

Using ChemSense: A Tutorial

ChemSense allows you to create drawings and animations of chemical reactions, share your work with other lab groups, and comment on other's work. This tutorial will guide you through how to create molecule drawings, comment on others' work, and create an animation.

We will begin by creating some drawings of a few compounds.

- 1) Log onto ChemSense with the login name and password that your teacher gave you. (Do not check the Save Password box, since other students may be using your computer.)
- 2) Look for your class period under **Discussion Thread** in the upper left corner.
- 3) Expand or open your class period by clicking on the + or > beside your class period.
- 4) Look for your group name under your class period, and click on it.
- 5) With your group name selected, go up to the **Item** menu and select **Build On**.

Note: Whenever you do a Build On, the item that you create will appear indented (“threaded”) just below the item that you last selected. It is important whenever you create a new item that you pay attention to where you want it to go, and click on the existing item that you want your new item to appear under.



- 6) You will be prompted to choose an item type. Select **Drawing**.
- 7) A drawing tool window will appear in the ChemSense workspace. This window contains drawing tools that we will use to draw some molecules. Let's start by drawing water.

The first tool that you'll want to use is the periodic table tool, which looks like this:



When you click on this tool, a tiny periodic table will appear. In this table, click on the element that you want to draw, click the **Select** button, and then click on the drawing area. You can “spray” this element across the drawing area repeatedly by clicking several times.

- ➔ **Let's try it:** Select hydrogen from the tiny periodic table, and click on the drawing area. Move your mouse and click again to create a second hydrogen atom. Then select oxygen from the periodic table and place one oxygen in the drawing area.

Next you'll probably want to draw bonds between elements. Click on a bond tool, like the single-bond tool: , You can draw the bond between any two elements. It should “click” into place and connect the elements. If you move an element that is bonded to another element, the bond will “stretch” and they will stay connected. To move an element, click on the select tool:  and then click on the element and drag it to a new position.

- ➔ **Let's try it:** Select the single bond tool, and draw a bond between one of the hydrogen's and the oxygen. Then draw another bond between the other hydrogen and the oxygen. Now select the oxygen and move it. You should see the bonds stretch.

Once you have drawn an entire molecule, you can “group” it and make copies of it. This is much faster than drawing several copies by hand. To group a molecule, select the entire molecule and select **Arrange / Group**. Once an item is grouped, you can duplicate it by selecting it and choose **Edit / Duplicate**.

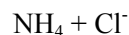
Notice that there are keyboard shortcuts for these and most other menu commands. You may want to use them!

➔ **Let's try it:** Click on the select tool, and draw a box around your water molecule until all of the atoms and bonds are within the box and selected. Then choose **Group** from the **Arrange** menu. Then choose **Duplicate** from the **Edit** menu. You should now have two water molecules!

8) Let's draw some more molecules next to the water molecule. Draw the following:

- sodium chloride (NaCl)
- methane (CH₄)
- calcium carbonate (CaCO₃)

Next, write the chemical formula beside each of them using the text tool: **T** The text tool is “smart” about the text that you enter: it will display subscripts and superscripts on chemical formulas. For example, if you enter: NH₄ + Cl⁻, the 4 will be subscripted and the '-' will be superscripted, as:



You must type a space before and after a '+' or '-' if you *do not* want it to be interpreted as a superscript.

➔ **Let's try it:** Click on the text tool, and type in the chemical formula for one of your molecules. Then click on the drawing area below the molecule and the formula will appear.

9) Title and save your work. At the bottom of your drawing you can enter a **Title** and **Notes**. The title will appear next to your work in the browser area at the left when you save it.

➔ **Let's try it:** Type a title (like “Practice molecule drawings”) and notes if you like. Then click the Save button **Save** in the lower right. You should see your item appear indented below your group name, assuming that you built on your group name in #5 above. Close the drawing window now if you like.

10) Now let's see what others have created. In the browser area, look at another group's work on the above compounds. You may have to “reload” to see new work that has recently been added. To do this, click on your class period item, then click **Item / Reload Selected**.


➔ **Let's try it:** Open another group's drawing by double clicking on it in the item list.

11) Comment on one other group's work. To do this, you need to **Build On** it with a text note.

➔ **Let's try it:** Select one other group's drawing, and click **Item / Build On Selected**. Select the **Text** tool and type your comment. If you see anything wrong, suggest how the group could improve or fix it.

12) Create an animation that shows at the nanoscopic level what happens when NaCl is placed in H₂O.

➔ **Let's try it:** Select your group name in the item browser, and choose **Build On**. From the list of options, choose **Animation**. You should see a new animation editor window.

The animation tool looks like the drawing tool, except it has extra items just below the drawing canvas, including a “film strip” bar and buttons to add frames and play through frames. To create a frame, click the **Add Frame** button. To play your animation, click the **Play** button: 

➔ **Let's try it:** Draw an animation showing NaCl is placed in H₂O. Your animation should have at least 10 frames so it doesn't look too choppy. Also, use text to label the different parts of the animation.

When you're done., you can optionally export your animation to Quicktime if you like. To do this, select **Export Animation to Quicktime** from the **File** menu just below the film strip (below the drawing area).