

# **CURRICULUM**

## **Technology Education**

### **POWER MECHANICS II**

**(Elective Course)**

#### **Supports Academic Learning Expectation # 3**

Students and graduates of Ledyard High School will employ problem-solving skills effectively

#### **Supports Academic Learning Objective # 5**

Students and graduates of Ledyard High School will demonstrate critical thinking skills

Approved by Instructional Council  
6/10/08

**STUDENT LEARNING OBJECTIVES**  
**Power Mechanics II**

As a result of Technology Education, students independently and collaboratively will be able to:

<p><b>GOAL: District Goal #1 (State Standard #1) The Nature &amp; Evolution of Technology</b></p> <p>Understand the nature of technology, how it has evolved and its influence on its own evolution</p>	
LEARNING OBJECTIVES	SAMPLE INDICATORS/ASSESSMENTS OF LEARNING
<p><i>Students will know how to:</i></p> <p>1.1 Critically analyze a given technology against a perceived need or want</p> <p>1.2 Research how, social, economic, and political forces influence innovation, invention and adaptation</p> <p>1.3 Describe the transformation and conservation of kinetic and potential energy in mechanical, chemical and electrical systems.</p> <p>1.4 Explore and describe how electricity is generated, transferred and used in modern technologies.</p> <p>1.5 Use the systems model to analyze a complex technological system;</p> <p>1.6 Investigate the universal characteristics of systems and sub-systems;</p>	<p><i>Students will be able to:</i></p> <p>a. Analyze current transportation technologies used in land, air, sea and/or space and discuss ways to improve efficiency and operation</p> <p>a. Compare and contrast in written form industrial/societal needs versus environmental needs such as creating alternative forms of transportation</p> <p>b. Discuss global fossil fuel reserves, extraction processes, refinement and their impact on the economy</p> <p>a. Describe how hybrid or alternative vehicles transfer potential energy through their sub systems</p> <p>a. Disassemble, identify, assemble, and test electrical components such as alternators and starters found in a variety of transportation vehicles</p> <p>a. Analyze the sub-systems of land transportation vehicles</p> <p>a. Determine the universal characteristics of the systems and sub-systems in land transportation vehicles</p> <p>b. Perform needed repairs/maintenance and test the results</p>

**STUDENT LEARNING OBJECTIVES**  
**Power Mechanics II**

As a result of Technology Education, students independently and collaboratively will be able to:

<p><b>GOAL: District Goal #2 (State Standard #2) The Impacts of Technology</b></p> <p>Understand the impact that technology has on the personal, social, cultural, economic, political and environmental aspects of their lives.</p>	
LEARNING OBJECTIVES	SAMPLE INDICATORS/ASSESSMENTS OF LEARNING
<p><i>Students will know how to:</i></p> <p>2.1 Analyze technologies based on their positive and negative impacts;</p> <p>2.3 Demonstrate an understanding of local, state and national regulatory agencies in home and workplace safety;</p> <p>2.4 Select and demonstrate ethical solutions to technological problems;</p> <p>2.5 Identify and explore career opportunities in the areas of technology;</p> <p>2.6 Describe and evaluate how society's expectations drive technological development;</p>	<p><i>Students will be able to:</i></p> <p>a. Select from a variety of methods and technologies the most effective and safest process needed to perform tasks such as lift operations, oil changes, and chemical storage/handling</p> <p>a. Read and utilize the information contained on applicable material safety data sheets</p> <p>a. Demonstrate ethics in their design and repair methods</p> <p>a. Research career opportunities of interest and share the information</p> <p>a. Describe the impact of fuel cost on land vehicle design</p>

**STUDENT LEARNING OBJECTIVES**  
**Power Mechanics II**

As a result of Technology Education, students independently and collaboratively will be able to:

<p><b>GOAL: District Goal #3 (State Standard #3) The Research, Design &amp; Engineering</b></p> <p>Recognize that technology is the result of a creative act, and will be able to apply formal problem-solving strategies to enhance invention and innovation.</p>	
LEARNING OBJECTIVES	SAMPLE INDICATORS/ASSESSMENTS OF LEARNING
<p><i>Students will know how to:</i></p> <p>3.1 Use research techniques to support design development;</p> <p>3.2 Investigate multiple solutions to a design problem;</p> <p>3.3 Use communication technologies to visualize a design idea;</p> <p>3.4 Demonstrate knowledge of the legal and ethical principles related to ownership of intellectual properties</p> <p>3.5 Document a design to facilitate replication;</p> <p>3.6 Select appropriate technical processes and fabricate a prototype;</p>	<p><i>Students will be able to:</i></p> <p>a. Research information on the internet to aid in vehicle repair and maintenance</p> <p>a. Utilize appropriate materials and manufacturing processes to repair and maintain transportation vehicles</p> <p>a. Use appropriate technologies to locate and view transportation vehicles in order to expand their understanding of how they function</p> <p>a. Discuss patents related to transportation vehicles</p> <p>a. Create a set of design drawings to facilitate the improvement/modification of a transportation vehicle</p> <p>a. Design and build a transportation prototype utilizing appropriate technical processes</p>

**STUDENT LEARNING OBJECTIVES**  
**Power Mechanics II**

As a result of Technology Education, students independently and collaboratively will be able to:

<p><b>GOAL: District Goal #4 (State Standard #) 4 The Creation &amp; Use of Technology</b></p> <p>Know the origins, properties and processing techniques associated with the material building blocks of technology as demonstrated by effective application of the methods producing usable products and by effectively using those products.</p>	
LEARNING OBJECTIVES	SAMPLE INDICATORS/ASSESSMENTS OF LEARNING
<p><i>Students will know how to:</i></p> <p>4.2 Process materials based on their properties;</p> <p>4.3 Experiment with the alteration of material characteristics;</p> <p>4.4 Create a product demonstrating the application of technological processes;</p> <p>4.5 Use tools and procedures safely;</p>	<p><i>Students will be able to:</i></p> <p>a. Identify the characteristics of materials used to fabricate and repair transportation vehicles and process them based on these characteristics</p> <p>a. Explore an expanded variety of ways to alter materials used in transportation vehicles</p> <p>a. Design and build a transportation vehicle such as hover craft, automobiles, aircraft, and boats</p> <p>a. Demonstrate the ability to safely operate machine, shop, and specialized hand tools such as a tire changer, brake lathe, lifts, welders, bearings pullers and brake tools</p> <p>b. Continue to recognize unsafe situations in the workplace and decide how to correct them</p> <p>c. Use a wide variety of petroleum based products safely.</p> <p>d. Continue to demonstrate and appropriately use the knowledge of personal safety habits such as wearing personal protective equipment and proper dress</p>

**STUDENT LEARNING OBJECTIVES**  
**Power Mechanics II**

As a result of Technology Education, students independently and collaboratively will be able to:

GOAL: District Goal #4 (State Standard #) 4 <b>The Creation &amp; Use of Technology</b>	
Continued	
LEARNING OBJECTIVES	SAMPLE INDICATORS/ASSESSMENTS OF LEARNING
<p><i>Students will know how to:</i></p> <p>4.6 Select appropriate tools and procedures for a given task;</p> <p>4.7 Identify and describe methods used in manufacturing products;</p> <p>4.8 Explore and explain the properties and uses of common synthetic polymers such as polyethylene, polyvinyl chloride, and styrene</p>	<p><i>Students will be able to:</i></p> <p>a. Apply independent problem solving skills to select appropriate tools and procedures to build, repair and test transportation vehicles</p> <p>a. Determine appropriate tools, processes, and correct sequential steps needed and utilize them to build, repair and test transportation vehicles</p> <p>a. Select and utilize appropriate polymers to repair and maintain transportation vehicles</p>

**STUDENT LEARNING OBJECTIVES**  
**Power Mechanics II**

As a result of Technology Education, students independently and collaboratively will be able to:

<p><b>GOAL:</b> District Goal #5 (State Standard #5) The Future of Technology</p> <p>Demonstrate the ability to take known principles of technological innovation and apply them to hypothetical scenarios effectively.</p>	
LEARNING OBJECTIVES	SAMPLE INDICATORS/ASSESSMENTS OF LEARNING
<p><i>Students will know how to:</i></p> <p>5.1 Forecast trends in new and emerging technologies (e.g. nanotechnology, electro-magnetic radiation in communications, bio-related and alternative energy sources) and their potential impacts;</p> <p>5.2 Explore future labor market trends and educational needs</p> <p>5.5 Identify and explore technological solutions to future global needs and their impacts on individuals;</p> <p>5.6 Explore how human beings use technology to increase the carrying capacity of their environment</p>	<p><i>Students will be able to:</i></p> <p>a. Research and share trends in product design and development</p> <p>a. Continue to gain first hand knowledge of the future transportation labor market through such things as field trips, guest speakers and internet research</p> <p>a. Research future vehicle design implications based on increased fuel costs and demand.</p> <p>a. Research future vehicle design implications based on their environmental impact</p>