

Unit 1: Energy

Unit #:	APSDO-00034865	Duration:	10.0 Day(s)	Date(s):	
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Team:
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Grades:
 4

Subjects:
 Science

Unit Focus

In this unit, students will learn about the different forms that energy can take and the work that energy can do. Students will identify the differences between electrical energy and other forms that might not be recognized as easily and learn that energy can be converted from one form to another. Lessons will focus on discovering that energy can have different magnitudes, that the strength of the energy can be altered by different factors, and the different ways in which energy can be stored. Students will learn how energy can flow within a circuit. Summative assessments include a performance task utilizing the engineering design process with a written component that assesses mastery of concepts and skills. Supporting instructional materials for this unit may include mentor text(s), print and online resources, related laboratory equipment and materials, and teacher generated inquiry tasks.

Stage 1: Desired Results - Key Understandings

Established Goals	Transfer	
Next Generation Science Standards (DCI) <i>Science: 4</i> <ul style="list-style-type: none"> Energy and fuels that humans use are derived from natural sources, and their use affects the environment in multiple ways. Some resources are renewable over time, and others are not. <i>ESS3.4.A1</i> Energy can also be transferred from place to place by electric currents, which can then be used locally to produce motion, sound, heat, or light. The 	T1 (T2) Design an investigation or model using appropriate scientific tools, resources, and methods. T2 (T5) Communicate scientific information clearly, thoroughly, and accurately.	
	Meaning	
	Understandings	Essential Questions
	U1 (U465) Energy can be transferred from place to place by sound, light, heat, and electric currents or from object to object through collisions.	Q1 (Q465) How can I convert energy from one form to another to solve a problem? Q2 (Q463) How can we observe energy and its movement?

<p>currents may have been produced to begin with by transforming the energy of motion into electrical energy. <i>PS3.4.B3</i></p> <ul style="list-style-type: none"> • Energy can be moved from place to place by moving objects or through sound, light, or electric currents. <i>PS3.4.A2</i> • Energy is present whenever there are moving objects, sound, light, or heat. When objects collide, energy can be transferred from one object to another, thereby changing their motion. In such collisions, some energy is typically also transferred to the surrounding air; as a result, the air gets heated and sound is produced. <i>PS3.4.B1</i> • Light also transfers energy from place to place. <i>PS3.4.B2</i> • The expression "produce energy" typically refers to the conversion of stored energy into a desired form for practical use. <i>PS3.4.D1</i> • The faster a given object is moving, the more energy it possesses. <i>PS3.4.A1</i> • When objects collide, the contact forces transfer energy so as to change the objects' motions. <i>PS3.4.C1</i> 	<p>U2 (U466) Objects moving quickly have more energy.</p> <p>U3 (U467) Energy shows up in the forms of motion, sound, light, heat and electricity.</p>	<p>Q3 (Q464) How can energy be stored?</p>
Acquisition of Knowledge and Skill		
Knowledge		Skills
<p>K1</p> <p>Energy can exist in various forms (i.e., electrical, motion, sound, heat, light)</p> <p>K2</p> <p>Energy can be converted from one form to another (i.e., electrical to light, heat, or motion; motion to electrical; sun to electrical)</p> <p>K3</p> <p>Objects moving quickly have more energy</p>	<p>S1</p> <p>Construct an explanation and/or model to illustrate how energy can be transferred or used for work</p> <p>S2</p> <p>Identify or create examples of kinetic and potential energy (e.g., student on swing)</p> <p>S3</p> <p>Construct and explain examples of energy storage</p> <p>S4</p> <p>Construct and explain examples of energy transfer</p>	