HOME/SCHOOL CONNECTION

Investigation 1: Energy and Circuits

Lightbulbs are rated by the amount of energy they consume as they work. The unit of electric power is the watt. Just because a lightbulb uses more electric power does not mean it is brighter.

Incandescent bulbs	Compact fluorescent bulbs	LED lamps
Energy inefficient	Energy efficient	Very energy efficient
Ninety percent of energy consumed is converted into wasted heat.	Initial cost is higher, but long life span saves money; less heat waste.	Price is high. No heat waste.
Short-lived and expensive to maintain.	Contains mercury so must be disposed of properly.	Very long service life. No toxic materials.

With the help of a grown-up, record the watt rating for each bulb you can easily check in your home. You may be surprised by the low wattage of the newer compact fluorescent bulbs (CFLs). Add up the total watts used by the lights you are able to check.

Safety Note: Only check bulbs that are turned off and cold.

Lightbulb location	Kind of bulb	Watt rating
	Total watts	

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Investigation 2: The Force of Magnetism

Find out how magnets are used around the home. Some ways might be to hold kitchen cabinets closed, to keep a refrigerator door shut, or to stick things to the refrigerator door. Talk with your family about the magnets.

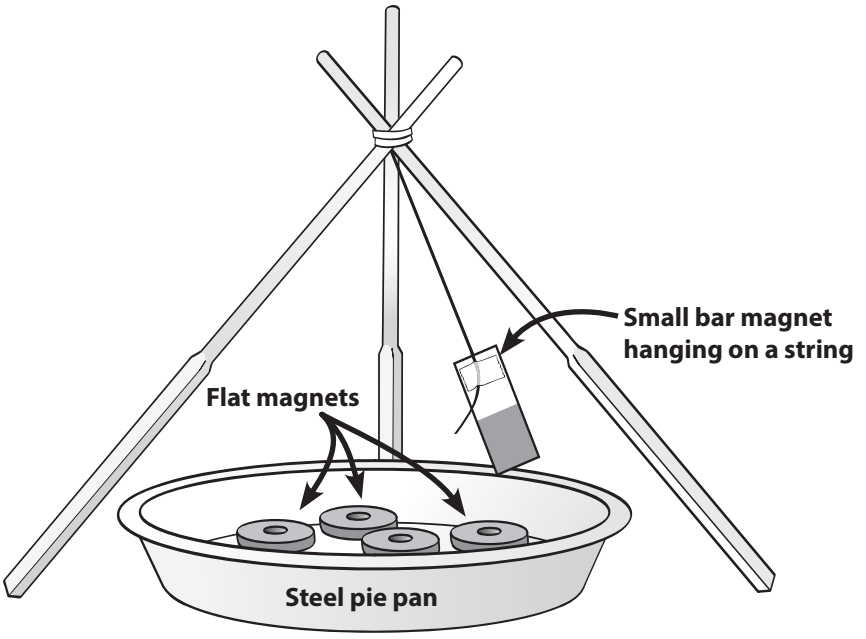
Can you think of another way to use magnets around the house?

Can you invent a magnet game?

Talk over some ideas with your family and try out some games, if you can.

Draw a picture of your invention to share with the class, and write a paragraph explaining what it does.

Here's one idea for a magnetic dancer.



Dancing magnet toy

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Investigation 3: Electromagnets

Safety Note: Ask an adult to help you with this activity. Be sure to follow safety rules about electricity. Just look, don't touch!

Home electricity is provided by the electric utility company in your community. One large wire brings the electricity into your home. The wire can come to your home from a power line strung on poles, or from a cable underground. Can you find where the main electricity wire comes to your home?

You might have several wires coming to your home. Which one is the electricity? The trick is to look for the electric meter. The main wire always comes to the electric meter first. Why is there a meter on the electric line?

The electricity next goes to a distribution box with or circuit-breakers. The electricity divides and goes to several locations in your home. Each circuit breaker protects and serves a different circuit. How many circuits are in your home?

Wires are hidden inside the walls of your home. We connect our electric lights and appliances to the electric power in the walls by plugging them into electric sockets. How do you think plugging a lamp into a socket completes a circuit to light the lamp? Draw a picture to show how you think it might work.

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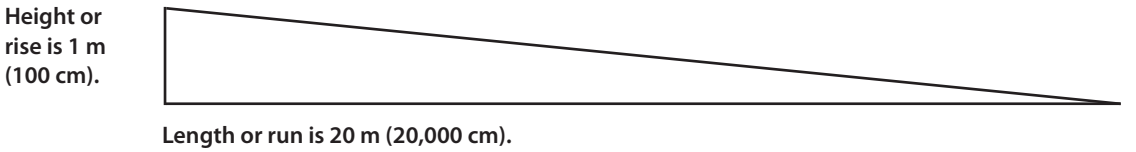
Investigation 4: Energy Transfer

Wheelchair ramps provide a long, gradual slope that makes it easier for a person in a wheelchair to get into or out of a building.

Engineers have set recommendations for ramp construction, using the relationship between the height of the entrance and the length of the ramp. For every 1 unit of height, the ramp should be 20 units long. That relationship can be described as a ratio. The ratio is 1:20.

If the entrance is 1 meter (m) high, the ramp should be 20 m long.

The height is called the **rise**. The length is called the **run**.



The steepest ramp allowed is one that has a ratio of 1:16.

Determine how long the ramps would need to be for the height of the entrances listed in the table. Calculate the length for both ratios.

Height of entrance to building	Ramp 1:20	Ramp 1:16
50 cm		
80 cm		
120 cm		
150 cm		
200 cm		

1. What if you had to make a ramp with a rise of 80 centimeters (cm), but it could not be longer than 15 m. Which ramp ratio would you use, 1:20 or 1:16?

2. If you had to create a ramp using a 1:20 ratio for an entrance that was 150 cm high, but you only had a space that was 10 meters long, how else could you construct the ramp so it fits in your space?

HOME/SCHOOL CONNECTION

Investigation 5: Waves

Safety Note: Never look directly at the Sun or reflect sunlight in a person's eyes. Both can damage eyes.

The Sun seems to move across the sky because Earth is turning on its axis. You can use a mirror to observe the movement. Here's how.

Find a window where light from the Sun shines in. Position a mirror to reflect sunlight onto a wall. Tape a piece of paper there. Mark the center of the reflection of the Sun. Wait 10 minutes and mark the center of the reflection again. Did the reflection move? Why?