



Unit 2: Energy, Energy Transfer & Electricity

Subject Area: Science	Course: 4th Grade Science		
Unit Title: Energy, Energy Transfer, & Electricity	Grade(s): 4	Start: November	End: December
Unit Summary: In this unit, students explore energy! Students investigate how energy is stored, how it can make objects move, and how collisions transfer energy between objects. Students also construct devices that convert energy from one form into another, such as heat into motion and electricity into light.			

Stage 1: Desired Results

Massachusetts Learning Standards

- **4-PS3-1.** Use evidence to construct an explanation relating the speed of an object to the energy of that object.
- **4-PS3-2.** Make observations to show that energy can be transferred from place to place by sound, light, heat, and electric currents.
- **4-PS3-3.** Ask questions and predict outcomes about the changes in energy that occur when objects collide.
- **4-PS3-4.** Apply scientific principles of energy and motion to test and refine a device that converts kinetic energy to electrical energy or uses stored energy to cause motion or produce light or sound.
- **4-ESS3-1.** Obtain information to describe that energy and fuels humans use are derived from natural resources and that some energy and fuel sources are renewable and some are not.
- **Practices:**
 - 1. Asking questions (for science) and defining problems (for engineering)
 - 3. Planning and carrying out investigations
 - 6. Constructing explanations (for science) and designing solutions (for engineering)
 - 8. Obtaining, evaluating, and communicating information



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Transfer (Authentic, relevant application of learning to new situations)	
<p>Students will be able to independently use their learning to...</p> <ul style="list-style-type: none"> • Argue for and act on the importance of energy to life. (Is) • Make informed decisions about personal and societal use of energy. (ps) • Interpret and critique claims about the use of energy from public and private sources. (ps) 	
Meaning	
<p style="text-align: center;">Enduring Understandings</p> <p>Students will understand that...</p> <ul style="list-style-type: none"> • An object's energy is related to its speed • Energy never disappears, it transfers and changes from one form of energy to another • Energy can be "stored" and turned into "motion" • During a collision, energy transfer can cause an object to change location or position and/or generate heat or sound, but the object itself does not change. • Energy and fuels that humans use are derived from natural sources. Some resources are renewable over time, and others are not 	<p style="text-align: center;">Essential Questions</p> <p>Students will consider...</p> <ul style="list-style-type: none"> • How are motion and energy related? • How does energy change? • How does energy travel? • How do humans use energy and fuel derived from natural resources?
Acquisition	
<p style="text-align: center;">Knowledge</p> <p>Students will know...</p>	<p style="text-align: center;">Skills</p> <p>Students will be skilled at...</p>



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| <ul style="list-style-type: none">● energy exists in many forms and can be changed from one form to another (sound, light, heat, and electric)● the faster a given object is moving, the more energy it possesses● when objects collide, the force of that collision will cause the object to move in another direction● the term "produce energy" means the conversion of stored energy into another form for practical use (ex. a battery is stored energy that can be used to make a toy work)● humans use energy and fuel derived from natural resources● some energy and fuel sources are renewable and some are not● Vocabulary: energy, speed, light, heat, electric current, motion, renewable resources, nonrenewable resources, fossil fuel, solar energy, wind energy | <ul style="list-style-type: none">● asking questions that can be investigated and predict reasonable outcomes about motion and energy. (4-PS3-3)● making observations to produce data to serve as the basis for evidence for an explanation of a phenomenon or test a design solution (4-PS3-2)● making observations about motion, energy and its transfers● using evidence (e.g., measurements, observations, patterns) to construct an explanations about how energy can change (4-PS3-1)● obtaining, evaluating, and communicating Information about motion, energy and energy transfers● obtaining, evaluating, and communicating information about natural resources (4-ESS3-1)● applying scientific ideas about energy and motion to solve design problems |
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