1403 Appendices: Excel

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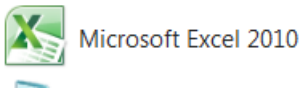
Note: online video tutorials are available at:
http://www.ualr.edu/rebelford/labs/excelvideo.htm

I. Three Ways to Open Excel

1. Right-click on Desk Top, Click New/Microsoft Excel Worksheet.
   Note this places a worksheet called "New Microsoft Excel Worksheet" on your desktop. You should now click on the name (not icon and change the name). Once this is done, double click on the worksheet.

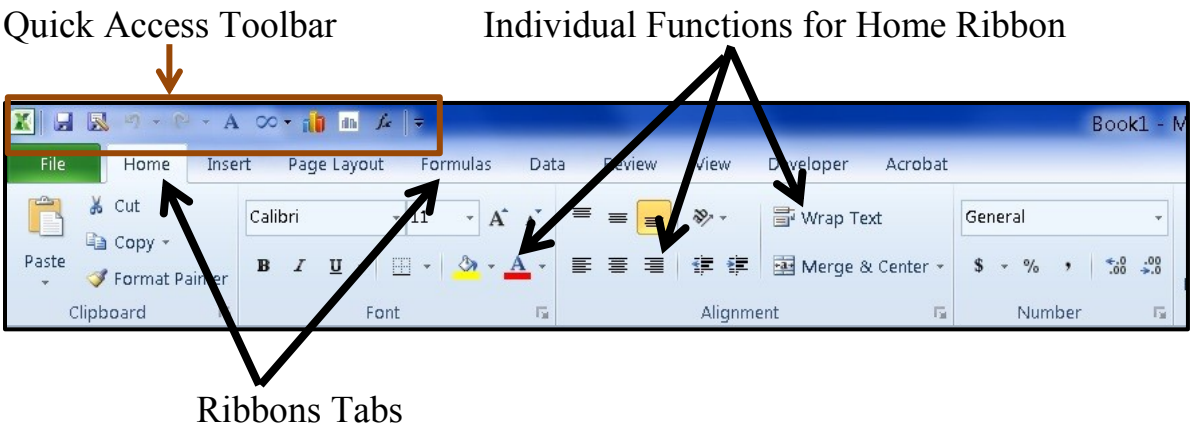
2. Double click either the Microsoft Excel icon on the desktop.

3. Click the start menu  at the bottom left corner.
   a. Click the Excel Icon if present 

   .
   b. Click /All Programs/Microsoft Office/Microsoft 2010 Excel 2010.

II. Using the Excel Ribbon

The ribbon in Excel consists of a series of tabs with buttons to allow the user to have additional abilities and functions with quick access while working with spreadsheets. Among using the tabs on the ribbon the user will be able to apply formatting options, page layout options and to specify data or graphing needs. This will be done by first selecting the appropriate ribbon tab for a desired action, followed by the button within the new tab to achieve a specific function.



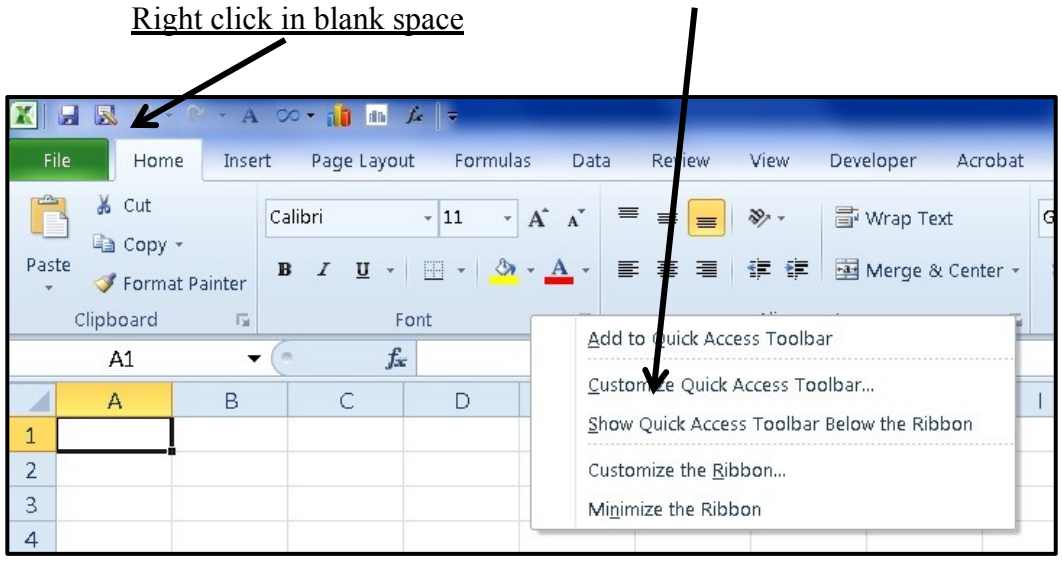
Some of the major functions of the Ribbon bar used in chemistry are:

- Home: Clipboard: Copy, Paste, Cut
  Font: Size, Effects, Color, Type, Fill\
  Alignment: Merge, Wrap, Indent\
- Insert: Tables, Pictures, Shapes, Illustrations, Charts, Text Boxes, Headers, Footers, Equations, Symbols
- Page Layout: Margins, Orientation, Page formatting
- Review: Spelling
- View: Zoom, Workbook Views

III. Setting up the Quick Access Toolbar

The Quick access toolbar allows for frequently used functions to be placed at the top of the Excel Ribbon. This makes these functions available no matter which ribbon tab the user is currently on. Follow these steps to customize the quick access toolbar.

1. Start by right clicking on the Quick Access tool bar. This will give you several options to choose from. Choose the option that says "Customize Quick Access



2. This will open a window allowing the user to add or remove buttons from the quick access toolbar. This is also the same window that controls many other settings, such as defining where to save a document and many of the general settings and behaviors used within excel.

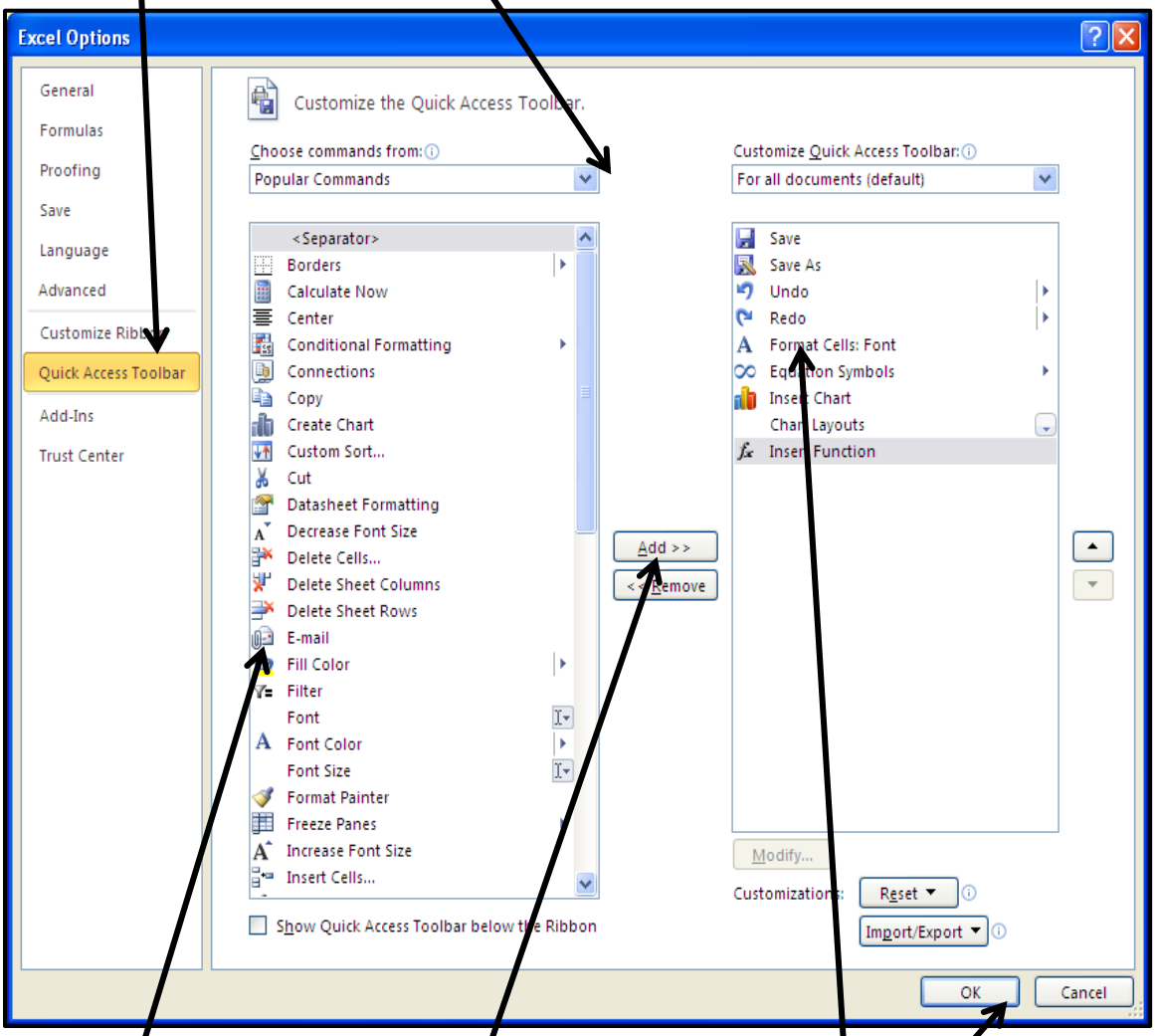
Notes:

1. A second technique to add a function icon to the quick access toolbar is to **right click on the icon in any Ribbon**, and choose the "Add to Quick Access Toolbar" option.
2. In the SCLB computer lab the quick access toolbar will be different for different user logins. So you should try and use the same computer each time, or customize multiple computers. But once you have customized it, other students will not change it when they are logged in.

Tip: familiarize yourself with the right click options and then add to the quick access toolbar those options which are not available through the right click.

3. Make sure that the tab for “Quick Access Toolbar” is selected.

4. Elect the dropdown box for “choose commands from” and select “All Commands” (the default is “Popular Commands”.



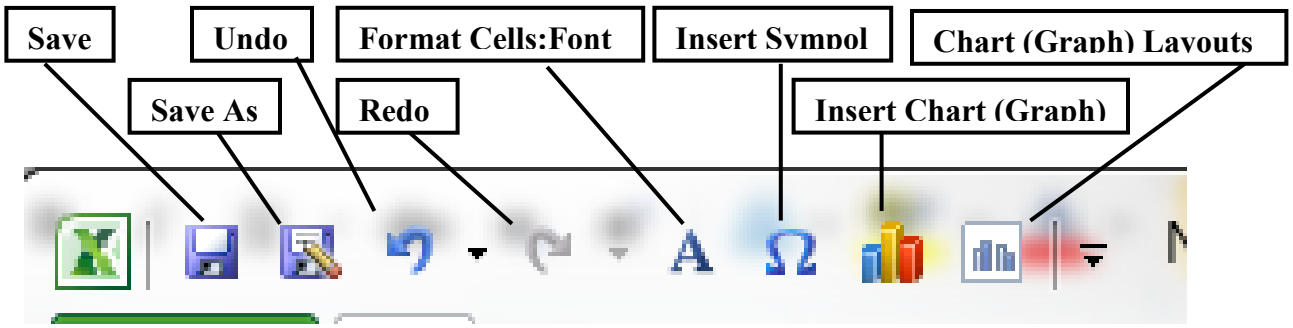
5. Click the needed tabs to highlight them and then click the add button to move the function into the current toolbar.

6. The new functions will be placed in the box above. Once all needed functions are added, click OK to return to the Excel Worksheet.

Recommended Functions to be added to the Quick Access Toolbar Include “Save”, “Save As”, “Undo”, “Redo”, “Format cells: Font”, “Equation Symbols”, “Insert Chart”, “Chart Layouts”, and “Insert Function”

IV. Using the Quick Access Toolbar Buttons

Quick Access Buttons



a) Save
b) Save As
c) Undo
d) Redo

a. Save (Ctrl + S)
Clicking the Save button will allow the user to save a copy of the excel worksheet if the file has already been previously saved. If the file has not been previously saved, the "save as" window will open asking for a location and name for the file to be saved. **YOU SHOULD SAVE YOUR WORK FREQUENTLY – every time you have done something that took time!**

b. Save As (F12)
Clicking this button will bring up the "Save As" window asking for a location and name to save the file regardless of whether the file has been previously saved. This is very useful when multiple revisions must be made. You can also save the file in different formats.

c. Undo (Ctrl + Z)
Clicking this button will take the spreadsheet back before the last command was made allowing unnecessary changes to be corrected. You can go back several steps. **This is very useful if you make a mistake**

d. Redo (Ctrl + Y)
This will undo and undo, (to add a command that was previously undone).

V. Format Cells

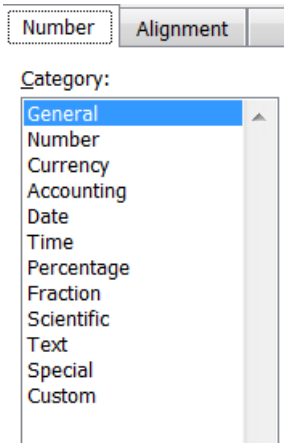
a. Quick Access Toolbar Format Cells: Font Functions Format Cells: Font

NOTE: RIGHT CLICK will often get you these functions

1. Number Tab
2. Alignment Tab
3. Font Tab
4. Border Tab
5. Fill Tab

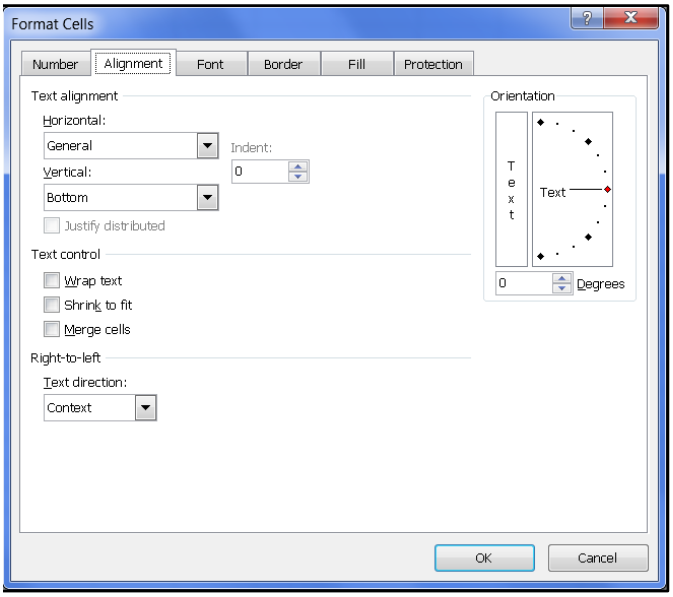
i. Number tab

Allows several categories or pre-defined formats to be selected for one or more cells. The most commonly used will be General, Number, Date, Percentage, Fraction and Scientific. After selecting the category, more options may appear to the right to further define the format of the cell. Select appropriate options followed by the OK button at the bottom right of the window to apply the new settings.



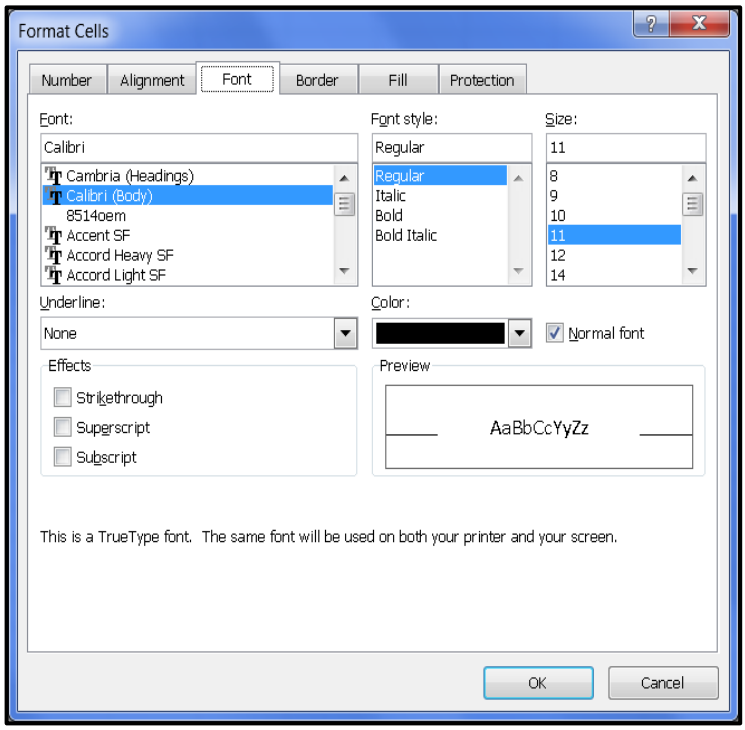
ii. Alignment tab

Will allow for horizontal and vertical alignment settings to be set for one or more cells using the drop down. The most important and useful options within this tab include the wrap text and merge cells. Use the wrap text to keep the width of a cell at a standard size and the cell will add depth to compensate for cropping characters. The Merge cell box will make multiple cells into one to make presentable tables.



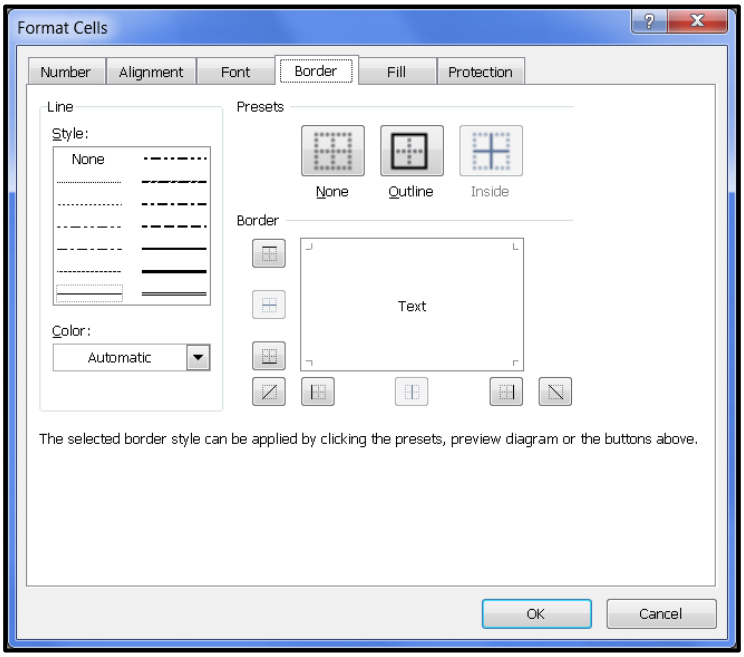
iii. Font tab

- chose font type (symbols have Greek prefixes)
- Italic/bold
- font size
- subscripts
- superscripts
- font color



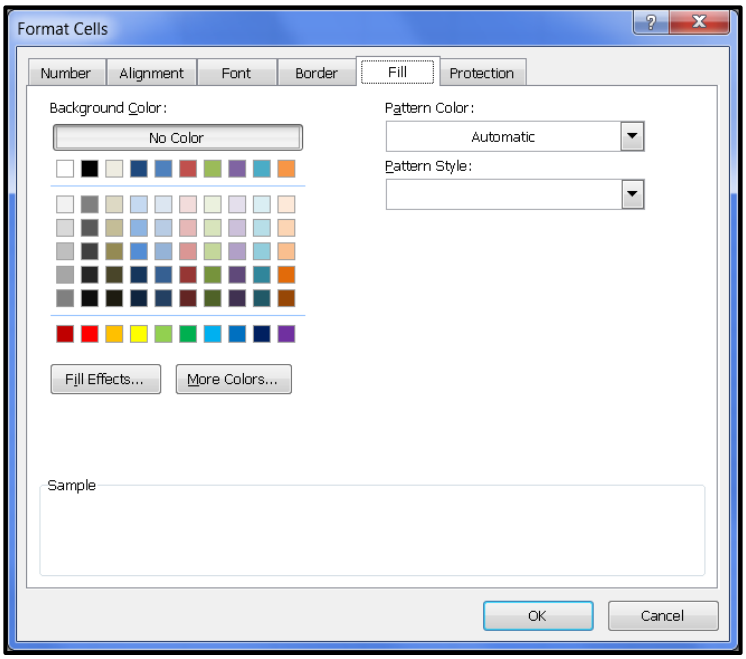
iv. Border tab

Select one or more cells in a worksheet and then access this dialog box. Apply a color and style for the border.
Data cells should have solid borders. This is done by clicking outline and inside



v. Fill Tab

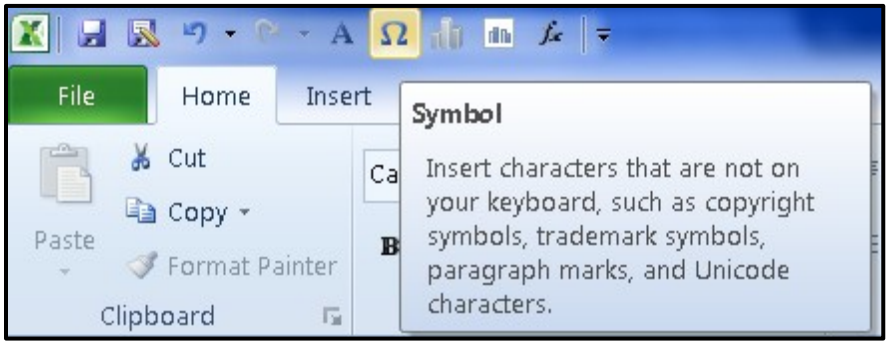
allows for the shading of cells. Select a single cell or multiple cells and open this dialog box. Then select a color and fill effects if needed. This is a very useful tool in helping to separate Column headings from the data underneath.



b. Insert Symbol

There are several convenient ways to insert Greek Symbols when working with Excel.

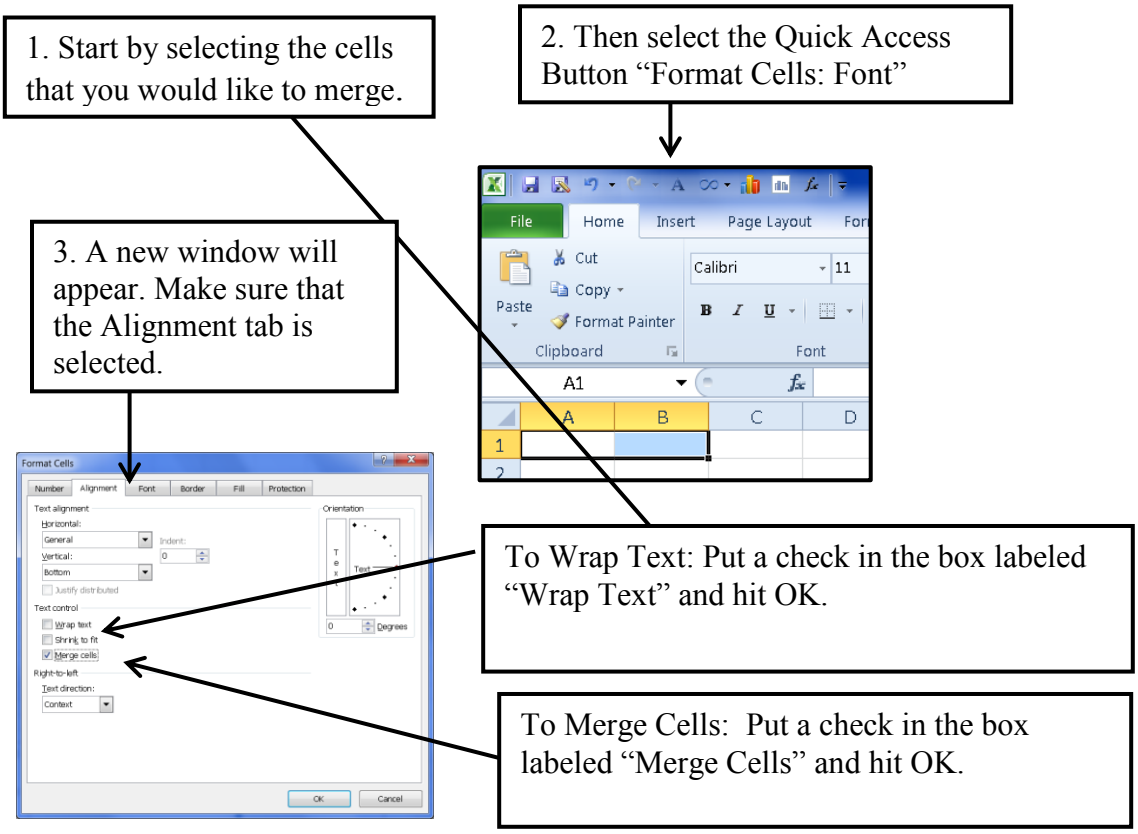
2. Click the Quick Access Toolbar button "Symbol". A new window will appear



c. Formatting a Spread Spreadsheet

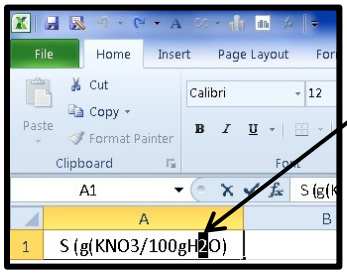
i. Merge Cells/Wrap Text
ii. Subscript/Superscript
iii. Font Size
iv. Bold/Italics/Underline
v. Font Style
vi. Greek Characters

i.) Merge Cells & Wrap Text

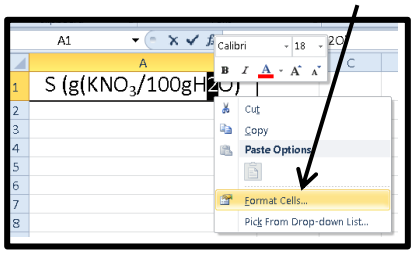


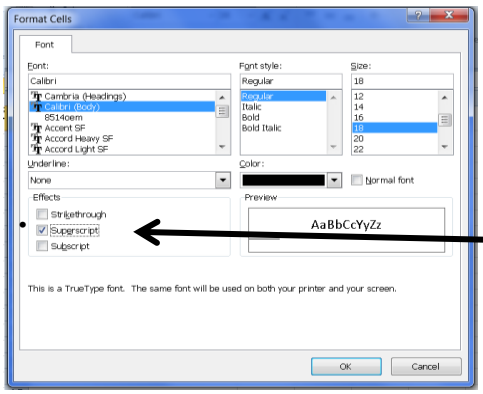
From the alignment option you can also control the location of the text within the cell.

ii.) Subscripts/Superscript using Right Click



1. Begin by highlighting text to be converted to a subscript/Superscript.
2. Once the text is highlighted, **right click** on the converted text and select format cells**.**



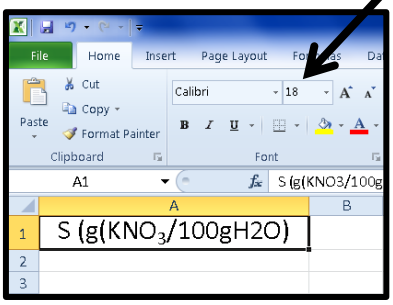


3. A new window will appear with text formatting options. Select either the checkbox for subscript or superscript. Select "OK"

iii.) Font/Size

Font size can be selected either before typing or after typing and normal font options are available in the Home Ribbon

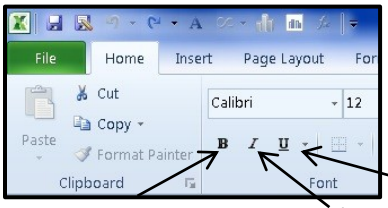
Select the drop down box for the font size selection after double clicking the cell to be formatted and select desired size.



If it is necessary to just increase or decrease font size without a particular value in mind, the text can be highlighted and font formatting buttons can be used to increase and decrease to the next available .

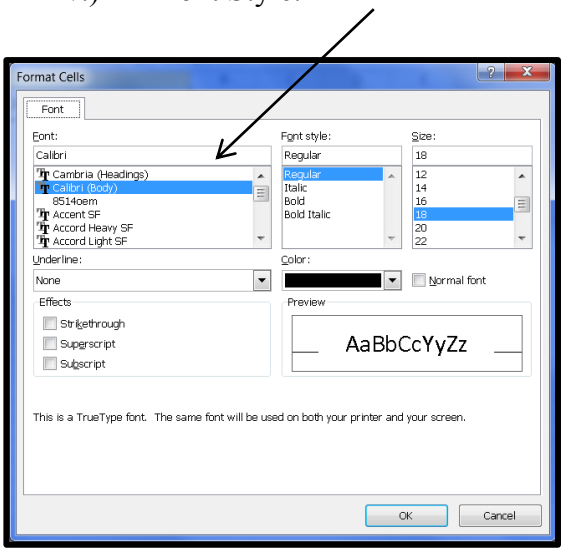
Another way to change font size is to double click within a cell and right click, selecting format cells. A new window will appear allowing for the selection of a font size.

iv.) Bold/*Italics*/Underline Font formatting



Bold *Italics* Underline

v.) Font Style:



The style of font may selected using the toolbar buttons above before typing or after typing by selecting relevant text, followed by the appropriate button.

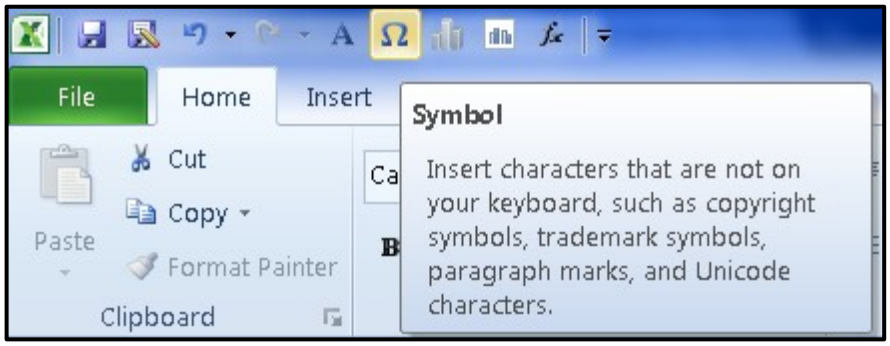
Text may also be highlighted, and then followed by a right click and selecting format cells. In the new window select the Font style needed and then OK.

vi.) Greek Symbols

There are several convenient ways to insert Greek Symbols when working with Excel.

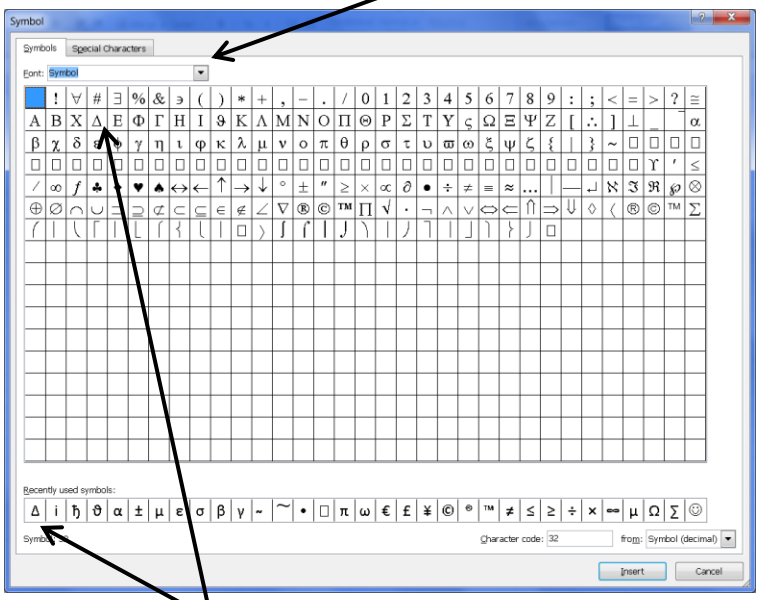
1. Start by clicking within a cell and setting the cursor where you want the Greek Symbol to be placed.

2. Click the Quick Access Toolbar button "Symbol". A new window will appear



This window has many options.

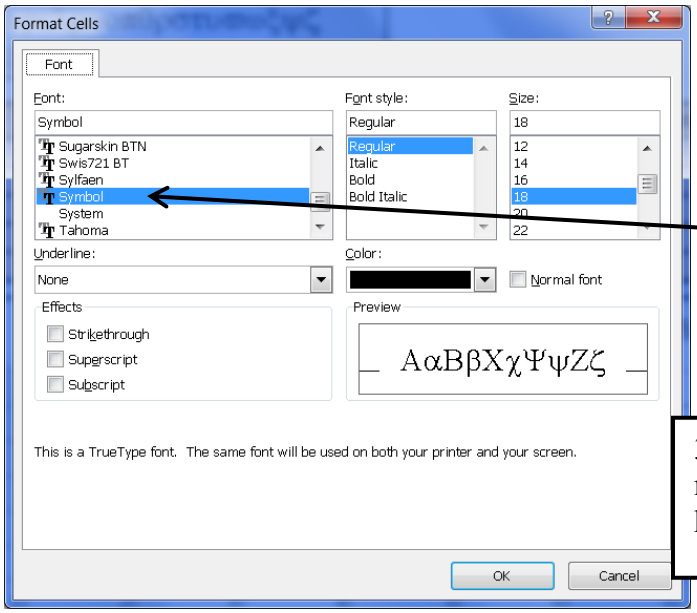
Select the font option Symbol



Select the symbol from the recently used symbols or the large grid above. To insert a symbol double click on the icon or click once to highlight and then click the insert button at the bottom right.

There is an alternate way to Insert Greek Symbols which is through the keyboard and may be more beneficial if several Greek symbols are needed within a cell.

1. Start by placing the cursor within a cell or text box where the needed symbols will go. Then select the quick access toolbar button "Format Cells: Font" and choose symbol. This can also be accessed from the dropdown box on the "home" ribbon or through a right click.

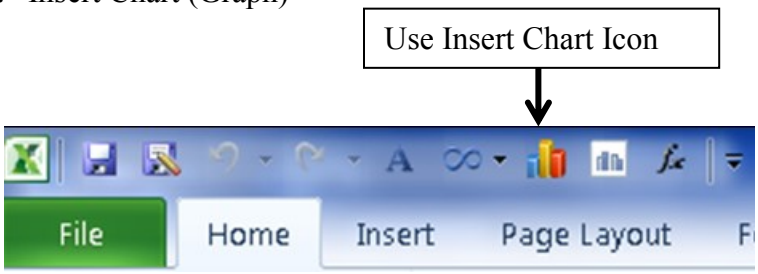


2. Select the Font "Symbol" and click Ok.

3. Now with the font specified you may type symbols through your keyboard.

VI. Creating a Graph from Data

a. Insert Chart (Graph)



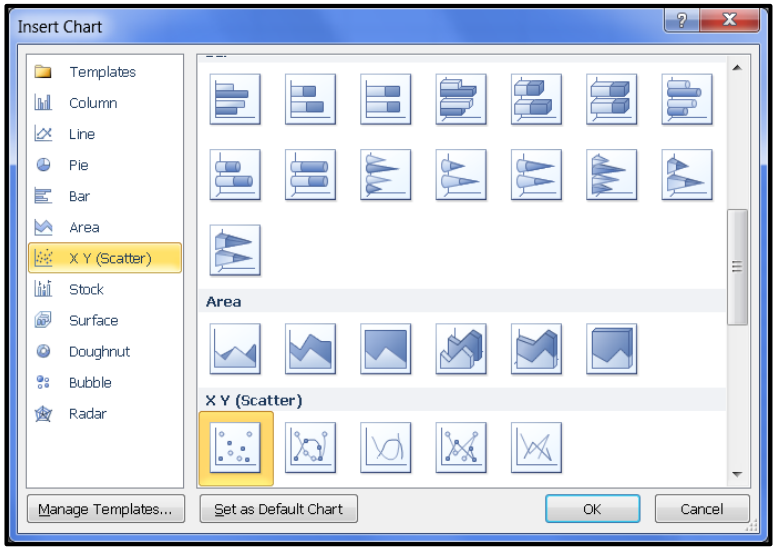
Step 1: Highlight data of two columns you wish to graph. The left column will be the x-axis and the right will be the y-axis.

If the columns are not near each other highlight the first, then while pressing the "ctrl" key, highlight the second.

1	-0.52227639
1.30103	-0.0707314
1.477121	0.193405487
1.60206	0.380813592
1.69897	0.526178612
1.778151	0.644950481
1.845098	0.745370665
1.90309	0.832358586
1.954243	0.909087369
2	0.977723605

Step 2: Click the Insert Chart Icon of the Quick Access Toolbar (above)

Step 3: Choose X,Y Scatter

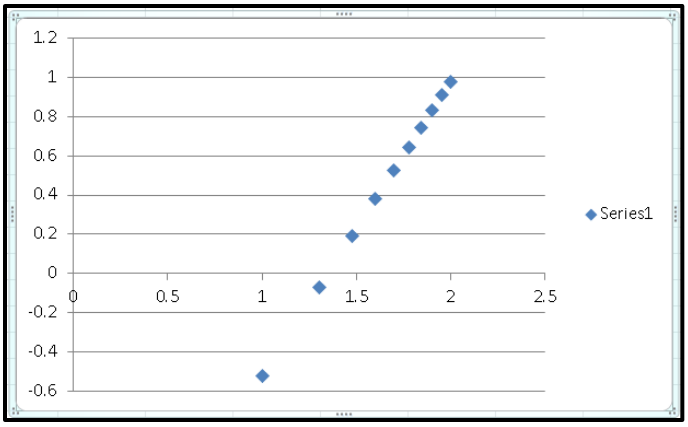


You have several options

- Scatter with only markers
- scatter with markers
- Scatter with smooth lines
- Scatter with straight lines and markers
- Scatter with straight lines

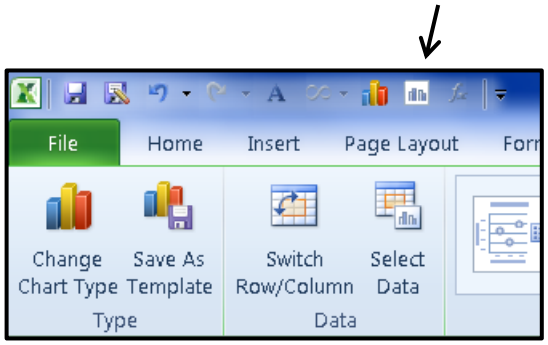
Chart will display as an object in spreadsheet. Move the graph to where it looks good.

Make sure the graph is not on a page edge when you print it

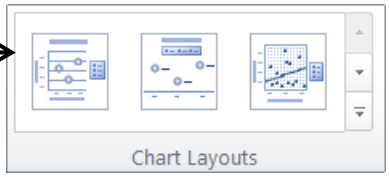


b. Create Graph Titles

The next step is to make titles. This is done with Use Chart Layout  icon.



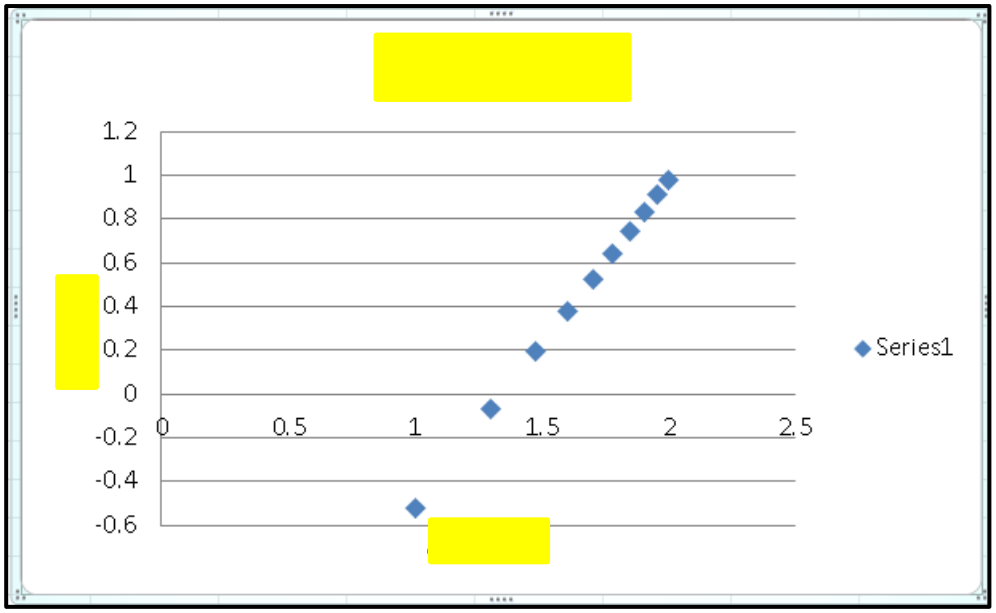
Use Layout 1 →



Type in titles.

Format titles as you would spreadsheets.

Remember, right click often provides shortcuts for many useful functions



Note: You can format the titles the same way you format text within a spreadsheet data cell. For example, to make a subscript in H_2O, highlight the "2", right click and choose font, and click subscript.

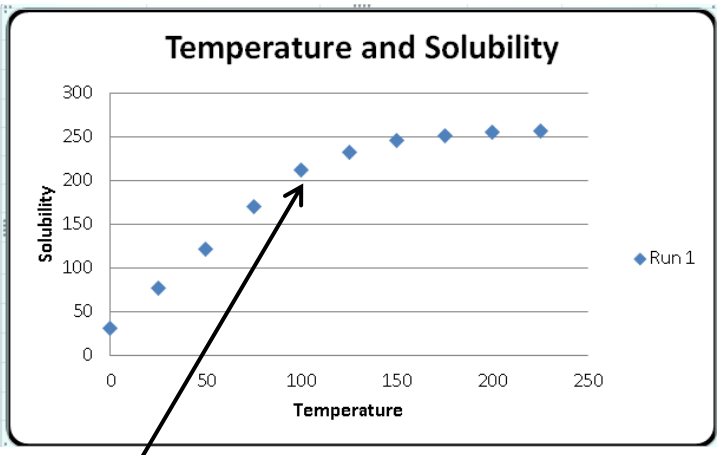
VII. Adding Mathematical Fits to Graphs

You will be doing linear, power and exponential fits to your data by adding a trendline, and then showing he equation on your graph.

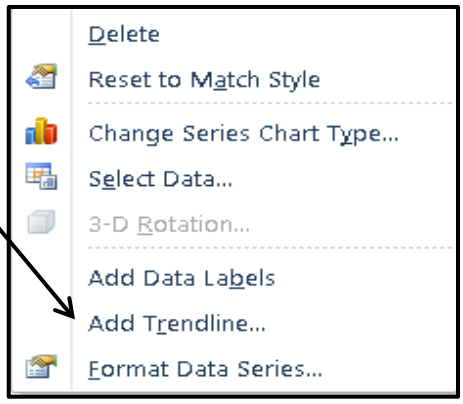
i. Adding a Trendline

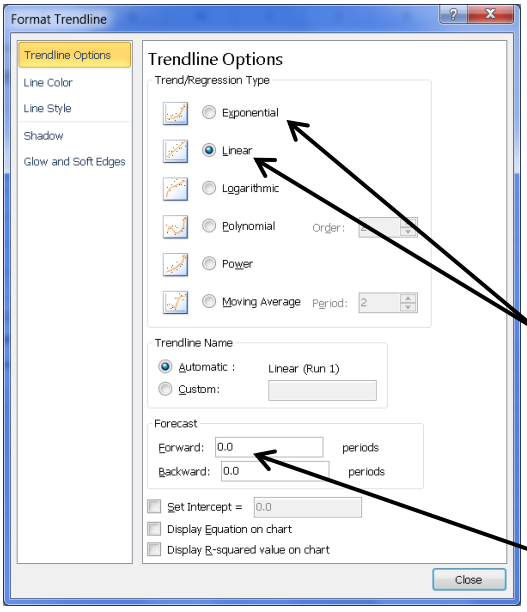
- To add a trendline, make sure that the graph is complete and all of the needed data has been plotted. A completed graph is shown below using the X-Y scatter design with an option to not connect the points with a line.

Run 1	
Temperature	Solubility
0	32
25	77
50	122
75	170.6
100	212
125	232
150	246
175	251
200	255
225	257



1. To add a trend line, begin by right clicking on a data point. There should be an option that says "Add Trendline" as shown in the figure to the right. Select this option and a new window with many options will appear.

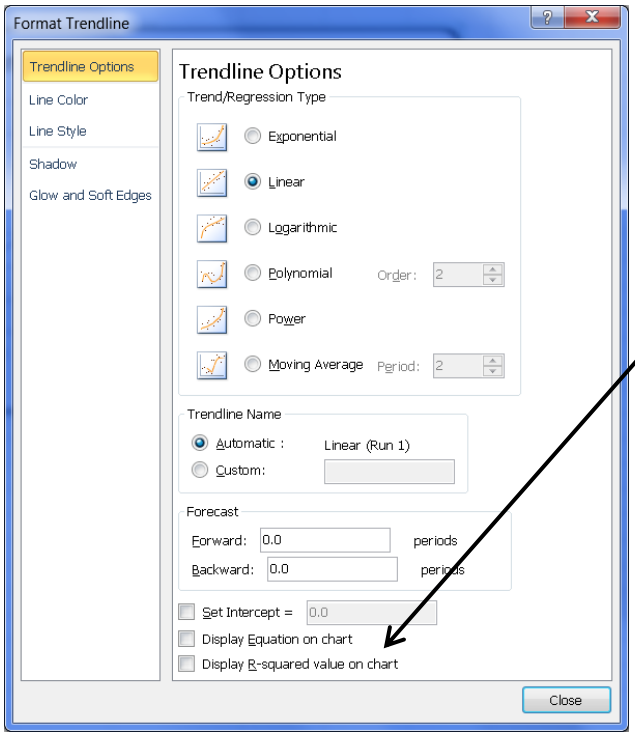




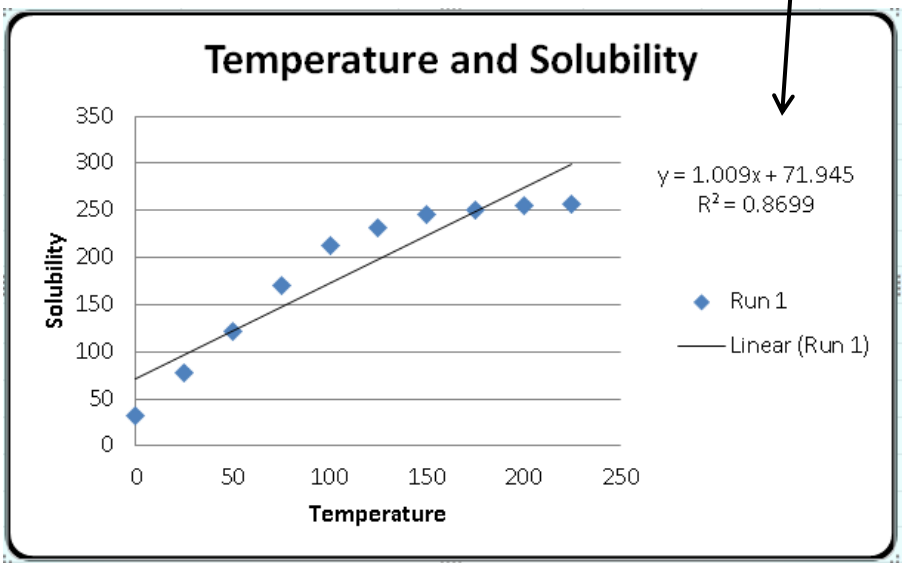
2. The new window will usually select "Linear" regression type by default as the window opens. Any changes made on this window will automatically apply to the graph in real time without having to close the window. The most commonly used will be "Linear", "Exponential", and "Power". Note, a power function must go through origin (0,0) and do not try and plot data where either x or y is not equal to zero when the other is.

ii. Show Trendline Equation

- Usually when adding a trendline, you will want to select two options to go with the Trendline being added.

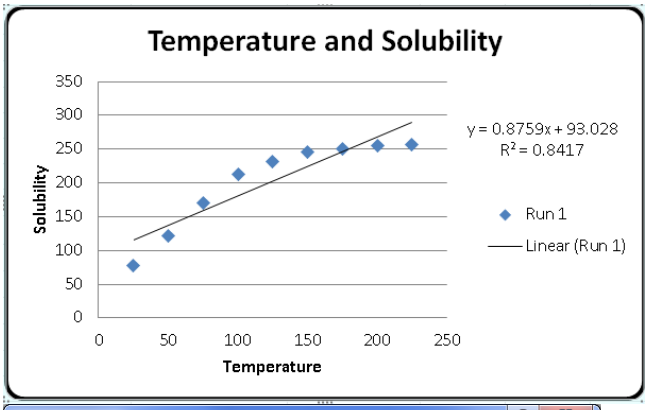


1. When the window opens while adding a "Trendline", there will be several options. At the bottom of the window, there will be several check boxes. For most Trendlines used this semester, you will want to show the equation and the R-squared value. To do this select, both check boxes. The graph below shows these options when selected.

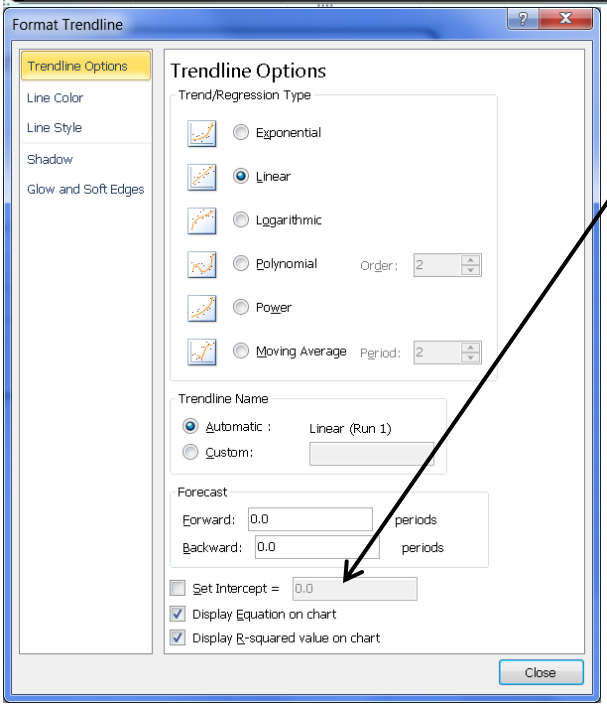


iii. Force Trendline Through Origin

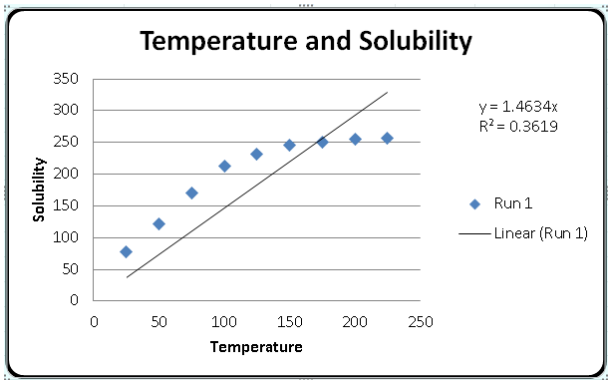
- Sometimes you will want to force the trendline through the origins.



1. To make the Trendline go through the origin, right click on the Trendline and select "Format Trendline". A new window will open.



2. At the bottom of the window select the option "Set Intercept" and make sure the value is set to "0,0". This should stretch the Trendline through the origin as shown below.



- Note, for a linear fit y-mx+b the equation becomes y = mx when you force the line through the origin.

VIII. Mathematical Manipulation of Data

You will often have to perform mathematical operations on a column of data. Here we will look at two data columns from a series of experiments, one of mass, and one of volume. We will then calculate the density for each experiment

	A	B	C	D
1	Exp. #	M (g)	V (ml)	
2	1	0.984	1.045	
3	2	1.876	1.859	
4	3	5.473	4.503	
5	4	143.583	142.998	
6	5	23.879	24.125	
7	6	56.364	55.983	
8	7	4.934	5.035	
9	8	67.348	68.3627	
10	9	84.374	84.24	

Into column d we are are going to calculate the density from from the data in columns B and C.

- Into cell D2 we type the equation =()/()
- Place the curser between the first set of parenthesis (by left clicking) and then click onto cell B2 and press enter
- Repeat this for the second set of parenthesis, but click on cell C2 and press enter.
- Cell D2 should now have the equation =(B2)/(C2)

	A	B	C	D
1	Exp. #	M (g)	V (ml)	
2	1	0.984	1.045	=(B2)/(C2)
3	2	1.876	1.859	
4	3	5.473	4.503	
5	4	143.583	142.998	
6	5	23.879	24.125	
7	6	56.364	55.983	
8	7	4.934	5.035	
9	8	67.348	68.3627	
10	9	84.374	84.24	

- You will now see the number 0.941627
- Click on this cell and you will see a little square in the bottom right corner
- Place the curser on this cell and drag down
- This will repeast the operation for all the rows you drag over (rows 2-10 here)

	A	B	C	D
1	Exp. #	M (g)	V (ml)	
2	1	0.984	1.045	0.941627
3	2	1.876	1.859	

	A	B	C	D
1	Exp. #	M (g)	V (ml)	
2	1	0.984	1.045	0.941627
3	2	1.876	1.859	1.009145
4	3	5.473	4.503	1.215412
5	4	143.583	142.998	1.004091
6	5	23.879	24.125	0.989803
7	6	56.364	55.983	1.006806
8	7	4.934	5.035	0.97994
9	8	67.348	68.3627	0.985157
10	9	84.374	84.24	1.001591

Other operations you will use this semester are

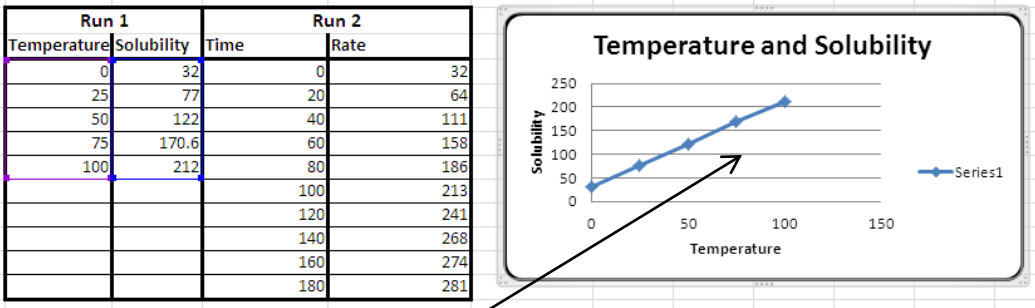
1. base 10 logs: =log(cell value)
2. Natural logs: =ln(cell value)
3. Reciprocal Values =1/(cell value)
4. multiplication (here by 2) =2*(cell value)
5. exponentiation (squared) =(cell value)^2

IX. Changing Data for a Graph

a. Change Graph Data
b. Switch Axis

Once you have created a spreadsheet you can use it as a template for future experiments. So for a future experiment, you can click on the graphs from experiment 1, save with a new file name, and then simply change the data associated with a graph. You now need to edit the spreadsheet and graphs to fit the new experiment, but this can save you a lot of time. We will now look at Changing data

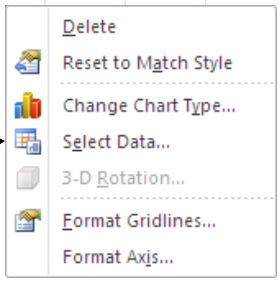
Figure VIII.1 Shows a plot of solubility as a function of temperature from the data in "run 1". We will now take new data from run 2 and make a plot of the rate as a function of time.



Run 1		Run 2	
Temperature	Solubility	Time	Rate
0	32	0	32
25	77	20	64
50	122	40	111
75	170.6	60	158
100	212	80	186
		100	213
		120	241
		140	268
		160	274
		180	281

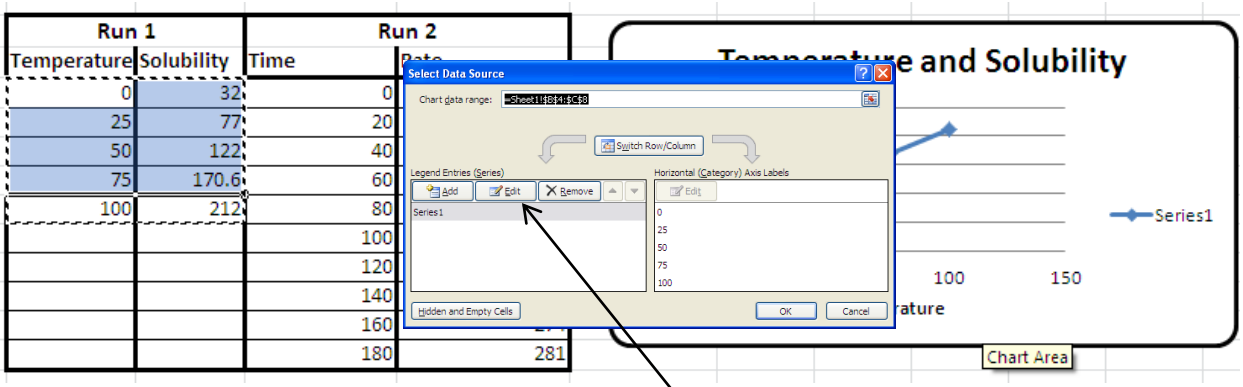
Fig VIII.1: Plot of run 1

1). Right Click in graph area and a pop-up box will appear



2). Click "Select Data"

A new option box will open (fig VIII.2). Note The data being plotted from Run 1 is outlined:



Run 1		Run 2	
Temperature	Solubility	Time	Rate
0	32	0	
25	77	20	
50	122	40	
75	170.6	60	
100	212	80	
		100	
		120	
		140	
		160	
		180	281

Fig VIII.2: Select Data Source box is activated.

3). Click Edit (if more than one series of data is plotted you need to choose which series you wish to edit). The Edit Series box appears (Fig VIII.3)

4). To change x-Axis data click grid box to left of Series X values

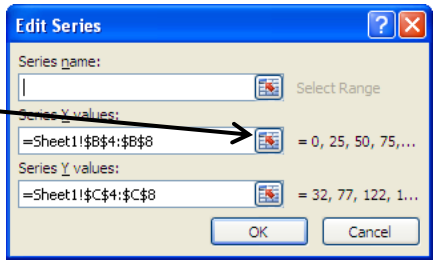


Fig VIII.3: Edit Series box .

The data that is originally plotted will now be outlined (Fig VIII.4)

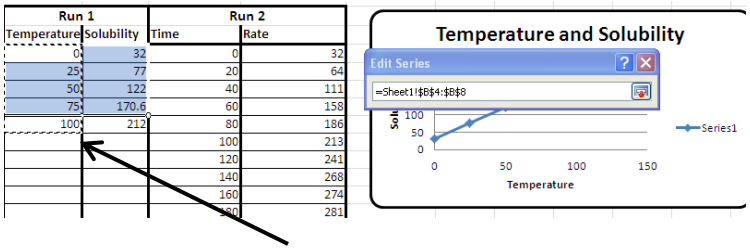


Fig VIII.4: After clicking grid box on x-axis you can See what was plotted by the double lines .

5). Highlight the new data you want to plot and click the grid box on the edit series pop-up window.

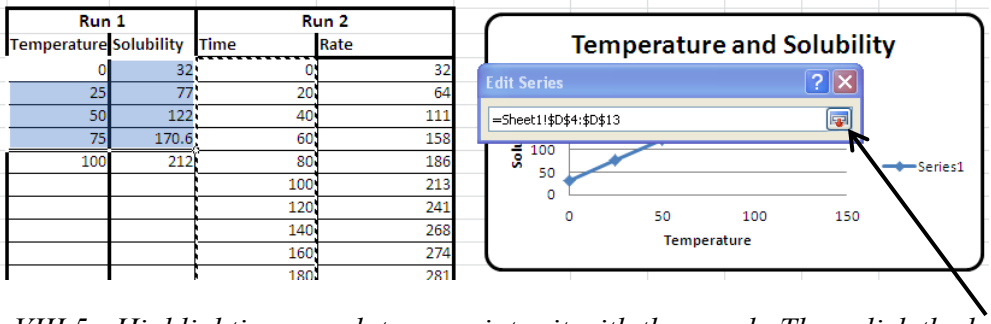


Fig VIII.5: Highlighting new data associates it with the graph. Then click the box

6). Repeat for the Y-axis, and click OK twice

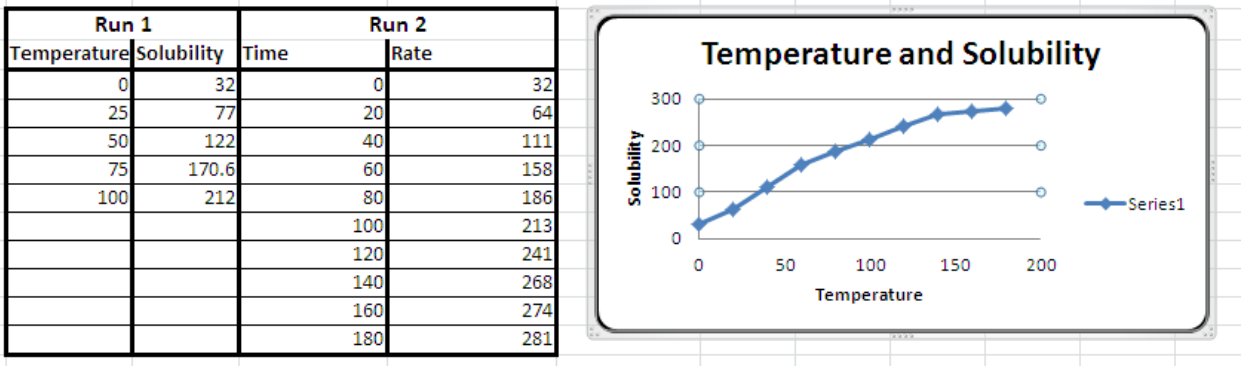


Fig VIII.6: New data being plotted in graph

Note the scales automatically adjusted. You now need to edit the titles and save the graph with a new name.

The same technique can be used to swap axis if you accidentally plotted the wrong columns.