LAB [20 pts]
Molecular Model Building

Name _____
Lab Partner _____
Period _____ **Date** _____

Introduction:
In this lab, you will build models of molecules. Using these wooden models you will draw the 3-D diagram and determine its shape. This lab deals with very important concepts because it allows us to predict the shapes of molecules. We will find out later that knowing the shape of molecules allows us to understand a wide variety of physical and chemical properties of molecules.

Procedure: **YOU MUST WRITE IN PENCIL!!!!!!**

1) Draw your Lewis Dot structure. Make sure you have the correct number of electrons and full octets.
2) Build the 3D model of your molecule using the model set. Follow these guidelines when building:
   a) Use one stick for a **single** bond, two springs for a **double** bond and three springs for a **triple** bond. Use a stick for all **lone pairs on central atoms and terminal atoms with double or triple bond.**
   b) Use the following colored spheres for these elements:
   carbon—black **oxygen**—red **nitrogen, phosphorus, or sulfur**—blue
   hydrogen—white **all halogens (F, Cl, Br, I)** —either green, purple or orange
3) By looking at your model that you built, draw a 3-D drawing of your molecule.
4) Determine the electron geometry and hybridization of the central atom of your molecule.
5) Determine the specific shape of the central atom of your molecule.
6) **Come show me your models and drawings after you finish every few molecules. I must OK them.** Do not take your models apart until I have checked them off.

Formula	Total # of ve^-	Lewis Structure (All Electrons)	3-D Drawing No lone pairs needed on single-bonded terminal atoms.	Electron Geom., Hybrid., Bond Angle & Molecular Geom.
1) CH_4 (natural gas)				
2) OF_2				
3) CH_3Br				
4) CH_2O (formaldehyde)				
5) PH_3				

Formula	Total # of ve^-	Lewis Structure (All Electrons)	3-D Drawing No lone pairs needed on single-bonded terminal atoms.	Electron Geom., Hybrid., Bond Angle & Molecular Geom.
6) CS_2 (Carbon disulfide)				
7) C_2H_6				
8) C_2H_4				
9) C_2H_2 (Acetylene)				
10) O_3 (ozone)				
11) CO (carbon monoxide)				
12) H_2S				
13) NH_4^+ ammonium				
14) CO_3^{2-} carbonate *(in shells and baking soda)*				

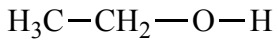
Directions for the rest of the lab: ***Shapes of larger molecules***

So far all the molecules you have made have been relatively small. However, most of the molecules naturally found are much larger. Thus, we must be able to determine the shape of an entire molecule, by determining the specific shape around EACH main atom.

Do these examples with me in class. Then proceed to finish the lab. Expand these condensed molecules and put in all missing electron pairs on the Lewis Structures. Label each atom (other than H) with its hybridization, then draw a realistic 3D drawing.

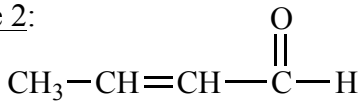
Lewis Dot (with all lone pairs) **Realistic 3-D Drawing**

Example 1:



ethanol
(drinking alcohol)

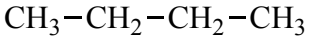
Example 2:



Last few Problems: ***You must do the Lewis Dot, build the model and draw as realistically as possible.***

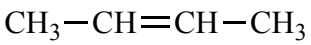
Lewis Dot* (with all lone pairs)** ***Realistic 3-D Drawing

15)



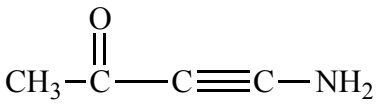
(Butane- in cigarette lighters)

16)



(2-butene)

17)



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