

INTRODUCTION TO MICROSOFT EXCEL 2016

- Excel workbooks can be created and opened using Excel 2016 (the standalone desktop app), or by logging into www.office.com (Office 365) with your StFX username and password and using Excel Online in the browser. The browser version is convenient but keep in mind some features may work differently than the desktop app. The instructions below refer to the standalone version of Excel.

Double click on the Excel icon or select Start/All Programs/Excel. Click on blank workbook.

This will open the Excel program for you and you will see a spreadsheet where you can insert your data. The main cursor for Excel is a plus sign. *See figure 1*

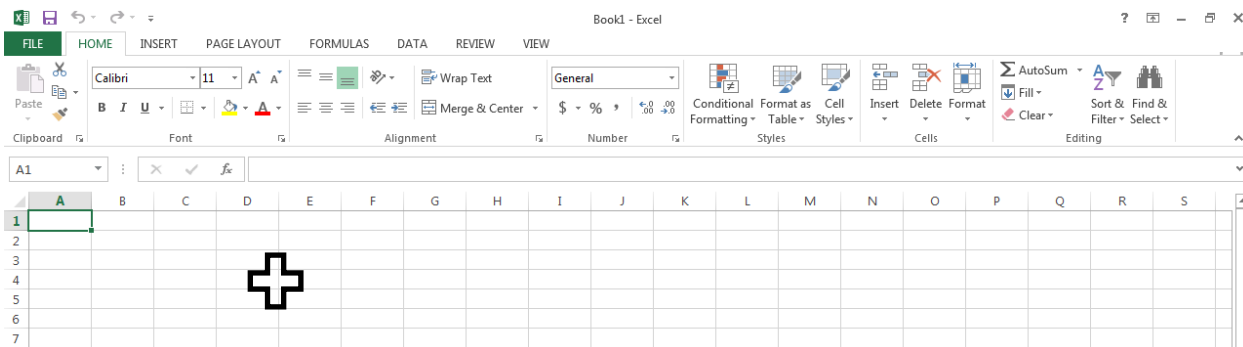


Figure 1

To introduce you to Excel we will work through the following problem:

Plot a graph using the data given below; absorbance readings versus concentration. Using the equation of best fit line, determine the concentration of the unknown.

<u>Concentration (M)</u>	<u>Absorbance</u>
0.00	0.000
0.10	0.131
0.20	0.264
0.30	0.369
0.40	0.497
0.50	0.625
0.60	0.712

Absorbance of the unknown: 0.536

To solve this problem we need to plot a standard curve and obtain the “line of best fit” using linear regression for our data. The “line of best fit” in Excel is called a “trendline.”

- In cell A1, type in the title for the x data: i.e. Concentration (M) and press **<enter>**. You will notice that the column is not large enough for our title. To change the size of the column put your cursor (double headed arrow cursor should appear) on the line between the cells “A”

and “B” and stretch the column as desired. OR double click on the line separating column A and B to have the cell expand to custom fit your entry. This will adjust the column width according to the longest entry in the entire column. *figure 2*

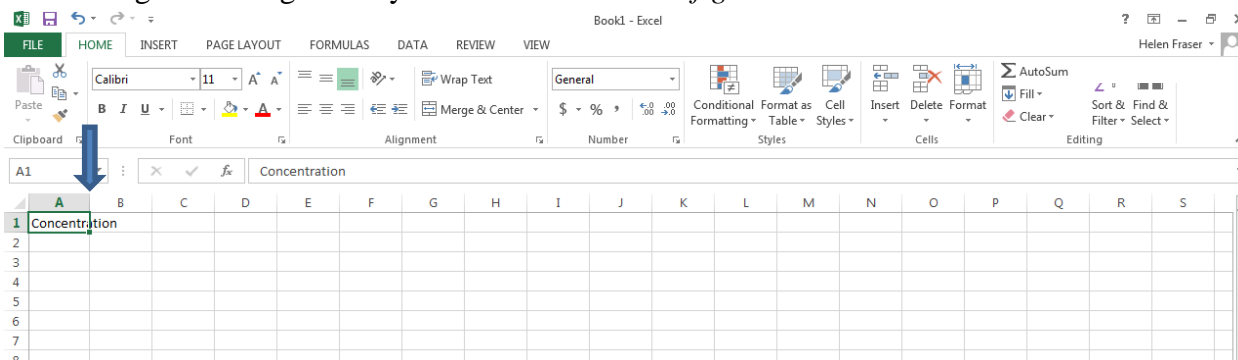


Figure 2

You can now enter the x data in the cells below your title, one entry per cell, pressing **<enter>** after each addition. Once all of the concentration data is entered move the cursor to cell B1.

Enter the title for the y data in cell B1: i.e. Absorbance **<enter>**. Following the instructions above, adjust the cell width and enter the data for absorbance. *See figure 3*

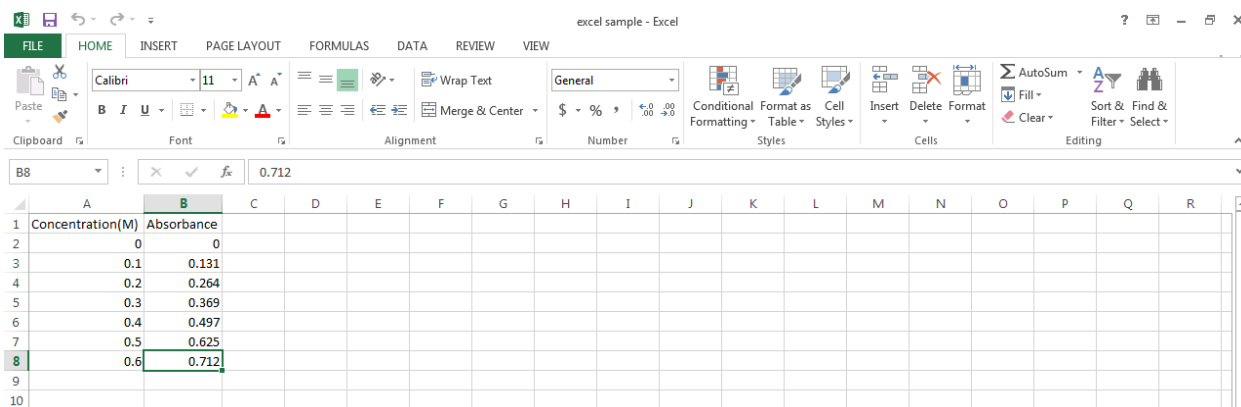


Figure 3

Set the number of decimal places for your x data to 2 by selecting the data (click on cell A2 and drag through to cell A8) and right click on the highlighted selection or possibly 2 finger tap on Trackpad. Select **Format Cells**. *See figure 4*

Click on the **Number** tab then from the Category list, select **Number** and set decimal places to 2. Click on **OK**. *See figure 5*

Ensure your y data is set to 3 decimal places by repeating the above steps for the absorbance data.

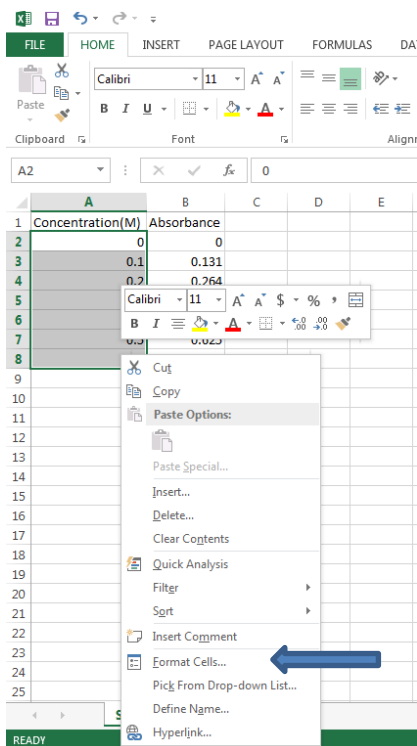


Figure 4

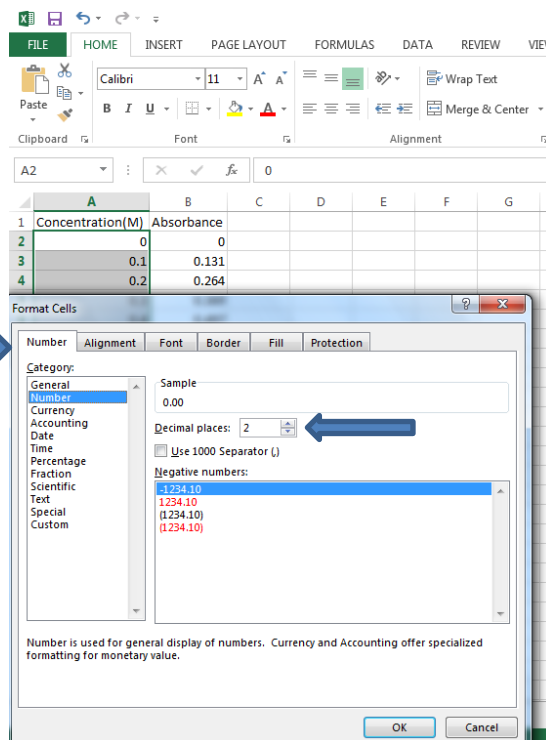


Figure 5

- Excel will display the graph in what they call the Chart. Next we will create a chart for the data. Using the cursor, highlight the data that you want to plot in the chart. Then select the **Insert** tab at the top of the screen.

You will see a section called **Charts** in the menu under the **Insert** tab. Here you can pick the type of chart that you want (i.e. column, bar, pie, scatter etc). Select **Scatter** from the icons and choose **scatter** (plot with only markers, no lines) from the drop-down menu. (as you move over each Scatter icon it will explain what it is) See figure 6

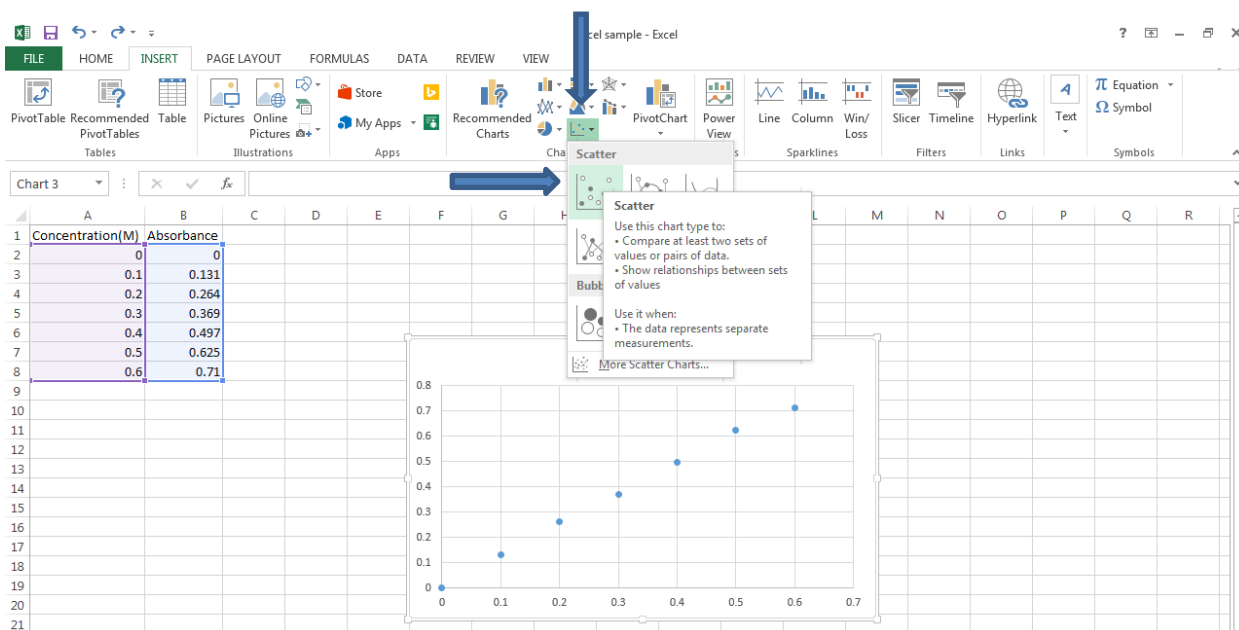


Figure 6

Check that your concentration data is plotted on the x axis.

- Continuing under **Chart Tools, Design** across the top of screen, open **Chart Elements** drop-down box by clicking the green plus symbol on the right of the chart or by clicking on the **Add Chart Element** icon in the top left corner of the screen. Click on Chart Title and type “Absorbance vs Concentration (M)” (replacing “Chart Title”) in box in Chart. Left click or click outside the box. You may move box to where you would like title by clicking on the outer edge of box (with the 4-headed arrow cursor).

Continuing with **Chart Element**, select the **Axis Titles** and modify the following sections:

Horizontal axis title: click on Axis Title below x axis and then click within the box and type in “Concentration (M)” (replacing “Axis Title”). Left click or click outside the box.

Vertical axis title: repeat above step and type in “Absorbance” for the y axis. *See figure 7*

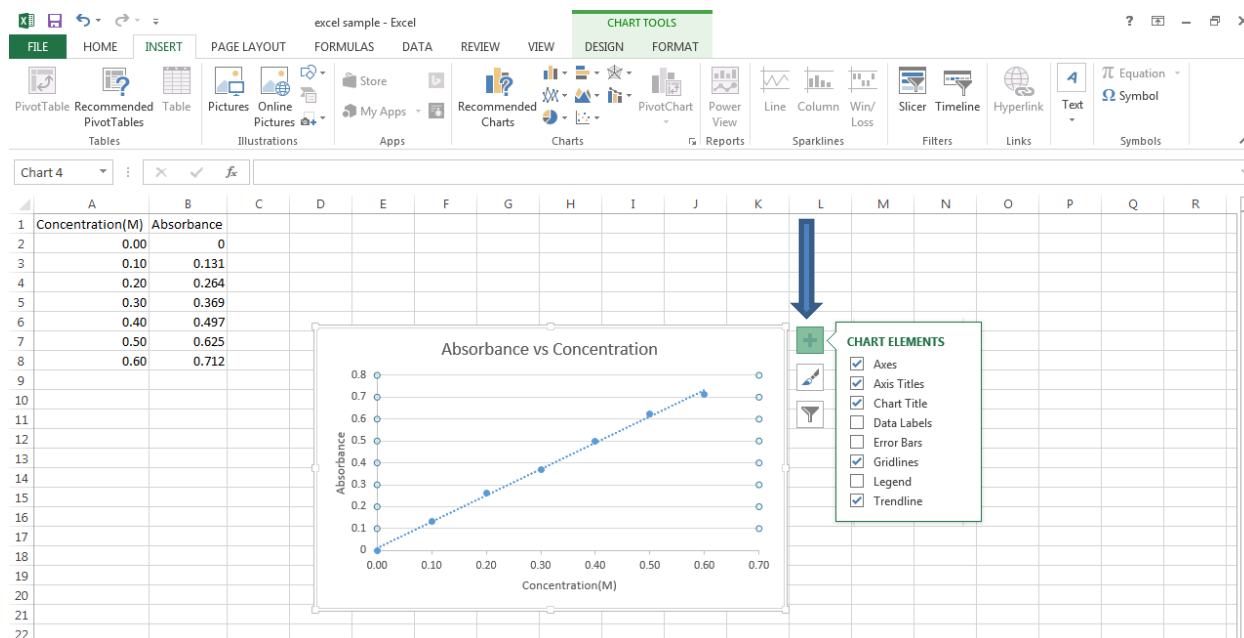


Figure 7

You can modify chart axes, gridline, legend and data labels. Use **Gridlines** to add or remove gridlines on graph. The same can be done with the legend etc.

You can click on the outer edge of the chart (with the 4-headed arrow cursor) to move it around within the sheet you are in. You can move the chart to a new sheet so that it takes up the whole sheet on its own, or move it as an object into another sheet by choosing **Chart Tools** then **Design** tab and using the **Move Chart Location** icon (to the far right). Leave the chart in Sheet 1 (where you are currently working).

Note: if you need to print your data and graph, you should move chart below data table so it will all be on 1 page

- Optional: You can “pretty up” the graph. Available are chart styles and colors etc.
- To complete the problem that we are working on, we need to use linear regression to find the line of best fit for the supplied data.

Continuing with **Chart Elements**, choose **Trendline** then **Linear**.

Chose **Linear** as your Trend/Regression type and make sure that the regression is based on the series absorbance. See figure 8

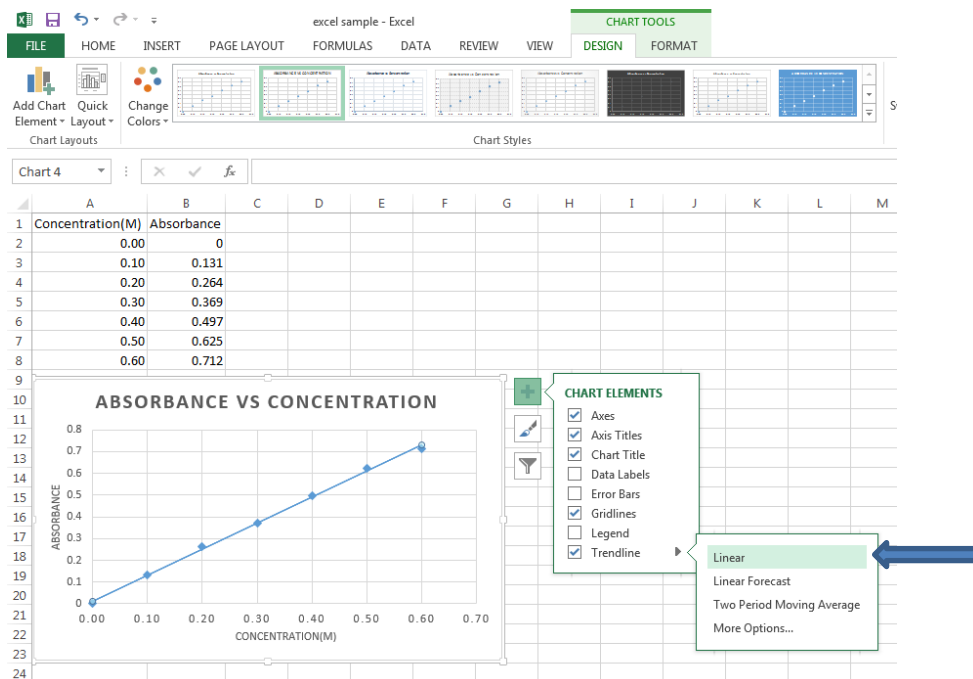


Figure 8

Under **Trendline, More Options**, you also need to tell Excel to display the equation of the best fit line on your chart along with the R^2 (R-squared) value (you will need to scroll down in the Format Trendline drop-down box). To do this you have to check both boxes **Display Equation on chart** and **Display R-squared value on chart**. Click **Close**. The trendline and R^2 value should now be displayed on the graph. You can click and drag the equation to a location on the graph where it can be clearly seen. See figure 9

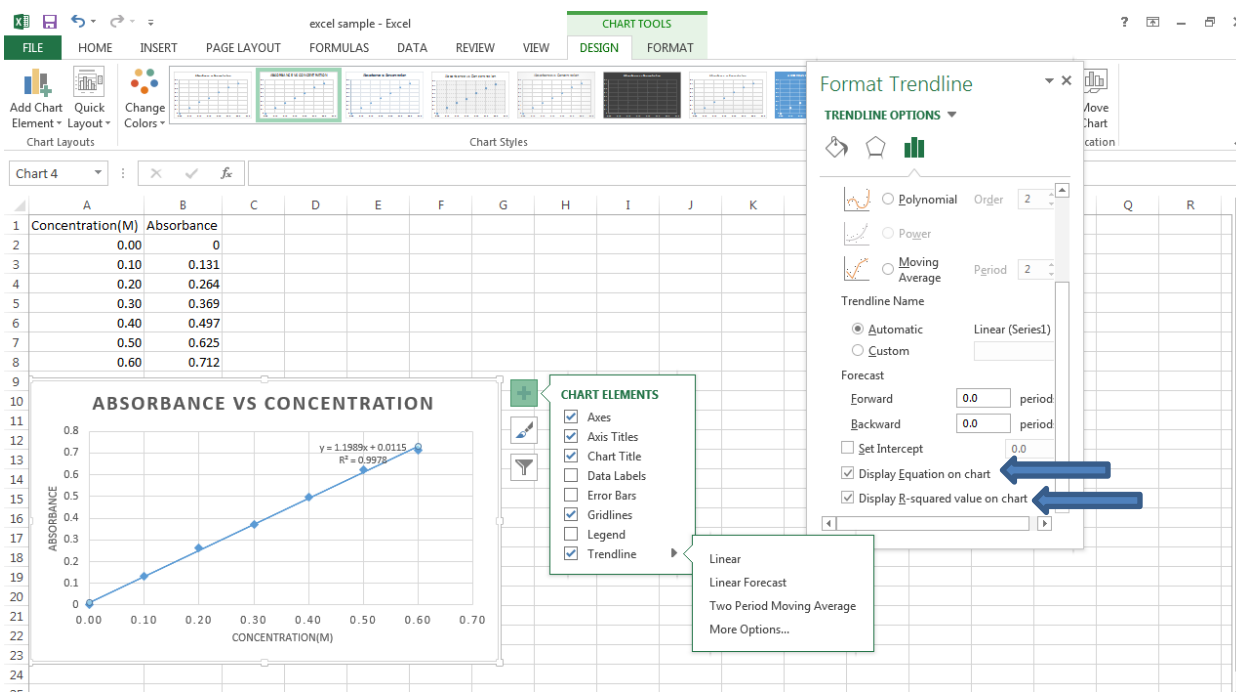


Figure 9

Don't forget – the point of finding this equation is to solve the concentration (x) of your unknown using the absorbance value (y) obtained.

- To print your graph alone you must click within the chart and then click the **File** tab (upper left corner of the screen). Select **Print**. If you wish to print the chart and the data table you must click in the spreadsheet outside of the chart (in an empty cell). Click the **File** tab and then select **Print**. (remember to make sure it all fits on page before printing)
- Save the file to your **H-drive** and exit Excel.