CHAPTER REVIEW

Chemistry Is a Physical Science

SECTION 1 REVIEW

1. What is chemistry?
2. What branch of chemistry is most concerned with the study of carbon compounds?
3. What is meant by the word *chemical*, as used by scientists?
4. In which of the six branches of chemistry would a scientist be working if he or she were doing the following:
   a. investigating energy relationships for various reactions
   b. comparing properties of alcohols with those of sugars
   c. studying reactions that occur during the digestion of food
5. Identify each of the following as an example of either basic research, applied research, or technological development:
   a. A new type of refrigerant that is less damaging to the environment is developed.
   b. A new element is synthesized in a particle accelerator.
   c. A computer chip is redesigned to increase the speed of the computer.

Matter and Its Properties

SECTION 2 REVIEW

6. a. What is mass?
   b. What is volume?
7. How does the composition of a pure compound differ from that of a mixture?
8. a. Define property.
   b. How are properties useful in classifying materials?
9. What is the difference between extensive properties and intensive properties?
10. a. Define chemical property.
    b. List two examples of chemical properties.
11. Distinguish between a physical change and a chemical change.
12. a. How does a solid differ from a liquid?
    b. How does a liquid differ from a gas?
    c. How is a liquid similar to a gas?
    d. What is a plasma?
13. What is meant by a change in state?
14. Identify the reactants and products in the following reaction:
    potassium + water $\longrightarrow$ potassium hydroxide + hydrogen
15. Suppose different parts of a sample material have different compositions. What can you conclude about the material?

Elements

SECTION 3 REVIEW

16. What is the significance of the vertical columns of the periodic table? What is the significance of the horizontal rows?
17. Compare the physical properties of metals, nonmetals, metalloids, and noble gases, and describe where in the periodic table each of these kinds of elements is located.
18. Suppose element X is a poor conductor of electricity and breaks when hit with a hammer. Element Z is a good conductor of electricity and heat. In what area of the periodic table does each element most likely belong?
19. Use the periodic table to write the names of the elements that have the following symbols, and identify each as a metal, nonmetal, metalloid, or noble gas.
    a. K c. Si e. Hg
    b. Ag d. Na f. He
20. An unknown element is shiny and is found to be a good conductor of electricity. What other properties would you predict for it?
21. Use the periodic table to identify the group numbers and period numbers of the following elements:
    a. carbon, C c. chromium, Cr
    b. argon, Ar d. barium, Ba

MIXED REVIEW

22. a. Define physical property.
b. List two examples of physical properties.

23. How can you tell the difference between an element and a compound?

24. Identify each of the following as either a physical change or a chemical change. Explain your answers.
a. A piece of wood is sawed in half.
b. Milk turns sour.
c. Melted butter solidifies in the refrigerator.

25. Write a brief paragraph that shows that you understand the following terms and the relationships between them: *atom, molecule, compound,* and *element.*

26. Pick an object you can see right now. List three of the object's physical properties that you can observe. Can you also observe a chemical property of the object? Explain your answer.

CRITICAL THINKING

27. **Interpreting Concepts** One way to make lemonade is to start by combining lemon juice and water. To make the lemonade taste better you could add some sugar. Is your lemonade-sugar combination classified as a compound or a mixture? Explain your answer.

28. **Analyzing Results** A pure white, solid material that looks like table salt releases gas when heated under certain conditions. There is no change in the appearance of the solid, but the reactivity of the material changes.
a. Did a chemical or physical change occur? How do you know?
b. Was the original material an element or a compound?

29. **Interpreting Concepts**
a. Is breaking an egg an example of a physical or chemical change? Explain your answer.
b. Is cooking an egg an example of a physical or chemical change? Explain your answer.

USING THE HANDBOOK

30. Review the information on trace elements in the *Elements Handbook* in the back of this text.
a. What are the functions of trace elements in the body?
b. What transition metal plays an important role in oxygen transport throughout the body?
c. What two Group 1 elements are part of the electrolyte balance in the body?

RESEARCH & WRITING

31. Research any current technological product of your choosing. Find out about its manufacture and uses. Also find out about the basic research and applied research that made its development possible.

32. Investigate current and proposed technological applications of superconductors. Find out which of these applications have been successfully tested or are already in use.

ALTERNATIVE ASSESSMENT

33. During a 1 h period, make a list of all the changes that you see around you and that involve matter. Note whether each change seems to be a physical change or a chemical change. Give reasons for your answers.

34. Make a concept map using at least 15 terms from the vocabulary lists. An introduction to concept mapping is found in **Appendix B** of this book.

extension

Graphing Calculator
Graphing Tabular Data
Go to **go.hrw.com** for a graphing calculator exercise that asks you to graph temperature vs. time for a chemical reaction.

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