

Planned Course: Honors Physics Unit # 3: Energy Estimated Time: 4 weeks	Course Number: 403H Grade Level: 11/12 Level/Track: Honors/AP	Department: Science Board Approval Date: August 27, 2018	
Big Ideas / PA Academic Standards	➤ Core Concepts (in question format) <ul style="list-style-type: none"> ● Skills/Knowledge 	Activities/Strategies/Study Skills (identify some activities as remedial or enrichment activities)	Assessments (include types and topics)
<p>Big Ideas:</p> <p>Big Idea 3: The interactions of an object with other objects can be described by forces.</p> <p>Big Idea 4: Interactions between systems can result in changes in those systems.</p> <p>Big Idea 5: Changes that occur as a result of interactions are constrained by conservation laws.</p> <p>PA Academic Standards:</p> <p>3.2.10.B2:</p> <p>Explain how the overall energy flowing through a system remains constant.</p> <p>Describe the work-energy theorem.</p> <p>Explain the relationships between work and power.</p>	<p>➤ What is work?</p> <ul style="list-style-type: none"> ● Recognize the difference between the scientific and the ordinary definitions of work. ● Define work, relating it to force and displacement. ● Identify where work is being performed in a variety of situations. ● Calculate the net work done with many forces are applied to an object. <p>➤ What are the various forms of energy?</p> <ul style="list-style-type: none"> ● Identify several forms of energy. ● Calculate kinetic energy for an object. ● Distinguish between kinetic and potential energy. ● Calculate the potential energy associated with an object's position. 	<p>Build a Roller Coaster Virtual Lab</p> <ul style="list-style-type: none"> ● Students will use the principles of conservation of mechanical energy to create a roller coaster that is both “safe” and “fun.” Students will calculate energies, heights, shapes, and velocities of the roller coaster along its path. <p>Human Power Lab</p> <ul style="list-style-type: none"> ● Students will calculate the work and power required to complete several physical tasks (running up stairs, push ups, etc) <p>Potential Energy on Shelves Virtual Lab (Gizmo)</p> <ul style="list-style-type: none"> ● Compare the potential energy of several objects when you place them on shelves of different heights. Learn that two objects at different heights can have the same potential energy, while two objects at the same height can have different potential 	<p>Hands on laboratory assessments (Human Power Lab)</p> <p>Lab Simulations (Build a Roller Coaster Virtual Lab, Potential Energy Gizmo).</p> <p>Quizzes on major concepts.</p> <p>Homework to reinforce major concepts.</p> <p>Unit Test.</p>

	<p>➤ Is mechanical energy conserved?</p> <ul style="list-style-type: none"> ● Identify situations in which conservation of mechanical energy is valid. ● Recognize the forms that conserved energy can take. ● Solve problems using conservation of mechanical energy. <p>➤ What is the relationship between work, power, and energy?</p> <ul style="list-style-type: none"> ● Apply the work-kinetic energy theorem to solve problems. ● Relate the concepts of energy, time, and power. ● Calculate power in two different ways. ● Explain the effect of machines on work and power. 	<p>energies.</p> <p>Problem Solving Examples and Guided Practice</p> <p>Class discussion and guided note taking</p>	
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