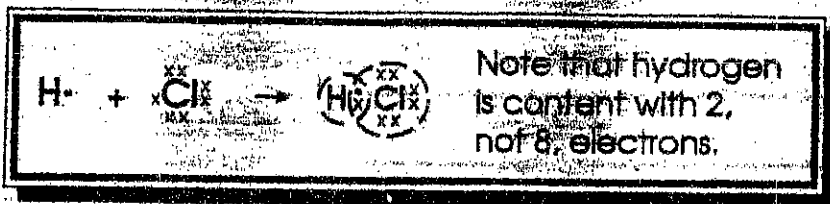


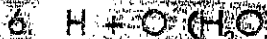
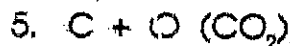
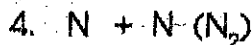
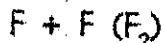
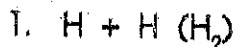
1. COVALENT BONDING

Name _____

(Use "HONC" rule to determine # of unpaired e⁻s.)
Covalent bonding occurs when two or more nonmetals share electrons, attempting to attain a stable octet of electrons at least part of the time. For example:



Show how covalent bonding occurs in each of the following pairs of atoms. Atoms may share one, two or three pairs of electrons.



2

7-2 Review and Reinforcement

Covalent Bonding

If the statement is true, write "true." If it is false, change the underlined word or words to make it true. Write your answer on the line provided.

- _____ 1. A group of atoms united by ionic bonds is called a molecule.
- _____ 2. A covalent bond is formed by a shared pair of electrons.
- _____ 3. A double covalent bond consists of two shared electrons.
- _____ 4. A molecular formula tells you how many atoms are in a single molecule of the compound.
- _____ 5. The empirical formula for a molecule specifies which atoms are bonded to each other in the molecule.
- _____ 6. A pair of electrons not involved in bonding is called a shared electron pair.
- _____ 7. In nonpolar covalent bonds, the electrons are shared unequally between two atoms.
- _____ 8. Lewis structures use a triple dash to represent a double bond.

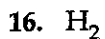
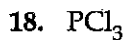
Use the information in Figure 7-19 of the textbook to calculate the electronegativity differences between each pair of elements listed in the chart below. Then indicate whether the bond would be nonpolar covalent, polar covalent, or ionic. Write your answers in the chart.

	Electronegativity Difference	Type of Bond
9. H—O		
10. C—H		
11. K—F		
12. N—H		
13. Na—F		
14. O—Cl		

3

7-2 Review and Reinforcement (continued)

Write Lewis structures for each of the following molecules. Indicate the bonds with either dots or dashes.



Answer the following questions as directed.

21. Explain why the molecule SF_4 is an exception to the octet rule.

22. Explain the relationship between electronegativity and polarity.

23. Compare and contrast single, double, and triple covalent bonds.

4

8-1 Review and Reinforcement

The Shape of Small Molecules

Matching

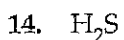
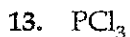
On the line at the left, write the letter that identifies the bond angles of each of the following molecules or ions. Each letter can be used once, more than once, or not at all.

- | | | |
|-------|-----------------------------|------------------|
| _____ | 1. BeCl_2 | a. 180° |
| _____ | 2. CH_2Cl_2 | b. 120° |
| _____ | 3. SeH_2 | c. 109.5° |
| _____ | 4. NH_4^+ | d. 107° |
| _____ | 5. BCl_3 | e. 105° |
| _____ | 6. PBr_3 | |
| _____ | 7. HCl | |

Complete the following table by filling in the molecular shape and bond angles for each of the molecules listed.

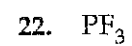
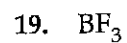
	Molecule	Molecular Shape	Bond Angles
8.	H_2O		
9.	CHCl_3		
10.	BF_3		
11.	NH_3		
12.	CO_2		

Draw a ball-and-stick model for each of the following molecules in the space provided. Label the bond angles in your drawings.



8-1 Review and Reinforcement (continued)

Draw a ball-and-stick model for each of the following and identify the hybrid orbitals in each molecule or ion.



8-2 Review and Reinforcement

Polarity

Complete each of the following sentences by filling in the appropriate word or phrase from the list below.

nonpolar	unequally
polar	electric
negative	polarity
shape	molecule
equally	

- In a polar bond, electrons are shared _____ between two atoms.
- A molecule that is composed of only one kind of atom is a(n) _____ molecule.
- The _____ of a molecule, as well as the polarity of its bonds, determines the polarity of the molecule.
- In a polar molecule, one end of the molecule is positive and the other end is _____.
- Polar molecules align themselves in a(n) _____ field.
- The _____ of a large molecule helps to determine its shape.

Identify each of the following molecules as a polar or nonpolar molecule. Write your answer on the line provided.

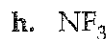
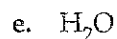
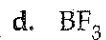
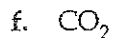
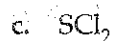
- HF _____
- F₂ _____
- H₂O _____
- O₃ _____
- CBr₄ _____
- C₂H₄ _____

Solve each of the following problems as directed. Show all your work.

- Illustrate the molecular shape of each of the following molecules. Identify each molecule as polar or nonpolar.
 - BFl₂
 - NH₂Cl



8-2 Review and Reinforcement (continued)



Answer each of the following questions in the space provided.

14. Why is HCl a polar molecule while Cl_2 is a nonpolar molecule?

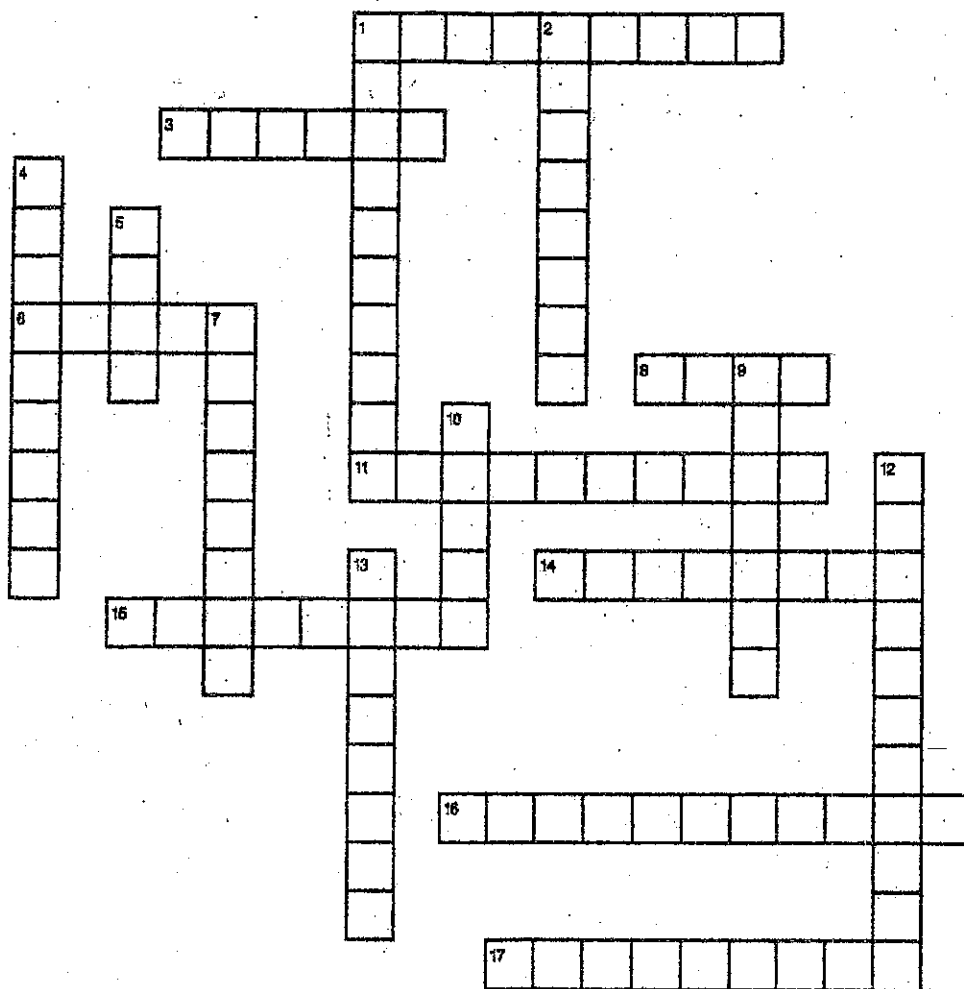
15. Explain why water has different properties from carbon dioxide. Base your answer on the molecular structure of these substances.

16. The proteins in many cells contain both polar and nonpolar sidechains. The nonpolar sidechains are usually found on the inside of the protein, while the polar sidechains are found on the outside facing the cell's cytoplasm, which is mostly water. Explain why proteins assume this type of structure.

CHEMICAL BONDING CROSSWORD

Name _____

8



Across

1. Ammonia is polar because its shape is _____.
3. Word to describe a molecule with an unequal charge distribution
6. Type of bond formed between an active metal and a nonmetal
8. The simultaneous attraction of electrons for the nuclei of two or more atoms is a chemical _____.
11. Type of covalent bond in which one atom donates both electrons
14. Bonding that is responsible for the relatively high boiling point of water
15. Type of covalent bond found in diatomic molecules
16. Carbon dioxide is nonpolar because it is _____.
17. Particles formed from covalent bonding

Down

1. Compounds with both ionic and covalent bonds contain this type of ion.
2. Type of bond found in aluminum foil
4. The formulas of ionic compounds must be expressed as _____ formulas.
5. The shape of a water molecule
7. Type of bond found between nonmetals
9. Type of covalent bonding that is found in the diamond
10. Type of covalent bond found between atoms of different electronegativity values
12. Force of attraction between nonpolar molecules
13. Element with the highest electronegativity value