**Reference: Chemical Bonding**

**Polarity of Bonds**

Polarity of bonds is solely determined by electronegativity differences. The range below is the range we will use in Honors Chemistry. These ranges are flexible, although the general rule is a metal and nonmetal will form an ionic bond and two nonmetals will form a covalent bond. (Learn these values!) *PS: They are different than your book!*

* 0.0 to 0.49 nonpolar covalent bond
* 0.5 to 1.69 polar covalent bond
* 1.7 and up ionic bond

**Polarity of Compounds** (Compounds can also be either non-polar covalent, polar covalent, or ionic).

Polarity of a molecule depends upon **two** things

* + **the polarity of the bonds**
  + **the shape of the molecule**
* All molecules with only nonpolar bonds are nonpolar molecules.
* Molecules with polar bonds, may or may not be polar molecules, depending on the shape.
* **Non-polar covalent compound (molecule)**
  + Molecules that are not attracted to a charge
  + Contains only non-polar bonds

OR

* + Contains polar bonds that “cancel” each other out
  + Symmetrical
  + Contains no lone pairs of electrons around central atom
* **Polar covalent compound (molecule)**
  + Is attracted to a charge
  + Contain(s) polar bond(s) that is/are not canceled out
  + Asymmetrical – lone pairs of electrons around central atom

**Covalent Bonding:**

**Bond Strength:**

Triple > Double > Single

**Bond Energy**

Triple > Double > Single

**Bond Length**

Single > Double > Triple

**Intermolecular Forces (IMF)**

Forces that attract molecules to other molecules.

**Hydrogen Bonding**

* Strongest forces between H-F, H-N, and H-O (polar)

**Dipole-Dipole**

* Attraction between oppositely charged regions of neighboring molecules (ex. HCl – polar)

**London Dispersion Forces**

* The weakest of the IMF. They are proportional to the mass of the molecules. (Technically all molecules have these forces.)
* These are the only forces of attraction between completely nonpolar molecules. Large nonpolar molecules may have substantial dispersion forces resulting in high boiling points and small molecules