Using Excel to Make a Graph of Your Data

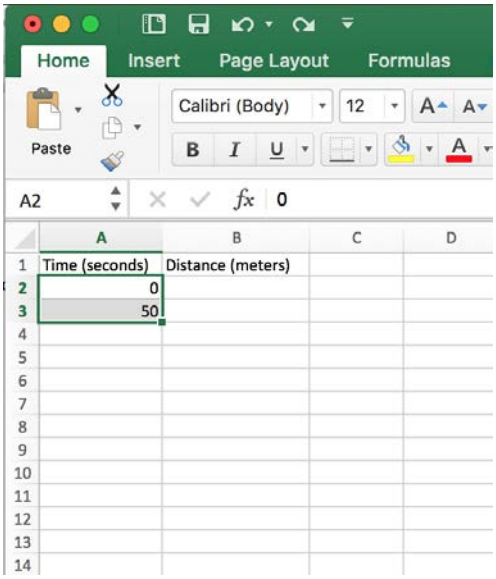
Microsoft Excel for Mac Users (Office 2016)

1. *Inserting Your Data with Simple Excel Commands*

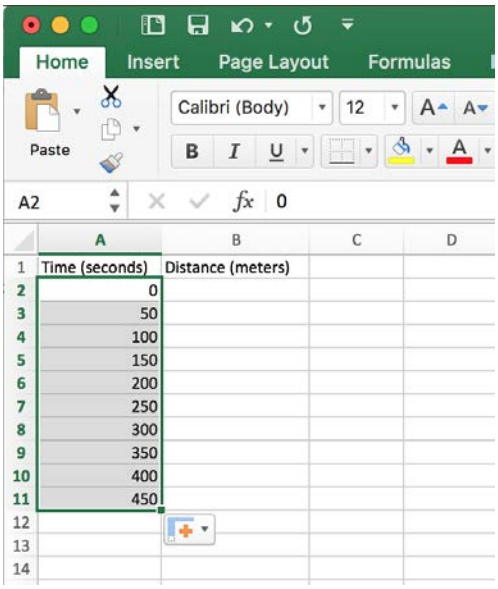
Insert your data into an excel document. Make two columns in which the first column is the x-axis and the second is the y-axis as shown below.

Time (Seconds)	Distance (meters)
0	10
50	10.5
100	30
150	35
200	37
250	40
300	45
350	50
400	55
450	60

When there is a series of values that change in incremental units, the program can see the trend and extend it for you. For example, for the x-axis above, the time increment is 50 seconds. Instead of typing in 0, 50, 100, 150, etc., first highlight cells A2 and A3. This will tell the program that you are going down the column in increments of 50.

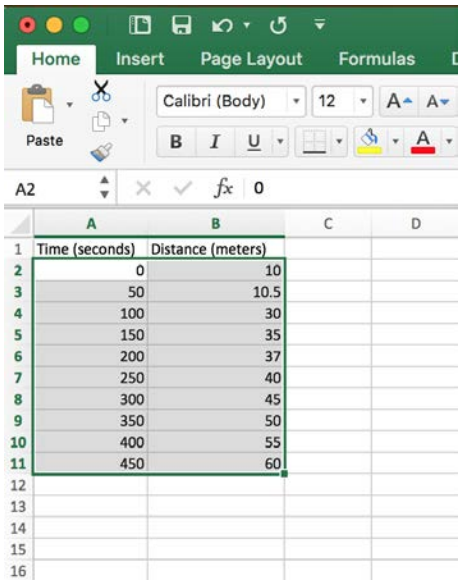


Next click on cell A3 and then drag the corner of the green box down to the appropriate number of data points; each value will be automatically calculated. This gives all of the x-values much more efficiently then entering them in by hand. Then type in the distance column values by hand.



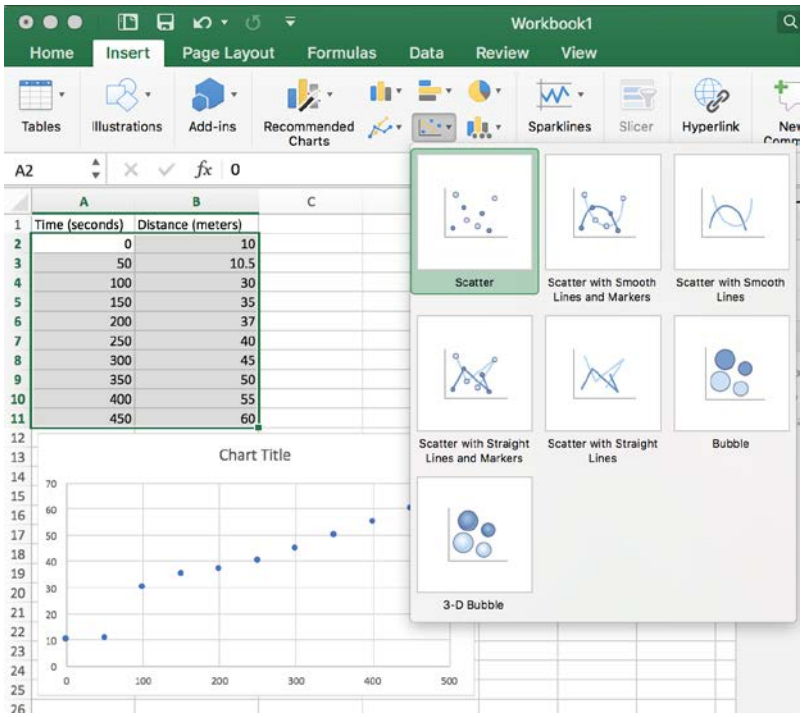
2. *Plotting your data*

First highlight both columns of the data (excluding titles), as seen below.



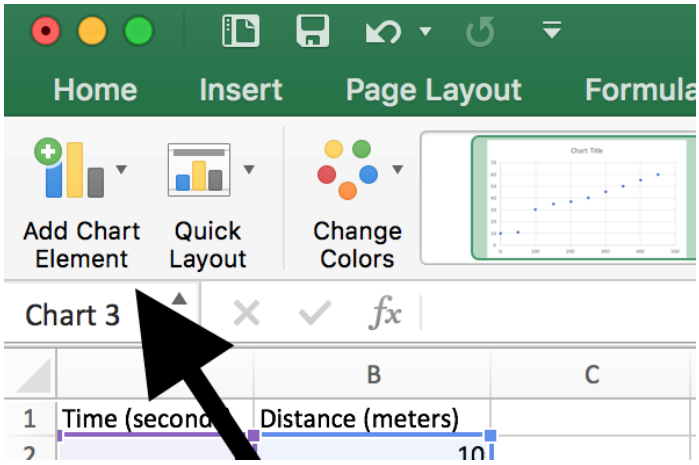
Next select the ***Insert*** tab. Under the ***Insert*** tab click on the scatter plot icon and then select ***Scatter***.

This will display a graph, as seen below.



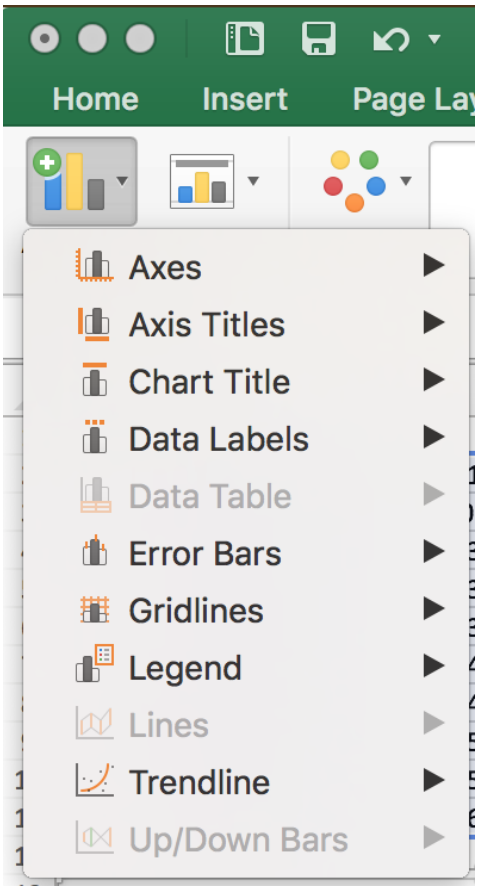
You can move the graph so that it is not covering the data simply by clicking on the graph and dragging it to a different portion of the screen.

If you double-click on the graph, a new tab will appear in the bar labeled ***Add Chart Element***. This tab will be needed for editing your graph



3. *Labeling Axis and Creating a Title*

First make sure that the graph is selected (double-click on the graph). Then select the ***Add Chart Element*** tab and then the following drop-down menu will appear.



To add a chart title:

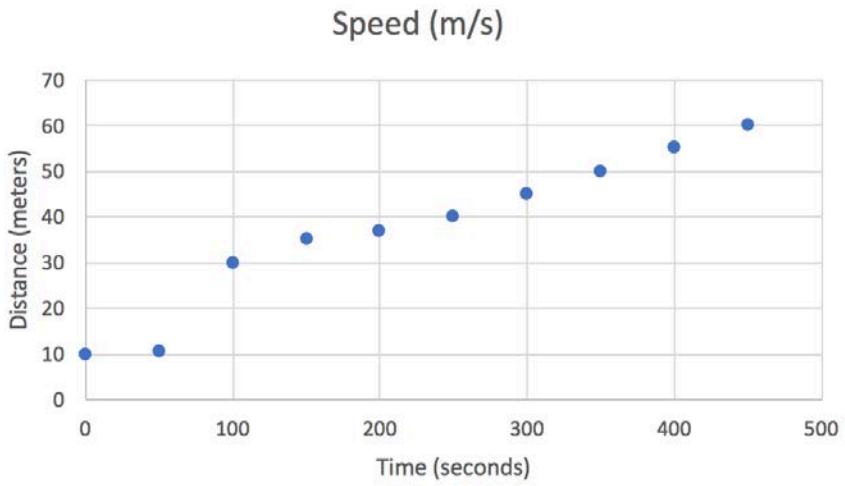
The chart title should be automatically added in this version. If it is now, however, under the ***Add Chart Element*** tab hover the cursor over the ***Chart Title*** option, and the select ***Above Chart*** to add a title to your chart.

To add an axis title:

Under the ***Add Chart Element*** tab select ***Axis Titles → Primary Horizontal*** and type in the x-axis title "Time (seconds)"

Under the ***Add Chard Element*** tab select ***Axis Titles → Primary Vertical*** and type in the y-axis title "Distance (meters)"

An example of this graph with the appropriate labels can be seen below.



4. *Add/Subtract Gridlines or Legend*

First make sure that the graph is selected (click on the graph). Then select the ***Chart Layout*** tab.

Gridlines:

For Excel 2016, major horizontal and vertical gridlines should already be in the graph, however if you'd like to change them, follow these instructions:

Under the ***Add Chart Element*** tab select ***Gridlines → Primary Major Horizontal*** and ***Gridlines → Primary Major Vertical*** (or any others you would like to include).

Legend:

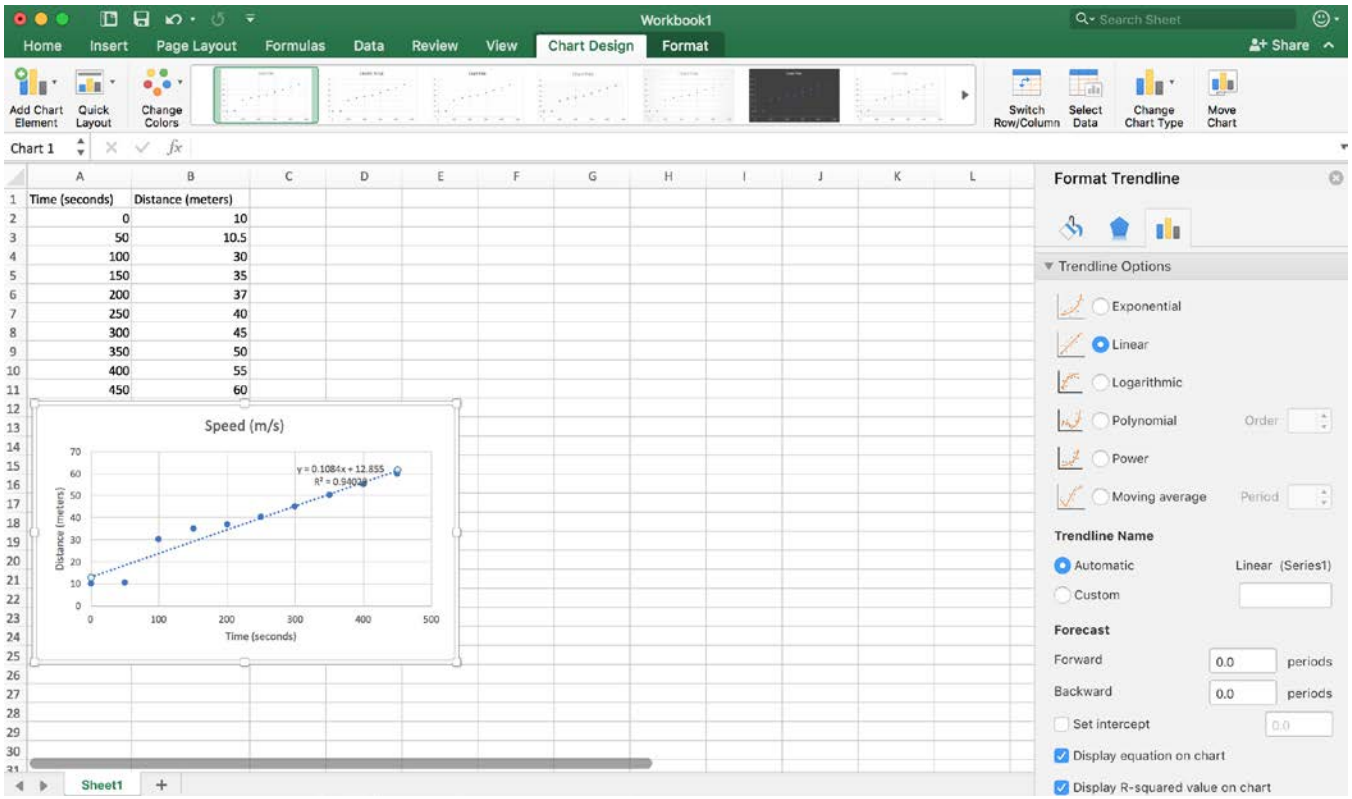
Under the ***Add Chart Element*** tab hover over ***Legend*** and then select the legend that you would like to use. You should only have a legend if there is more than one data sets plotted on the same graph.

5. *Adding Trendlines*

First make sure that your graph is selected (double-click on the graph). Then select the ***Add Chart Element*** tab.

Under the ***Add Chart Element*** tab hover over ***Trendline*** and then select the appropriate Trendline (linear).

To display the equation of the line and the R^2 value on the graph under the ***Add Chart Element*** tab select ***Trendline → More Trendline Options…*** This will open a new box on the right titled "Format Trendline". At the bottom the box select check the boxes labeled ***Display equation on chart*** and ***Display R-squared value on chart***. Then move the equation on the graph so that it is not blocking the data.



6. *Adding additional Series*

(This is also useful when you only want to put a Trendline on part of a series)

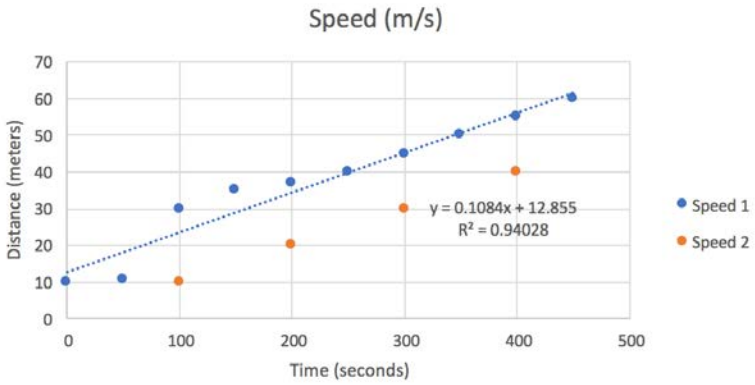
To follow along with the tutorial type the following data table on the chart in columns C and D. Note: Do not erase the original table.

Time (seconds)	Distance (meters)
100	10
200	20
300	30
400	40

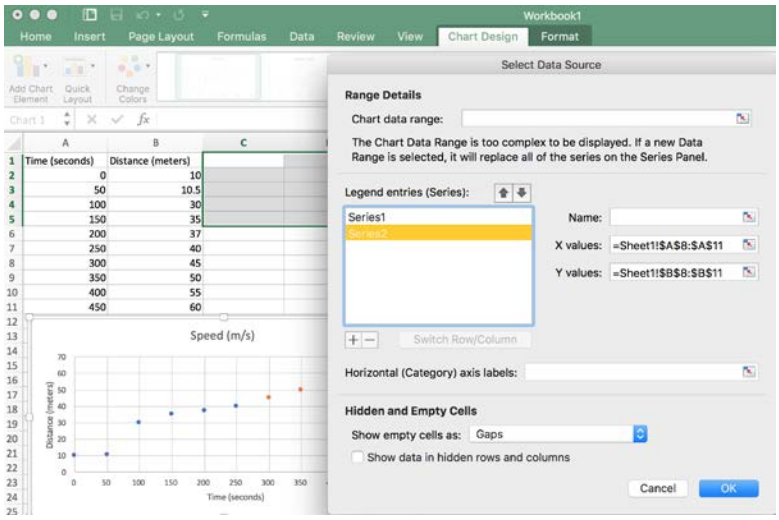
First make sure that the graph is selected (double-click on the graph). Then select the ***Chart Design*** tab (top right).

Under the ***Chart Design*** tab choose ***Select Data***. This will open a new window. Click on the small "+" at the bottom of the main box, which will allow you to create a new series. Type in the series name and then select the x and y values on your table. If you click on the chart icon to the right of the x values box you can highlight the values for that series from your data table. When you are finished click on the chart icon again. Once you are finished click ***OK***. You will then be able to repeat the process for the y values. If you would like to edit any series (including titles) under the ***Chart Design*** tab click on ***Select Data*** and this will open a new window. Click on the series that you are interested in editing and type in your edits. Once

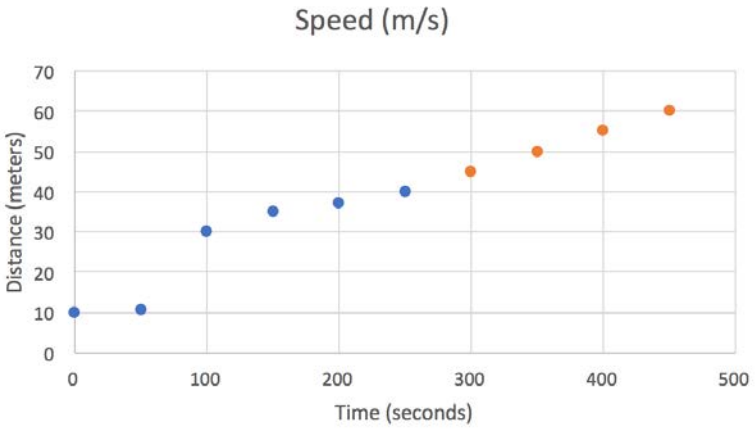
you are finished click on ***OK***. Do not forget to add a legend if you are plotting more than one data series.



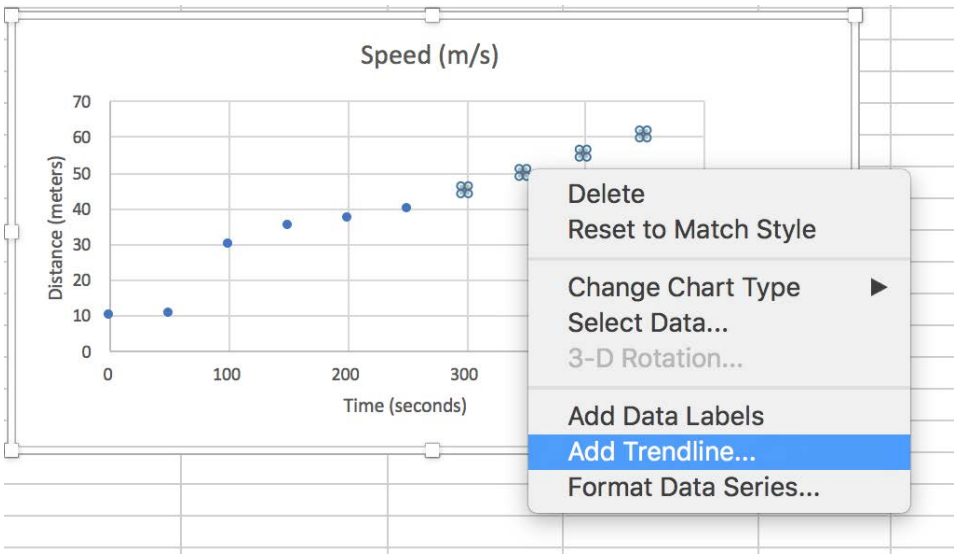
Note: If you want to only fit a *portion* of your data to a trendline, you can enter the data in two parts. Put the part the data that you wish to fit in one series and the other part in another series. Redo the plot so that the first 6 points are in one series and the last 4 points are in another series.



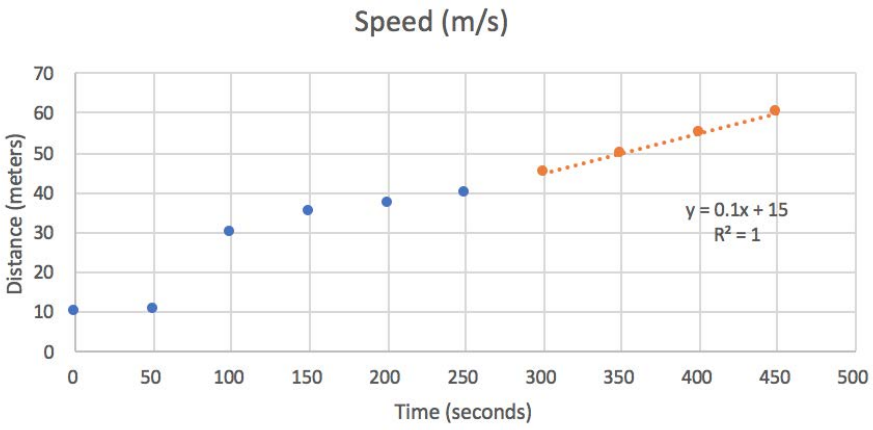
Your graph should look like the graph below (colors can be changed).



In order to fit a trendline to just part of the series, highlight the points on the graph by clicking on one of them. Then right-click on the points and select ***Add Trendline…***, and you can add adjust the trendline as done previously.



The resulting trendline will fit only to the selected series, and the equation and R-squared values can be added to it. Your final graph should look like the graph below.



Exercise: Plotting Data

Using the directions above create a plot of the following data points using excel. On your graph include the following:

1. Axis Titles with Units
2. Graph Title
3. Major Vertical and Horizontal Gridlines
4. Best Fit Line for the decreasing portion of the data
5. Display equation of line on graph as well as the R^2 value

Print your graph and turn it in next week. This counts for 2 lab technique points.

Time (Sec)	Amount (mL)
0	227
10	217
20	200
30	198
40	170
50	167
60	154
70	132
80	115
90	105
100	100
110	83
120	57
130	33
140	10
150	0
160	5
170	0
180	2
190	3
200	1