Small Engines

Course Description:

The curriculum for this course is developed from the Wisconsin Standards for Technology and Engineering. This introductory elective Small engines class will introduce students to the basic operating principles that make all small engines work. Students will disassemble and assemble engines while identifying various parts throughout the process. Preventative maintenance on small engines will be covered so students will have valuable information that they can use well into the future. Safe practice in the industrial environment and at home will be modeled and practiced. Completion of this course will equip the student with the knowledge and experience to be an educated consumer. The information in this course overview outlines what students should understand and be able to do by the end of the trimester.

Mastery Standards:

Knowledge of equipment and safety procedures are essential to responsible use of equipment and tools. (AC1.c, AC1.d, AC1.e, AC1.f, MNF1.a)

Understanding and knowledge of tools and materials is requisite for analyzing sound choices in methods and materials. (BB1.a, BB1.b, BB1.c, BB1.d, BB1.e, BB1.f)

Quality design, engineering, and construction require accurate knowledge and application of measuring systems. (AC1.a, AC1.b, AC1.c, AC1.d, AC1.e, AC1.f)

Executing and receiving evaluations and feedback on projects is vital to learning and improving skills. (ENG4.c, ENG5.a)

Specific tasks require experience and knowledge to correctly identify, select, and safely use appropriate tools, machines, products, systems, and techniques. (MNF1.a, MNF1.b, MNF1.c, MNF1.d, MNF1.e, MNF1.f, MNF1.g, MNF1.h)

Unit	Description of Unit and Learning Targets
Unit Title: Safety Essential Questions: ● How do you incorporate safety knowledge into operation and maintenance when working in an Automotive and Small Engine Shop?	Students will investigate the hazards associated with the operation and repair of internal combustion engines, learn and review industry safety procedures before working with the hazards. Learning Targets: ● I can demonstrate and use the hand tools of the trade properly and safely. ● I can identify safety and health protections and procedures that are critical to worker well being. ● I can demonstrate the safe use of electrical connection methods and electrical wiring procedures. ● I can recognize the potential accidents and injuries that may occur in a given work environment. ● I can identify the chemical hazards present when working with a small engine.
Unit Title: Safety Hoist Operation Essential Questions: ● Why is safety in the Auto Shop so important?	Students will learn how to safely and correctly operate an automotive lift in the Auto-Shop. Learning Targets: ● I can spot a vehicle in the hoist bay area in order to use the automotive lift properly. ● I can correctly adjust the lifting points on the vehicle.

	● I can operate the lift to perform work on an automobile.
Unit Title: Precision Measuring Equipment Essential Questions: ● How do you apply precise measurement skills to an internal combustion engine?	Students use various precision measuring devices to measure engine components. Learning Targets: ● I can apply conventional construction measurement processes accurately (i.e., geometric and trigonometric functions). ● I can add, subtract, multiply and divide in the Standard Measuring System to the 1/16: and the Metric Measuring System to millimeters. ● I can select and apply the appropriate units and scales for situations involving measurement. ● I can use a dial caliper to accurately measure engine parts. ● I can use a micrometer to accurately measure engine parts.
Unit Title: Common Hand Tools and Specialty Tools Essential Questions: ● What are the basic hand tools and what are some of the special small engine hand tools?	Students will learn the identity and use of common hand tools and specialty small engine tools. Learning Targets: ● I can identify all common hand tools. ● I know how to use the common hand tools. ● I can identify all small engine specialty tools. ● I know how to use the small engine specialty tools.
Unit Title: Introduction to Engines Essential Questions: ● What are common hand tools used in our daily lives?	Students will learn about the history of engines and the types of engines. Learning Targets: ● I know when the concept of an engine came about. ● I know the different types of engines that are used. ● I can explain the many ways to classify an engine
Unit Title: Mechanical System Essential Questions: ● How do the parts to a small engine work together to produce usable mechanical power?	Students will learn the parts of a Small Gas Engine and how they all work together. Learning Targets: ● I can identify all the engine parts. ● I can explain how the parts work together to produce power.
Unit Title: Fuel System Essential Questions: ● How do the fuel system parts work together to create power?	Students will learn how the fuel system in an engine works. Learning Targets: ● I can identify all the fuel system parts. ● I can explain how a carburetor works. ● I can service the different types of air cleaners on a small engine. ● I can make adjustments on the carburetor.
Unit Title: Ignition System Essential Questions: ● How do the ignition system parts work together to create power?	Students will learn how the ignition system in an engine works. Learning Targets: ● I can identify all the ignition system parts. ● I can explain how the ignition system works. ● I can test the ignition system for spark.
Unit Title: Lubrication System	Students will learn how the lubrication system in an engine works.

Essential Questions: ● How do the lubrication system parts work together to create power?	Learning Targets: ● I can identify all the lubrication system parts. ● I can explain how the lubrication system works. ● I know the two different types of lubrication systems. ● I know how engine oil is graded and tested for use.
Unit Title: Cooling System Essential Questions: ● How do the cooling system parts work together to create power?	Students will learn how the cooling system in an engine works. Learning Targets: ● I can identify all the cooling system parts. ● I can explain how the cooling system works. ● I know the two different types of cooling systems. ● I know the importance of keeping an engine clean for proper cooling efficiency of the engine.
Unit Title: Troubleshooting and Preventative Maintenance Essential Questions: ● How does a user of Small Engine equipment prevent maintenance issues and fix problems with their equipment?.	Students will determine what system is malfunctioning and determine the corrective action. Learning Targets: ● I can perform preventive maintenance procedures that will keep a small engine running correctly and efficiently. ● I can select and perform an appropriate maintenance in the process in order for the product or system to continue functioning properly, to extend its life or to upgrade its capability given a flawed product or system. ● I can diagnose a system that is malfunctioning and use tools, materials, or machines to repair it. ● I can use appropriate tools, materials, and machines to repair a malfunctioning system.
Unit Title: Hands on Engine Work Essential Questions: ● How does it all work?	Students will learn how to disassemble, measure parts, and reassemble a Small Gas Engine. Learning Targets: ● I can successfully disassemble a small engine. ● I can use the proper measuring tools to take measurements on parts of a small engine. ● I can successfully reassemble a small engine.