CHAPTER 6 Assessment

Section 6.1

Vocabulary Review

Describe the difference between the terms in each set.

1. electron—proton
2. ionic bond—covalent bond
3. isotope—element
4. atom—ion

Understand Key Concepts

Use the photo below to answer question 5.

5. What does the image above show?
   - **A.** a covalent bond
   - **B.** a physical property
   - **C.** a chemical reaction
   - **D.** van der Waals forces

6. Which process changes a chlorine atom into a chloride ion?
   - **A.** electron gain
   - **B.** electron loss
   - **C.** proton gain
   - **D.** proton loss

7. Which of the following is a pure substance that cannot be broken down by a chemical reaction?
   - **A.** a compound
   - **B.** a mixture
   - **C.** an element
   - **D.** a neutron

8. How do the isotopes of hydrogen differ?
   - **A.** the number of protons
   - **B.** the number of electrons
   - **C.** the number of energy levels
   - **D.** the number of neutrons

Constructed Response

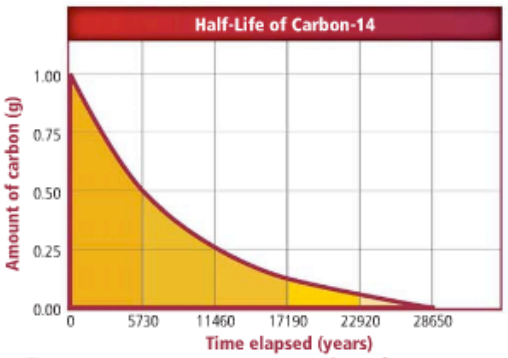
9. **Short Answer** What is a radioactive isotope? List uses of radioactive isotopes.

10. **Short Answer** What factor determines that an oxygen atom can form two covalent bonds while a carbon atom can form four?

11. **Open Ended** Why is it important for living organisms to have both strong bonds (covalent and ionic) and weak bonds (hydrogen and van der Waals forces)?

Think Critically

Use the graph below to answer question 12.



12. **Analyze** According to the data, what is the half-life of carbon-14? How can this information be used by scientists?

13. **Explain** The gecko is a reptile that climbs on smooth surfaces such as glass using van der Waals forces to adhere to the surface. How is this method of adhesion more advantageous than covalent interactions?

Section 6.2

Vocabulary Review

Match the term on the left with the correct definition on the right.

14. activation energy	**A.** a protein that speeds up a reaction
15. substrate	**B.** a substance formed by a chemical reaction
16. enzyme	**C.** the energy required to start a reaction
17. product	**D.** a substance that binds to an enzyme

Chapter 6 Assessment

Understand Key Concepts

18. Which of the following is a substance that lowers the activation energy?

A. an ion **C.** a catalyst
B. a reactant **D.** a substrate

19. In which of the following are bonds broken and new bonds are formed?

A. chemical reactions **C.** isotopes
B. elements **D.** polar molecules

20. Which statement is true of chemical equations?

A. Reactants are on the right.
B. Products are on the right.
C. Products have fewer atoms than reactants.
D. Reactants have fewer atoms than products.

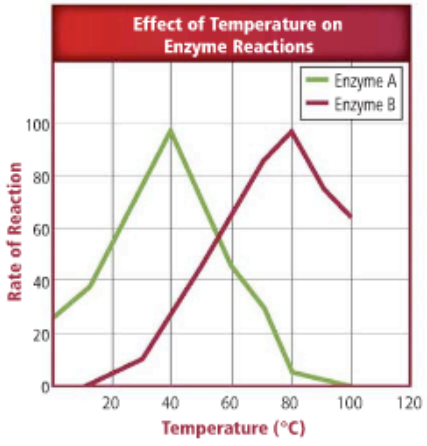
Constructed Response

21. Short Answer What features do all reactions involving enzymes have in common?

22. Open Ended Identify and describe factors that can influence enzyme activity.

Think Critically

Use the graph to answer questions 23 and 24.



23. Describe the effect temperature has on the rate of the reactions using the graph above.

24. Infer Which enzyme is more active in a human cell? Why?

Section 6.3

Vocabulary Review

State the relationship between the terms in each set.

25. solution—mixture

26. pH—buffer

27. acid—base

28. solvent—solute

29. polar molecule—hydrogen bond

Understand Key Concepts

Use the figure below to answer question 30.

30. What does the image above show?

A. a heterogeneous mixture **C.** a solution
B. a homogeneous mixtrure **D.** a suspension

31. Which statement is not true about pure water?

A. It has a pH of 7.0.
B. It is composed of polar molecules.
C. It is composed of ionic bonds.
D. It is a good solvent.

32. Which is a substance that produces OH^- ions when dissolved in water?

A. a base **C.** a buffer
B. an acid **D.** salt

Constructed Response

33. Open Ended Why are hydrogen bonds so important for living organisms?

34. Short Answer Hydrochloric acid (HCl) is a strong acid. What ions are formed when HCl dissolves in water? What is the effect of HCl on the pH of water?

35. Open Ended Explain the importance of buffers to living organisms.

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Think Critically

36. **Predict** two places in the body where buffers are used to limit sharp changes in pH.

37. **Draw** a diagram of table salt (NaCl) dissolved in water.

Section 6.4

Vocabulary Review

Complete the following sentences with vocabulary terms from the Study Guide page.

38. Carbohydrates, lipids, proteins, and nucleic acids are _____.

39. Proteins are made from _____ that are joined by _____.

40. _____ make up fats, oils, and waxes.

41. DNA and RNA are examples of _____.

Understand Key Concepts

42. Which two elements are always found in amino acids?

A. nitrogen and sulfur
B. carbon and oxygen
C. hydrogen and phosphorus
D. sulfur and oxygen

43. Which joins amino acids together?

A. peptide bonds **C.** van der Waals forces
B. hydrogen bonds **D.** ionic bonds

44. Which substance is not part of a nucleotide?

A. a phosphate **C.** a sugar
B. a base **D.** water

Constructed Response

45. **Open Ended** Why do cells contain both macromolecules and small carbon compounds?

46. **Open Ended** Why can't humans digest all carbohydrates?

Think Critically

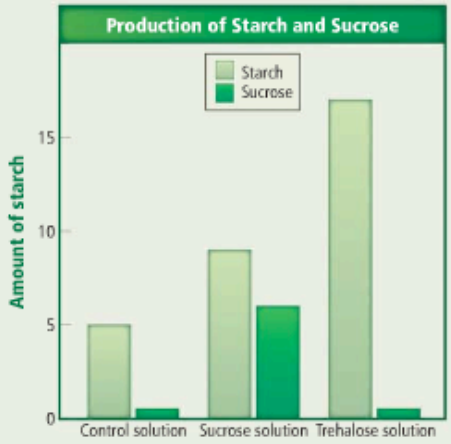
47. **Create** a table for the four main biological macromolecules that lists their components and functions.

Additional Assessment

48. **WRITING in Biology** Research and write a job description for a biochemist. Include the types of tasks biochemists perform and materials that are used in their research.

DBQ Document-Based Questions

Starch is the major carbon storehouse in plants. Experiments were performed to determine if trehalose might regulate starch production in plants. Leaf discs were incubated for three hours in sorbitol (the control), sucrose, and trelahose solutions. Then, levels of starch and sucrose in the leaves were measured. Use the data to answer the questions below.



Data obtained from: Kolbe, et al. Trehalose 6-phosphate regulates starch synthesis via post translational redox activation of ADP-glucose pyrophophorylase. *Proceedings of the National Academy of Sciences of the USA* 102(31): 11118–11123.

49. Summarize the production of starch and sucrose in the three solutions.

50. What conclusion might the researchers have reached based on this data?

Cumulative Review

51. How do reproductive strategies differ? **(Chapter 4)**

52. Describe three broad categories of biodiversity value. **(Chapter 5)**