

## Chapter 6 Chemical Bonds

**Section 6.2 Covalent Bonding****(pages 165–169)**

*This section discusses the formation of covalent bonds and the factors that determine whether a molecule is polar or nonpolar. It also discusses attractions between molecules.*

**Reading Strategy (page 165)**

**Relating Text and Visuals** As you read the section, look closely at Figure 9. Complete the table by describing each type of model shown. For more information on this Reading Strategy, see the **Reading and Study Skills** in the **Skills and Reference Handbook** at the end of your textbook.

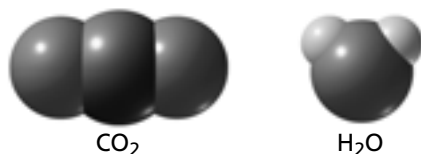
Molecular Models	
Model	Description
Electron dot	
Structural formula	
Space-filling	
Electron cloud	

**Covalent Bonds (pages 165–167)**

- Describe a covalent bond. \_\_\_\_\_  
\_\_\_\_\_
- Circle the letters of molecular models that show orbitals of atoms overlapping when a covalent bond forms.
  - electron dot
  - structural formula
  - space-filling
  - electron cloud
- Describe a molecule. \_\_\_\_\_  
\_\_\_\_\_
- Is the following sentence true or false? In a covalent bond, the atoms are held together by the attractions between the shared electrons and the protons in each nucleus. \_\_\_\_\_
- Circle the correct answer. Nitrogen has five valence electrons. How many pairs of electrons must two nitrogen atoms share in order for each atom to have eight valence electrons?
  - zero
  - one
  - two
  - three

**Chapter 6 Chemical Bonds****Unequal Sharing of Electrons (pages 167–168)**

6. In general, elements at the \_\_\_\_\_ of a group have a greater attraction for electrons than elements at the \_\_\_\_\_ of a group have.
7. In a hydrogen chloride molecule, the shared electrons spend more time near the \_\_\_\_\_ atom than near the \_\_\_\_\_ atom.
8. Describe a polar covalent bond. \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_
9. When atoms form a polar covalent bond, the atom with the greater attraction for electrons has a partial \_\_\_\_\_ charge.
10. Is the following sentence true or false? In a molecule of a compound, electrons are always shared equally by both atoms.  
\_\_\_\_\_
11. Circle the letter of each factor that determines whether a molecule is polar or nonpolar.
- a. the number of atoms in the molecule
  - b. the type of atoms in the molecule
  - c. the number of bonds in the molecule
  - d. the shape of the molecule



12. Compare the shapes of carbon dioxide and water molecules. Circle the letter of the polar molecule.
- a. carbon dioxide                      b. water
13. Is the following sentence true or false? In a water molecule, the hydrogen side of the molecule has a partial positive charge, and the oxygen side has a partial negative charge.  
\_\_\_\_\_

**Attraction Between Molecules (page 169)**

14. Water has a higher boiling point than carbon dioxide because attractions between polar molecules are \_\_\_\_\_ than attractions between nonpolar molecules.
15. Is the following sentence true or false? Attractions among nonpolar molecules explain why nitrogen can be stored as a liquid at low temperatures and high pressures. \_\_\_\_\_