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Office 2007

Excel

Charts

October 2007

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INTRODUCTION

These notes and exercises are aimed at those who want to explore alternative ways of presenting data to users.

Charts are an excellent choice as they are visually appealing, and make it much easier for your target audience to understand the data, rather than having to wade through columns of figures in a worksheet.

Microsoft Excel offers a large selection of different chart types, including pie, column, and line charts, as well as custom charts which can be user-defined or built-in.

Knowledge assumed

Experience of using Windows

Familiarity with a mouse, icons, loading software and click boxes

Either attended the Spreadsheet Introduction training course, or have experience of using Excel.

Areas covered

Creating different types of chart

Formatting charts

Document signposts

Instructions for you to type

Bold text

Shortcuts

Reminders

Notes

Exercises

CHART TYPES

Microsoft Excel offers a selection of standard charts:

Chart type	Use
Column	Compares data in a vertical format
Bar	Compares data in a horizontal format
Line	Compares data in a line format
Pie	Compares data in a percentage format
Scatter Plot	Compares pairs of values in a dot format
Area	Compares the trend of values over time or across categories
Doughnut	Compares multiple series of data in a percentage format
Radar	Displays changes in values relative to a centre point
Surface	Displays trends in values across two dimensions
Bubble	Compares sets of three values
Stock	Displays a chart for comparison of stock prices and quotes
Cylinder	Same as a column or bar chart, but uses a cylindrical format
Cone	Same as a column or bar chart, but uses a conical format
Pyramid	Same as a column or bar chart, but uses a pyramid format

You can create custom chart types by changing any of the standard or custom built-in chart types.

For example, if you want the same title information to appear on all of your department's charts, you can create a chart with that title, save the chart as a user-defined custom chart type, and then share it with others to use like a template.

CHOOSING A CHART

Before you can create a chart, you must enter data into a worksheet.

If you know the type of chart you want to create, it is a good idea to try and ensure that the data in your worksheet is arranged so that the resulting chart displays the information as you would expect. While you can manipulate the data later, it is much easier if you give a little thought beforehand to how you input the data.

For a Column or Bar chart, you need to arrange your data either in columns:

Fault number	Number of days
19003	6
17780	3

or rows:

Fault number	19003	17780
Number of days	6	3

For a Pie chart, you should use only one column or row of data. You can also use a column for labels, for example:

Kate Shelden	5
John Reynolds	4
Keith Ballard	9

For an XY scatter chart, arrange the data in columns, with x values in the first column and corresponding y values in the adjacent column:

X	Y
387	228
401	198

If, however, you can't decide which kind of chart to use, you can experiment with the different types until you find one you like.

For this training course, a number of files are provided for you, so there is no requirement to input data.

CREATING A COLUMN CHART

A column chart is one of the most popular types of chart.

- Open Excel

The data you are going to use to create the chart is saved in CSV (comma separated values) format.

This is a popular format for transferring data from one table-oriented application to another, because most database systems are able to import and export comma-delimited data.

The data in the file looks like this:

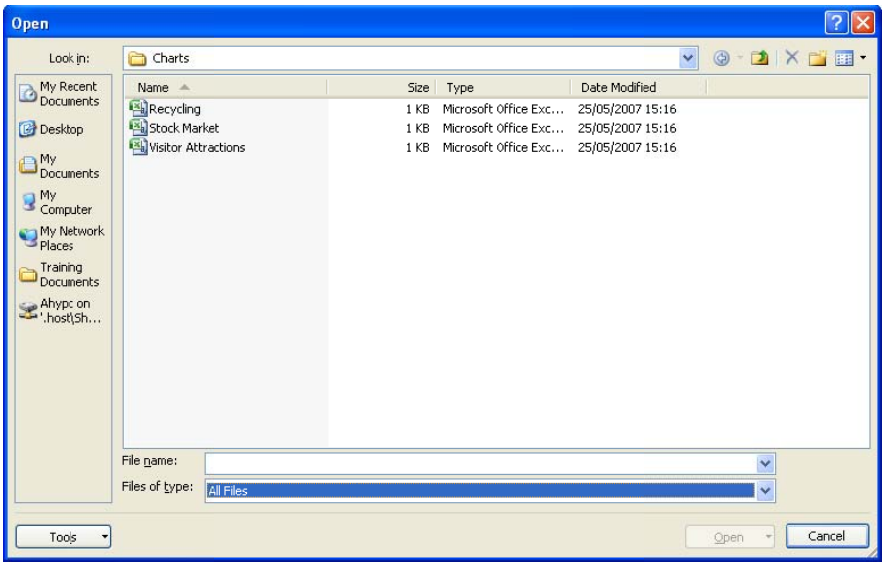
```
Top Visitor Attractions 2000,,

,1999,2000
Madame Tussauds's,2.6,2.4
Tower of London,2.4,2.3
Natural History Museum,1.7,2.3
Science Museum,1.5,1.3
Westminster Abbey,1.3,1.3
National Portrait Gallery,1,1.2
St Paul's Cathedral,1.1,1.2
London Zoo,1.1,1.2
```

Each comma instructs the software application to enter the data in a new column.

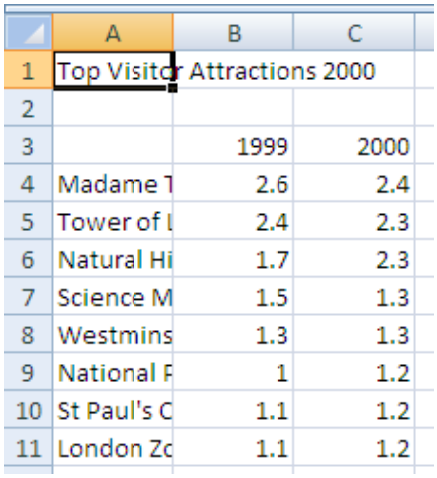
Even though this is not an Excel (.xls) file, this type of file can be opened in Excel.

- Click the **Office Button**
- Select **Open**
- Navigate to the **Charts** folder on drive C
- Select **All Files** in the **Files of type:** dialog box



- Select the file **Visitor Attractions**
- Click **Open**

The workbook is opened.



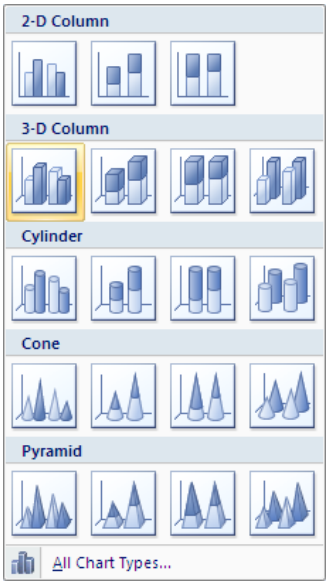
	A	B	C
1	Top Visitor Attractions 2000		
2			
3		1999	2000
4	Madame T	2.6	2.4
5	Tower of L	2.4	2.3
6	Natural Hi	1.7	2.3
7	Science M	1.5	1.3
8	Westmins	1.3	1.3
9	National F	1	1.2
10	St Paul's C	1.1	1.2
11	London Zc	1.1	1.2

- Save the file as an **Excel Workbook** with the filename **Attractions**

You need to select the data which will be displayed in the chart.

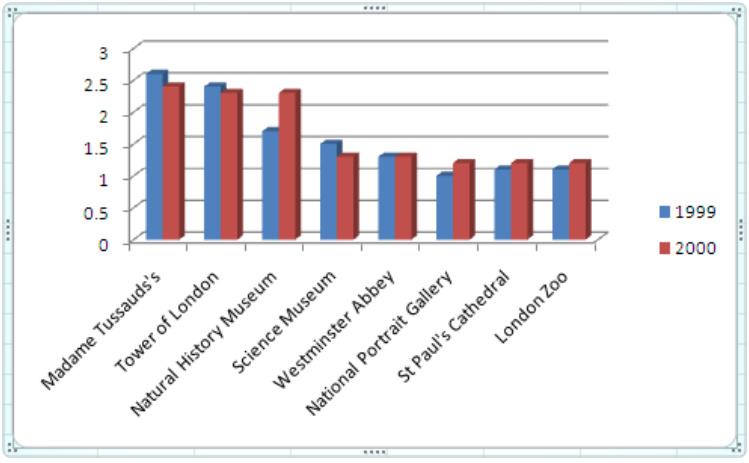
- Select cells **A3** to **C11**
- Select the **Insert** ribbon tab
- Click the **Column** button from the Charts group of commands 

A pop up window enables you to choose the type of column chart that you want for your diagram.



- Choose the first 3-D Column chart type

A basic 3-D column chart is drawn on the worksheet.



FORMATTING A COLUMN CHART

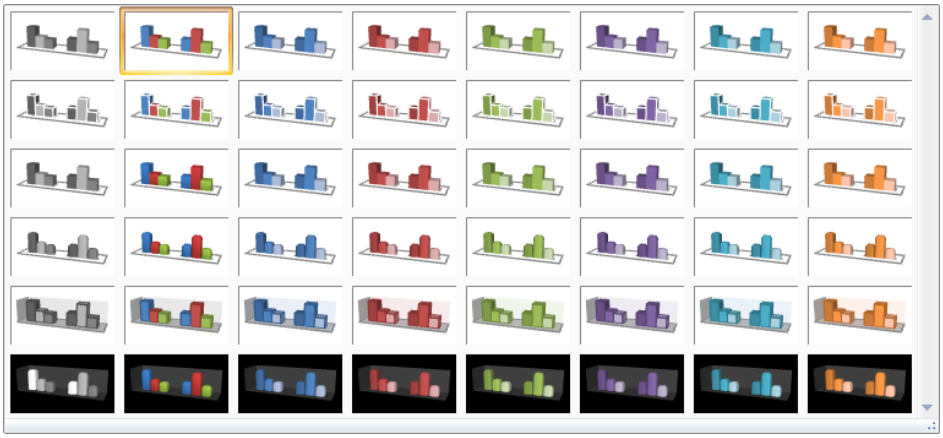
When a chart is selected, three additional ribbon tabs appear giving access to various chart tools. Tabs that appear when particular objects are selected are called contextual tabs. You will use tools on these contextual tabs to format the chart and give it a more professional look.

Changing the chart style

Excel has a number of built-in chart styles from which to choose.

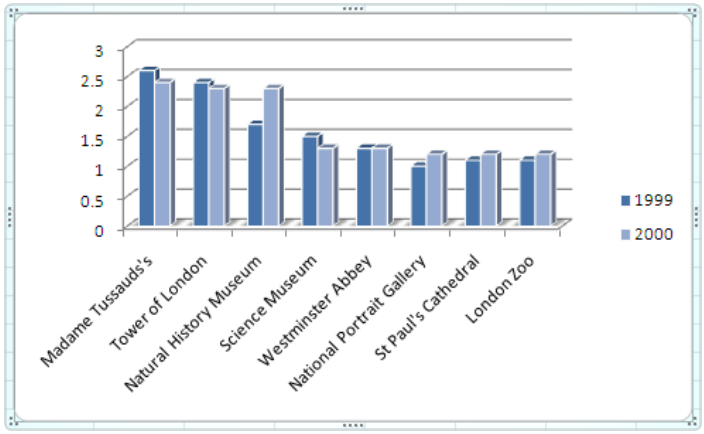
- Ensure that the column chart is selected
- Ensure that the **Design** contextual tab is selected
- Click the **More** button at the side of the **Chart Styles** group of commands 

A gallery of chart styles is displayed.



- Choose **Style 11**

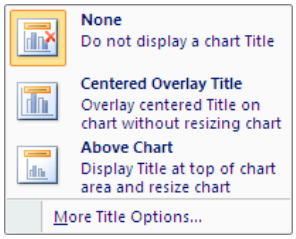
The new style is applied to the chart.



Adding a title to the chart

- Ensure that the chart is selected so that the contextual tabs are displayed
- Select the **Layout** contextual tab
- Select the **Chart Title** button from the **Labels** group of commands

A short list of options is displayed.

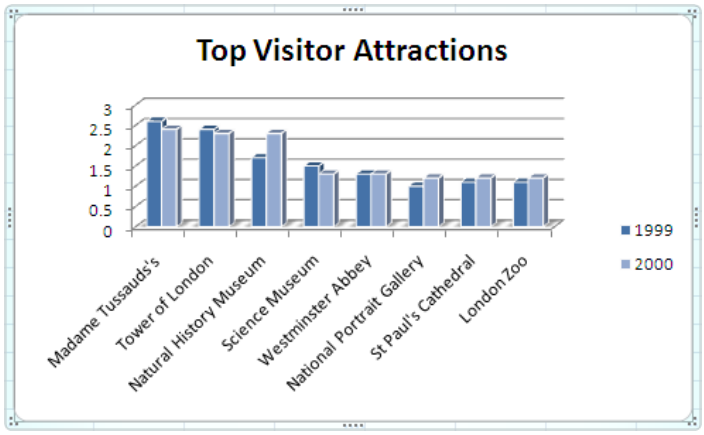


- Select **Above Chart**

A **Chart Title** place holder is positioned on the chart.

- Key in the title **Top Visitor Attractions**
- Press Enter

The new title is added to the chart.



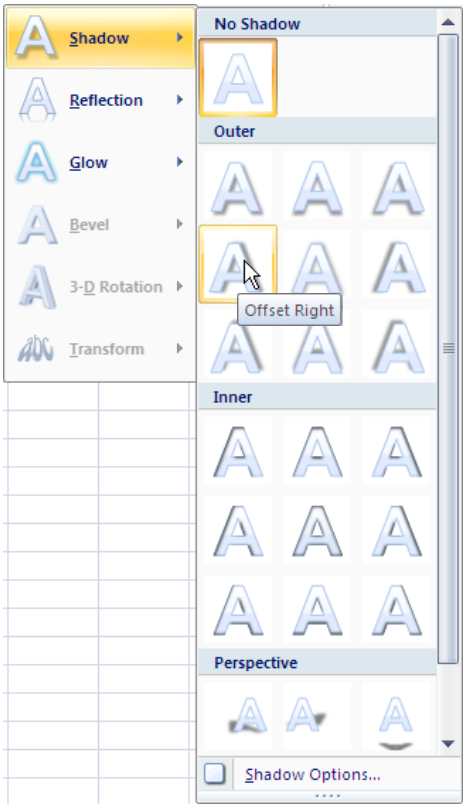
Remember to save the workbook regularly as you make changes to it.

Adding a drop shadow to the title

- Select the chart title 

- Select the **Format** contextual tab
- Select the **Text Effects** button from the **WordArt Styles** group of commands 
- Point to **Shadow** on the drop-down options

A gallery of shadow styles is displayed.

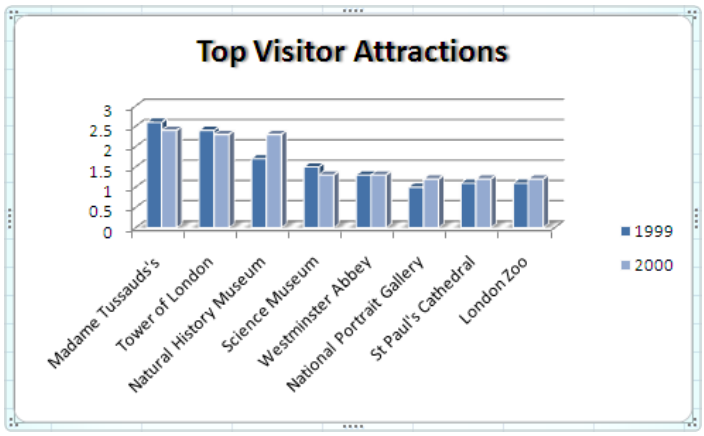


- Move the mouse pointer over some of the shadow styles to see the effects on the title text and the names of the styles
- Select the **Offset Right** shadow style

The title is formatted with the chosen style:

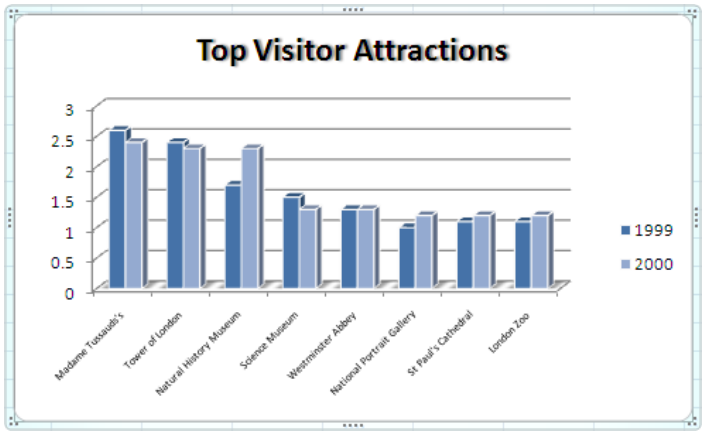
Top Visitor Attractions

The names of the attractions on the horizontal axis takes up almost half of the chart area space.



To change the proportion of space used by these labels you can either enlarge the chart area or use a smaller font size for the labels. In this exercise you will use a smaller font size.

- Select the names of the attractions on the horizontal axis
- Select the **Home** ribbon tab
- Change the font size to **6** using the **Font Size** dialog box in the **Font** group of commands



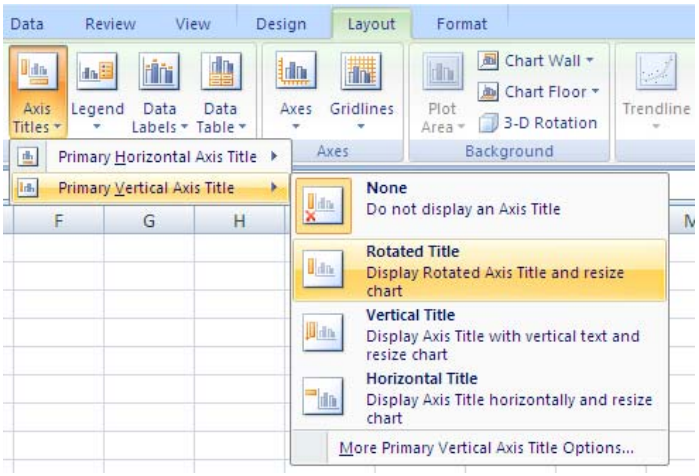
Adding an axis title

The number of visitors is measured in millions. This needs to be shown as a label for the vertical axis.

With the chart selected,

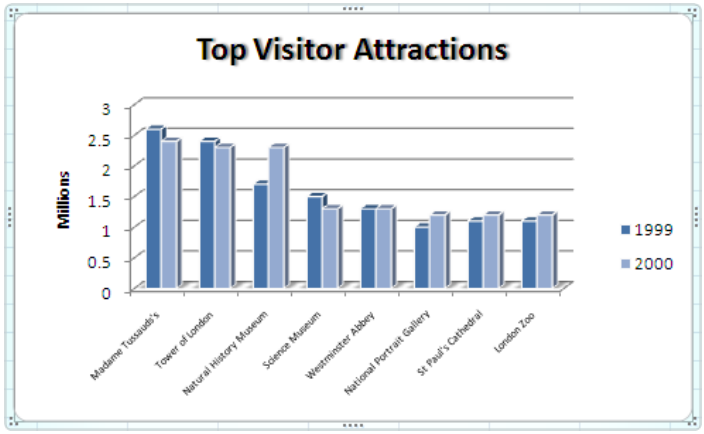
- Select the **Layout** contextual tab
- Select **Axis Titles** from the **Labels** group of commands

- Point to **Primary Vertical Axis Title**



- Select **Rotated Title**
- Key in **Millions**
- Press Enter

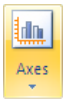
The axis title is added to the chart.



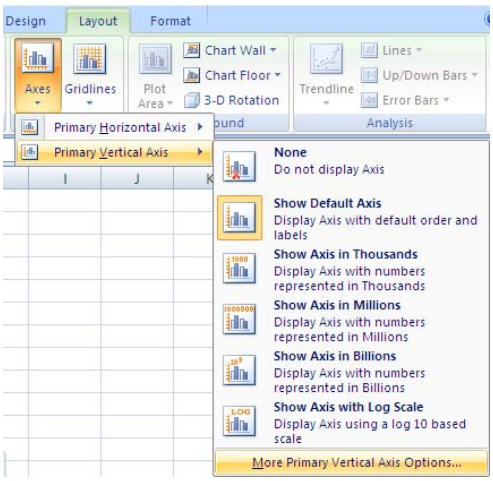
The current vertical scale has a range of 0 to 3 millions in intervals of 0.5 million.

The range is appropriate for the data, but the chart would look cleaner with fewer interval lines. You will therefore change the interval to 1 million.

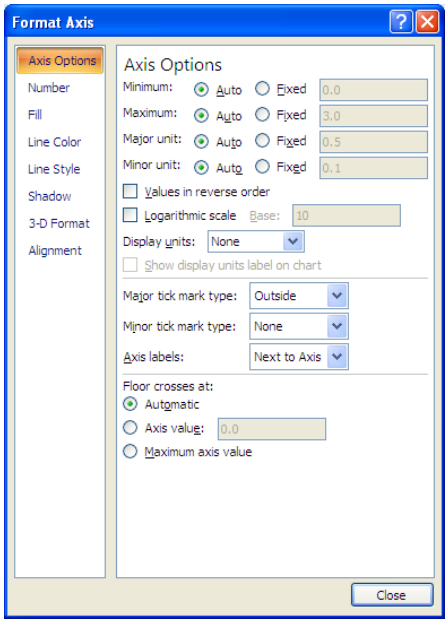
- Ensure that the **Layout** contextual tab is selected
- Select the **Axes** button from the **Axes** group of commands



- Point to **Primary Vertical Axis**

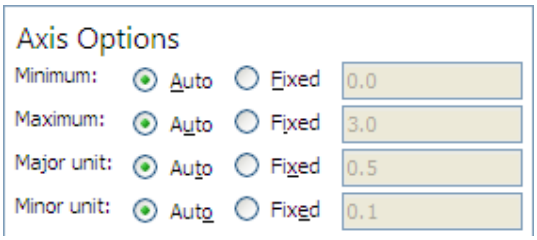


- Select **More Primary Vertical Axis Options** to bring up the **Format Axis** dialog box



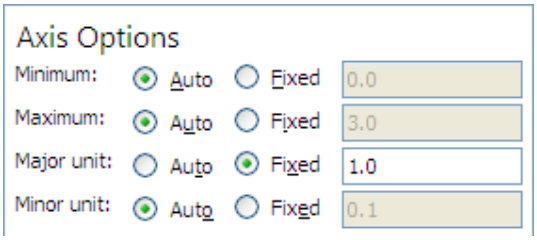
- Ensure that **Axis Options** is selected in the left pane

Notice that by default the scaling options on the axis are set automatically.



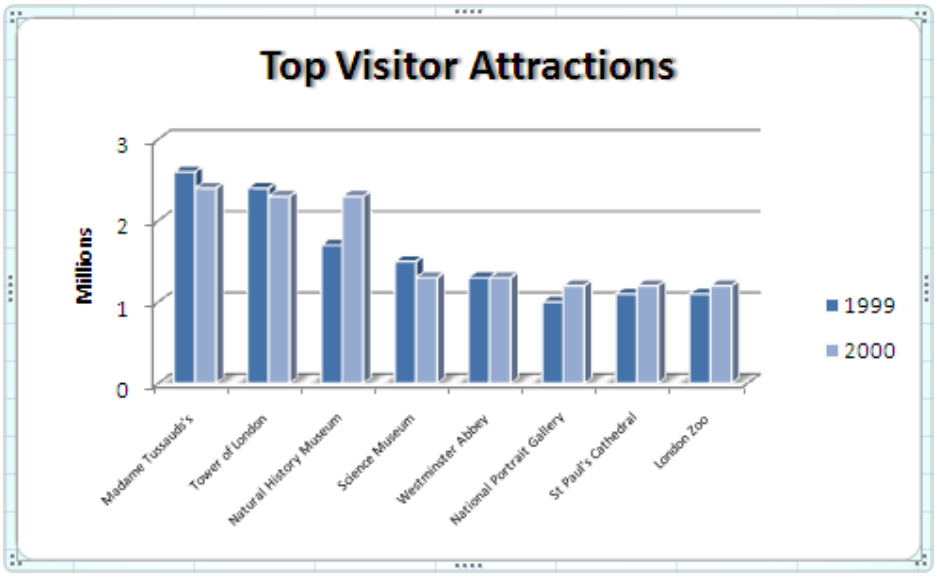
To change the intervals shown on the chart from 0.5 to 1, you need to alter the value for the Major unit in the Axis Options.

- Select the **Fixed** radio button for the Major unit
- Change the value to **1.0**



- Close the **Format Axis** dialog box

The vertical axis is changed.



Changing the chart background

A variety of textures, colours and gradients can be used to format the background of your charts and graphs.

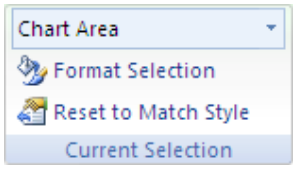
You will now fill the background of the Visitor Attractions chart with a gradient, using colours that match the existing style.

➢ Ensure that the **Chart Area** is selected

To check which section of the chart is currently selected:

- Select either the **Layout** or **Format** contextual tab

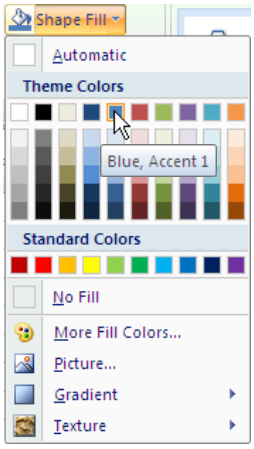
The **Current Selection** group shows the name of the section selected



➢ Select the **Format** contextual tab

➢ Select the **Shape Fill** drop-down from the **Shape Styles** group of commands

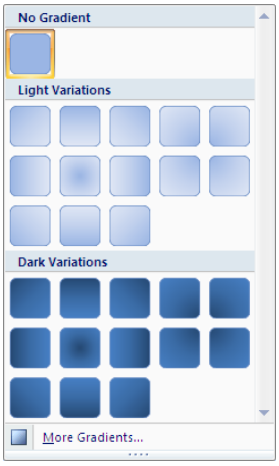
➢ Select **Blue, Accent 1** from the **Theme Colors** section



➢ Select the **Shape Fill** drop-down

➢ Point to **Gradient**

A gallery of various gradients is displayed.

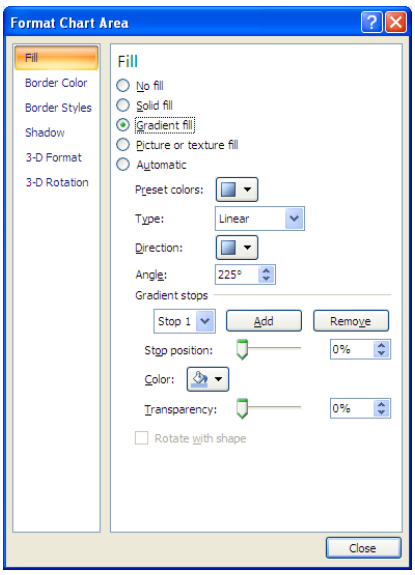


- Move the mouse pointer over some of the options to see the effects on the background and the names of the gradients
- Choose one of the **Linear Diagonal** options from the **Light Variations** section

The background colour is changed to match the selected gradient option.

To format the gradient further:

- Ensure that the Chart Area is still selected
- Select the **Shape Fill** drop-down
- Point to **Gradient**
- Select **More Gradients** to bring up the **Format Chart Area** dialog box

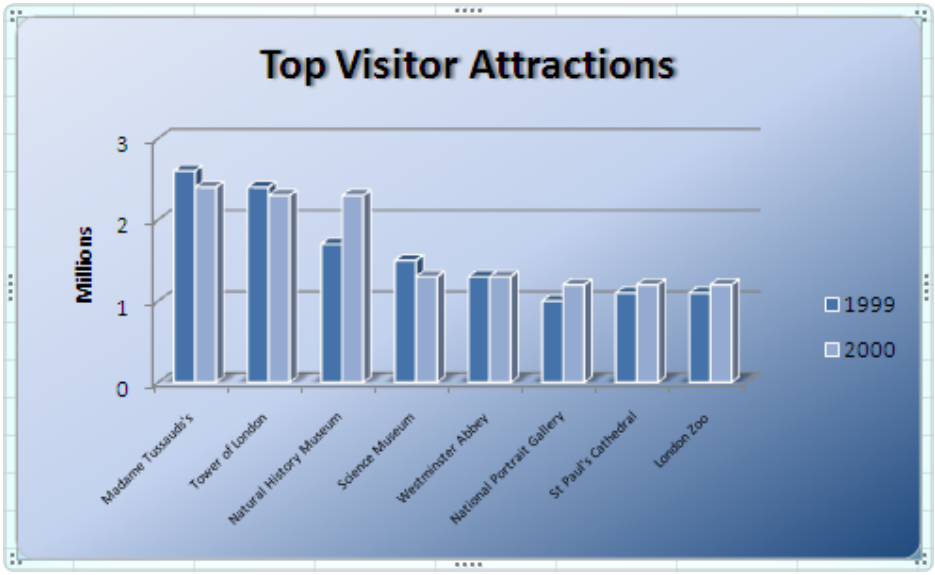


You will use this dialog box to change one of the colours for the gradient.

- Select the **Color** drop-down button 

- Choose **Dark Blue, Text 2** theme colour

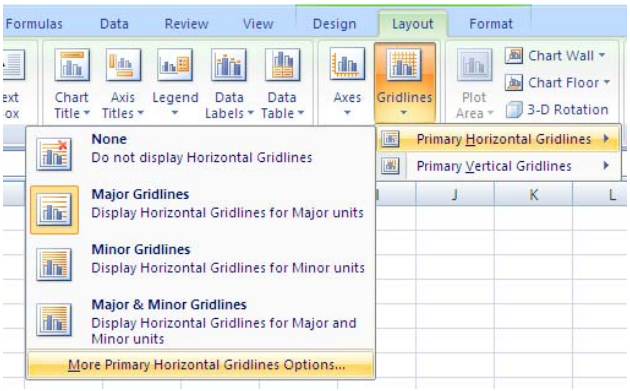
- Close the Format Chart Area dialog box



Changing the gridline colour

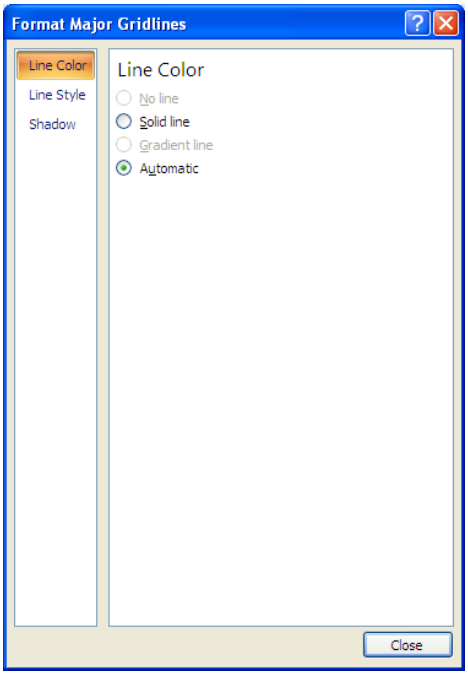
With the chart selected,

- Select the **Layout** contextual tab
- Select **Gridlines** from the **Axes** group of commands
- Point to **Primary Horizontal Gridlines** on the drop-down options



- Select **More Primary Horizontal Gridlines Options** to display the **Format Major Gridlines** dialog box

- Ensure that **Line color** is selected in the left pane
- Select the **Solid line** radio button
- Click the **Color** button 
- Choose **White**
- Close the **Format Major Gridlines** dialog box

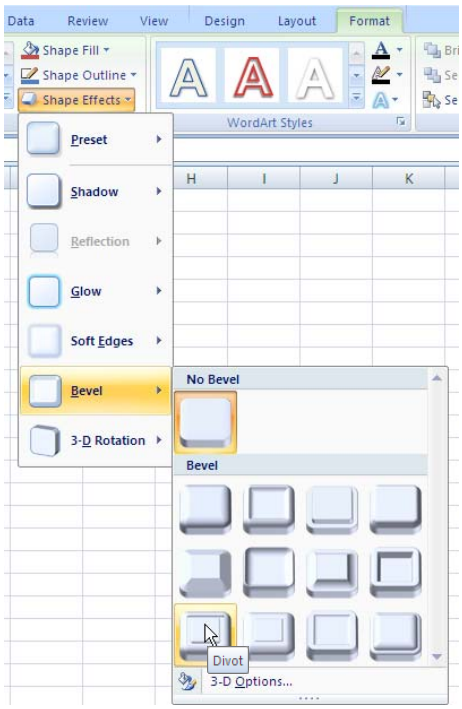


The gridlines are now white.

Bevelling the edge of the chart

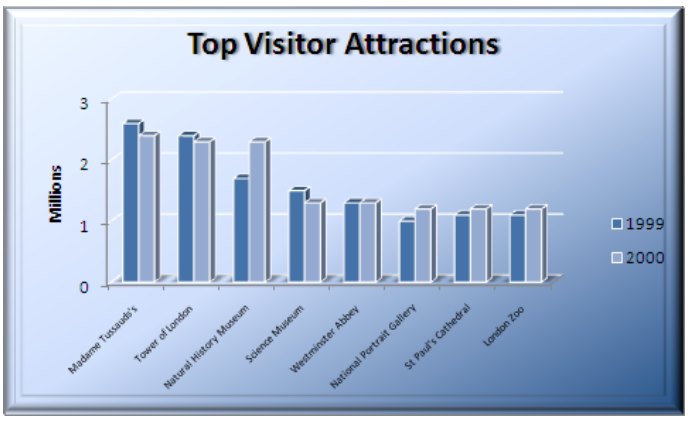
With the chart selected,

- Select the **Format** contextual tab
- Select **Shape Effects** from the **Shape Styles** group of commands
- Point to **Bevel** on the drop-down commands
- Move the mouse pointer over some of the Bevel options to see the effects on the chart and the names of the options



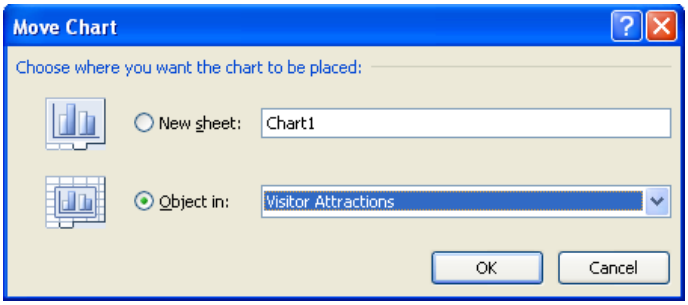
- Select **Divot**

The edge of the chart is now bevelled with the selected style.



- Ensure that the chart is selected
- Select the **Design** contextual tab
- Select **Move Chart** from the **Location** group

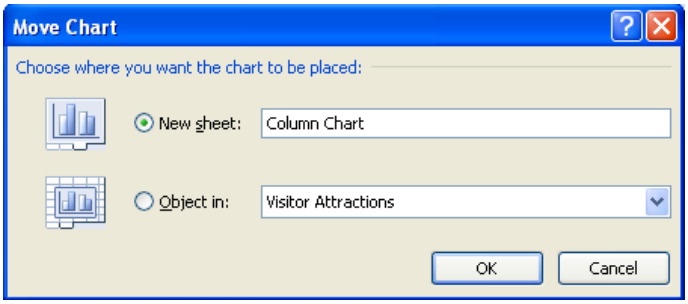
The **Move Chart** dialog box is displayed.



- Select the **New Sheet** radio button

The default title for the new sheet is Chart1.

- Change the title to **Column Chart**



- Click **OK**

An enlarged version of the chart is shown on the new worksheet.

The names of the attractions on the horizontal axis are now too small.

- Select the horizontal axis labels and change the font size to **10**
- Save the workbook

CREATING A PIE CHART

- Select the **Visitor Attractions** worksheet

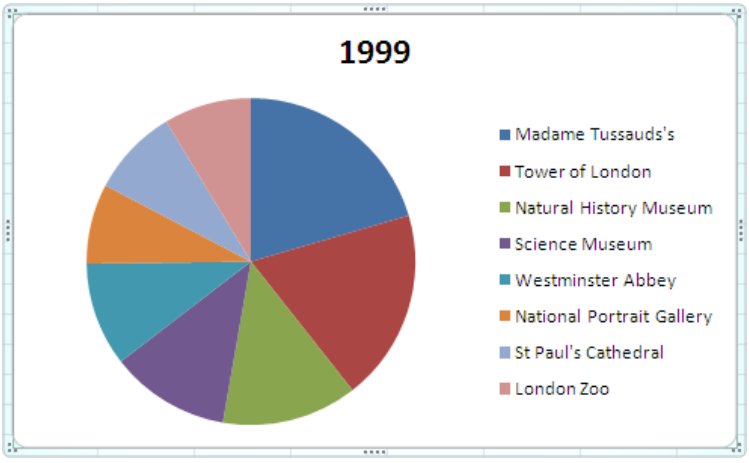
You will create a pie chart to illustrate the number of visitors who attended the various attractions in 1999.

- Select cells **A3** to **B11**
- Select the **Insert** tab
- Select **Pie** from the **Charts** group of commands

2-D and 3-D pie chart styles are displayed.

- Choose the first 2-D Pie option

The following pie chart is displayed on the worksheet.



FORMATTING A PIE CHART

When the pie chart is selected three contextual tabs appear above the ribbon giving access to various chart tools.

Change the chart style

- Ensure that the **Design** contextual tab is selected
- Click the **More** button in the **Chart Styles** group to display all the available pie chart styles
- Select **Style 42**

Change the chart title

- Click the chart title to select it
- Key in **Comparison of visitors in 1999**
- Press Enter

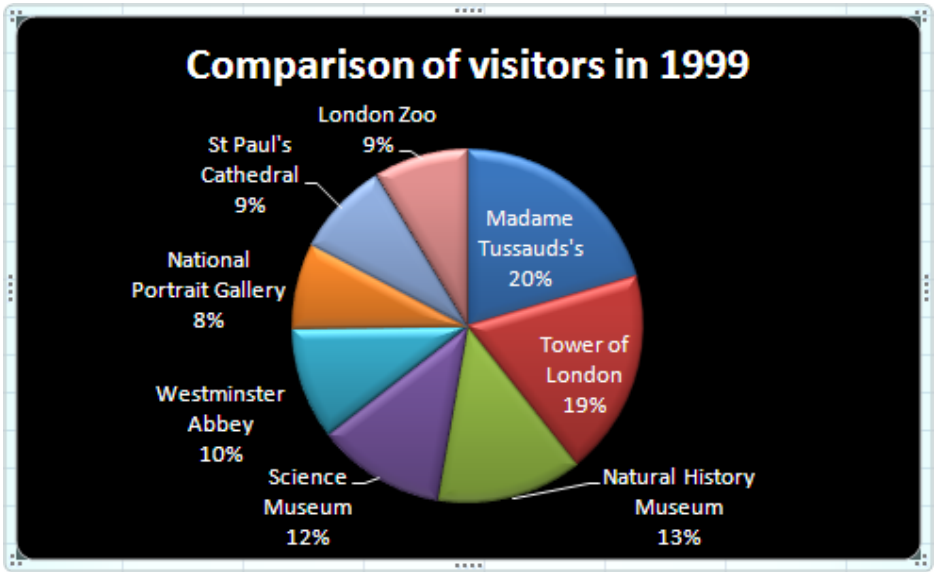
Using a pre-designed chart layout

Excel offers a choice of pre-designed layouts for each type of chart.

- Ensure that the pie chart is selected
- Select the **Design** contextual tab
- Select the **More** button in the **Chart layouts** group to display all the available pre-designed layouts for this type of chart

You can see from the diagrams which layouts include a title, which include a legend, etc.

➢ Select **Layout 1**



Changing the size of the chart

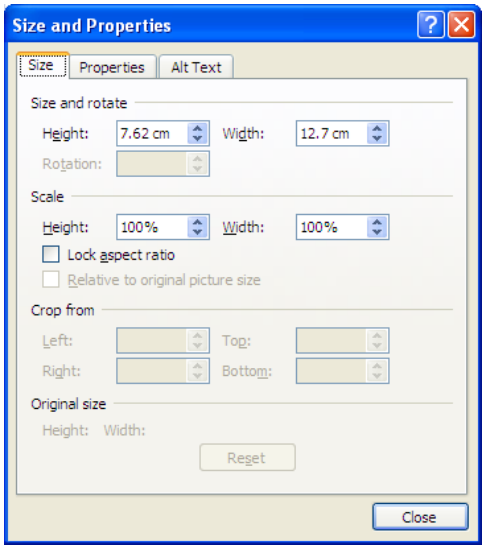
The size of the present pie chart does not allow all of the information to be written on the sectors of the pie. You will increase the size so that each label can be accommodated on the appropriate slice.

➢ Ensure that the chart is selected

➢ Select the **Format** ribbon tab

➢ Select the **Size** dialog launcher

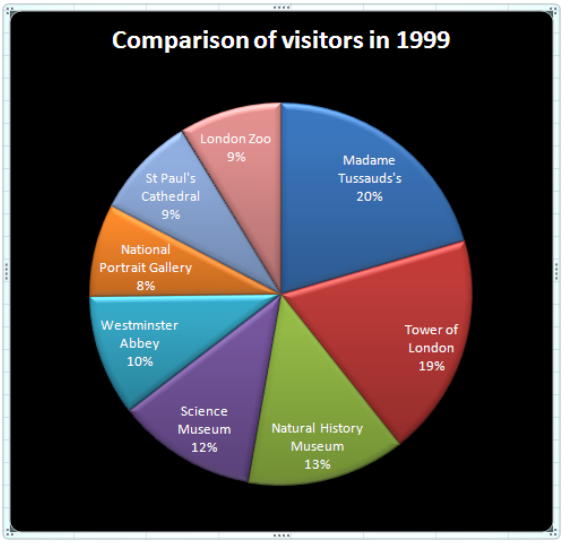
The Size and Properties dialog box is displayed with the Size tab selected.



Seeing that the chart is squashed vertically but not horizontally, your intention is to increase the height but not the width.

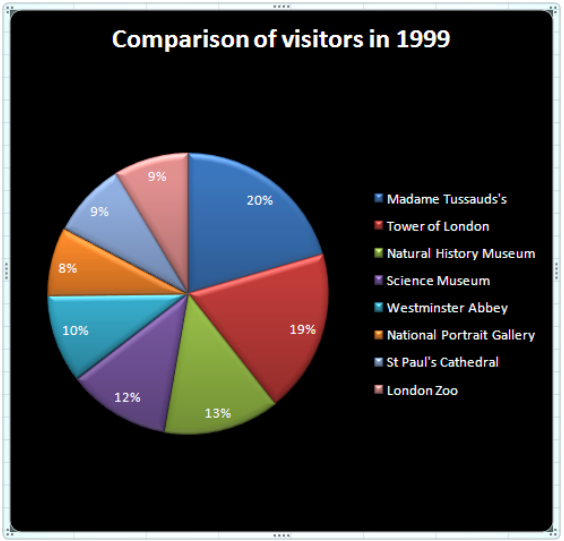
- Ensure that the **Lock aspect ratio** check box is NOT selected
- Change the **Height** to **160%**
- Close the Size and Properties dialog box

All the labels and percentages are now shown on the respective slices.



On your own

- Change the layout to show only the **percentage** values on the pie, with a **title** and **legend** also on the chart.

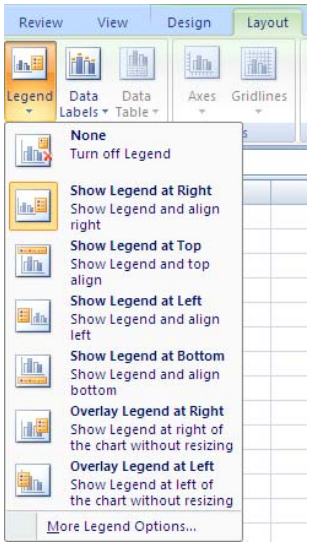


Moving the legend

The legend can be positioned in various places on the chart area.

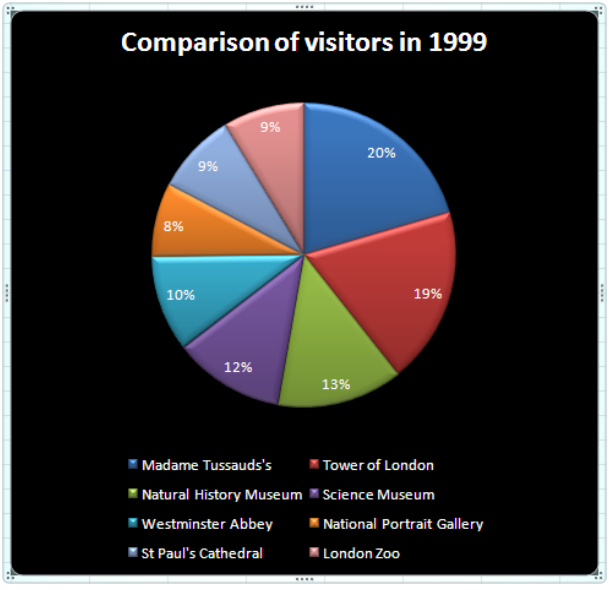
- Ensure that the chart is selected
- Select the **Layout** ribbon tab
- Select **Legend** from the **Labels** group of commands

Legend options are displayed.



- Choose **Show Legend at Bottom**

The Legend is moved to the bottom of the chart.

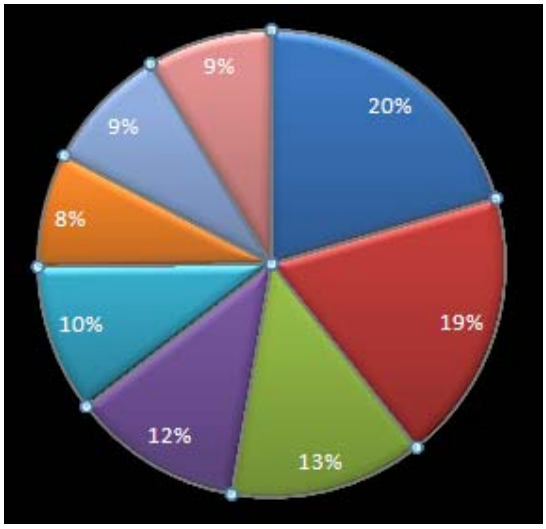


Exploding a sector of the pie chart

A section of the pie chart can be emphasized by pulling it away from the rest of the diagram.

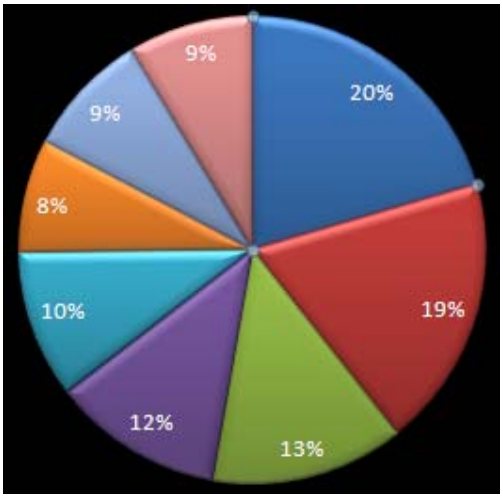
- Click onto the blue 20% sector of the pie

The selection circles around the pie and at the centre indicate that all of the slices are selected.

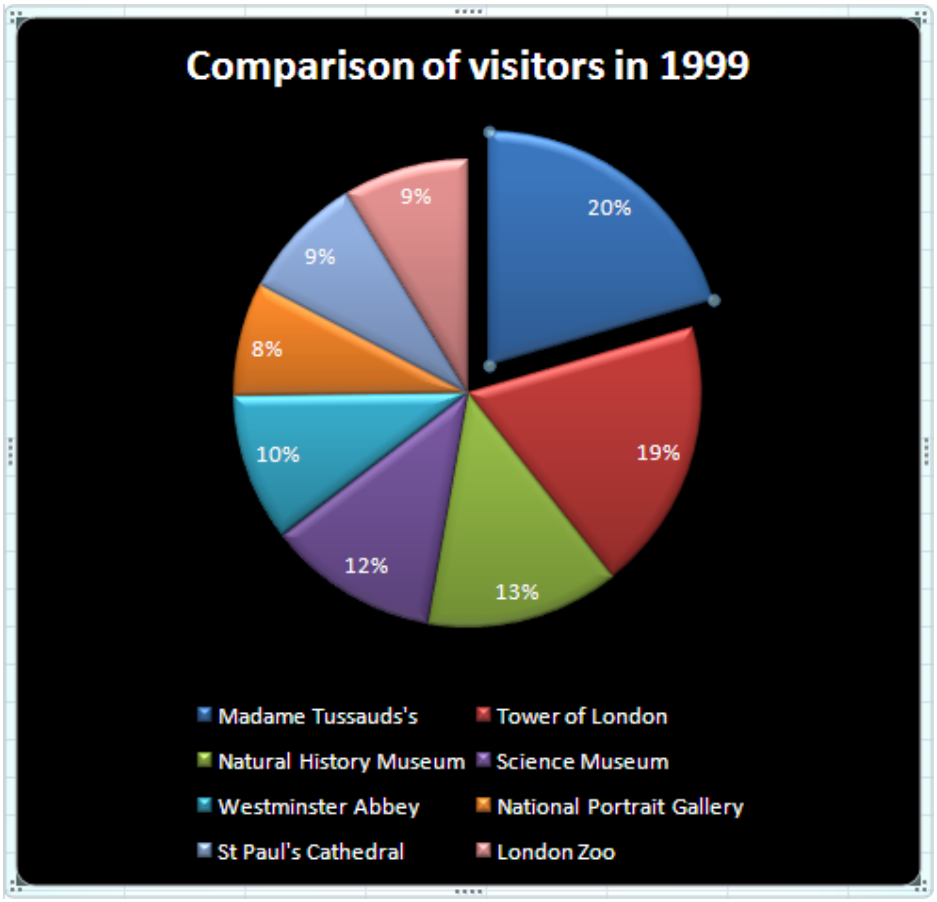


- Click once more on the blue 20% sector

This time the selection circles are around the 20% slice indicating that the slice is selected.



- Position the mouse pointer over the selected slice
- Use the left mouse button to drag the slice away from the centre



This technique enables you to emphasize one or two sections of the chart.

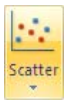
Exercise

- Insert a new worksheet in your workbook and change the name of the new sheet to **1999 Pie Chart**
- Move the pie chart from the Visitor Attractions worksheet to the 1999 Pie Chart worksheet
- Select the Visitor Attractions worksheet and create a pie chart for the year 2000 visitor attraction figures, choosing one of the 3-D Pie options
- Choose one of the alternative chart styles
- Insert the title **Comparison of attractions for 2000**
- Show the legend on the left of the chart
- Emphasise Madame Tussauds by dragging the slice a short distance away from the others
- Add a gradient of your choice to the background of the chart
- Bevel the edge of the chart area using a bevel option of your choice
- Save and close the workbook

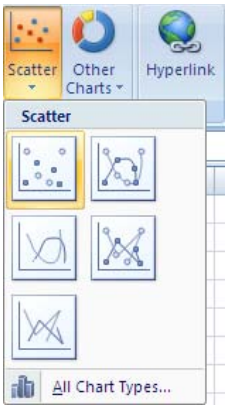
CREATING A SCATTER GRAPH

The data for this next graph has been saved as another csv file.

- Open the file **Recycling**.csv from the **Charts** folder on drive **C**
- Save the file as an **Excel workbook** with the filename **Scatter graph**
- Select cells **A4** to **C9**
- Select the **Insert** ribbon tab
- Select **Scatter** from the **Charts** group of commands

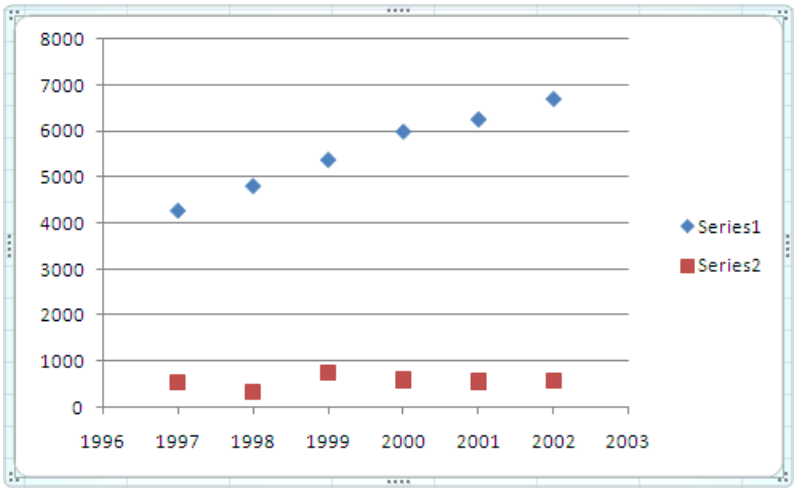


Various Scatter graph options are displayed.



- Choose the first option (**Scatter with only Markers)**

A scatter graph is created in the Recycling worksheet.



FORMATTING THE SCATTER GRAPH

Just like all the other charts, the Chart Tools contextual tabs appear on the ribbon when the scatter graph is selected. These provide access to the tools you need to edit and format the graph.

Adding meaningful text to the legend

Series are related data points that are plotted in a chart. You can see that there are two series on the scatter graph.

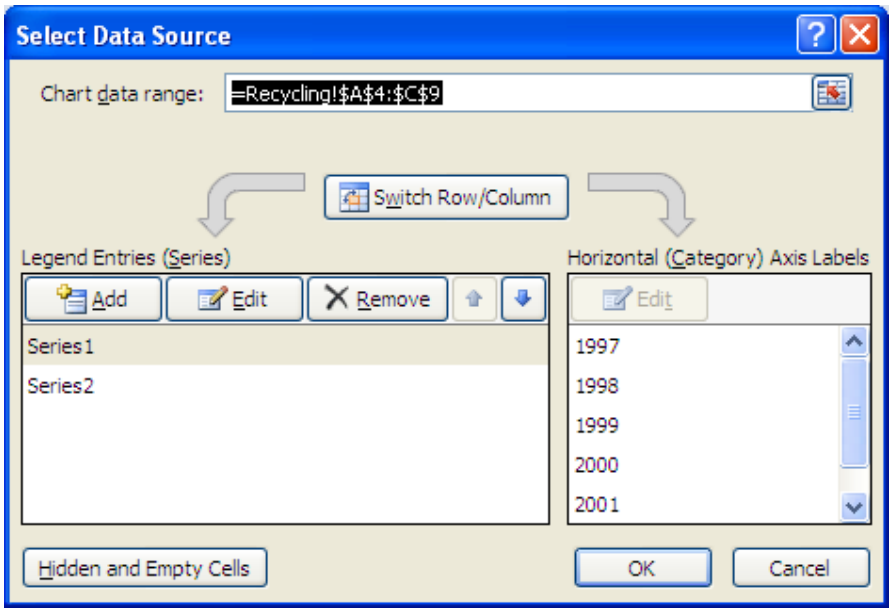
For this chart, Series1 is the Kerbside collection data, while Series2 is the Recycled through banks data.

The legend on the graph shows the default names Series1 and Series2, because the column headings were not included when the data for the chart was selected.

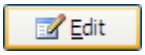
You will now correct this by choosing the names for the two series of data.

- Select the **Design** contextual tab
- Click **Select Data** from the **Data** group of commands

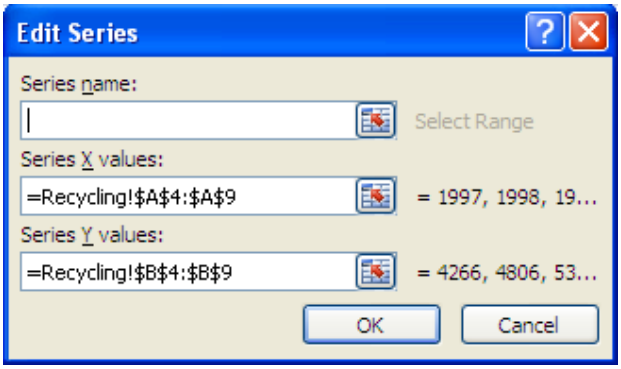
The **Select Data Source** dialog box is displayed.



In the Legend Entries section,

- Select **Series1**
- Click 

The **Edit Series** dialog box is displayed.



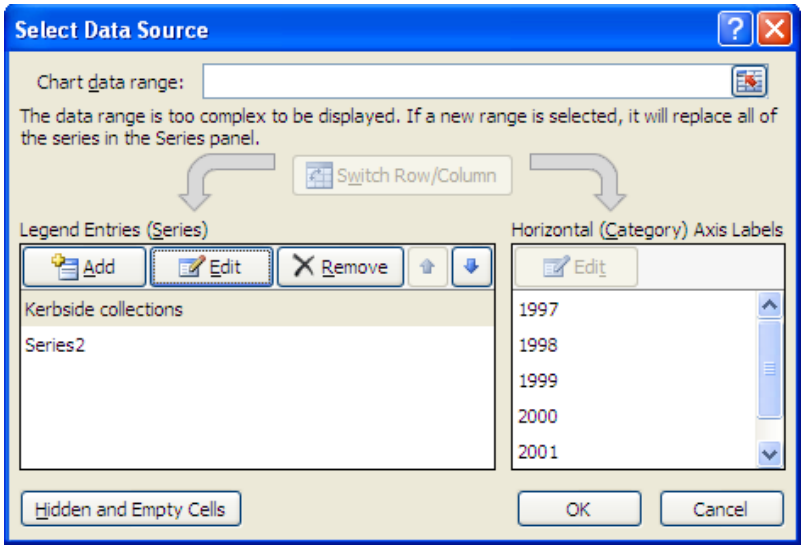
The name for the first series is in cell B3.

- If the flashing cursor is not in the **Series name** box, click into the box
- Click cell **B3**

The cell's reference is copied into the Series name box.

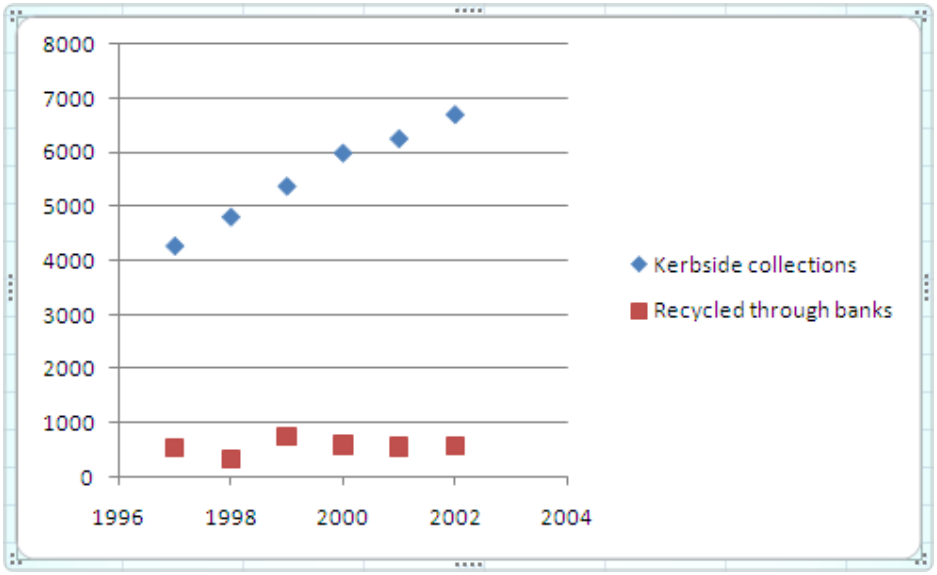
- Click **OK** to accept the text in cell B3 as the name for the series

The name is updated in the **Select Data Source** dialog box



- Change the **Series2** name to the column heading in **C3** (Recycled through banks)
- Close the **Select Data Source** dialog box

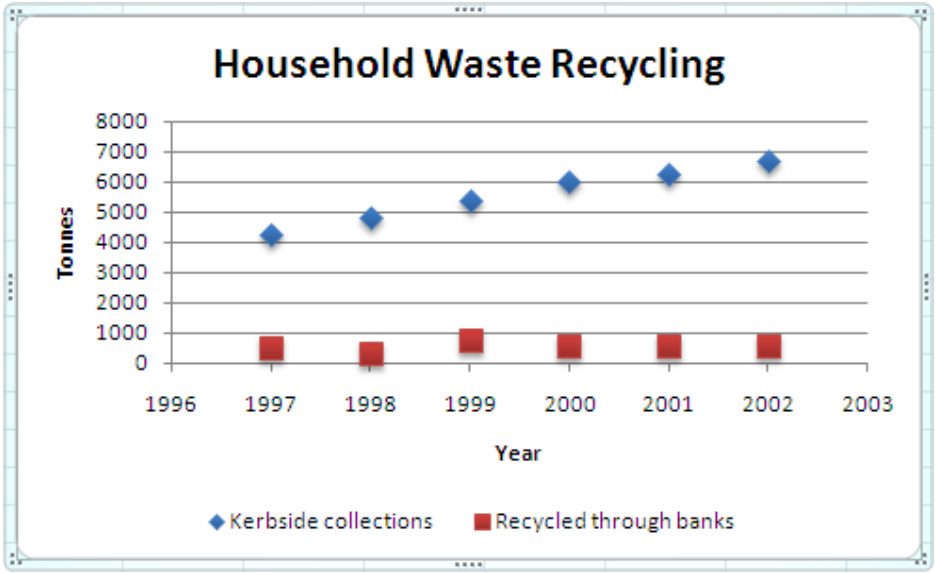
The graph is updated.



On your own

- Add the title **Household Waste Recycling** to the graph (see page 9)
- Add the rotated title **Tonnes** to the vertical axis (see page 12)
- Add the title **Year** to the horizontal axis
- Move the legend to the bottom of the graph (see page 25)
- Choose an alternative style from the Chart Styles gallery (see page 8)

I have chosen style 18.

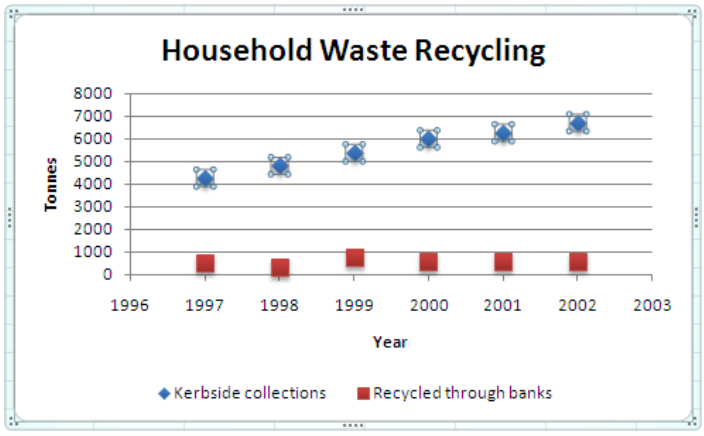


Formatting markers

The shapes that mark the positions of the data points on the graph are called Markers. These can be edited and changed to customise your graph.

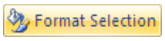
- Select the **Format** contextual tab
- Click onto any one of the Kerbside collections markers

All the markers for the Kerbside collections data series are selected.



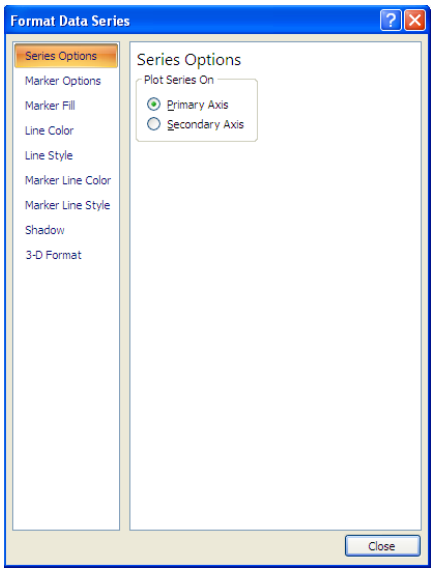
Kerbside collections markers

- Select **Format Selection** from the **Current Selection** group of commands



The **Current Selection** group is also on the **Layout** tab.

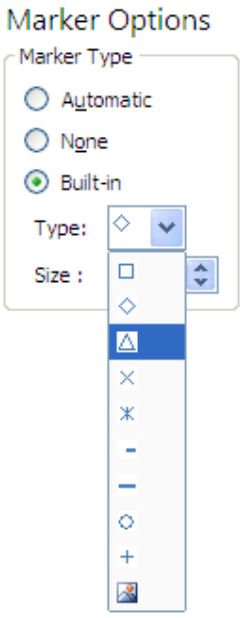
The **Format Data Series** dialog box is displayed.



- Select **Marker Options** from the left pane

You will change the shape and size of the markers.

- Select the **Built-in** marker type radio button
- Click the **Type** down-arrow and choose the triangle shape



- Change the **Size** value to **6**
- Click **Close** to close the Format Data Series dialog box

On your own

- Change the size of the markers for the **Recycled through banks** data points to **6**

For each of the data series you are going to add a line that best fits the data to show the general trend.

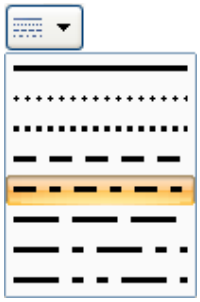
- Select the Kerbside collections markers
- Select the **Layout** contextual tab
- Select **Trendline** from the **Analysis** group of commands

- Choose **Linear Trendline** from the list of options

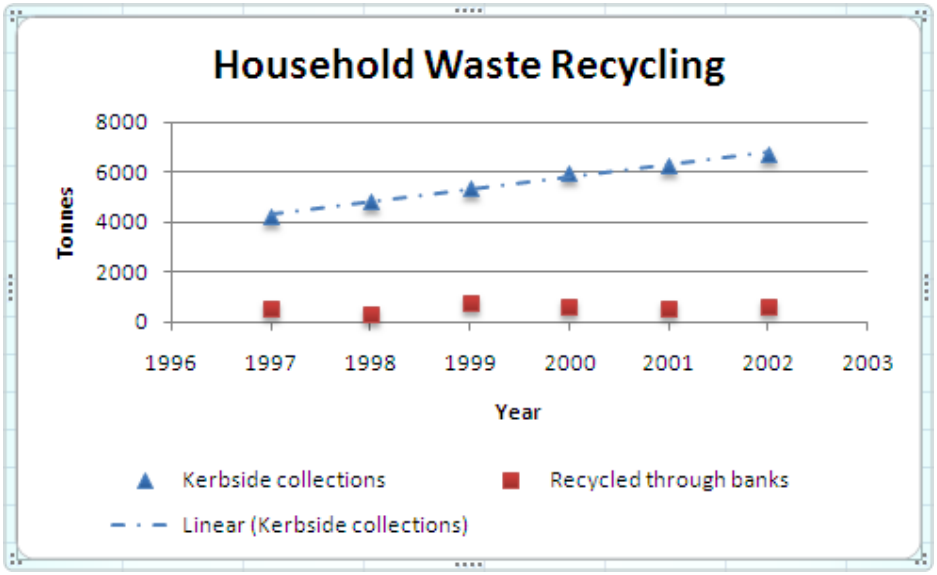
A trendline is drawn through the Kerbside collections data points.

You will change the colour of the line to match the markers.

- Ensure that the trendline is selected
- Select **Trendline** from the **Analysis** group on the **Layout** tab
- Select **More Trendline Options** to open the **Format Trendline** dialog box
- Select **Line Color** from the left pane
- Select the **Solid line** radio button
- Click the **Color** button to display a swatch of colours
- Choose a colour to match the data point markers
- Select **Line Style** from the left pane
- Select the **Dash type** button



- Choose one of the dash line options from the list displayed
- Use the **Width** option to change the width of the line to **1.5 pt**
- Close the **Format Trendline** dialog box



On your own

- Add a trendline for the Recycled through banks data points
- Change the colour of the trendline to match the colour of the markers
- Change the thickness and style of the line
- Save the workbook

CHANGING FROM ONE CHART TYPE TO ANOTHER

You will change the Household Waste diagram from a scatter graph to a bar chart.

- Ensure that the workbook **Scatter graph** is open
- Save the workbook with the new name **Bar chart**

The trendlines will not be needed in the new chart so you will first delete them.

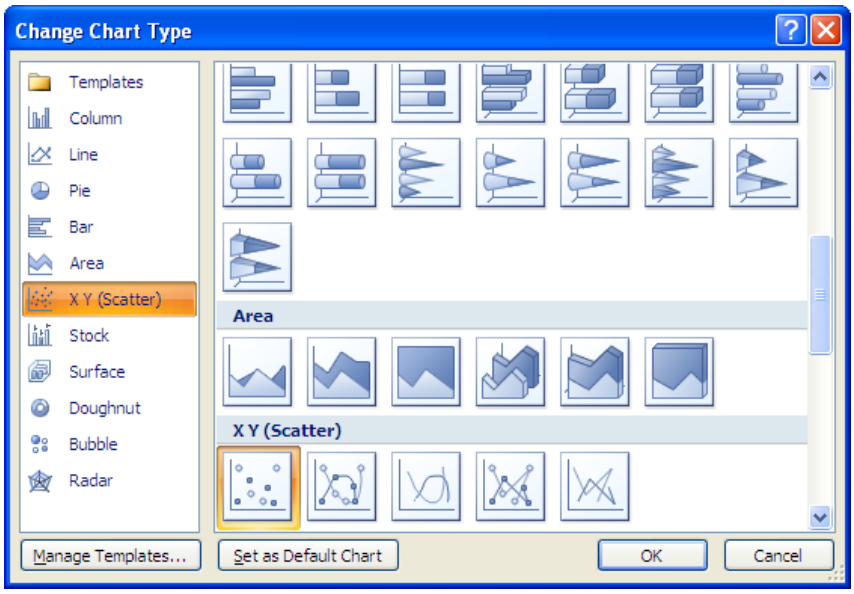
- Select the scatter graph to display the contextual tabs
- Select the **Layout** contextual tab
- Select **Trendline** from the **Analysis** group
- Choose **None** from the drop-down list to delete both trendlines

If a trendline was first selected, then choosing **None** from the trendline options would delete only the selected trendline.

You are now ready to change the chart type.

- Select the **Design** contextual tab
- Select **Change Chart Type** from the **Type** group of commands

The **Change Chart Type** dialog box is displayed.

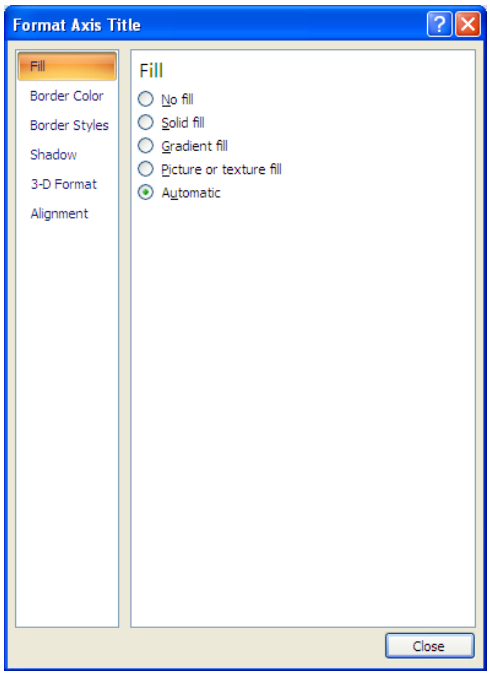


- Select **Bar** from the left pane
- Click **OK** to accept the default bar type

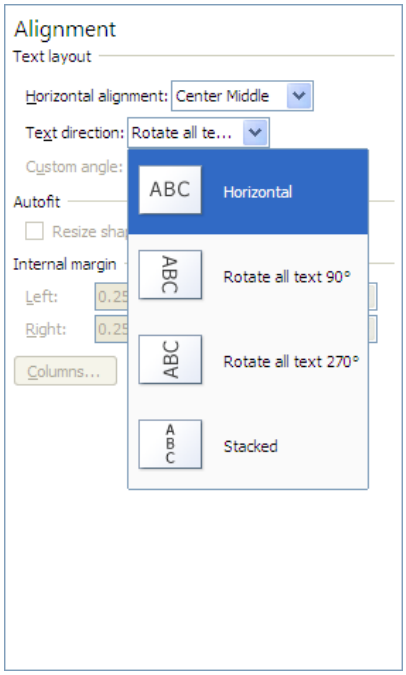
The axes have been swapped over and therefore the axis titles need to be rotated.

- Select the **Format** contextual tab
- Select the horizontal axis title **Tonnes**
- Select **Format Selection** from the **Current Selection** group

The **Format Axis Title** dialog box is displayed.



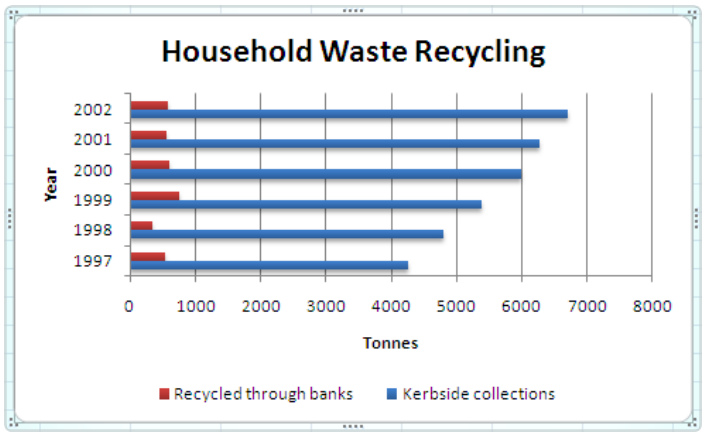
- Select **Alignment** from the left pane
- Click the drop-down arrow for **Text direction**



- Choose **Horizontal**

With the **Format Axis Title** dialog box displayed,

- Select the vertical axis title **Year**
- Select **Alignment** from the left pane
- For **Text direction** choose **Rotate all text 270°**
- Close the Format Axis Title dialog box



- Save and close the workbook

COMBINING CHART TYPES

When comparing two different types of data, or data from two different sources, it may be better to use different chart types for each of the data series.

In this next exercise you will represent one data series as a column chart and another data series as a line graph.

- Open the file **Stock Market**.csv from the **Charts** folder on drive **C**
- Resave the file as an **Excel Workbook** with the filename **MultiChart**

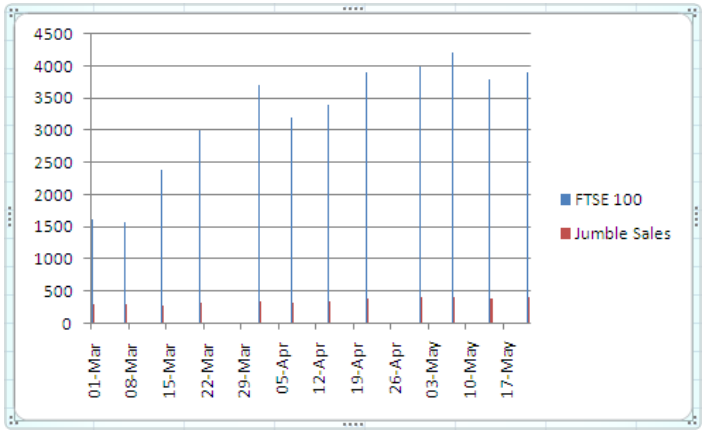
You start by creating a column chart for both data series.

- Select cells **A4** to **C16**
- Create a **2-D clustered column** chart

To create a 2-D clustered column chart

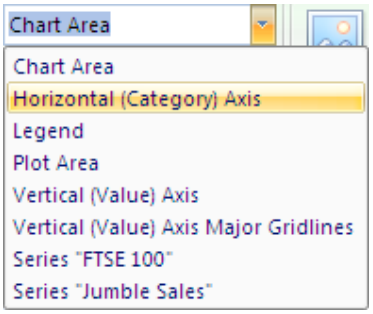
- Select the **Insert** ribbon tab
- Select **Column** from the **Charts** group of commands
- Choose the **Clustered Column** from the **2-D Column** options

The following chart is inserted on the worksheet.



Excel has automatically chosen a time scale for the horizontal axis. This is not suitable for the current data. You will change this to just the dates given in the data.

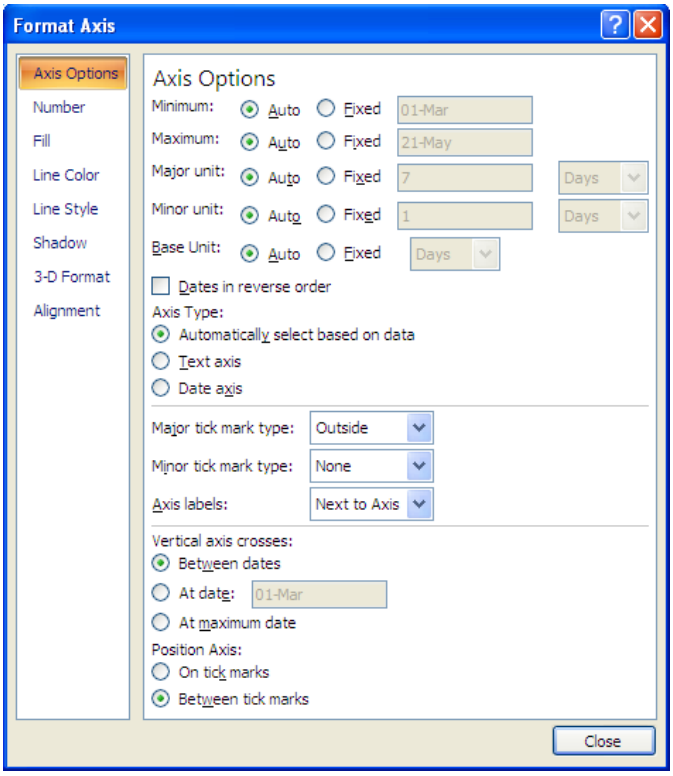
- Select the **Layout** contextual tab
- Click the drop-down arrow in the **Current Selection** group to display all the elements of the current chart



This is a useful method for accurately selecting an object on the chart.

- Choose **Horizontal (Category) Axis**
- Select **Format Selection** from the **Current Selection** group

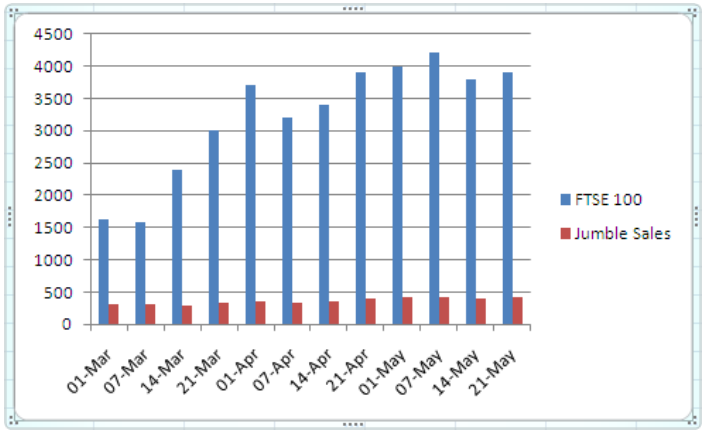
The **Format Axis** dialog box is displayed with **Axis Options** selected in the left pane.



Note that for **Axis Type**, the default setting is **Automatically select based on data**.

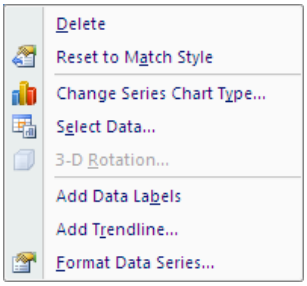
- Select the **Text axis** radio button
- Close the Format Axis dialog box

The chart should now look like this:



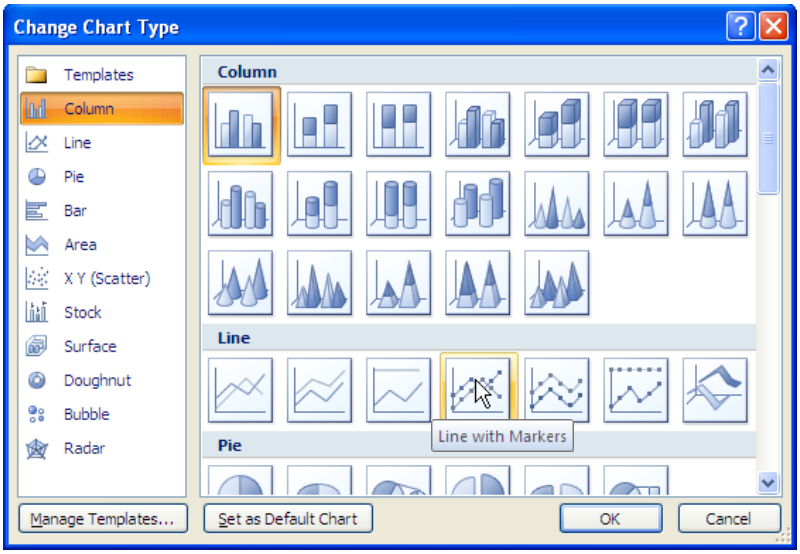
➢ Click the right mouse button on any of the **FTSE 100** columns

The following shortcut menu is displayed.



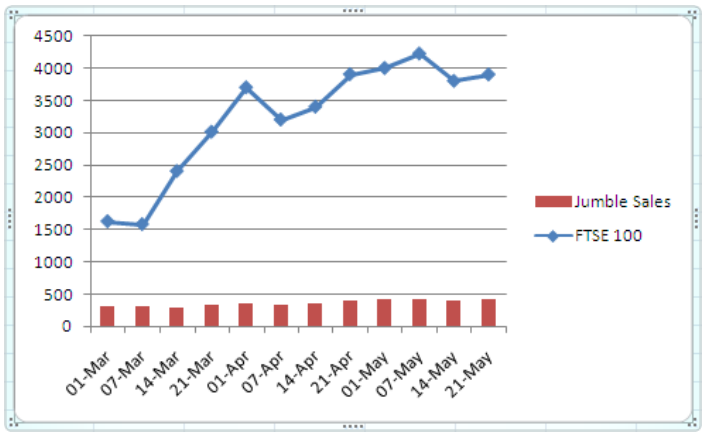
➢ Select **Change Series Chart Type**

The **Change Chart Type** dialog box is displayed.



- Select **Line with Markers** from the Line chart options
- Click **OK**

The FTSE 100 data is shown as a line chart.

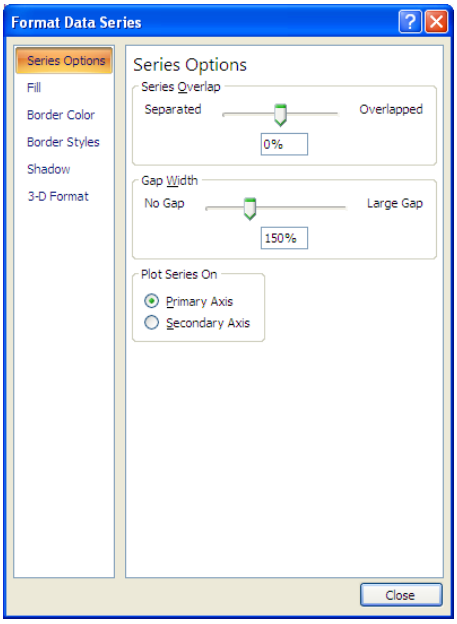


The columns for the Jumble Sales data are all very short, indicating that the vertical scale is not suitable for both data series.

The next step therefore is to add a separate scale for the Jumble Sales figures.

- Click the right mouse button on any of the **Jumble Sales** columns
- Choose **Format Data Series** from the shortcut menu

The **Format Data Series** dialog box is displayed with **Series Options** selected in the left pane.

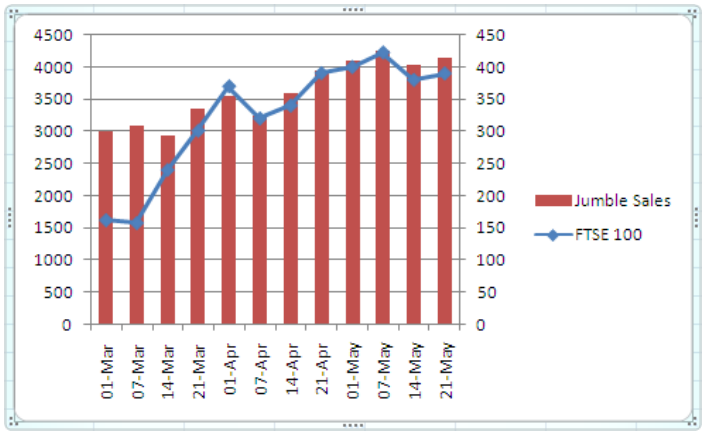


- Select the **Secondary Axis** radio button in the **Plot Series On** section

You can also change the size of the gaps between the columns.

- Change the percentage value to **120%** in the **Gap Width** section
- Close the Format Data Series dialog box

The chart now shows the data as two different chart types using different scales.



To complete the diagram you will label the vertical axes so that it is clear which scale relates to the different series. You will also move the legend to the top of the chart.

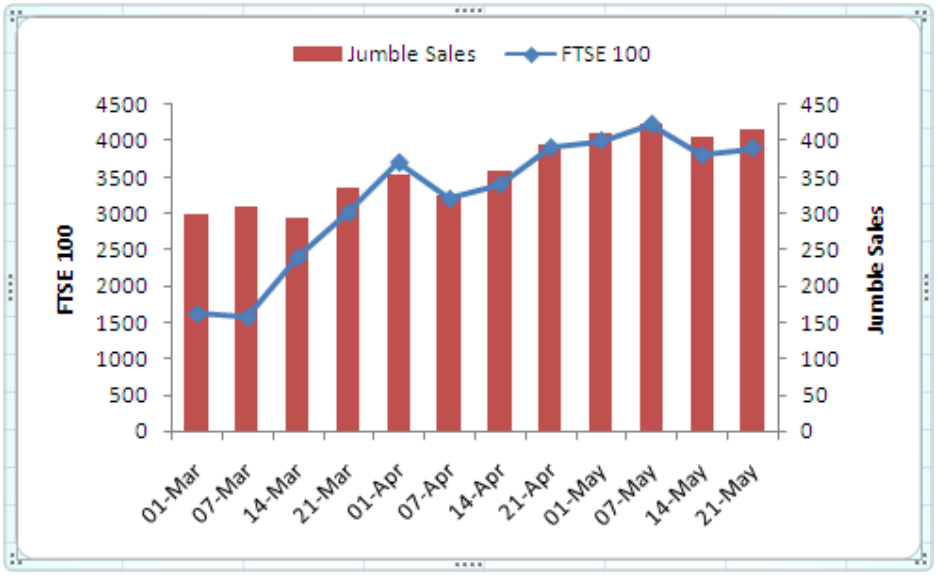
- Select **Axis Titles** from the **Labels** group on the **Layout** contextual tab
- Point to **Primary Vertical Axis Title** on the drop-down list
- Select **Rotated Title**
- Type **FTSE 100**
- Press Enter
- Select **Axis Titles**
- Point to **Secondary Vertical Axis Title**
- Select **Rotated Title**
- Type **Jumble Sales**
- Press Enter
- Move the Legend to the top of the chart

Sometimes you may wish to display your chart without the horizontal gridlines on the plot area.

To remove the gridlines:

- Ensure that the **Layout** contextual tab is selected
- Select **Gridlines** from the **Axes** group of commands

- Point to **Primary Horizontal Gridlines**
- Select **None** from the list of options



- Make further formatting changes as you see fit
- Save and close the worksheet