Making a graph in Excel:

1. Highlight or select the block of data you wish to graph. Do not highlight text, just numbers. (Hint: if graphing data by month, it is often best to just select the data without selecting the months, even if you're using numbers for the months. Then, when in chart wizard – see below– you can specify the x-axis with either numbers or names of the months – step 6.)

2. Click on the **chart wizard** icon at the top right of the tool bar (next to the globe).
3. Select the type of graph you wish to make (e.g., bar, line, or XY scatter). You may click on the "Press and hold to view sample" bar to view your graph. If it is not to your liking, or seems completely wrong or unlike the data you selected, you can still change the layout in steps below. Click "next".
4. Step 2 of the chart wizard is called chart source data. To manipulate the legend headings, x-axis labels and to change the way your data is presented, click on the **series** tab.
5. "Series 1" is your first data line or bar. With "series 1" highlighted, you can name it under "Name:" (this is the name that will appear in the legend). If the program has given you a graph that does not look right, or uses the wrong set of data, you can select the exact data to use by putting the cursor in the "Values:" box. First delete the existing data, then set your cursor in the blank box. Then, select the data set from the appropriate worksheet column or row. You can then select "series 2" from the "Series" box, name it, and select the appropriate values. (NOTE: it is not always necessary to change the values. However, when using large data sets, especially when there are more rows than columns, the computer will alter the way in which it presents the data.)
6. While still on step 2 of the chart wizard, on the series tab, you can label your x-axis, or give it values. You can do this by placing your cursor in the "Category (X) axis labels:" box and then selecting the appropriate labels (whether numbers or text) from the worksheet. You can also type in your x-axis labels, separating each entry with a comma.
7. When you are finished, hit "next" and continue to the 3rd step of chart wizard. Here you can title your graph, title your axes, and if so desired, get rid of the grid lines. "Chart title:" is the title of the graph, and will appear at the top of the graph. "Category (X) axis:" is the x-axis label. "Value (Y) axis:" is the y-axis label. In each appropriate box, you can type in the desired label.
8. While still on the 3rd step, you can get rid of the gridlines on the graph by clicking on the **gridlines** tab. Under "Value (Y) axis", click on the "Major gridlines" box, which will uncheck the box and get rid of the gridlines.
9. Click on "next" and select "As new sheet" if desired. Then click "finish".

Tips for altering graph appearance and adding error bars:

10. To clear the grey area behind the chart, you can simply double click on the grey area, giving you a "Format plot area" box. Here you can click on "None" under "Border" and "None" under "Area". This will give you a clean graph without a border or fill around the plot area. Then click "OK".

11. By clicking once on the legend and keeping the right mouse button depressed, you can move the legend to wherever on the graph you prefer. By double clicking on the legend you can alter the font size (click the **Font** tab and under "Size:" choose the preferred font) and the presence of a border (under the **Patterns** tab, click "none" under "Border").

12. To alter the thickness of the axes and the font size of the axes labels, double click on the axis (Value axis = Y and Category axis = X). Under the **Patterns** tab, you can change the "Weight" of the axis, which is the thickness of the line. Here you can also alter the presence of tick marks. Under the **Font** tab, you can select the size of the font, and change the font style from regular to bold, or whatever is desired. You can also change the scale represented on the axes by clicking on the **Scale** tab (mostly used on the y-axis). Here you can also select "Values in reverse order" (again on the y-axis) when creating graphs for groundwater data.

13. Double clicking on the category labels will allow you to alter their font size.

14. To change the size of a symbol or line (line graphs), double click on the line or symbol. (If not all symbols are highlighted, redo, or only the one symbol will be altered). Under the **Patterns** tab, under "Line", you can change the "Weight:" of the line, the "Color:", and the "Style:". Also under the Patterns tab, under "Marker" you can change the color of the symbol (using "Foreground:" and "Background:"). Here is also where you can change the size of the symbol by clicking up or down under "Size:".

15. To add error bars, click on the **Y Error Bars** tab (still under the "Format data series" from double clicking on the line or symbol of data). Under "Display" click on either "Both" or "Plus" or "Minus" as desired. Then, under "Error amount" click on "Custom:" (If using only "plus" or "minus", then click on the appropriate box "+" or "-". If using "Both" then you will have to do first the "+" box, then go back and repeat for the "-".) Put the cursor in the appropriate box (e.g., "+") and then click on the worksheet with the standard error values (should be on the same sheet as the initial data). Highlight/select the data, and it will appear in the "+" box. Then click "OK" and start again by double clicking on the symbol or line to add the "-" standard errors.

To plot data series along a secondary value axis in a 2-D chart

Click the data series you want to plot along a secondary value axis.

On the FORMAT menu, click SELECTED DATA SERIES, and then click the AXIS tab.

Click SECONDARY AXIS.

To create a superscript in a chart label

Highlight the text, right click, select format axis title, and check superscript.

<u>To create a trendline on an excel graph.</u>

On the graph (XY scatter is the chart type), select the dataset (series) for which you want a trendline.

Then click on Chart, and Add Trendline. You can choose Linear (or other, depending on the data type) and double check that you have the correct data series selected. Then click on Options where you can select "Display R-squared value on chart". This will give you the correlation between the x & y axes, but not a P value, which would give you significance. Don't worry about the P value. Just treat the R^2 value as your percent correlation. Note that excel will not give you a negative value, so if the relationship is negative, you have to insert the - sign.

If you get an R^2 of .98, then this means the y series is 98% correlated with the x series. (Correlation is not causation, however.)