

Exploring Molecular Shapes

1) **On a separate sheet of paper** do the following for each of the molecules listed below.

- Draw the Lewis Dot Diagram
- Draw the structural diagram
- Draw a three dimensional sketch of how you predict the molecule will look with enough room for you to add bond angles and lengths.

Do this for the following:



- 2) Go to the following URL to check your predictions:
http://chemsite.lsrhs.net/j_periodic_table/molecule_exercise.html
- 3) Measure the bond angles of all the atoms in the molecules and the carbon/carbon bond lengths for C₃H₈, C₃H₆, and C₃H₄.
- 4) What relationship do you notice about the length of single, double, and triple bonds?
- 5) Why did the bond angle get more acute as you measured the following molecules? CH₄ NH₃ H₂O (Hint: Think about how and why the atoms are being repelled at all.)

- 6) Given the following molecule (methacrylonitrile) C_4H_5N :
$$\begin{array}{c} \text{H} \\ | \\ \text{H}:\text{C}::\text{C}:\text{C}::\text{N}: \\ | \\ \text{H} \end{array}$$
 Draw the structural formula and a 3d sketch which includes predicted bond angles.

- 7) Go to some of the websites listed below and find a molecule which shows an example of each of the common shapes: **Tetrahedral, Trigonal Pyramidal, Trigonal Planar, Bent, and Linear.**

You can find many molecules at the following websites:

- www.webmolecules.com
- www.ch.ic.ac.uk/vchemlib/mol/mol.html
- www.wellesley.edu/Chemistry/Flick/molecules/newlist.html
- www.nysaes.cornell.edu/fst/faculty/acree/flavornet/chem.html
- www.sci.ouc.bc.ca/chem/molecule/molecule.html