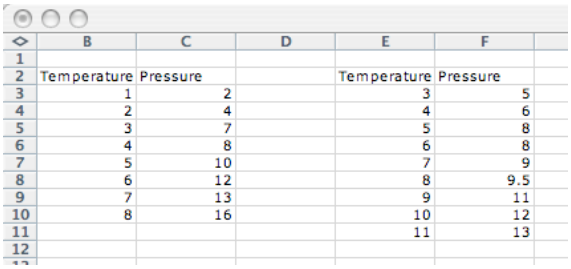
Excel Tutorial

Introduction

In this tutorial, you will learn how to plot multiple sets of data using Excel. It is basic stuff, so it is good to make sure you know how to do it.
The screenshots here make using a Mac, so the PC may not look exactly the same, but the principles are the same.

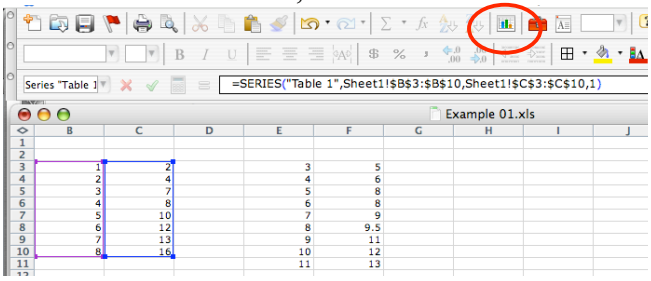
Step by step tutorial

1. Suppose we have two sets of data on the temperature and the pressure of an experiment as shown below.

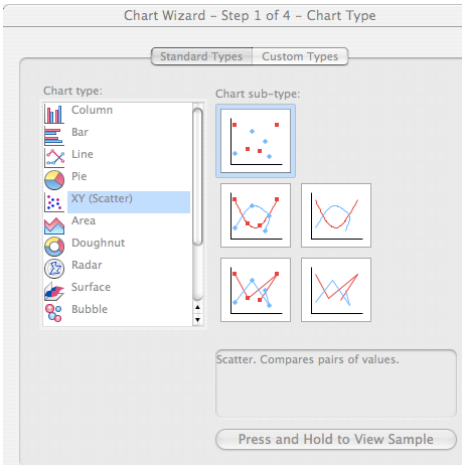


	B	C	D	E	F
1					
2	Temperature	Pressure		Temperature	Pressure
3	1	2		3	5
4	2	4		4	6
5	3	7		5	8
6	4	8		6	8
7	5	10		7	9
8	6	12		8	9.5
9	7	13		9	11
10	8	16		10	12
11				11	13
12					

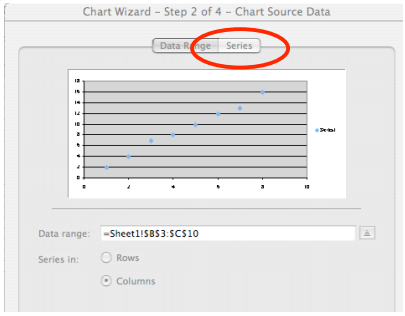
2. Use the mouse to select the first data set, then click on the "Chart Wizard" on the top.



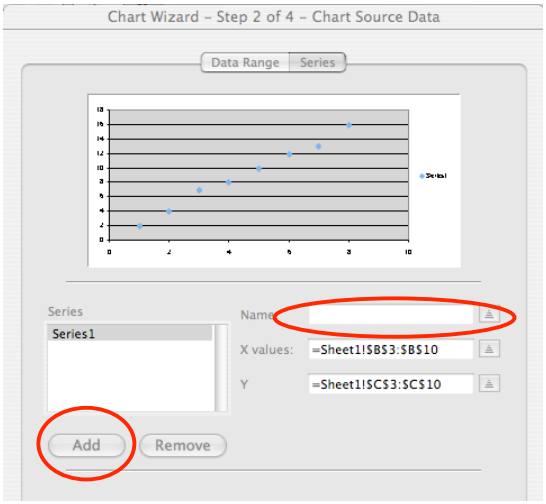
3. The Chart Wizard window will open. Choose "XY (Scatter)" and under sub-type, choose the box with no line. Click "Next".



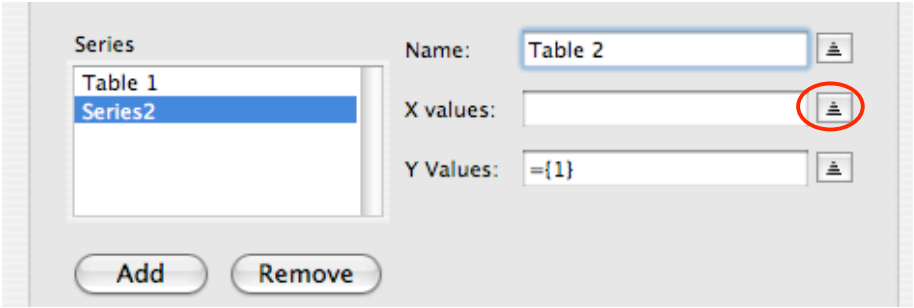
4. You will see the following window. Click on the "Series" tab.



5. The window will change to the following form. Type a descriptive name in the "Name" area, such as "Table 1 Data", or "Data Set 1"… etc. Click on "Add" to add the second data set.



6. A new series will be added to the window. Type a descriptive name in the "Name" area, such as "Table 2", or "Data Set 2" for this new series. Click on the arrow on the right at "X values".



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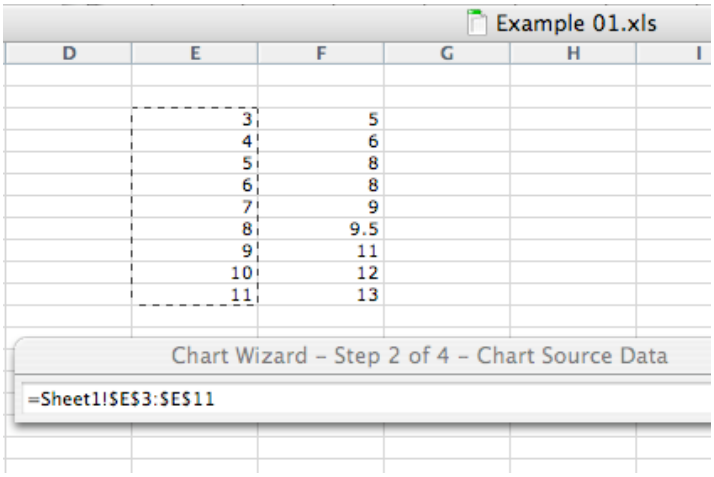
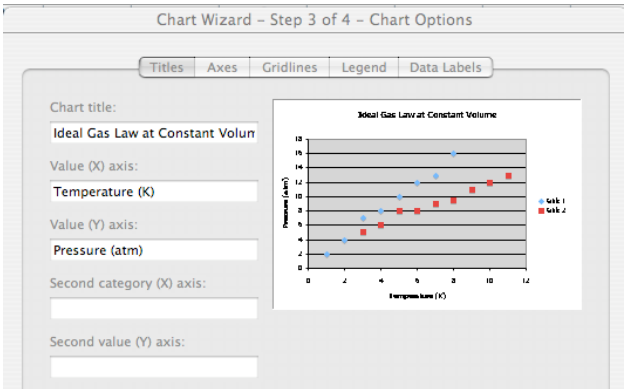
7. The Chart Wizard will shrink to only one row. Use your mouse to select the column that represents the data on the *x*-axis as shown below.

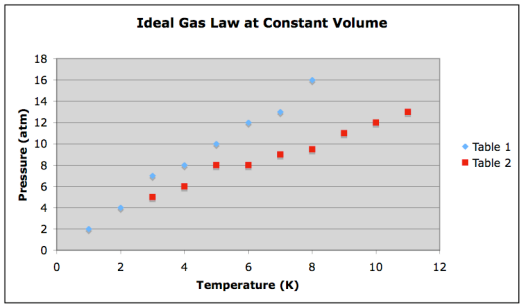


8. Repeat step 7 for the "Y values" then click "Next".

9. Give the chart a title, and label your *x* and *y* axes as shown below. The title should be descriptive and tell the reader what it is for. ALWAYS put the units (in this case, *K* and *atm*) after the variables. Click "Next".



10. After specifying where you want the chart, you should find the following chart appearing on your Excel spreadsheet.



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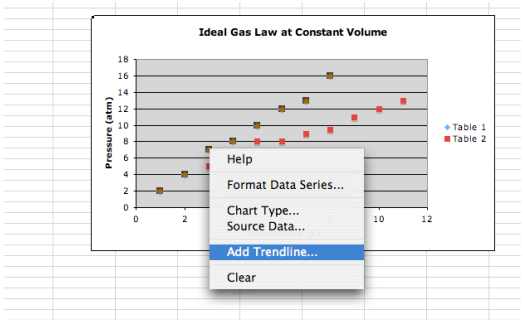
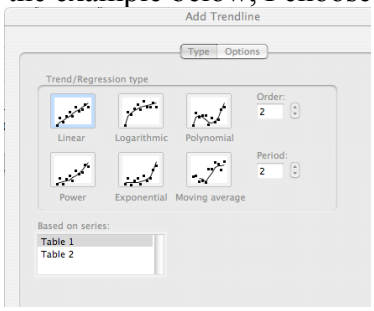
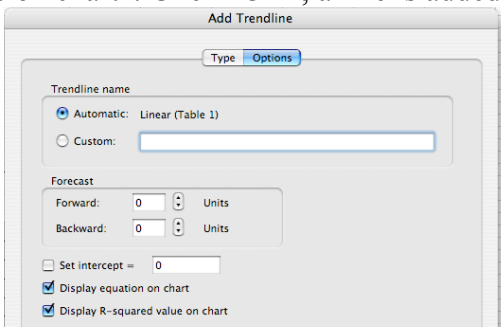
11. Right-click (or control-click) one of the data point, and choose “Add Trendline…” from the popup menu.



12. The following window will pop up. Choose the line/curve type that you want, and then click the “Option” tab. In the example below, I choose to use a straight line fit.

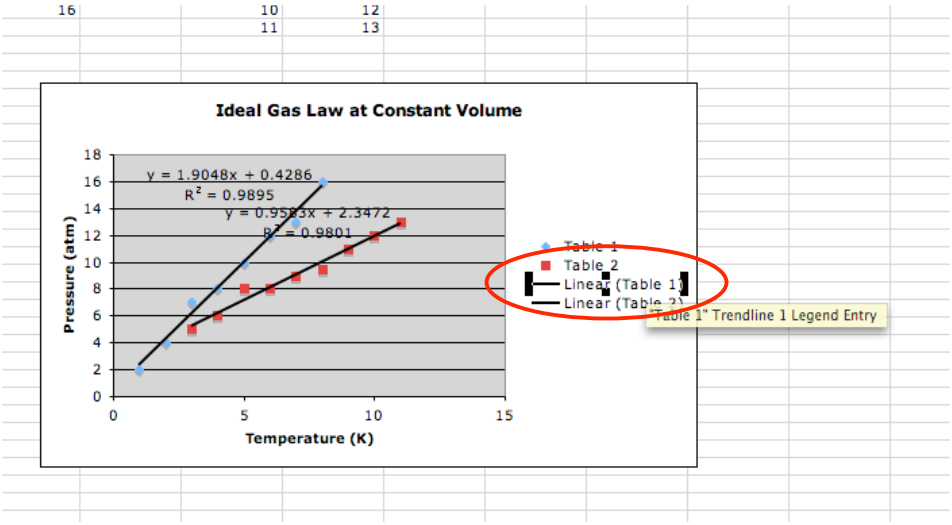


13. Usually in a science lab, you will want to select “Display equation on chart” and “Display R-squared value on chart”. Click “OK”, a line is added to the first data set.

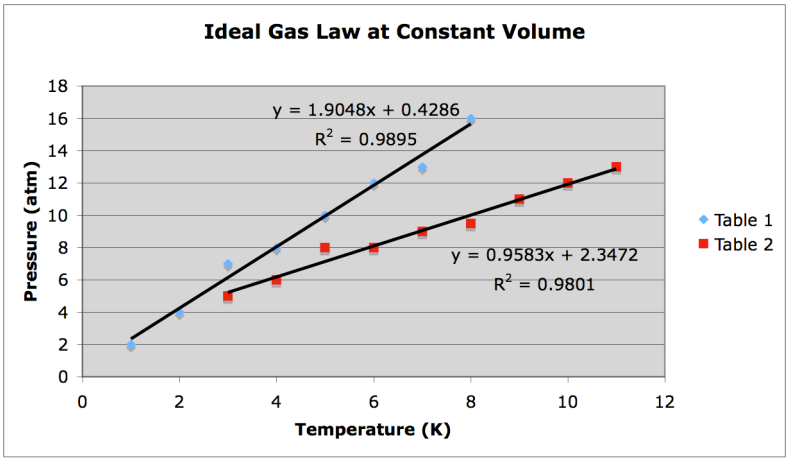


14. Repeat steps 11 – 13 for the second data set.

15. If you like, you can select any part of the chart and make changes to it. For example, you may like to delete the legend entries of the trendlines by selecting them and pressing the delete button.



16. This is the finished product:



17. The R^2 value tells you how well a fit the line is. If $R^2 = 1$ it is a perfect match, if R^2 is very close to 0 then it is a very bad fit. In the example above, Table 1 has a better fit because its R^2 value is closer to 1.

18. The equation gives you the slope of the curve and the *y*-intercept. In the example above, Table 1 has an equation $y = 1.9048\,x + 0.4286$, this means the slope is *1.9048atm/K*, and the *y*-intercept is *0.4268atm*. Note that both the slope and the *y*-intercept have units. NEVER forget the units in these quantities!

Exercise in Excel

You need to first draw a graph in Excel and use the slope to answer all the questions below. If you do not use the slope, you are doing something wrong.

1. Given $a=g\sin\theta$, find the experimental value of g from the table below (make sure your answer has unit).

$a\ (m/s^2)$	0.85	1.61	2.56	3.11	4.65	4.85	5.27	6.30	7.07
$\theta\ (°)$	5	10	15	20	25	30	35	40	45

2. Given $E=hf$, find the experimental value of h from the table below. In the graph that you draw, the y-axis should be draw with the unit $10^{-14}J$, and the x-axis should have the unit of $10^{20}s^{-1}$, but I want you to give the value of h in Js.

$E\ (10^{-14}J)$	9.95	13.40	17.00	19.50	22.93	25.84	29.84	33.50	37.95
$f\ (10^{20}s^{-1})$	1.5	2	2.5	3	3.5	4	4.5	5	5.5

3. Given $ab=nm$, and that n=50. Find m using a graph of the data below.

a	3	6	9	12	15	18	21	24	27
b	166.67	80.83	48.89	45.83	46.67	27.78	23.86	20.21	20.74