

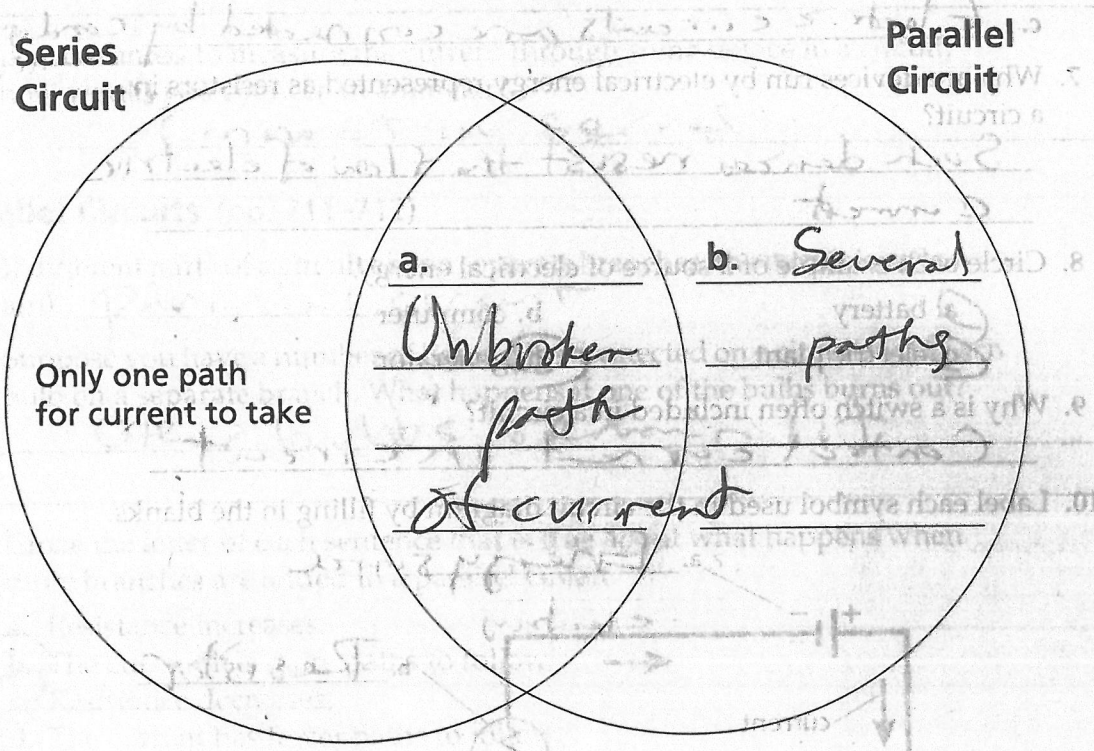
Electricity ▪ Guided Reading and Study

Electric Circuits and Power (pp. 706–714)

This section describes Ohm's Law. It also describes the basic features of an electric circuit and explains what series and parallel circuits are.

Use Target Reading Skills

As you read, compare and contrast series circuits and parallel circuits in the Venn diagram below. Write the similarities in the space where the circles overlap and the differences on the left and right sides.



Ohm's Law (p. 707)

- Who performed experiments in the 1800s that demonstrated how current, voltage, and resistance are related?
George Ohm
- Ohm's law says that resistance is equal to the voltage divided by the current.
- Write the equation for Ohm's law.
Resistance = Voltage ÷ Current
 $R = V/I$
- In a circuit, there is a 0.8 A current in the bulb. The voltage across the bulb is 4.0 V. What is the bulb's resistance?
5 Ω

Electricity ▪ Guided Reading and Study

Electric Circuits and Power (continued)

5. Is the following sentence true or false? For the same resistance, the greater the voltage, the greater the current. True

Features of a Circuit (pp. 708–709)

6. What are the three basic features all electric circuits must have?

- a. Circuits have devices run by electrical energy
- b. A circuit has a source of electrical energy
- c. Electric circuits are connected by conducting wires

7. Why are devices run by electrical energy represented as resistors in a circuit?

Such devices resist the flow of electric current

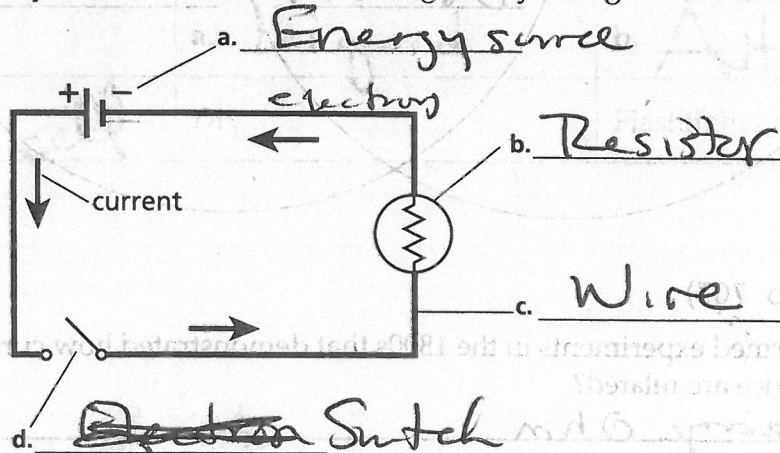
8. Circle each example of a source of electrical energy.

- a. battery
- b. computer
- c. electric plant
- d. generator

9. Why is a switch often included in a circuit?

Control current in circuit

10. Label each symbol used in the circuit diagram by filling in the blanks.



Series Circuits (p. 710)

11. What is a series circuit?

Electric circuit in which all parts of circuit are connected one after another

12. In a series circuit, how many paths are there for a current to take?

one

Electricity • Guided Reading and Study

13. Suppose you have a number of light bulbs connected together in a series circuit. What happens if one of the bulbs burns out?

The burned out bulb acts as a break in the circuit

14. As more light bulbs are added to a series circuit, the bulbs become dimmer. Why?

Adding bulbs increases resistance

15. If you wanted to measure the current through some device in a circuit, how would you connect an ammeter?

Connect in series

Parallel Circuits (pp. 711-712)

16. If different parts of a circuit are on separate branches, the circuit is called a(n) parallel circuit

17. Suppose you have a number of light bulbs connected on a circuit, with each bulb on a separate branch. What happens if one of the bulbs burns out?

Other bulbs remain lit

18. Circle the letter of each sentence that is true about what happens when more branches are added to a parallel circuit.

- a. Resistance increases.
- b. The current has more paths to follow.
- c. Resistance decreases.
- d. The current has fewer paths to follow.

19. Is the following sentence true or false? Adding more paths to a parallel circuit will increase the current. TRUE

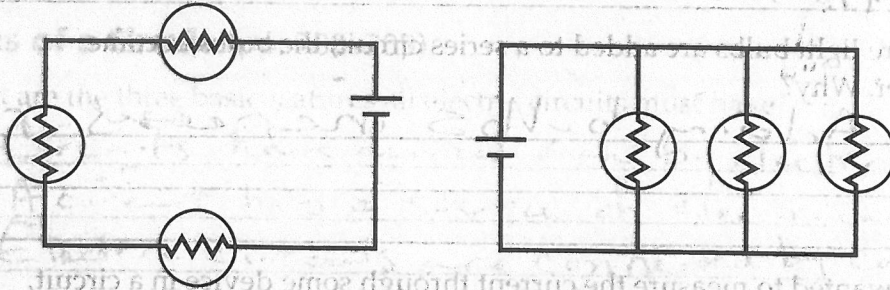
20. If you wanted to measure the voltage in a parallel circuit, how would you connect the voltmeter?

Connect in Parallel

Electricity • Guided Reading and Study

Electric Circuits and Power (continued)

21. Identify each of the circuits shown here by writing the type of circuit on the line.



a. Series b. Parallel

22. Why wouldn't you want the circuits in your home to be series circuits?

All power would go off.

Electric Power (pp. 712–713)

23. Is the following sentence true or false? A washing machine transforms electrical energy into mechanical energy. true

24. The rate at which energy is transformed from one form to another is known as power.

25. What is the unit of power? Watt

26. What two factors does the power of a light bulb or appliance depend on?

a. voltage b. current

27. To calculate power, you multiply voltage by current.

28. A clock radio has 0.1 amps of current in it, and it uses a standard voltage of 120 V. What is the power rating for this radio?

12W

Paying for Electrical Energy (p. 714)

29. What two factors does the energy use on an electric bill depend on?

a. power b. time

30. What formula do you use to determine the amount of energy used by an appliance?

Energy = P × T

31. Electric power is usually measured in thousands of watts, or

KW kilowatts

32. The unit of electrical energy is the

~~Watt~~ (kWh)