

Excel Tutorial – STEM Cats, Fall 2017

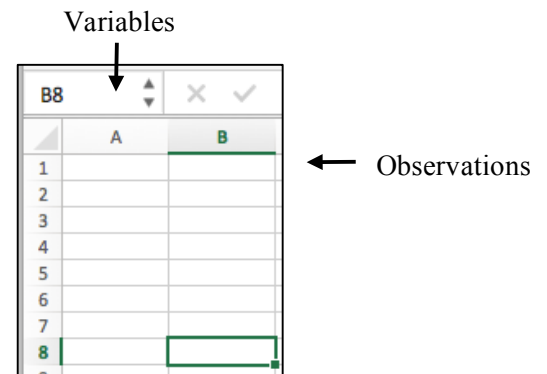
This tutorial is designed to give an introduction into data entry, analysis, and graphing in Microsoft Excel. Here you will find a brief summary of these basic skills including instructions to get you started and screenshots for visual aids. To practice these skills, we encourage you to use the “STEMCats_Excel_Example.xlsx” document that is available on Canvas.

1. Introduction

Microsoft Excel is a great tool for data organization, visualization, and analysis. It is a powerful tool that has a variety of built-in functions and it gives you the capacity to write your own! Here are a few basics to get you started with data entry:

- Excel worksheets are composed of rows (defined by numbers) and columns (defined by letters)
- Columns are good to organize variables, and rows for observations
- An example data sheet might look like this:

N	O	P
Day	Plant Species A	Plant Species B
1	3	10
2	4	10
3	2	9
4	0	8
5	3	8
6	2	8
7	3	5
8	4	9
9	1	10
10	2	8



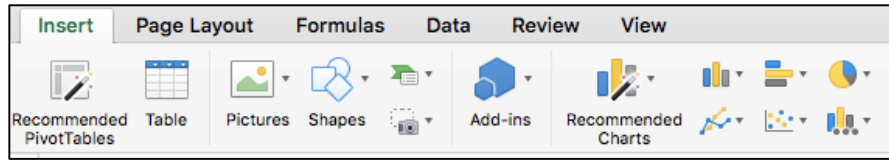
2. Generating a Graph

Excel offers a variety of graphing options, including x-y scatter plots which are commonly used in the sciences. Follow the steps below to create a basic x-y scatter plot with a data set.

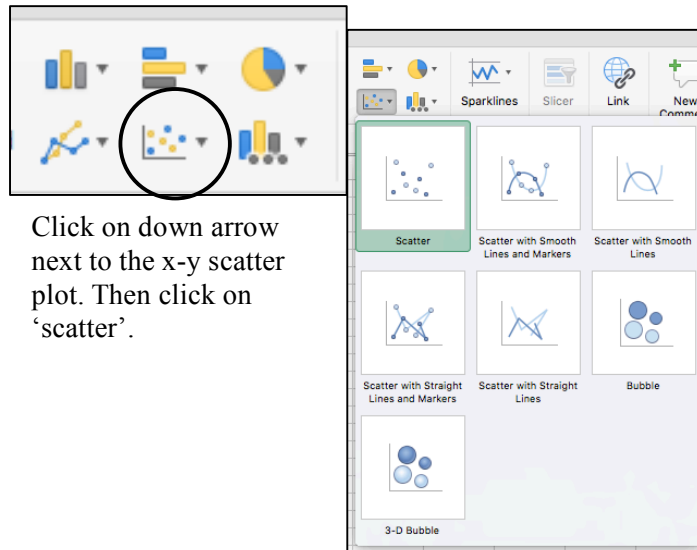
- First, select the data you would like Excel to include in your graph. You can do this by clicking on the first cell of the data set (in the above example it would be the column header “Day”), hold down the SHIFT key, and select the last cell (“8”, corresponding with the last data point in the ‘Plant Species B’ column). You can also drag the cursor over the three columns to select them. The selected cells will become highlighted as seen on the right.

The screenshot shows the same data table as above, but with the entire data range (rows 1-10, columns N-P) highlighted in grey. The headers 'N', 'O', and 'P' are also highlighted.

- After the cells to graph have been selected, click on the INSERT tab and navigate to the graphing options.

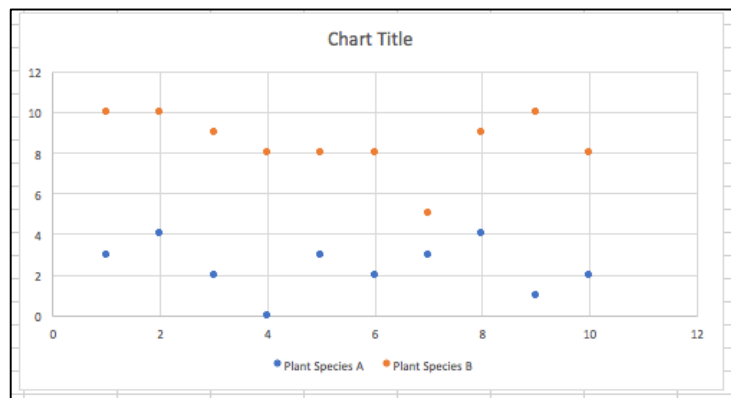


- Each style of graph has different formats available. Click on the down arrow to the right of it to see available options. Graph the data using the x-y scatter plot first.



Click on down arrow next to the x-y scatter plot. Then click on 'scatter'.

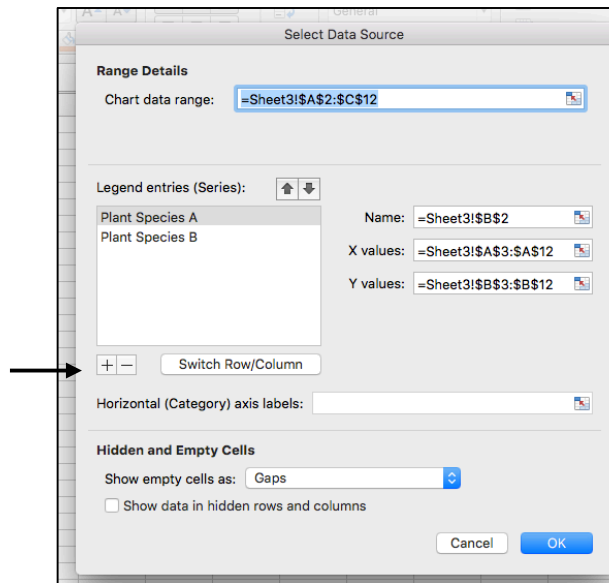
- After clicking 'scatter' a graph will pop up! The legend reflects the column labels, if there are no labels Excel will label them 'Data series'. From here, we can add trend lines, format colors, and add a title and vertex labels.



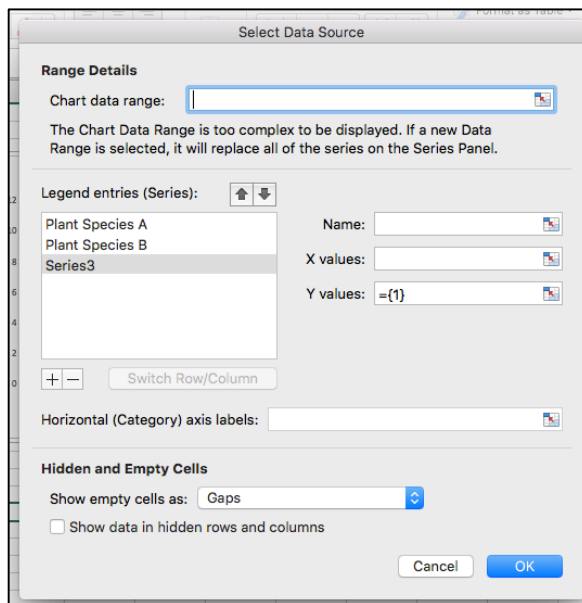
- If you have a question about what cells excel has selected you can always click on the graph and excel will highlight the data series. You can also right click on the graph and click 'Select Data' to manually choose columns after the graph has been generated.

- If additional data needs to be added, for instance if you observe a third plant species, you can easily add the data to the graph through 'Select Data'. Once you are in 'Select Data', click the '+' sign, this will add another data series.

Click here to add another data series to your graph.



- Either manually enter the name of data ('Plant Species C'), or click on the column label. To add the data, click in the 'Y values' box and select your data on the excel sheet.



← Name the data series here

← Click in this box, and then highlight the new data column to be added

3. Adding Axis Labels

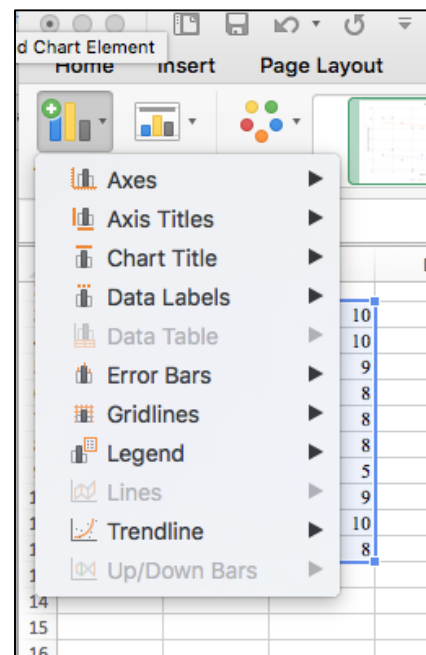
It is important to include axis labels on a graph in order for your reader to understand what they are viewing! The option to add axis labels, format gridlines, or to add a trend line, navigate to the 'Chart Design' tab.



- Once in the 'Chart Design' tab, click on 'Add Chart Element' to see a drop-down menu of options. Here you can choose to add 'Axes', 'Axis Titles', etc.

'Axis Titles' allows you to display axis labels

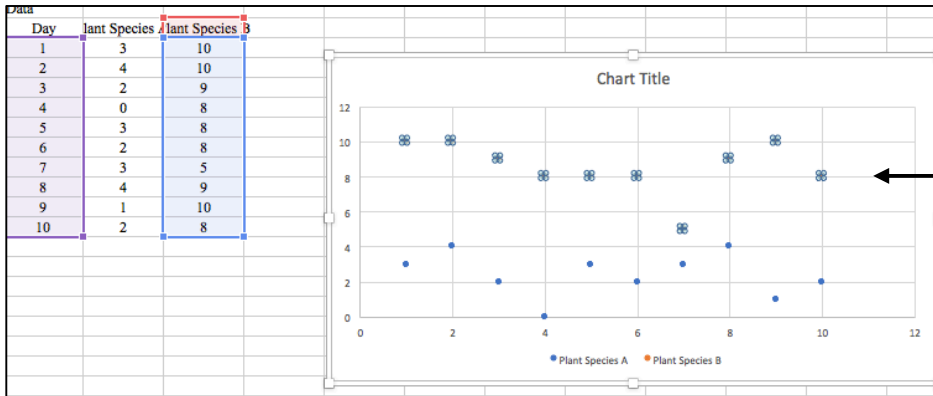
Adding a trend line can be a good way to visualize data. You can do it here, or see part 4 below!



4. Adding a Trend Line (Version 2!)

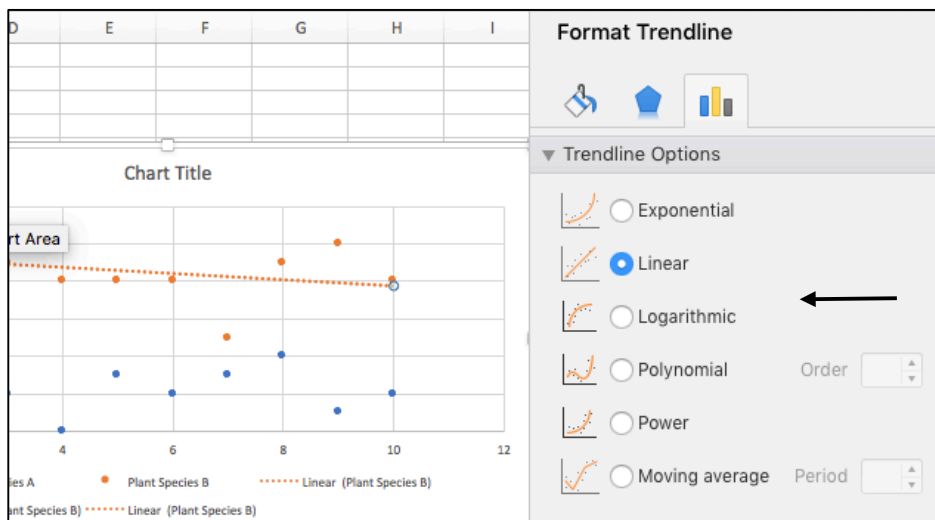
Adding a trend line is a useful visualization for to examine trends in your data. At its most basic, a trend line is way to examine if data have a mathematical trend, such as a linear or quadratic. The hypothesis you might be testing may also assume the data would follow a particular type of trend and adding a trend line would be an easy visualization to test this hypothesis.

- To add a trend line, first select the data series you want to fit a trend line to. You can do this by clicking on any of the data points in that series. Excel will then highlight the data series and the relevant columns.



Data series has been selected

- After data has been selected, right click to select 'Add Trendline'. From the 'Format Trendline' panel, you can click on which trendline you would like to add.



- Note the additional trend line options!
- The 'Format Trendline' panel also has an option to display an equation with the trend line or display an R^2 value. The R^2 value provides an indication of how well the data fits the selected trend. The higher the R^2 value, the greater the data fit that selected trend.

