

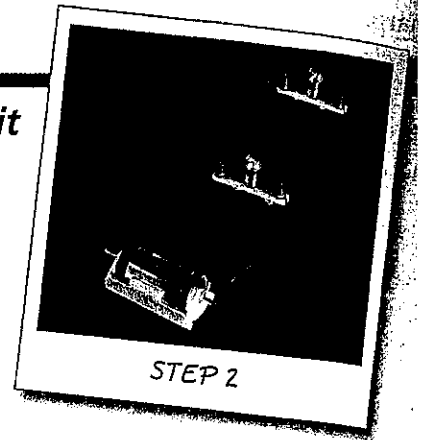
20-6 What is a parallel circuit?

INVESTIGATE



Making Another Kind of Electric Circuit HANDS-ON ACTIVITY

1. Obtain a dry-cell (size D) battery, four insulated wires, and two light bulbs in holders from your teacher.
2. Connect the light bulbs to the battery using the wires. Do not make a series circuit. Make sure that you use all four wires to create separate paths. You will know that you have correctly connected the wires when you remove one of the light bulbs and the other stays lit.



THINK ABOUT IT: What is the difference between this type of electric circuit and a series circuit?

Objectives

Describe a parallel circuit. Compare a parallel circuit and a series circuit.

Key Term

parallel circuit: circuit in which an electric current can follow more than one path

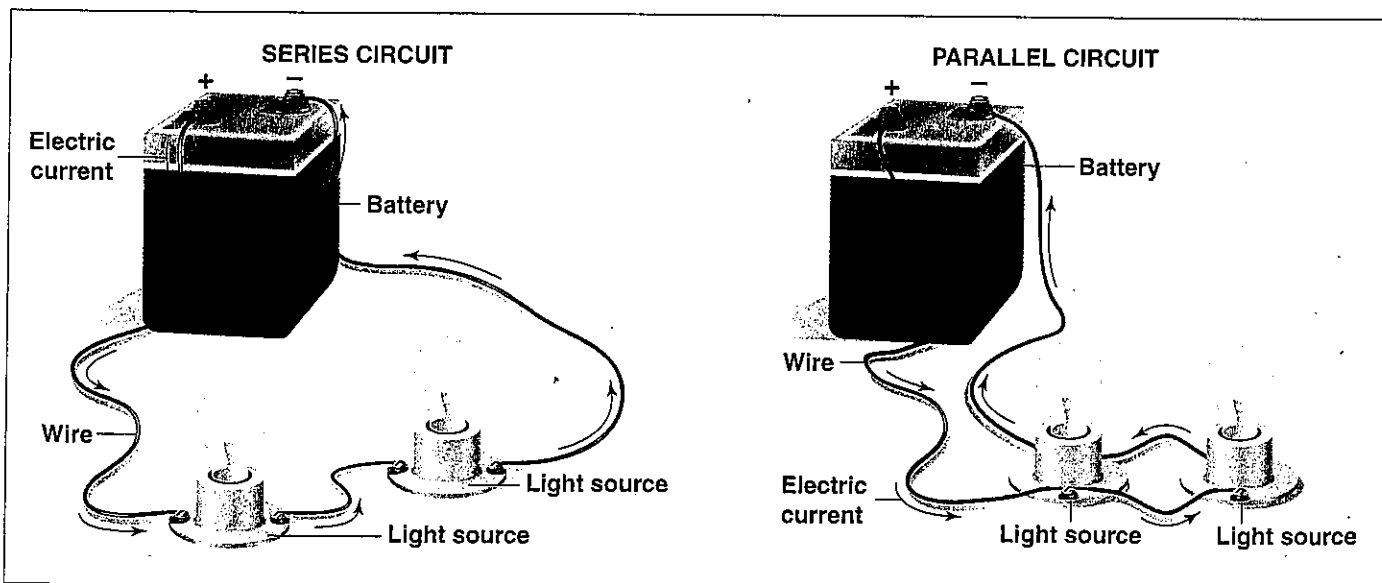
Parallel Circuit In a series circuit, there is only one path that an electric current can follow. In a parallel circuit an electric current can follow more than one path. The illustration on the right in Figure 20-18 shows a parallel circuit. Two lamps

are connected to one battery. Notice how the wires are connected to each lamp. If one lamp goes out, charges can still flow through the other path. The other lamp will remain lit.

1 DEFINE: What is a parallel circuit?

Series Circuits versus Parallel Circuits In a series circuit with two lamps, what would happen if one of the lamps went out? The charges flowing to that lamp would stop. Because there is a break in the path, neither lamp would light. This is a great disadvantage in using a series circuit.

However, if the two lamps were set up in a parallel circuit, this problem could be avoided. In a



▲ Figure 20-18 In a series circuit (left), electric current has only one path to follow. In a parallel circuit (right), electric current can follow more than one path.

parallel circuit, the current can follow more than one path. If the lamps were connected in different paths, one lamp would not stop working if the other lamp went out. Because the charges could follow different paths, electric current could still reach the other lamp. This is the reason why electric circuits in homes and businesses are parallel circuits.

- 2 **DESCRIBE:** What happens to the current in a series circuit when a lamp goes out?

✓ CHECKING CONCEPTS

1. In a _____ circuit, the current follows only one path.
2. In a _____ circuit, the current can follow more than one path.
3. Homes, offices, and schools use _____ electric circuits.

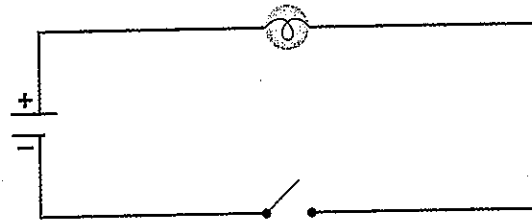


THINKING CRITICALLY

4. **HYPOTHEZIZE:** How could you change a series circuit into a parallel circuit?

BUILDING SCIENCE SKILLS

Labeling a Diagram Figure 20-19 shows an open series circuit with one lamp connected to the current source. Copy the diagram into your notebook. Identify and label each of the following parts in the diagram: the source of the electric energy, the lamp, the wire, and the switch.



▲ Figure 20-19 Open series circuit



People in Science

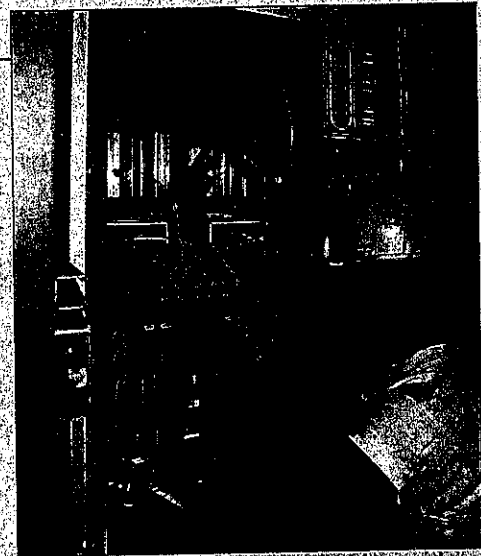
ELECTRICIAN

An electrician is a person who is trained to install and repair electric equipment. An electrician must know how much electricity a building needs. A house with basic appliances such as a refrigerator and a television needs a certain amount of electricity. A high-rise apartment building needs much more electricity.

Most homes have wall outlets that supply a certain amount of electricity. However, different kinds of appliances may need a different amount of electricity. An electrician has to make sure that the correct amount is being used. An electrician must also be familiar with different types of wires. Most houses use copper wiring, but some use aluminum. Older homes may need to have all the wiring replaced. An electrician needs to make sure that the correct type of wiring is used.

Anyone interested in a career as an electrician should take courses in mathematics, physics, and chemistry in high school. They can also participate in apprenticeship programs that take four to five years to complete.

Thinking Critically What are some of the things an electrician must know when installing wiring in a home?



▲ Figure 20-20 An electrician needs to know how much electricity a building needs