



8A Electricity

How does electricity work?

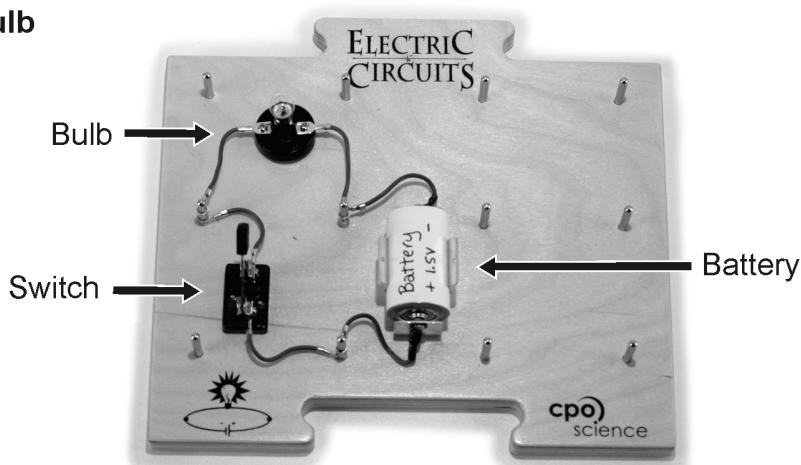
What happens when you turn on an electric light? Where does the light energy come from? The answer is electricity. We use electricity to store energy and to carry energy to where we need it.

Materials

- Electric circuits kit
- 1 “D” battery
- Pieces of foil, wood, plastic, metal paper clips, and other small objects.

1 Building a circuit

Single bulb circuit



1. Build the circuit shown in the diagram with one battery, a switch, and a bulb.
2. Open and close the switch and see what happens.

2 Thinking about what you observed

- a. How can you tell electric current is flowing in the circuit? Can you see the current?
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- b. Current flows from positive to negative. Trace the flow of current around the circuit with your finger.
- c. How does the switch cause the current to stop flowing?
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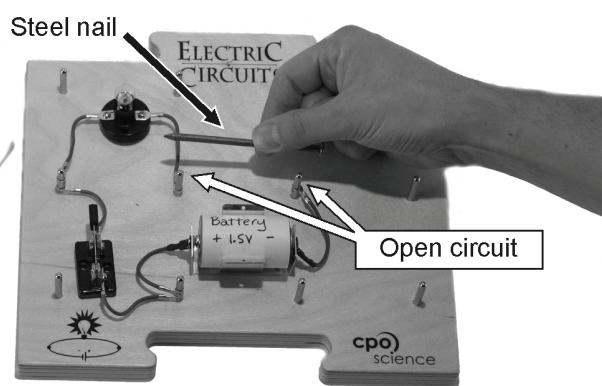
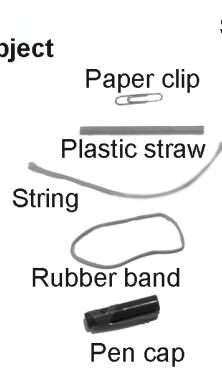
- d. Why does the bulb go out when you open the switch?

3 Conductors and insulators

Materials in which electric current flows easily are called *conductors*.

Materials through which current does not flow through easily are called *insulators*.

Connect circuit through each object



1. Break one connection in your one-bulb circuit.
2. Complete the circuit by touching different materials between the wire and the post.
3. Which materials allow the bulb to light and which do not?

4 Thinking about what you observed

- a. Make a table listing the materials as either conductors or insulators.

Table I:

Conductors	Insulators



- b. What characteristics are shared by the conductors you found?

- c. What characteristics are shared by the insulators you found?

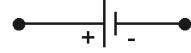
5 Circuit diagrams

For describing electric circuits we use the language of *circuit diagrams*. In a circuit diagram wires are represented by solid lines. Electrical devices like switches, batteries, and bulbs are represented by symbols.

Actual device



Symbol



Battery



Switch



Bulb



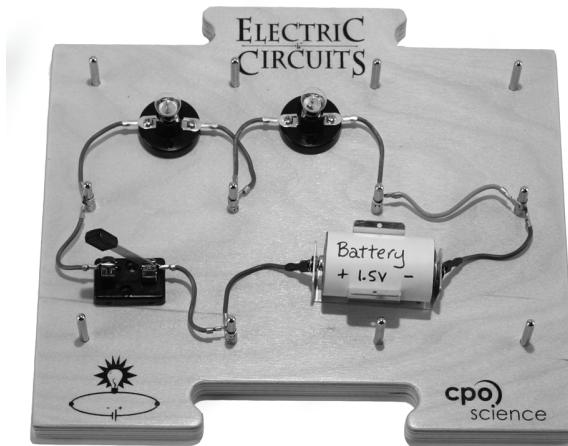
Wire

- a. Using these symbols, draw a picture of the circuit you built with one battery, switch, and light bulb.

6 A series circuit

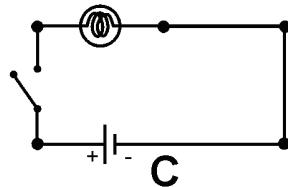
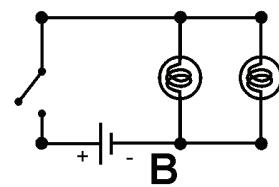
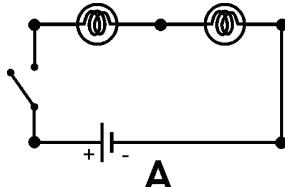
A *series circuit* has only one path for the electrical current. Build this series circuit and use your finger to trace the path taken by the current.

1. Build the circuit shown on the right with one battery, a switch, and two bulbs.
2. Open and close the switch and see what happens. Pay attention to the brightness of the bulbs.
3. Unscrew one of the bulbs part way. What happens?



7 Thinking about what you observed

- a. Which of the three diagrams matches this circuit? _____



- b. How does the brightness of the bulbs compare to the circuit with one bulb? _____

- c. Can you explain the brightness difference using the idea of energy? _____

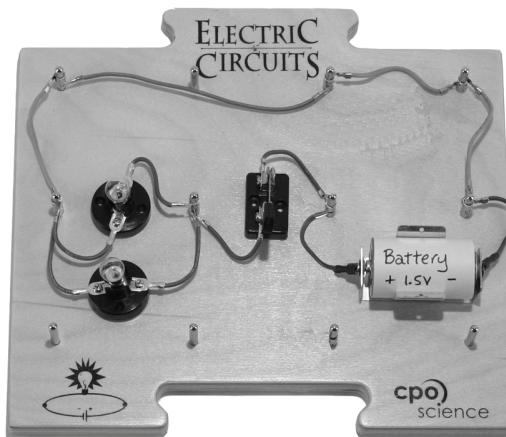
- d. Can you explain why unscrewing one bulb made both bulbs go out? _____



8 A parallel circuit

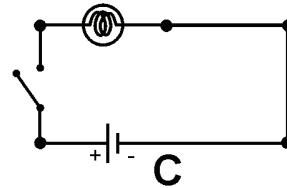
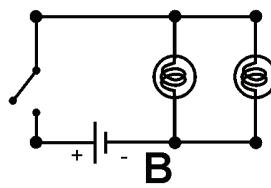
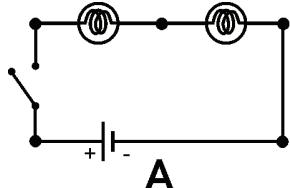
A *parallel circuit* has more than one path for the electrical current. Build this parallel circuit and use your finger to trace each path taken by the current.

1. Build the circuit shown on the right with one battery, a switch, and two bulbs.
2. Open and close the switch and see what happens. Pay attention to the brightness of the bulbs.
3. Unscrew one of the bulbs part way. What happens?



9 Thinking about what you observed

- a. Which of the three diagrams matches this circuit? _____



- b. How does the brightness of the bulbs in this circuit compare to the series circuit bulbs? _____

- c. Can you explain the brightness difference using the idea of energy? _____

- d. Can you explain why unscrewing one bulb did NOT make the other bulb go out? _____