

# How to Graph Using Excel

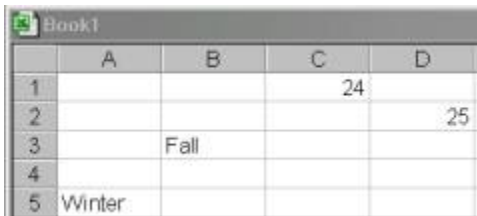
## Purpose

It is often said that a picture is worth a thousand words. In the case of statistics, it isn't easy to look at charts or lists of numbers to be able to tell trends, make comparisons or try to make generalizations. Histograms (column graphs), circle graphs (pie charts) and broken line graphs all create a visual representation of data.

Excel has built in functions to create such graphs. This tutorial will lead you through an example to learn how to create histograms, and line graphs using the features found in Excel.

## Procedure

Excel is a Windows based spreadsheet program, with many powerful features. At first glance it is nothing more than a matrix (table) of rows and columns, called **cells**. Cells can contain words or numbers.



	A	B	C	D
1			24	
2				25
3		Fall		
4				
5	Winter			

*Fig.1 Excel Table*

Each cell has a “name” associated with it.

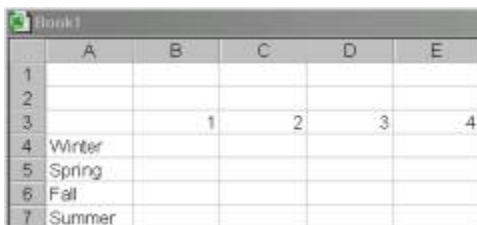
“Winter” is in cell A5

“Fall” is in cell B3

“24” is in cell C1

“25” is in cell D2

In other words, the column letter and row number name each cell.



	A	B	C	D	E
1					
2					
3		1	2	3	4
4	Winter				
5	Spring				
6	Fall				
7	Summer				

*Fig.2 Excel Table, data in rows and columns*

If information is placed in a continuous row or column, the designation is as follows:

The numbers are in cells **B3, C3, D3, and E3** denoted by **B3:E3**.

The words are in cells **A4, A5, A6 and A7** denoted by **A4:A7**.

## Using the VW Beetle data to make graphs

No matter what kind of graph you are trying to create, the first step is to always enter the information into cells in Excel. Then the Chart Wizard is selected to make the graph.

1. In cell A1 put in the title of your data.

	A	B
1	VW Beetle Data	
2	Time(s)	Velocity(m/s)

2. In row 2 put in your data headings WITH UNITS
3. In Column A put in you time data.
  - a. You can just go down the list to enter 0.0 through 1.4 OR
  - b. Excel can also do formulas:
    - i. put 0 in cell A3
    - ii. Move your cursor to cell A4 and type “=A3+.1” you can type “A3” or just point to it. After you hit ENTER “0.1” will appear.
    - iii. Now you can copy & paste this formula from cell A4 to A5 – A17.
4. In Column B put in your Velocity data.

	A	B
1	VW Beetle Data	
2	Time(s)	Velocity(m/s)
3	0.00	0.0
4	0.10	4.0
5	0.20	3.0
6	0.30	16.0
7	0.40	28.0
8	0.50	41.0
9	0.60	52.0
10	0.70	63.0
11	0.80	75.0
12	0.90	87.0
13	1.00	97.0
14	1.10	108.0
15	1.20	115.0
16	1.30	122.0
17	1.40	127.0

You should now have this:

Your data may have different

decimal locations. It can be fixed from the FORMAT menu:

- a. Click on the top of Column A (over the A, the column will become highlighted)
- b. From the menu choose Format – Cells
- c. From the Number tab, choose Number from the Category chooses
- d. On the right you will see ‘decimal’ toggle the up/down arrows to get 2
- e. Click “OK”
- f. Do the same for Column B, (steps a-e) but toggle to get 1 decimal.

## Creating a Line Graph

- From the menu choose Insert-Chart-XY(scatter)-scatter w/ points connected by lines
- Click Next

	A	B	C
1	VW Beetle Data		
2	Time(s)	Velocity(m/s)	
3	0.00	0.0	
4	0.10	4.0	
5	0.20	3.0	
6	0.30	16.0	
7	0.40	28.0	
8	0.50	41.0	
9	0.60	52.0	
10	0.70	63.0	
11	0.80	75.0	
12	0.90	87.0	
13	1.00	97.0	
14	1.10	108.0	
15	1.20	115.0	
16	1.30	122.0	
17	1.40	127.0	

- Make sure your data range says “=Sheet1!\$A\$1:\$B\$17” – this tells excel where the data is. The 1<sup>st</sup> column is the x-axis data, the 2<sup>nd</sup> column is the Y-axis data.

Data Range | Series

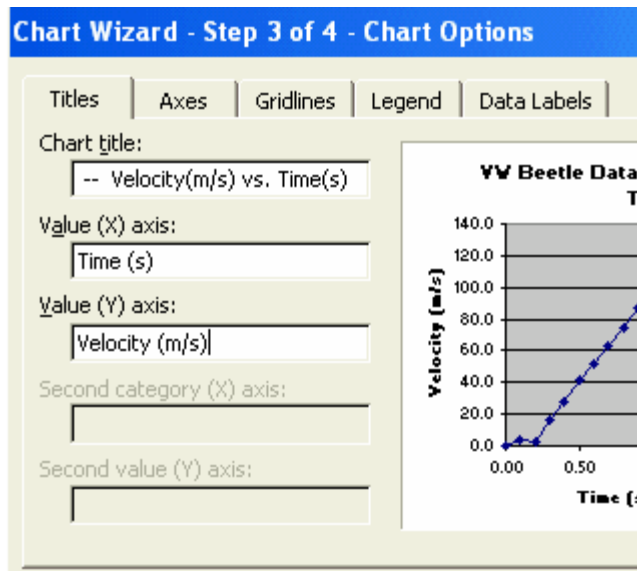
VW Beetle Data Velocity(m/s)

Data range:

Series in:  Rows  Columns

Notice that Excel gives you a preview of your data. The format including title, axes, gridlines, legend can be tweaked in Step 3 of the Chart Wizard.

\*\*Under the **Title** tab, fill in the blanks for Chart title, Value(X) axis, Value(Y) axis. Be sure to include descriptive titles and units. Shown below is a suggestion:

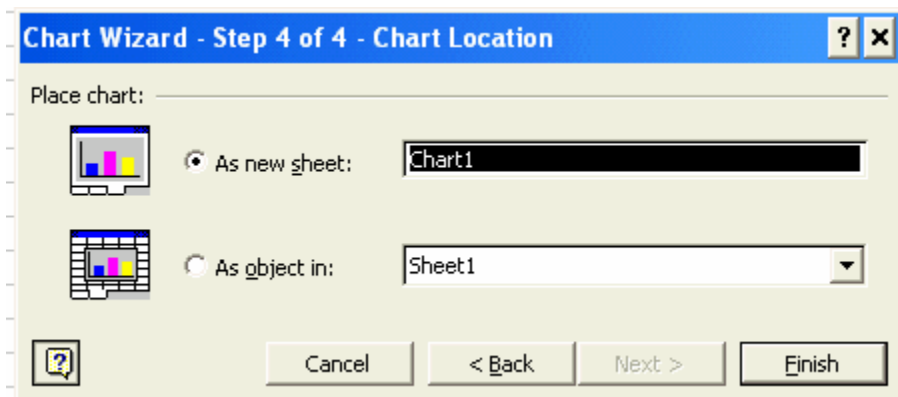


\*\* Under the **Axes** tab – Value (X) & Value (Y) should be selected so that values show on your axes. You can select/deselect to see the difference.

Under the **Gridlines** tab – you can tell Excel which gridlines you want on your graph.

The **Data Labels** tab allows you to select what information (if any) you want to show right next to the data point. You can check/uncheck to see the effect.

\*\* Click Next when your done.



Step 4 allows you to decide where you want the graph to be:

- On a new/separate sheet (now your spread sheet has 3 sheets as shown on the bottom -- Sheet 1, Sheet 2, and Sheet 3) which you call whatever – here “Chart1” is chosen.
- As an object in an existing sheet(default is the sheet your data is on)

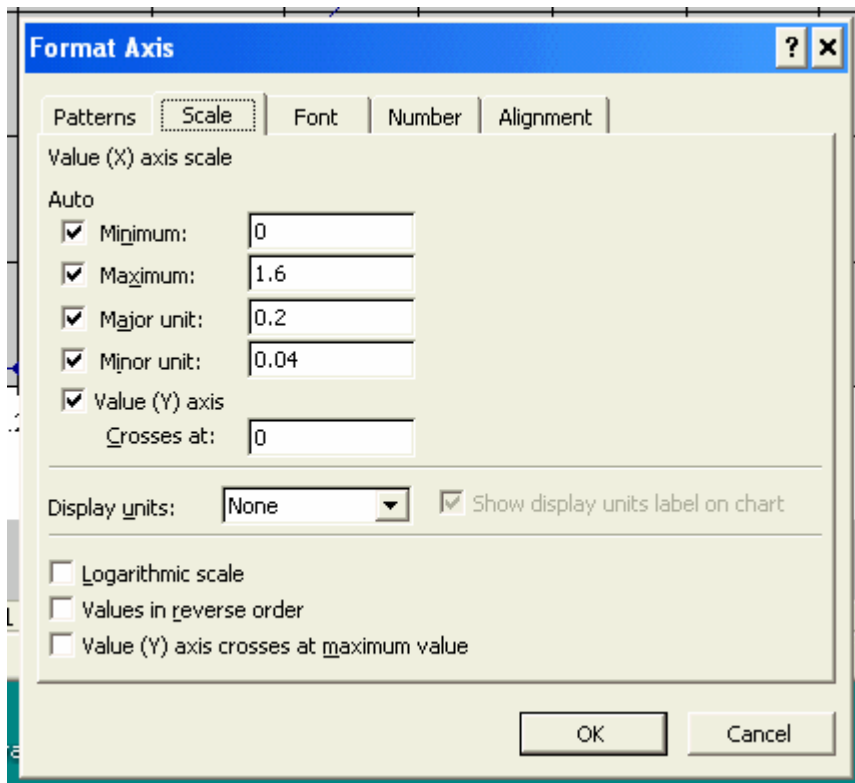
The choice is yours.

Click Finish. You now see the graph.

If you choose print from the pull down menu (File>Print), you will get a paper copy of this graph.

More Tweaking.....

You may want some adjustments on your X-axis and/or Y-axis. If you go along either axis and right-click, you can open the Format Axis menu:



From here, you can

- change the **pattern** lines on your axis,
- **Scale** – change max/min and increment on your axis
- **Font** – **Number** – **Alignment** tabs are pretty apparent when you click on the tab.

### Drawing a Best-Fit Line

- From the menu Chart – **Add Trendline** you can draw a best-fit line

### Display the R-squared value for a trendline

- Click the trendline for which you want to display the R-squared value.
- On the **Format** menu, click **Selected Trendline**.
- On the **Options** tab, select **Display R-squared value on chart**.