Thoughts for the Day
CH301 Fall 2010
09/14/10

More VSEPR

First draw the Lewis Dot Structure.
Then for the central atom (or atom of interest) get the steric number
Identify the electronic geometry
Put in atoms and LP and identify the "molecular" geometry (this is the geometry).

See the hand on the webpage for summary
Go to the following webpages for more practice and 3-D animations

http://winter.group.shef.ac.uk/vsepr/

http://undergrad-ed.chemistry.ohio-state.edu/VSEPR/

Tweaking geometries.

Things to remember

LP-LP repulsion is the largest
LP-BP is next
BP-BP is smallest

When comparing BP-BP
Double bonds are generally "more repulsive" than single bonds
Also, look at the electronegativity differences as this may modify the repulsions due to partial charges.

Finally, there is the size of the atoms. Larger atoms are typically more "repulsive", however this is not a clear without knowing something about the bond lengths.

Polarity

In general, chemistry will use the term non-polar to mean a whole class of molecules which are either purely non-polar or have very small polarities. For us, we will currently divide things between polar and strictly nonpolar (zero dipole moment).

As such, lots of things will be polar. To be non-polar molecules will need to be very symmetric (CH4, CO2, NO3-, SF6, ….)

Any lone pairs in a molecule will generally make it polar (except is square planar molecules). H2O, NH3, …

Also, different atoms (different EN) can lead to polarity. CHCl3, CH3OH, …

Strain in molecules

Some molecule have a geometry that moved the bond angles away from their VSEPR ideal limits. For example C3H6 cyclopropane is an equilateral triangle shape with 60° angles for the C-C-C angles. However, the steric number for each carbon is 4 and should be tetrahedral with an angle of 109.5°. As such, cyclopropane is not a particularly stable molecule (compared to other hydrocarbons).