



## ChemSense Animator Quick Start Guide

### Background

The ChemSense Animator is a simple drawing and animation tool that lets you create storyboard animations of chemical and nanoscopic processes. The canvas and drawing tools support the drawing of two-dimensional structural representations (see Figure 1). This introductory guide covers the features of the drawing and the animation tool.

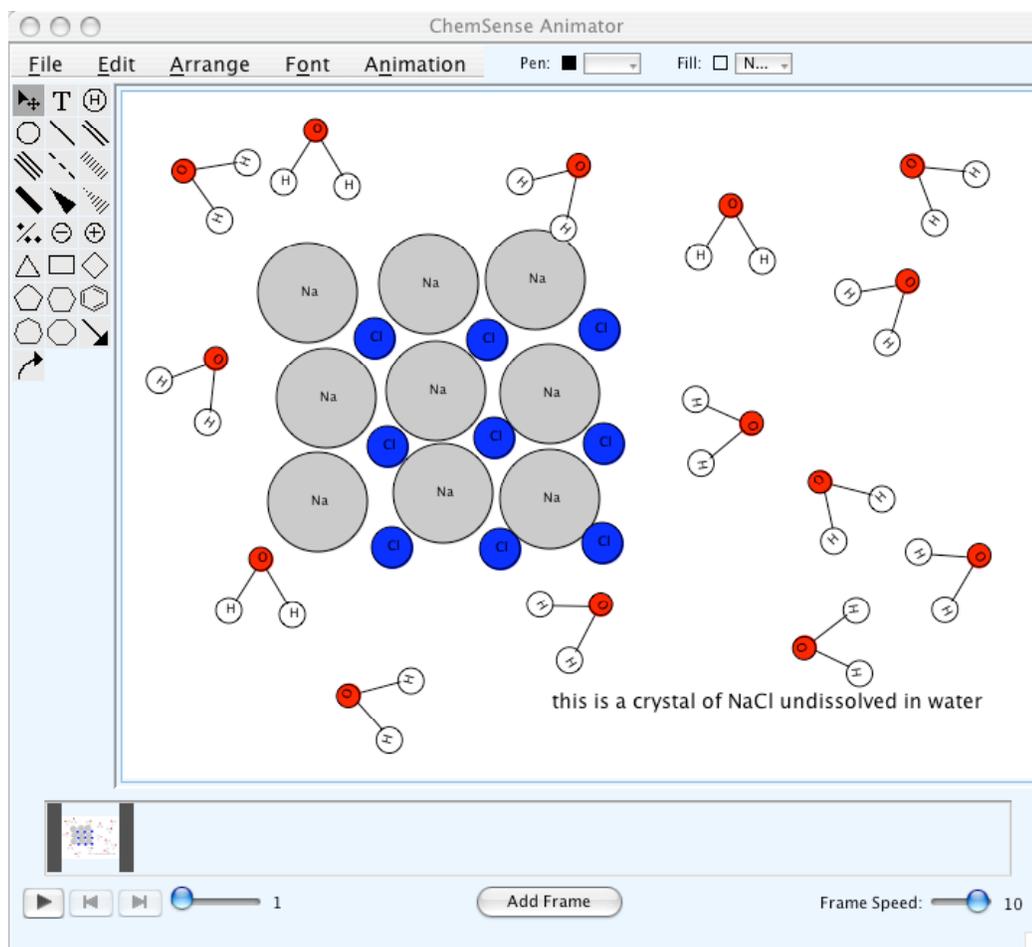
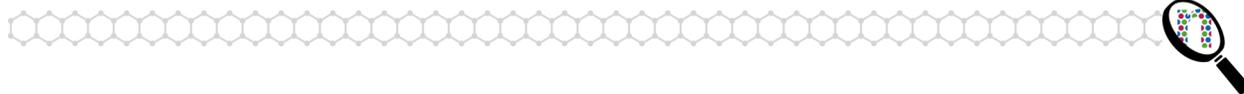


Figure 1. Creating a drawing of salt in water using the drawing canvas and tools.

### Drawing Features

The drawing area consists of a toolbar of shapes (left), an canvas drawing area (right), various color tools for the outline and fill color of shapes (top), and a menu with options for duplicating, moving, layering, grouping, and otherwise modifying selected shapes. Multiple levels of undo/redo are also supported. ChemSense drawings are saved as XML to your local computer, and can also be exported as a JPEG or PNG image for the Web. Animations that you create from a series of drawings can be saved as Quicktime or as an animated GIF, as described below. But first, let's walk through a quick tutorial.



## Hands-On Tutorial

Launch the ChemSense Animator. A drawing tool similar to the one in Figure 1 will appear. Let's start by drawing water. The first tool that you'll 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. For example, you can use the single-bond tool  to draw the bond between any two elements that will "snap" into place to connect them. 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 duplicate it. This is much faster than drawing it over again by hand. To group a molecule, select the entire molecule and select **Arrange / Group**. Once an item is grouped, duplicate it by selecting it and choosing **Edit / Duplicate** (keyboard shortcut: Control-D)

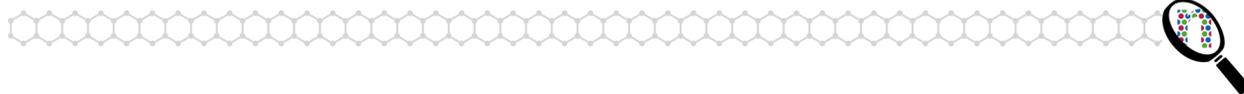
Notice that there are keyboard shortcuts for these and most other menu commands. You may want to use them!

- **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!

Next, let's write the chemical formula for water using the text tool:  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: H2O the 2 will be subscripted, as: H<sub>2</sub>O

- **Let's try it:** Click on the text tool, type in the chemical formula for water, then click on the drawing area below the molecule and the formula will appear.

That's all for now. We'll come back to this drawing a bit later, and make an animation out of it, so save your work.



## Drawing Features - Summary

A list of drawing goals and how to accomplish them are described in the table below. After that, the animator features are described.

Goal	Action
Draw a shape	Select a tool and click on the canvas to "stamp" the shape. Some tools, like the bond/line tool and arrow tool, can be dragged before you release the mouse (e.g., to draw a line in the desired direction).
Select a shape or multiple shapes	Click on the selection tool  and then click on a shape. When a shape is selected, a rectangular border around it indicates the selection. Use shift-click to select multiple shapes at a time.
Move a shape	Click on it and drag it to a new position. To just nudge it a little in one direction, select it and press the arrow keys, or select <b>Nudge</b> from the <b>Arrange</b> menu.
Move a shape to a different layer	Select the shape and use the move layer options in the <b>Arrange</b> menu to bring it forward or move it behind another shape.
Resize a shape	Select the shape, look for a tiny white square that appears in the lower-right corner, and drag this corner to a new position.
Rotate a shape	Select the shape, look for a tiny yellow circle that appears in the upper-right corner, and drag this circle to a new position.
Change the color of a shape	For outline color, select the <b>Pen</b> button, select the shape, and click on a new color in the color bar. For fill color, select <b>Fill</b> instead of <b>Pen</b> , and repeat these steps.
Duplicate a shape	Select the shape and choose <b>Duplicate</b> from the <b>Edit</b> menu. Note that many menu item options have keyboard shortcuts, as specified on the menu item.
Group a number of shapes	Select multiple shapes using Shift-Click and then choose <b>Group</b> from the <b>Arrange</b> menu.

## The Text Tool

The Text tool  deserves some special mention. It accepts and displays multiple lines of text. It also uses a few simple rules to parse the text that you enter to display any subscripts and superscripts on chemical formulas. For example, if you type:

NH<sub>4</sub> + Cl<sup>-</sup>

in the text edit window and then click on the canvas, the following will be displayed:

NH<sub>4</sub> + Cl<sup>-</sup>



That is, the 4 will be subscripted and the '-' will be superscripted. Note that you must type a space before and after the '+' if you *do not* want it to be interpreted as a superscript. A plus ('+') or minus ('-') immediately following a letter or number (no space) will be automatically superscripted, and a number immediately following a letter (no space) will automatically be subscripted. Anything following a space or equals sign ('=') is always displayed in normal type, neither subscripted nor superscripted.

If you want to force a word to be superscripted, type a '^' character before it; if you want to force it to be subscripted, type a '|' character before it. For example, if you enter:

This should be ^superscripted

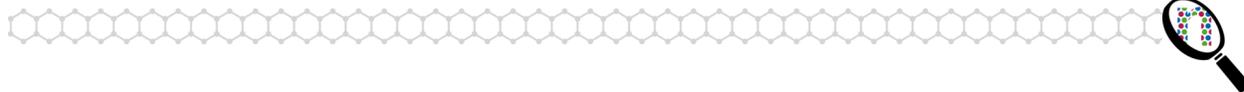
This should be |subscripted

Then when you click on the canvas you will see:

This should be <sup>superscripted</sup>

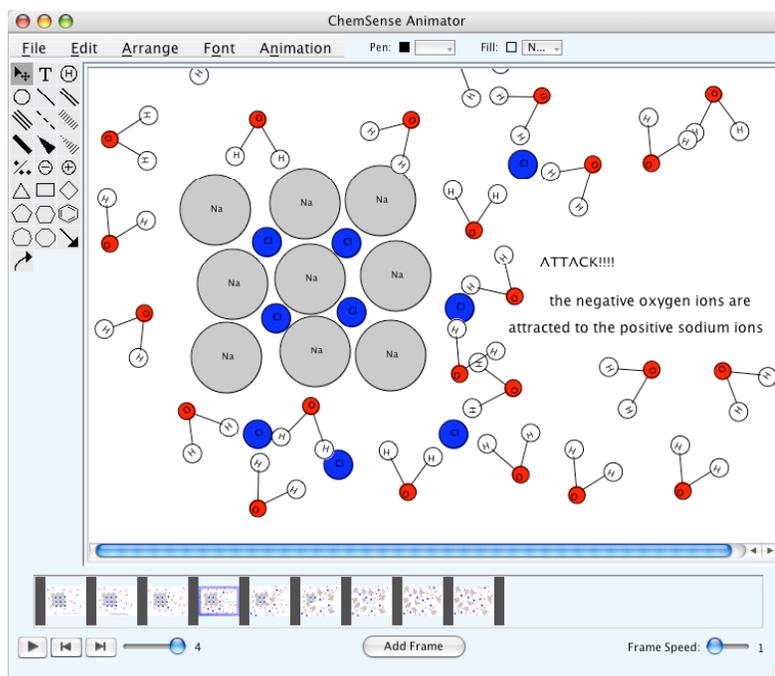
This should be <sub>subscripted</sub>

Finally, to edit existing text, just double-click on the text and enter your changes in the dialog that appears. To later change the font size, style, or family, select the text shape and use the **Font** menu to choose new values.



## Animation Features

With the Animator you can create multiple frames of a drawing to build a storyboard animation (see Figure 2).



*Figure 2. Animating the process of salt as it dissolves in water by using the animation and draw features to create multiple frames.*

The animation window has two main parts:

1. The top part of the Animator window contains a drawing area where you can draw and edit individual frames.
2. The bottom part of the window contains the animator controls. The controls consists of a filmstrip to interact with the frames, sliders and buttons (immediately below the filmstrip) to step through, play, and add frames, and a duration slider to specify the amount of time spent on the selected frame.

Animations are saved as XML and can be opened and saved via the **File** menu. To create a new animation, first make a drawing of the initial frame. To create a second frame, press the **Add Frame** button. This will copy the contents of the current frame into a new frame, which you can then edit to change. Continue in this fashion for each new frame you want to create.

## Hands-On Tutorial

Let's make an animation of water molecules wiggling. You should have a screen of several water molecules in front of you from the end of the last tutorial.



➤ **Let's try it:** Click on the **Add Frame** button. You'll now have a second frame of water molecules. Click on the selection tool, and then click on one of the water molecules and move it slightly to the left. Click on another water molecule and move it slightly to the right. Do this for as many molecules that you like. Press the **Play** button and the 2 frames will play in sequence. If you add more frames, the animation will be more interesting. Press the **Add Frame** button again, and move some molecules. Repeat as many times as you like, and then **Play** your animation.

## Animation Features - Summary

The Animator features illustrated above, as well as others, are summarized below.

Goal	Action
Scroll the film	Move the slider just below the film strip, or go forward and back one frame at a time using step forward  and step backward  buttons. Mouse over a frame on the film strip to see the frame number.
Edit an existing frame	Click on the frame in the film strip (scroll the film if necessary) and make your edits to that frame.
Delete a frame	Select the frame and choose <b>Delete Selected Frame</b> from the <b>Animation</b> menu. To delete all frames, choose <b>Delete All Frames</b> from the <b>Animation</b> menu.
Change frame duration/speed	Select the frame and adjust the <b>Frame Speed</b> bar (far right, below the film strip).
Play animation	press the play  button on the far left.
Loop animation	Select <b>Loop Animation</b> in the <b>Animation</b> menu and then play.
Export to Web format	Select <b>Export Animation to Animated GIF</b> <sup>1</sup> or <b>Export Animation to Quicktime</b> <sup>2</sup> .

<sup>1</sup> On Mac OS X, there appears to be an incompatibility in the current Java implementation (1.4.2) when producing an animated GIF, so Mac OS X users should use Quicktime export for the time being.

<sup>2</sup> On Microsoft Windows, you must first do a custom install of Quicktime be able to export animations to Quicktime. This custom installation is described in the README file that comes along with the installation. In brief, you have to install Java (if it's not already installed), download and launch the Quicktime installer, choose Custom for Installation type, and check Quicktime Essentials (1st item, should be selected by default), Quicktime Internet Extras (2nd item), and QuickTime for Java (2nd to last item; scroll down to it). If you are using Mac OS X, you don't need to do a custom installation; Quicktime and Java are already installed on Mac OS X, and will just work.