

## Excel Tutorial - Part III

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**Purpose:** Learn more about different types of graphs and how to make them.

**Importance:** Excel has powerful graphing capabilities that allow you to present your data effectively. Presenting data graphically is better than presenting it in tables. Results are clearer, trends are easier to identify and reporting your results is greatly simplified if you create understandable graphics.

**What to hand in:** N/A

**Goals:** After this activity, you will be able to:

- Format charts the way you want

**Software:** Microsoft Excel

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## SECTION 1: THE BASICS:

Let's go back to the cantilevered beam example that you did on the first part of the Excel tutorial. Go ahead and open that file. We are interested in the graph right now.

You will do the following to the graph:

- [Give it a title and label the axes](#)
- [Format the chart area, the axes and the line](#)
- [Add a second vertical axis for the moment](#)

## STEP 1: TITLE AND LABEL THE AXES

1. Right click anywhere on the white area of the graph and select **Chart Options**
2. Fill in the boxes in the window that appears. Give the chart a meaningful title and label the axes appropriately. For now, let's label the y-axis as stress. It is **ABSOLUTELY NECESSARY** to include the units in the labels such as inches and pounds per square inch (psi) in this case.
3. You can experiment with the other options in the dialog box shown above. Click on **Axes, Gridlines, Legend** or **Data Labels** and change a few options to learn how they work.
4. When you are done click on **Ok**.

## STEP 2: CHART AREA, AXES AND LINE FORMATS

1. Right click on the gray area and select **Format Plot Area**. Notice that there is a difference between clicking on the gray area and clicking on the white area. The white area is called the **Chart Area**. The gray area is called the **Plot Area**.
2. You can change the border and the shading of your plot area here. Try an automatic border and no area shading. Click on **Ok** after you are done.
3. To format the axes, right click on each axis and select **Format Axis**. You will know the axes are selected if you see two black dots at the end of the axes.
4. The best way to learn is to experiment with the options and see what happens. Make sure you explore the tabs for **Scale, Font, Number** and **Alignment**.
5. To format the lines you do the same. Right click each line and select **Format Data Series**.
6. Select the options you want and check out the results. Click **Ok** at the end.

### STEP 3: SECOND VERTICAL AXIS

1. To add a second vertical axis for the *moment*, right click on the line that shows the data for the moment and select **Format Data Series**.
  2. Click on the **Axis** tab and check **Secondary axis**.
  3. Click on **Ok**. The axis should now appear on the right side of the chart. NOTE: You need to make sure you enact the necessary steps to title and provide units for the secondary axis.
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## SECTION 2: SOURCE DATA:

This section deals with the definition of the source data used to create a chart. The first time you created the chart, you probably selected the data range you wanted and clicked on **Insert->Chart**. Now you will learn how to define the data source yourself and how to name it.

Let's start with a simple example. Let's say you want to measure the ambient temperature every hour during the day for a complete week and plot the results.

If you select the range from the cell that says **Time** to the cell that says **70** at the bottom right corner of the table and click on **Insert->Chart**, Excel automatically creates a graph. However, let's assume that you only want to see a plot for Monday, Tuesday and Saturday. Just select any empty cell on the spreadsheet and click on **Insert->Chart**. The usual dialog box appears. Choose the highlighted options.

In most cases, you would want to use the lower left option, which connects data points with straight lines. This is typically used over the option which adds curvature to the line between data points. Why? In most cases, adding curvature to a plot without the data to back it up is considered bad practice. This is analogous to permitting the computer to "add imaginary data" to your experimental data.

For the purposes of this exercise, you may assume that the temperature transition between one hour and the next is a smooth transition. Click on **Next**.

In the next dialog box, select the **Series** tab. Then click on **Add**. Type the name of your series in the box that says **Name** or click on the cell on the spreadsheet that contains the name of your series. Then select the **X-Values** and **Y-Values** of your series. You may type them in the format shown below, or select the data by clicking on the first data point and dragging to the last. The **X-Values** would be the time of day and the **Y-Values** would be the temperature values for Monday. Click on **Add** again and repeat the process for Tuesday and Saturday. Then click on **Next** and follow the steps outlined in [Section 1](#) to format the chart to your liking.

It would be good to format the scale of the x-axis to show the hours like 8:00am, 10:00am, and so on. Right click on the x-axis and select **Format Axis**. In the dialog box that appears select the **Scale** tab and fill it in. Click on **OK** after you are done.

Some modifications would be good. For example, you can incline the text below the x-axis to make it fit nicely and you can format the data series and the plot area. To change the alignment of the text you right click on the x-axis, choose **Format Axis**, select the **Alignment** tab and change the alignment to 45 degrees.

If later on you decide to add another day to your chart, just right click on the chart area. Remember, the chart area is the white area around the plot and the plot area is the area delimited by your axes. After you right click the chart area select **Source Data** and add another series for Sunday for example. Your series will be automatically added to the chart and to the legend. You might need to format the line.