## Excel Primer
CH141 – Fall, 2018

To Start Excel : Click on the Excel icon found in the lower menu dock. Once **Excel Workbook Gallery** opens double click on **Excel Workbook.** A blank workbook page should appear containing a grid of cells with letters labeling columns and numbers labeling rows.

To Enter Numbers and/or text: Click in the cell that you wish to type in. Enter numbers or text headings as desired. You can type in the formula bar or you can type directly into the target cell. To enter your new information, click on the green √ or press the **return** key. If you change your mind and you want to leave the contents of the cell unchanged after you have started typing, just click on the red **X** or hit the **delete** key. This will cause the new text to be discarded.

Formatting of cells can be accomplished by highlighting the desired cells then select the desired formatting option. This option can be selected on the toolbar (for example, **B** stands for bold, click on it to choose it) or by pulling down the **Format** menu and choosing **Cells…**. In particular, you can change the number of significant figures displayed. For example, type the value 3.14159265 for pi. Highlight this cell then pull down the **Format** menu and choose **Cells…**. click on the **Number** tab and choose "Number" as the Category. Change the number of decimal places to the desired number as illustrated below.
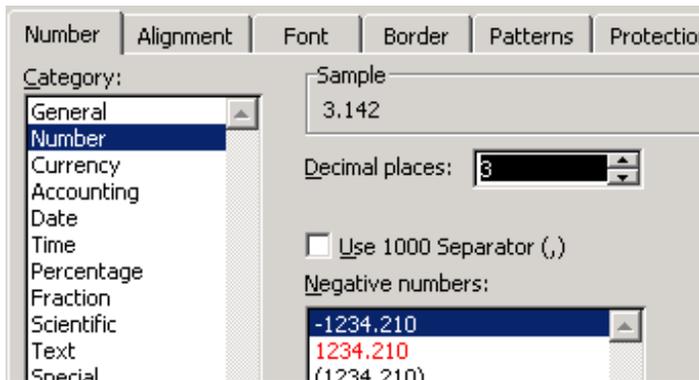
You can also choose "Scientific" as the category to convert numbers into scientific notation.

The number of decimal places may be also adjusted with the buttons in the toolbar.

To Enter Formulas in Excel: You will want to be able to see the formula bar, so begin by clicking on **View** at the top menu bar, then scroll the mouse to **Formula Bar.** If a check mark appear by "Formula Bar" the window should appear for displaying the formula of any highlighted cell. If "Formula Bar" is not checked, click once to reveal the formula bar.

To have Excel do a calculation for you in a specific cell begin by clicking on the empty cell, then type the formula into the cell. This is where the answer will automatically be presented. Every formula begins with an equal (=) sign. Division is denoted by a back slash "/" and multiplication is denoted by "*" when writing formulas in Excel.

Example 1) to add the number in cell B1 to the number in cell E7 and have this sum appear in cell G22, type "=**B1+E7**" in cell G22, then press the **Enter** key.

Example 2) to multiply the number in A5 by that in B5 and subtract 10, and have the value appear in C5, type "= **((A5*B5) –10)**"in cell C5, and then press the **Return** key

Example 3) to calculate the average, median, and standard deviation for the numbers in cells D3 to D22 type =AVERAGE(D3:D22), =MEDIAN(D3:D22), and =STDEV(D3:D22), respectively in the cells you wish these values to appear followed by pressing the **Return** key. Note that the colon specifies a range of cells.

Another way to implement these and many other functions is to use the *fx* icon in the formula bar. Click on the cell in which you want the final answer to appear. Now click the *fx* icon. Select the function desired such as AVERAGE for average by double clicking in the Formula Builder window. The prompt will ask you for what range of cells do you want the average. You have two options at this point; option one is to reply to the prompt by entering the beginning and end of the range (for example C2:C55), option two is to highlight the cells desired to be included using the mouse (then hit the **Return** key). This is a time saver when you have a lot of data to manipulate.

Repeating Calculations: Filling cells down or across: Now we get to the real power of spreadsheet applications. As an example let's make an interest table for a bank. Assume the interest rate is 5.4% and we want to calculate the yearly interest for a range of deposits. If the first deposit is in cell C3, the interest can be calculated by the formula =5.4*C3/100:

deposit	interest
2000	=5.4*C3/100

We can now easily repeat this calculation with automatic row filling. So start by entering new values for the deposit in successive rows, then highlight the formula cell you entered above:

deposit	interest
2000	108
3000	
4000	
5000	

special fill handle

Click on the special fill handle and drag down to the row with your last deposit value. The calculation will now be automatically filled in for you:

deposit	interest
2000	108
3000	162
4000	216
5000	270

Notice the formulas that have be entered automatically for you:

deposit	interest
2000	=5.4*C3/100
3000	=5.4*C4/100
4000	=5.4*C5/100
5000	=5.4*C6/100

Excel will change the cell address to reflect the different deposit values for you automatically. This mode is called relative addressing. You can fill formulas down rows or across columns. This ability is a time saving advantage!

Relative verses Absolute Cell Addresses: Row filling is very handy, except there are times when you don't want Excel to automatically adjust the cell references in your formulas. The interest calculation above is a good example. Note that the interest rate was put directly into the formula. However, the interest rate at banks changes from day-to-day. It would be better to put the interest rate into a cell so that you can change just the one cell when the interest rate changes:

interest rate=	5.4	deposit	Interest
		2000	=B2*C3/100
		3000	
		4000	
		5000	

However, if you try to fill this formula down, for the next row, Excel will change the formula to =B3*C4/100. Try it. Of course the interest rate is still in cell B2. To tell Excel not to change the cell reference put $ signs in front of the column and row (as illustrated below) or alternatively type the "fixed" value into the formula:

interest rate=	5.4	deposit	Interest
		2000	=B2*C3/100
		3000	
		4000	
		5000	

Now drag the formula down the column to continue calculating the missing interest values .

Making a Graph: It is a quirk of Excel to read the first column of data as the X variable and the second adjacent column as the Y variable. This is something to keep in mind when you type in your data to be graphed (X on the left, Y on the right). The x and y values for a plot don't need to be in adjacent columns. Select just the x values first and then hold down the Control key and select the y values.

% Cu (g/g)	V (mL)	density (g/mL)
0	22.343	7.143
10	22.520725	7.320725
20	22.69845	7.49845
30	22.876175	7.676175

Hold down the Control key while selecting the y-column

This is something to keep in mind when you type in your data to be graphed (X on the left, Y on the right). Highlight the data you wish to plot then click on **Insert** (top menu bar) and scroll down to click on **Chart.** You can also just directly click on the green **Chart** tab. Choose the appropriate options in each window. PLEASE use the plot type called **Scatter** and choose **Marked Scatter** as the type. Try different options to see what they do to familiarize yourself with the different features. We will add a trendline later to approximate the data.

It is often necessary to adjust the scale of the axes. You should have the data fill the plot area. For example for the plot:

Double click on the axis scale
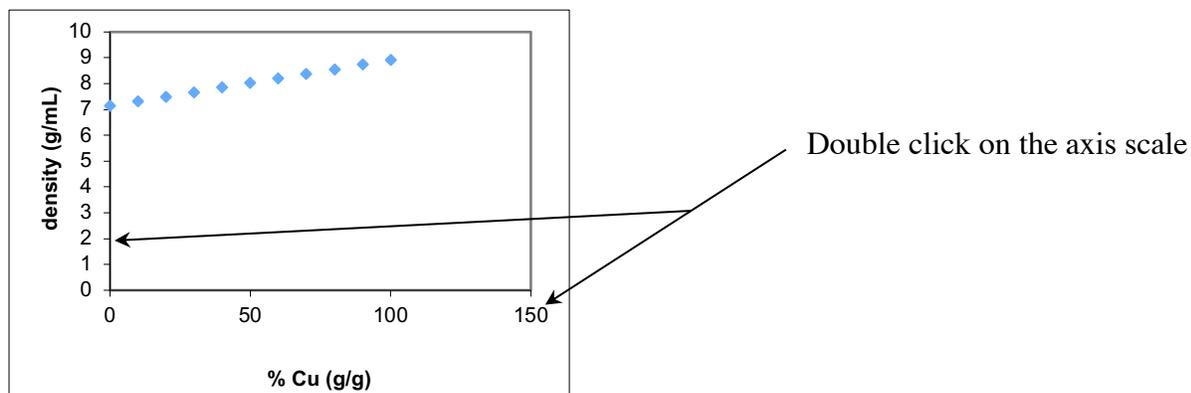
Left double click on the axis scale that you want to change then click on **Scale** to change the max and min of that axis. For example, the x-axis maximum should be 100 and the y-axis should have a minimum of 7 and a maximum of 9 (see the resulting graph displayed below).

Linear Regression: To determine the best-fit equation of the line a trendline is needed and then the correlation coefficient is determined. The correlation coefficient is displayed as R^2 and indicates how accurately the data fit the chosen trend/regression type. To obtain the trendline right click on any of the graphed data points, then scroll the mouse to **Add Trendline**. Click on the left Format Trendline window for "**Options**". Select both the "**Display equation on chart**" and the "**Display the R-squared value on chart**", click **Done**. Two things will now appear on your graph- the equation of the line and the correlation coefficient. This equation can then be dragged to a more convenient spot for better visibility. Often the number of significant figures in the slope and intercept are too few. To change the number of significant figures in the regression results, right click on the linear regression results, so that they are highlighted as shown below:

Click to highlight the regression results
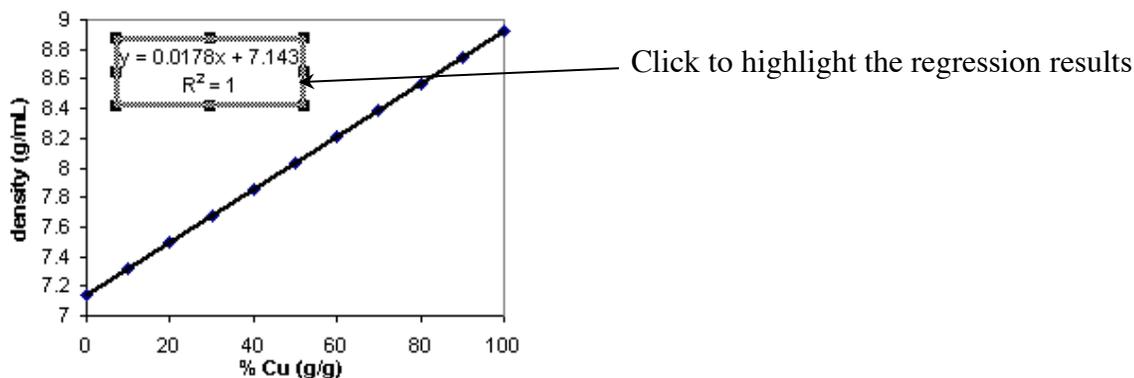
Choose **Format Trendline Label**. Switch the category to **Number** and then change the **Decimal places** to be as large as needed.

To add a second series to an existing one, highlight the new data set. To do that, first highlight column X data, then hold down both the Control and Command keys while highlighting the Y column data. Choose **Edit** (see top menu), then choose **Copy**, click on the graph once, return to **Edit** (top menu) and scroll down to **Paste Special.** When the Paste Special window opens up, check the following options: first, under "Add cells as" select ⊙New Series, second, for "Values (Y) in" choose ⊙Columns, third, ☑**Categories (X Values) in First Column,** then click **OK.**

To delete a chart you don't want, click on it once then from **Edit** (top menu), scroll down to **Clear,** and choose **All**.

To wrap text or shrink it go to Format, Alignment.
To get super and subscripts or change font size go to Format, Font.

Select **Help** (top menu) <u>or</u> click on the purple question mark (top workbook menu) for more help with Excel.

Important note: There might be slight cosmetic differences among different versions of Excel and especially the platform (Mac vs Windows). So please treat the instructions above as guidelines only.