Science Unit 1: Energy (Grade 4)

Content Area: **Science**
Course(s): **Science 4**
Time Period: **Marking Period 1**
Length: **6-8 weeks**
Status: **Published**

Established Goals/Standards

Please choose the appropriate Goals/Standards from the Standards tab above.

SEL.PK-12.2.1	Understand and practice strategies for managing one's own emotions, thoughts, and behaviors
SEL.PK-12.2.2	Recognize the skills needed to establish and achieve personal and educational goals
SEL.PK-12.2.3	Identify and apply ways to persevere or overcome barriers through alternative methods to achieve one's goals
SEL.PK-12.3.3	Demonstrate an understanding of the need for mutual respect when viewpoints differ
SEL.PK-12.3.4	Demonstrate an awareness of the expectations for social interactions in a variety of settings
SEL.PK-12.4.1	Develop, implement and model effective problem-solving, and critical thinking skills
SEL.PK-12.4.2	Identify the consequences associated with one's actions in order to make constructive choices
SEL.PK-12.5.1	Establish and maintain healthy relationships
SEL.PK-12.5.2	Utilize positive communication and social skills to interact effectively with others
SEL.PK-12.5.4	Demonstrate the ability to prevent and resolve interpersonal conflicts in constructive ways
SEL.PK-12.5.5	Identify who, when, where, or how to seek help for oneself or others when needed
CAEP.9.2.4.A.1	Identify reasons why people work, different types of work, and how work can help a person achieve personal and professional goals.
CAEP.9.2.4.A.2	Identify various life roles and civic and work - related activities in the school, home, and community.
CAEP.9.2.4.A.3	Investigate both traditional and nontraditional careers and relate information to personal likes and dislikes.
CAEP.9.2.4.A.4	Explain why knowledge and skills acquired in the elementary grades lay the foundation for future academic and career success.
4-PS3-3	Ask questions and predict outcomes about the changes in energy that occur when objects collide.
4-PS3-2	Make observations to provide evidence that energy can be transferred from place to place by sound, light, heat, and electric currents.
4-PS3-1	Use evidence to construct an explanation relating the speed of an object to the energy of that object.
4-PS3-4	Apply scientific ideas to design, test, and refine a device that converts energy from one form to another.
4-PS3-3.1.1	Ask questions that can be investigated and predict reasonable outcomes based on patterns such as cause and effect relationships.
4-PS3-2.3	Planning and carrying out investigations to answer questions or test solutions to problems in 3–5 builds on K– 2 experiences and progresses to include investigations that control variables and provide evidence to support explanations or design solutions.

4-PS3-2.3.1	Make observations to produce data to serve as the basis for evidence for an explanation of a phenomenon or test a design solution.
4-PS3-2.5.1	Energy can be transferred in various ways and between objects.
4-PS3-1.5.1	Energy can be transferred in various ways and between objects.
4-PS3-4.5.1	Energy can be transferred in various ways and between objects.
4-PS3-3.5.1	Energy can be transferred in various ways and between objects.
4-PS3-1.6	Constructing Explanations and Designing Solutions
4-PS3-1.6.1	Use evidence (e.g., measurements, observations, patterns) to construct an explanation.
4-PS3-4.6.1	Apply scientific ideas to solve design problems.
4-PS3-1.PS3.A.1	The faster a given object is moving, the more energy it possesses.
4-PS3-2.PS3.A.1	Energy can be moved from place to place by moving objects or through sound, light, or electric currents.
4-PS3-3.PS3.A.1	Energy can be moved from place to place by moving objects or through sound, light, or electric currents.
4-PS3-2.PS3.B.1	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.
4-PS3-3.PS3.B.1	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.
4-PS3-4.PS3.B.1	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 currents may have been produced to begin with by transforming the energy of motion into electrical energy.
4-PS3-2.PS3.B.2	Light also transfers energy from place to place.
4-PS3-2.PS3.B.3	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 currents may have been produced to begin with by transforming the energy of motion into electrical energy.
4-PS3-3.PS3.C.1	When objects collide, the contact forces transfer energy so as to change the objects' motions.
4-PS3-4.PS3.D.1	The expression "produce energy" typically refers to the conversion of stored energy into a desired form for practical use.
4-PS3-4.ETS1.A.1	Possible solutions to a problem are limited by available materials and resources (constraints). The success of a designed solution is determined by considering the desired features of a solution (criteria). Different proposals for solutions can be compared on the basis of how well each one meets the specified criteria for success or how well each takes the constraints into account.

Essential Questions

Please add your Essential Questions by clicking on the Lists tab above.

- How can energy be transferred from place to place?
- How do waves travel?
- How is speed related to energy?

- If an object is not moving, does it have energy?
- What are some ways that energy changes matter?
- What do all forms of energy have in common?
- What happens to energy in a collision?
- What is energy?
- Where does energy come from?

Core Ideas

Please add your Enduring Understandings by clicking on the Lists tab above.

- 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 currents may have been produced to begin with by transforming the energy of motion into electrical energy.
- 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 currents may have been produced to begin with by transforming the energy of motion into electrical energy.
- Energy can be moved from place to place by moving objects or through sound, light, or electric currents.
- Energy can be transferred in various ways and between objects.
- 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.
- Light also transfers energy from place to place
- Possible solutions to a problem are limited by available materials and resources (constraints). The success of a designed solution is determined by considering the desired features of a solution (criteria). Different proposals for solutions can be compared on the basis of how well each one meets the specified criteria for success or how well each takes the constraints into account.
- The expression “produce energy” typically refers to the conversion of stored energy into a desired form for practical use.
- The faster a given object is moving, the more energy it possesses.

Content

Students will be able to:

- Ask questions that can be investigated and predict reasonable outcomes based on patterns such as cause and effect relationships.
- Make observations to produce data to serve as the basis for evidence for an explanation of a phenomenon or test a design solution.
- Use evidence (e.g., measurements, observations, patterns) to construct an explanation.
- Apply scientific ideas to solve design problems.
- Develop an understanding of what energy is, the types of energy that exist, and how energy is transferred between objects.
- Understand the difference between potential and kinetic energy.
- Understand the relationship between energy and matter.

- Predict the changes in energy when two objects collide.
- Understand the relationship between energy and temperature.
- Develop an understanding of how energy is transferred through sound waves.
- Recognize the relationship between speed and the amount of energy an object possesses.

Resources

- HMH Science Dimensions textbook
- ActivBoard flipcharts
- Labs Activities
- United Streaming videos
- Brainpop
- Newsela