

What Energy Does

Unit Overview



DESIGN CHALLENGE:

How can we design a machine to solve a problem?

ANCHORING PHENOMENON:

A girl avoids taking out the trash by making an invention that does it for her.

STORYLINE

In this unit, students explore the flow of energy in natural and engineered systems in order to develop an understanding of how energy causes changes and can be transferred and transformed. The Crosscutting Concepts of Energy and Matter, as well as Stability and Change, are featured prominently in this unit as students track energy into, out of, and within systems.

To begin, students identify examples of energy all around them in order to develop a definition for this complex term. They focus on things that they can observe as evidence that energy is present, such as motion. Students then test and observe how energy makes things move, and they study collisions in order to demonstrate that moving objects contain energy and that when these objects collide, they transfer energy and change the object's motion.

In the next section, students construct an understanding of speed before they make the connection that the faster an object moves, the more energy it has. They also make the connection that the speed of objects affect the amount of energy transferred. They apply this knowledge using the engineering design process to design a ramp that can make a ball go a certain distance.

Students then learn for work to be done, energy has to be transferred to exert a force and move an object over a distance. Students consider how simple machines make doing work easier and discuss how simple machines can solve specific problems using the structure and function of the simple machine. In the final section, students use the ideas of energy transfer, work, and the engineering design process to design a machine to solve a problem.

OVERVIEW

Section 1 <i>How does energy make things happen?</i>	Section 2 <i>How can we measure energy transferred during a collision?</i>	Section 3 <i>How can we use simple machines to do work?</i>	Section 4 <i>How can we use simple machines and energy transfer to solve a problem?</i>
Total Time: 5 days LESSON 1 What can we observe as evidence of energy? LESSON 2 How does energy make things move?	Total Time: 10 days LESSON 3 What happens to energy when objects collide? LESSON 4 How does speed affect energy transfer in a collision? LESSON 5 How can we apply our knowledge of energy and speed to engineer the best ramp for the job?	Total Time: 10 days LESSON 6 What is work? LESSON 7 How can we choose the best simple machine for the job? LESSON 8 How can we use simple machines to make it easier to do work?	Total Time: 4 days LESSON 9 How can we design a machine to solve a problem?

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