

Chapter 13 COMPOUNDS

Chapter 13 Assessment

Vocabulary

Select the correct term to complete the sentences.

| | | |
|------------------|-------------------|-------------------|
| polyatomic ion | organic chemistry | Lewis dot diagram |
| nucleic acids | binary compound | saturated fat |
| chemical formula | amino acids | enzyme |
| proteins | valence electrons | ion |
| ionic bond | carbohydrates | covalent bond |
| oxidation number | unsaturated fat | polymer |
| lipids | chemical bond | DNA |

Section 13.1

1. H_2O is the ____ of water.
2. A(n) ____ is formed when atoms share one or more electrons.
3. A(n) ____ is formed when atoms transfer or share electrons.
4. A(n) ____ is formed when atoms transfer electrons.
5. You can use a(n) ____ to represent the valence electrons of an atom.
6. A charged atom is called a(n) ____.
7. The electrons involved in chemical bonds are called ____.

Section 13.2

8. A(n) ____ indicates the electric charge on an atom when it gains, loses, or shares electrons during chemical bond formation.
9. A compound consisting of two elements is called a(n) ____.
10. The type of ion that contains more than one atom is called a(n) ____.

Section 13.3

11. Fats, oils, and waxes are examples of ____.
12. ____ are molecules composed of long chains of smaller, repeating molecules.
13. Sugars and starches are examples of ____.
14. The building blocks of proteins are called ____.
15. A branch of chemistry that specializes in the study of carbon compounds is ____.
16. A fat that has fewer hydrogen atoms because double bonds exist among some of the carbon atoms is called a(n) ____.
17. A fat in which the carbon atoms are surrounded by as many hydrogen atoms as possible is called a(n) ____.
18. Very large molecules composed of carbon, hydrogen, oxygen, nitrogen, and sometimes sulfur are called ____.
19. A type of protein that speeds up a chemical reaction in living things is called a(n) ____.
20. Compounds made of many repeating nucleotides are known as ____.
21. ____ is a nucleic acid that contains the genetic code for an organism.

Concepts

Section 13.1

1. What is the chemical formula for water? What atoms make up this compound?
2. Why do atoms form compounds instead of existing as single atoms?

3. What type of bond holds a water molecule together?
4. What does the subscript 2 in H_2O mean?
5. Name the two most important factors in determining the properties of a compound.
6. Summarize the differences between a covalent compound and an ionic compound.
7. When atoms form chemical bonds, which of their electrons are involved in the bonds?

Section 13.2

8. Name a very reactive group of metals and a very reactive group of nonmetals. Why do they behave this way?
9. Noble gases usually don't form chemical bonds. Why?
10. Fill in the blank: Each successive element on the periodic table going from left to right across a period has an additional ____.
11. How does the oxidation number indicate if an electron will be lost or gained by the bonding atom?
12. Using the periodic table, what is the oxidation number of:
 - a. calcium
 - b. aluminum
 - c. fluoride
13. What is the total electric charge on a compound?
14. When elements in groups 1 and 17 combine, what type of compounds do they tend to form, covalent or ionic?
15. Elements that are widely separated on the periodic table tend to form ____ compounds.

16. Elements that are close together on the periodic table tend to form ____ compounds.
17. Strong electron donors are on the ____ side of the periodic table, while strong electron acceptors are on the ____ side.

Section 13.3

18. What do all organic molecules have in common?
19. What makes carbon uniquely suited to being the basis for biological molecules?
20. An organic compound contains carbon, hydrogen, oxygen, and nitrogen. Is this compound likely to be a lipid, carbohydrate, or protein? Explain.
21. Describe the four types of biological molecules. Give an example for each type.

| | |
|-----------------|-----------------|
| a. carbohydrate | c. protein |
| b. fat | d. nucleic acid |

Problems**Section 13.1**

1. For each of the chemical formulas listed below, name each element and tell how many atoms of each element are in that compound.

| | |
|--|----------------------------|
| a. $\text{C}_6\text{H}_{12}\text{O}_6$ | c. Al_2O_3 |
| b. CaCO_3 | d. $\text{B}(\text{OH})_3$ |
2. Draw Lewis dot diagrams for the following.

| | |
|-------|-------------------|
| a. Bi | c. Ne |
| b. Ge | d. SrI_2 |

Chapter 13

COMPOUNDS

Section 13.2

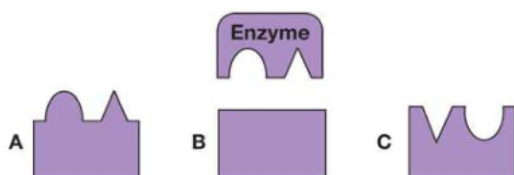
- Predict the formula for a molecule containing carbon (C) with an oxidation number of 4+ and oxygen (O) with an oxidation number of 2-.
- Which of the following would be a correct chemical formula for a molecule of N^{3-} and H^{+} ?
 - HNO_3
 - H_3N_6
 - NH_3
- Using the periodic table:
 - determine the oxidation number of Ca and Cl.
 - write the chemical formula for calcium chloride.
- Write the chemical formulas for the following compounds. Consult Figure 13.16 on page 320 if necessary.

| | |
|-----------------------|----------------------|
| a. sodium iodide | c. magnesium sulfide |
| b. aluminum hydroxide | d. ammonium nitrate |
- Name the following compounds.

| | |
|-------------|--------------|
| a. KI | c. KNO_3 |
| b. $SrCl_2$ | d. Al_2O_3 |

Section 13.3

- The diagram below shows an enzyme and three different molecules. Which of the three molecules would this enzyme target for a reaction?



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UNIT 4 MATTER AND ITS CHANGES

Applying Your Knowledge

Section 13.1

- The noble gases used to be called *inert* gases until 1962, when scientists were able to cause them to react and form compounds. Using a search engine and keywords “noble gas compound,” conduct research on this topic. Find the names of some noble gas compounds, who discovered them, their chemical formulas, and how they are used.

Section 13.2

- Answer each of the following questions about compounds.
 - Ammonium sulfate is often used as a chemical fertilizer. What is its chemical formula?
 - Calcium carbonate is a main ingredient in some antacids. What is its chemical formula?
 - Kidney stones, a painful ailment, are partially made of a compound whose chemical formula is $Ca_3(PO_4)_2$. What is the name of this compound?

Section 13.3

- Suppose that there are only three amino acids called 1, 2, and 3. If all three are needed to make a protein, how many different proteins could be made? Each amino acid may only appear in each protein once. Also, the position of the amino acid is important—123 is not the same as 321. Show your number arrangements to support your answer.
- You are entering a contest to design a new advertising campaign for National Nutrition Awareness Week. Create a slogan and a written advertisement that encourages teens to eat the right amounts of carbohydrates, lipids, and proteins. Use at least three facts to make your advertisement convincing.