Chapter 21 Magnetism

# **Section 21.3 Electrical Energy Generation and Transmission**

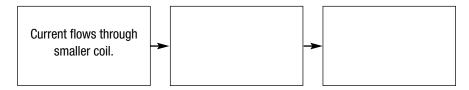
(pages 642-647)

This section describes how electricity is generated and transmitted for human use. A description of how generators and transformers function is given.

# Reading Strategy (page 642)

**Sequencing** As you read the section, complete the flowchart to show how a step-up transformer works. Then make a similar flowchart for a step-down transformer. For more information on this Reading Strategy, see the **Reading and Study Skills** in the **Skills and Reference Handbook** at the end of your textbook.

#### **Step-up Transformers**



# **Generating Electric Current** (pages 642-643)

- **1.** Is the following sentence true or false? A magnetic field can be used to produce an electric current.
- **2.** Circle the letter for the name of the process of generating a current by moving an electrical conductor relative to a magnetic field.
  - a. electromagnetic force
  - b. electromagnetic field
  - c. electromagnetic induction
  - d. electromagnetic conduction
- **3.** Electrical charges can easily flow through materials known as
- 4. Why is the discovery of electromagnetic induction significant? \_\_\_\_\_
- **5.** According to Faraday's law, electric current can be induced in a conductor by \_\_\_\_\_\_\_.
- **6.** Is the following sentence true or false? Moving a magnet relative to a coil of wire induces a current in the wire if the coil is part of a complete circuit. \_\_\_\_\_\_

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# Generators (pages 643-644)

- 7. A generator converts \_\_\_\_\_\_ energy into \_\_\_\_\_ energy.
- **8.** Circle the letter that best describes how most of the electrical energy used in homes and businesses is produced.
  - a. with DC generators
  - b. using AC generators at large power plants
  - c. with small magnets moving inside coils
  - d. by rotating a magnetic field around a coil of wire
- **9.** Is the following sentence true or false? In an alternating current produced by an AC generator, the flow direction of charges switches back and forth.
- **10.** Circle the letter of each sentence that is true about generators.
  - a. Small generators can produce enough electricity for a small business.
  - b. DC generators produce current that flows back and forth.
  - c. Small generators are available for purchase by the public.
  - d. Most modern power plants use DC generators.

### **Transformers** (pages 644-645)

- **11.** A device that increases or decreases voltage and current of two linked AC circuits is called a(n) \_\_\_\_\_\_.
- **12.** How does a transformer change voltage and current? \_\_\_\_\_
- **13.** Why are transformers necessary for home electrical service? \_\_\_\_\_
- **14.** Is the following sentence true or false? To prevent overheating wires, voltage is decreased for long-distance transmission.
- 15. How is voltage calculated in a transformer? \_\_\_\_\_\_
- **16.** Is the following sentence true or false? A step-down transformer decreases voltage and increases current. \_\_\_\_\_

# **Electrical Energy for Your Home (pages 646-647)**

- **17.** Name at least three sources used to produce electrical energy in the United States. \_\_\_\_\_\_
- **18.** A device with fanlike blades that can convert energy from various sources into electrical energy is called a(n) \_\_\_\_\_\_.