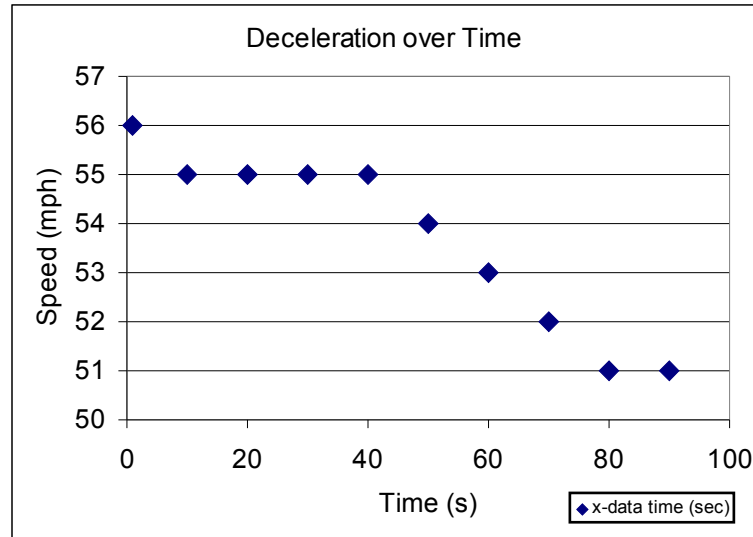


**Instructions for Using Microsoft Excel**  
**Graphing Datasets and Using Linear Regression**  
 Updated Fall 2007

1) Type in your data in a similar format to the following:

Pure Solvent		Solution 1	
y-data	x-data	y-data	x-data
Speed (mph)	time (sec)	Speed (mph)	time (sec)
56	1	56	1
55	10	55	10
55	20	54.5	20
55	30	54	30
55	40	53.5	40
54	50	53	50
53	60	53	60
52	70	52	70
51	80	51	80
51	90	51	90

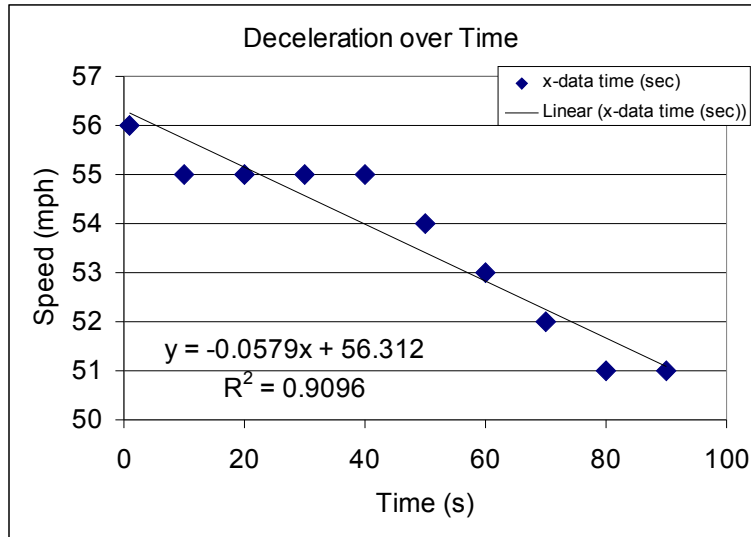
- 2) Make a scatter plot (graph) using the following steps...
- a) Select the graph button (top of the page on the toolbar next to the 100% button that changes the size of the page).
  - b) Make a scatter plot by selecting the “x, y scatter” item. (Over on the right side where it shows you the different types of scatter plots, the top plot with no lines should be selected.)
  - c) Click “next.”
  - d) Now select the “series” tab at the top of the page.
  - e) Select “add” to add a series (set of data) to your graph. (The screen will change to show a graph at the top and “name, x values, y values” on the right side.
  - f) To insert your x-data: Click on the red arrow next to “x values.” A small screen pops up. Take your mouse and select all of the x values (e.g. the numbers *only* in the time column). Now click on the red arrow again.
  - g) To insert your y-data: Click on the red arrow next to “y values.” A small screen pops up. Take your mouse and select all of the y values (e.g. the numbers *only* in the speed column). Now click on the red arrow again.
  - h) Hit “next,” and the screen changes allowing you to type in a title for the graph as well as titles for the x- and y-axes. Select a descriptive titles for your graph as well as names and appropriate units for the x- and y-axes. The units should be placed in parentheses.)
  - i) After typing in the title and axes labels, select “Finish.” Your graph will appear on the screen. (You can edit your graph by going back through the same process and selecting only the items you wish to edit.) (See Figure 1 below.)
  - j) If you want to change any features of your graph, you can click on that feature (e.g. the size or color of the dot markers) and then right click. A window should pop up that allows some changes to be made. The help file can also be helpful.



**Figure 1:** Example of Excel graph with the above data

- 3) Add a trendline to your data using the following steps...
  - a) Click on one of the markers in your graph.
  - b) Right click. In the window that pops up, select “Add trendline.”
  - c) The next window that pops up contains several types of trendlines. If the “linear” trendline is not already selected, select it.
  - d) Now click on the “options” tab on the top of the page. In the options, select “display equation on chart” and “display R-squared value on chart.”
  - e) Now select “ok.”
  - f) Your graph should now have a best-fit line that passes through the data markers. The line does not necessarily have to touch all or any of the markers. It’s the best line that passes through the data. (See the example of Figure 2 on the next page.)
  - g) You may click on the box that shows the equation and  $R^2$  value and drag the box to wherever on the graph you would like it.
  - h) The closer the  $R^2$  value is to 1, the better your data fits the straight line. For example, the graph in Figure 2 does not fit the data very well because  $R^2 = 0.9096$ . We can obviously tell that the middle of the graph has a straight plateau that prevents this data from having a good fit.) Data that has a curve on one end also will not have a good fit to a straight line. (This is not a hard and fast rule, but data that has  $R^2 \leq 0.97$  is usually not a good fit to a straight line.)

Continued on next page...



**Figure 2:** Example of Excel graph with a best-fit line through the data

#### 4) Importing Figures into Word...

##### a) In Excel...

- i) Click on the figure with the mouse.
- ii) Under Edit, select "copy".

##### b) In the Word document.

- i) Select the place to insert the figure.
- ii) Under Edit, select "paste special" and then select "Picture (Enhanced Metafile)".

If we paste directly without "paste special/Enhanced Metafile", the graph is linked to Excel. Any changes made in Excel will automatically be made in your Word document. The disadvantage to this automatic update feature is that it creates a very large Word document, and there is a higher probability that your computer will lock up or lose your document.