

# 4<sup>th</sup> Grade Science

## Week 6

<b>Your Week at a Glance</b>
<ul style="list-style-type: none"><li>• Forms of Energy</li><li>• NGSSS: SC.4.P.10.1; SC.4.P.10.3</li></ul>

- Forms of Energy
- NGSSS: SC.4.P.10.1; SC.4.P.10.3

**Student Name:** \_\_\_\_\_

**Teacher Name:** \_\_\_\_\_

**School:** \_\_\_\_\_

**SC.4.P.10.1** Observe and describe some basic forms of energy, including light, heat, sound, electrical, and the energy of motion. **SC.4.P.10.3** Investigate and explain that sound is produced by vibrating objects and that pitch depends on how fast or slow the object vibrates.

## Forms of Energy

### Kinetic and Potential Energy

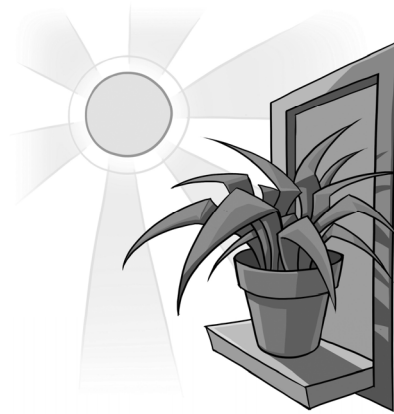
**Energy** is the ability to cause change in matter. **Kinetic energy** is the energy of motion. Any object that is in motion has kinetic energy. **Potential energy** is the energy something has because of its position or condition. For example, a roller coaster car at the top of a hill has potential energy because of its position and the force of gravity pulling on it. When the car moves down the hill, potential energy will change to kinetic energy. Potential energy can also be stored in objects by stretching or compressing them. A pogo stick has potential energy when the spring is pushed down. When the spring expands again, the potential energy changes to kinetic energy.

**Mechanical energy** is the total kinetic energy and potential energy of an object. As the roller coaster car rolls downhill, its potential energy decreases and its kinetic energy increases. However, its mechanical energy stays the same.

### Light Energy

Light is a form of energy that can travel through empty space. It does not need particles of matter to travel. Light allows us to see with our sense of sight. Plants use light from the sun to make food.

Light energy travel away from a source, such as the sun, in all directions. Light follows a straight path unless it strikes a surface or enters a new material. Then it can be blocked, change speed, or change direction.



### Chemical Energy

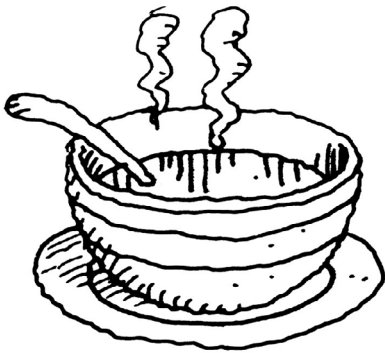
**Chemical energy** is energy stored within matter that can be released by a chemical change. For example, chemical reactions in your body release the chemical energy in food. You use that energy to live, move, and grow. Burning fuel, such as wood or gasoline, releases the chemical energy found in that fuel.

### Electrical Energy

**Electrical energy** is energy that comes from electric current. Wires carry electric current to your home and school. These wires are connected to electrical outlets. When you plug an electrical device into the outlet, that device can use the electrical energy. Electricity is generated in power plants. Some power plants use the chemical energy released by burning fossil fuels such as coal and natural gas. Some power plants use the energy of flowing water to generate electricity. Wind turbines and solar panels can also produce electricity.

## Heat

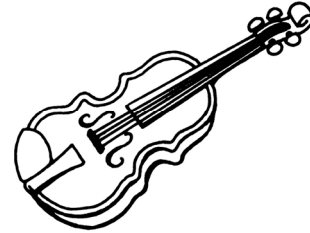
**Temperature** is the measure of how hot or cold something is. **Heat energy** moves from an object with a higher temperature to one with a lower temperature. When a cooler object, such as a room-temperature spoon, comes into contact with a warmer object or substance, such as a bowl of hot soup, heat energy flows from the soup to the spoon. The spoon's temperature will rise.



## Sound Energy

**Sound** is a form of energy we hear. It cannot move through empty space, but requires a material such as air or water to move. Sound is produced when something moves back and forth. This back-and-forth motion is called

vibration. For example, when a violinist pulls the bow across the instrument's strings, the strings and the wood of the violin vibrate. This vibration travels through the air to your ear.

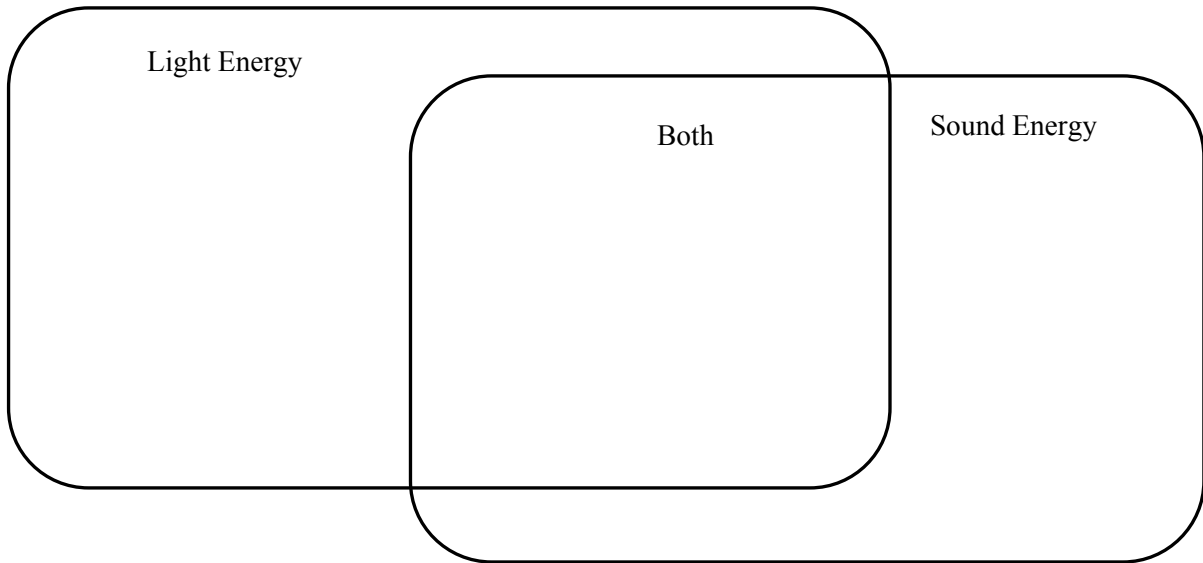


Pitch and volume are two properties of sound. Pitch is how high or low a sound is. A high-pitched sound, like a cat's meow, is produced by fast vibrations. A low-pitched sound, like a cow's moo, is produced by slower vibrations.

The **volume** of a sound is how loud or quiet the sound is. Volume is related to the amount of energy the sound has. Loud sounds have more energy than quiet sounds. Tap on a drum softly, and the drum will make a quiet sound. Bang on the drum with more energy, and it will make a louder sound.

# Student-Response Activity

**1** Complete the Venn diagram below to compare and contrast light energy and sound energy.



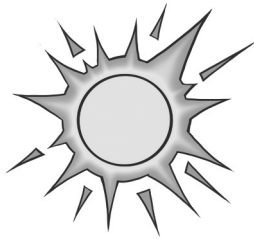
**2** Identify objects that produce each form of energy.

Form of Energy	Object
Sound	
Heat	
Electricity	
Light	

## Benchmark Assessment SC.4.P.10.1, SC.4.P.10.3

Fill in the letter of the best choice.

- 1 Which forms of energy are produced by the sun?



- (A) heat and sound
  - (B) light and electricity
  - (C) heat and light
  - (D) chemical and heat
- 2 Which energy change takes place when an electric hair dryer is used?
- (F) electricity to light energy
  - (G) electricity to sound energy
  - (H) electricity to heat and sound energy
  - (I) electricity to heat and chemical energy
- 3 Which object has potential energy but not kinetic energy?
- (A) a roller coaster car on the way up a hill
  - (B) a roller coaster car stopped on the top of a hill
  - (C) a roller coaster halfway down a hill
  - (D) a roller coaster nearly all the way down a hill

- 4 Which form of energy is stored in this container?



- (F) chemical energy
  - (G) electrical energy
  - (H) kinetic energy
  - (I) sound energy
- 5 How could you increase the pitch of a sound produced by an object?
- (A) Make the object vibrate faster.
  - (B) Make the object vibrate slower.
  - (C) Make the object vibrate louder.
  - (D) Make the object vibrate quieter.