Curriculum Map

Course: Power II/Simple Machine review

Grade: 10-12

Month: September-October

Enduring Understanding

- Technology is created, used and modified by humans.
- A technological world requires that humans develop capabilities to solve technological challenges and improve products for the way we live.
- Technological literacy is the ability to use, assess and manage technology around us.
- Simple Machine are the building blocks of more complex machines.
- Gears are configured it different ways in order to produce the desired force.

Essential Questions

- What constitutes a Simple Machine?
- How do we use Simple Machines to make life easier?
- How do we determine what Machine will work best for the application needed?
- How are gears configured to produce torque?
- How are gears configured to produce power?
- How are gears configured to produce speed?
- How are gears configured to produce distance?

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<tr>
<th>Standards</th>
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concept by making actual observations and necessary adjustments.
Apply the concept that engineering design is influenced by personal characteristics, such as creativity, resourcefulness, and the ability to visualize and think abstractly.
3.4.10.D1.
Refine a design by using **prototypes** and modeling to ensure quality, efficiency, and productivity of a final product
3.4.10.D2.
Diagnose a malfunctioning **system** and use tools, materials, and knowledge to repair it.
3.4.10.D3.
Synthesize data, analyze trends, and draw conclusions regarding the effect of **technology** on the individual, society, and the environment
3.4.12.D2.
Verify that engineering design is influenced by personal characteristics, such as creativity, resourcefulness, and the ability to visualize and think abstractly.

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<td>1. Rotary</td>
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<td>2. Linear</td>
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Define Kinetic Energy
Define Potential Energy
Define Rotary Motion
Define Linear Motion
Define Momentum
Define Friction
Define Gear Ratio

- Slowness
- Power
- Long distance

Documentation Packet to Include:
- sketches of possible design solutions
- Paragraph explaining why the student chose the design they chose
- Paragraph explaining how the student would improve their results if they had it to do again
Month: October-November

Enduring Understanding

- Technology is created, used and modified by humans.
- A technological world requires that humans develop capabilities to solve technological challenges and improve products for the way we live.
- Technological literacy is the ability to use, assess and manage technology around us.
- A technological world requires that humans develop capabilities to solve technological challenges and improve products for the way we live.
- Gears are needed to make work easier.
- Gears can be configured in different ways to give more speed, power, or torque.

Essential Questions

- How are gears configured to produce torque?
- How are gears configured to produce power?
- How are gears configured to produce speed?
- How are gears configured to produce distance?
- How do gear ratios affect momentum?
- How is Friction and drag related?

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<tr>
<td>3.4.10.C1. Apply the components of the technological design process.</td>
<td>Define momentum</td>
<td>Apply gearing knowledge to make a vehicle perform specified tasks.</td>
<td>The students will design and make a mousetrap powered vehicle that has a Trebuchet on it to travel a specific distance and then used to hit a target.</td>
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<tr>
<td>3.4.10.C2. Analyze a prototype and/or create a working model to test a design concept by making actual observations and necessary adjustments.</td>
<td>Define Friction</td>
<td>Be able to get the geared vehicle and a trebuchet to work in conjunction with each other.</td>
<td>Project testing</td>
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<tr>
<td>3.4.12.C2. Apply the concept that engineering design is influenced by personal characteristics, such as</td>
<td>Define Drag</td>
<td></td>
<td>Documentation Packet to Include:</td>
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<tr>
<td></td>
<td>Compare and Contrast Friction and Drag</td>
<td></td>
<td>- sketches of possible design solutions</td>
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<td>Define Acceleration</td>
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<td>- Paragraph explaining why the student</td>
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<tr>
<td>Creativity, resourcefulness, and the ability to visualize and think abstractly. 3.4.10.D1. Refine a design by using prototypes and modeling to ensure quality, efficiency, and productivity of a final product. 3.4.10.D2. Diagnose a malfunctioning system and use tools, materials, and knowledge to repair it. 3.4.10.D3. Synthesize data, analyze trends, and draw conclusions regarding the effect of technology on the individual, society, and the environment. 3.4.12.D2. Verify that engineering design is influenced by personal characteristics, such as creativity, resourcefulness, and the ability to visualize and think abstractly.</td>
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**Month:** November-February

**Enduring Understanding**

- Technology is created, used and modified by humans.
- A technological world requires that humans develop capabilities to solve technological challenges and improve products for the way we live.
- Technological literacy is the ability to use, assess and manage technology around us.
- A technological world requires that humans develop capabilities to solve technological challenges and improve products for the way we live.
- Renewable energy sources have to become more utilized in the world’s future to eliminate the dependence our fuels with finite amounts.

**Essential Questions**

- Why are renewable resources so important for our future?
- How can renewable energy sources be used to lessen our dependence on non-renewable energies?
- What is the difference between renewable and inexhaustible?

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| 3.4.10.B1. Compare and contrast how the use of **technology** involves weighing the trade-offs between the positive and negative effects. | How is energy produced  
- Renewable  
- Inexhaustible  
- Non renewable | Be able to categorize each type of energy.  
Be able to explain how each system is produced.  
Explain advantages and disadvantages. | Written Quizzes  
Teacher Questioning  
Project Testing  
Class presentations  
Construction of models |
| 3.4.10.B2. Demonstrate how humans devise **technologies** to reduce the negative consequences of other **technologies** | Advantages and disadvantages of each | Exploring alternate energy devices  
- Wind power  
- Solar power  
- Hydro power  
- Battery power | Documentation Packet to Include:  
- sketches of possible design solutions  
- Paragraph explaining why the student |
advertising, the strength of the economy, the goals of a company and the latest fads, contribute to shaping the design of demand for various technologies.

Recognize that technological development has been evolutionary, the result of a series of refinements to a basic invention

Analyze ethical, social, economic, and cultural considerations as related to the development, selection, and use of technologies.

Illustrate how, with the aid of technology, various aspects of the environment can be monitored to provide information for decision making.

3.4.10.C1.
Apply the components of the technological design process.

3.4.10.C2.
Analyze a prototype and/or create a working model to test a design concept by making actual observations and necessary adjustments.

Apply the concept that engineering design is influenced by personal characteristics, such as creativity, resourcefulness,

- Biomass fuel
- Geothermal
- Hydrogen

Paragraph explaining how the student would improve their results if they had it to do again
and the ability to visualize and think abstractly.
3.4.10.D1. Refine a design by using prototypes and modeling to ensure quality, efficiency, and productivity of a final product.
3.4.10.D2. Diagnose a malfunctioning system and use tools, materials, and knowledge to repair it.
3.4.10.D3. Synthesize data, analyze trends, and draw conclusions regarding the effect of technology on the individual, society, and the environment.
3.4.12.D2. Verify that engineering design is influenced by personal characteristics, such as creativity, resourcefulness, and the ability to visualize and think abstractly.
3.4.10.E3. Compare and contrast the major forms of energy: thermal, radiant, electrical, mechanical, chemical, nuclear and others.
3.4.12.E3. Compare and contrast energy and power systems as they relate to pollution, renewable and non-renewable resources, and conservation.
Analyze the development of transportation services and methods and their impact on society.

3.4.12.E5.
Explain how the design of intelligent and non-intelligent transportation **systems** depends on many processes and innovative techniques.
Month: March-April

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- Fluid properties affect the use and application of hydraulics and pneumatics.
- Hydraulics and pneumatics are used by people everyday to make their lives simpler.

**Essential Questions**

- What is the difference between Hydraulics and Pneumatics?
- For what application would each be used?
- How does compression effect their use?

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<tr>
<td>3.4.10.C1. Apply the components of the technological design process.</td>
<td>Hydraulics</td>
<td>Define Hydraulics</td>
<td>Project Test</td>
</tr>
<tr>
<td>3.4.10.C2. Analyze a <strong>prototype</strong> and/or create a working model to test a design concept by making actual observations and necessary adjustments.</td>
<td>Pneumatics</td>
<td>Define Pneumatics</td>
<td>Written Quizzes</td>
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<tr>
<td>3.4.12.C2. Apply the concept that engineering design is influenced by personal characteristics, such as creativity, resourcefulness,</td>
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<td>Explain the difference</td>
<td>Teacher Questioning</td>
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<td></td>
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<td>Define Viscosity</td>
<td>Construction of a hydraulic robotic arm</td>
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and the ability to visualize and think abstractly.

- Paragraph explaining why the student chose the design they chose
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Month: May - June

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- Current is either alternating or direct.
- Current can be controlled by adding difference electrical components into the system.

**Essential Questions**

- What is the difference between alternating current and direct current?
- How do we control electricity?
- How can we automate machines?

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<td>- Electrical</td>
<td>Define AC current</td>
<td>Project Test</td>
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<td>Apply the components</td>
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<td>Define DC current</td>
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<td>Teacher Questioning</td>
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<td>design process.</td>
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<td>Identify and explain the</td>
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<td>3.4.10.C2.</td>
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<td>- Resistors</td>
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| Wire electrical systems to control robot |   |   |