

## Chapter 20 Electricity

## Section 20.1 Electric Charge and Static Electricity

(pages 600–603)

*This section explains how electric charge is created and how positive and negative charges affect each other. It also discusses the different ways that electric charge can be transferred.*

### Reading Strategy (page 600)

**Identifying Main Ideas** Copy the table on a separate sheet of paper. As you read, write the main ideas. 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.

Characteristics of Electric Charge	
Topic	Main Idea
Electric Charge	An excess or shortage of electrons produces a net electric charge.
Electric Forces	Like charges repel and opposite charges attract.
Electric Fields	The strength of a field depends on the net charge and distance from the charge.
Static Electricity	Charge can be transferred by friction, contact, and induction.

### Electric Charge (pages 600–601)

- What are the two types of electric charge?  
a. Positive                      b. Negative
- Is the following sentence true or false? In an atom, negatively charged electrons surround a positively charged nucleus.  
true
- Is the following sentence true or false? If a neutral atom gains one or more electrons, it becomes a positively charged ion.  
false
- What is the SI unit of electric charge? The coulomb

### Electric Forces (page 601)

- Circle the letter of each sentence that is true about electric force.
  - Like charges attract and opposite charges repel.
  - Electric force is the attraction or repulsion between electrically charged objects.
  - Electric force is inversely proportional to the amount of charge.
  - Electric force is inversely proportional to the square of the distance between two charges.

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6. Which are stronger inside an atom, electric forces or gravitational forces? Electric forces are stronger.
7. Is the following sentence true or false? Electric forces cause friction and other contact forces. true

**Electric Fields (page 602)**

8. A charge's electric field is the effect the charge has on other charges in the space around it.
9. Circle the letters of the factors that the strength of an electric field depends on.
- the direction of the field
  - whether the charge is positive or negative
  - the amount of charge that produces the field
  - the distance from the charge
10. Is the following sentence true or false? The field of a negative charge points away from the charge. false

**Static Electricity and Charging (pages 602–603)**

11. Static electricity is the study of the behavior of electric charges.
12. Is the following sentence true or false? Charge can be transferred by friction, by contact, and by induction. true
13. What is the law of conservation of charge? The total charge in an isolated system is constant.
14. Rubbing a balloon on your hair is an example of charging by friction.
15. A charge transfer between objects that touch each other is called charging by contact.
16. Circle the letter of each sentence that is true about charging.
- When you rub a balloon on your hair, your hair loses electrons and becomes positively charged.
  - The sphere of a Van de Graaff generator transfers all of its charge to you when you touch it.
  - Induction occurs when charge is transferred without contact between materials.
  - Static charges cannot move.

**Static Discharge (page 603)**

17. Is the following sentence true or false? Static discharge occurs when a pathway through which charges can move forms suddenly. true
18. How does lightning occur? Negative charge in the lower part of a storm cloud induces a positive charge in the ground below the cloud. Eventually the air becomes charged, forming a pathway for the electrons to travel from the cloud to the ground.