



Planned Course: Physics I		Course Number: S403	Department: Science	
Unit: Work, Power and Energy		Grade Level: 11-12		
Estimated Time: 6 weeks		Level/Track:	Date Approved: 8/24/09	
PA Academic Standards	 Core Concepts (in question format) <ul style="list-style-type: none"> <li>Skills/Knowledge</li> </ul>	Activities/Strategies/Study Skills (identify some activities as remedial or enrichment activities)	Assessments (include types and topics)	
<p>3.1.12 Unifying Themes</p> <p>B. Apply concepts of models as a method to predict and understand science and technology.</p> <p>C. Assess and apply patterns in science and technology.</p> <p>D. Analyze scale as a way of relating concepts and ideas to one another by some measure.</p> <p>3.2.12 Inquiry and Design</p> <p>A. Evaluate the nature of scientific and technological knowledge.</p> <p>B. Evaluate experimental information for appropriateness and adherence to relevant science processes.</p> <p>3.4.12 Physical Science, Chemistry and Physics</p> <p>A. Apply concepts about the structure and properties of matter.</p> <p>B. Apply and analyze energy sources and conversions and their relationship to heat and temperature.</p> <p>C. Apply the principles of motion and force.</p>	<p>► What is work?</p> <ul style="list-style-type: none"> <li>Define work in a scientific sense</li> <li>Perform calculations to quantify work.</li> <li>Describe and use the SI unit of work, the Joule.</li> </ul> <p>► What is the difference between work and energy?</p> <ul style="list-style-type: none"> <li>Define energy as the capacity to perform work.</li> <li>Define the elements of mechanical energy as opposed to other types (chemical, thermal etc.).</li> </ul> <p>► What is Kinetic Energy?</p> <ul style="list-style-type: none"> <li>Define KE as the energy possessed by moving mass.</li> <li>Perform calculations of the KE possessed by moving objects.</li> </ul> <p>► What is potential energy?</p> <ul style="list-style-type: none"> <li>Describe PE as energy possessed by an object that is based on its position or condition.</li> </ul> <p>► What is Gravitational Potential Energy?</p> <ul style="list-style-type: none"> <li>Describe PEG as energy</li> </ul>	<ul style="list-style-type: none"> <li>Take notes on explanations from lectures.</li> <li>Engage in discussions of scientific definition of work and its relationship with energy and power.</li> <li>Demonstrate problem solving techniques at the blackboard.</li> <li>Do computer research on work and energy.</li> <li>Answer homework questions from text and/or worksheets. (Ch 9 pgs 165 thru 169)</li> <li>Use scientific method while performing laboratory experiments.</li> <li>In first lab construct computer demonstration of net work relationship to changes in KE.</li> <li>Study text Chapter 9 on Work Power and Energy.</li> <li>Take notes from text reading assignments and</li> </ul>	<ul style="list-style-type: none"> <li>Completion of homework.</li> <li>Discussion of homework assignments.</li> <li>Class participation in discussions of topics surrounding everyday events illustrating the assignments.</li> <li>Written reports of laboratory exercises.</li> <li>Class participation</li> <li>Written Chapter test</li> <li>Written pop quiz(s)</li> <li>Written reports of laboratory exercises</li> <li>Teacher observation of performance in LAB environment.</li> <li>Computer modeling of problems using IP</li> </ul>	

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<p>3.7.12 Technological Devices</p> <p>B. Evaluate appropriate instruments and apparatus to accurately measure materials and processes.</p> <p>D. Evaluate the effectiveness of computer software to solve specific problems.</p> <p>B. Apply concepts of models as a method to predict and understand science and technology.</p> <p>C. Assess and apply patterns in science and technology.</p> <p>D. Analyze scale as a way of relating concepts and ideas to one another by some measure.</p>	<p>possessed by a mass because it might fall.</p> <ul style="list-style-type: none"> <li>Calculate PEG and contrast the calculation with a calculation of work.</li> </ul> <p>► What is elastic Potential Energy?</p> <ul style="list-style-type: none"> <li>Describe elastic potential energy in terms of Hookes Law for springs.</li> <li>Contrast the PEelas calculation with a calculation of work.</li> </ul> <p>► Is Mechanical Energy conserved?</p> <ul style="list-style-type: none"> <li>Describe how friction converts mechanical energy into heat.</li> <li>Use the <math>W_{net} = \Delta KE</math> theorem to calculate changes in velocity.</li> <li>Discuss how in the absence of friction, ME is conserved.</li> <li>Use the concept of Conservation of ME to solve problems in mechanics.</li> </ul> <p>► What is the difference between power and energy.</p> <ul style="list-style-type: none"> <li>Describe the difference between work and power and energy and power.</li> <li>Describe power as the rate</li> </ul>	<p>additional explanations from lectures.</p> <ul style="list-style-type: none"> <li>Answer homework questions from text and from worksheets.</li> <li>Perform laboratory exercise(s) Energy and Work</li> </ul>	
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	<ul style="list-style-type: none"> <li>• of energy transfer.</li> <li>• Describe power as work/time and alternatively as Force x speed.</li> </ul>				