

Unit Plan: Kinetic and Potential Energy

Stage 1: Desired Results	
Learning Expectations:	
<p>Systems and Cycles Students in grade 7 focus on systems and cycles using their understanding of structures and functions, connections and relationships in systems, and flow of matter and energy developed in earlier grades. A focus on systems requires students to apply concepts and skills across disciplines, since most natural and designed systems and cycles are complex and interactive. They gain experience with plate tectonics, interactions of humans and Earth processes, organism systems to support and propagate life, ecosystem dynamics, motion and energy systems, and key technological systems used by society. Through grade 7, students begin a process of moving from a more concrete to an abstract perspective, since many of the systems and cycles studied are not directly observable or experienced. This also creates a foundation for exploring cause and effect relationships in more depth in grade 8. (MA STE Frameworks)</p>	
Curriculum Frameworks and Learning Standards	
<p>MA: Science and Technology/Engineering <i>*see standards for classification statements and state assessment boundaries</i></p>	
<ul style="list-style-type: none"> • 7.MS-PS3-1 Construct and interpret data and graphs to describe the relationships among kinetic energy, mass, and speed of an object • 7.MS-PS3-5. Present evidence to support the claim that when the kinetic energy of an object changes, energy is transferred to or from the object • 7.MS-PS3-7(MA). Use informational text to describe the relationship between kinetic and potential energy and illustrate conversions from one form to another. 	
Enduring Understandings <i>Discovery Education Lesson Objectives</i>	Essential Questions <i>Discovery Education Overarching/Lesson Questions</i>
<ul style="list-style-type: none"> • Explain how the kinetic energy of an object depends on its mass and velocity. • Generate examples of kinetic energy. Compare kinetic energy to potential energy. • Model how kinetic energy can be transformed into potential energy and how potential energy can be 	<ul style="list-style-type: none"> • How is energy transferred and conserved?

transformed into kinetic energy.	
Content	Skills (Science and Engineering Practices) <i>Massachusetts STE Frameworks - 2016</i>
<div> <div></div> PEKE Notes/Study Guide </div>	<ul style="list-style-type: none"> • Asking questions (for science) and defining problems (for engineering). • Developing and using models. • Planning and carrying out investigations. • Analyzing and interpreting data. • Using mathematics and computational thinking. • Constructing explanations (for science) and designing solutions (for engineering). • Engaging in argument from evidence. • Obtaining, evaluating, and communicating information.

Stage 2: Assessment Evidence	
Performance Tasks <i>Performance Expectations (NGSS)</i>	Other Evidence
<ul style="list-style-type: none"> • Plan an investigation to provide evidence that the change in an object's motion depends on the sum of the forces on the object and the mass of the object. • Construct and interpret graphical displays of data to describe the relationships of kinetic energy to the mass of an object and to the speed of an object. 	<ul style="list-style-type: none"> • Laboratory Experiments • Group Projects/Presentations • Interactive Gizmos • Quizzes/Tests • Formative Assessments

Stage 3: Learning Activities	
Optional Learning Activities	Vocabulary
<ul style="list-style-type: none"> • Activities Padlet 	Potential energy, kinetic energy, mass,

<ul style="list-style-type: none"> • Roller coaster design 	velocity, gravity
Instructional Resources	
<ul style="list-style-type: none"> • Discovery Education • ExploreLearning Gizmos • Generation Genius • CK-12 • Phet 	