

# #9701

## ELECTRICITY: A FIRST LOOK

RAINBOW EDUCATIONAL MEDIA, 2001

Grade Levels: 2-6

18 minutes

6 Instructional Graphics Enclosed

### DESCRIPTION

What is electricity and how is it made? What kinds are there? What are circuits and switches? Is electricity dangerous? Answers these questions with easy-to-duplicate experiments.

### ACADEMIC STANDARDS

#### Subject Area: Science – Physical Sciences

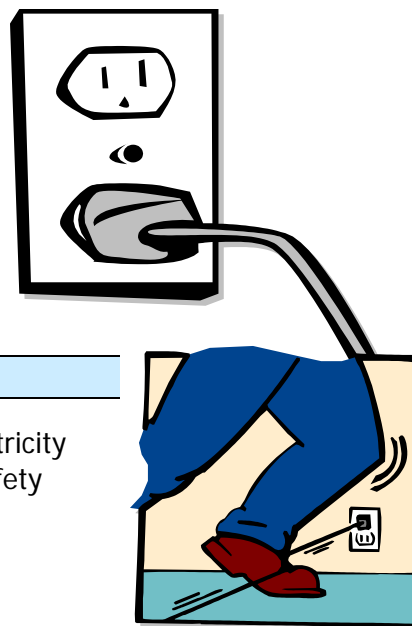
- ★ Standard: Understands the sources and properties of energy
  - Benchmark: Knows the organization of a simple electrical circuit (e.g., battery or generator, wire, a complete loop through which the electrical current can pass) (See Instructional Goals #5 and 6.)
  - Benchmark: Knows that electrical circuits provide a means of transferring electrical energy to produce heat, light, sound, and chemical changes (See Instructional Goal #3.)
- ★ Standard: Understands forces and motion
  - Benchmark: Knows that electrically charged material pulls on all other materials and can attract or repel other charged materials (See Instructional Goal #1.)
  - Benchmark: Knows that just as electric currents can produce magnetic forces, magnets can cause electric currents (See Instructional Goal #4.)

### INSTRUCTIONAL GOALS

1. To explain that electricity is a form of energy.
2. To compare static electricity to current electricity.
3. To describe ways in which people used electricity.
4. To describe different ways electricity can be produced.
5. To demonstrate how switches work.
6. To describe what conductors and insulators are.
7. To point out some important facts about electricity and safety.

### VOCABULARY

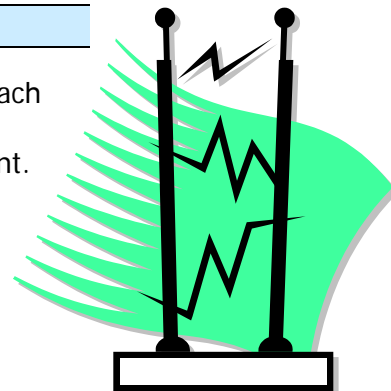
- |              |                        |
|--------------|------------------------|
| 1. battery   | 6. current electricity |
| 2. cables    | 7. electrical safety   |
| 3. circuit   | 8. frayed wire         |
| 4. compass   | 9. generators          |
| 5. conductor | 10. insulator          |



- |                   |                        |
|-------------------|------------------------|
| 11. kerosene lamp | 15. solar panels       |
| 12. magnet        | 16. static electricity |
| 13. pylons        | 17. switch             |
| 14. socket        | 18. wind power         |

### BEFORE SHOWING

1. Make a list of items used everyday that requires electricity. For each item, discuss what the early pioneers used instead.
2. Review the story about Benjamin Franklin's famous kite experiment.
3. Conduct a question/answer session before showing the video:
4. Does electricity always require the use of wires, plugs, and wall sockets?
5. How is electricity made?
6. Is electricity expensive?
7. How does electricity travel to people's home?
8. How does the electric switch work?
9. Is electricity dangerous?



### DURING SHOWING

1. View the video more than once, with one showing uninterrupted.
2. Pause after the section on static electricity. Make static electricity by doing the same experiments shown in the video. Discuss other objects that could be used.
3. Pause after the section showing the student making current electricity with a bar magnet and a coil of wire. Perform this experiment in class.
  - a. Keep the two jars with the wire coiled around them at least three feet apart. (This prevents the magnet itself from causing the compass needle to move.)
  - b. Use clay to hold the compass in one of the jars. The compass should be positioned so that, when pointing north, the needle is aligned with the lip of the jar rather than pointing into or out of the jar.
4. Pause at the section about batteries. How do batteries make electric currents?
5. Pause at the segment showing solar panels. How do the solar panels make electricity?
6. Pause at the segment showing the windmills. Explain how the way windmills produce electricity is similar to moving a magnet inside a coil of wire.
7. Pause at the section labeled What Will Happen? Discuss possible results.
8. Pause at the segment showing the lineman working on the job. Point out the special protective clothing.
9. Pause during the segment showing the dangers of electricity. List some things people should do or not do to be safe with electricity.

### AFTER SHOWING

#### ► Discussion Items and Questions

1. What were some appliances and machines mentioned in the video that depend on electricity?
2. Is it possible for people today to live without electricity?
3. What is static electricity? What is current electricity?

4. What is a circuit? What is the difference between a closed circuit and an open circuit? What happens if one breaks a circuit?
5. What is a switch? What are some examples of switches?
6. What is a conductor and what are some examples of conductors?
7. What is an insulator and what are some examples of insulators?
8. What are some other dangers of electricity that are not mentioned in the video?

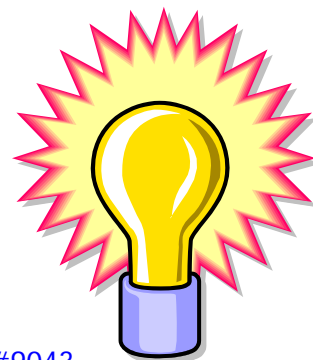
### ► Applications and Activities

1. Set up the battery-and-light-bulb experiment with the circuit opened as shown in the video.
  - a. Replace the paper clip with other metals or conductors. Do some conductors work better than others?
  - b. Replace the rubber eraser with other materials such as plastic, paper, wood, and glass. Make a list of other possible insulators.
2. Perform an experiment similar to the one using a bar magnet and a coil of wire.
  - a. Attach two ends of a wire to a battery and coil the middle part of the wire around a nail or iron rod.
  - b. Use the nail or rod to pick up steel paper clips or thumb tacks.
  - c. Unhook the wire from the battery and try to pick up the paper clips again. Explain the results.
3. Perform other activities that illustrate static electricity.
  - a. Pour salt and pepper on a piece of waxed paper. Charge a balloon by rubbing it with a piece of wool and slowly bring the balloon close to the mixture of salt and pepper. Observe what happens.
  - b. Tie a ten inch long piece of thread to an O-shaped cereal. Tape it from the edge of a desk. Rub a comb against a piece of wool and slowly bring the comb close to the cereal. Observe what happens.
4. Complete the "Electricity Match-up" worksheet. (See Instructional Graphics.)
5. Complete the "Static or Current?" worksheet. (See Instructional Graphics.)
6. Complete the "Power Cycle" worksheet. (See Instructional Graphics.)
7. Complete the "True or False" worksheet about electricity. (See Instructional Graphics.)
8. Complete the fill-in-the-blanks "Electricity Review". (See Instructional Graphics.)
9. Complete the "Electrical Safety" worksheet. (See Instructional Graphics.)
10. Develop a word search worksheet that uses the vocabulary from the video.
11. Join hands in a circle to illustrate how electricity flows only through a closed circuit.
  - a. Imagine the circle is an electrical wire. One student begins by squeezing the hand of the student to the left. Other students continue to squeeze in turn around the circle.
  - b. Allow the squeezing to go around the circle two or three times.
  - c. Have one student step out of the circle to break the circuit.
  - d. When the squeezing stops, discuss how this is similar to the flow of electricity when a circuit is opened.

### RELATED RESOURCES



- [Bill Nye the Science Guy: Simple Experiments You Can Do At Home #9043](#)
- [Knucklehead's Electrical Safety Video I #3624](#)





## World Wide Web

The following Web sites complement the contents of this guide; they were selected by professionals who have experience in teaching deaf and hard of hearing students. Every effort was made to select accurate, educationally relevant, and "kid safe" sites. However, teachers should preview them before use. The U.S. Department of Education, the National Association of the Deaf, and the Captioned Media Program do not endorse the sites and are not responsible for their content.

## Science Made Simple

- **WHAT IS STATIC ELECTRICITY?**

<http://www.sciencemadesimple.com/static.html#LEARNMORE>

Explains what static electricity is and includes several experiments that produce static electricity.

- **ACTIVITIES TO EXPLORE STATIC ELECTRICITY**

<http://www.mos.org/sln/toe/staticmenu.html>

Includes background information for teachers and links to experiments on static electricity.



## ***THE ELECTRIC CLUB*** **ACTIVITIES HANDBOOK**

- **THE ELECTRIC CLUB**

<http://www.schoolnet.ca/general/electric-club/e/>

Contains links for various kinds of activities and experiments related to electricity. Examples are: Balloon Charge, Lemon Power, The Money Pile, and Charge It.

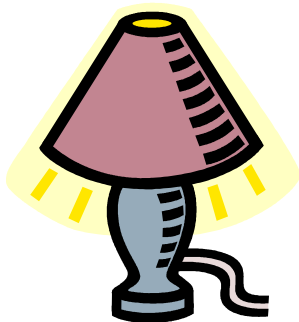
## INSTRUCTIONAL GRAPHICS

- ELECTRICITY MATCH-UP
- STATIC OR CURRENT?
- POWER CYCLE
- TRUE OR FALSE
- ELECTRICITY REVIEW
- ELECTRICAL SAFETY

## Electricity Match-up

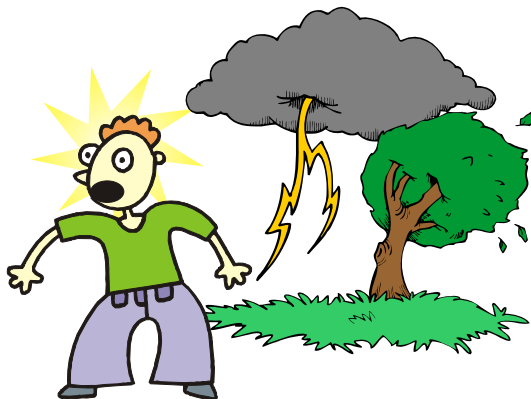
Each item on the left uses electricity to help us do work.

**Directions:** Match each item with the thing that helped us do the same job before electricity was discovered.



## Static or Current?

**Directions:** Label each example of static electricity with an "S."  
Label each example of current electricity with a "C."



1. \_\_\_\_\_

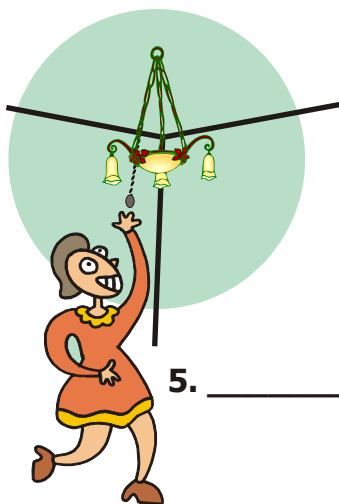
2. \_\_\_\_\_



3. \_\_\_\_\_



4. \_\_\_\_\_



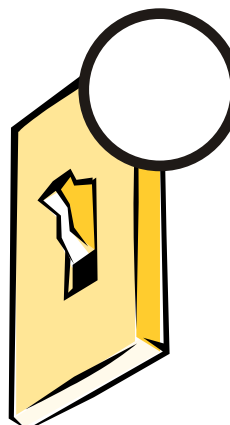
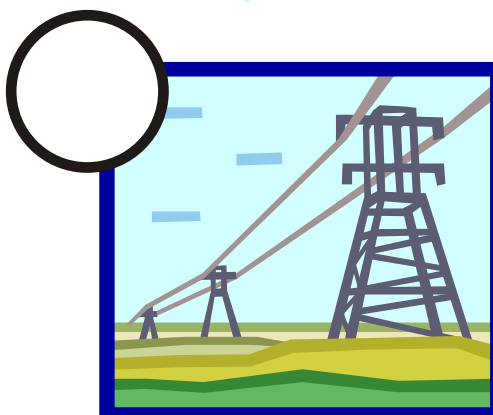
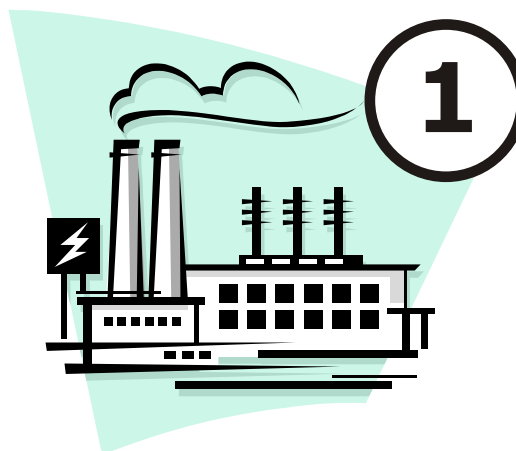
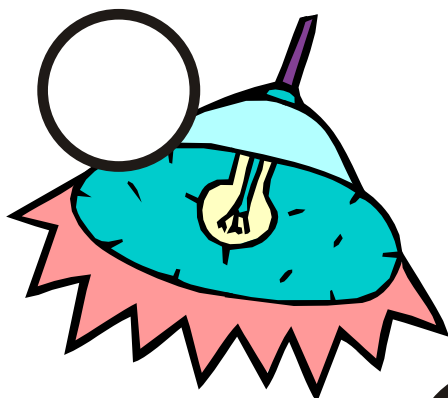
5. \_\_\_\_\_



6. \_\_\_\_\_

## Power Cycle

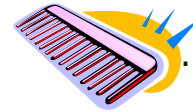
**Directions:** Each picture shows a step in the cycle that brings power to our homes. Number each picture in the correct order. The first one is done for you.



## True or False

**Directions:** Write a "T" beside each true sentence and an "F" beside each false sentence.

1. \_\_\_\_ Lightning happens when water in a cloud rubs against a



2. \_\_\_\_ Current electricity flows through a wire like water in a

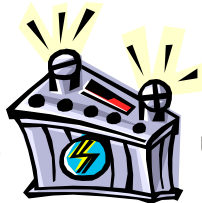


3. \_\_\_\_ Electricity is made in a



and sent to our homes.

4. \_\_\_\_ A



uses energy from the wind to make electricity.

5. \_\_\_\_ We can make electricity using wire and a

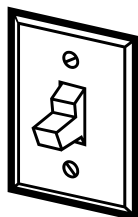


6. \_\_\_\_ A



carries electrical currents to our homes.

7. \_\_\_\_ A



opens and closes a circuit.

8. \_\_\_\_ Before electricity, people used



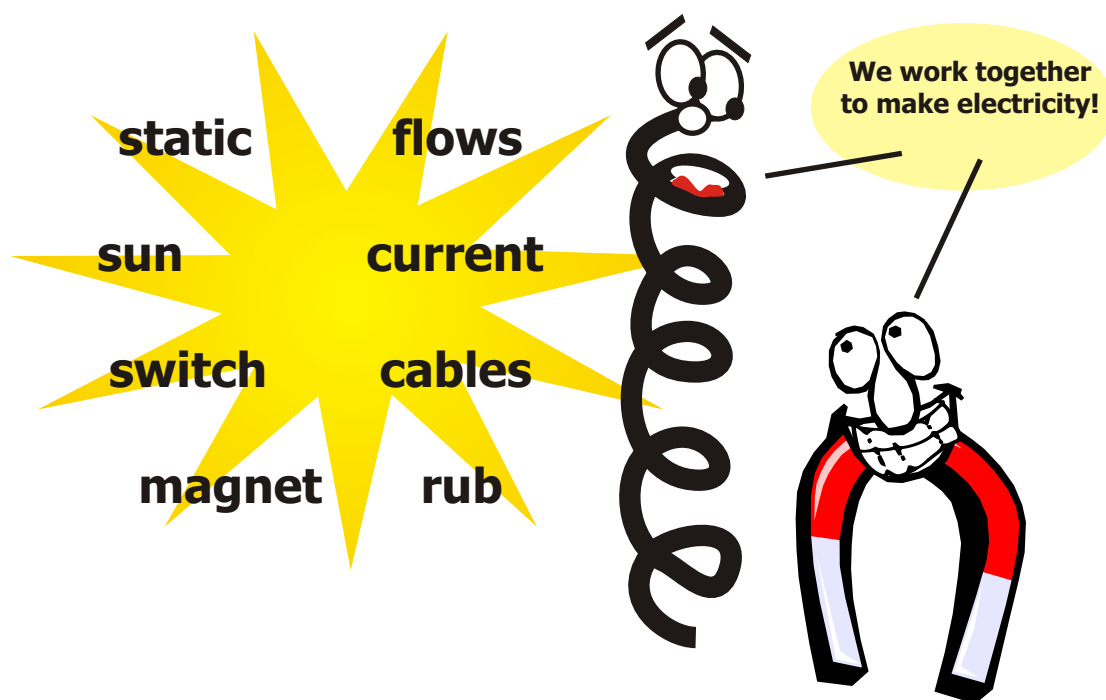
to read at night.



## Electricity Review

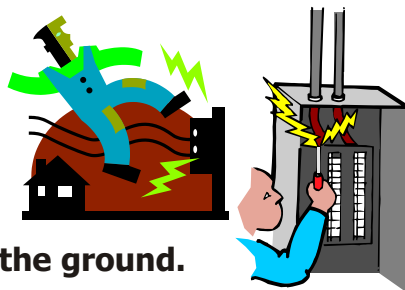
**Directions:** Fill in each blank with the best word from below.

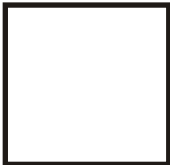
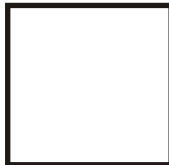
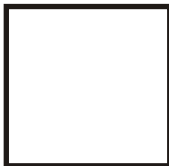
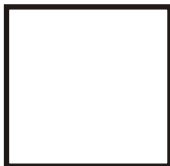
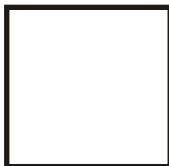


1. Lightning is a powerful form of \_\_\_\_\_ electricity.
2. We use \_\_\_\_\_ electricity to run machines in our homes.
3. We can make electricity with a coil of wire and a \_\_\_\_\_.
4. Static electricity is made when two things \_\_\_\_\_ together.
5. Current electricity \_\_\_\_\_ from one place to another.
6. Solar panels on roofs use heat from the \_\_\_\_\_ to make electricity.
7. Electricity is carried by \_\_\_\_\_ from power plants to homes.
8. A \_\_\_\_\_ opens and closes a circuit.



## Electrical Safety

**Directions:** Cut out the pictures at the bottom, then glue each picture to the correct blank box.



1. Never touch  that have fallen to the ground.
2. Watch out for wires that have fallen onto a  .
3. Never put anything inside a  .
4. Don't keep a  near the sink or bathtub.
5. Never place an electrical cord under a  .
6. Always unplug something by pulling on the  .
7. If you see a broken or split wire, tell a  right away.

