

# Study Guide

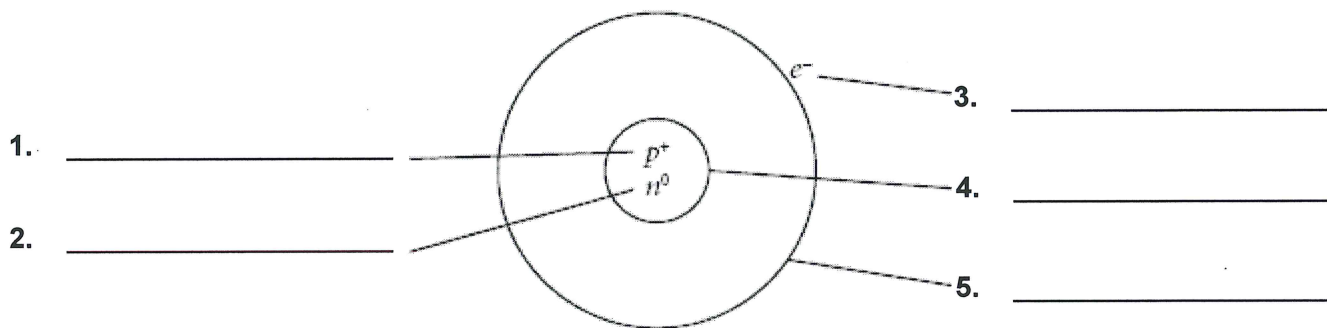
## CHAPTER 6

### Section 1: Atoms, Elements, and Compounds

In your textbook, read about the structure of atoms.

Label the diagram of an atom. Use these choices:

- electron                  energy level                  neutron                  nucleus                  proton



In your textbook, read about elements, compounds, and chemical bonds.

If the statement is true, write true. If the statement is false, replace the italicized term or phrase to make it true.

6. On the periodic table, each element has a unique name and *formula*.

\_\_\_\_\_

7. The periodic table is organized into horizontal rows, called periods, and vertical columns, called *elements*.

\_\_\_\_\_

8. *Water* is composed of hydrogen and oxygen.

\_\_\_\_\_

9. Atoms of the same element that have different numbers of neutrons are called *isotopes*.

\_\_\_\_\_

10. The *period* of an element is the amount of time it takes for half of a radioactive isotope to decay.

\_\_\_\_\_

11. A *combination* is a substance formed when two or more different elements combine.

\_\_\_\_\_

12. The two main types of chemical bonds are *covalent bonds* and *van der Waals forces*.

\_\_\_\_\_

CHAPTER 6

Section  
Quick Check

Section 1: Atoms, Elements,  
and Compounds

After reading the section in your textbook, respond to each statement.

1. Define ionic bond.

---

---

2. Identify the particles that make up atoms, and state their charges.

---

---

3. Clarify the difference between carbon-12 and carbon-14 in terms of their abundance, stability, and atomic structure.

---

---

---

---

4. Oxygen has eight protons in its nucleus. Calculate the number of neutrons and electrons in a neutral oxygen-16 atom. Show your work and explain.

---

---

---

---

5. When 200 mL water and 2.5 g sodium chloride are combined, they make a saltwater solution. When 100 mL water and 5 g sodium chloride are combined, they also make a saltwater solution. Conclude whether or not salt water is a compound. Explain.

---

---

---

---

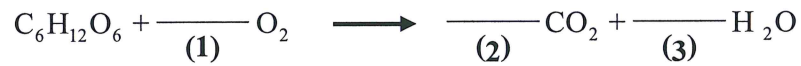
## CHAPTER 6

*Study Guide*

## Section 2: Chemical Reactions

In your textbook, read about reactants and products.

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



Respond to each statement.

4. **State** the principle that explains why there must be the same number of atoms of each element on each side of an equation.

---



---

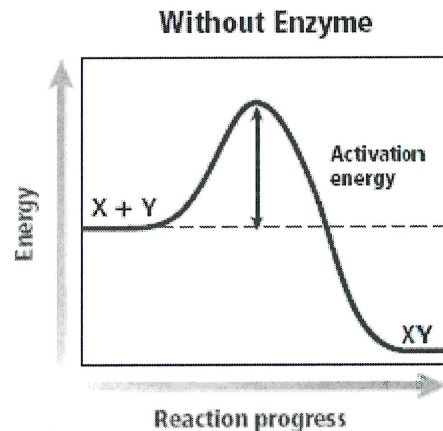
5. **Identify** which number indicates the number of atoms of each element in a molecule of a substance.

---

In your textbook, read about activation energy and enzymes.

Refer to the graph of the reaction pathway.

6. Draw a line on the graph that approximates the reaction pathway if an enzyme is added to the reactants.



Match the description in Column A with the term in Column B.

**Column A**

- \_\_\_\_\_ 7. minimum amount of energy required for reactants to form products
- \_\_\_\_\_ 8. substance that lowers energy needed to start a chemical reaction
- \_\_\_\_\_ 9. protein that is a biological catalyst
- \_\_\_\_\_ 10. molecule that binds to an enzyme

**Column B**

- A. enzyme
- B. substrate
- C. activation energy
- D. catalyst

**Section  
Quick Check****CHAPTER 6****Section 2: Chemical Reactions**

After reading the section in your textbook, respond to each statement.

1. **State** the term for the amount of energy that is needed for a chemical reaction to occur.

---

---

2. **Summarize** the relationship between an enzyme and a substrate.

---

---

---

3. **Classify** which of the compounds in the reaction below are reactants and which are products.



---

---

4. **Compare** endothermic reactions and exothermic reactions.

---

---

---

---

5. **Predict** Suppose four atoms of oxygen gas ( $\text{O}_2$ ) and two atoms of hydrogen gas ( $\text{H}_2$ ) are combined. Determine how many atoms of water ( $\text{H}_2\text{O}$ ) and oxygen gas ( $\text{O}_2$ ) will be produced.

---

---

---

CHAPTER 6

**Study Guide**

**Section 3: Water and Solutions**

In your textbook, read about water's polarity.

Label the diagram. Use these choices:

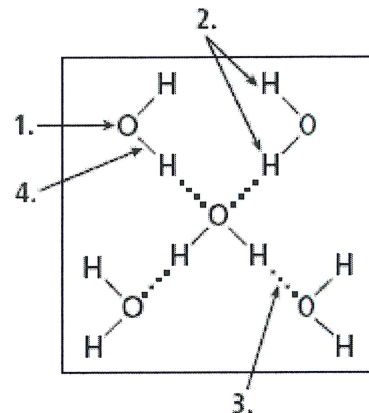
covalent bond

hydrogen bond

slightly negative end

slightly positive end

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_
4. \_\_\_\_\_



In your textbook, read about mixtures with water.

For each statement below, write true or false.

- \_\_\_\_\_ 5. A mixture is a combination of two or more substances in which each substance retains its individual characteristics.
- \_\_\_\_\_ 6. A suspension is a mixture that has a uniform composition throughout.
- \_\_\_\_\_ 7. In a mixture, the solvent is the substance that is dissolved.
- \_\_\_\_\_ 8. A mixture of sand and water is a heterogeneous mixture.
- \_\_\_\_\_ 9. A suspension is a homogeneous mixture in which water is mixed with a substance that does not dissolve in it.

In your textbook, read about acids and bases.

Use each of the terms below only once to complete the passage.

acids

bases

biology

buffers

hydrogen ions

neutral

pH

Substances that release hydrogen ions when dissolved in water are called

- (10) \_\_\_\_\_. The more (11) \_\_\_\_\_ a substance releases, the more acidic the solution becomes. Substances that release hydroxide ions when dissolved in water are called (12) \_\_\_\_\_. Acids and bases are key substances in (13) \_\_\_\_\_. The concentration of hydrogen ions in a solution is called (14) \_\_\_\_\_. Pure water is (15) \_\_\_\_\_ and has a pH value of 7.0. (16) \_\_\_\_\_ are weak acids or weak bases that can react with strong acids or strong bases to keep the pH within a particular range.

# Section

## CHAPTER 6

# Quick Check

## Section 3: Water and Solutions

After reading the section in your textbook, respond to each statement.

1. **Tell** how a solution is made. Use the terms *solute* and *solvent* in your answer.

---

---

2. **Discuss** the importance of buffers in biology.

---

---

---

---

3. **Explain** why water molecules are polar.

---

---

---

---

4. **Indicate** whether a solution will have more  $\text{OH}^-$  or  $\text{H}^+$  if the pH value of the solution is 10.

---

---

5. **Determine** whether each of the following is a solution or a heterogeneous mixture: oil mixed with vinegar by shaking to make a salad dressing that settles into an oil layer and a vinegar layer; carbon dioxide dissolved in water to make carbonated water for making soft drinks. Explain.

---

---

---

---

Copyright © Glencoe/McGraw-Hill, a division of The McGraw-Hill Companies, Inc.

CHAPTER 6

*Study Guide*

Section 4: The Building Blocks of Life

In your textbook, read about the building blocks of life.

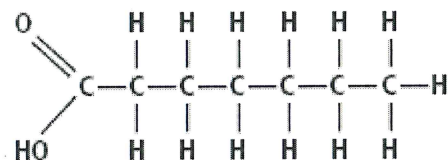
For each statement below, write true or false.

- \_\_\_\_\_ 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 molecules made from repeating units of identical organic compounds that are linked together by hydrogen bonds.
- \_\_\_\_\_ 4. Carbon is a component of almost all biological substances.
- \_\_\_\_\_ 5. Macromolecules can be organized into vitamins, lipids, proteins, and nucleic acids.

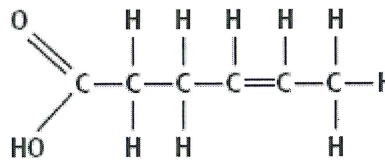
In your textbook, read about carbohydrates, lipids, proteins, and nucleic acids.

Label the diagrams. Use these choices: saturated fat, unsaturated fat.

6. \_\_\_\_\_



7. \_\_\_\_\_



Complete the table by checking the correct column(s) for each description.

Description	Carbohydrate	Lipid	Protein	Nucleic Acid
8. Stores coded genetic information				
9. Makes up fats, oils, and waxes in biology				
10. Makes up muscles, skin, and hair				
11. Forms double-helix structures				
12. Is made of amino acids				
13. Includes glucose, lactose, sucrose, and glycogen				
14. Stores energy and is part of membranes				
15. Contains peptide bonds				

CHAPTER 6

# Section Quick Check

## Section 4: The Building Blocks of Life

After reading the section in your textbook, respond to each statement.

1. **Recall** what polymers are.

---

---

---

2. **Review** why carbon can form a variety of organic compounds in a variety of shapes.

---

---

---

---

3. **Express** the importance of nucleic acids to living organisms.

---

---

---

---

4. **Compare** and **contrast** saturated fats and unsaturated fats in terms of their structures.

---

---

5. **Assess** why the structure of proteins is so complex.

---

---

---

---