

1. Write the electron configurations for
  - a. Neon
  - b. Argon
  - c. Krypton
  - d. Xenon
  
2. Circle the valence electrons
3. How many electrons are in the valence shell of Noble gases?
  
4. Draw the electron configuration for a sulfur atom, how many valence electrons?
  
5. Draw the electron configuration for a sulfide ion, how many valence electrons?
  
6. Draw the Lewis structure for oxygen
  
7. Draw the Lewis structure for nitrogen
  
8. Draw the covalent bonds for N<sub>2</sub>
  
9. Drawing Lewis structures:
  - a. Determine the number of valence electrons:
  - b. Add up the valence electrons for all atoms in molecule; add/subtract electrons to account for ionic charges.
  - c. Arrange atoms in a pattern that shows how they are bonded:
  - d. Atom with largest bonding capacity in the center; other atoms arranged around center; lowest bonding capacity (H) on periphery
  - e. Connect atoms with single bonds.
  - f. Complete octets of atoms connected to central atom by adding lone pairs.
  - g. Compare the number of electrons in structure to the number determined in step 1:
  - h. All electrons are used = done!
  - i. If not, remaining electrons placed around central atom
  - j. Complete octet around central atom (if needed) by converting one or more lone pairs on adjacent atom into bonding pairs
  
10. Draw the Lewis structures for
  - a. Water
  
  - b. Carbon dioxide
  
  - c. Formaldehyde (H<sub>2</sub>CO)
  
  - d. Methane (CH<sub>4</sub>)

11. What is a polar bond?
12. Which of the following bonds in each pair are more polar?
- C–N or C–O
  - Cl–Cl or O=O
  - N–H or C–H
13. Draw the resonance structures for ozone, O<sub>3</sub>.
14. Draw the resonance structures for dinitrogen monoxide, determine the best structure by finding the formal charges. The structure with the fewest formal charges is the best.