



## Chapter 19 Review

### Vocabulary review

Match the following terms with the correct definition. There is one definition extra in the list that will not match any term.

#### Set One

- |                      |  |
|----------------------|--|
| 1. covalent bond     | a. The electrons involved in chemical bonding  |
| 2. ionic bond        | b. Most atoms need eight valence electrons to be stable                                |
| 3. octet rule        | c. A bond between atoms in which electrons are lost or gained                          |
| 4. valence electrons | d. A number that represents the number of electrons that are lost or gained in bonding |
|                      | e. A bond between atoms in which electrons are shared                                  |

#### Set Two

- |                     |   |
|---------------------|---|
| 1. Binary compound  | a. An ion like $\text{Na}^+$ , $\text{K}^+$ , or $\text{Cl}^-$                      |
| 2. Monoatomic ion   | b. Electrons that are involved in bonding   |
| 3. Oxidation number | c. An ion like $\text{CO}_3^{2-}$ or $\text{OH}^-$                                  |
| 4. Polyatomic ion   | d. A number that indicates how many electrons will be gained or lost during bonding |
|                     | e. A molecule composed of two monoatomic ions                                       |

### Concept review

- Why do atoms tend to combine with other atoms instead of existing as single atoms?
- Why are atoms in Group 18 considered to be chemically stable?
- How can you determine the number of valence electrons by looking at the periodic table?
- What conditions are met when an atom is chemically stable?
- What is the major difference between ionic and covalent bonds?
- Provide one general rule for predicting whether or not a bond will be ionic. (Hint: use the periodic table in your rule.)
- What are polymers? Give an example of a natural polymer and a synthetic polymer.
- What is an oxidation number? How can you determine an element's oxidation number by looking at the periodic table?
- In a chemical formula, what do subscripts tell you?
- What is the relationship between the formula mass of a compound, the Avogadro number of molecules of that compound, and the mass in grams of the compound?

## Problems

1. Fill in the table below.

Element	Atomic number	Valence electrons	Lewis dot diagram
Fluorine			
Oxygen			
Phosphorus			
Carbon			
Beryllium			
Nitrogen			
Sulfur			
Neon			
Silicon			

2. Identify which of the following bonds are ionic or covalent and justify your reasoning.

- C-C
- Na-Br
- C-N
- C-O
- Ca-Cl

3. Fill in the table below.

Element	Number of valence electrons	Electrons gained or lost during ionization	Oxidation number
Potassium			
Aluminum			
Phosphorus			
Krypton			

4. Which group number on the periodic table is represented by each description?

- These atoms form compounds with ions that have an oxidation number of  $1^-$ .
- The oxidation state of the atoms in this group is  $3^-$ .
- Atoms in this group have four valence electrons in the outermost energy level. The atoms in this group form compounds with ions like  $H^+$ ,  $Na^+$  and  $Li^+$ .
- If these ions combined with  $Al^{3+}$ , you would need three of them and two aluminum ions in the formula.
- Atoms in this group lose two electrons during ionization.

5. Which of the following would be a correct chemical formula for a molecule of  $N^{3-}$  and  $H^+$ ?

- $HNO_3$
- $H_3N_6$
- $NH_3$
- NH