

Charts in Excel 2007

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Introduction – Charts in Excel 2007

Basic charts for use in the sciences may be generated in Excel, which provides options for plotting your data onto different types of charts. The most commonly used are line charts, column (or bar) charts and x-y scatter charts. Line and column charts are suitable for data that are measured at regular intervals (e.g. monthly monitoring of the number of individuals in a changing population – the population is variable but the months are fixed intervals that always occur in the same order). The x-y scatter chart is appropriate for data where the x-values and y-values are both variable and can occur in any order. This example demonstrates how to construct an x-y scatter chart from a subset of data from the Star Cluster Photometry Teaching Module.

Part 1: Generating a Basic Chart

To generate an x-y scatter chart, it is easiest if the data are already arranged with a column of x-values and a column of y-values adjacent to each other. The columns may contain numbers or formulas. Excel will automatically plot the left column as the x-values and the right column as the y-values on the chart.

1. Selecting the Data and Generating the Raw Chart

Highlight the two columns of data, as in Figure 1, and click on **Scatter** and then on the top left image on the **Scatter** menu. This will place the raw chart into the worksheet as in Figure 2.

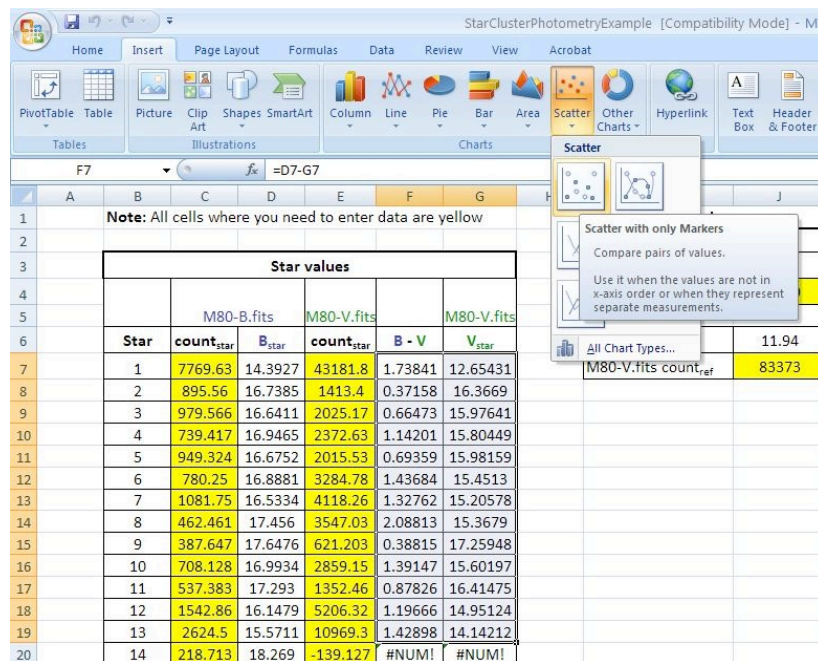


Figure 1: Data to be plotted using the Chart Wizard are highlighted. Note that in this example, the **B-V** and **V_{star}** entries on row 14 are invalid and display **#NUM!**. The contents of these cells should be deleted if including a full column of data with valid entries above and below the invalid entries.

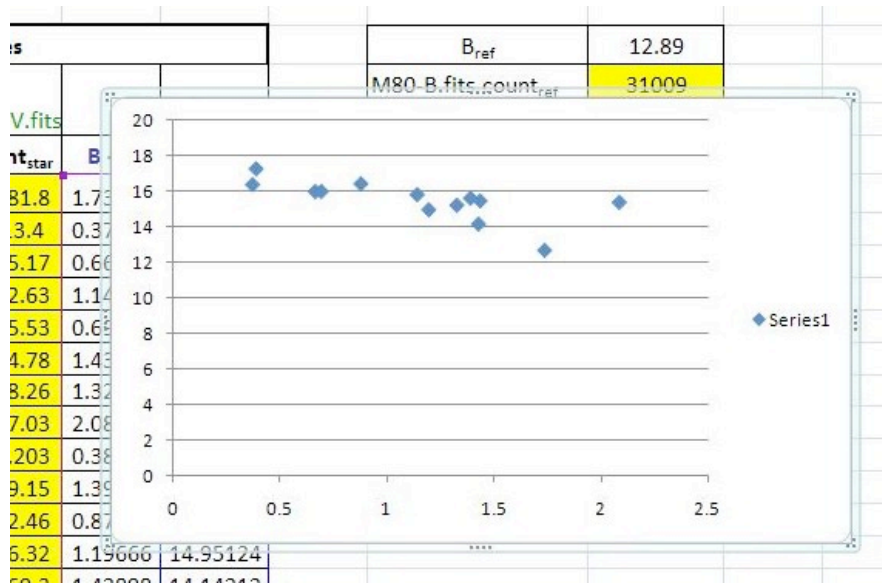


Figure 2: The raw chart.

2. Naming the First Data Series

Double-click **Series1** on your chart. This opens a window (see Figure 3, left) that allows you to **Add** or **Edit** your data series (each series is a set of x-y values). To name your data series, click **Edit** and another window opens (see Figure 3, right) where you can enter a **Series name**. Type in **M80** and then click **OK**.

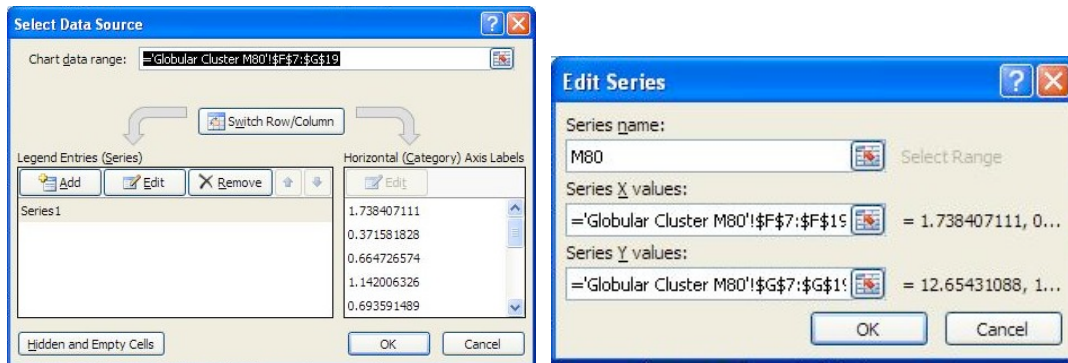


Figure 3: Naming your data series.

3. Adding Titles

At the very top of the screen you should see the **Chart Tools** menu, and below are three options: **Design**, **Layout** and **Format**. So far you have been in the **Design** tab. Now click on the **Layout** tab. You will see icons for **Chart Title** and **Axis Titles** (see Figure 4). Use these menus and boxes to add titles to your chart. When you select one of the options, whatever you type will, at first, only appear in the formula bar and doesn't show up on the chart until you click **Enter**.

For this example, add these labels:

- Chart title: **H-R Diagram**
- Value (X) axis: **B-V**
- Value (Y) axis: **V magnitude**

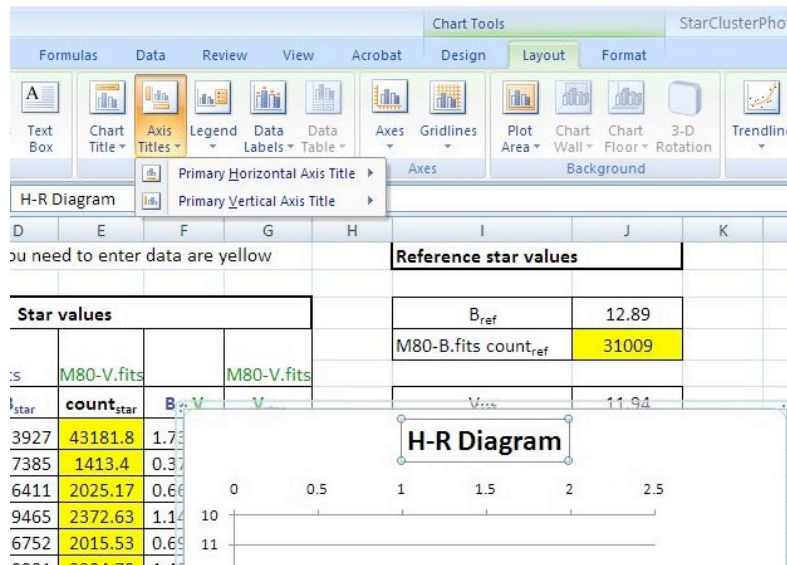
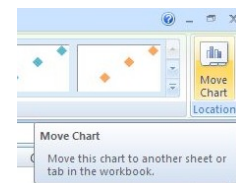


Figure 4: Adding Titles using the **Chart Title** and **Axis Titles** menus.

4. Moving the Chart

You can choose whether to have the chart show up on a separate tab in your Excel file or to leave it on the spreadsheet itself alongside your data. For this example, go back to the **Design** tab and find the **Move Chart** icon at the top right of your screen. This opens to a menu where you can choose to move the chart to a **New Sheet**. Check this button and then click **OK**.



Your chart will now be displayed on a separate tab and occupy the whole window. This makes it much easier to see your data.

Part 2: Adding Another Data Series

In many cases, you will need to plot more than one series. To add another series:


1. Locate the new Data Series

The second data series is usually another pair of columns of data. It may be in the same file on the same tab or on a different tab. It may even be in another file, but the file should be open. For this exercise, sample data from the **NGC 2420** tab will be used.

2. Go to your Chart

Make sure you are effectively “in” the chart you want to add the new data to. Either click onto the chart (if it is in your spreadsheet) or click on the **Chart** tab (if the chart has been set up on a separate tab).

3. Add a New Data Series

Double-click the legend on your chart (it should now say **M80**). This opens the **Select Data Source** window (see Figure 3, left) that allows you to **Add** another data series. Click on the **Add** button and enter a series name in the **Edit Series** window (Figure 5). The **Series X values** box is initially blank and the **Series Y values** may say **= {1}**. To add the new data, click on the right side of the **X-values** box where there is a little symbol with a red arrow .

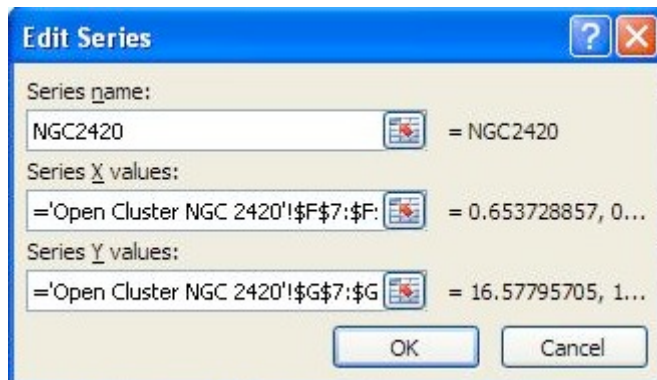


Figure 5: Adding a second data series.

When you click on this icon and the Chart Wizard will minimise to a single row. Click on the tab where you have your new data and select the column of data that will be your x-values. This range should now appear in the “mini” Chart Wizard as in Figure 6.



Figure 6: The “mini” Chart Wizard for adding new data.

Return to the Chart Wizard by clicking the little icon on the right (with the red down arrow).

4. Add the Y-series Data

Repeat Step 3, this time choosing the symbol alongside the **Y-values** box and selecting the column of data that will be your y-values. Click **OK**. Your chart should now look something like Figure 7, with two series of data in different colours, labelled axes, a title and a legend. Note, however that further changes have been made to this chart – the y-axis runs in the opposite direction and only ranges between 10 and 18. Instructions for these options are in Part 3.

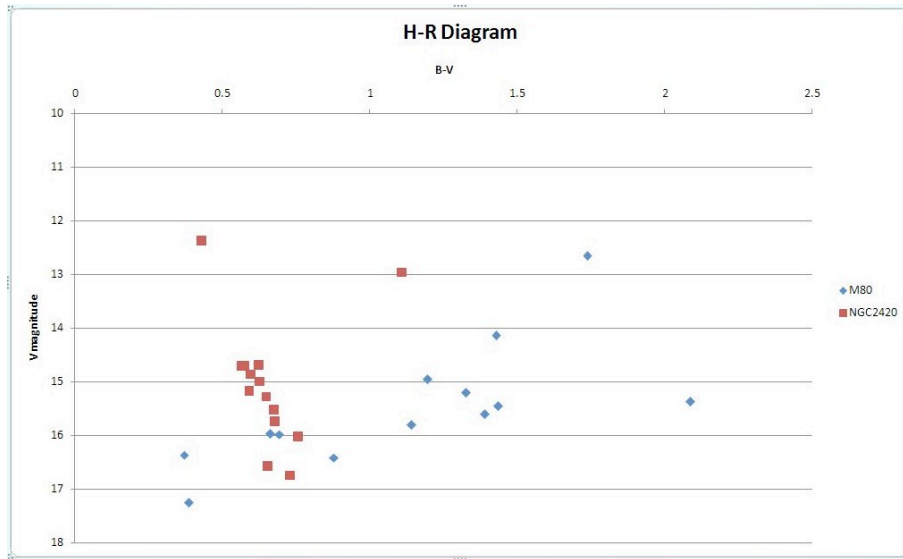


Figure 7: A complete chart.

Part 3: Other Handy Options

Many options that change the appearance of the chart rely on right-clicking the particular chart component that you wish to alter. A selection of these options is described below.

1. Changing the Range and Order on an Axis

When plotting magnitudes in astronomy, recall that the magnitude scale has small numbers for bright stars and large numbers for faint stars. This means that in the chart shown in Figure 2, the bright stars are represented by the data points lower down and the faint stars are shown by the data points nearer the top of the chart. Also note that there are no data at all with magnitudes between 0 and 12. To reverse the axis and restrict its range (so that the chart is not half-full of empty space), right-click on any number on the y-axis and a new menu will open (see Figure 8, left). Select **Format Axis** to see the **Axis Options** (Figure 8, right). Check the **Minimum** button and enter 10 as the minimum, tick the check-box that says **Values in reverse order** and click **Close**. Note that this changes the position of the x-axis, moving it to the top of the chart.

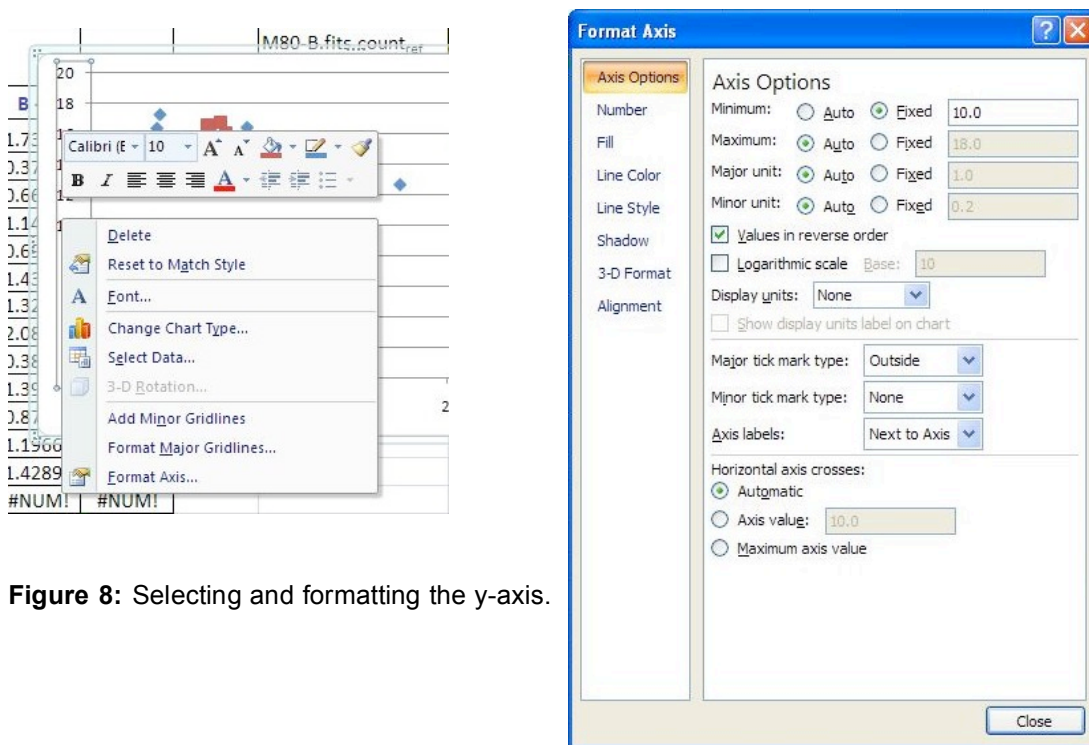


Figure 8: Selecting and formatting the y-axis.

2. Changing the Appearance of the Data Series

If you want to change the colour or symbol used for the data, right-click on one of the data points on your chart and select **Format Data Series**. The window should look like Figure 9. Here you can change the **Size** and **Type** (shape) of the data points in the selected series. You can experiment with different options to create a clear, easy-to-view chart. Remember that you may wish to be able to print your chart in black-and-white, in which case colours should be dark and shapes of symbols for different series need to be distinctive.

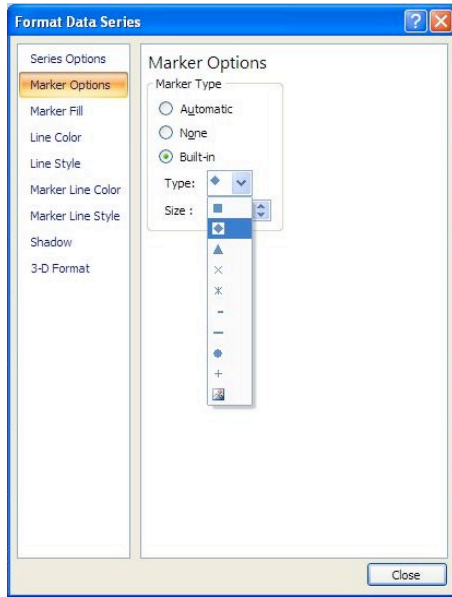


Figure 9: The Marker Options allow you to change the appearance of the data symbols on your chart.

With the previous steps performed, and choosing the + symbol for the blue data series, the final chart looks like Figure 10. Note that the blue data series is the same as the one shown in Figure 2.

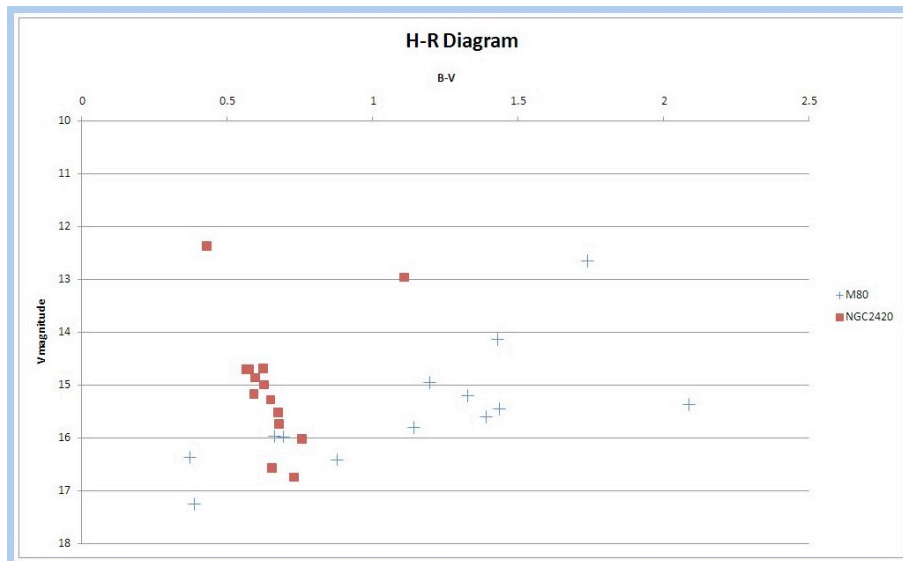


Figure 10: The final chart.