br>Demonstrate how to start and run the engine safely.  | Spark Test<br>Compression Test<br>Siphon<br>Troubleshoot<br>Oil sensor                             | SGE Final packet<br><br>Items to bug engine for troubleshooting<br><br>Troubleshooting scenario<br><br>Gas and Oil                                                                                                                                                                          |

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| <b>Unit 8-Careers Related to Small Gas Engines</b> |                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                    |                                                                                                                                            |                                                                                                       |
| 18                                                 | <p><b>CRP.10.01.</b><br/>Identify career opportunities within a career cluster that match personal interests, talents, goals and preferences.</p> <p><b>CRP.10.02.</b><br/>Examine career advancement requirements (e.g., education, certification, training, etc.) and create goals for continuous growth in a chosen career.</p> | <p>Identify careers related to small gas engine maintenance and repair.</p> <p>Describe the roles and responsibilities of engine-related careers in the small engine industry.</p> <p>Compare and contrast required skills, training, and certifications for different engine-related careers.</p> | <p>Technician<br/>Mechanic<br/>Shop Manager<br/>Diagnostics<br/>Service Manager<br/>Parts Specialist<br/>Engine Assembler<br/>Operator</p> | <p>Ag Explorer Website</p> <p>Career Worksheets</p> <p>Career Activity</p> <p>Career Presentation</p> |