

Martensdale- St. Marys Community School

Grades 9-12 Industrial Arts Curriculum

Standard 1: Students will understand how electrical theory is used in ever day life, including how electricity is generated and is the power source of the future.

Grade Level/Course: Energy and Power.

| <i>Benchmark: The student will:</i> | <i>Course/Grade Level Objectives</i> | <i>Instructional Strategies</i> | <i>Assessments</i> | <i>Instructional Timeline</i> |
|---|--|--|---------------------------|--------------------------------------|
| Describe the generation of electrical power. | Research the many different ways that electricity can be produced. | | | |
| Explain how heat, pressure, light, and friction is related to electrical power. | Demonstrate the different relationships through research. | | | |
| Complete statements related to magnetism and electricity. | Report on what was learned through research. | | | |
| Describe the parts of OHMs law. | Do problems related to OHMs law | | | |
| List examples of different electronic parts. | Research what electronic parts look like and what their job is. | | | |
| Describe how electricity is the power of the future. | Explain the future uses of electricity. | | | |

Standard 2: Students will understand that fluid power systems are the science of hydraulics, include both gases and liquids.

Grade Level/Course: Energy and Power.

| Benchmark: The student will: | Grade Level/Course Objectives | Instructional Strategies | Assessments | Instructional Timeline |
|--|--|---------------------------------|--------------------|-------------------------------|
| Discuss the first uses of hydraulics were wind and water power. | Measure and figure the number of square inches at piston top is. | | | |
| Describe the principles of fluid power. | Read and answer questions from a packet over the three laws of fluids. Write a paper over Boyles, Charles and Pascal's law. | | | |
| Describe how fluids are used as a force multiplier. | Draw a fluid power system. | | | |
| List the different ways hydraulic pressure is used every day. | Tear down an air conditioning compressor. | | | |
| Explain the operation of a pressure control valve. | Identify correct safety standards with hydraulics. | | | |
| Describe the steps used in the principle of heating and cooling. | Define the laws used in heating and cooling. | | | |

Standard 3: Students will study the historical development of power, while studying the internal and external types of engines.

Grade Level/Course: Energy and Power.

| <i>Benchmark: The student will:</i> | <i>Grade Level/Course Objectives</i> | <i>Instructional Strategies</i> | <i>Assessments</i> | <i>Instructional Timeline</i> |
|--|--|--|---------------------------|--------------------------------------|
| Describe what a power-driven mechanism is. | Look on line at different types of power mechanisms. | | | |
| Explain what types of engines are a Stirling and Wankel. | Sketch different parts related the many styles and types of engines. Write a report on the different power sources. | | | |
| Describe how the term reciprocation relates to power. | Design a poster that shows reciprocating actions. | | | |
| Describe a turbine engine and how it works. | Look over the many types of turbine engines. | | | |
| Identify how different petroleum products are used in today's power sources. | Research the petroleum industry and look at the history of the different products related to power sources. | | | |
| Evaluate emission as related to modern power sources. | Research emission standards and develop a poster related to them. | | | |
| Describe how a diesel engine operates. | Compare a gasoline engine to a diesel engine. | | | |

Standard 4: Students will identify the different types of electrical motors, and their basic construction.

Grade Level/Course: Energy and Power.

| Benchmark: The student will: | Grade Level/Course Objectives | Instructional Strategies | Assessments | Instructional Timeline |
|--|---|---------------------------------|--------------------|-------------------------------|
| Identify basic types of electrical motors. | Find different styles of electric motors making a poster from the research | | | |
| Explain the workings and parts of an electrical motor. | Tear- down several electric motors and identify the different parts | | | |
| Describe the different between brush and brushless motors. | Find information from disassembled motors which are brush and which are brushless. | | | |
| Identify the different between a n AC and DC motor. | Use information from disassembled motors along with manuals to find AC and DC motors. | | | |
| Define voltage and amps related to electrical motors. | Use the materials learn in earlier unit on OHMs Law. | | | |

Standard 5: Students will identify the different types of small gas engines and their basic construction.

Grade Level/Course: Energy and Power.

| Benchmark: The student will: | Grade Level/Course Objectives | Instructional Strategies | Assessments | Instructional Timeline |
|---|---|---------------------------------|--------------------|-------------------------------|
| Identify the basic types of small gas engines. | Design a poster showing the different types of small engine used. | | | |
| Explain the four-stroke and two-stroke systems. | Disassemble several engines to see if they are 2-stroke or 4-stroke engine noting the differences. | | | |
| Identify different types and styles of carburetors. | Find and tear down several styles of carburetor drawing sketching the different parts used in each. | | | |
| Identify parts of the ignition system. | Remove and inspect the parts of an ignition system from several engines. | | | |
| Identify parts of the exhaust system. | Remove and inspect the parts of an exhaust system from several engines. | | | |

