

Energy in Action

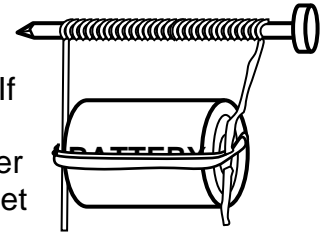
Energy is the ability to cause changes in matter or to make things happen. You use many forms of energy every day to make your life more comfortable and safer. Some common forms of energy include electrical, heat, light, sound, and solar energy. The chart below describes different forms of energy.

Recognizing Different Forms of Energy			
	Description	Sources	Uses
Electrical	Caused by charged particles	Batteries, electrical outlets, solar panels, lightning	Provides energy for tools and appliances
Heat	The movement of particles in matter	Hot objects, the sun	Cook food, weld metal, warm buildings
Light	Energy that travels in waves that you can see	Light bulbs, televisions, flashlights, lasers, the Sun	Helps people to see, lasers used in surgery and industry
Sound	Caused by the vibrations of objects	Televisions, radios, guitars, musical instruments	Relaxation, communication
Solar	Energy from the sun	The sun	Provides light and heat for the Earth, powers solar cells for electricity

You can find examples of the different forms of energy in nature. Lightning is a natural example of electrical energy. Heat energy inside the Earth warms underground water and rock, producing geysers and volcanoes. Fireflies and other animals with glowing body parts are natural examples of light sources. Thunder, produced by vibrating air, is a natural source of sound on the Earth. The sun, however, is the most important light and heat source for the Earth. Light and heat from the sun are forms of solar energy.

Reflection is the bouncing of light from a surface. You can see objects because light reflects from their surfaces. Light is **transmitted** when it passes through objects. Light easily passes through clean water, air, and clear glass. Some light is **absorbed** by objects. This light turns into heat. Have you ever noticed how hot the sand on the beach is on a hot day? Light passing from one kind of matter into another is **refracted**, or bent. This occurs because light travels at different speeds through different kinds of matter. Many tools, such as eyeglasses, cameras, binoculars, hand lenses, and microscopes, are useful because of refraction.

Electrical energy is very useful because it can be changed into many other forms of energy. Electricity travels in closed paths called **circuits**. The flow of electricity starts and ends at the energy source. If the circuit is broken or incomplete, the electricity cannot flow and the electrical device will not work correctly. Electricity can be used to power a special type of magnet called an **electromagnet**. This special magnet is made of iron wrapped in a coil of wire. You can make an electromagnet from an iron nail, some wire, and a battery. When the electric current flows through the wire, the nail becomes a magnet. The electromagnet only works if the circuit is complete.



Say something and touch the front of your throat, just under your chin. Can you feel your vocal cords moving? When you speak, air moves past your vocal cords, causing them to **vibrate**, or move back and forth. The vibration of objects is what produces sound. Any object that makes a sound is vibrating. Sound energy travels from the vibrating object to your ear. This energy causes your ear drum to vibrate. Then, your ear and brain work together to help you hear the sounds. Sound energy can only move through some type of matter: a solid, a liquid, or a gas.

It takes energy to make objects move. It is harder to lift a bowling ball than a soccer ball even though they are about the same size. That is because a bowling ball has more **mass** than a soccer ball. It takes a lot of effort to quickly roll a bowling ball down the lane. A bowling ball is also hard to stop. **Inertia** makes it hard to start or stop the ball from rolling. Inertia is the tendency for a moving object to keep moving and a resting object to remain at rest. The greater an object's mass, the more inertia the object possess.

A **force** is a push or a pull that can change an object's motion. **Gravity** is a force that causes motion. Gravity is the force of attraction between objects. The greater the mass of the object, the greater the force of gravity the object has. The Earth's gravity causes all objects on its surface to be pulled towards the center of the Earth. A force called **friction** opposes motion and can slow down or stop moving objects. There is friction whenever two objects rub together.

Name _____

Date _____

Energy in Action

- 1 A car parked outside gets warmer on sunny days than on cloudy days. Which of the following is warming the car during the day?

 - A The car's engine
 - B The car's headlights
 - C Solar energy
 - D Electrical energy

- 2 What is the main type of energy given off by an electric stove?

 - A Heat energy
 - B Solar energy
 - C Geothermal energy
 - D Electrical energy

- 3 Which of the tools listed below does NOT have a lens to refract light?

 - A A camera
 - B A mirror
 - C A telescope
 - D Binoculars

- 4 Light is refracted by—

 - A striking a smooth, shiny surface
 - B striking a dark surface
 - C passing through a mirror
 - D passing into a new material

- 5 A closed path through which electrical energy flows is called a—

 - A current
 - B conductor
 - C wire
 - D circuit

- 6 Sound is caused by—

 - A electricity
 - B vibrations
 - C light
 - D heat

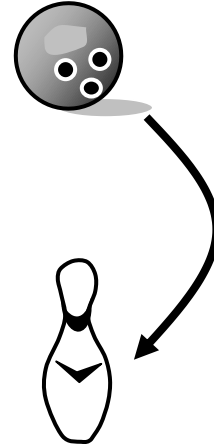
- 7 Which of the following forces is responsible for leaves falling off of a tree?
- A Inertia
 - B Gravity
 - C Friction
 - D Motion

Use the table below to answer question 8.

Mass of Objects			
Toy car	Brick	Marble	Rock
3 g	12 g	.75 g	15 g

- 8 Which of the objects listed in the table above would take the most force to move?
- A The toy car
 - B The brick
 - C The marble
 - D The rock
- 9 What form of energy causes the wires in a toaster to give off heat and light?
- A Heat energy
 - B Light energy
 - C Electrical energy
 - D Solar energy

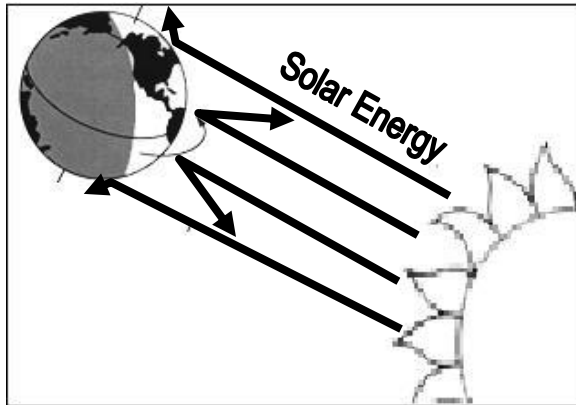
- 10 If the bowling ball follows the path shown in the picture below, in which direction will the pin move when struck by the bowling ball?



- A B C
- A Toward A
 - B Toward B
 - C Toward C
 - D Toward the ball

- 11 Which of the following objects would be best at reflecting light?
- A A lens
 - B A mirror
 - C Eyeglasses
 - D A rainbow

- 12 What behavior of light is shown in the drawing below?



- A Reflection
B Refraction
C Absorption
D Transmission
- 13 An insulator does not allow electricity to pass through it easily. Which of the following would make a good insulator?
- A Iron nail
B Copper coin
C Rubber glove
D Metal doorknob
- 14 Which of the following is the best description of an object that is making sound?
- A Getting hotter
B Glowing brightly
C Conducting electricity
D Moving back and forth
- 15 Which object below will bend light?
- A A piece of wood
B A tinted window
C A pair of eyeglasses
D A clear window pane
- 16 Astronauts on the moon cannot hear each other speak without a radio. Why is this true?
- A The sound moves away on the wind.
B The vibrations move too quickly.
C The sound waves move too slowly.
D There is no air on the moon.