

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:

CH₄ NH₃ H₂O C₃H₈ C₃H₆ C₃H₄ CH₄O

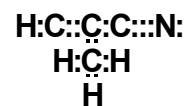
2) Go to the following URL to check your predictions:

http://chemsite.lsrhs.net/bonding/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) $\text{C}_4\text{H}_5\text{N}$:

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:

- <http://www.3dchem.com/atoz.asp>
- <http://www.rcsb.org>
- (needs chime)
www.wellesley.edu/Chemistry/Flick/molecules/newlist.html