

STELLA™ Modeling Software

All of the uses of STELLA™ in CHM 102 and CHM 103 are for running simulations. We will not be writing or modifying any models.

You must have the STELLA™ run-time only version loaded on the computer. You can download this free from the High Performance Systems website at:

<http://www.hps-inc.com/STELLAdemo.htm>

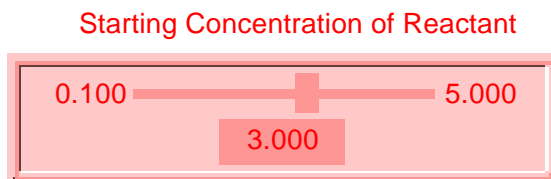
The college open computer labs (A-338 and L-112), math computer labs (M-3113 & M-3119), and science computer lab (CH-309) will have it installed. Look for this icon shown below:



On a college computer in a lab, click on the ACADEMIC APPLICATIONS folder, then the MATH folder and find STELLA™ and boot it up, close the new model screen (inner screen), and then go to file and then click on open and get to the A: drive and select the appropriate model.

If you have downloaded STELLA™ on your home computer and have loaded it on your hard-drive, to boot STELLA™ and a model up - go to the CHM 102 stuff folder on the floppy disk, and click on the model you want. This will open the model to the simulation page, which is where you want to be. (If this does not work, boot STELLA first, then close the new model screen (inner screen), and then go to file and then click on open and get to the A: drive and select the appropriate model. You will download version 7, which will run the models (version 5).

The simulations are displayed in a graphical fashion. Many graphs plot 2 or 3 variables or multiple runs of a single variable at a variety of levels and a color key is given across the top of the graph. Click on the “RUN” button for the program to run the simulation. There are a number of sliders to adjust variables. A slider is shown below:

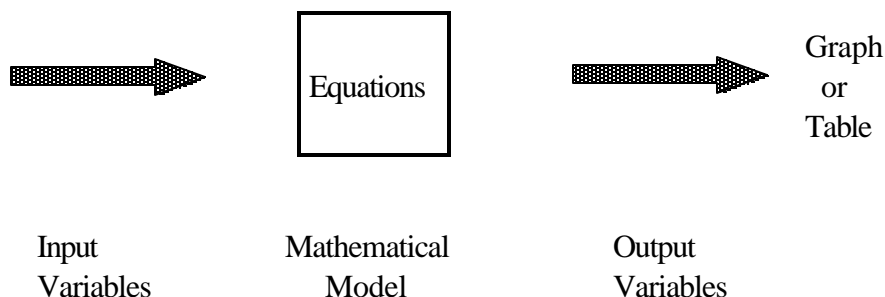


Read any instructions on the computer screen as many graphs are multilayered (flip through graphs on top of graphs). Change the graphs by clicking on the lower left-hand corner of the graph, where the page is turned up. The “CLEAR” button will erase the lines on a graph.

If by chance you mess up the model, close it and reopen, since on the run-time only version you cannot save any changes. To change from model to model, go to “File” and select close model and then repeat selecting open for the next model. You can only open one model at a time. If a printer is available, you can print graphs. However, it is not necessary, since the activities just require sketches of the graphs.

Using STELLA™ Model Simulations

STELLA™ Modeling software is a powerful tool for constructing mathematical models of physical/chemical systems. After constructing a model, simulations can be run by changing the input variables and following the response of a model on a graph or in a table of output variables or results.



Studying Graphs

We are going to take the graphical approach to studying variables. Here are some items we are going to investigate on graphs in a number of models in kinetics, equilibria, and radioactive decay:

- " independent versus dependent variables
- " direct versus indirect relationships
- " linear versus non-linear behavior
- " equation of a line - $y = mx + b$
- " slope (m) and its variation
- " y-intercepts (b)
- " transformation of variables such as log plots
- " translation of a curve/line

You may want to consult an algebra textbook to review some of these simple mathematical concepts.

Investigating Changing Variables

When we change a variable using a slider, we want to see how the graph responds. A good approach to this is to *change a variable from low to high at 3 or 4 different values*. Try to explore the total range of the variable. Then investigate another variable if required. Before starting another variable, set the previous variable at mid-range on the slider. Discover the trend in a variable and then move on to the next one. Many of the graphs will show multiple runs to allow easy comparison of changes. If a graph becomes too busy, press the clear button. Sketching and labeling graphs are highly recommended.