6.1 Ions: Transfer of Electrons

- ions form when electrons can be easily transferred to yield an octet
  - metals will lose electrons giving an empty valence shell with a stable inner octet remaining
  - non-metals gain electrons filling the valence shell to a stable octet
- predict changes in atomic radius when ions form
- predict charges of common ions formed from main-group elements
- Chemistry Link to Health
  - Important Ions in the Body – Na⁺, K⁺, Ca²⁺, Mg²⁺, Cl⁻

6.2 Ionic Compounds

- ionic compounds form between metals and non-metals (or polyatomic ions...obviously)
- be able to write the formula of ionic compounds
- the charge of the cations must balance the charge of the anions
  - Sample Problem 6.3
  - 6.15, 6.17, 6.19, 6.149

6.3 Naming and Writing Ionic Formulas

- be able to name ionic compounds
  - cation then anion
- transition metals can have different charges
  - use the formula to determine the charge
  - know silver, cadmium, and zinc ions
- 6.21, 6.25, 6.27, 6.29, 6.99, 6.111, 6.115

6.4 Polyatomic Ions

- a charged molecular species
  - 2+ atoms (usually non-metals) covalently bonded with an overall p⁺/e⁻ imbalance
- write formulas using polyatomic ions
- name compounds containing polyatomic ions
- know all the polyatomic ions in Table 6.8
  - there is a pattern! – see the Polyatomic Ion handout
  - Sample Problem 6.8
  - 6.35, 6.39, 6.41, 6.45, 6.89, 6.113

6.5 Molecular Compounds: Sharing Electrons

- molecular compounds form between two non-metals
- atoms satisfy the octet rule by sharing of electrons
- molecules are discrete groups of atoms that are always associated with one another
- be able to write the formula or names of molecular compounds
- prefixes are included in the name to indicate the balance of atoms – know Table 6.10
  - mono if often omitted
  - oa and oo are avoided in naming by dropping the first vowel
  - Sample Problem 6.11
  - 6.47, 6.51, 6.55, 6.91, 6.97, 6.117, 6.119, 6.121, 6.123
6.6 Lewis Structures for Molecules

- know the diatomic elements (and remember the left leg kick!)
- be able to interpret a Lewis structure
- given a formula, you do not need to be able to draw the structure

6.7 Electronegativity and Bond Polarity

- be able to define and use the concept of electronegativity
- be able to apply the rules of thumb discussed in class to identify polar or nonpolar bonds
- be able to indicate the electron distribution in a polar bond using partial charges, dipole moments, or sketches of electron distribution
- 6.61, 6.63, 6.67, 6.69, 6.105, 6.129, 6.131, 6.133

6.8 Shapes of Molecules

- be able to predict the three-dimensional structure of a molecule about any atom
- given the Lewis structure, identify the electron arrangement and molecular shape
- know electron arrangements for two to four electron sets
- know molecular shapes
- know the bond angles associated with each electron arrangement
- identify, understand, and describe how lone pairs or multiple bonds affect bond angles
- see Molecular Shape handout
- covered in lab lecture
- Sample Problem 6.15
- 6.71, 6.75, 6.139

6.9 Polarity of Molecules and Intermolecular Forces

- be able to identify whether a molecule is polar is nonpolar
- **KEY SKILL** identify attractive forces in samples
  - intermolecular forces
    - dispersion forces
    - dipole-dipole interactions (DP-DP)
    - hydrogen bonds (H-bond)
  - ion-dipole
  - ionic bonds
- explain the differences in strengths of different forces
- explain how the different attractive forces affect physical properties such as mp & bp
- Sample Problem 6.17
- 6.79, 6.81, 6.83, 6.85, 6.87, 6.103, 6.107, 6.141, 6.145, 6.156

**MEMORIZE**

- the polyatomic ions in Table 6.8 – charge, formula, and name
- prefixes for naming molecular compounds in Table 6.10
- diatomic elements