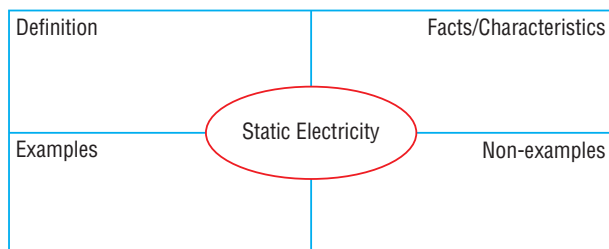


What Do You Remember?

- Describe the following terms in your own words: (11.1, 11.2, 11.4, 11.6) **K/U**
 - the Law of Electric Charges
 - charging by friction
 - charging by conduction
 - conductor
 - insulator
 - charging by induction
- Describe the difference between charging by friction and temporarily charging by induction. (11.2, 11.6) **K/U**
- Explain how the following devices work. Use diagrams in your explanations. (11.1) **K/U C**
 - a pith ball electroscope
 - a metal leaf electroscope
- Describe how two different materials are charged by friction. (11.2) **K/U**
- Draw a diagram using the appropriate charges showing (11.1) **K/U C**
 - an attraction between charges
 - a repulsion between charges
 - an attraction of a charged object to a neutral object
- Determine the type of charge on the following objects. An object having (11.1) **K/U**
 - 4 positive charges and 3 negative charges
 - 7 positive charges and 9 negative charges
- List two applications of electrostatics. (11.1, 11.2, 11.6) **A**
- Explain the operation of a laser printer. (11.6) **K/U C**
- Copy and complete the following graphic organizer (11.1, 11.2, 11.8) **K/U C**

Definition	Facts/Characteristics
Examples	Non-examples
	

What Do You Understand?

- Does static electricity mean that the charges never move? Explain. (11.1) **K/U C**
- Explain, using a diagram, why electrons travel easily between atoms, while protons do not. (11.1) **K/U C**
- There are plastic decals that you can attach to a window without using glue (Figure 1). Explain how these decals stay on the window. (11.1, 11.2, 11.6) **C A**



Figure 1

- Can charging by friction occur only in solids? Explain using an example. (11.2) **T/I C**
- During electrostatic experiments, you charged handheld insulators. Explain why you did not use conductors. (11.3, 11.4, 11.5) **K/U**
- Draw diagrams showing how an object can be charged (11.1, 11.2, 11.6) **K/U C**
 - positively by temporary induction
 - negatively by conduction
 - neutral by grounding
- Consult the electrostatic series on page 473 and determine the charge that each of these materials would receive: (11.3) **K/U**
 - polyester rubbed with nylon
 - wool rubbed with acetate
 - silk rubbed with glass
 - cotton rubbed with cotton
- Two solids are both positively charged. Solid A is more positively charged than solid B. Using diagrams, show what would happen if the two materials came in contact and you observed a discharge. (11.8) **K/U C**
- Neutral objects are attracted to charged objects. Explain why. (11.1) **K/U C**

19. A neutral particle is travelling past an object that has a negative charge. What might happen to the neutral particle? Explain using the correct terms. (11.2, 11.6) **K/U C**
20. Explain the difference between how a metal leaf electroscope and a pith ball electroscope detect the presence of a charge imbalance. (11.1) **K/U**

Solve a Problem

21. A movie plot involves using a fictitious material called Element X. Describe how the scientist in the movie might use an electroscope to test whether Element X was a conductor or an insulator. (11.1, 11.2) **T/I**
22. A cat rubs against a student's rubber boot. The boot then touches the neutral pith ball of an electroscope. A piece of ebonite is brought near the pith ball electroscope, and the pith ball is observed to repel. What can you conclude about the type of charge on the ebonite? Explain your reasoning. (11.1, 11.2, 11.3) **T/I C**
23. An experiment involves three charged objects: A, B, and C. Object A repels object B and attracts object C. Object C is repelled by ebonite charged with fur. What is the charge on each object? Explain your reasoning. (11.1, 11.3) **T/I C**
24. Carpets are usually made from different materials than socks. Explain what could be done to reduce the effect of static discharge when you walk across a carpet wearing socks. (11.1, 11.2) **K/U**
25. Suppose that you were sent to an area where flammable chemicals were being stored. The area has a cold, dry climate. What types of clothes would you wear to minimize the chance of an electrostatic discharge? Be specific. (11.2) **K/U C**
26. Why would a factory install an electrostatic precipitator on its chimney when there are financial costs associated with both the installation and the operation of the device? Discuss your answer with a classmate. (11.2) **A**

Create and Evaluate

27. Design your own lightning rod. Provide a labelled diagram. (11.8) **T/I C**

28. Use diagrams to explain how an electric air cleaner works. Your answer should include a discussion on the Law of Electric Charges. (11.2) **K/U C**
29. Design a procedure that would allow you to determine whether an unknown material is charged negatively or positively. You may use any equipment discussed in this chapter. (11.1, 11.2, 11.3) **T/I C**
30. Many different types of products remove dust from your furniture at home. Many of the products use the principle of static charges causing attraction of the dust to the product. Evaluate the effectiveness of different kinds of electrostatic dusters based on your own criteria. Suggest an environmentally responsible choice. (11.2) **T/I C A**

Reflect On Your Learning

31. In this chapter, you have learned that objects can be charged by induction—either permanently or temporarily. (11.1, 11.6)
- How are temporary and permanent charging similar? How do they differ? **K/U**
 - Do you find these techniques easy to understand and explain?
 - How can using diagrams enhance your ability to communicate your understanding?

Web Connections

32. In 2003, NASA sent two rovers to Mars to collect data about the planet. Research how scientists may have had to deal with an imbalance of electrons. Write a short summary reporting on what you learned. (11.8) **T/I C**
33. Researchers are designing less expensive colour laser printers so that laser printers are as affordable as inkjet printers. Research some of the latest developments. Write a short summary of your findings. (11.4) **T/I C**
34. Compare the operation of a laser printer with the operation of a photocopier. List any differences or similarities. (11.4) **C A**



To do an online self-quiz or for all other Nelson Web Connections, **GO TO NELSON SCIENCE**