

Chapter 10 Review

Make Your Own Summary

Summarize the key concepts of this chapter using a graphic organizer. The Chapter Summary on the previous page will help you identify the key concepts. Refer to Study Toolkit 4 on pages 566–567 to help you decide which graphic organizer to use.

Reviewing Key Terms

1. A list of materials that have been arranged according to their ability to hold on to electrons is a(n) . (10.1)
2. Metals and other materials in which electrons can move easily between atoms are classified as electrical . Non-metals are classified as . (10.1)
3. Electric charges can be detected in a laboratory using a device called a(n) . (10.2)
4. The force exerted between two charged objects is transmitted through space by a(n) . (10.2)
5. A(n) can reduce the chances of a lightning strike. (10.2)
6. An uses a static charge to remove unwanted particles and liquid droplets from a flow of gas. (10.3)

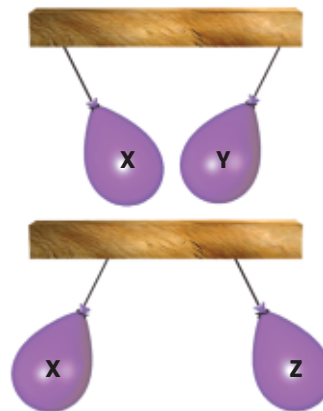
Knowledge and Understanding **K/U**

7. Explain why two electric charges may interact, even though there is no contact between them.
8. Explain why a strip of polyethylene had a negative charge after it was rubbed with a piece of silk cloth.
9. Touching a ground to a charged object causes the object to become neutral. Explain why.
10. Explain, on an atomic level, how an insulator differs from a conductor.
11. Why is the electric charge on a solid object always explained in terms of an excess or deficit of electrons?

12. If a neutral object has no net charge, why is it attracted to a charged object that is placed nearby?
13. Suggest a reason why most homes in a city do not need to be protected by a lightning rod.
14. Which law of electric charges is applied in electrostatic spray painting?
15. Why are Van de Graaff generators used in atom smashers?

Thinking and Investigation **T/I**

16. A strip of acetate has a positive charge after it is rubbed with wool. A piece of lead has a negative charge after it is rubbed with wool, but a positive charge after it is rubbed with silk. A piece of copper has a negative charge after it is rubbed with silk. Arrange acetate, copper, and lead in order, according to their ability to hold on to electrons. Give reasons for your order.
17. Experiments were performed with three balloons, labelled X, Y, and Z. The results of bringing two different pairs of balloons close together are shown below.



What can you infer about the type of charge (definitely charged, possibly charged, definitely neutral, or possibly neutral) on each balloon?

18. A student saw a metal leaf electroscope with its leaves spread apart and concluded that the electroscope must have a permanent charge. She decided to try an experiment. She rubbed an ebonite rod with fur to give the rod a permanent charge. Then she brought the rod close to the sphere on the electroscope. She observed that the leaves collapsed. When she brought the rod even closer, without making contact, the leaves began to spread apart again. What was the charge on the metal leaf electroscope before the experiment began?

Communication **C**

19. BIG IDEAS Explain the statement “electric charge is neither created nor destroyed.” Describe how the movement of *one* type of particle can result in the formation of *two* different types of electric forces.

20. BIG IDEAS Modern materials used in homes, offices, and businesses have contributed to increased problems with electrostatic discharge. Write a pamphlet for architects and home renovation companies, explaining how to anticipate these problems. Include specific suggestions for how to reduce the build-up of static charges.

21. BIG IDEAS A petroleum refinery has developed an electrostatic separator to remove small solid particles from oil. Make a diagram to show how this separator uses the properties of static electricity.

22. The wood, paper, and pulp industry is one of many industries that require knowledge of materials and coatings. Find out what courses are offered at colleges and universities in Canada to prepare for a career in this industry.

Application **A**

23. Why does wiping a television or computer screen with a wool cloth cause dust to build up again within a few days?

24. Electrostatic precipitators are used by industries and power plants to remove particles from gases. Use the Internet to identify a factory or power plant that has an electrostatic precipitator. Research the cost of the electrostatic precipitator and the amount of particulate emissions it removes from the atmosphere. Also find out what happens to the removed solids and how the environment is improved by removing them from the waste gases.

25. a. What evidence shows that the child in drawing **A** has a static charge? What do you think generated the charge?

b. What is different about the materials that were used to build the slides in the two drawings?

c. Cochlear implants are electronic devices that are surgically implanted into the ears to give people who are profoundly deaf partial hearing. Why can some playground equipment damage these implants?

