Name Date Class

Chapter 6

The Chemistry of Life

Reinforcement and Study Guide

Section 6.1 Atoms and Their Interactions

In your textbook, read about elements, atoms, and isotopes.

If the statement is true, write *true*. If it is not, rewrite the italicized part to make it true.

1. An element is a substance that *can be* broken down into simpler substances. _____

2. On Earth, *about 25* elements are essential to living organisms. _____

3. Only four elements—*carbon, hydrogen, oxygen, and nitrogen*—make up more than 96 percent of the mass of a human. _____

4. Each element is abbreviated by a one- or two-letter *formula*. _____

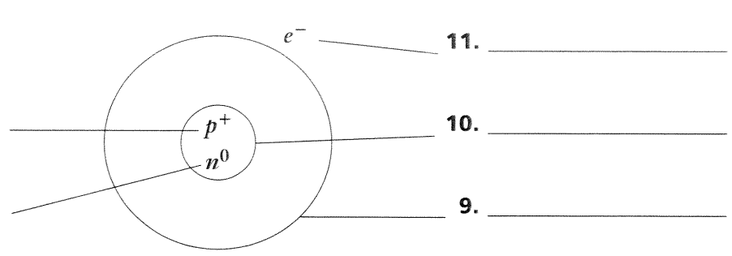
5. Trace elements, such as iron and magnesium, are present in living things in *very large* amounts.

_____

6. The properties of elements are determined by *the structures of their atoms*. _____

Label the parts of the atom. Use these choices:

energy level electron neutron proton nucleus



7. _____

8. _____

9. _____

10. _____

11. _____

Answer the following questions.

12. What is the maximum number of electrons in each of the following energy levels: first, second, third?

_____

_____

13. Boron has two isotopes, boron-10 and boron-11. Boron-10 has five protons and five neutrons. How many protons and neutrons does boron-11 have? Explain.

_____

_____

_____

_____

_____

_____

In your textbook, read about compounds and bonding, chemical reactions, and mixtures and solutions.

Write the type of substance described. Use these choices: compound, element.

_____ **14.** H_2O, a liquid that no longer resembles either hydrogen or oxygen gas

_____ **15.** A substance that can be broken down in a chemical reaction

_____ **16.** Carbon, the substance represented by the symbol C

Complete the table by checking the correct column for each description.

Statement	Ionic Bond(s)	Covalent Bond(s)
17. Found in the compound NaCl		
18. Increases the stability of atoms		
19. Results in the formation of a molecule		
20. Is formed when atoms share electrons		

Fill in the blanks with the correct number of molecules to balance the chemical equation. Then answer the questions.

$$C_6H_{12}O_6 + \_\_O_2 \longrightarrow \_\_CO_2 + \_\_H_2O$$

21. Why must chemical equations always balance?

_____

_____

22. Which number indicates the number of atoms of each element in a molecule of a substance.

_____

23. When is a mixture not a solution?

_____

_____

24. What is the difference between an acid and a base?

_____

_____

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In your textbook, read about water and its importance.

For each statement below, write true or false.

_____ **1.** In a water molecule, electrons are shared equally between the hydrogen atoms and oxygen atom.

_____ **2.** The attraction of opposite charges between hydrogen and oxygen forms a weak oxygen bond.

_____ **3.** Because of its polarity, water can move from the roots of a plant up to its leaves.

_____ **4.** Water changes temperature easily.

_____ **5.** Unlike most substances, water expands when it freezes.

Circle the letter of the choice that best completes the statement.

6. All objects in motion have
a. potential energy. **b.** heat energy. **c.** kinetic energy. **d.** random energy.

7. The first scientist to observe evidence of the random motion of molecules was
a. Brown. **b.** Darwin. **c.** Mendel. **d.** Hooke.

8. The net movement of particles from an area of higher concentration to an area of lower concentration is called
a. dynamic equilibrium. **b.** nonrandom movement.
c. concentration gradient. **d.** diffusion.

9. Diffusion occurs because of
a. nonrandom movement of particles. **b.** random movement of particles.
c. a chemical reaction between particles. **d.** chemical energy.

10. When a few drops of colored corn syrup are added to a beaker of pure corn syrup, the color will
a. move from low concentration to high concentration.
b. form a polar bond.
c. start to diffuse.
d. remain on the bottom of the beaker.

11. Diffusion can be accelerated by
a. decreasing the pressure. **b.** increasing the temperature.
c. decreasing the movement of particles. **d.** increasing the dynamic equilibrium.

12. When materials pass into and out of a cell at equal rates, there is no net change in concentration inside the cell. The cell is in a state of
a. dynamic equilibrium. **b.** metabolism. **c.** imbalance. **d.** inertia.

13. The difference in concentration of a substance across space is called
a. dynamic equilibrium. **b.** concentration gradient.
c. diffusion. **d.** Brownian movement.

In your textbook, read about the role of carbon in organisms.

For each of the following statements about carbon, write true or false.

_____ **1.** Carbon atoms can bond together in straight chains, branched chains, or rings.

_____ **2.** Large molecules containing carbon atoms are called micromolecules.

_____ **3.** Polymers are formed by hydrolysis.

_____ **4.** Cells use carbohydrates for energy.

Write each item below under the correct heading.

sucrose	glucose	starch	$C_6H_{12}O_6$
cellulose	glycogen	fructose	$C_{12}H_{22}O_{11}$

Monosaccharide	Dissaccharide	Polysaccharide
5.	8.	10.
6.	9.	11.
7.		12.

Complete the table by checking the correct column for each description.

Description	Lipids	Proteins	Nucleic Acids
13. Made up of nucleotides			
14. Most consist of three fatty acids bonded to a glycerol molecule			
15. DNA and RNA			
16. Contain peptide bonds			
17. Produce proteins			
18. Commonly called fats and oils			
19. Made up of amino acids			
20. Used for long-term energy storage, insulation, and protective coatings			
21. Contain carbon, hydrogen, oxygen, and nitrogen			