

Evidence of Energy

By investigating motion, sound, heat, and light, children learn that they and other objects in the classroom use energy.

Grade Level: K–4

Subject Areas: English
Language Arts, Health, Physical
Education, Science

Setting: Classroom

Time:

Preparation: 15 minutes

Activity: 50 minutes

Vocabulary: Energy, Heat,
Kinetic energy, Light, Sound,
Work

Major Concept Area:

- Definition of energy

Objective

Students will be able to identify evidence of energy being used in their lives.

Rationale

Locating observable forms of energy such as motion, sound, heat, and light helps students understand what energy is.

Materials

- Flashlight
- Bell
- Radio (optional)
- Find additional resources related to this activity on keepprogram.org > Curriculum & Resources

Background

What is always present but never visible? Energy. Energy is a difficult concept to understand because it is not a concrete object that you can see or touch. To comprehend what energy is, you need to understand what it does. That is, although energy isn't visible, you can detect evidence of energy. Jumping, moving a wheelchair, eating, and singing all require energy. Nonliving things also use energy—a clock, a vacuum cleaner, and a mechanical toy all need energy to move. Using these items involves energy in a form called kinetic energy (energy of motion). Work is involved whenever anything moves a distance, and energy is needed to do work. Therefore, a definition of energy is the ability to do work.

Sound is produced when we strike something. Sound is also evidence that energy is present. But does sound do work? Yes, sound can move things. Sound waves move the tiny bones in your ear and shake windows when a loud truck passes by. Sound waves are also evident in the vibrations from a playing radio. Our body is working even when it appears to be still. Breathing, blinking, and digesting food all require energy. For us to do these activities, our bodies burn the energy in food. We know this is happening because we feel warm (burning generates heat).

Therefore, heat is evidence that energy is being used. Nonliving things produce heat when they use energy, too. A car or a vacuum cleaner feels warm when it's running. Clocks and mechanical toys produce heat as well, but the amount is so small that we can't detect it with our hands. Heat is a form of energy that can change things. Heat can melt an ice cube or make water boil.

The definition of energy can be amended to say that energy is the ability to do work or to change things. Light is another observable form of energy. Light can change things. When light shines on your arm it makes your arm feel warm. When light shines on a green plant, the plant can make food. Therefore, although energy itself isn't visible, you can detect evidence of energy. Movement, sound, heat, and light provide evidence that energy is present and being used.

Procedure

Orientation

Write the word "energy" on the board. Ask students what they think energy is. Note their answers.

Shine a flashlight, ring a bell, and jump or walk around. Ask students what these things have in common. Guide student responses to the fact that everything you're doing involves energy. Tell students that energy is everywhere, but you can't see it directly. You can, however, see evidence that energy exists.

Steps

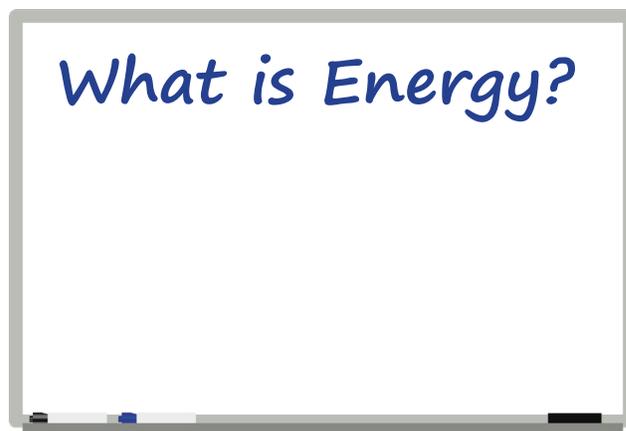
1. Lead students in a quick game of "Simon Says" to show that they can move and use energy. Have students look around the room and identify things that move or can move. Items they may notice include a clock, a bell, and a stapler. Tell students that all these things use energy.
2. Knock on wood or ring a bell. Tell students that sound is a form of energy. Students can look for other things that produce sound, such as a radio. Students can also feel the sound vibrations that come from the radio.
3. Have students put one of their hands on their arms. Ask them to describe how it feels. Tell students that heat is evidence of energy. Instruct students to look for other things that could give off heat. Students may notice a radiator, a motorized object, or other students.
4. Some students may have noticed that the sun and light bulbs also produce heat. Explain that light is evidence of energy. Have students look for examples of light energy.
5. Clarify some beginning ideas about the nature of energy by leading a discussion. You might begin by saying: "There are many things in the world that we know exist because we can see them. But there are some things we cannot see. Energy is one of those

things. How do we know energy is there? Who can tell me a way?" Children will probably suggest some of the following:

- We can move
- The radiator feels warm
- The sun is shining

Closure

Write the words "What is Energy?" on the whiteboard or ask the question aloud. Have students form their own definition. Accept all responses, but emphasize that energy usually involves movement and heat. Have students keep track of the evidence of energy in their lives (see **Assessment**).



Assessment

Formative

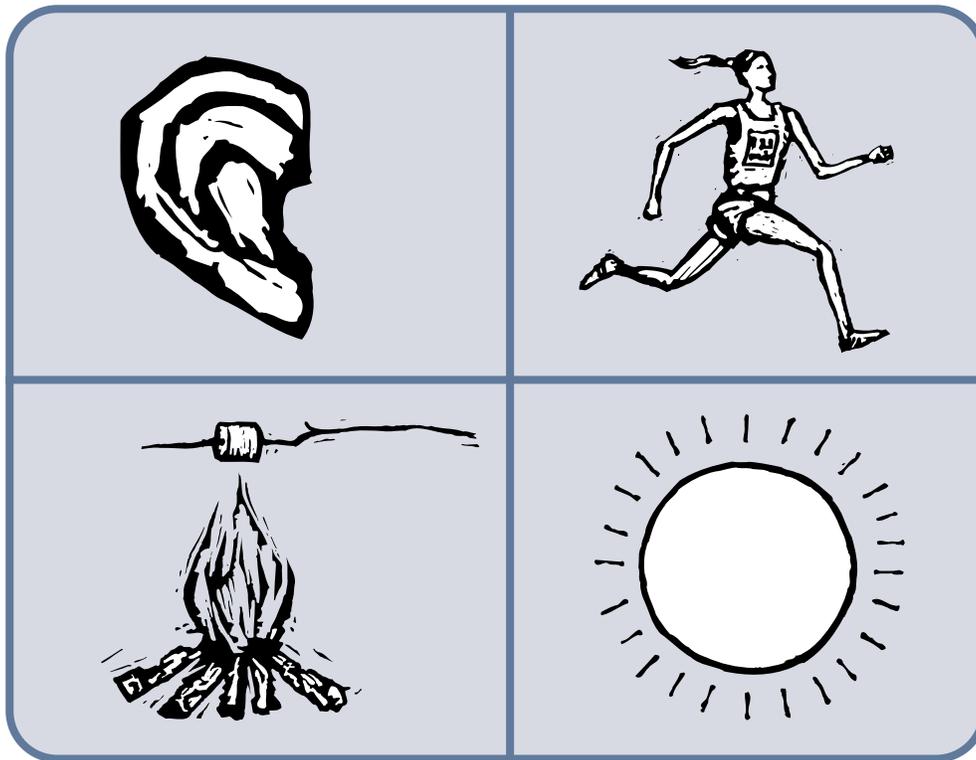
When students define energy, do they relate movement, sound, heat, and light to evidence that energy is being used?

Summative

Have students create symbols to represent things that indicate energy is being used. For example, sound energy could be an ear, movement could be a stick figure running, heat could be a flame, and light could be the sun. Students working in small groups should draw these symbols on four cards. Invite the class to look around the room or school and tape or lay the cards on things that demonstrate the evidence of energy represented on the card. Show the class samples of items using energy and have students indicate if they see, hear, or feel these items to detect evidence of energy (for example, they hear a radio and it feels warm). Students may also discover that some items provide evidence of more than one form of energy.

Related KEEP Activities

This activity serves well as an introduction to energy. To have students further investigate the forms of energy presented here, see K-5 Energy Sparks for Theme I: “Exploring Sound,” “Exploring Light Energy,” and “Exploring Movement.” The activity “Exploring Heat” allows students to further study thermal energy. Students can conduct a more thorough inventory of energy in their lives as well as their dependence on electricity. Some ideas for this are presented in K-5 Energy Sparks for Theme I: “Energy Use at Home,” and K-5 Energy Sparks for Theme II: “Electricity in Our Lives.”



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