cLAB: 3D Molecules

OBJECTIVE: Construct 3-Dimensional computer models of fictional (and some non-fictional) compounds and ions. You will:

#1 Draw your own Lewis structures for compounds and ions, and neatly record your answers on the Lewis Structure Worksheet.

#2 Use MolView to construct 2D and render 3D models of your compounds and ions.

#3 Use Jing or the Snipping Tool on your computer to copy and paste images of your 2D and 3D models into PowerPoint or Google Slides, and label each slide.

#4 Save your entire presentation as a PDF and submit it to TurnItIn.com and your Assignment Turn In folder in Google Drive.

IMPORTANT: Use the instructions below to explain the expectations for each step.

#1 Old School

➢ On the cLAB Worksheet, NEATLY draw Lewis structures for the molecules and polyatomic ions - there are ten in all. Next, determine the molecular geometry for each structure.

➢ Turn in this worksheet on the due date in class.

#2 MolView

➢ Log on to molview.org and click on **Continue**

➢ You'll immediately see an example of what MolView can do. There is a 2D structural formula of a sample compound on the left canvas and a 3D rendering of the compound on the right canvas.

➢ STOP!! Go to the MolView Manual and review the functions of the Tools on the first two pages.

➢ Next, use the guidelines below and the MolView instruction pages to constructs your own 2D and 3D models:

1. Click on Trash to clear the 2D canvas. (The 3D canvas will not clear yet.)

2. Click on the appropriate atom symbols in the right tool bar and then click in the left canvas to add the atom. As you enter additional atoms, place them in the correct arrangement around each other from your Lewis structure drawing. (This is one reason why you have to have the Lewis structures done ahead of time.)

   - Select the **Color Mode** button so that the atoms show up in different colors.

   - Be sure to leave enough space between the atoms so that the bonds you are about to draw don't over lap and hide the atom symbols. After you add the atoms, click on the **Center** button to center your structure and make it larger.

   - You can also use two fingers on a touch pad (or use a mouse) to zoom in or out to make the atoms larger or smaller.

   - IONS: For positive or negative ions, add the atoms first, then at the bottom of the left tool bar, click on either e- or e+. Go back to the atom that has the charge, and click on it until you have the correct (+) or (-) charge.

3. To add bonds between the atoms, in the left tool bar, click on the correct bond type (single, double, or triple). Then click on one of the atoms in the bond and drag the bond around to connect to the next atom. You should see the bond kind of settle in place.

   - If your atoms are too close together, it may cover up one of the atoms, especially if it is carbon – BUT the whole thing still may work.

   - Don't just keep clicking, because every time you do, you are adding bonds or atoms!!

   - Use the Back, Erase, or Trash buttons to correct mistakes or start over.

4. When you have your 2D Lewis structure drawn, click on the **2D to 3D** button. Next, click on the **Model** tab and select BOTH **Ball and Stick** AND **ChemDoodle** to view your model and check your structure for accuracy.

   - You can click on the model and rotate it to show it from different perspectives. If you are correct, you are good to go.
   - If your structure was incorrect, you will see additional atoms or new structures that weren't there before. This means you have to start over and construct it again!

5. When your 2D model is correct, click on the **Model** tab, and this time select **van der Waals Spheres** to show that model (and use the **ChemDoodle** engine). Rotate the model and enlarge it so that you have the best view of the geometry of the structure, and so that as many atoms as possible are showing, etc. This **van der Waals Spheres** model is the one that you will include in your presentation.

6. Copy and paste both the 2D and the 3D models into your presentation, and label each slide, using the next set of instructions.

#3 A Snipping Tool

➢ Your next step is to cut and copy two views –the 2D view and the 3D of each structure and then paste them into separate PowerPoint slides or Google Slides.

➢ Open the Start menu and/or type snip in the Search bar of your desktop

➢ Choose Snip & Sketch or the Snipping Tool and click on New

   1. Select the Rectangular clip
   2. In a few seconds, a crosshair will appear. Click and draw over the area you want to copy - get as close to the molecule as possible with as little of the background color as possible.
   3. This automatically copies your image to the clipboard and you can now paste the image where you need it.

#4 Google Slides or PowerPoint

➢ Go to Google Slides (or PowerPoint) and paste the 2D view and the 3D view for each structure onto two separate slides.

   A. Stretch the images ONLY from the corners to fill the slide from either top to bottom or from left to right (whichever fits first).
   B. Make sure you only stretch from the corners so you keep the aspect ratio constant – so the image won't be warped.
   C. You can also edit the size under the *Format* tab. Each view should not be stretched or skewed out of shape.

➢ Add a title for each slide. Use a font as large as Calibri font size 44 or larger in black for the 2D view and either in black or white for the 3D view. Use correct subscripts and superscripts for the formulas.

➢ It's okay if your title is on top of your image, as long as it's not on the molecule. If you happen to type the title first and it is hidden under your structure, right click on the structure and select **Send to Back** and the title will show on top.

➢ LAST STEP: Save your file as a PDF to TurnItIn.com and in your Assignment Turn In folder in Google Drive in **exactly** this way: **Class Period Last name, First name cLAB: 3D Molecules**

   *Example: **C3 Skinner, Tammy cLAB: 3D Molecules***

cLAB: 3D Molecules Lewis Structure Worksheet

Formula	Lewis Structure (hand drawn)	Molecular Geometry
PH_2F		
N_2O_2		
BCl_3		
$SiCl_3Br$		
$ONCl$		
CNF		
PH_4^{+1}		
NO_2^{-1}		
$C_2H_3O_2^{-1}$		
$HC_2H_3O_2$		