Intermediate

Excel: Creating and Customising Charts

Introduction
The exercises below introduce some of the different graphs available within Excel and how to customise them; the techniques used are broadly applicable to those graph types not covered.

Prerequisites
This document assumes that you are familiar with the use of a computer keyboard and mouse, have a working knowledge of Excel and can enter and select data.

Contents

About this Document

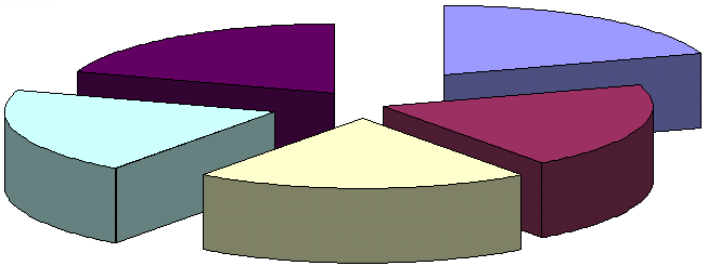
Words in **bold**	Will need to be typed or chosen from a menu or window
Small capitals – e.g. ALT	Indicate keys that you press
Bulleted lists	Are guidelines on how to perform a task
Choose **Insert** - **Picture**	Show menu commands – in this case, choose the option Picture from the Insert menu at the top of the screen

1. Some basics

1.1 Keep it simple

There are a few things to keep in mind before you produce a chart;

- You are trying to convey a message – and your chart should aid in that, not simply reproduce all the data for people to pick the sense from
- 3d charts distort the image



What size are the pieces of the pie chart above? *

- How is the chart to be used? You can use colours if it will be on screen or reproduced in colour, but should stick to obviously different shades, or patterns if it is to be printed in black and white, and especially if it will be photocopied or faxed
- Keep it simple – avoid clutter as much as possible, keep labels clear and brief
- Know your audience – tailor the level of detail and description accordingly
- Two simple charts may be better than one – but for comparing data one chart may be much better

* All are the same size – this effect can be mediated by, for instance, including the values on the chart, but the 3d is still a distortion

2. Introduction

Objectives To open Excel

2.1 Open Excel

- Open Excel. In ITS workstation rooms you will find it under **Start – Programs – Microsoft Office – Excel 2003**

Excel automatically starts with three worksheets; you may switch between them by using the tabs at the bottom of the screen

Figure 2-1

New sheets are inserted by choosing **Insert – Worksheet**

You may move around the current worksheet by using the arrow keys or the mouse

3. Laying out the data

3.1 Adding data

You will of course need some data to make your chart. The more clearly labelled and laid out that data is, the easier it will be to produce a chart from it.

- In a new spreadsheet, enter the data as shown below (remember to use the drag handle to insert the dates) – the actual numbers you enter are not overly important, but keep them all between 1 and 15

	A	B	C	D
1		Apples	Oranges	Lemons
2	January	6	4	7
3	February	12	7	1
4	March	8	5	3
5	April	7	2	6
6	May	3	10	3
7	June	10	2	2
8	July	4	5	11
9	August	2	3	11
10	September	11	12	8
11	October	5	6	9
12	November	4	8	2
13	December	9	10	5

Note that:

- There are no gaps between rows or columns
- The data as entered has a header row, which labels each column
- The upper left cell is left blank
- There is a column of categories (months, in this case) which label each row

4. The Chart Wizard

Objectives To create a chart from the data entered above

4.1 Select the data

We will use the Chart Wizard to create a column chart from the data just entered. The wizard runs through four steps, allowing you to customise your chart.

Although Excel will in some circumstances guess which data you want to include in your chart correctly, it is far better to take control and select that data from the outset.

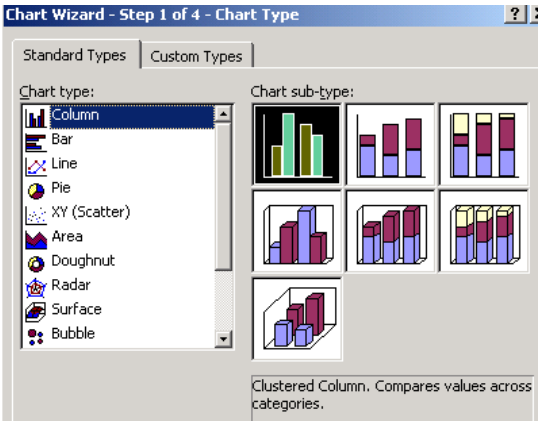
- Select all the data entered above, including all headings (Start at one corner of the data – you may select data with the mouse, by clicking and dragging, or the keyboard, by holding SHIFT and using the arrow keys)

- Click on the Chart Wizard icon  or choose **Insert - Chart**

4.2 Step One – Chart Type

A new window pops up. Excel groups charts by type on the left hand side, with those options available within each type available in the main part of the window.

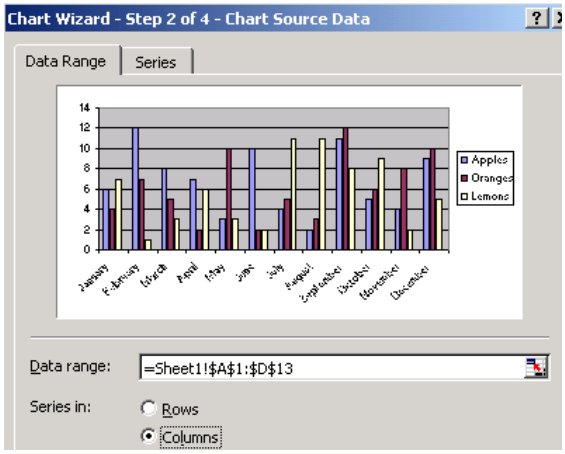
The two most commonly used column charts are the first two – clustered column and stacked column. We will use the Clustered Column, which should be selected already, as shown in the screenshot.



- Click Next

4.3 Step Two – Source Data

The next step shows you a preview of your chart. A couple of things to note;



You may switch between plotting by Row or by Column – with the data we entered, either way makes sense, though this won't always be the case.

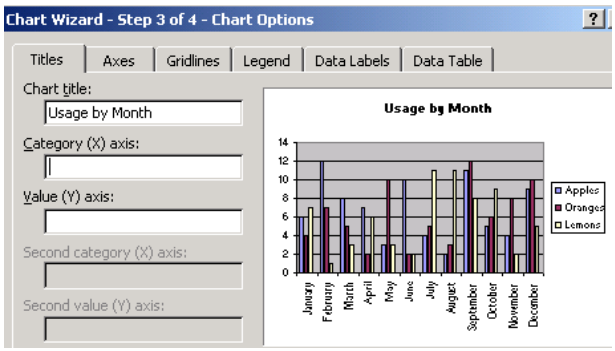
- Change to plot by Columns, as shown above

The Data range box shows where the source data is.

- Click into the Data range box. Note the "marching ants" around your source data
- Click back on the word "Columns" to stop the ants
- Click Next

4.4 Step Three – Chart options

Most options are contained within this step – you can always return to them by choosing **Chart options** from the Chart menu.

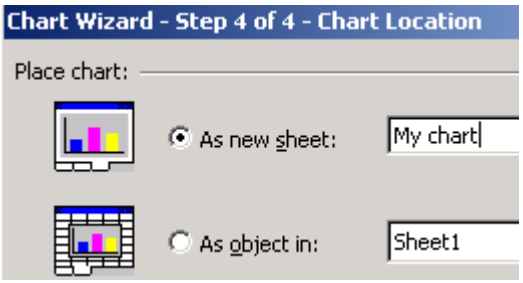


From here you may add a title for the chart and labels for the axes, switch the legend on/off, add data labels and the data table and switch gridlines on or off.

- Add a title to the chart
- Click Next

4.5 Step Four – Chart location

Finally, you should decide where the chart goes, either as an object on the same sheet as the data (or another sheet if you change what is displayed in that box), or on its own, new, sheet, which will have whatever name you give it. Either will work, but a chart inserted onto a new sheet gives that chart a little more space. In addition, pasting into Word a chart inserted as an object leaves a border round the edge – charts on their own sheet have no border.



- Choose As new sheet and enter a label for the new sheet
- Click **Finish**

5. Chart Customisation

Objectives To change the appearance of the chart

5.1 Colours and fills

There are lots of different "areas" on Excel charts, which give different options when double-clicked. Most are obvious, but there are one or two fiddly ones – for instance, the label for an axis is separate to the axis. Double-clicking on the label allows you to change font, colour etc. Double-clicking on the axis allows you to change the scale as well.

Change colour

- Double-click on one of the yellow bars on the chart
- Change the colour to white on the right-hand side
- Note the options for to "Border" on the left – these relate to the line around each column in this series
- Click OK

If you find double-clicking fiddly, either right-click and choose Format Data Series, or click once and choose Format – Selected Data Series from the menu

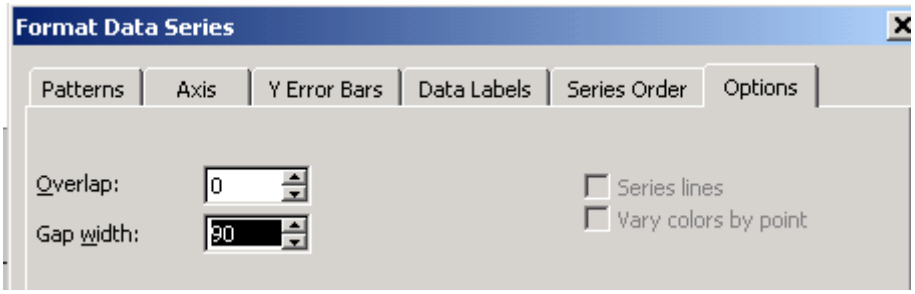
Use a pattern

- Double-click on one of the red bars on the chart
- Click on **Fill Effects**
- Click on the pattern tab
- Choose a pattern
- Change the foreground colour to black
- Click OK

Make columns fatter

- Double-click on one of the blue bars on the chart

- Click on the **Series Order** tab
- Click on Move down – note the order of the columns changes in the preview (not yet on the main chart)
- Click on the **Options** tab
- Change the Gap width to 90, as shown below



- Click OK

Grey background

The background to the chart is known as the **Plot Area**.

- Double click in that area – avoid the gridlines, which are tricky to click on but may interfere
- Change both Border and Area to "none" – that removes the grey background and the line around the edge of the plot area
- Click OK

5.2 Gridlines

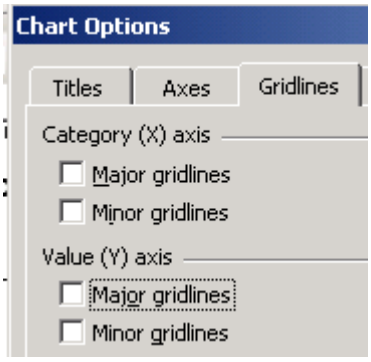
The only items on the chart that cannot be removed by double-clicking are the gridlines. For those you will need to open the Chart options

Either

- Choose **Chart – Chart Options** from the menu

Or

- Right-click on a blank area of the chart (the Plot area, or the white area outside that) and choose Chart Options



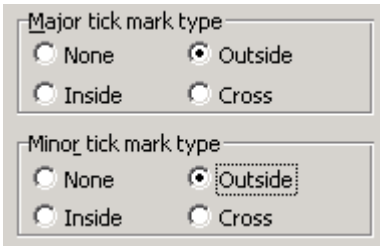
Then

- Click on the **Gridlines** tab
- Untick the Major Gridlines
- Click OK

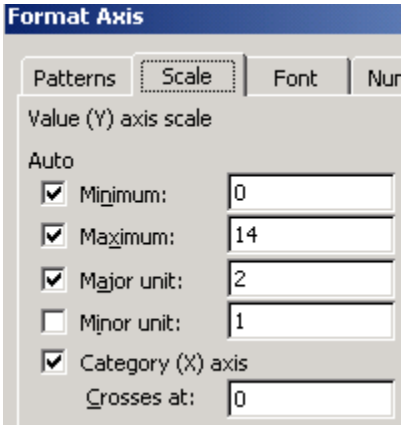
5.3 Change the Scale of the Y Axis

At the moment, the Y axis shows all the even numbers up to 14 (or higher if your numbers were bigger). We will change it to show a mark for each value.

- Double-click on any number on the Y axis
- On the **Patterns** tab, switch on Minor Tick marks, outside – as shown below



- Click on the **Scale** tab



- The minor tick marks we switched on will be displayed at every increment of the value shown in the Minor Unit box. At 0.4 it is too low – change that figure to 1

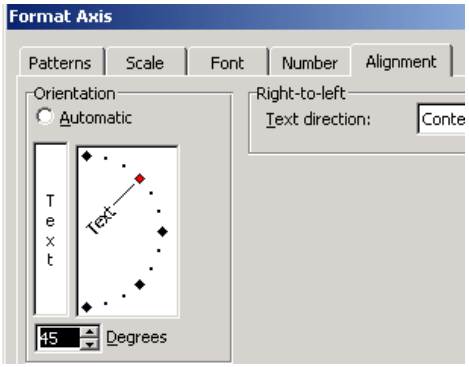
- Click OK

5.4 The X Axis

The X axis sensibly shows the name of each month and so needs little adjustment – note, though, that with more categories, or longer names, Excel may run out of space to display them all, and will hide every other one, or more. Should that happen, you have two options;

1. Increase the size of the chart (not possible if it is already on its own sheet)
2. Change the orientation of the text labels

- Double-click on any of the month names
- Click on the **alignment** tab
- Rotate the text, as in the screenshot below (note that the "Offset" number, also on this tab, is the space between the axis and the labels)
- Click OK



6. Pie Chart

Objectives To create and customise a pie chart

6.1 Enter data

On a blank spreadsheet within the same workbook (use the tabs at the bottom of the screen to switch between sheets), enter the data shown below.

	A	B
1		Ambulance Missions
2	Road Traffic Accidents	44
3	Horse riding	11
4	Medical emergency	10
5	Sporting	10
6	Collapses	7
7	Falls	6
8	Cardiac arrest	6
9	Chest pain	3
10	Works/farm	3

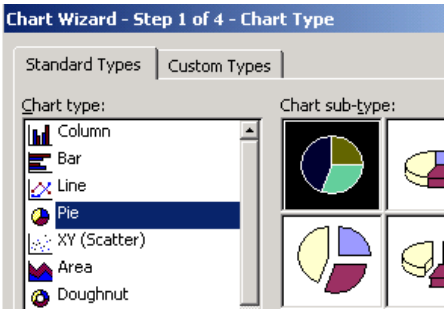
6.2 Create a pie chart

Again, it is best to select the data before you insert the chart

- Select all the data you just entered, using either the mouse or the keyboard
- Click on the Chart wizard icon 

Step 1

- Choose **Pie** from the list of types, and ordinary pie from those
- Click Next



6.3 Step 2 – Chart Source data

There is little to change here – note that changing from displaying series in columns to displaying the series in rows ruins the chart

- Click Next

Step 3 – Chart Options

Note that the Chart title has been filled in automatically from the column heading

- Click on the **Data labels** tab
- Put a tick next to **Percentage** to display those values on the chart
- Click Next

Step 4 – Chart location

- Insert the chart as a new sheet

6.4 Customisation

The finished chart, once on its own sheet, is less squashed than the preview within the wizard would have suggested. However, the text is a little small.

- Click once on the chart title
- Use the toolbar – just as you would in Word – to change the typeface to Arial Black and the size to 24
- Click once on any of the percentages
- Use the toolbar again to change the size to 12

The legend is doing its job, but we are forcing people to refer to it in order to decipher the chart. We will remove the legend and add the category descriptions directly to the chart.

- Click once on the legend
- Press the DELETE key (if you prefer, you can cut it, or right-click and click clear)

We now need to use the Chart options to add the labels to the chart

- Choose **Chart – Chart options**
- On the **Data labels** tab, put a tick next to **Category name**
- Click OK

6.5 Group versus individual selection

At the top of the chart, one or two of the categories are not a little bunched together. We will select them individually so as to rearrange them.

- Click once on any one of the category descriptions (e.g. Sporting)

Note that all of the descriptions are selected together – allowing you to change the font, size colour and so on of them all together

- Click again on a different description

Now, only the description you clicked on is selected – the secret to selecting one item on its own is to click twice, but without double-clicking

- You may now click and drag any individual description as you want – as it is moved further from the chart, a line appears to connect it to the correct part of the chart

The same technique may be used on slices of the pie chart

- Click twice slowly on the largest section
- Drag it away from the rest of the chart

With an individual slice selected, you may also change the colour of that category

- Double-click on the same slice
- Change the colour of the slice to green

Should you need to select all the slices together again, you should click away – a blank section of the chart, such as the plot area, is ideal – and then click again on a slice.

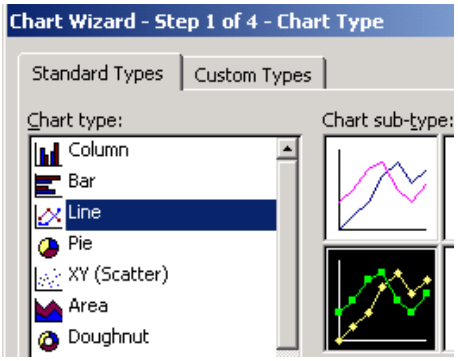
7. Line chart and custom markers

Objectives To plot and customise a line chart

7.1 Use existing data

Line charts treat values on the x axis purely as non-numeric, categorical information and spaces it equally along the axis – they work best, therefore, with non numerical data on that axis.

- Use the tabs at the bottom to return to the data entered in exercise 3
- Select all that data
- Click on the Chart Wizard
- From the list of types, choose **Line**
- Select the Line with Markers type, as shown
- Click Next



Step 2
Again, we can plot the data in columns or rows

- Select Rows to see the difference
- Change back to Columns
- Click Next

Step 3 – Chart Options
The chart needs little added, but we will make a couple of changes

- On the **Titles** tab, add the chart title "Fruit bought over time"
- On the Gridlines tab, switch off all gridlines
- Click Next

Step 4 – Chart Location

- Insert the chart as a new sheet called Line Chart

7.2 Customisation

We will make a few changes to the chart

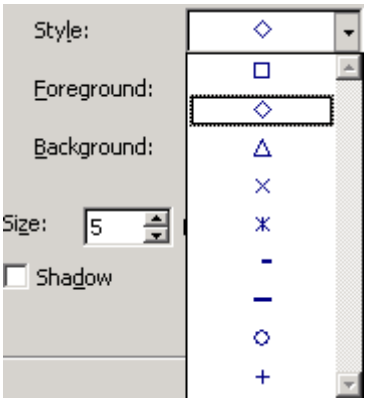
- Double click on the plot area and remove the border and background (change both to "None"

- Click on each axis in turn and use the toolbar to change the font size to 14
- Click on the chart title and change the font size to 16

7.3 Change markers

Excel offers 9 styles of markers for the points within your data series. Two are only available if you change the background colour from "automatic" to white

- Double-click on any point on your line chart
- On the **Patterns** tab, under the Markers category, click on the drop-down next to Style
- Change the shape to a circle
- Click OK



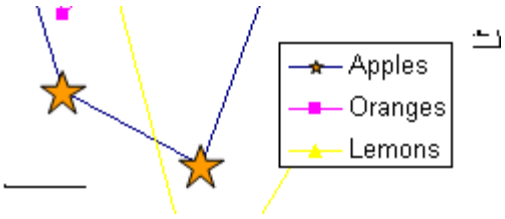
The screenshot on the right shows a slightly different selection – the two at the bottom are different

- Double-click on any point on your line chart
- On the **Patterns** tab, under the Markers category, change the background colour from automatic to white
- Click on the drop-down next to Style
- Choose the + symbol from the bottom of the list

7.4 Custom markers

Although Excel limits the choice to 9 markers from the drop-down you can in fact use any shape.

- From the **drawing toolbar** at the bottom of the screen (if you cannot see it, click on the  icon), click on **Autoshapes – Stars and Banners** and pick the 5-point star (top right)
- Click and drag on the chart to draw a star – make it a little under a centimetre (approx) across
- Double-click on the star and give it a fill colour other than white
- With the star selected, copy it
- Select any point on the Apples data series
- Click Paste (note that right-clicking will not work – use the icon, the menu option or CTRL + V for paste)
- Click on the original star and delete it



The same technique will work for pictures

- From the menu, choose **Insert – Picture – Clip Art**
- Type Orange in the Search for: box
- Wait a few seconds for the results – click once on a suitable picture to insert it
- Resize the picture (click on it once, then click and drag any corner) to make it

much smaller
- Copy the inserted picture
- Select any point on the Oranges data series
- Paste (CTRL + V) the picture onto that series

Note that if you select an individual point of data, you may apply a particular picture to that point alone – useful if you want to draw attention to just that point.

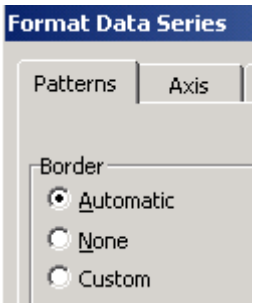
7.5 Custom building blocks on a bar chart

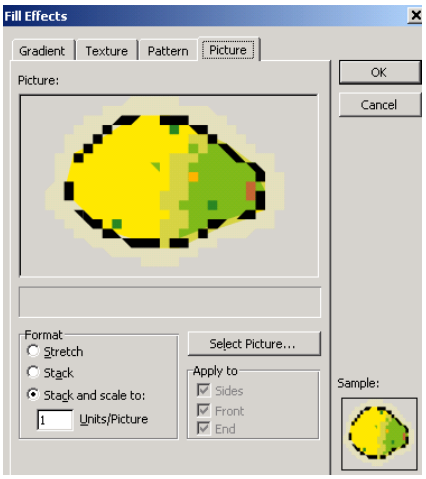
You may achieve the same effect on a bar chart – however, in this case a simple paste will cause the picture to be stretched to fill the whole bar, which is unlikely to give a good result. Better to make the picture a building block, so a higher bar uses a greater number of "blocks" of the picture piled on top of one another.

- Click on one of the lemons on the chart
- Copy that lemon
- Use the tabs at the bottom of the screen to return to the bar chart
- Click once on the bars representing lemons and paste (**Edit – Paste**)

The picture is stretched in each case to fill the bar shown on screen – we must tell Excel to stack the picture instead.

- Double-click on any bar in the data series
- On the **Patterns** tab, click on **Fill Effects**
- Click on the **Picture** tab
- At the bottom-left, choose to Stack and scale to 1 unit/picture, as shown
- Click OK on the Fill Effects window
- Back on the Patterns tab, change the Border to Automatic
- Click OK on the Format Data series window





If you have time, repeat for the other data series on the bar chart

8. Scatter graph

Objectives To plot a scatter chart

8.1 Open a set of data

Where you have data with two sets of numbers that are to be plotted against each other, such as coordinates.

- In Windows Explorer, go to Departments (P:), ITS
- Open the spreadsheet OldApps1 on Win2k3…\ecdl\DailyRainfall.xls

- Select all the data (A1:B15)
- Click on the Chart Wizard

Step 1

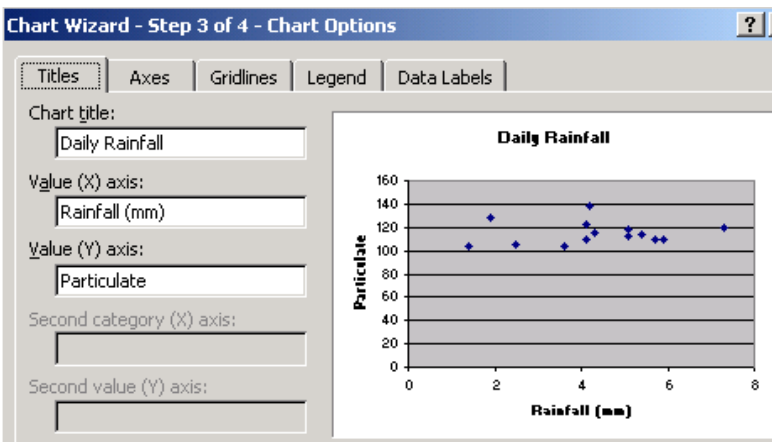
- From the list of types, pick XY (Scatter)
- Choose the top-left option, Scatter
- Click Next

Step 2

- Click Next

Step 3 – Chart Options

- On the **Legend** tab, switch off the legend
- On the **Titles** tab, change the Chart title to Daily Rainfall and label the X and Y axes as shown
- Click Next



Step 4 – Chart Location

- Insert the chart on a new sheet

If you have time: You may customise the chart – try removing the grey background and turning the points into + symbols. Note that Excel has plotted the x and y axes as numerical values – try creating a line chart from the same data to see the difference

9. Combination chart

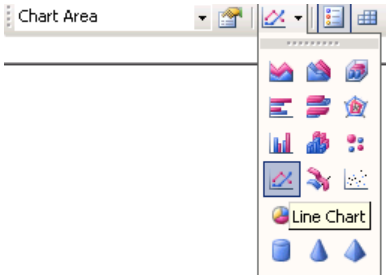
Objectives To display data series in different formats on one chart

9.1 Combine chart types

You may wish to compare slightly different pieces of data on one chart, or just to give one series a different look to make it easier to pick out from a busy chart. Doing so is simple.

When you choose to insert a new chart, there are a few combination types on the Custom tab. In fact, you can combine charts in all sorts of ways.

- Close the Daily Rainfall chart, if you still have it open
- On your original spreadsheet, return to the first bar chart you added
- Click on the series for Apples
- From the **chart toolbar**, click on the **chart type icon** and choose Line Chart (as shown below)



The other series are left intact, the data for Apples is now displayed as a line.

You may achieve the same effect by either right-clicking and choosing Chart type, or choosing the same option from the **Chart menu**.

9.2 More information

For more on Excel in general and charts in particular the excellent tutorials at http://peltiertech.com/Excel/ are recommended