

Name _____

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Guided Reading Chapter 10: Electric Charges and Magnetic Fields

Section 10-1: Electricity, Magnetism, and Motion

1. The ability to move an object some distance is called _____.

2. Complete the table about forms of energy.

Forms of Energy	
Energy Form	Definition
	The Energy associated with electric currents
Mechanical Energy	

3. When a current-carrying wire is placed in a magnetic field, what energy conversion occurs?

4. A device that uses an electromagnet to measure small amounts of current is called a(n) _____.

5. What is used to turn the pointer of a galvanometer?

6. In a galvanometer, what does the amount of rotation of the loops of wire and the pointer depend on?

7. A device that uses an electric current to turn an axle is called a(n) _____.

8. What energy conversion occurs in an electric motor?

9. A device that reverses the flow of current through an electric motor is called a(n) _____.

10. What does a commutator consist of?

11. As a commutator moves, it slides past two contact points called _____.
12. The arrangement of wires wrapped around an iron core in an electric motor is called a(n) _____.

Section 10-2: Generating Electric Current

1. The current that results from electromagnetic induction is called a(n) _____.
2. When will an electric current be produced in a conductor?
3. What are two cases in which an electric current can be produced with a conductor and a magnet?
 - a. _____
 - b. _____
4. What is electromagnetic induction?
5. What does the direction of an induced current depend on?
6. Is the following sentence true or false? The flow of an induced current may change direction.
7. Complete the table about induced currents.

Induced Currents			
Induced Current	Abbreviation	Description	Example
	AC		Circuits in the home
	DC		Batteries

8. A device that converts mechanical energy into electrical energy is called a(n) _____.
9. How is an electric motor the opposite of an electric generator?

10. Is the following sentence true or false? Large generators use armatures similar to those in a motor.

11. The parts of a generator that rotate with the wire loop and make contact with the brushes are called _____.

12. Complete the table about energy resources. See *Exploring Energy Resources* on pages 320-321.

Energy Resources		
Resource	Source of Energy	What Turns a Turbine
	Energy in atom's nucleus	
Hydroelectricity	Falling water	Moving water
Solar Energy		Steam
	Movement of tides	
	Heated underground water	
Energy from wind		Windmill
	Chemical energy in fossil fuels	

13. A circular device made up of many blades that is turned by water, wind, steam, or tides is called a(n) _____.

14. According to the graph in Figure 9 on page 322, what is the leading resource for generating electricity in the United States?

15. What percentage of electricity does nuclear energy generate?

16. Is the following sentence true or false? Cost is a very important factor in the generation of electricity.

17. According to Figure 10 on page 322, what are the pros of using coal?

18. What are three cons of using coal to produce electricity?

a. _____

b. _____

c. _____

19. Which energy resources have pros of “no wastes”?

20. Complete the table about energy resources.

Energy Resources		
Type of Resource	Definition	Examples
	A resource that can be replaced in nature at a rate close to the rate at which it is used.	
Nonrenewable resource		

Section 10-3: Using Electric Power

1. What is power?
2. The power used by a light bulb or an appliance depends on what two factors?
 - a. _____
 - b. _____
3. What formula do you use to calculate power?
4. Use Figure 13 on page 325 to rank the following appliances according to how much power they use. Rank the appliance with the highest power rating as 1.
 - a. _____ toaster
 - b. _____ microwave oven
 - c. _____ clothes dryer
 - d. _____ water heater
 - e. _____ color television
 - f. _____ stove
5. What two factors does the energy use on an electric bill depend on?
 - a. _____
 - b. _____
6. What formula do you use to determine the amount of energy used by an appliance?
7. Electric power is usually measured in thousands of watts, or _____.
8. The unit of electrical energy is the _____.
9. What is the specific energy equation you would use to determine the amount of electrical energy used by an appliance?

10. A device that increases or decreases voltage is called a(n) _____.
11. Why is a transformer necessary so that electricity can be brought into a home?
12. In a transformer, what induces a current in the secondary coil?
13. Why won't a transformer work with direct current?
14. If there are more loops in the secondary coil of a transformer than in the primary coil, will the voltage in the secondary coil be higher or lower than in the primary coil?
15. Complete the table below about types of transformers.

Types of Transformers		
Type of Transformer	Increases or Decreases Voltage?	Setup
		<p>Primary: 1000V, 2 A, 50 turns, 2000 W Secondary: 200V, 10 A, 10 turns, 2000 W</p>
		<p>Primary: 100 V, 10 A, 5 turns, 1000 W Secondary: 400 V, 2.5 A, 20 turns, 1000 W</p>

16. Why did Nikola Tesla think AC would be better for distribution of electricity to homes?
17. What does using alternating current with transformers reduce in long transmission wires?
18. In Figure 17 on page 330, what hangs on the telephone pole just outside the house? What is the purpose of that device?

Section 10-4: Batteries

- The energy stored in chemical compounds is called _____.
- What is a chemical reaction?
- In the 1800, who designed the first electric battery?
- In Volta's battery, a chemical reaction between which two metals produced a current?
- A device that converts chemical energy into electrical energy is called a(n) _____.

Match the term with its description.

- | Term | Definition |
|---------------------|---|
| 6. ____ electrode | a. The part used to connect the cell to a circuit |
| 7. ____ electrolyte | b. A metal in an electrochemical cell |
| 8. ____ terminal | c. A substance that conducts electric current |
- What occurs between the electrodes and the electrolyte in an electrochemical cell?
 - How do the chemical reactions change the electrodes?
 - A combination of two or more electrochemical cells in a series is called a(n) _____.
 - Is the following sentence true or false? The voltage of a battery is the sum of the voltages of the cells.
 - Two or more electrochemical cells are connected in a(n) _____.
 - Complete the table about wet and dry cells.

Electrochemical Cells		
Type of Cell	Electrolyte – Liquid or Dry?	Example
Wet cell		
	Dry	Flashlight battery

- A battery in which the products of the electrochemical reaction can be turned back into reactants to be reused is called a(n) _____.