



# ChemDraw Tutorial 1

## Getting Started – Warming Up Exercise

- 1- Launch the ChemDraw Ultra application program
- 2- Program opens with a white workspace (document window) in the center and some toolbars around the workspace. The toolbar windows can be customized (removed or inserted from the View menu)
- 3- Also make sure that under **Object** menu you have fixed your lengths (Ctrl + L) and angles (Ctrl + E) to prevent variable sized lengths and angles in your shapes.

- 4- Click the bond tool  and click on the page to create a structure such as a cyclohexane 
- 5- If your shape does not look as accurate then select the shape with either of the selection tools, open the 'Structure' menu and select the 'Clean Up Structure' option. The shape structure will be fixed.
- 6- Then create another cyclohexane shape. You may use one of the ready cyclohexane ring templates in the main toolbar. Click select to highlight the last structured drawing. A hand tool will appear on the shape and you can use it to drag and change the shape position.

Note: You may insert other shape options which are not available on the toolbar by using the

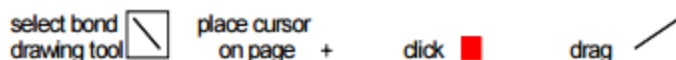
templates  option.

## Experiment 1 – Reaction Schemes

The following instructions illustrate how to draw molecules. Work through the step-by-step instructions to draw the structure of 2-propanol shown on the right.

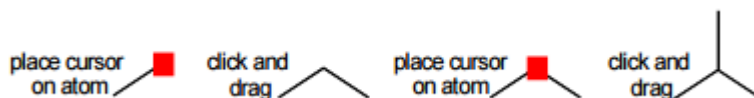


1. First you will draw a bond: Click on the bond drawing tool in the palette on the left-hand side of the screen. Move the cursor to the blank window, click-hold-drag and release the mouse to draw a bond.

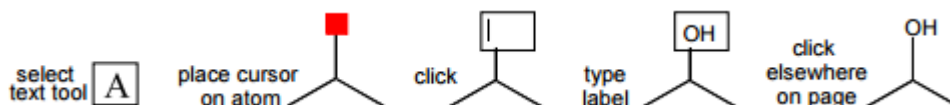


Each end of the bond represents a carbon atom until you change it to another type of atom.

2. You will now draw the other bonds: Place the cursor on one end of the bond; a black square will appear. Click-and-drag the mouse to draw a second bond. Click-and-drag from the middle atom to draw a third bond.



3. One of the carbon atoms should be changed to a hydroxyl group: Click on the text tool; place the cursor on the atom you want to label, a black square will appear. Click the mouse when the end of a bond is highlighted with a black square, a text box will appear. Type OH using the keyboard, and then click the mouse elsewhere on the window. Numbers entered in atom labels are automatically written as subscripts.




### Other Drawing Tools

A series of bond drawing tools are available to show the three-dimensional arrangement of atoms.



Double bonds are made by clicking on an atom and dragging along an existing bond to an adjacent atom. A number of ring structures can be drawn automatically. Work through the following example.

- i. Select the five-membered ring tool, click-and-drag on the drawing window and see what happens.
- ii. Now select the bond drawing tool, click on an atom in the five membered ring (the structure of cyclopentane), drag to an adjacent atom and release. A double bond will appear (to give the structure of cyclopentene). 

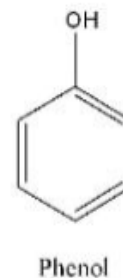


## Experiment 2

### *Captions and Atom labels*

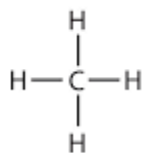
You can annotate simple hydrocarbon structures using captions and atom labels using the text tool. For example, you can add the atom label "OH" and the caption "Phenol" to a drawing of toluene to create:

1. Select the Cyclohexane ring, click in the document window. The ring appears.
2. Select the Solid Bond tool, click on the lines to create double lines as shown on the right.
3. Using the Solid Bond tool, click on the tip of the ring to create a vertical line.
4. Using the Text tool, click the top end of the vertical line. A text box appears. In the text box, type OH.
5. Click outside the text box.
6. Using the Text tool, click below the drawing and type "Phenol" in the textbox.
7. Click outside the text box.

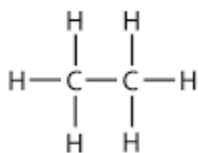


To edit the caption or atom label, click in the text box with the text tool and begin typing.

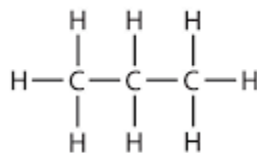
### Experiment 3



Methane



Ethane



Propane

Let's draw the symbol for Methane

1. Select the bond drawing tool, and create a horizontal line.
2. Double click on the left end and type H.
3. Then double click on the right end and type C.
4. Activate the bond drawing tool, then click and drag another horizontal line from the letter C. Name the other end of the line, type H.
5. Repeat step 4 by drawing two more vertical lines from the letter C. Name the other end of the line, type H.
6. Using the Text tool, click below the drawing and type "Methane" in the textbox.

**LAB WORK:** Now sketch out the molecule representations of Ethane and Propane. Demonstrate your work to your instructor.