Unit 5 - Transfer of Energy

Content Area: **Science**
Course(s): **Science 4**
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Unit Summary

In this unit of study, fourth-grade students develop an understanding that energy can be transferred from place to place by sound, light, heat, and electrical currents. Students also obtain and combine information to describe that energy and fuels are derived from natural resources and that their uses affect the environment. The crosscutting concepts of Cause and Effect; Energy and Matter; and the Interdependence of Science, Engineering, and Technology; and Influence of Science, Engineering, and Technology on Society and the Natural World are called out as organizing concepts for these disciplinary core ideas. Students are expected to demonstrate grade appropriate proficiency in planning and carrying out investigations and obtaining, evaluating, and communicating information. Students are also expected to use these practices to demonstrate understanding of the core ideas.

Standards

LA.W.4.7	Conduct short research projects that build knowledge through investigation of different aspects of a topic.
LA.W.4.8	Recall relevant information from experiences or gather relevant information from print and digital sources; take notes and categorize information, and provide a list of sources.
LA.W.4.9	Draw evidence from literary or informational texts to support analysis, reflection, and research.
MA.4.OA.A.1	Interpret a multiplication equation as a comparison, e.g., interpret 35 = 5 × 7 as a statement that 35 is 5 times as many as 7 and 7 times as many as 5. Represent verbal statements of multiplicative comparisons as multiplication equations.
SCI.4.4-ESS3-1	Obtain and combine information to describe that energy and fuels are derived from natural resources and that their uses affect the environment.
SCI.4.4-PS3-2	Make observations to provide evidence that energy can be transferred from place to place by sound, light, heat, and electric currents.
TECH.8.1.5.E.1	Use digital tools to research and evaluate the accuracy of, relevance to, and appropriateness of using print and non-print electronic information sources to complete a variety of tasks.
TECH.8.1.5.E.CS1	Plan strategies to guide inquiry.
TECH.8.1.5.E.CS2	Locate, organize, analyze, evaluate, synthesize, and ethically use information from a variety of sources and media.
TECH.8.1.5.E.CS3	Evaluate and select information sources and digital tools based on the appropriateness for specific tasks.

Student Learning Objectives

SLO 1: Make observations to provide evidence that energy can be transferred from place to place by sound, light, heat, and electric currents. (4-PS3-2)

SLO 2: Obtain and combine information to describe that energy and fuels are derived from natural resources and their uses affect the environment. (4-ESS3-1)

4-ESS3-2: Generate and compare multiple solutions to reduce the impacts of natural Earth processes and climate change have on humans.

Essential Questions

Where do we get the energy we need for modern life?

Part A: How does energy move?

Part B: From what natural resources are energy and fuels derived? In what ways does the human use of natural resources affect the environment?

How can we reduce our impact on the Earth?

Enduring Understandings

Students will understand that:

- Energy can be moved from place to place by moving objects or through sound, light, or electric currents. (4-PS3-2)
- 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-PS3-2)
- Light also transfers energy from place to place. (4-PS3-2)
- 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)
- 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. (4-ESS3-1)
- Energy can be transferred in various ways and between objects. (4-PS3-2)

Application

Students will be able to independently use their learning to:

- Make observations to produce data that can serve as the basis for evidence for an explanation of a phenomenon or for a test of a design solution.
- Make observations to provide evidence that energy can be transferred from place to place by sound, light, heat, and electric currents.
- Identify cause-and-effect relationships in order to explain change.
- Obtain and combine information from books and other reliable media to explain phenomena.
- Obtain and combine information to describe that energy and fuels are derived from natural resources and their uses affect the environment.
- Examples of renewable energy resources could include:
    - Wind energy,
    - Water behind dams, and
    - Sunlight.
- Examples of nonrenewable energy resources are:
    - Fossil fuels,
    - Fissile materials
    - Examples of environmental effects could include:
    - Loss of habitat due to dams

- Loss of habitat due to surface mining
- Air pollution from burning of fossil fuels.

Skills

Students will be skilled at: