

Unit 7 Reading Assignment

Learning Objectives in this Unit:

- Describe the difference between ionic and covalent bonding and differentiate between ionic and covalent compounds.
- Use the concept of electronegativity to predict bond covalency, bond polarity, and the dipole moment of molecules.
- Draw Lewis symbols, structures, and resonance structures. Use formal charge to rank likely Lewis structures.
- Use VSEPR to determine atomic orbital hybridization, predict electron pair and molecular geometry for molecules and ions.
- Describe sigma (σ) and pi (π) bonding in hybrid and molecular orbitals. Understand the differences between valence bond and molecular orbital theory.

Read more about this topic: [Chapter 7, Section 8.1](#)

1. Fill in the blank with “high” or “low”; “lose” or “gain”; “cations” or “anions”
Metals have relatively [_____] ionization potentials and [_____] electrons easily to form [_____] .
Nonmetals have relatively [_____] electron affinities and [_____] electrons easily to form [_____] .
2. Which of the following is NOT true of the covalent compounds?
 - a. Lower melting and boiling points
 - b. Softer in their solid states
 - c. Formed by atoms with similar tendencies to attract electrons
 - d. Good conductors of electricity
3. Match the type of bond to the approximate difference in electronegativity. (Remember these are only guidelines!)

Ionic	0.4 to 0.8
Polar Covalent	>1.8
Pure Covalent	<0.4
4. Use [Figure 7.6](#) to indicate which atom in each polar covalent bond would have the partial negative charge and which would have the partial positive charge: H—F; F—C; S—O; O—N
5. Fill in the blanks
How many electrons are shared in each type of bond?
Single bond [_____] electrons
Double bond [_____] electrons
Triple bond [_____] electrons

Unit 7 Reading Assignment

6. Order the steps for drawing a Lewis structure using the octet rule

1	Place all remaining electrons on the central atom
2	Draw a skeleton structure of the molecule and connect with single bonds
3	Determine the total number of valence electrons
4	Form double or triple bonds as needed
5	Place all remaining electrons on the central atom

7. Fill in the blanks

Elements in the [_____] and higher periods can have an expanded valence shell because they have empty [_____] orbitals in the same shell.

8. Which of the following is NOT true of formal charge?

- A structure which minimizes formal charge is preferred
- Formal charge is the hypothetical charge an atom would have if electrons were evenly distributed
- Formal charge is the charge on an atom in the molecule
- The formal charge on all atoms in a structure must sum to the total charge on the molecule or ion

9. Fill in the blanks

The VSEPR module assumes that [_____] pairs in the valence shell of a central atom will arrange to [_____] repulsion by [_____] distance.

10. Fill in the blanks with either “side to side” or “end to end”

A sigma (σ) bond forms via [_____] orbital overlap along the internuclear axis

A pi (π) bond forms via [_____] orbital overlap on opposite sides of the internuclear axis