Name _____ Class_____Date_____

Skills Worksheet

Chapter Review

USING KEY TERMS

Complete each of the following sentences by choosing the correct term from the word bank.

crystal	lattice ionic bond	molecule
chemical bond	chemical bonding	metallic bond
valence electron	ion	covalent bond

1. An interaction that holds two atoms together is a(n) _____.
2. A charged particle that forms when an atom transfers electrons is a(n) _____.
3. A bond formed when atoms share electrons is a(n) _____.
4. Electrons free to move throughout a material are associated with a(n) _____.
5. An electron in the outermost energy level of an atom is a(n) _____.
6. Ionic compounds are bonded in a three-dimensional pattern called a(n) _____.

UNDERSTANDING KEY IDEAS

Multiple Choice

_____ 7. Which element has a full outermost energy level containing only two electrons?
   a. fluorine, F
   b. helium, He
   c. hydrogen, H
   d. oxygen, O

_____ 8. Which of the following describes what happens when an atom becomes an ion with a 2^- charge?
   a. The atom gains 2 protons.
   b. The atom loses 2 protons.
   c. The atom gains 2 electrons.
   d. The atom loses 2 electrons.

_____ 9. The properties of ductility and malleability are associated with which type of bonds?
   a. ionic
   b. covalent
   c. metallic
   d. All of the above

_____ 10. What type of element tends to lose electrons when it forms bonds?

a. metal
b. metalloid
c. nonmetal
d. noble gas

_____ 11. Which pair of atoms can form an ionic bond?

a. sodium, Na, and potassium, K
b. potassium, K, and fluorine, F
c. fluorine, F, and chlorine, Cl
d. sodium, Na, and neon, Ne

Short Answer

12. List two properties of covalent compounds.

_____

_____

13. Explain why an iron ion is attracted to a sulfide ion but not to a zinc ion.

_____

_____

14. Compare the three types of bonds based on what happens to the valence electrons of the atoms.

_____

_____

_____

Math Skills

15. For each atom below, write the number of electrons it must gain or lose to have 8 valence electrons. Then, calculate the charge of the ion that would form. Show your work below.

a. calcium, Ca

b. phosphorus, P

c. bromine, Br

d. sulfur, S

CRITICAL THINKING

16. **Concept Mapping** Use the following terms to create a concept map: *chemical bonds, ionic bonds, covalent bonds, metallic bonds, molecule, and ions*

7. **Identifying Relationships** Predict the type of bond each of the following pairs of atoms would form:
   a. zinc, Zn, and zinc, Zn

   _____

   b. oxygen, O, and nitrogen, N

   _____

   c. phosphorus, P, and oxygen, O

   _____

   d. magnesium, Mg, and chlorine, Cl

   _____

18. **Applying Concepts** Draw electron-dot diagrams for each of the following atoms, and state how many bonds it will have to make to fill its outer energy level.
    a. sulfur, S

    _____

    b. nitrogen, N

    _____

    c. neon, Ne

    _____

    d. iodine, I

    _____

    e. silicon, Si

    _____

19. **Predicting Consequences** Using your knowledge of valence electrons, explain the main reason so many different molecules are made from carbon atoms.

    _____

    _____

20. **Making Inferences** Does the substance being hit in the drawing below contain ionic or metallic bonds? Explain your answer.

    _____

    _____

    _____

INTERPRETING GRAPHICS

Use the drawing of a wooden pencil below to answer the questions that follow

21. In which part of the pencil are metallic bonds found?

_____

_____

22. List three materials that are composed of molecules that have covalent bonds.

_____

_____

_____

23. Identify two differences between the properties of the material that has metallic bonds and the material that has covalent bonds.

_____

_____

_____

_____