



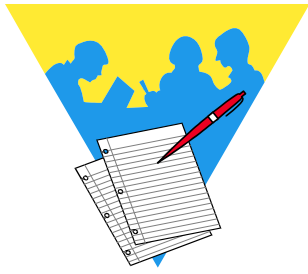
## Excel Charts

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Excel: Charts  
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## Lesson Notes

# Excel

## Charts

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## Using this Manual

Welcome to the *Excel 2010 Charts* course. This manual and the data files are designed to be used for learning, review and reference after the class. The data files can be downloaded any time from *The Computer Workshop* website:

**<http://www.tcworkshop.com>**

There is no login or password required to access these files. You will also find handouts and supplementary materials on the website in the Download section.

### To Download Data Files

Once on *The Computer Workshop* website, locate and click the *Student Resources* link in the top navigation bar. When on the *Student Resources* page, click the **Data Files** button.

1. **Data Files** page displays a list of general application types.
2. Click once on the *Microsoft Office Courses* link.
3. Click once on the software related to the course.
4. Click once on the version related to the course.
5. If there are multiple folders, click on the *TCW* folder.
6. Click on the course name to download the data files.

You can choose to open or save the zipped folders content to your computer.

While on the *Student Resources* page, you can also access handouts by clicking the **Handouts** button. Handouts are in PDF format and also available to you without login or password. Simply open the PDF and either print or save to your computer.





## Conventions

## Conventions Used in this Manual

The hands-on exercises (Actions) are written in a two-column format. The left column (“Instructions”) gives numbered instructions, such as what to type, keys to press, commands to choose from menus, etc. The right column (“Results/Comments”), contains comments describing results of, reasons for, quick keys, etc. for the instructions listed on the left.

- ◆ Key names and Functions are bold and enclosed in square brackets:

**[Enter], [Tab], [F5], [F10]**

- ◆ Keys you press simultaneously are separated by a plus (+) sign, typed in bold and enclosed in square brackets. You do not press the plus.

**[Shift + F5]**

- ◆ Keys you press in sequence are separated by a space, bold and enclosed in square brackets.

**[Home] [Down Arrow]**

- ◆ Ribbon tab names are in bold and italic: Example: ***Home***

- ◆ Group names are in bold: Example: **Font**

- ◆ Dialog box names are in italic: Example: *Save As*

- ◆ Button names are bold and enclosed in square brackets: Example: **[Sort]**

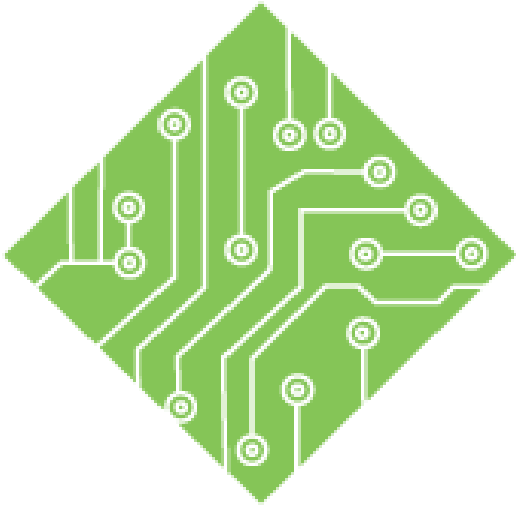
- ◆ Information you are to type will be in bold. Example:

**This is the first day of the rest of your life.**

- ◆ Information that you need to supply will be indicated with pointed brackets. Example: Type: **<your name>**.





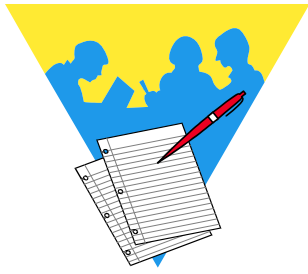


# Lesson 1: Chart Overview and Types

## Lesson Overview

You will cover the following concepts in this chapter:

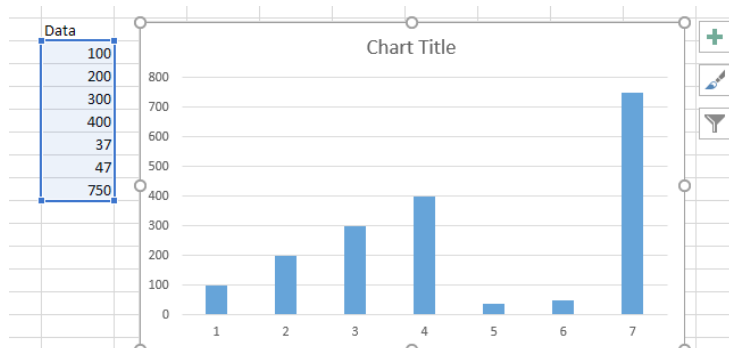
- ◇ Chart Overview
- ◇ Charts Introduction
- ◇ The Chart Window
- ◇ Quick Analysis
- ◇ Recommended Charts
- ◇ Chart Types
- ◇ Bar Charts
- ◇ Column Charts
- ◇ Line Charts
- ◇ Scatter (XY) Charts
- ◇ Pie Charts
- ◇ Area Charts
- ◇ Bubble Charts
- ◇ Doughnut Charts
- ◇ Stock Charts
- ◇ Surface Charts
- ◇ Radar Charts
- ◇ Funnel Charts
- ◇ Waterfall Charts
- ◇ Box and Whiskers Charts
- ◇ Treemap Charts
- ◇ Sunburst Charts



## Lesson Notes

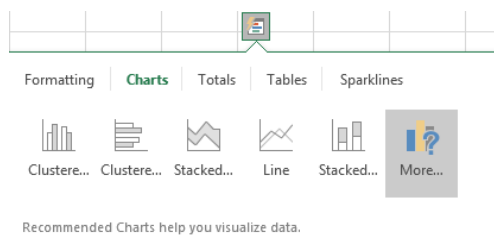
## Chart Overview

It can be hard to discern patterns or relationships that exist within basic tables of numerical entries. *Excel's* powerful charting tools help create a more meaningful representations of your data by making it easy to build professional looking charts such as the one displayed below.



A chart is a graphic representation of your worksheet data. Using charts to represent worksheet data often creates a better understanding of your data rather than simply presenting the numbers in a spreadsheet. They also a great way to add branding to your presentations.

One of the major changes in *Excel* is the way that charts are created and handled. In previous versions of *Excel*, charts were often created with the chart wizard. *Excel*, has taken a new approach that a creating professional looking charts in just a few clicks. Instead of the old chart wizard, *Excel* provides a series of chart options that are found on the **Insert Tab** and with the **Quick Analysis Smart Tag** that appears when multiple cells are selected.



Once the chart is created and selected, a set of contextual tabs are available in the ribbon. The **Chart Tools** group of tabs are **Design** and **Format**. As well as new chart buttons to Add/ Remove Chart Elements, Apply Formatting Styles And Colors, and Filtering.

This lesson will cover the elements of a chart, different chart types and their uses to help you gain a better understanding of which chart will best represent your data.

# Charts

## Introduction

### Note

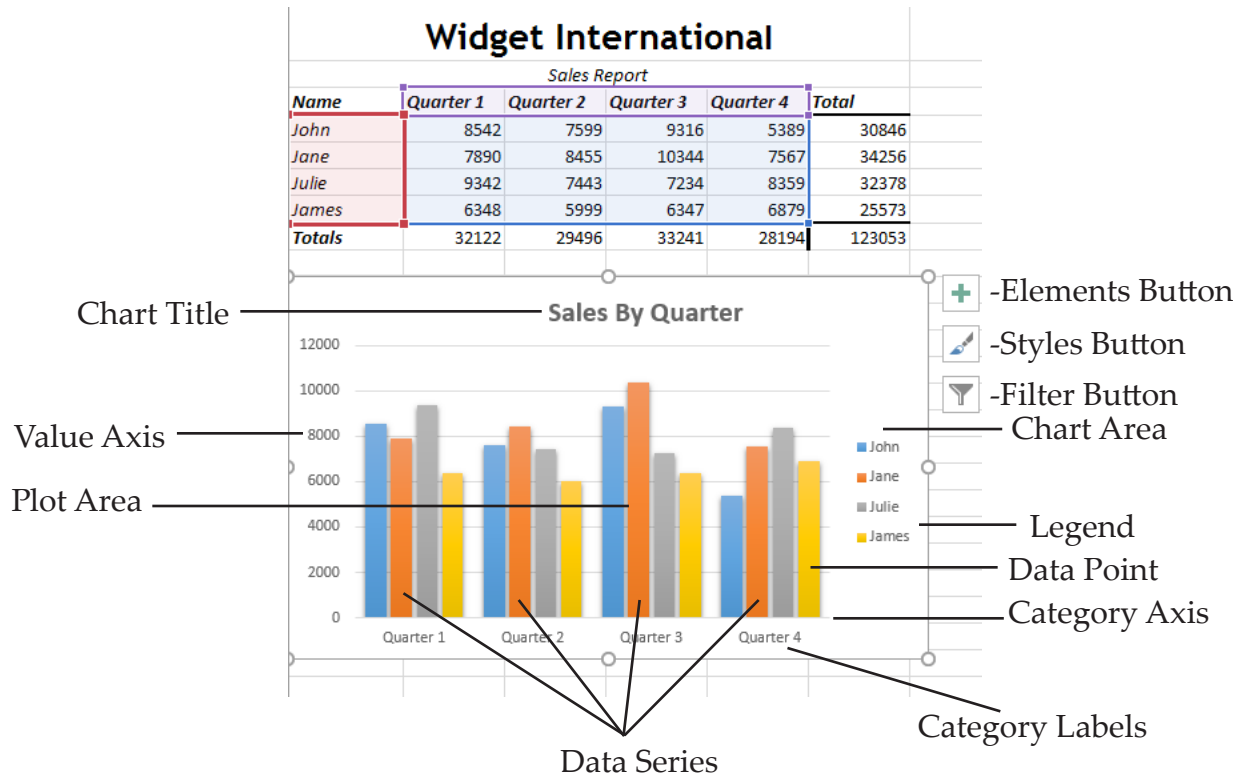
The **Y-axis** is usually the vertical axis and contains data. The **X-axis** is usually the horizontal axis and contains categories.

A chart is a graphic representation of worksheet data. Using a chart to represent worksheet data often leads to a better understanding of the data rather than simply presenting the numbers on a spreadsheet.

Illustrated below is a spreadsheet showing the Sales for Widget International and a corresponding chart. Charts are easy and fun to work with so let begin with getting familiar with some of the terminology for creating graphs and charts.

## Chart Terminology

The figure below shows a chart with the basic elements labeled. It also shows you the data that was used to create the chart, which will help you identify what you will need to select in your spreadsheet to create a meaningful chart. Notice the Total Column and Row were not selected to prevent the Chart from being out of proportion. Also, the Title was not selected because it is a merged cell and would have required selecting the data in the Total Column. Instead, the Chart Title was added after the Chart was created.





## The Chart Window

### Identifying Chart Objects

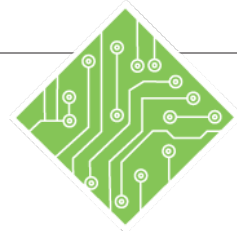
To change your chart, you need to first select the chart object you would like to change. When you point to an item in the chart a tooltip will appear naming the object.

#### Chart Objects:

- ◆ **Chart Area**— is the whole chart.
- ◆ **Gridlines**—are the vertical and/or horizontal lines that are useful in guiding the eye to more easily identify the value associated with each series.
- ◆ **Plot Area**—the area of the chart where the values are graphed.
- ◆ **Legend**—is the color key for the value series. By default this would be the row labels.
- ◆ **Category Axis**—if the series is by rows it will display the column labels. If the series is by column, the row labels will be displayed.
- ◆ **Value Axis**—displays the range of values plotted.
- ◆ **Value Series**—data in the default column chart are plotted by *row* in column bars called "*series*".
- ◆ **Wall**—appears in chart types such as columns and bar charts. It is the area behind the columns and bars.
- ◆ **Floor**—is connected to the wall in 3-D charts.
- ◆ **Chart Elements button**—This allows you to quick add or remove Chart Elements.
- ◆ **Chart Styles and Colors button**— Allows you quick access to the pre-built styles and color schemes.
- ◆ **Filter Chart button**— Allows you to filter the chart without having to redefine the data set.

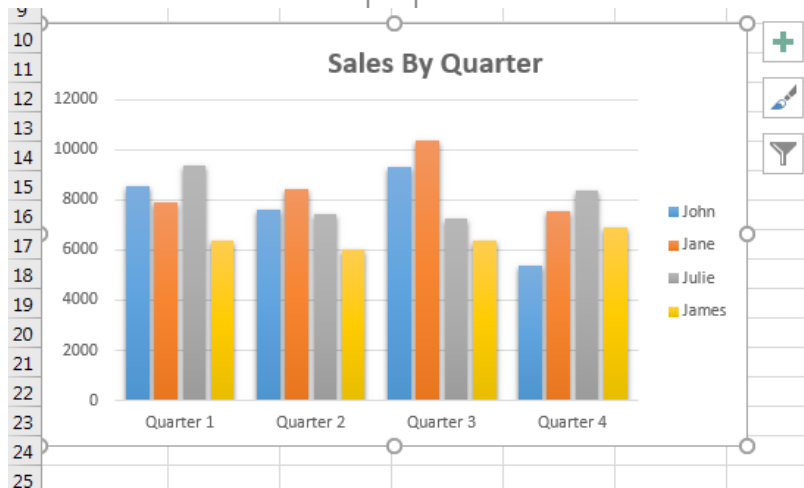


## Action 1.1 - Chart Terminology



### Instructions:

### Results/ Comments:



1. Using the picture above, locate the Chart Area.
2. Locate the Plot Area.
3. Locate the Chart Title.
4. Locate the Legend.
5. Locate the Value Axis.
6. Locate the Category Axis.

This is the entire chart and all its elements.

In a 2-D chart, the Plot Area is the area bound by the axes, including all data series. In a 3-D chart, the area is bounded by the axes, including the data series, category names, tick-mark labels, and axis titles.

This is typed in after the Chart is created and reflects what the data represents.

Each color identifies a different series in the Chart. The text came from the first column of the data selected on the spreadsheet.

The Value Axis provides the scale for the data points in the chart and was determined by the rows of sales numbers selected for each sales person.

The Category Axis includes the labels for all categories in the chart. The text for this example was determined by the first row of data selected for the series.



**Instructions:**

7. Locate the Quarter 1 Category.
8. Locate the first column for each quarter  
- note they will be the same color.
9. Locate the first Quarter 1 column.
10. Locate the **[Chart Elements]** button.
11. Locate the **[Chart Styles]** button.
12. Locate the **[Chart Filtering]** button.

**Results/ Comments:**

This is the four columns above Quarter 1 and contains one data point for each sales person.

Data markers of the same color constitute a data series - in our example, this represents 4 quarters of Sales for John.

This is the data that represents individual values plotted in a chart and are represented by bars, columns, lines, pie or doughnut slices, dots, and various other shapes called data markers. (In our example, this column is for John's 1st Quarter Sales.)

To the right of the selected chart. This allows for quick access to add, remove, and reposition chart elements.

To the right of the selected chart. Using this button allows you to choose from the list of pre-defined chart style and color schemes.

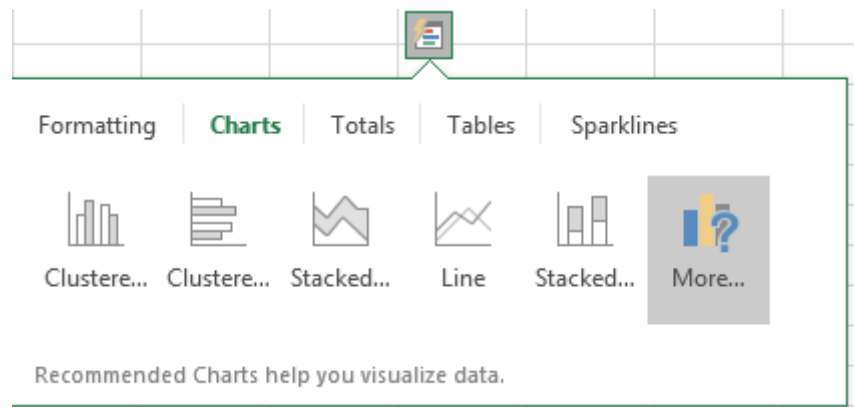
To the right of the selected chart. This allows you to choose what data is displayed in the chart without having to reselect data.

## Quick Analysis

When you select multiple cells in *Excel*, you will see the *Quick Analysis Smart Tag* appear to the lower right corner of the selection.

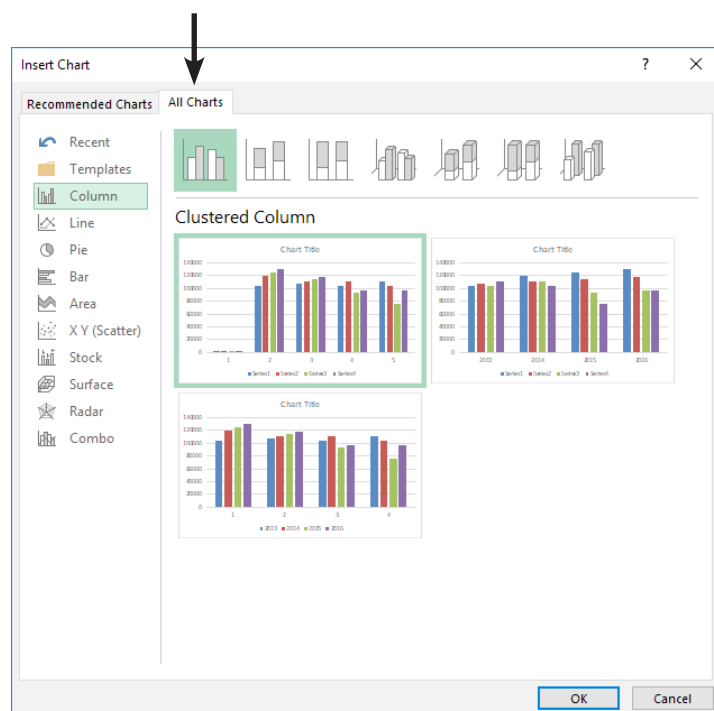
### Note

When a cell range is actively selected, use the **[Ctrl + Q]** keyboard shortcut to open the *Quick Analysis* dialog.



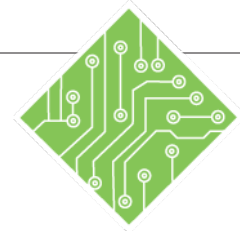
This tool offers live previews of basic conditional formatting, recommended chart types, auto totaling options, recommended tables, and sparklines. By clicking the desired header in the *Smart Tag* you will see the set of options below.

When choosing the *Charts* option, you are shown a set of recommended charts which are based on the structure of the selected data. If none of the displayed chart types are appropriate, then choose the *More...* option to open the *Insert Chart* dialog. When in the *Insert Chart* dialog, click the *All Charts* tab to have access to every type of chart.





## Action 1.2 - Using the Quick Analysis Smart Tag



### Instructions:

1. Open the **QuickAnalysis.xlsx** file
2. Select cells **A3:E7**.
3. Click the *Smart Tag* icon.
4. Select the *Charts* option at the top of the *Quick Analysis* window.
5. Examine the list of *Recommended Charts* by hovering over each one.
6. Choose the first option.

### Results/ Comments:

This is the data set to make into a chart.

The icon only appears when more than one cell is selected. It will be located at the lower right corner of the selected range of cells. The *Quick Analysis* set of options are displayed.

The list of options changes to show recommended charts.

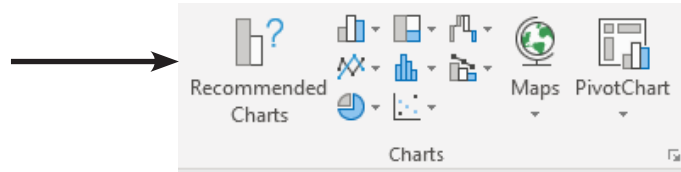
As you hover over the recommended chart a preview of that chart is displayed.

The chosen chart type is inserted .

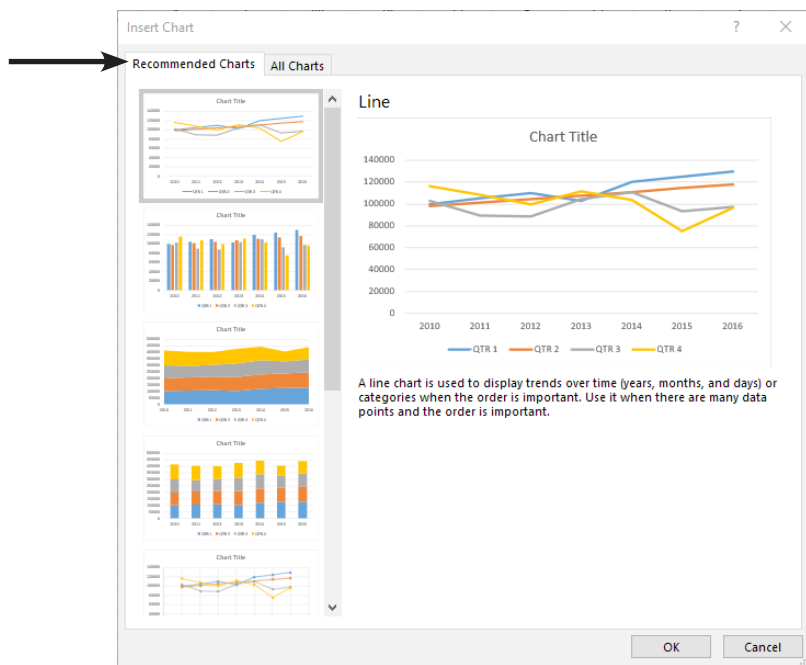


## Recommended Charts

You now can let *Excel* offer suggested chart types based on the structure of the selected data. This can be done using the *Quick Analysis Smart Tag* as outlined earlier or by clicking the **[Recommended Charts]** button within the **Charts Group** on the *Insert Tab* in the ribbon.



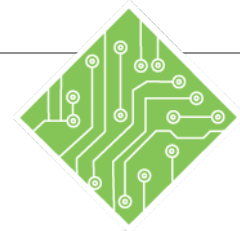
Clicking the **[Recommended Charts]** button opens the *Insert Chart* dialog to the *Recommended Charts* tab in the window. Scroll through the list of charts on the left side of the window to see if there is one that suits your needs.



When you select the type of chart you need double-click chart thumbnail or click the **[OK]** button



### Action 1.3 - Using the Recommended Charts



#### Instructions:

1. The **QuickAnalysis.xlsx** file should still be open.
2. Select Sheet2.
3. Select cells **A3:E7**.
4. On the **Insert Tab** in the **Charts Group**, click the **[Recommended Charts]** button.
5. Use the scroll bar on the left side of the window to see the list of charts *Excel* recommends.
6. Click on each one in the list to see a larger view to the right of the window.
7. Double-click whichever chart you like.
8. Close the file without saving.

#### Results/ Comments:

If not, reopen the file.

This is the data set to make into a chart.

The *Insert Chart* dialog opens with the **Recommended Chart** tab active.

*Excel* bases these on the structure of the selected data.

The selected chart is inserted.

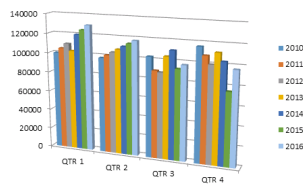
**[Ctrl + W]**.

# Chart Types

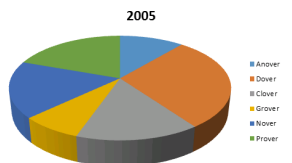
Excel offers many chart types and choosing the right one will be critical in conveying the information held within the raw tabular data in a meaningful manner. Each chart type displays relationships or trends contained in the data. Depending on the structure of the data in the spreadsheet will help in choosing the appropriate type of chart.

Chart types include:

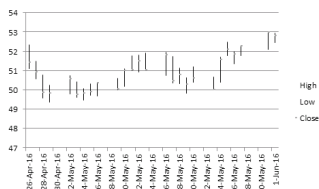
Area



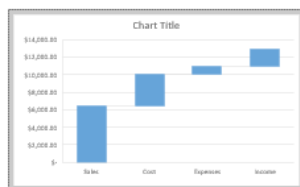
Column



Pie

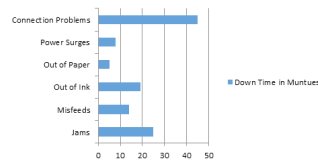


Stock

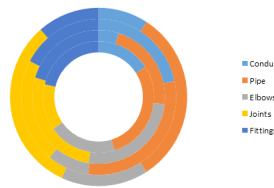


Waterfall

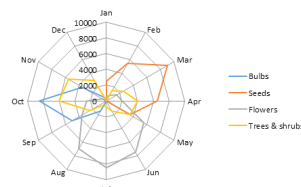
Down Time in Muntues



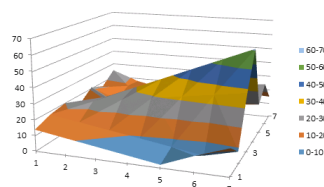
Bar



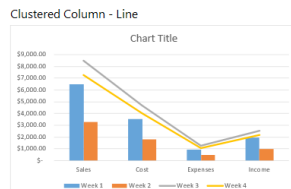
Sunburst



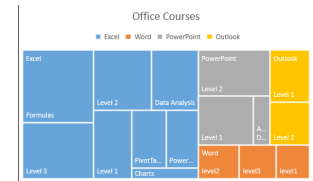
Radar



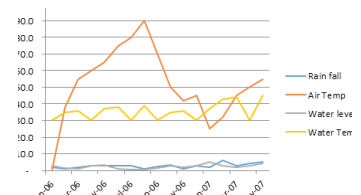
Surface



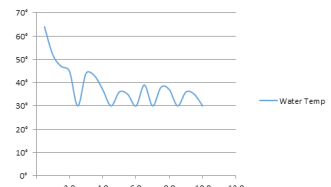
Combination



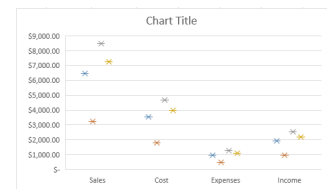
Treemap



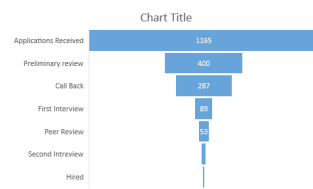
Line



X Y (Scatter)



Box and Whisker



Funnel

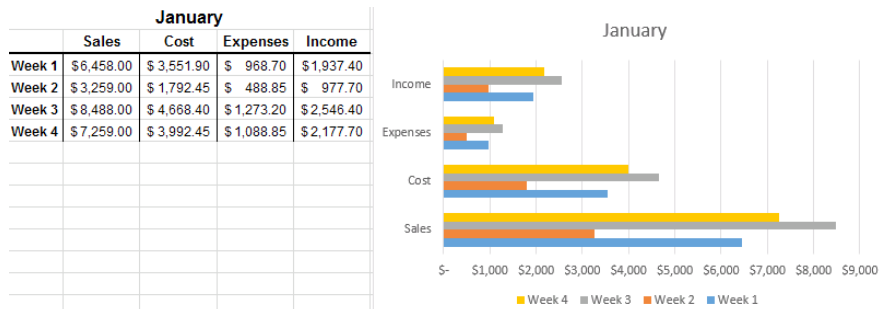
## Bar Charts

Bar Charts are useful for comparing data points in one or more data series. Although they can be used to clearly illustrate comparisons among individual items.

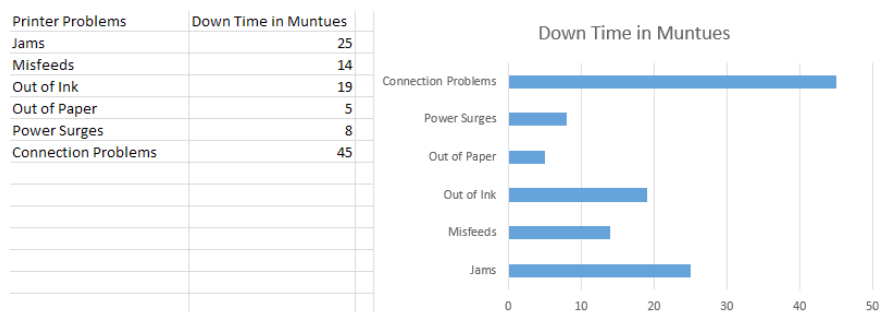
For a bar chart, data should be structured with categories along the vertical axis and values along the horizontal axis.

### When to Use a Bar Chart

- ◆ If you have one or more data series that you want to plot.
- ◆ If your data contains positive, negative, and zero (0) values.
- ◆ If you want to compare the data for numerous categories.
- ◆ If the axis labels are long.
- ◆ If the values that are shown are durations.



Bar Chart displaying single data series



Bar Chart displaying multiple data series

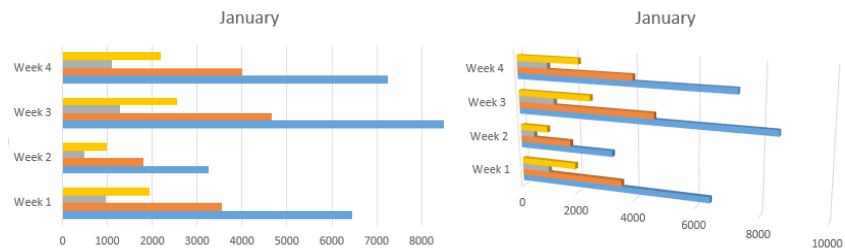


## Bar Charts, continued

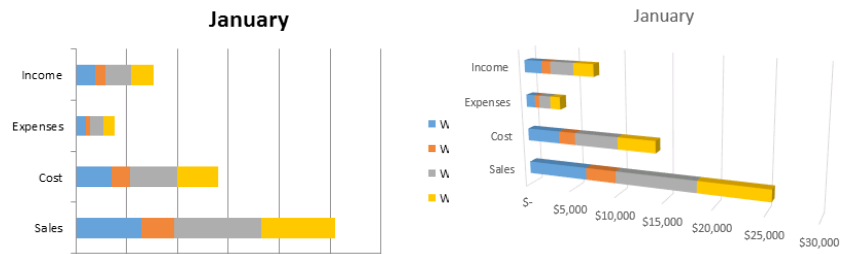
### Subtypes of Bar Charts

There are several Bar Chart types to choose from:

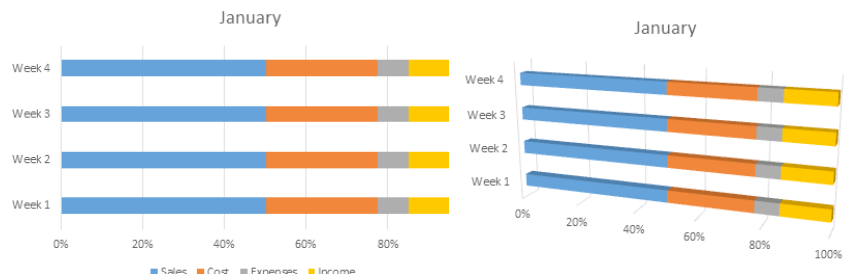
- ◆ **Clustered bar and clustered bar in 3-D:** Compare values across categories. In a clustered bar chart, the categories are typically organized along the vertical axis, and the values along the horizontal axis. A clustered bar in 3-D chart displays the horizontal rectangles in 3-D format; it does not display the data in 3-D format.



- ◆ **Stacked bar and stacked bar in 3-D:** these types of bar charts show the cumulative values of individual items in the data set. The 3-D chart variations still display the data along only two axes, it does not allow for a third axis.



- ◆ **100% stacked and 100% stacked in 3-D:** Compares the percentage each value item contributes to a total across categories.



## Bar Charts, continued

### Creating a Bar Chart

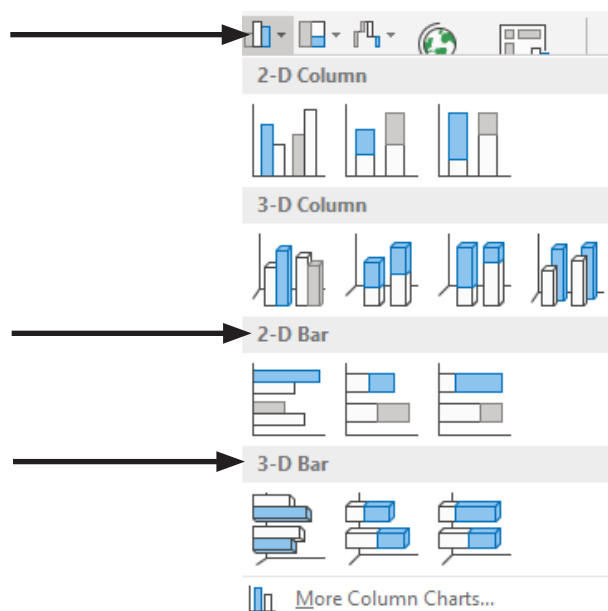
- ◆ Select the data to be charted.
- ◆ For a single data series chart, the data should be arranged with the headers (categories) at the top of the two columns. The first column representing the data points and the second representing the values.

Printer Problems	Down Time in Muntues
Jams	25
Misfeeds	14
Out of Ink	19
Out of Paper	5
Power Surges	8
Connection Problems	45

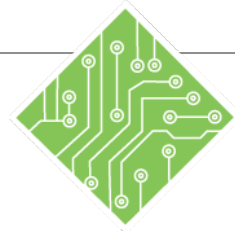
- ◆ For a multi point data series chart, the data should be arranged with the headers (categories) in the first row and the data points and the first column.

	Sales	Cost	Expenses	Income
Week 1	\$6,458.00	\$ 3,551.90	\$ 968.70	\$1,937.40
Week 2	\$3,259.00	\$ 1,792.45	\$ 488.85	\$ 977.70
Week 3	\$8,488.00	\$ 4,668.40	\$ 1,273.20	\$2,546.40
Week 4	\$7,259.00	\$ 3,992.45	\$ 1,088.85	\$2,177.70

- ◆ On the *Insert Tab* in the **Charts Group**, click the **[Insert Column or Bar Chart]** button drop-down and choose the type of Bar Chart you want to create.



## Action 1.4 - Creating a Bar Chart



### Instructions:

1. Open the **Charts.xlsx** file from the data files folder.
2. Activate the *Bar Single Series* worksheet.
3. Select cells **A1:B7**.
4. Click the *Insert Tab* on the ribbon.
5. In the **Charts Group**, click the **[Insert Column or Bar Chart]** button drop-down and choose the *Clustered Bar* from the **2-D** set of options.
6. Click into the chart and set the cursor on the border of the chart, the cursor changes to a four sided arrow. Click and drag the chart below the data set.
7. With the chart actively selected, notice the ribbon now displays the *Chart Tools* set of tabs, with *Design* and *Format* tabs.
8. Click any cell in the spreadsheet to deselect the chart.
9. Reselect the chart by clicking on it.

### Results/ Comments:

Click the sheet tab at the bottom of the worksheet.

This is the data set that will be charted. Notice the structure of the data; the categories are listed in the vertical (Y) axis and the values are along the horizontal (X) axis.

From here you have access to the charts types that *Excel* can generate from your data.

The chart is added to the spreadsheet. It shows a comparison of each category in the data set.

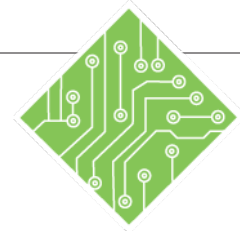
The chart is repositioned. If the cursor changes to a two headed arrow you are able to resize the chart.

These are contextual tabs and are only available when the chart is actively selected.

The *Chart Tools* tabs are no longer displayed.

The *Chart Tools* tabs are re-displayed.





### Instructions:

10. Click the *Chart Tools Design Tab*.
11. Click the **[Change Chart Type]** button.
12. Note the different bar charts across the top of the dialog.
13. Choose any of available *Bar Chart* types and click the **[OK]** button.
14. Repeat steps 11 through 13 to change the chart again, try each to see how they look.
15. Activate the *Bar Multiple Series* worksheet.
16. Select cells **A2:E6**.
17. Click the *Insert Tab* on the ribbon.
18. In the **Charts Group**, click the **[Insert Column or Bar Chart]** button drop-down and choose the *Clustered Bar* from the **2D** set of options.
19. Try changing the chart type again to find one you like by repeating steps 10 through 13.
20. Save the file as **MyCharts**. Leave the file open.

### Results/ Comments:

The ribbon displays the *Design Tab* where you can begin making modifications to the chart.

The *Change Chart Type* dialog is displayed where you can change the chart to any other type of chart. The *Bar Chart* category should be active.

All the 2-D and 3-D bar charts are displayed; Clustered, Stacked and 100% Stacked.

The chart is changed. You can also double-click the chart type you want to apply it.

Explore all the *Bar Chart* options.

Click the sheet tab at the bottom of the spreadsheet.

This is the data set to be charted. Notice the structure of the data, there are categories along both the X and Y axes of the data.

The chart is added to the spreadsheet.

The list of Bar Chart options is the same as before.

Click the *File Tab*, then the **[Save]** button or use the key command, **[CTRL + S]**.



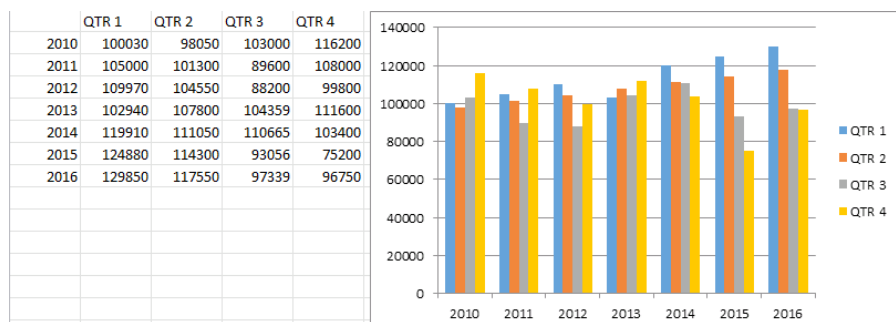
## Column Charts

Column Charts use vertical bars to compare data points in one or more data series across categories. These charts are useful when showing data changes over a period of time or for illustrating comparisons among items.

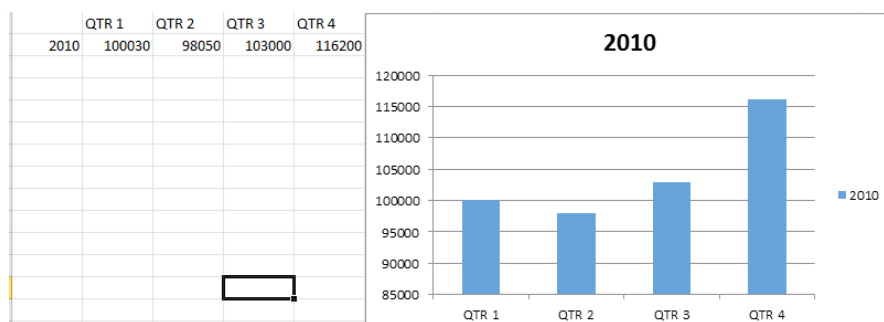
The data should be structured in columns or rows on a worksheet to be plotted in a column chart. In column charts, categories are typically organized along the horizontal axis and values along the vertical axis. This structure is a reversal of what is used to create bar charts.

### When to Use a Column Chart

- ◆ If you have one or more data series that you want to plot.
- ◆ If your data contains positive, negative, and zero (0) values.
- ◆ If you want to compare the data for numerous categories side by side.



Multiple data series column chart



Single data series column chart

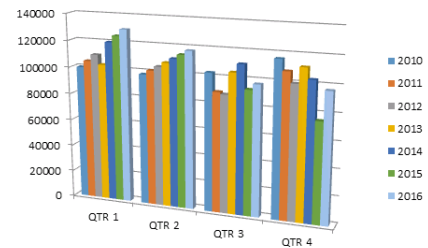
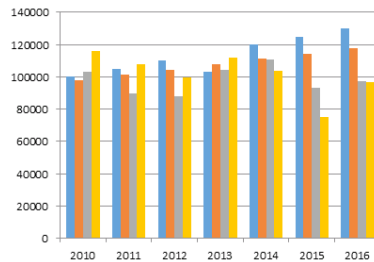


## Column Charts, continued

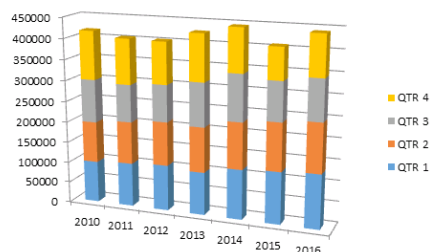
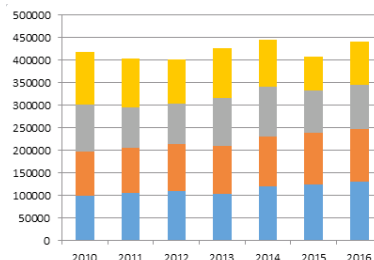
### Subtypes of Column Charts

There are several Column Chart types to choose from:

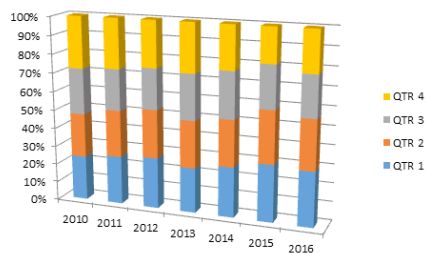
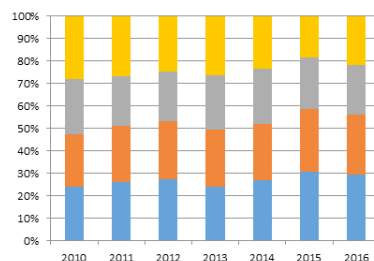
- ◆ **Clustered column and clustered column in 3-D:** use these to compare values across categories or when you have categories that represent: ranges of values, specific scale arrangements, or when you have names that are not in any specific order.. Clustered column charts display values on two axes only.



- ◆ **Stacked column and stacked column in 3-D:** show relationships of individual items to the whole, comparing the contribution of each value to a total across categories. Use a stacked column chart when you have multiple data series and when you want to emphasize the total.



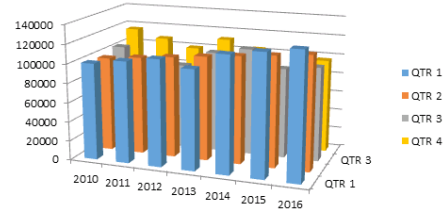
- ◆ **100% stacked column and 100% stacked column in 3-D:** compares the percentage each value contributes to a total across categories.





## Column Charts, continued

- ◆ **3-D column:** 3-D column charts use three axes that you can modify (a horizontal axis, a vertical axis, and a depth axis) and they compare data points along the horizontal and the depth axes.



### Creating a Column Chart

- ◆ Select the data to be charted.
  - ◆ For a single data series chart, the data should be arranged with the headers (data points) in the top row. The first cell in the second row should contain the category of the series.

	QTR 1	QTR 2	QTR 3	QTR 4
2010	100030	98050	103000	116200

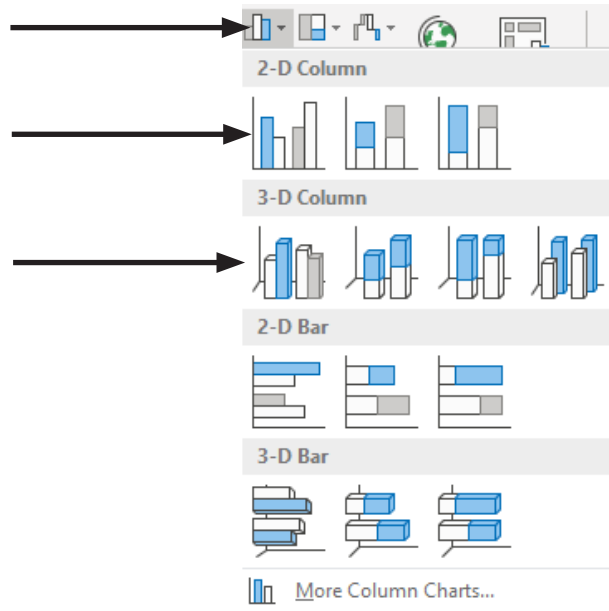
- ◆ For a multi point data series chart, the data should be arranged the way as a single data series but each additional row add another category.

	QTR 1	QTR 2	QTR 3	QTR 4
2010	100030	98050	103000	116200
2011	105000	101300	89600	108000
2012	109970	104550	88200	99800
2013	102940	107800	104359	111600
2014	119910	111050	110665	103400
2015	124880	114300	93056	75200
2016	129850	117550	97339	96750

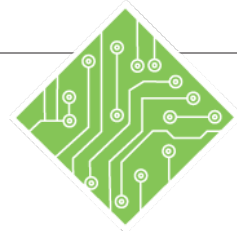


## Column Charts, continued

- Click the [Insert Column or Bar Chart] button drop-down and choose the type of Column Chart use wish to create. The button is found on the *Insert Tab* in the **Charts Group**.



## Action 1.5 - Creating a Column Chart



### Instructions:

1. **MyCharts.xlsx** file should still be open.
2. Activate the *Column Single Series* worksheet.
3. Select cells **A1:E4**.
4. Click the *Insert Tab* on the ribbon.
5. In the **Charts Group**, click the **[Insert Column or Bar Chart]** button drop-down and choose the *Clustered Column* from the **2-D** set of options.
6. Move the chart under the data set.
7. Click the *Chart Tools Design Tab*.
8. Click the **[Change Chart Type]** button.
9. Choose any of available Column Chart types and click the **[OK]** button.
10. Activate the *Column Multiple Series* worksheet.

### Results/ Comments:

If not, re-open the file from the data files folder.

Click the sheet tab at the bottom of the spreadsheet.

These are the cells to be charted. The categories are listed along the X axis but could also be along the Y axis since you are comparing only one set of data.

A chart displaying the comparison with vertical bars is added to the spreadsheet.

With the chart actively selected move the cursor over the border to display the four headed move arrow cursor.

The *Design Tab* tools are displayed in the ribbon.

The *Change Chart Type* dialog is displayed where you can change the chart to any other type of chart. The Column Chart category should be active. All the 2-D and 3-D Column Charts are displayed; Clustered, Stacked and 100% Stacked.

The chart is changed. You can also double-click the chart type you want to apply it.

By clicking the sheet tab at the bottom of the spreadsheet.



**Instructions:**

11. Select cells **A1:E8**.
12. Click the *Insert Tab* on the ribbon.
13. In the **Charts Group**, click the **[Insert Column or Bar Chart]** button drop-down and choose the *Clustered Column* from the **2-D** set of options.
14. Move the chart under the data set.
15. Click the *Chart Tools Design Tab*.
16. Click the **[Change Chart Type]** button.
17. Choose any of available Column Chart types and click the **[OK]** button.
18. Save the file and leave it open.

**Results/ Comments:**

This is the data set to be charted. Notice there are categories along both axes.

The chart is added to the spreadsheet.

Using the four sided arrow cursor.

The *Change Chart Type* dialog is displayed where you can change the chart to any other type of chart. The Column Chart category should be active. All the 2-D and 3-D Column Charts are displayed; Clustered, Stacked and 100% Stacked.

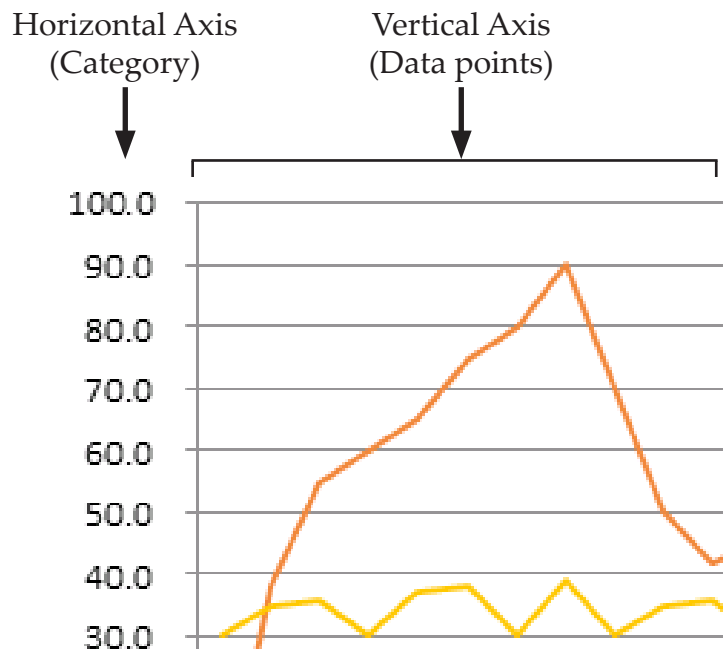
The chart is changed. You can also double-click the chart type you want to apply it.

**[CTRL + S]**.

## Line Charts

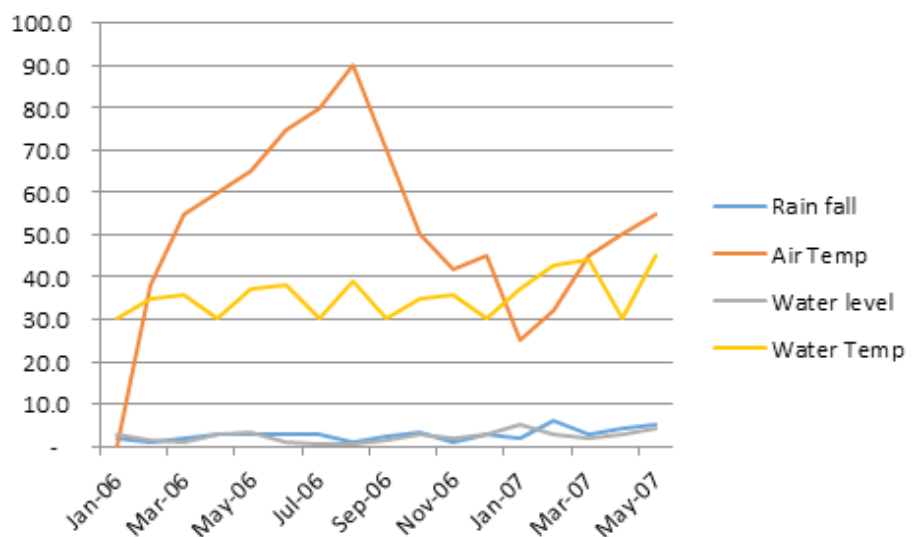
Line Charts are used to display trends in relation to a common scale, and are therefore ideal for showing trends in data at equal intervals or over time. In a Line Chart, the horizontal axis displays category data and all value data is displayed evenly along the vertical axis.

If the first column of the data contains text labels, dates or a few numeric labels that are the category along the horizontal axis then use the Line Chart.



### Note

If you have numeric labels, empty cell A1 before you create the Line Chart. By doing this, Excel will not recognize the numbers in column A as a data series and automatically places these numbers on the horizontal (category) axis. After creating the chart, you can re-enter the text into cell A1.



### Note

Note Text



## Line Charts, continued

### Note

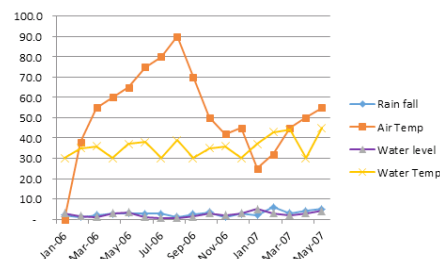
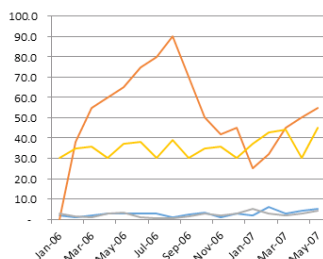
As a general rule, use a Line Chart if your data has non-numeric x values — for numeric x values, it is usually better to use a Scatter Chart.

## When to Use a Line Chart

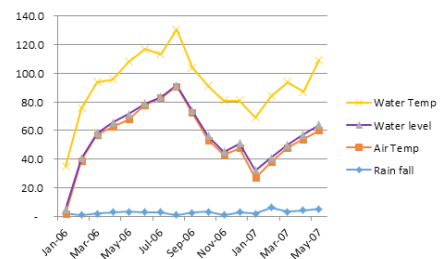
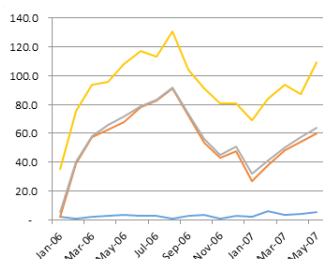
- ❖ If your category labels are text, and are representing evenly spaced values such as months, quarters, or fiscal years.
- ❖ If there are multiple series—for one series, you should consider using a category chart.
- ❖ If you have a few evenly spaced numerical labels, especially years. If you have more than ten numerical labels, use a Scatter Chart instead.

## Subtypes of Line Charts

- ❖ **Line and Line with Markers:** Displayed with or without markers to indicate individual data values, Line Charts are useful to show trends over time or ordered categories, especially when there are many data points and the order in which they are presented is important. If there are many categories or the values are approximate, you should use a Line Chart without markers.



- ❖ **Stacked line and Stacked Line with Markers:** Displayed with or without markers to indicate individual data values, stacked Line Charts are useful to show the trend of the contribution of each value over time or ordered categories. If there are many categories or the values are approximate, you should use a stacked Line Chart without markers.



### Note

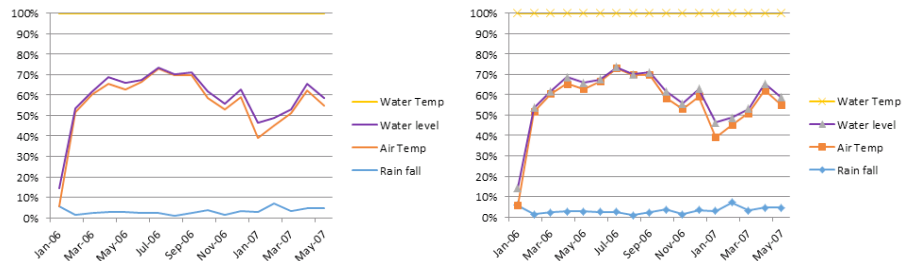
For a better presentation of this type of data, you may want to consider using a Stacked Area Chart instead.

## Line Charts, continued

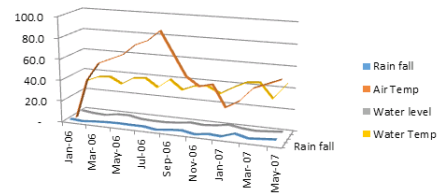
### Note

For a better presentation of this type of data, you may want to consider using a 100% stacked Area Chart instead.

- ◆ **100% Stacked Line and 100% Stacked Line with Markers:** Displayed with or without markers to indicate individual data values, 100% Stacked Line Charts are useful to show the trend of the percentage each value contributes over time or ordered categories. If there are many categories or the values are approximate, you should use a 100% Stacked Line Chart without markers.



- ◆ **3-D line:** 3-D Line Charts show each row or column of data as a 3-D ribbon. A 3-D Line Chart has horizontal, vertical, and depth axes that you can modify



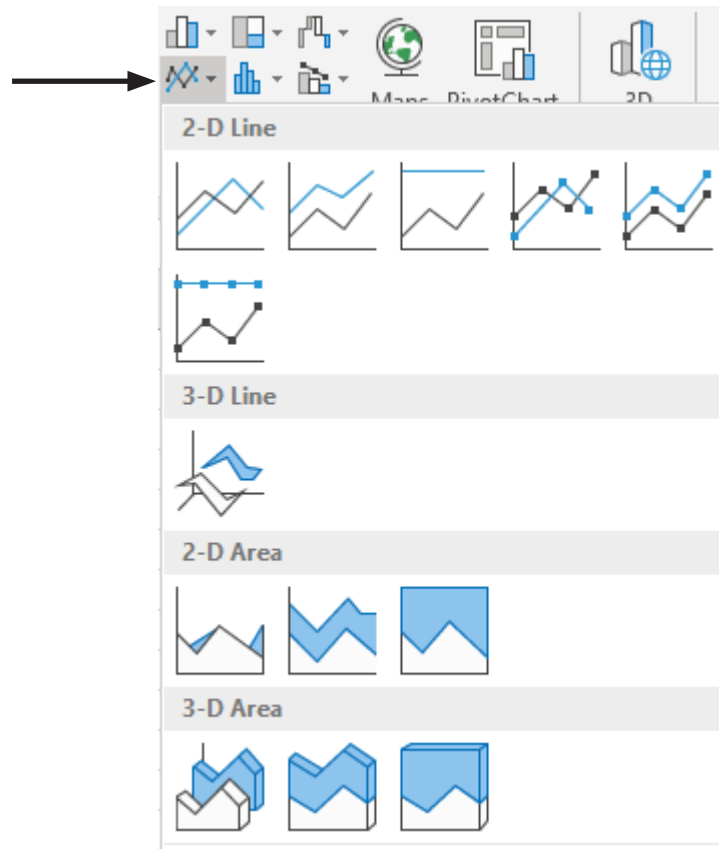
## Creating a Line Chart

- ◆ Select the data to be charted, remember that the first column should contain either text, dates, or only a few numeric values (less than ten).

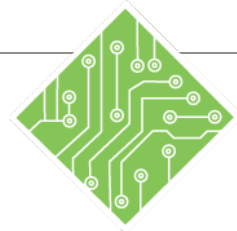
Month	Rain fall	Air Temp	Water level	Water Temp
Jan-06	2.0	28°	3.0	30°
Feb-06	1.0	38°	1.5	35°
Mar-06	2.0	55°	1.0	36°
Apr-06	2.7	60°	3.0	30°
May-06	3.0	65°	3.3	37°
Jun-06	2.8	75°	1.0	38°
Jul-06	2.8	80°	0.5	30°
Aug-06	1.0	90°	0.5	39°
Sep-06	2.4	70°	1.4	30°
Oct-06	3.3	50°	3.0	35°
Nov-06	1.0	42°	2.0	36°
Dec-06	2.8	45°	3.0	30°
Jan-07	2.0	25°	5.0	37°
Feb-07	6.0	32°	3.0	43°
Mar-07	3.0	45°	2.0	44°
Apr-07	4.0	50°	3.0	30°
May-07	5.0	55°	4.0	45°

## Line Charts, continued

- Click on the *Insert Tab*.
- Locate the **Charts Group**.
- Click the **[Insert Line or Area Chart]** button drop-down and choose the type of Line Chart you wish to create.



## Action 1.6 - Creating a Line Chart



### Instructions:

1. **MyCharts.xlsx** file should still be open.
2. Activate the *Line and Scatter* sheet.
3. Select cells **A1:B10**.
4. Click the *Insert Tab* in the ribbon.
5. In the **Charts Group**, click the **[Insert Line or Area Chart]** button drop-down and choose *Line* (the first one). Move the chart beside the data.
6. Select cells **A22:E39**.
7. Click the *Insert Tab* in the ribbon.
8. In the **Charts Group**, click the **[Insert Line or Area Chart]** button drop-down and choose *Line* from the set of options, the first one.
9. Click the *Chart Tools Design Tab*.
10. Click the **[Change Chart Type]** button.

### Results/ Comments:

If not, re-open the file from the data files folder.

Click the sheet tab at the bottom of the spreadsheet.

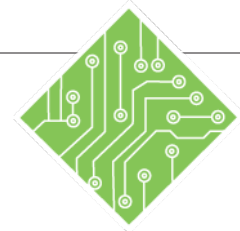
This is a data set that will create a single line Line Chart. The X axis is the data series while the Y axis is the category. The category for a Line Chart should be at regular intervals, time is a prime example since this type of chart is used to display trends in relation to a common scale

The Line Chart is added to the spreadsheet. It shows the rainfall fluctuations over the span of days recorded within the data.

This data set tracks several categories of data across the X axis.

The Line Chart is added to the spreadsheet. It shows how each category's data fluctuates over the span of months recorded within the data.

The *Change Chart Type* dialog is displayed where you can change the chart to any other type of chart. The Line Chart category should be active. All the Line Charts are displayed; Line with and without markers, Stacked with and without markers, 100% stacked with and without markers, and 3-D Line.



**Instructions:**

11. Choose any of available Line Chart types and click the **[OK]** button.
12. Move the Chart to the right of your data.
13. Try changing the chart type on the first Line Chart you made.
14. When you have found a chart type you like, save the file and keep it open.

**Results/ Comments:**

The chart type you chose is displayed.

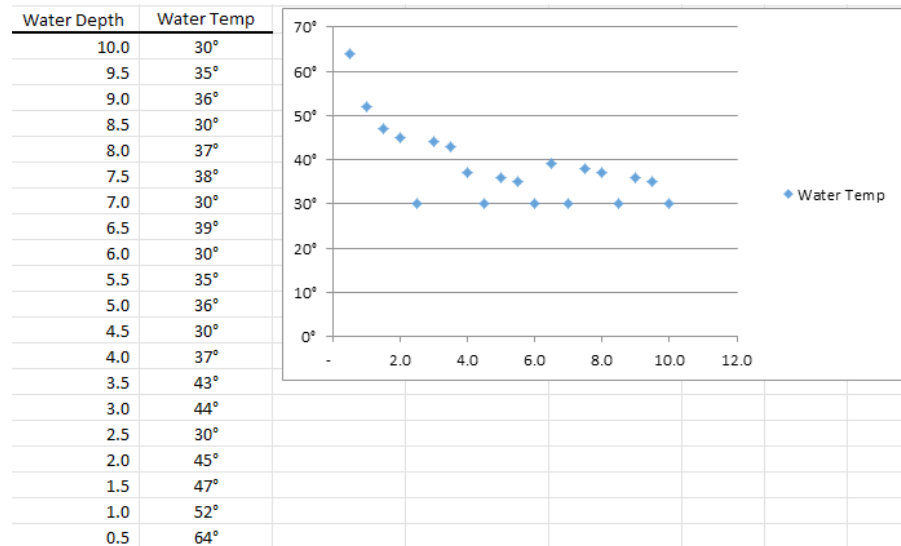
Repeat steps 9 through 11.

**[CTRL + S].**



## Scatter (XY) Charts

Scatter Charts, also referred to as XY charts, are used to find relationships between X and Y variables. Therefore, they always have two value axes, the horizontal axis draws its values from the first column of data while the vertical axis is based on the values in the data. The data points are generated from the intersection of an x and y numerical values, these values are combined into single data points. Depending on the data, these data points may be distributed evenly or unevenly across the horizontal axis.



### When to Use a Scatter Chart

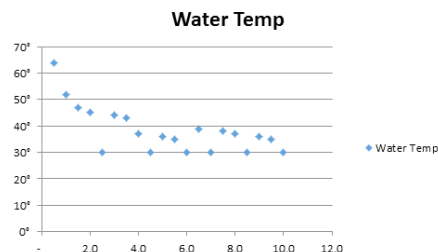
- ◆ If you want to change the scale of the horizontal axis.
- ◆ If you want to make that axis a logarithmic scale.
- ◆ If values for horizontal axis are not evenly spaced.
- ◆ If there are many data points on the horizontal axis.
- ◆ If you want to effectively display worksheet data that includes pairs or grouped sets of values and adjust the independent scales of a Scatter Chart to reveal more information about the grouped values.
- ◆ If you want to show similarities between large sets of data instead of differences between data points.
- ◆ If you want to compare large numbers of data points without regard to time—the more data that you include in a Scatter Chart, the better the comparisons that you can make.



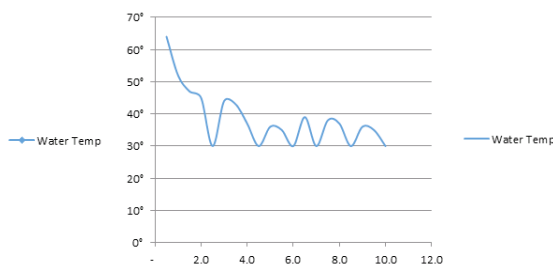
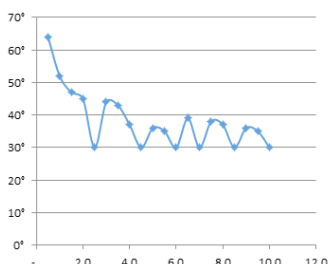
## Scatter (XY) Charts, continued

### Subtypes of Scatter Charts

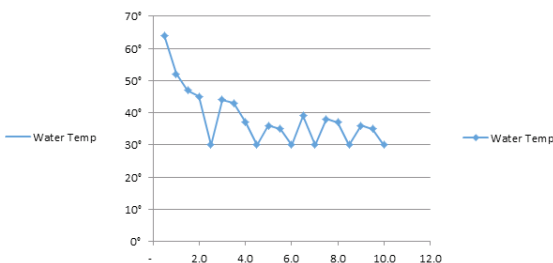
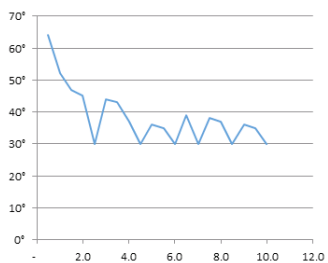
- ◆ **Scatter:** This type of chart compares pairs of values. Use a Scatter Chart without lines when you have data in a specific order.



- ◆ **Scatter with Smooth Lines and Markers and Scatter with Smooth Lines:** This type of chart can be displayed with or without a smooth curve connecting the data points. These lines can be displayed with or without markers. Use the Scatter Chart without markers if there are many data points.



- ◆ **Scatter with Straight Lines and Markers and Scatter with Straight Lines:** This type of chart can be displayed with or without straight connecting lines between data points. These lines can be displayed with or without markers.





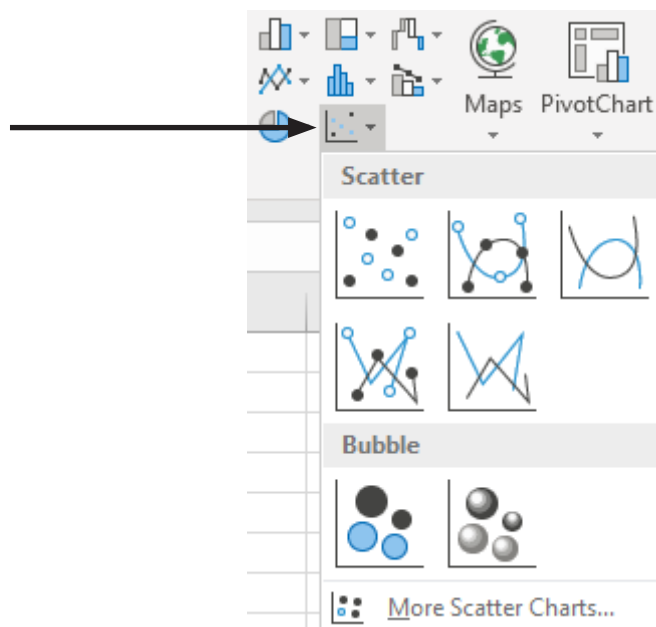
## Scatter (XY) Charts, continued

### Creating a Scatter Chart

- ◆ Select the data to be charted. There should be two columns of data and the first column should contain numeric data and will be the X (horizontal) axis.

Water Depth	Water Temp
10.0	30°
9.5	35°
9.0	36°
8.5	30°
8.0	37°
7.5	38°
7.0	30°
6.5	39°
6.0	30°
5.5	35°
5.0	36°
4.5	30°
4.0	37°
3.5	43°
3.0	44°

- ◆ Click the **[Scatter Chart (X, Y), or Bubble Chart]** button drop-down and choose the Scatter Chart you wish to use. The button is found in the **Charts Group** on the *Insert Tab*.



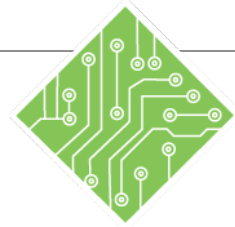


## Scatter (XY) Charts, continued

While Scatter Charts and Line Charts can look similar, especially when a Scatter Chart is displayed with connecting lines, there is a big difference in the way each of these chart types plots data along the X (horizontal) axis and the Y (vertical) axis.

Use a Line Chart if you want to:	Use a Scatter Chart if you want to:
<i>Use text labels on the horizontal axis.</i> These text labels can represent evenly spaced values such as months, quarters, or fiscal years.	<i>Change the scale of the horizontal axis</i> Because the horizontal axis is a value axis, more scaling options are available.
<i>Use a small set of numerical labels on the horizontal axis.</i> Useful to display a few, evenly spaced numerical labels that represent a time interval, such as years.	<i>Use a logarithmic scale on the horizontal axis</i> Because the horizontal axis is a value axis, you can turn it into a logarithmic scale.
<i>Use a time scale along the horizontal axis</i> Useful to display dates in chronological order at specific intervals or base units, such as the number of days, months, or years, even if the dates on the worksheet are not in order or in the same base units.	<i>Display worksheet data that includes pairs or grouped sets of values</i> You can adjust the independent scales of the axes to reveal more information about the grouped values.
	<i>Show patterns in large sets of data</i> Useful for illustrating the patterns in the data, for example by showing linear or non-linear trends, clusters, and outliers.
	<i>Compare large numbers of data points without regard to time</i> The more data that you include in a Scatter Chart, the better the comparisons that you can make.

## Action 1.7 - Creating a Scatter Chart



### Instructions:

1. **MyCharts.xlsx** file should still be open.
2. The *Line and Scatter* sheet should also still be active.
3. Select cells **A43:B63**.
4. Click the *Insert Tab* in the ribbon.
5. In the **Charts Group**, click the **[Insert Scatter (X Y) or Bubble Chart]** button drop-down and choose *Scatter* from the set of options, the first one.
6. Move the Chart to the right of your data.
7. Click the *Design Tab* in the *Chart Tools* group of tabs.
8. Click the **[Change Chart Type]** button.
9. Choose any of available Scatter or Bubble Chart types and click the **[OK]** button.
10. Save the file and leave it open.

### Results/ Comments:

If not, re-open the file from the data files folder.

If not then click the *Line and Scatter* sheet tab at the bottom of the spreadsheet.

This is the data set to be charted. For a Scatter Chart there should only be two columns or rows of data, the first column or row will be the X axis with the values should be in the second column or row. Unlike Line Charts, Scatter Charts don't need the X axis to be at regular intervals.

The Scatter Chart is added to the spreadsheet.

The *Change Chart Type* dialog is displayed where you can change the chart to any other type of chart. The Scatter Chart category should be active. All the Scatter Charts are available; markers only, smooth or straight line, both with or without markers.

Try each to see the variations. As you can see, the Bubble Charts are not good for this much data.

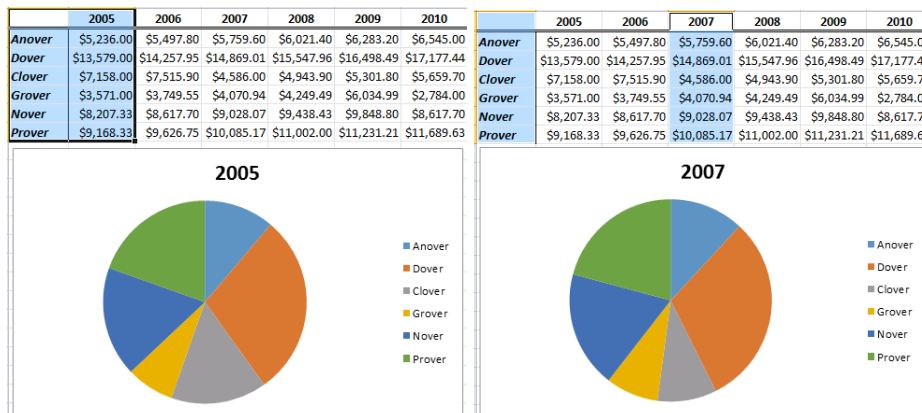
**[CTRL + S]**.

## Pie Charts

### Note

It is possible to make non-continuous selections from a larger data set to create Pie Charts.

Pie Charts are used to show the contribution of each value (slice) proportionally to the sum of the items, the total (pie). Pie Charts always use one data series, the worksheet data should be arranged in either one column or one row. A column or row of category names can also be included, as long as they are in the first column or row in the selection. The categories will be presented as the legend of the Pie Chart while the data is displayed as percentages of the total.



Pie Chart based on continuous selection

Pie Chart based on non-continuous selection

## When to Use a Pie Chart

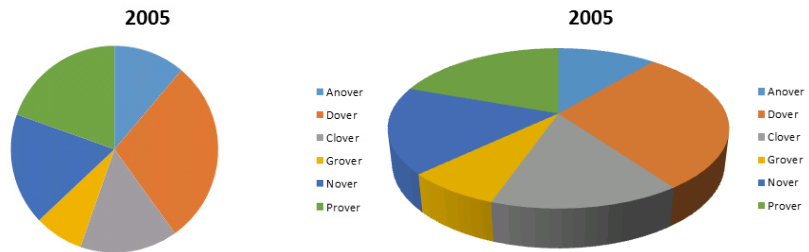
- ◆ If you are plotting only one *Data Series*.
- ◆ If no negative values are in the *Data Series*.
- ◆ If the values you are plotting have few zeros in the *Data Series*.
- ◆ If you have seven or less categories to chart although, you can still make a Pie Chart from larger data sets.
- ◆ If the categories can be represented as part of the whole pie.



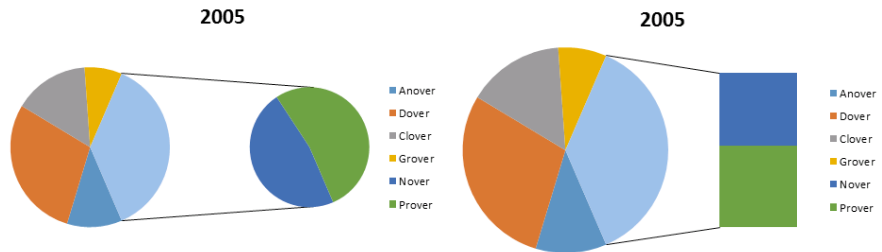
## Pie Charts, continued

### Subtypes of Pie Charts

- ◆ **Pie and Pie in 3-D:** Pie Charts display the contribution of each value to a total in a 2-D or 3-D format. You can pull out slices of a Pie Chart manually to emphasize the slices.



- ◆ **Pie of Pie and Bar of Pie:** Pie of Pie or Bar of Pie Charts display Pie Charts with user-defined values that are extracted from the main Pie Chart and combined into a secondary Pie Chart or into a stacked bar chart. These chart types are useful when you want to make small slices in the main Pie Chart easier to distinguish.



## Pie Charts, continued

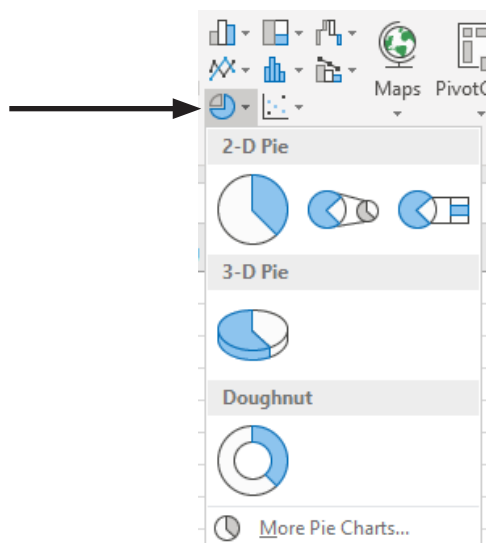
### Creating a Pie Chart

- ◆ Select the data to be charted.
- ◆ Remember that Pie Charts only plot one data series so the selection should be at most either two rows or columns. One of which contains the headers and the other the data.
- ◆ You can make non-continuous selections from larger data sets as long as one contains the headers and the other the data

	2005	2006	2007	2008	2009	2010
Anover	\$5,236.00	\$5,497.80	\$5,759.60	\$6,021.40	\$6,283.20	\$6,545.00
Dover	\$13,579.00	\$14,257.95	\$14,869.01	\$15,547.96	\$16,498.49	\$17,177.44
Clover	\$7,158.00	\$7,515.90	\$4,586.00	\$4,943.90	\$5,301.80	\$5,659.70
Grover	\$3,571.00	\$3,749.55	\$4,070.94	\$4,249.49	\$6,034.99	\$2,784.00
Nover	\$8,207.33	\$8,617.70	\$9,028.07	\$9,438.43	\$9,848.80	\$8,617.70
Prover	\$9,168.33	\$9,626.75	\$10,085.17	\$11,002.00	\$11,231.21	\$11,689.63

	2005	2006	2007	2008	2009	2010
Anover	\$5,236.00	\$5,497.80	\$5,759.60	\$6,021.40	\$6,283.20	\$6,545.00
Dover	\$13,579.00	\$14,257.95	\$14,869.01	\$15,547.96	\$16,498.49	\$17,177.44
Clover	\$7,158.00	\$7,515.90	\$4,586.00	\$4,943.90	\$5,301.80	\$5,659.70
Grover	\$3,571.00	\$3,749.55	\$4,070.94	\$4,249.49	\$6,034.99	\$2,784.00
Nover	\$8,207.33	\$8,617.70	\$9,028.07	\$9,438.43	\$9,848.80	\$8,617.70
Prover	\$9,168.33	\$9,626.75	\$10,085.17	\$11,002.00	\$11,231.21	\$11,689.63

- ◆ Select the *Insert Tab* and location the **Charts Group**. Click the **[Insert Pie or Donut Chart]** button drop-down and choose the Pie Chart you wish to use.



## Pie Charts, continued

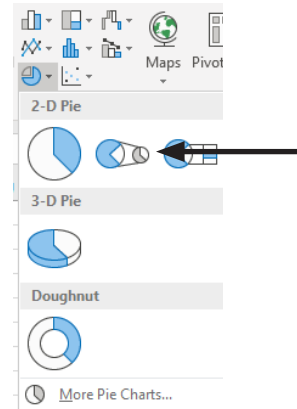
### Note

The left chart is always the main chart, and the secondary chart is always to its right. You can't rearrange them.

Connector lines are added automatically. You can remove them or change the connector styles.

### Creating a Pie in Pie Chart

- ◆ Select the data to be charted.
- ◆ The lesser values should be at the bottom of the data list but this is not necessary since you can edit this once the chart is created.
- ◆ Click the **[Insert Pie or Doughnut Chart]** button drop-down and choose *Pie of Pie* from the menu.



### Changing to a Pie of Pie Chart

- ◆ Select the Pie Chart and click the **[Change Chart Type]** button on the *Design Tab*.
- ◆ Choose the *Pie of Pie* or *Bar of Pie*.

### Editing the Secondary Pie or Bar

- ◆ Right-click the pie or bar and choose *Format Data Series* from the menu.
- ◆ In the *Format Data Series* dialog, click the type of data to display in the secondary chart form **Split Series By** field drop-down.
- ◆ To change how many data points appear in the secondary chart, make adjustments to the **Values in second plot** field.
- ◆ Use **Pie Explosion** to separate (explode) the slices of the pie.
- ◆ **Gap Width** controls the amount of space between the Pie Chart and the secondary chart.
- ◆ **Second Plot Size** controls the size of the secondary chart.

## Action 1.8 - Creating a Pie Chart



### Instructions:

1. **MyCharts.xlsx** file should still be open.
2. Activate the *Pie* sheet.
3. Select cells **A1:B7**.
4. Click the *Insert Tab* in the ribbon.
5. In the **Charts Group**, click the **[Insert Pie or Doughnut Chart]** button drop-down and choose *Pie* from the **2-D** set of options, the first one.
6. Move the Pie Chart below the data set.
7. Click the *Chart Tools Design Tab*.

### Results/ Comments:

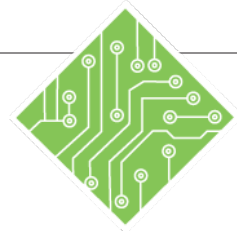
If not, re-open the file from the data files folder.

Click the *Pie* sheet tab at the bottom of the spreadsheet.

This is the data set to be charted. The Pie Chart will create a chart where all of the data points will be compared to each other as a cumulative total. For a Pie Chart there should only be two columns or rows of data, the first column or row will be the X axis with the values should be in the second column or row. This data structure is similar to the Scatter Chart data structure. If the data set has more than two rows or columns and you want to still create a Pie Chart to examine only part of the data, select only the first row or column and hold the **[CTRL]** key while selecting the second set of cells containing values.

The Pie Chart is added to the spreadsheet.

Position the cursor over the edge of the active chart, when the four headed arrow move cursor appears you can click and drag it to it's new location.



### Instructions:

8. Click the **[Change Chart Type]** button.
9. Choose any of available Pie Chart types and click the **[OK]** button.
10. Save the file.
11. Select cells **A1:A7** and **C1:C7**.
12. Click the *Insert Tab* in the ribbon.
13. In the **Charts Group**, click the **[Insert Pie or Doughnut Chart]** button drop-down and choose any *Pie*.
14. Move the new Pie Chart below the first one.
15. Save the file.
16. Select cells **N2:O8**.
17. Click the **[Insert Pie or Doughnut Chart]** button drop-down and choose *Pie of Pie* from the menu.
18. Move the chart under the data so it does not overlap the existing Pie Chart and examine how the chart is set up.

### Results/ Comments:

The *Change Chart Type* dialog is displayed where you can change the chart to any other type of chart. The Pie Chart category should be active. All the Pie Charts are available; Pie, 3-D Pie, Pie of Pie, Bar of Pie and Doughnut.

Try each to see the variations.

#### **[CTRL + S].**

Select the first range of cells that contain the categories for the chart. Hold the **[CTRL]** key and select the second set of cells that contain the values. This is a noncontinuous selection from a larger data set where you want to create a Pie Chart.

The second Pie Chart is added to the spreadsheet.

#### **[CTRL + S].**

These are the cells you will use for a Pie of Pie Chart.

The chart is added to the spreadsheet.

The three smaller amount have been combined into a single wedge in the main chart and the secondary chart shows how those three from the single in the main chart.





### Instructions:

19. Right-click the secondary chart and choose *Format Data Series* from the menu.
20. Click the drop-down for the **Split Series By** field and choose *Percentage Value*.
21. Change the value from **10%** to **15%** in the **Values less than** field.
22. Click the drop-down for the **Split Series By** field and choose *Position*.
23. Change the value from **3** to **2** in the **Values in second plot** field.
24. Change the value from **2** to **3** in the **Values in second plot** field.
25. In the *Format* pane, click the **[Close]** button.
26. Save the file and leave the file open.

### Results/ Comments:

The *Format Data Series* pane opens with the **Series Options** category displayed.

The Ink data point is now included in the secondary plot.

The secondary plot goes back to the default of 3 positions. The default is not always three positions, it is relative to the values of each data point the charts is drawing from.

The secondary plot now show the Flash Drives and Cables data points.

The Secondary plot is back to it's original state.

The *Format* pane closes.

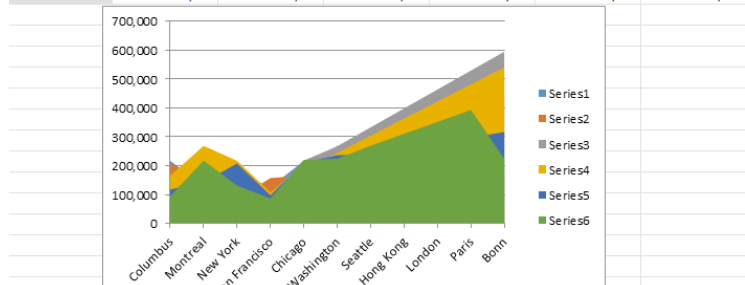
**[CTRL + S].**



## Area Charts

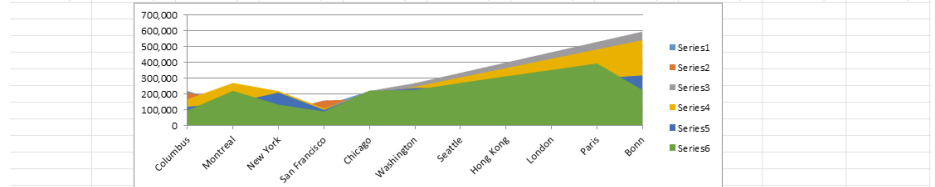
An Area Chart is essentially a Line Chart where the areas below the lines filled with colors. Area Charts emphasize the magnitude of change over time, and can be used to draw attention to the total value across a trend. In this chart type, the horizontal axis is based on the text values in either the first row or column and the vertical axis is based on the values in the columns.

Columbus	217,047	207,740	130,942	165,678	117,634	94,567
Montreal	129,870	152,144	78,730	269,108	143,538	217,968
New York	174,850	83,568	86,895	217,047	207,740	130,942
San Francisco	125,678	157,634	104,567	108,182	97,627	87,071
Chicago	216,992	165,678	217,968	185,774	209,903	219,951
Washington	154,635	269,108	267,550	245,006	236,453	224,402
Seattle	185,774	217,047	333,086	304,238	237,534	268,906
Hong Kong	245,006	108,182	398,623	363,470	257,375	310,558
London	198,955	169,269	464,159	422,702	277,217	351,558
Paris	85,655	164,516	529,696	481,934	297,058	392,883
Bonn	436,991	159,762	595,232	541,166	316,889	224,209



Area Chart using data in vertical configuration

Columbus	Montreal	New York	San Francisco	Chicago	Washington	Seattle	Hong Kong	London	Paris	Bonn
217,047	129,870	174,850	125,678	216,992	154,635	185,774	245,006	198,955	85,655	436,991
207,740	152,144	83,568	157,634	165,678	269,108	217,047	108,182	169,269	164,516	159,762
130,942	78,730	86,895	104,567	217,968	267,550	333,086	398,623	464,159	529,696	595,232
165,678	269,108	217,047	108,182	185,774	245,006	304,238	363,470	422,702	481,934	541,166
117,634	143,538	207,740	97,627	209,903	236,453	237,534	257,375	277,217	297,058	316,889
94,567	217,968	130,942	87,071	219,951	224,402	268,906	310,558	351,558	392,883	224,209



Area Chart using data in vertical configuration

### Note

The data series will need to be renamed when formatting the chart.

## When to Use an Area Chart

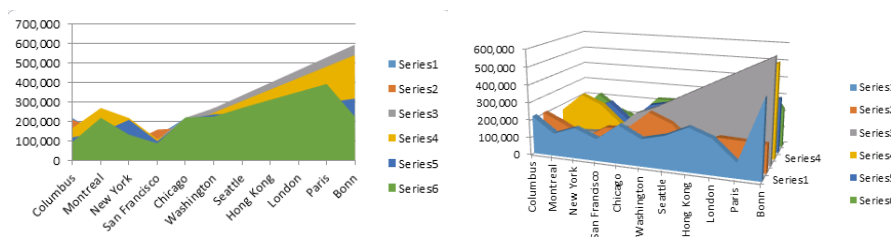
- ❖ Since these chart types are similar to Line Charts, consider the same reason as mentioned in the Line Chart section of this lesson.
- ❖ If you want to show rough part-to-whole comparisons.



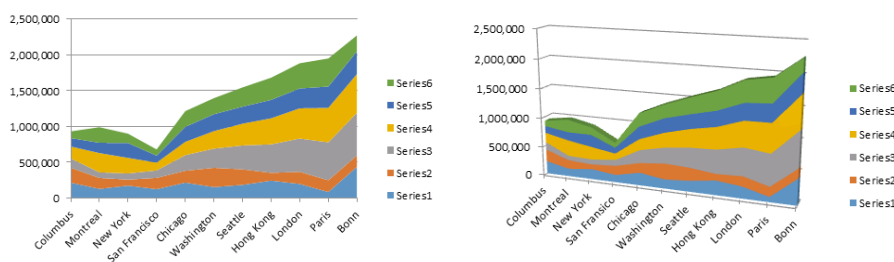
## Area Charts, continued

### Subtypes of Area Charts

- Area and 3-D Area:** Area Charts display the trend of values over time or categories. A 3-D Area displays the same but presents the areas in a 3-D format. To present data in a 3-D format that uses three axes (horizontal, vertical, and depth axes) that you can modify, you should use the 3-D Area Chart subtype. As a general rule, you should consider using a Line Chart instead of a non-stacked Area Chart.

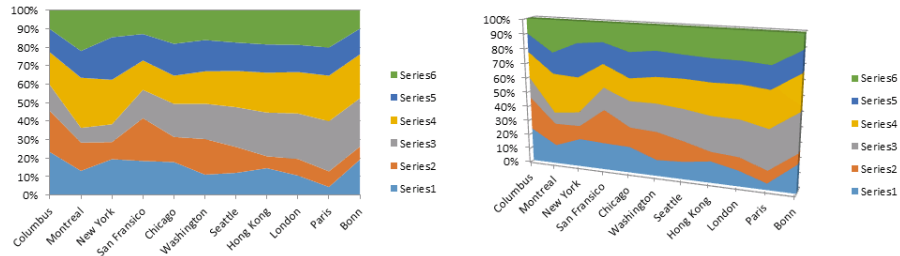


- Stacked Area and 3-D Stacked Area:** Stacked Area Charts display the trend of the contribution of each value over time or categories. A 3-D Stacked Area Chart displays the same but presents the areas in a 3-D format. To present data in a 3-D format that uses three axes (horizontal, vertical, and depth axes) that you can modify, you should use the 3-D Area Chart subtype.



## Area Charts, continued

- 100% Stacked Area and 3-D 100% Stacked Area: 100% stacked Area Charts display the *trend of the percentage each value contributes over time or categories*. A 100% stacked Area Chart in 3-D displays the same but presents the areas in a 3-D format; it does not display the data in 3-D format. To present data in a 3-D format that uses three axes (horizontal, vertical, and depth axes) that you can modify, you should use the 3-D Area Chart subtype.



## Creating an Area Chart

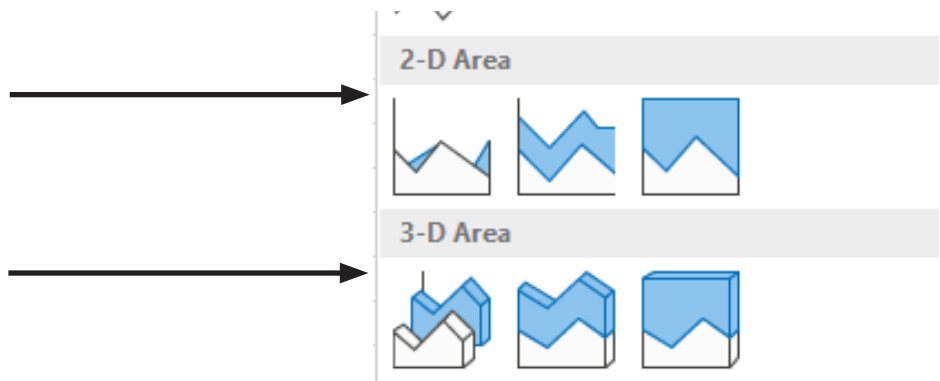
- Select the data to be charted. The header text can be in the first row or column, not recommended to have headers for both.

Columbus	217,047	207,740	130,942	165,678	117,634	94,567
Montreal	129,870	152,144	78,730	269,108	143,538	217,968
New York	174,850	83,568	86,895	217,047	207,740	130,942
San Francisco	125,678	157,634	104,567	108,182	97,627	87,071
Chicago	216,992	165,678	217,968	185,774	209,903	219,951
Washington	154,635	269,108	267,550	245,006	236,453	224,402
Seattle	185,774	217,047	333,086	304,238	237,534	268,906
Hong Kong	245,006	108,182	398,623	363,470	257,375	310,558
London	198,955	169,269	464,159	422,702	277,217	351,558
Paris	85,655	164,516	529,696	481,934	297,058	392,883
Bonn	436,991	159,762	595,232	541,166	316,889	224,209

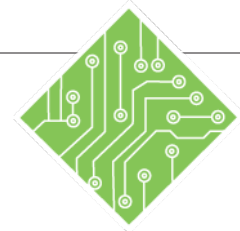
- Select the *Insert Tab* and locate the **Charts Group**.



- Click the **[Insert Line or Area Chart]** button drop-down and choose the Area Chart you wish to use.



## Action 1.9 - Creating an Area Chart



### Instructions:

1. **MyCharts.xlsx** should still be open.
2. Activate the *Area* sheet.
3. Select cells **A1:K7**.
4. Click the *Insert Tab* in the ribbon.
5. In the **Charts Group**, click the **[Insert Line or Area Chart]** button drop-down and choose *Area* from the **2-D** set of options, the first one.
6. Move the Area Chart below the data set.
7. Reselect the data set and copy it.
8. Select cell **A30**.
9. Right-click the cell, then from the *Paste* option, choose *Transpose* (The 4th Paste option).
10. Select cells **A30:G40**.
11. Click the *Insert Tab* in the ribbon.

### Results/ Comments:

If not, re-open the file from the data files folder.

Click the *Area* sheet tab at the bottom of the spreadsheet.

This is the data set to be charted. Area Charts are similar to Line Charts with the addition of filled space below the line, as such the structure of the data is the same as that of a Line Chart. The headers can be in either the first row (X) or the first column (Y), although *you should not have headers running in both the X and Y axes*.

An Area Chart is added to the spreadsheet.

Position the cursor over the edge of the active chart, when the four headed arrow move cursor appears you can click and drag it to it's new location.

You will be creating another Area Chart from the same data but structured with the categories in the first column.

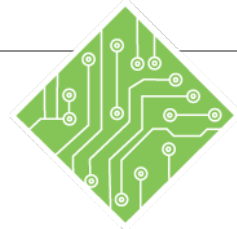
This is where the data is to be placed.

The data set contains the same information but is configured with the categories in the first column.

This is the data set to be charted again.

You will create another chart.

## Action 1.9 - Creating an Area Chart, continued



### Instructions:

12. In the **Charts Group**, click the **[Insert Line or Area Chart]** button drop-down and choose *Area* from the **2-D** set of options, the first one.
13. If not already selected, click the *Chart Tools Design Tab*.
14. Click the **[Change Chart Type]** button.
15. Choose any of available Area Chart types and click the **[OK]** button.
16. Move the chart to the right of your first chart.
17. Save the file and leave it open.

### Results/ Comments:

The second chart is added to the spreadsheet. Notice that even though the data structure was transposed the chart is just like the first chart you created.

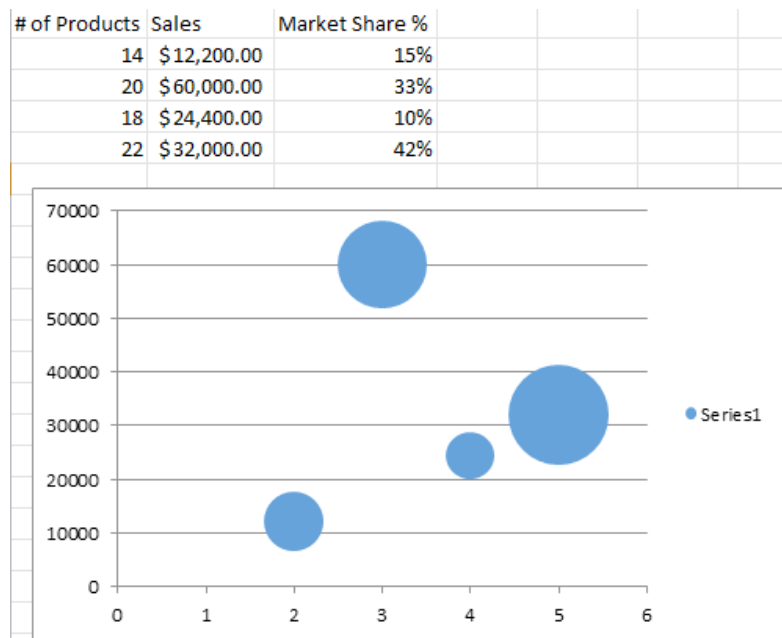
The *Change Chart Type* dialog is displayed where you can change the chart to any other type of chart. The Area Chart category should be active. All the Area Charts are available; Area, Stacked Area, and 100% Stacked both in 2-D and 3-D.

Try each to see the variations.

**[CTRL + S].**

## Bubble Charts

The Bubble Chart is a variation of a Scatter Chart where data points are replaced with bubbles that visually emphasize specific values. The size of the bubbles adds an additional dimension to the data. Like a Scatter Chart, a Bubble Chart does not use a category axis, both horizontal and vertical axes are value axes. The Bubble Chart plots X and Y values but adds a Z (size) to the values. Use a Bubble Chart instead of a Scatter Chart when your data has three data series, each containing values sets. The values in the third data series are used to determine the bubble sizes.



### When to Use a Bubble Chart

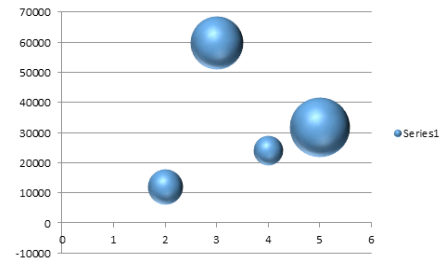
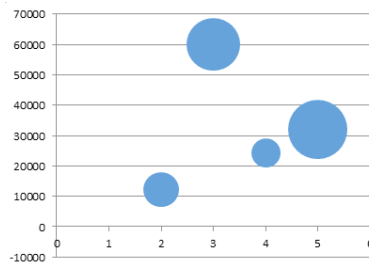
- ◆ If there are three values per data point. These values can be in rows or columns on the worksheet, but they must be in the following order: x value, y value, and then Z value.
- ◆ If there are multiple data series to be plotted. Scatter Charts use sets of x values and y values, but Bubble Charts use sets of x values, y values, and Z values.



## Bubble Charts, continued

### Subtypes of Bubble Charts

**Bubble and 3-D Bubble:** Bubble Charts are similar to XY (Scatter) chart, but they compare sets of three values instead of two. The third value determines the size of the bubble marker. You can choose a bubble or a 3-D Bubble Chart subtype.

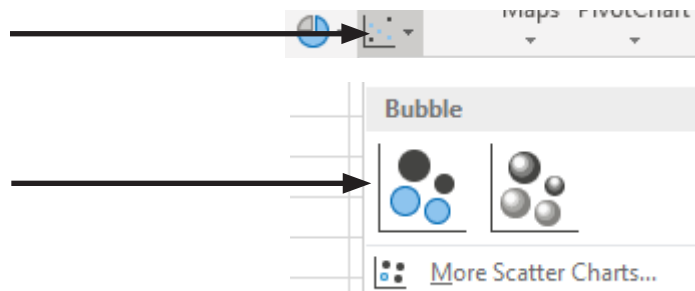


### Creating a Bubble Chart

- ◆ Select the data to be charted.
- ◆ Remember that Pie Charts only plot one data series so the selection should be at most either two rows or columns. One of which contains the headers and the other the data.

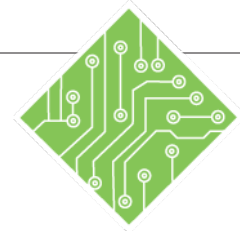
# of Products	Sales	Market Share %
14	\$ 12,200.00	15%
20	\$ 60,000.00	33%
18	\$ 24,400.00	10%
22	\$ 32,000.00	42%

- ◆ Select the *Insert Tab* and locate the **Chart Group**.
- ◆ Click the **[Insert Scatter (X Y) or Bubble Chart]** button drop-down and choose the Bubble Chart you wish to use.





## Action 1.10 - Creating a Bubble Chart



### Instructions:

1. **MyCharts.xlsx** should still be open.
2. Activate the *Bubble* sheet.
3. Select cells **A1:C5**.
4. Click the *Insert Tab* in the ribbon.
5. In the **Charts Group**, click the **[Insert Scatter (X Y) or Bubble Chart]** button drop-down, from the *Bubble* set choose the first one.
6. The *Chart Tools Design Tab* should already be selected, if not, select it.
7. Click the **[Change Chart Type]** button.
8. Choose the 3-D Bubble Chart variation and click the **[OK]** button.
9. Save the file and leave it open.

### Results/ Comments:

If not, re-open the file from the data files folder.

Click the *Bubble* sheet tab at the bottom of the spreadsheet.

This is the data set to be charted. The Bubble Chart is similar to a Scatter Chart in the way it located the points, using the first two columns. Unlike a Scatter Chart that can only use two columns of data, the Bubble uses a third column to determine the size of the bubbles.

A Bubble Chart is added to the spreadsheet. In this case the *Market Share* column is used to determine the size of each bubble. It is a good idea to have the third columns values total 100% so the bubble sizes display their relationship more accurately.

The *Change Chart Type* dialog is displayed where you can change the chart to any other type of chart. The Bubble Chart category only offers a 2-D and 3-D version of the chart.

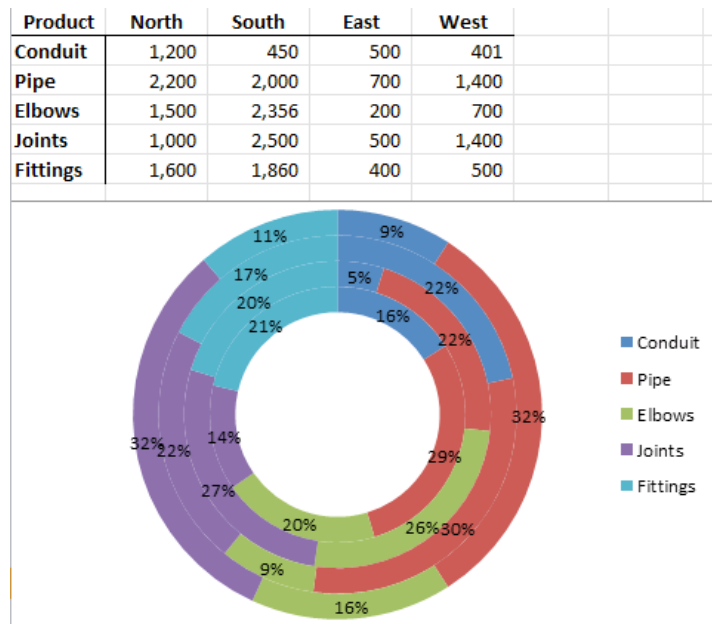
The chart is changed.

**[CTRL + S]**.



## Doughnut Charts

Doughnut Charts show the relationship of parts to a whole, like a Pie Chart **but it can contain more than one data series**. Data that is arranged in columns or rows only on a worksheet can be plotted in a Doughnut Chart. The first data set will be placed in the inner ring of the doughnut.



Due to the circular nature of Doughnut Charts; they can be difficult to read, especially when displaying multiple data series. The proportions of outer rings and inner rings do not represent the size of the data accurately, data points on outer rings may appear larger than data points on inner rings while their actual values may be smaller. It is useful to displaying values or percentages data labels in a Doughnut Chart. When you want to compare the data points side by side, consider a stacked column or stacked bar chart instead.

### When to Use a Doughnut Chart

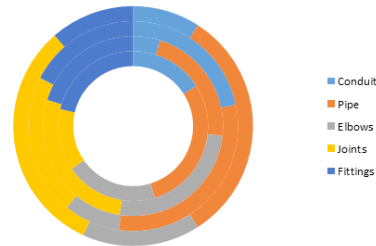
- ◆ If you have one or more data series to be plotted.
- ◆ If none of the values that you want to plot is negative.
- ◆ If none of the values are a zero (0) value.
- ◆ If there are less than seven categories per data series.
- ◆ If the categories represent parts of whole in each ring of the Doughnut Chart.



## Doughnut Charts, continued

### Subtypes of Doughnut Charts

- ◆ **Doughnut:** Doughnut Charts display data in rings, where each ring represents a data series.



- ◆ **Exploded Doughnut:** Much like exploded Pie Charts, exploded Doughnut Charts display the contribution of each value to a total while emphasizing individual values, but they can contain more than one data series. Like Pie Charts, to explode a Doughnut Chart, you use the *Format Data Series* panel.



### Creating a Doughnut Chart

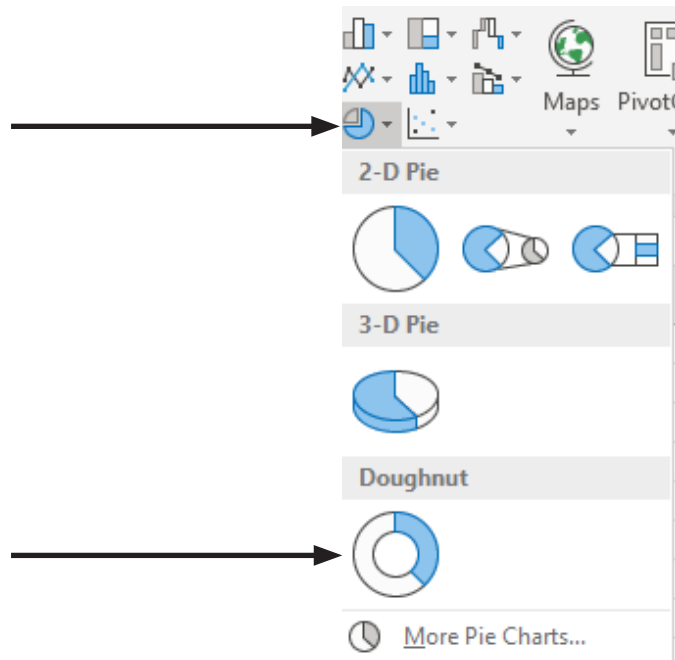
- ◆ Select the data to be charted. Remember that Doughnut Chart will place the first data series in the inner ring with each data series forming the next ring.

Product	North	South	East	West
Conduit	1,200	450	500	401
Pipe	2,200	2,000	700	1,400
Elbows	1,500	2,356	200	700
Joints	1,000	2,500	500	1,400
Fittings	1,600	1,860	400	500

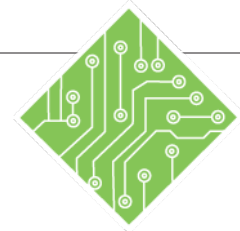


## Doughnut Charts, continued

- Click the *Insert Tab* and locate the **Charts Group**.
- Click the **[Insert Pie or Doughnut Chart]** button drop-down and choose the Doughnut Chart at the bottom or the drop-down.



## Action 1.11 - Creating a Doughnut Chart



### Instructions:

1. **MyCharts.xlsx** file should still be open.
2. Activate the *Doughnut* sheet.
3. Select cells **A1:E7**.
4. Click the *Insert Tab* in the ribbon.
5. In the **Charts Group**, click the **[Insert Pie or Doughnut Chart]** button drop-down, from the *Doughnut* set choose the only one available.
6. Click the *Chart Tools Design Tab*.
7. Click the **[Change Chart Type]** button.
8. Choose the *Doughnut* Chart on the right and click the **[OK]** button.
9. Explode the Chart using the *Format Chart Area* pane.
10. Save the file and leave it open.

### Results/ Comments:

If not, re-open the file from the data files folder.

Click the *Doughnut* sheet tab at the bottom of the spreadsheet.

This is the data set to be charted. Doughnut Charts are similar to Pie Charts but can plot multiple series of data unlike a Pie that only plots one. The structure of the data can be arranged vertically or horizontally. The first row or column of data will be used to create the inner ring of the doughnut and each subsequent row or column will create the next ring outward.

A Doughnut Chart is added to the spreadsheet. Each ring represents a cumulative total of the row or column it is based on, much like a Pie Chart does.

The *Change Chart Type* dialog is displayed where you can change the chart to any other type of chart. The Doughnut Chart category only offers the Doughnut Chart with two versions which switches the data series used.

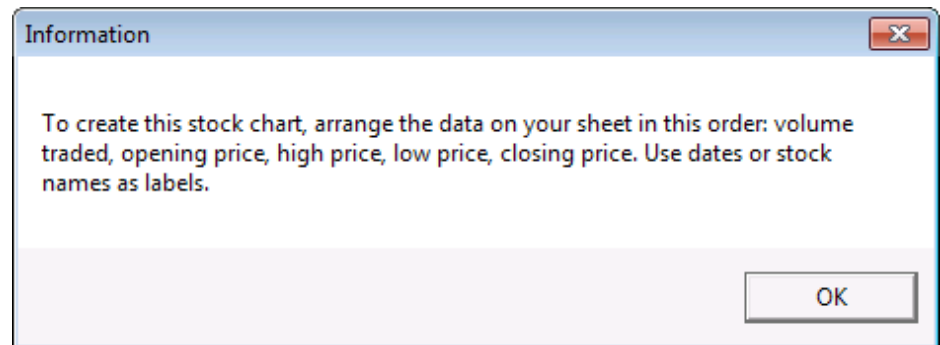
The chart is changed.

**Right-click** the chart and choose **Format Data Series**. Only the outer data series can be exploded.

**[CTRL + S]**.

## Stock Charts

Data that is arranged in columns or rows in a specific order on a worksheet can be plotted in a Stock Chart. As its name implies, a Stock Chart is most often used to illustrate the fluctuation of stock prices. There are four variations to the Stock Chart and the arrangement of the data is different for each and must be respected, if the data is not configured correctly *Excel* will display an Information window explaining how the data must be configured.

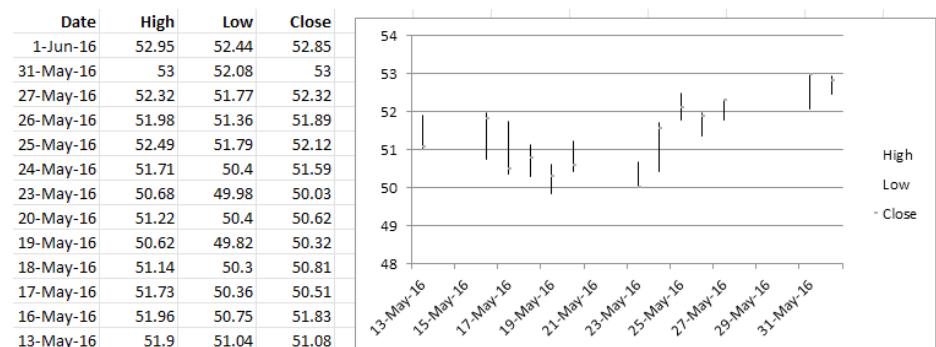


However, this chart may also be used for scientific data. For example, you could use a Stock Chart to indicate the fluctuation of daily or annual temperatures. You must organize your data in the correct order to create Stock Charts.

The way Stock Chart data is organized in your worksheet is very important. For example, to create a simple high-low-close Stock Chart, you should arrange your data with High, Low, and Close entered as column headings, in that order.

### Subtypes of Stock Charts

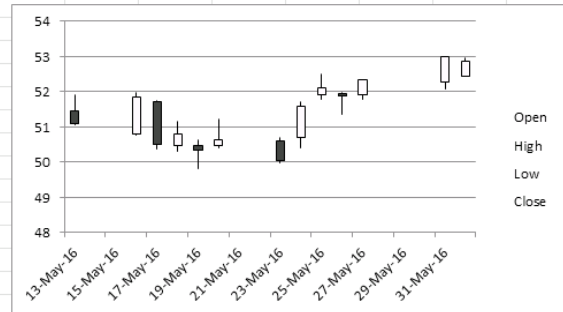
- ◆ **High-Low-Close:** The high-low-close chart is often used to illustrate stock prices. It requires three series of values in the following order: high, low, and then close.



## Stock Charts, continued

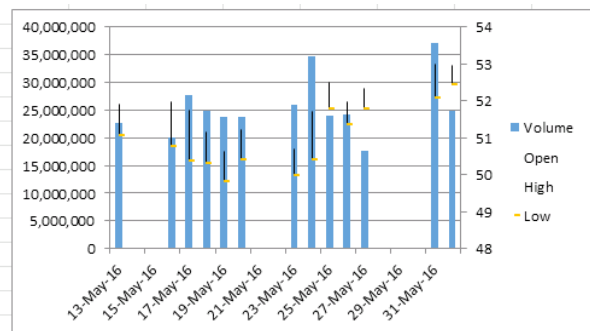
- ❖ **Open-High-Low-Close:** This type of chart requires four series of values in the correct order (open, high, low, and then close).

Date	Open	High	Low	Close
1-Jun-16	52.44	52.95	52.44	52.85
31-May-16	52.26	53	52.08	53
27-May-16	51.92	52.32	51.77	52.32
26-May-16	51.93	51.98	51.36	51.89
25-May-16	51.92	52.49	51.79	52.12
24-May-16	50.7	51.71	50.4	51.59
23-May-16	50.6	50.68	49.98	50.03
20-May-16	50.48	51.22	50.4	50.62
19-May-16	50.47	50.62	49.82	50.32
18-May-16	50.48	51.14	50.3	50.81
17-May-16	51.72	51.73	50.36	50.51
16-May-16	50.8	51.96	50.75	51.83
13-May-16	51.44	51.9	51.04	51.08



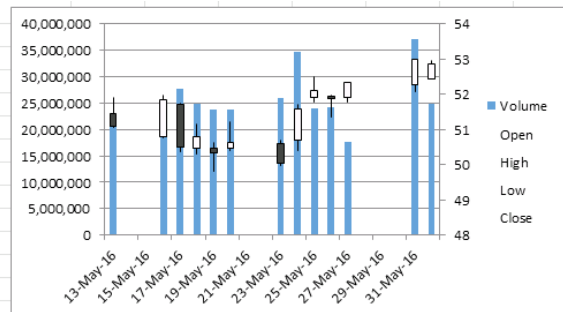
- ❖ **Volume-High-Low-Close:** This type of chart requires four series of values in the correct order (volume, high, low, and then close). It measures volume by using two value axes: one for the columns that measure volume, and the other for the stock prices.

Date	Volume	Open	High	Low
1-Jun-16	24,772,900	52.44	53	52.4
31-May-16	37,137,700	52.26	53	52.1
27-May-16	17,653,700	51.92	52.3	51.8
26-May-16	24,182,900	51.93	52	51.4
25-May-16	24,040,200	51.92	52.5	51.8
24-May-16	34,621,600	50.7	51.7	50.4
23-May-16	25,999,700	50.6	50.7	50
20-May-16	23,692,400	50.48	51.2	50.4
19-May-16	23,842,400	50.47	50.6	49.8
18-May-16	24,907,500	50.48	51.1	50.3
17-May-16	27,803,500	51.72	51.7	50.4
16-May-16	20,032,000	50.8	52	50.8
13-May-16	22,592,300	51.44	51.9	51



- ❖ **Volume-Open-High-Low-Close:** This type of chart requires five series of values in the correct order (volume, open, high, low, and then close).

Date	Volume	Open	High	Low	Close
1-Jun-16	24,772,900	52.44	53	52.4	52.85
31-May-16	37,137,700	52.26	53	52.1	53
27-May-16	17,653,700	51.92	52.3	51.8	52.32
26-May-16	24,182,900	51.93	52	51.4	51.89
25-May-16	24,040,200	51.92	52.5	51.8	52.12
24-May-16	34,621,600	50.7	51.7	50.4	51.59
23-May-16	25,999,700	50.6	50.7	50	50.03
20-May-16	23,692,400	50.48	51.2	50.4	50.62
19-May-16	23,842,400	50.47	50.6	49.8	50.32
18-May-16	24,907,500	50.48	51.1	50.3	50.81
17-May-16	27,803,500	51.72	51.7	50.4	50.51
16-May-16	20,032,000	50.8	52	50.8	51.83
13-May-16	22,592,300	51.44	51.9	51	51.08

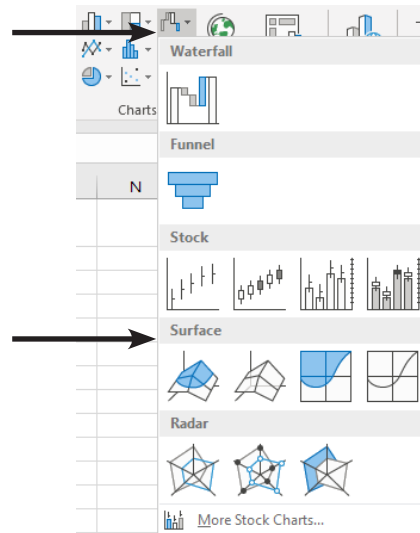




## Stock Charts, continued

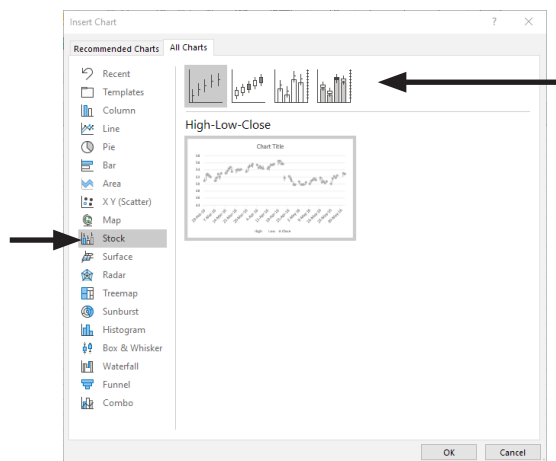
### Creating a Stock Chart

- ◆ Arrange your data according to the type of Stock Chart you want to create.
- ◆ Select the data.
- ◆ Click on the *Insert Tab*.
- ◆ Click the **[Insert Waterfall, Funnel, Stock, Surface, or Radar Chart]** button drop-down and choose the desired Stock Chart from the drop-down.

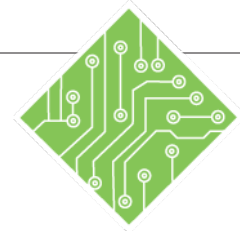


- OR -

- ◆ Click the **[Recommended Charts]** button. The **Insert Chart** dialog box is displayed.
- ◆ Choose **Stock** from the chart list on the left of the dialog.
- ◆ Choose the chart you wish to use.







**Instructions:**

1. **MyCharts.xlsx** should still be open.
2. Activate the *Stock* sheet.
3. Select cells **A1:D14**.
4. Click the *Insert Tab* in the ribbon.
5. In the **Charts group** click the **[Recommended Charts]** button to display the **Insert Chart** dialog. Click the *All Charts* tab. Select *Stock* from list of choices. From the *Stock* set choose the first one.
6. Click **[OK]**. Move the Chart to the right of the data.
7. Select cells **M1:P14**.

**Results/ Comments:**

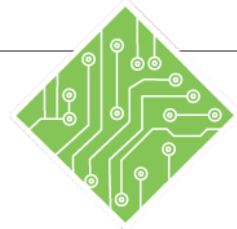
If not, re-open the file from the data files folder.

Click the *Stock* sheet tab at the bottom of the spreadsheet.

This is the data set to be charted. Even though the data set could be much larger, for these examples we will use only a small selection. The variations of the Stock Charts require the data to be structured in a very specific manner. Creating a High, Low, Close Stock Chart must have the four columns of data: the first should contain either the scale for the chart or the stock names, the second column contains the high values, the third contains the low values, and the last contains the closing values. If the structure is not correct *Excel* will display an *Information* window explaining why it can not create the chart.

The High, Low, Close Stock Chart is added to the spreadsheet. The data in the first column is used as the Y axis on the chart and the remaining columns of data are used to plot the chart itself.

Creating the Open, High, Low, Close Stock Chart must have the five columns of data: the first should contain either the scale for the chart or the stock names, the second column contains the open values, the third contains the high values, the fourth contains the low values, and the last contains the closing values.



**Instructions:**

8. Click the *Insert Tab* in the ribbon.
9. In the **Charts group** click the **[Recommended Charts]** button to display the **Insert Chart** dialog. Click the *All Charts* tab. Select *Stock* from list of choices. From the *Stock* set choose the Open-High-Low-Close Chart.
10. Click **[Cancel]**.
11. Select cells **M1:AQ14**.
12. Click the *Insert Tab* in the ribbon.
13. In the **Charts group** click the **[Recommended Charts]** button to display the **Insert Chart** dialog. Click the *All Charts* tab. Select *Stock* from list of choices. From the *Stock* set choose the Open-High-Low-Close Chart.
14. Click the **[OK]** button.
15. Save the file and leave it open.

**Results/ Comments:**

The **[OK]** button is greyed out. This is due to the fact the selection does not include enough data to create this type of Stock Chart.

The *Insert Charts* dialog closes.

Now the selection contains enough data in the correct configuration to enable a preview and the **[OK]** button is active, allowing you to utilize this type of chart.

The chart is added to the file.

**[CTRL + S]**.

## Surface Charts

Surface Charts are used to show how a set of data points are connected in a three-dimensional surface. Think of them as topographic maps of your data. Consider how map grids are created, the X (horizontal) axis uses letters or numbers as does the Y (vertical) axis. Where they intersect is the data point to be plotted on the Z (height) axis, the values being plotted have to be uniformly spaced along the X and Y axes. You can't have arbitrarily spaced data as you can in XY scatter plots. This structure is the same as the way Excel organizes spreadsheets with rows, columns, and cells. The data headers should not be text since text is ignored by the Surface Chart, both categories and data series should be numeric values.

Like topographic maps, the colors and patterns in a Surface

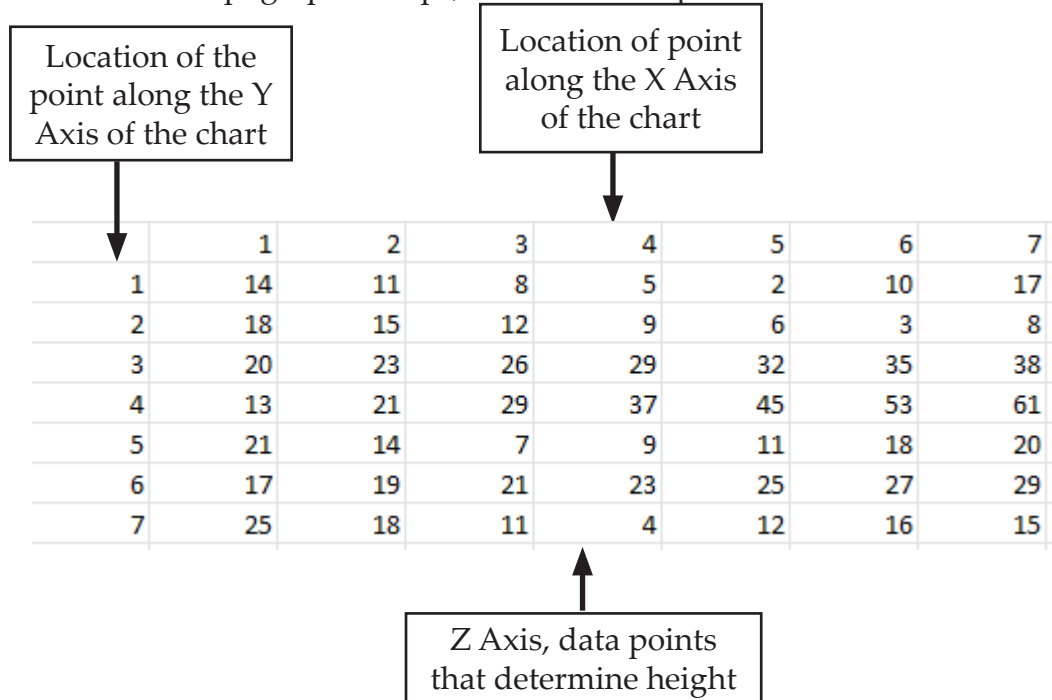
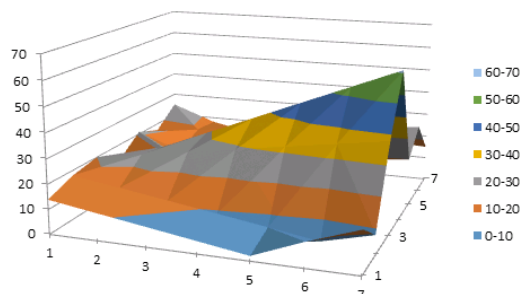


Chart indicate areas that contain the same range of values.

Unlike other chart types, a Surface Chart does not use colors to distinguish the data series, values are distinguished by colors.

To enhance a Surface Chart, you can change the colors and use transparency to display color bands that are obscured in the back of the chart.

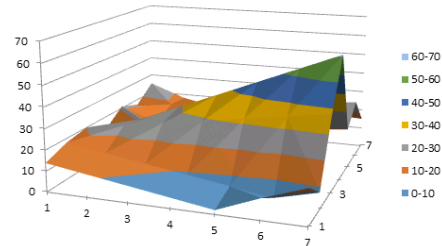




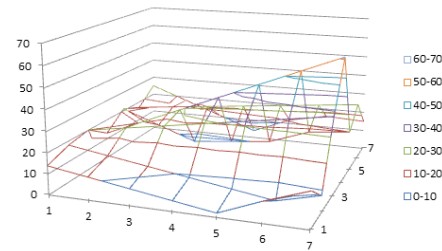
## Surface Charts, continued

### Chart Subtypes for Surface Charts

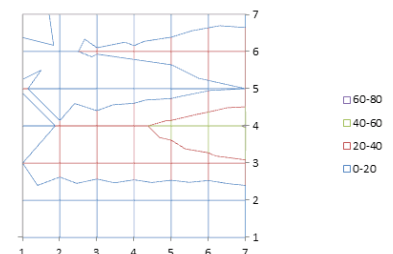
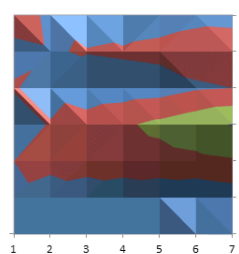
- ◆ **3-D surface:** 3-D Surface Charts show trends in values across two dimensions in a continuous curve. Colors in a Surface Chart do not represent the data series; they represent the distinction between the values.



- ◆ **Wireframe 3-D Surface:** Displayed without color, a 3-D Surface Chart is called a wireframe 3-D Surface Chart.



- ◆ **Contour and Wireframe Contour:** Contour and wireframe contour charts are Surface Charts viewed from above. In a contour chart, colors represent specific ranges of values. A wireframe contour chart is displayed without color.



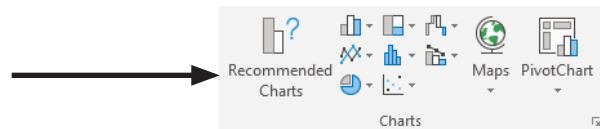
## Surface Charts, continued

### Creating Surface Charts

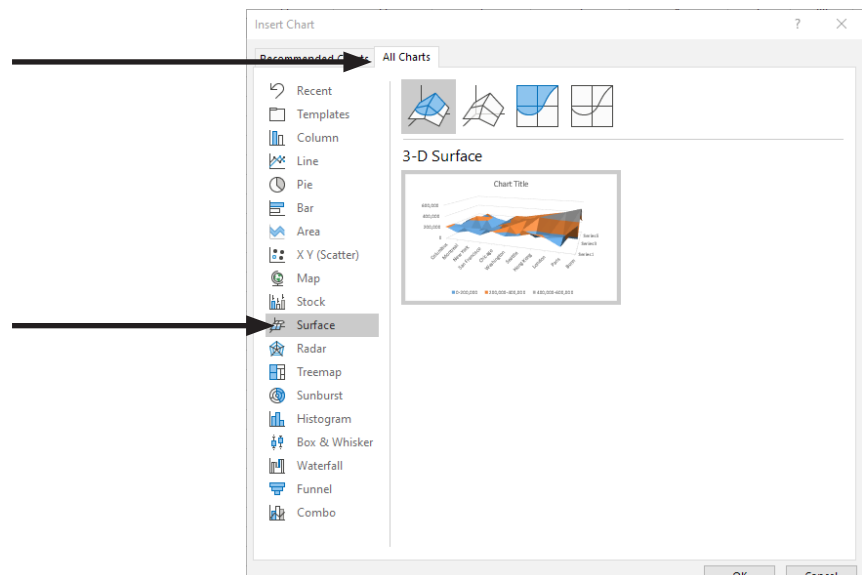
- ◆ Select the data to be plotted.

	1	2	3	4	5	6	7
1	14	11	8	5	2	10	17
2	18	15	12	9	6	3	8
3	20	23	26	29	32	35	38
4	13	21	29	37	45	53	61
5	21	14	7	9	11	18	20
6	17	19	21	23	25	27	29
7	25	18	11	4	12	16	15

- ◆ Select the *Insert Tab* and **Charts Group**.
- ◆ Click the **[Recommended Charts]** button. The **Insert Chart Dialog** is displayed.



- ◆ Click the *All Charts Tab* and select **Surface** from the list of chart types on the left of the dialog.



## Action 1.13 - Creating a Surface Chart



### Instructions:

1. **MyCharts.xlsx** file should still be open.
2. Activate the *Surface* sheet.
3. Select cells **A3:H10**.
4. Click the *Insert Tab* in the ribbon.
5. In the **Charts Group**, click the **[Recommended Charts]** button.  
  
Select the *All Charts Tab* and click *Surface* from the list at the left.  
  
Click on the 3-D Surface option.  
  
Click **[OK]** and move the chart below the data.
6. Click the *Chart Tools Design Tab*.
7. Click the **[Change Chart Type]** button.
8. Choose the *Wireframe 3-D Surface Chart* variation and click the **[OK]** button.
9. Save the file and leave it open.

### Results/ Comments:

If not, re-open the file from the data files folder.

Click the *Surface* sheet tab at the bottom of the spreadsheet.

This is the data set to be charted. The Surface Chart structure requires the first row and column of the data set to create a grid pattern, the data is used to determine the height at which each data point is set on the grid.

A Surface Chart is added to the spreadsheet. The X and Y axes represent the grid pattern held in the first row and column of the data set ( never use text headers for this type of chart). The elevations of the chart are based on where the data point intersects the grid. The legend in this chart does not reflect any series of data but rather the elevation levels of the chart.

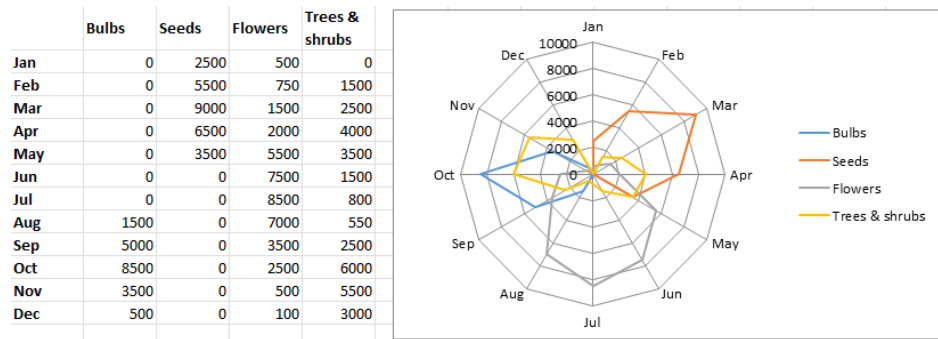
The *Change Chart Type* dialog is displayed where you can change the chart to any other type of chart. The Surface Chart category should be active, where you can choose from 3-D surface, wireframe 3-D surface, contour, or wireframe contour options.

The chart is changed. Try viewing each of the variations.

**[CTRL + S]**.

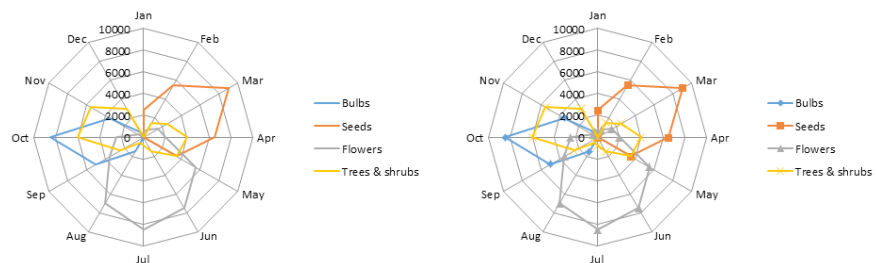
## Radar Charts

Radar Charts, also referred to as a spider or star charts because of its appearance, plots the values of each category along a separate axis that starts in the center of the chart and ends on the outer ring. Concentric lines connect each spoke and make up the units of measurement and each point is plotted for each variable on the spokes, they are then connected with lines. Data that is arranged in columns or rows on a worksheet can be plotted in a Radar Chart.

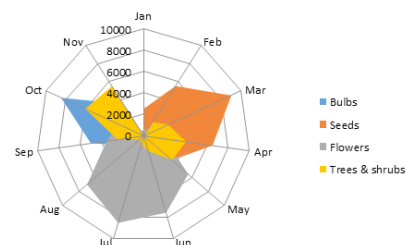


## Subtypes of Radar Charts

◆ **Radar and Radar with Markers:** With or without markers for individual data points, Radar Charts display changes in values relative to a center point.



◆ **Filled Radar:** In a filled Radar Chart, the area covered by a data series is filled with a color.





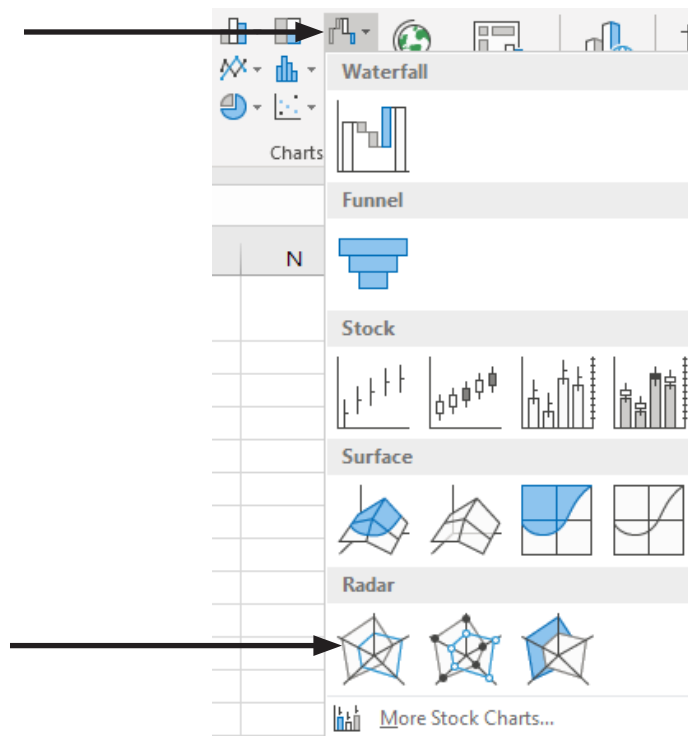
## Radar Charts, continued

### Creating Radar Charts

- ◆ Select the data to be plotted.

	Bulbs	Seeds	Flowers	Trees & shrubs
Jan	0	2500	500	0
Feb	0	5500	750	1500
Mar	0	9000	1500	2500
Apr	0	6500	2000	4000
May	0	3500	5500	3500
Jun	0	0	7500	1500
Jul	0	0	8500	800
Aug	1500	0	7000	550
Sep	5000	0	3500	2500
Oct	8500	0	2500	6000
Nov	3500	0	500	5500
Dec	500	0	100	3000

- ◆ Select the *Insert Tab* and locate the **Charts Group**.
- ◆ Click the **[Insert Waterfall, Funnel, Stock, Surface or Radar Chart]** button drop-down and choose the Radar Chart you wish to use.







**Instructions:**

1. **MyCharts.xlsx** file should still be open.
2. Activate the *Radar* sheet.
3. Select cells **A3:E13**.
4. Click the *Insert Tab* in the ribbon.
5. In the **Charts Group**, click the **[Insert Waterfall, Funnel, Stock, Surface or Radar Chart]** button drop-down, from the *Radar* set choose the first one. Move the chart below the data.
6. Click the *Chart Tools Design Tab*.
7. Click the **[Change Chart Type]** button.
8. Choose *Radar with Markers* chart variation and click the first option, then click the **[OK]** button.
9. Save the file and leave it open.

**Results/ Comments:**

If not, re-open the file from the data files folder.

Click the *Radar* sheet tab at the bottom of the spreadsheet.

This is the data set to be charted. The Radar Chart structure can be arranged with the headers running along both rows and columns, with the upper left corner left blank. If there is something in that cell then the chart tries to incorporate it as a data series within the chart.

A Radar Chart is added to the spreadsheet. Each data series creates a ring around the center of the chart.

The *Change Chart Type* dialog is displayed where you can change the chart to any other type of chart. The Radar Chart category should be active, where you can choose from radar, radar with markers, or filled radar options.

The chart is changed. Try viewing each of the variations.

**[CTRL + S].**



## Funnel Charts

When you want to see how stages in a process compare to each other, then a Funnel Chart is a great option. This type of chart shows the process steps in a stacked and descending, as values decrease during each phase or step in a process the overall appearance of the chart takes on the shape of a funnel.

### Note

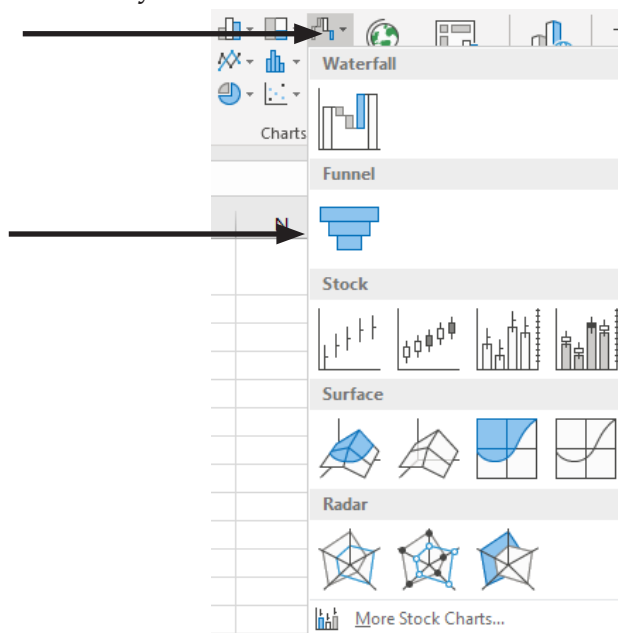
Funnel Charts are only available in Excel 365 or 2019.

Data should be structured in two columns to use a Funnel Chart. The first column containing the steps in the process while the second contains the values associated with each phase.

New Team Hirings	
Applications Received	565
Preliminary review	400
Call Back	287
First Interview	89
Peer Review	53
Second Interview	25
Hired	10

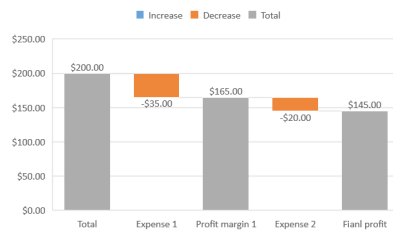
## Creating A Funnel Chart

- ◆ Select the data.
- ◆ Select the **Insert Tab** and locate the **Charts Group**.
- ◆ Click the **[Insert Waterfall, Funnel, Stock, Surface or Radar Chart]** button drop-down and choose the *Radar* Chart you wish to use.

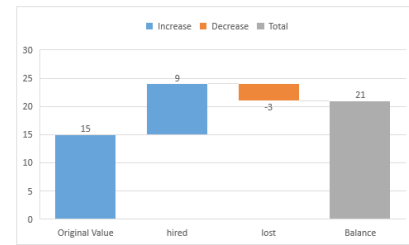


## Waterfall Charts

Visualizing a series of values as a running total, use the Waterfall Chart. This chart type can show the values as a diminishing total (Waterfall) or an arch (Bridge).



Waterfall



Bridge

Both types of this chart illustrate how an initial value is impacted by subsequent positive and negative values with a final resulting total. In both cases the first and last rows should contain a starting and ending value, the rows between can contain additions (positive values) and subtractions (negative values). When a Waterfall type is desired, include rows after each addition or subtraction that determine the current value.

### Waterfall data set

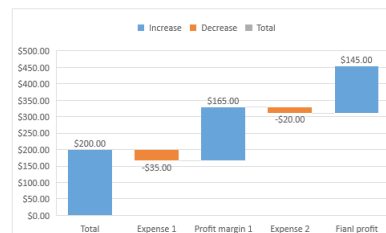
Total	\$200.00	← Original Value
Expense 1	-\$35.00	← Negative Value, formatted as negative
Profit margin 1	\$165.00	← Formula adding values 1 & 2
Expense 2	-\$20.00	← Negative Value, formatted as negative
Final profit	\$145.00	← Formula adding values 3 & 4

### Bridge data set

Original Value	15	← Original value
hired	9	← Original value + new value
lost	-3	← If value is negative, format as negative
Balance	21	← Formula adds all values to arrive at balance

## Creating a Waterfall Chart

- ◆ Select the data set.
- ◆ Select the **Insert Tab** and locate the **Charts Group**.
- ◆ Click the **[Insert Waterfall, Funnel, Stock, Surface or Radar Chart]** button drop-down and choose the **Waterfall Chart**.
- ◆ The initial Waterfall Chart is inserted.



## Waterfall Charts, continued

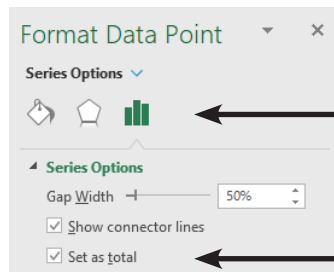
### Formatting the Waterfall Chart

Once the initial chart has been inserted, it needs to be formatted to complete the process of creating a Waterfall chart. Data points which represent the total and running totals need to be set as total, this will stop them from being floating columns and have them start from zero on the horizontal axis.

#### Note

Clicking once on a column will select the entire data series, it is the second click that allows you to select a data point within the series.

- ❖ Click the first column in the chart twice to select the data point.
- ❖ If you are not planning to make other changes to the formatting of the chart, then right-click the data point and choose to *Set as Total* directly from the menu.
- ❖ If you are planning to make other formatting changes then, right-click the selected data point and choose *Format Data Point* from the menu.



Series Options button

- ❖ In the *Format* pane, click the **[Series Option]** button.
- ❖ Check the **Set as total** checkbox.
- ❖ Click each column representing a running total and set it as a total also.

### Formatting the Bridge Chart

Once the initial chart has been inserted, it needs to be formatted to complete the process of creating a Bridge chart. The final data point in the series needs to be set as a total. This will stop it from floating and make it start from zero on the horizontal axis, creating an arched bridge appearance to the charted data.

- ❖ Click the last data point in the series twice to select it.
- ❖ Right-click the data point and choose *Set as Total* from the menu.
- ❖ Should other aspects of the chart require formatting, choose *Format Data Point* from the menu.
- ❖ Use the *Format Data Point* pane to set As Total.

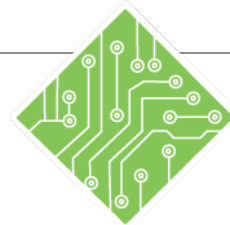


## Waterfall Charts, Showing or Hiding Connector Lines continued

- ◆ Click on a column in the chart to select the data series.
- ◆ Right-click the data series and choose *Format Data Series* from the menu.
- ◆ In the *Series Options* check or uncheck the **Show connector lines** checkbox.
- ◆ Switch the the *Fill & Line* formatting tools and apply *Border* formatting to customize the connectors.



## Action 1.15 - Creating a Funnel and Waterfall Chart



### Instructions:

1. **MyCharts.xlsx** file should still be open.
2. Activate the *Funnel* sheet.
3. Select cells **A3:B9**.
4. Click the *Insert Tab* in the ribbon.
5. In the **Charts Group**, click the **[Insert Waterfall, Funnel, Stock, Surface or Radar Chart]** button drop-down, choose *Funnel* from the menu. Move the chart to the right of the data.
6. Select cells **A20:B24**.
7. Click the *Insert Tab* in the ribbon.
8. In the **Charts Group**, click the **[Insert Waterfall, Funnel, Stock, Surface or Radar Chart]** button drop-down, choose *Waterfall* from the menu. Move the chart to the right of the data.
9. Select the first data point in the series.
10. Right-click the data point and choose *Format Data Point* from the menu.
11. Check the **Set as total** checkbox.

### Results/ Comments:

If not, re-open the file from the data files folder.

Click the *Funnel* sheet tab at the bottom of the spreadsheet.

The top value in this data set is a cumulative starting value for the chart. The remaining values represent diminishing values associated with each step in a process.

The Funnel chart is added to the sheet.

This data set shows a total value in the top position with negative values and running totals of the first value in relation to the negatives.

The Waterfall chart is added to the sheet but still requires a few modifications to be completed.

Click the first bar in the chart twice.

The *Format* pane opens with the *Series options* active.

This ensure that data point begins at the bottom of the horizontal axis.

## Action 1.15 - Creating a Funnel and Waterfall Chart, continued



### Instructions:

12. Select the next positive value data point on the chart.
13. In the *Format* pane, check the **Set as total** checkbox.
14. Set the last positive value data point as a total.
15. Close the *Format* pane.
16. Select cells **A30:B33**.
17. In the **Charts Group**, click the **[Insert Waterfall, Funnel, Stock, Surface or Radar Chart]** button drop-down, choose *Waterfall* from the menu. Move the chart to the right of the data.
18. Select the last data point in the series.
19. Right click the last data point and choose *Set as Total* from the menu.
20. Save the file and leave it open.

### Results/ Comments:

Simply click the next blue shape in the chart.

This again sets the data point's starting position as zero on the horizontal.

Repeat steps 12 and 13.

This data will be used to create a Bridge chart.

The initial Waterfall chart is inserted.

The first click will select the entire data series, the second click will select the individual data point from within the series.

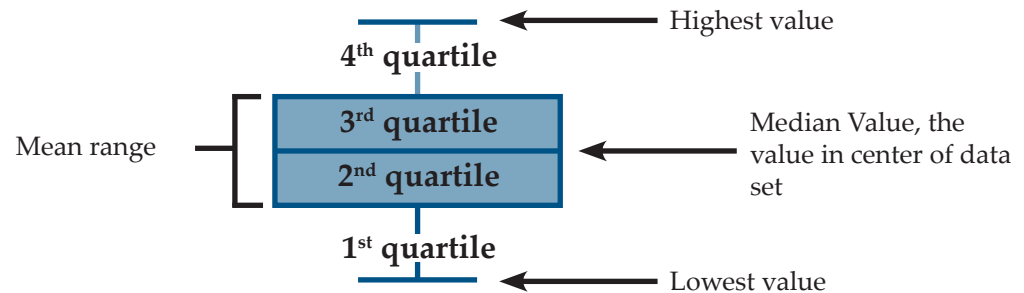
The data point is re-positioned to begin from the zero point on the horizontal axis.

**[CTRL + S].**

## Box and Whiskers Charts

The Box and Whisker Chart shows four aspects of the data; high point, low point, a median range, and the mid point. This type of chart lends itself to presenting statistical analysis of data sets, you will often see it used to present comparative testing results.

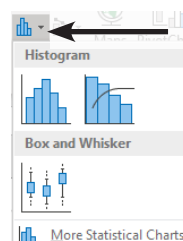
To better understand the Box and Whisker Chart, look at the example diagrammed below.



- ◆ The **Box**: represents the mean within the data set, representing 50% of the data set, distributed between the 1st and 3rd quartiles.
- ◆ The **Median**: divides the box into the second and third quartile ranges.
- ◆ **Top Whisker**: shows the highest outlying value in the data set.
- ◆ **Bottom Whisker**: shows the lowest outlying value from the data set.
- ◆ **Quartiles**: are the results of taking the range of values from low to high in account with the number of data points within the data set broken into quarters.

### Creating A Box and Whisker Chart

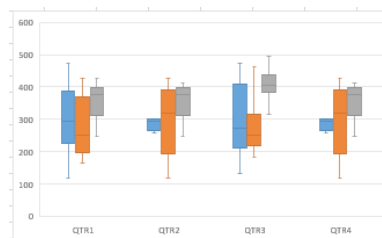
- ◆ Select the data set.
- ◆ Select the **Insert Tab** and locate the **Charts Group**.
- ◆ Click the **[Insert Statistical Chart]** button drop-down and choose the **Box and Whisker Chart**.





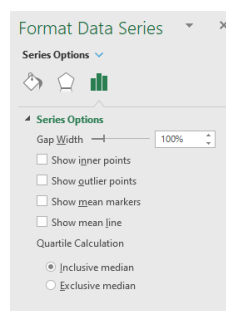
## Box and Whiskers Charts, continued

- ◆ The initial Box and Whisker Chart is inserted.



### Formatting the Data Series

- ◆ Right-click a data series in the chart.
- ◆ Choose *Format Data Series* from the menu.



- ◆ In the *Format Data Series* pane turn on or off elements from the series with the checkboxes. (Each series will have to be handled individually.)

Listed below is an explanation of the series options:

Series Options	Description of Option
<i>Gap width</i>	Controls spacing between categories.
<i>Show inner points</i>	Displays data points lying between the lower and upper whisker line.
<i>Show outlier points</i>	Displays outlier points lying either below or above whisker line.
<i>Show mean markers</i>	Displays mean marker of the series.
<i>Show mean line</i>	Displays a line connecting the means of the selected series.
<i>Quartile Calculation</i>	Choose a method of median calculation:
<i>Inclusive median:</i>	Median is included in the calculation if N (the number of values in the data) is odd.
<i>Exclusive median:</i>	Median is excluded from the calculation if N (the number of values in the data) is odd

## Action 1.16 - Creating a Box and Whisker Chart



### Instructions:

1. **MyCharts.xlsx** file should still be open.
2. Activate the *Box&Whisker* sheet.
3. Select cells **A1:D33**.
4. Click the *Insert Tab* in the ribbon.
5. In the **Charts Group**, click the **[Insert Statistic Chart]** button drop-down, choose *Box and Whisker* from the menu. Move the chart to the right of the data.
6. Right-click the first data series in the chart, choose *Format Data Series* from the menu.
7. Adjust the **Gap Width** with the slider to **50%**.
8. Uncheck all the checkboxes.
9. Change the Quartile Calculation type.
10. Select each data series and make the same modifications to the series options.
11. Save the file.

### Results/ Comments:

If not, re-open the file from the data files folder.

Click the *Box&Whisker* sheet tab at the bottom of the spreadsheet.

Select any cell with a value, use the **[Ctrl + A]** short to select all connected data.

The Box and Whisker chart is added to the sheet.

The *Format* pane opens with the data series options actively displayed.

You can also type the value directly into the **Gap Width** field.

Any extra elements are removed from the series.

The whiskers change in relation to the calculation. The outlier values are included or not.

Modifying a data series will only apply to the selected series, each one requires individual modifications.

**[Ctrl + S]**.

## Treemap Charts

The Treemap is well suited to showing comparative hierarchical trends in categorized data. Categories contain a series of rectangles, each smaller shape represents a subset or branch of the tree. The structure of the data should move across columns from main-category to sub-categories in descending order from left to right with the last column containing the values.

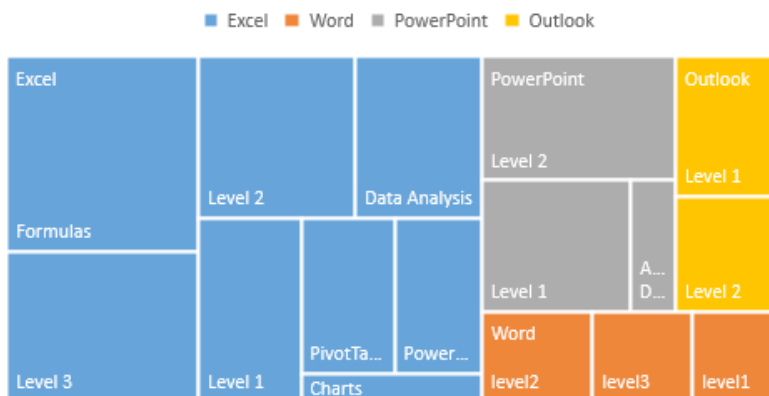
### Note

If there are several columns of values, consider making several Treemap charts with noncontinuous selections, categories and differing value columns.

Main Categories Column      Sub Categories Column      Values Column

Program	Course	Students
Excel	Level 1	458
Excel	Level 2	613
Excel	Level 3	700
Excel	Data Analysis	495
Excel	Formulas	905
Excel	PivotTables	352
Excel	Charts	126
Excel	PowerPivot	328

Office Courses



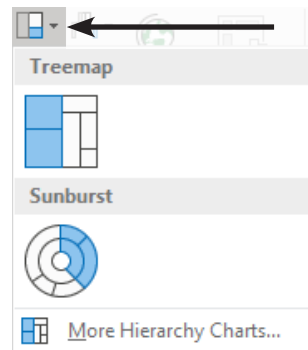
## Creating a Treemap Chart

- ◆ Select your data.
  - ◆ To select in a noncontinuous manner: select the category columns and then hold the **[Ctrl]** key to select a value column of data.
- ◆ Activate the *Insert Tab*.
- ◆



## Treemap Charts, continued

- ◆ In the **Charts Group**, locate and click the [**Hierarchy Chart**] button drop-down. Choose *Treemap* from the menu.



- OR -

- ◆ Click the [**Recommended Charts**] button in the **Charts Group**.
- ◆ The *Recommended Charts* dialog opens.
  - ◆ On the *Recommended Charts* tab, since the data is structured for this type of chart a *Treemap* will be one of the options to choose.
  - ◆ On the *All Charts* tab, select *Treemap* from the list

### Setting the Label Display

Colors are automatically applied to differentiate the categories. Treemap shapes can display labels to clearly indicate the sub-category or not, enabling and modifying labels will improve the charts readability.

- ◆ If the labels are needed but not visible:
  - ◆ Right-click one of the shapes Treemap shapes and choose *Add Data Label* from the menu.

- OR -

- ◆ Select the chart, then click the [**Chart Elements**] button beside the chart, check the **Data Labels** checkbox.
- ◆ To choose the label:
  - ◆ Right-click one of the Treemap shapes and choose *Format Data Series* from the menu.
  - ◆ The *Format* pane opens to *Series Options*.
  - ◆ In *Label Options*, choose the desired display option.



## Sunburst Charts

Like a Treemap, Sunburst charts are used to show hierarchical relationships within a data set. While Treemap charts show comparative relations with size, Sunbursts effectively reveal how categories are or can be broken down into contributing sub-categories. The inner most circle are the main categories within the data and each subsequent ring shows the division of the category component parts, the larger the wedge the larger its contribution with its' category.

### Note

The main category does not have to be repeated in order to be established as the main category, in either hierarchical chart type.

The data must be structured in the same way as it was in the Treemap chart. Category columns leading into their associated values.

Main Categories Column			Value Columns		
First Quarter	Program	Course	Students	Cost	Total
Jan	Excel	Level 1	153	245	\$ 37,485.00
	Excel	Level 2	410	245	\$ 100,450.00
	Excel	Level 3	75	245	\$ 18,375.00
	Excel	Data Analysis	53	245	\$ 12,985.00
	Excel	Formulas	80	180	\$ 14,400.00
	Excel	PivotTables	203	180	\$ 36,540.00
	Excel	Charts	87	180	\$ 15,660.00
	Excel	PowerPivot	63	180	\$ 11,340.00
	Excel	Level 1	315	245	\$ 77,175.00
Feb	Excel	Level 2	407	245	\$ 99,715.00
	Excel	Level 3	96	245	\$ 23,520.00
	Excel	Level 1	315	245	\$ 77,175.00



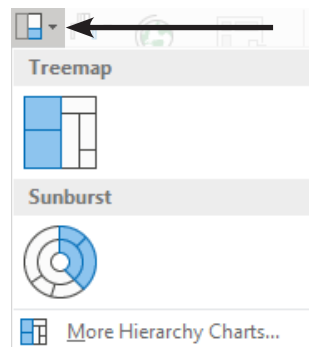
### Create a sunburst chart

- ◆ Select your data.
- ◆ Activate the Insert Tab.



## Sunburst Charts, continued

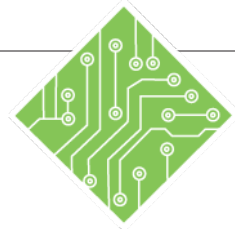
- ◆ In the **Charts Group**, locate and click the **[Hierarchy Chart]** button drop-down. Choose *Sunburst* from the menu.



- ◆ Since Sunburst charts are hierarchical, they will also be available as recommended chart type.



## Action 1.17 - Creating Treemap and Sunburst Charts



### Instructions:

1. **MyCharts.xlsx** file should still be open.
2. Activate the *Treemap* sheet.
3. Select cells **A1:C17**.
4. Click the *Insert Tab* in the ribbon.
5. In the **Charts Group**, click the **[Insert Hierarchy Chart]** button drop-down, choose *Treemap* from the menu. Move the chart to the right of the data.
6. Right-click the first data series in the chart, choose *Add Data Labels* from the menu.
7. Select cells **A30:F54**.
8. Click the *Insert Tab* in the ribbon.
9. In the **Charts Group**, click the **[Insert Hierarchy Chart]** button drop-down, choose *Sunburst* from the menu. Move the chart to the right of the data.
10. Right-click the first data series in the chart, choose *Add Data Labels* from the menu
11. Save the file.

### Results/ Comments:

If not, re-open the file from the data files folder.

Click the *Treemap* sheet tab at the bottom of the spreadsheet.

The Treemap chart is added to the sheet.

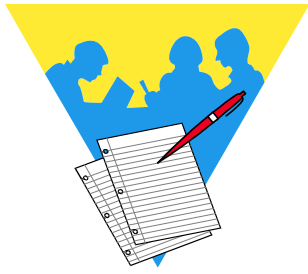
Data labels are added to the chart groupings and rectangles.

Take note the structure of the data.

The Sunburst chart is added to the sheet.

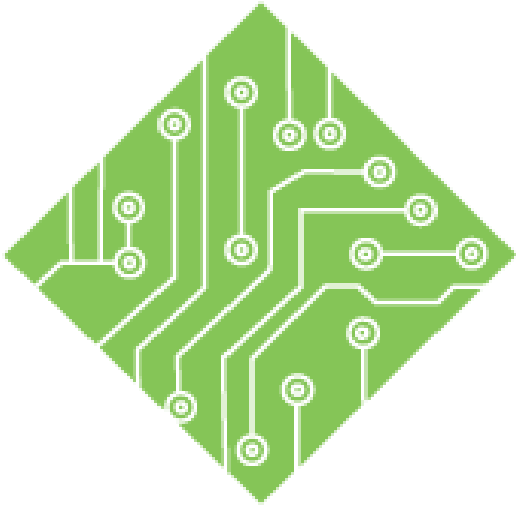
Data labels are added, showing the main grouping begins from the inner rings and works outward to individual items.

**[Ctrl + S].**



## Lesson Notes



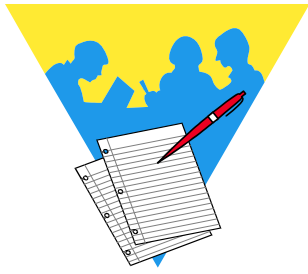


## Lesson 2: Modifying a Chart

### Lesson Overview

You will cover the following concepts in this chapter:

- ◆ Modifications
- ◆ Redefining Chart Data
- ◆ Moving Charts
- ◆ Layouts and Styles
- ◆ Chart Elements
- ◆ Adding and Removing Chart Elements
- ◆ Formatting Chart Elements
- ◆ Saving a Chart Template



## Lesson Notes

## Modifications

Data is always being added to, updated, or changed in some manner. Charts would not be very useful if you couldn't modify them. There will be times the data range needs to be redefined to incorporate new data or examine smaller subsets of the data. The *Excel* charting tools offer the ability to modify all aspects of charts, from reselecting the data, changing the orientation of some charts, adding or removing chart elements, and applying formatting.

Once a chart has been created, it is a good idea to format it. This gives you the opportunity to apply your branded colors, fonts, and logos to the chart, to reinforce your corporate identity. While it is easy to apply formatting to the chart elements, it can become tedious work. To that end, when the chart type you are working with is completely formatted you will want to save it as a template.

Chart templates allow you to apply formatting to new charts in *Excel* with only a few clicks of the mouse, giving you the ability to create a consistent look for all of your documents. These templates are stored, by default in the **Microsoft/ templates/ charts** folder. This folder location is shared by all of your *Microsoft Office* programs allowing you to use the same chart formats across the *Office Suite* of programs.

This lesson will take you through the processes of redefining the chart data, selecting the charts elements, adding or removing chart elements, formatting the elements, saving the chart template, and applying the chart template to new or existing charts in *Excel*.



## Redefining Chart Data

### Switching Rows and Columns

By default *Excel* will plot the data in your chart by rows. Each row represents a "series". This means, you are comparing row data that is then grouped in columns. The column labels will appear in the legend. The row labels appear on the x axis.

When you click on the **[Switch Row/Column]** button in the **Data Group** on the *Design Tab*, the data will switch so that now you are comparing the column data. The legend will show the row labels and the column labels will appear on the x axis. You can switch back and forth to help you determine which configurations best represents the data being charted. This option does not work well in every chart type.

To switch rows and columns:

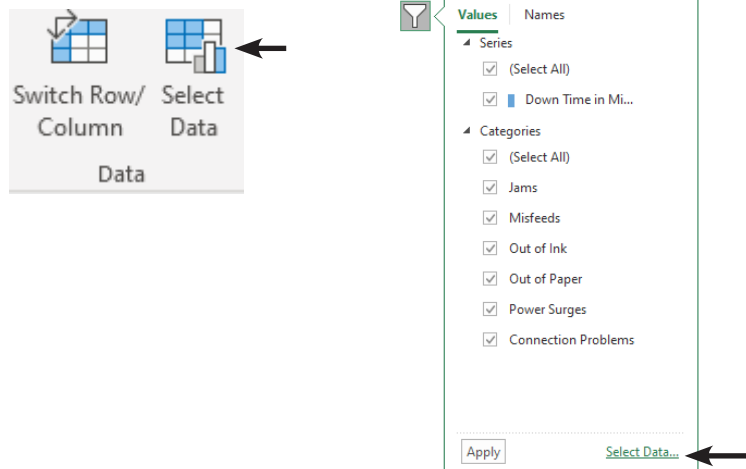
- ◆ Select the chart.
- ◆ Click the *Design Tab*.
- ◆ Click the **[Switch Rows/Columns]** button.

### Select Data

There may be times when the data you are using for the chart has had new data added and the chart is no longer accurate, or that you included more than needed, or simply did not select the correct data to be charted. When this happens it is not necessary to delete the chart and start over, you can redefine the data range the chart is drawing from. This is done by clicking the **[Select Data]** button in the **Data Group** on the *Design Tab* or from within the **[Filtering]** button options..

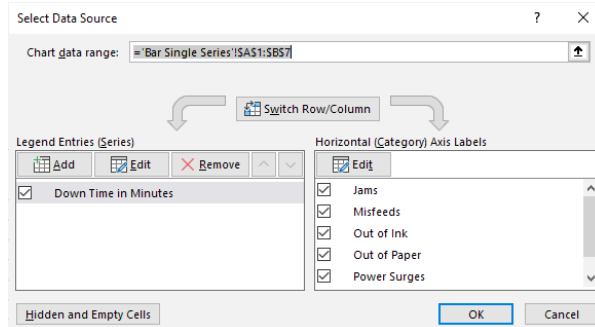
#### Note

The Select Data dialog can also be opened from the right-clicking menu of the chart.



## Redefining Chart Data, continued

When you click the button; *Excel* opens the *Select Data Source* dialog, takes you back to the data source, and highlights the current data used by the chart. Even if the chart is on a different worksheet than the chart.



In this dialog you can either type in the cell range you want into the **Chart data source** field or while the field is highlighted, click and drag to define the new data range from the data on the worksheet.

As you can see in the dialog, you have access to the **[Switch Rows/Columns]** button and even edit the text and content along both axis. When you finish making changes, click the **[OK]** button to be taken back to the chart.

### To Redefine The Data Range Of A Chart:

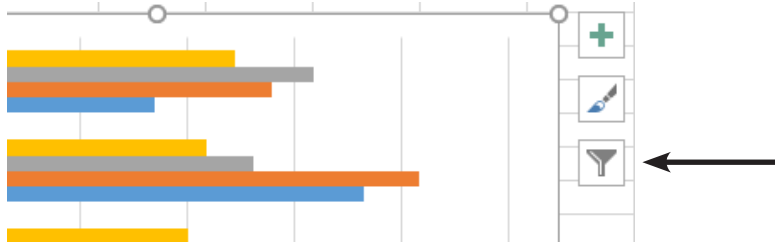
- ◆ Click on the **[Select Data]** button in the **Data Group** on the *Design Tab*.
- ◆ The *Select Data Source* dialog opens.
- ◆ Select the new range in your worksheet or use the **Chart data source** field in the dialog box.
- ◆ Make any other changes you want in relation the context on the axis.
- ◆ Click **[OK]**.



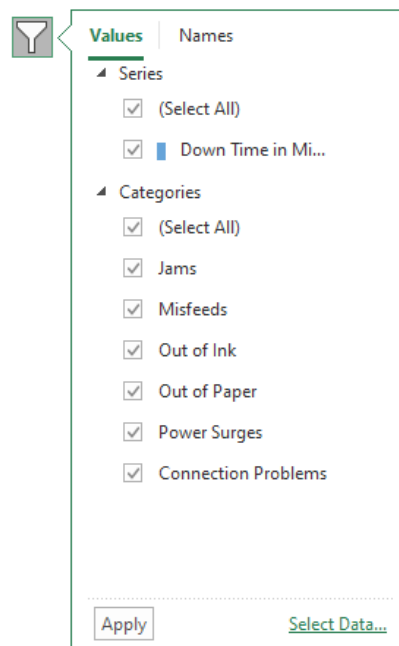
## Redefining Chart Filtering Charts

### Data, continued

Excel now has the ability to filter chart data directly in the chart itself. Allowing you to focus in on specific subsets within the data, without having multiple charts which each show subsets of information. The button is displayed only when a chart is selected, it is the bottom of the three new buttons to the right of the chart.



Clicking the **[Filter]** button opens a list of all the *Charts' Series* and *Categories*. You simply uncheck the items that you don't want to be included in the chart, click the **[Apply]** button and the chart is updated to reflect your choices.



From within the *Filter Options* menu, you are also able to access the *Select Data* dialog by clicking the **[Select Data]** button.



## Action 2.1 - Redefining Chart Data



### You Do This:

1. **MyCharts.xlsx** should still be open.
2. Activate the *Bar Multiple Series* sheet.
3. Select the chart.
4. Click the *Design Tab* in the ribbon.
5. Click the **[Switch Rows/Columns]** button in the **Data Group**.
6. Click the **[Switch Rows/Columns]** button in the **Data Group** again.
7. Activate the *Pie* sheet.
8. Click the **[Switch Rows/Columns]** button in the **Data Group**.
9. Click the **[Switch Rows/Columns]** button in the **Data Group** again.
10. Activate the *Bar Multiple Series* sheet.
11. Click the chart to make it active.
12. Click the **[Select Data]** button in the **Data Group** on the *Design Tab* in the ribbon.
13. In the **Chart data source** field, change the cell address **\$E\$6** to **\$D\$6** and click **[OK]**.

### Results/ Comments:

If not, re-open the file from the data files folder.

Click the sheet tab at the bottom of the spreadsheet.

Click on the chart to make it active. Once active, the *Chart Tools Tabs* are displayed on the ribbon.

The X axis and legend are changed, the chart now displays the column data on the Y axis and the legend displays weeks.

The chart is returned to its original state.

Click the sheet tab at the bottom of the spreadsheet.

The chart no longer displays any useful information since this type of chart uses only two columns of data and displays that data as a percentage of the whole.

The chart is returned to its original state.

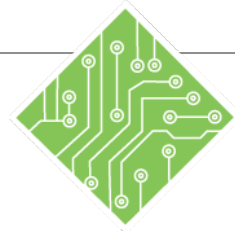
Click the sheet tab at the bottom of the spreadsheet.

If necessary.

The *Select Data Source* dialog opens.

Highlight the letter **E** in the address and type **D**.

## Action 2.1 - Redefining Chart Data, continued



### You Do This:

14. Observe the chart.
15. Activate the *Pie* sheet.
16. Click the chart to make it active.
17. Click the **[Select Data]** button in the **Data Group** on the *Design Tab* in the ribbon.
18. While the **Chart data source** field is highlighted, use the mouse to select cells **A1:A7** then holding the **[CTRL]** key select cells **G1:G7** and click **[OK]**.
19. Observe the chart.
20. Activate the *Bar Multiple Series* sheet.
21. Select the chart.
22. Click the **[Filter]** button.
23. Uncheck one the *Series* and *Categories* checkboxes and click the **[Apply]** button.
24. Click the **[Filter]** button.
25. Check the Select all checkboxes for both the *Series* and *Categories* and click the **[Apply]** button.
26. Save the file.

### Results/ Comments:

The chart now omits the Income data from the chart.

Click the sheet tab at the bottom of the spreadsheet.

If necessary.

The *Select Data Source* dialog opens.

The chart data source now is completely redefined to pull data from elsewhere in the data set.

The chart now displays 2016's values.

The menu of filtering option is displayed.

The chart now only shows the items that were still checked. Notice that there is also a **[Select Data]** button in the menu.

The menu of filtering option is displayed.

The chart now shows all the data in the data set.

**[CTRL + S]**.



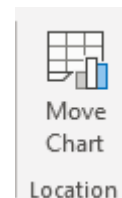
## Moving Charts

### Note

When using the keyboard shortcut of **F11**, the chart is automatically placed on a new worksheet by itself.

## Moving Charts

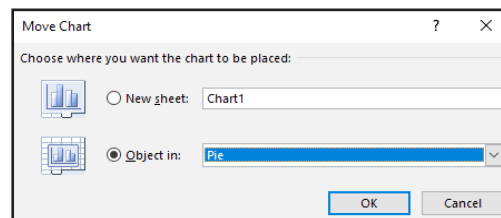
By default, *Excel* will place a chart into the worksheet that contains the data when using the chart buttons on the *Insert Tab* or *Quick Analysis* smart tag. However, charts can be placed on a worksheet by themselves or other worksheets by using the **[Move Chart]** button on the *Design Tab*. The right-click menu also offers a *Move Chart...* option.



When you click the button the *Move Chart* dialog opens, from this dialog you can choose to move the chart to other existing worksheets or create new worksheet for the chart.

### Note

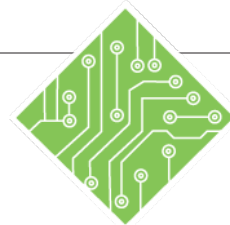
Consider moving several charts onto a single worksheet. Creating a type of dashboard worksheet that shows all relevant charted data in one place.



## Move a Chart to Another location

- ◆ Select the chart.
- ◆ Click the *Design Tab* in the ribbon.
- ◆ Click on the **[Move Chart]** button.
- ◆ The *Move Chart* dialog opens.
  - ◆ Move to an existing worksheet, click the *Object in:* radio button and click the down arrow of the **Sheet Name** field to select an existing sheet.
- OR -
- ◆ Move to a new sheet, click the *New sheet* radio button. To name the sheet, type a name in the **Name** field.
- ◆ When done, click **[OK]** or press **[Enter]**.

Moving charts with this tool only applies within the current workbook. In order to move a chart into another workbook, use the worksheet *Move or Copy* tool. Remember to check the copy checkbox if you still want a copy of the chart in the original file



### You Do This:

1. **MyCharts.xlsx** should still be open.
2. Activate the *Bar Multiple Series* sheet.
3. Select the chart.
4. Click the *Design Tab* in the ribbon.
5. Click the **[Move Chart]** button in the **Location Group**.
6. Choose the *Objects in* radio button and click the drop-down arrow to see the list of existing worksheets in this file.
7. Choose the *New Sheet* radio button and replace the **New sheet** field text with **My New Bar**.
8. Click the **[OK]** button.
9. Save the file.

### Results/ Comments:

If not, re-open the file from the data files folder.

Click the sheet tab at the bottom of the spreadsheet.

Click on the chart to make it active. Once active, the *Chart Tools Tabs* are displayed on the ribbon.

The *Move Chart* dialog opens.

This option allows you to move a chart onto any other worksheet in the current file.

A new worksheet is be added to the file with the name *My New Bar*. The only thing on the new sheet is the chart, this is a much cleaner way to present the chart.

**[CTRL + S]**.

## Layouts and Styles

### Chart Layouts

*Excel* offers a series of different chart layouts in the **Chart Layouts Group** on the *Design Tab*. These are pre-built layouts with recommended chart elements in place. To see what is offered, click the **[Quick Layout]** button drop-down and click the one you want to use. You are not limited to using only the pre-built layouts offered here, you can add, move, or remove chart elements at will with the tools found in the **[Add Chart Element]** button on the *Design Tab* or by using the **[Add Chart Element]** to the right of the chart.



The gallery options will change based on the type of chart.

### Chart Styles Group

On the *Charts Tools Design Tab* is the **Chart Styles Group** of commands. In this group of command you will find a gallery of pre-built styles and colors.



Clicking the Style Gallery more button expands the gallery, enabling you to see all available options.



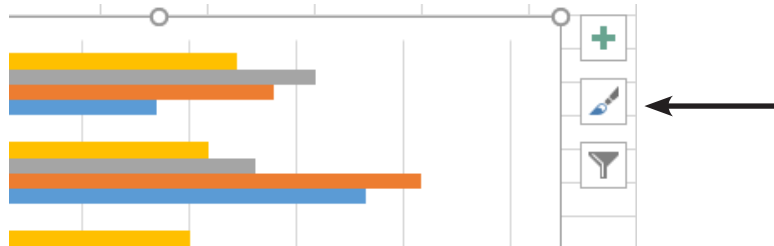
Clicking the **[Change Colors]** button gives you access a gallery of color palettes.



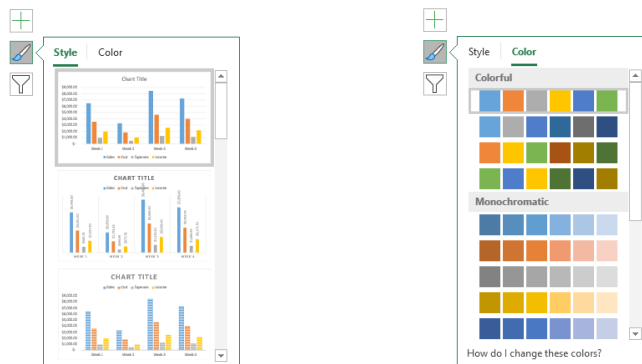
## Layouts and Styles, continued

### The Chart Styles and Colors button

Another way to access these galleries is to use the [Styles And Color] button, which is found to the right of the chart.



When you click the button, a gallery with two tabs is displayed. The first tab contains a complete list of available styles. The second tab contains the Color palette gallery. These galleries are the same as found in the **Styles Group** on the *Design Tab*.



If you need to change the color palettes offered in the Change Colors galleries, you will need to create a new set of custom color themes.

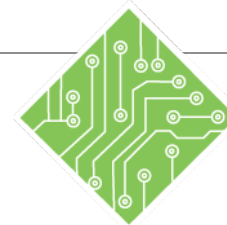
#### Note

Save color and font themes become part of the software, so you should need to do this only once.

### To create a new custom color theme

- ❖ Go to the **Page Layout Tab**.
- ❖ In the **Themes Group**, click the [Colors] drop-down button.
- ❖ Choose *Customize Colors* to open the *Create New Theme Colors* dialog.
- ❖ Change the **Accent** colors to create a palette of your own design.
- ❖ Type a name in the Name field and click the [Save] button.





**You Do This:**

1. **MyCharts.xlsx** file should still be open.
2. Select the chart on the *Bar Single Series* sheet.
3. Click the *Design Tab* in the ribbon.
4. Click the **[Quick Layout]** button in the **Chart Layouts Group**.
5. Hover over each of the options in the gallery.
6. In the **Styles Group**, click the **[More]** button of the Styles gallery.
7. Hover over each of the options in the gallery
8. Click the **[Styles]** button to the right of the chart.
9. Scroll through the list of styles and hover over them.
10. Click the *Colors Tab* at the top of the menu.
11. Apply a different style and color palette to your chart.
12. Save the file and leave it open.

**Results/ Comments:**

If not, re-open the file from the data files folder.

Once active, the *Chart Tools Tabs* are displayed on the ribbon.

A gallery of quick layout options is displayed.

This is a live preview gallery. So as you hover over the options, the chart changes to reflect that option.

The gallery of pre-built styles is displayed.

This is also a live preview gallery, allowing you to see how each option will look when applied.

You have access to the same styles as in the **Style Gallery** on the *Design Tab*.

The menu offers live preview.

The gallery displays the color available palettes.

**[CTRL + S].**



## Chart Elements

### Chart Elements

A chart can contain many elements, the availability of the elements depends on the type of chart being used. When applying *Quick Layouts*, some charts elements are added or removed as part of the chosen layout. A list of chart elements was presented at the beginning of the last lesson but we shall review then again here.

#### Elements Used By All Chart Types

- ◆ **Chart Area:** The area that makes up the chart, every charts has a chart area. This encompasses all the elements used by a chart.
- ◆ **Plot Area:** The area where the actual chart is displayed, enclosed by the axis. Every charts has a plot area, 3D charts can enclose three axis and their titles.
- ◆ **Category; X Axis:** The horizontal line where labels of the chart's categories are arranged. Categories are the individual measurement intervals or groupings for the original data.
- ◆ **Value; Y Axis:** The vertical axis of column charts.
- ◆ **Data Series:** The data series is a collection of data points (or markers), they normally correspond to the data held within a single row or column.
- ◆ **Data Point:** These are the individual values in the data that the chart is displaying within each Data Series.
- ◆ **Chart Title:** This can be created automatically or added or removed at your discretion.
- ◆ **Legend:** This is used to identify the data series in the chart.
- ◆ **Data Labels:** These can be added to display the actual values from the data to each data point. The only chart that does not allow data labels to the chart is the Surface chart.





## Chart Elements, continued

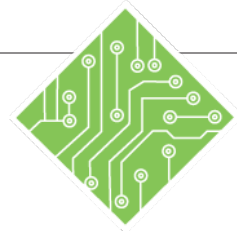
### Elements Dependent on Chart Type

Depending on the chart type being used, the chart may or may not have all these items.

- ◆ **Category; X Axis Title:** This is used to display a title below the x-axis of the chart. Not available when using the Pie, Doughnut, or Radar charts.
- ◆ **Value Y Axis Title:** This is used to display a title along the left of the y-axis of the chart, it can be vertical, stacked, or rotated text. Not available when using the Pie, Doughnut, or Radar charts.
- ◆ **Gridlines:** These are extensions of the axis scale, they are placed on the walls or the plot area of the chart to make it easier to estimate the value of specific data points. They can be placed on both horizontal and vertical axis. Not available when using the Pie or Doughnut charts.
- ◆ **Data Marker:** A piece of data plotted on a chart, normally corresponds to the data in a single cell. This can be a column value, bar, slice, cross or square depending on the type of the chart. Only available in Line, Scatter, or Radar charts.
- ◆ **Data Table:** A grid that appears in the chart displaying the exact data that is used to create the chart. Not available when using Pie, Doughnut, Bubble, Surface, Scatter, or Radar charts.
- ◆ **Trend line:** This is used to show trends of a data series on the chart, it is possible to forecast future trends based on the current data. Each data series can have a trend line applied. Not available when using the 3D Line, Pie, Area, Doughnut, Surface, or Radar charts.
- ◆ **Error Bars:** These can be used to display the amount of error or uncertainty with each data point. Not available when using certain Bar, Column, and Line charts, Pie, Area, Surface, or Radar charts.
- ◆ **Wall:** Only applicable to 3D charts. Consider it as the side and back of a 3D plot area, although it can be formatted separately from the plot area.
- ◆ **Floor:** Only applicable to 3D charts. Consider it as the bottom of a 3D plot area, although it can be formatted separately from the plot area.



## Action 2.4 - Determine the Availability of Chart Element



### You Do This:

1. **MyCharts.xlsx** file should still be open.
2. Select the chart on the *Bar Single Series* sheet.
3. Click the *Design Tab* in the *Chart Tools* set of tabs on the ribbon.
4. In the **Chart Layouts Group**, click the **[Add Chart Elements]** drop-down button to expand a list of available *Chart Elements*.
5. Hover over the *Chart Title* element to expand the list, Hover over each of the available options.
6. Click the **[Chart Elements]** button to the right of the chart.
7. Hover over the *Chart Titles* option and click the arrow to expand the additional options for the *Chart Title*.
8. Select the *Doughnut Chart* on the *Doughnut* sheet.
9. In the **Chart Layouts Group**, click the **[Add Chart Elements]** drop-down button to expand a list of available *Chart Elements*.
10. Click the **[Chart Elements]** button to the right of the chart.

### Results/ Comments:

If not, re-open the file from the data files folder.

Click on the chart to make it active. Once active, the *Chart Tools Tabs* are displayed on the ribbon.

The *Design Tab* tools are displayed in the ribbon.

Each item in the list can further be expanded to show more options related to that given element.

This is another live preview gallery, and as such we are shown how our choices will impact the chart.

A list of elements available for this type of chart are displayed in the menu.

These are similar to those offered in the **[Add Chart Elements]** button on the *Design Tab*.

If any options are greyed out, then they are not applicable to this type of chart.

This menu will only show the elements available for this type of chart.



## Adding and Removing Chart Elements

### Note

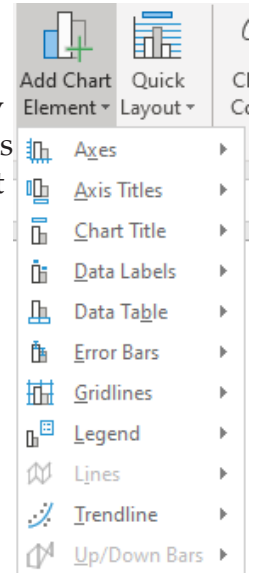
When adding textual chart elements, as soon as it has been added you can simply type the necessary text and tap the **[Enter]** key to apply it.

Now that you are able to determine what elements are available for the chart types it is time to add or remove the elements as needed. When the chart is active you are able to add or remove chart elements using either the *Design Tab* or the **[Chart Elements]** button.

### Adding Chart Elements From the Design Tab

With a chart actively selected, activate the Design Tab in the ribbon. In the **Chart Layouts Group** click the **[Add Chart Element]** to display a list of available elements. Should any elements be greyed out, then that specific element can not be applied to the current chart.

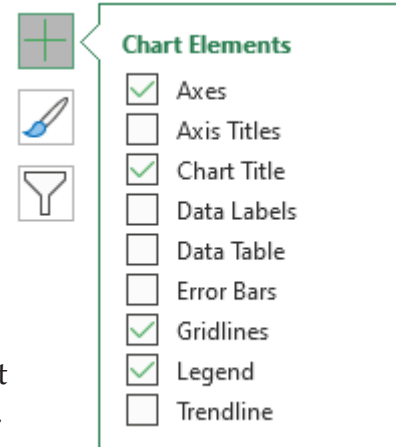
As you hover over any of the elements, you can click the arrow to expand the options for that element.



### Adding Chart Elements Using the Element Button

The **[Chart Elements]** button, located to the right of the chart will also show a list of available chart elements. This list will show only the elements associated with the currently active chart type.

Checking the checkbox for a given element will turn it on or off. Clicking the arrow beside an element will show the options of the element.





## Adding and Removing Chart Elements, continued

### Adding Chart Elements

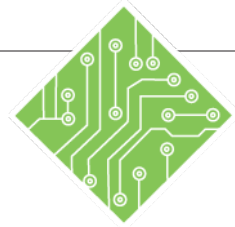
- ◆ Click into the chart.
- ◆ On the *Design Tab*, locate and click on the **[Add Chart Element]** button.
- ◆ Scroll down to the desired element, click it to expand its options. Select the desired element option.
- OR -
- ◆ To the right of the chart, locate and click the **[Chart Element]** button.
- ◆ Check the desired element checkbox to turn on the element. Click the arrow of the desired element to expand the list of options.

### Removing Chart Elements

- ◆ When the element is actively selected, tap the **[Delete]** key.
- OR -
- ◆ On the *Design Tab*, locate and click the **[Add Chart Element]** button.
- ◆ Expand the element options and choose *None* from the set of options.
- OR -
- ◆ Click the **[Chart Element]** button to the right of the chart.
- ◆ Scroll down to the unwanted element and uncheck the checkbox.



## Action 2.5 - Adding and Removing Chart Elements



### You Do This:

1. **MyCharts.xlsx** file should still be open.
2. Select the chart on the *Area* sheet.
3. On the *Design Tab*, click the **[Add Chart Element]** in the **Chart Layouts Group**.
4. Hover over the *Chart Title* element, when the options appear, scroll over and click on *Above Chart*.
5. Type in:  
**Home Sales.**  
Then tap the **[Enter]** key.
6. Select the chart on the *Pie* sheet.
7. Select the *Chart Title* element and press the **[Delete]** key.
8. On the *Design Tab*, click the **[Add Chart Element]** in the **Chart Layouts Group**
- 9.
10. Hover over the *Legend* element, when the list of available options are displayed, choose one.
11. Click any blank area of the chart.
12. Save the file.

### Results/ Comments:

If not, re-open the file from the data files folder.

Click the *Area* sheet tab, then click into the chart.

The list of available chart elements are displayed.

The Chart Title element is added to the chart, currently it displays the default text of **Chart Title**.

When the title element is selected and you type text, when you tap the **[Enter]** key, the text is added to the element.

The *Chart Title* element is removed from the chart.

The legend is now active and in the position you chose.

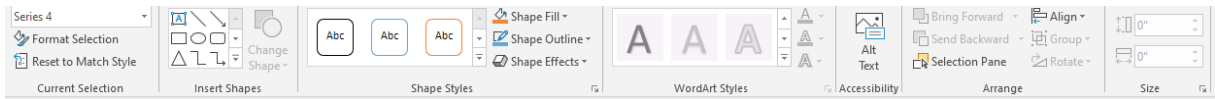
You can hover over each of the options to see the live preview gallery show what each choice looks like.

The *Legend* is now added to the chart.

**[CTRL + S]**.

## Formatting Chart Elements

Chart elements can be formatted with the controls found on the **Chart Tools Format Tab**. This tab will allow you to select elements, add new shapes to the chart, add Alt Text, apply formatting styles to text and elements, arrange the chart elements, and open the *Selection* pane.



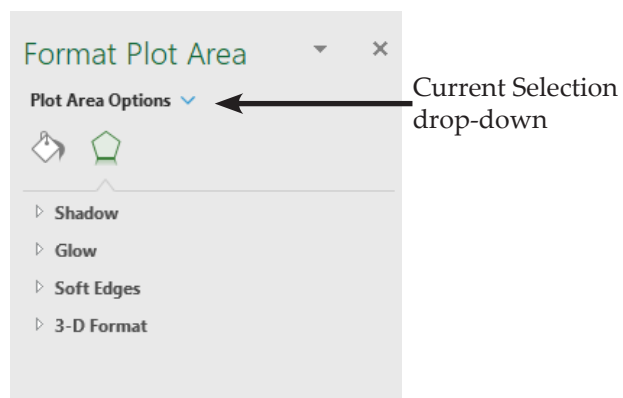
### Note

Alt text is read aloud by screen reading software to assist the visually impaired.

To apply or modify formatting attributes of a chart element, you must first select it. This can be done by using the mouse to click on the element or by using the **Current Selection** field in the **Current Selection Group** on the **Format Tab**. The field has a drop-down arrow which expands to reveal every element currently in use in the chart, select the specific element to format then make the necessary modifications.



Once the element is actively selected, it can now be formatted. Formatting controls can be found on the **Formatting Tab** in the ribbon as well as on the Formatting pane. To access the *Formatting* pane, right-click any element in the chart and choose *Format (Element)* from the menu. It is a good idea to leave the Format pane open until all the formatting is completed. With that in mind, the formatting pane also offers a **Current Selection** drop-down list of all chart elements in use. The **Current Selection** drop-down is located below the *Format* pane title, this helps in selecting hard to click on elements such as gridlines.



## Formatting Chart Elements, continued

### Note

If you created a custom font theme and that theme is in use on the current file, then your basic text formatting choices are already in play.

## Textual Elements

*Excel* offers a set of pre-built text styles called *WordArt Styles* which modify text fill color, text outlining and effect attributes. The styles are found on the *Chart Tools Format Tab* or *Formatting* pane. Unfortunately these styles do not impact the font, size, or other basic font formatting attributes, these attribute will be modified from either the *Home Tab*.

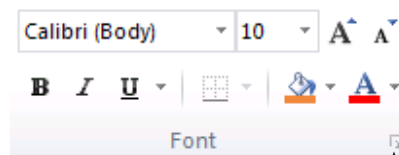
## Font Formatting

Since charts contain elements that are textually based, we will start with formatting text. This can be done using the font formatting tools on the *Home Tab*.



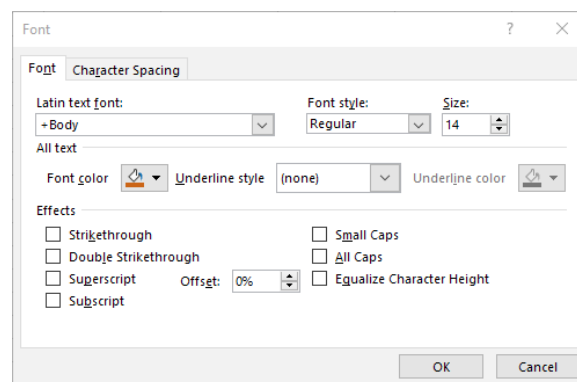
Text formatting tools on the Home Tab

To access an even greater level of text formatting control, click the **[Font Settings]** button in the lower right corner of the **Font Group**.



Font Settings button

The *Font* dialog opens, giving full control over font formatting and character spacing.



Take this opportunity to apply branded fonts, maintaining a consistent look across documents.

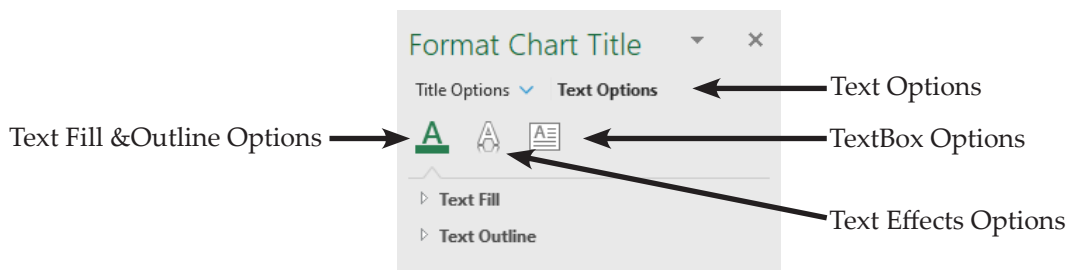
## Formatting Chart Elements, continued

### Font Styling With WordArt

The *WordArt Styles* offer quick formatting designed to make the appearance of the text on eye-catching. The **WordArt Styles Group** on the *Chart Tools Format Tab* has a gallery of pre-built styles and also controls which allow for customization to the style.



*WordArt Styles* are also found in the *Format* pane when any selected chart element contains or can contain text. To access the *WordArt* controls in the *Format* pane switch from *Shape Options* to *Text Options*. Then choose the category of controls from the list of three options.

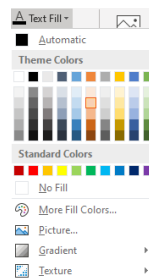


### Applying WordArt to Text

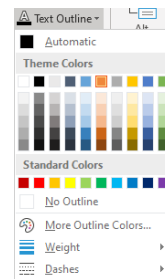
- ◆ Select the chart element with text to be formatted.
- ◆ Activate the *Chart Tools Format Tab* or right-click the chart element and choose *Format (Element)* to open the *Format* pane.
- ◆ Using the *Format* pane:
  - ◆ Click the [Text Options] button at the top of the pane.
  - ◆ Click the [Text Fill & Outline] options button.
  - ◆ Expand the *Text Fill* options to access the fill controls.
  - ◆ Expand the *Text Outline* options to access the outlining controls.
  - ◆ Click the [Text Effects] options button.

## Formatting Chart Elements, continued

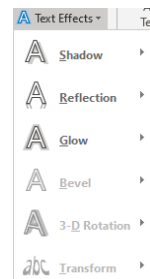
- ◇ All the effect categories can be expanded to gain access to their controls.
- ◇ Click the **[Textbox]** options button.
- ◇ Here you are able to control the vertical alignment, text direction, and margins of the textbox.
- ◇ Using the **Chart Tools Format Tab**:
  - ◇ Click the Gallery drop-down to see the pre-built set of options and choose one as a starting point.
  - ◇ To change the fill color of the text, use the **[Text Fill]** button drop-down.
  - ◇ To change to text outline, use the **[Text Outline]** button drop-down. Here you will be able to change the color, weight (thickness), and Dashes (line type).
  - ◇ To change the text effect, use the **[Text Effects]** button drop-down. Here you will be able to modify shadows, glows, reflections, bevels, 3-D rotation, and transformations.



Text Fill



Text Outline

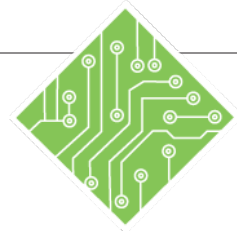


Text Effects

- ◇ Each of these button drop-down will also contain additional drop-downs that allow more controls. Eventually, if you follow all the options you will end up in the *Format* pane.

To apply formatting to all text elements within the chart, select the chart and not a specific text element. With the chart actively selected, any changes will be applied to all text elements. Use the text formatting tools available on the **Chart Tools Format Tab**, **Home Tab**, or **Format** pane.

## Action 2.6 - Formatting Text Elements in a Chart



### You Do This:

1. **MyCharts.xlsx** file should still be open.
2. Activate the *Column Single Series* sheet.
3. Select the chart.
4. Click the *Home Tab*.
5. In the **Font Group**, change the font to *Trebuchet MS*.
6. Click the *Format Tab* in the **Chart Tools** set of tabs on the ribbon.
7. Click the **[More]** button of the WordArt Styles gallery.
8. Hover the cursor over the gallery preview tiles.
9. Click away from the gallery to close it without applying any of the styles.
10. Click the **[Dialog Launcher]** button at the lower right corner of the **WordArt Styles Group**.
11. Select the *Text Fill* category on the left side of the window.
12. Click the *Solid* radio button and then click the *Color* drop-down and choose *More Colors* from the menu.

### Results/ Comments:

If not, re-open the file from the data files folder.

Click the sheet tab at the bottom of the spreadsheet.

Click on the chart to make it active. Once active, the **Chart Tools Tabs** are displayed on the ribbon.

The font is changed for all the text in the chart.

The *Format Tab* tools are displayed in the ribbon.

The gallery of **WordArt Styles** is expanded.

Since the gallery is live preview enabled, you should see all textual elements changing as you move from one tile to the next.

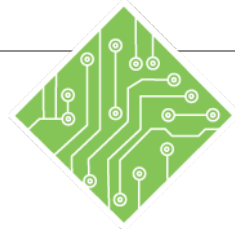
No style is applied and the gallery closes.

The *Format Text Effects* dialog opens.

Options related to different styles of filling the text are displayed on the right side of the window.

The *Colors* dialog opens.





**You Do This:**

13. Click the *Custom Tab* and enter the specific RGB values of your branded color.
14. Select the *Shadow* category, under text effects in the Format Pane.
15. Click the *Presets* drop-down and choose any choice you like.
16. Explore the other categories but *don't* apply any other effects.
17. Click the **[Close]** button.
18. Select the Chart Title and activate the *Home Tab*.
19. In the **Font Group**, change the size of the text to 28.
20. Save the file.

**Results/ Comments:**

It is in the custom color dialog where you are able to exactly set the color. Every color choice command will allow you into the *Color* dialog where specific colors can be applied.

Options related to shadow styles are displayed on the right side of the window.

They formatting effects are applied to the text.

You will change only this element by selecting it.

The size of the title text is changed.

**[CTRL S].**

## Formatting Chart Elements, continued

### Formatting Graphic Elements

Once an element has been added to the chart, it may require formatting. You can select the element using either the mouse or the from the **Current Selection** field in the **Current Selection Group** or *Format* pane. When an element is selected it can be formatted.

Shape formatting tools are found on the *Chart Tools Formatting Tab* in the **Shape Styles Group** or in the *Format* pane.

To access the *Format* dialog:

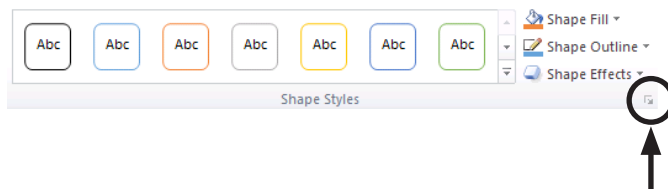
#### Note

Many chart elements include both graphic and text components..

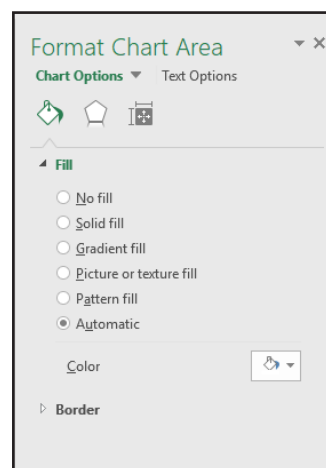
- ◆ Select and right-click an element, then choose *Format (Element)* from the menu.

- OR -

- ◆ Click the **[Dialog Launcher]** button in the **Shape Styles Group** on the *Format Tab*.



Once the *Format* dialog is open you can choose the aspect of the element to be formatted from the list of categories on the top of the window and the available options are listed below in the window. This dialog works in the same manner as the *Format Text Effects* dialog.





## Formatting Chart Elements, continued

The basic categories in the *Format* dialog include:

- ◆ **The Fill Category:** allows you to remove any fills of the element, add solid color fills, add gradient fills, add picture or texture fills, pattern fills, or use the automatic fill which is white.
- ◆ **The Border Color Category:** allows you to remove the border color, add a color, add a gradient, or use the automatic border which is no border.
- ◆ **The Border style category:** allows you to control the width, compound type, dashes type, caps, and spacing.
- ◆ **The Shadow Category:** allows you to add shadows to the element and control all aspects of the shadow.
- ◆ **The Glow and Soft Edges Category:** allows you to add glows and soft edges to the elements and control all aspects of the effect.
- ◆ **3D:** allows you to apply and control the bevel, depth, contour, and surface of the objects.
- ◆ **Size:** allows you as set the size of the chart or selected element.
- ◆ **Properties:** allows you to control the positioning of the chart in relation to the worksheet and protection properties.

Others will become available depending on the element or chart type being worked with. As you see them, take the time to explore what can be done with them.

### Formatting the Axis and Gridlines

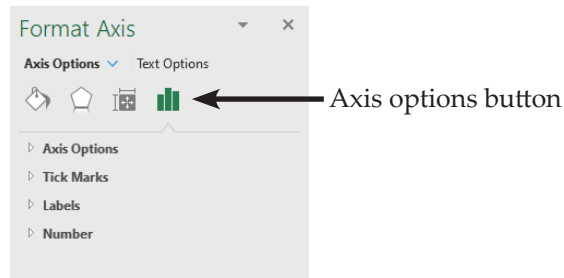
*Excel* creates the scale of the axis automatically based on the value range in the existing data. This scale may not always fit your needs, requiring that a custom scale be created.





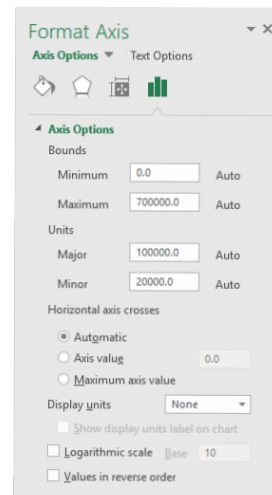
## Formatting Chart Elements, continued

When an axis is selected and the *Format* pane is open, click the [Axis] options button.



With the Axis options active, you are able to customize the scale of values the axis uses, add major and minor gridlines, modify the tick marks, the labels, and apply number formatting. Each of these categories can be expanded to reveal all necessary controls.

Expanding the *Axis Options* categories allows you to: set the upper and lower limits of the bounds, modifying the units sets the gridlines increments, change the horizontal axis value, add or remove the axis display units, enable a logarithmic scale, and invert the axis scale.

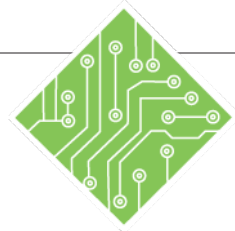


Should axis use dates, then controls related to applying a date scale are available in the *Format Axis* pane.

Once the units for the gridlines are set, you may need to make some formatting changes to those lines. Selecting the gridline can sometimes be difficult when using the mouse, so use the **Current Selection** field in either the *Chart Tools Design Tab* or *Format* pane. With the gridline selected you are now able to modify the line color, weight, or style.



## Action 2.7 - Formatting Graphic and Axis Elements



### You Do This:

1. **MyCharts.xlsx** file should still be open.
2. Activate the *Column Single Series* sheet.
3. Select the chart.
4. Right-click into the blank area of the chart and choose *Format Chart Area* from the menu.
5. Select the *fill* category then click the *Solid Fill* radio button.
6. Click the **Color** drop-down and choose *More Colors...* from the menu.
7. Click the *Custom* tab and enter the RGB values as;  
**133, 197, and 87**  
Click the **[OK]** button.
8. Set the transparency to a value of **75**.
9. Click the vertical axis text.
10. Select the *Axis Options* category on the top of the format pane.
11. Change to **Minimum** value for bounds to **90000**.
12. Change the **Major Unit** value to **10000**.

### Results/ Comments:

If not, re-open the file from the data files folder.

Click the sheet tab at the bottom of the spreadsheet.

Click on the chart to make it active. Once active, the **Chart Tools Tabs** are displayed on the ribbon.

The *Format Chart Area* pane opens.

The *Color* dialog box opens.

You are entering in the values of a branded color.

The chart area fill is now semi-transparent.

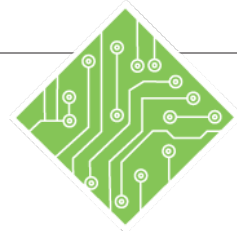
The *Format Chart Area* pane changes to the *Format Axis*.

The axis options are displayed.

The current value at the low end of the axis will be changed. The word Auto will be replaced with "Reset".

The major divisions of the axis scale will be changed.

## Action 2.7 - Formatting Graphic and Axis Elements, continued



### You Do This:

13. Change the **Minor Unit** value to **5000**.
14. Click the **[Close]** button.
15. Select the legend and tap the **[Delete]** key.
16. Activate the *Stock* sheet.
17. Right-click on the horizontal axis containing the dates and choose *Format Axis* from the menu.
18. Change the **Major Unit** value to **14 (days)**.
19. Try clicking other elements in the chart to see the formatting options that are available.
20. Click the **[Close]** button.
21. Save the file.

### Results/ Comments:

The subdivisions of the axis scale will be changed.

The changes you made to the axis are displayed.

The legend is removed from the chart since it is not necessary in this chart.

Click the sheet tab at the bottom of the spreadsheet. Notice how the date scale at the bottom of these charts is not very well laid out.

The *Format* pane shows *Axis* options.

We want to see the scale in bi-weekly format.

The formatting changes you just made are visible in the axis. You can change other elements to modify the chart so it is more to your liking.

To finish and apply any other changes made.

**[CTRL S]**.

## Saving a Chart Template

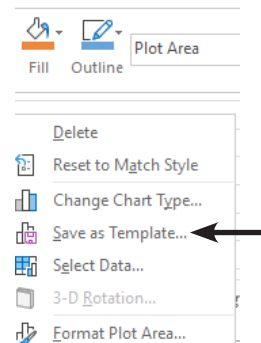
After all the chart elements have been formatted to meet branding standards or is simply formatted the way you want, it is time to save it as a template for later use. By creating templates based on a formatted chart, you will be able to apply the template to new chart which will help in creating a standardized and consistent look to your work. When saving the templates, do not change the default location since templates in the default location are available in any of the other *Microsoft Office* applications in the suite.

### Note

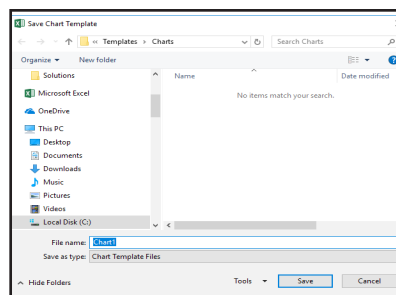
To share the template with other people, sending them a copy of the file so they can save the chart as a template on their own system.

## Save the Template

- ◆ Select the formatted chart.
- ◆ Right-click the chart, choose the *Save as Template* option.



- ◆ The *Save Chart Template* dialog opens.



### Note

You may already have files containing formatted charts, to save them as templates, open the file containing the chart and follow the save as template procedure.

- ◆ Do not change the location of where it is being saved, it will be directed to the **Microsoft\Templates\Charts** folder by default. This ensures easy access from other *Office* applications.
- ◆ Name the template something short and descriptive and click the **[Save]** button.

If you use several chart types you should consider saving each formatted chart type as a template to speed the charting process.



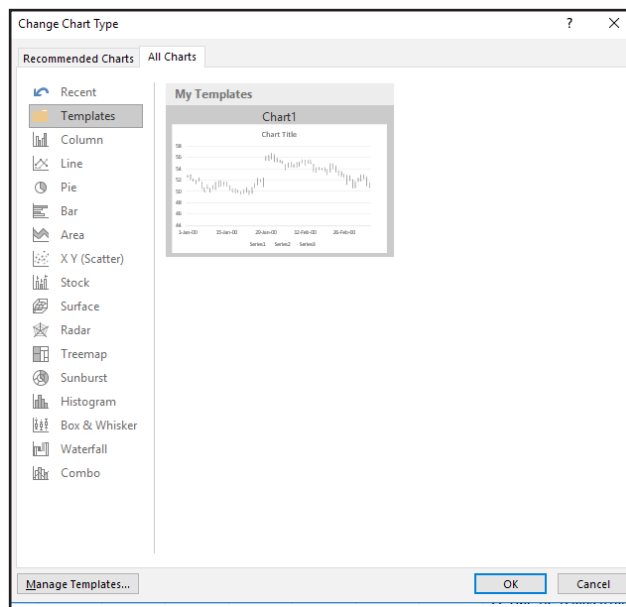
## Saving a Chart Template, continued

### Using the Chart Template

- ◆ Create a new chart or select an existing chart.
- ◆ Click the **[Change Chart Type]** button in the **Type Group** on the *Design Tab*.

-OR-

- ◆ Right-click the chart and choose *Change Chart Type* from the menu.
- ◆ The *Change Chart Type* dialog opens.



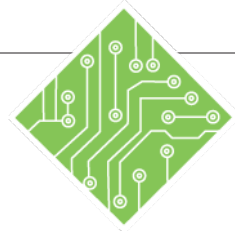
- ◆ In the *Change Chart Type* dialog box, choose the *Templates* folder from the list of categories on the left side of the window.
- ◆ The list of templates you have saved are listed.
- ◆ Select the one you want to apply to the new chart and click the **[OK]** button.

This procedure will be the same in the other *Office* applications the have charting tools. If you right-click the template, it can be set as the default, so when you create a new chart it will come in with your formatting applied.





## Action 2.8 - Working With Chart Templates



### You Do This:

1. **MyCharts.xlsx** file should still be open.
2. Activate the *Column Single Series* sheet.
3. Select the chart.
4. Click the *Design Tab*.
5. Right-click the chart and select **[Save As Template]**
6. Name the template **SingleCol** and click the **[Save]** button.
7. Activate the *Bar Single Series* sheet.
8. Select cells **A1:B7**.
9. Click the *Insert Tab*.
10. Click the **[Column]** button drop-down in the **Charts Group** and choose the first of the options.
11. Click the *Design Tab*.
12. Click the **[Change Chart Type]** button in the **Type Group**.
13. Click the *Templates* option in the categories listed on the left.

### Results/ Comments:

If not, re-open the file from the data files folder.

Click the sheet tab at the bottom of the spreadsheet.

Click on the chart to make it active. Once active, the *Chart Tools Tabs* are displayed on the ribbon.

The *Save Chart Template* dialog opens.

Do not change the location where the template will be saved.

You will create a new chart based on the data in this worksheet.

This is the data to be charted in a new column chart.

A new column chart is added to the spreadsheet.

Since the new chart is selected the *Chart Tabs* are available, if the tabs are not available, select the chart.

The *Change Chart Type* dialog opens.

The list of saved template is displayed on the right side of the window.



**You Do This:**

14. Choose the **SingleCol** template and click the **[OK]** button.
15. Right-click the axis and choose *Format Axis* from the menu.
16. Change the **Maximum**, **Minimum**, **Major** and **Minor Units** back to *automatic* and click the **[Close]** button.
17. Right-click the chart and select **[Save As Template]** button.
18. Name the template;  
**SingleColAutoScale**  
and click the **[Save]** button.
19. Click the **[Change Chart Type]** button in the **Type Group**.
20. Click the *Bar* option in the categories listed on the left and choose the first one of the choices and click the **[OK]** button.
21. Save the file.
22. Open *Word* and create a new blank document if needed.
23. Click the *Insert Tab*.
24. Click the **[Chart]** button drop-down in the **Illustrations Group** and choose the first of the column options.

**Results/ Comments:**

The chart now has the background color, font, font sizes, text effects, and axis scale applied. Everything looks good except the scale does not work in this case.

The *Format* pane shows *Axis* options.

The charts axis scale is reset and the chart shows the data properly.

You will save another version of the template. The *Save Chart Template* dialog opens.

Do not change the location where the template will be saved.

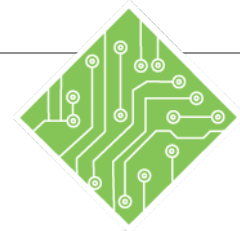
The chart you have been working with should still be actively selected.

You will now change to chart type of a formatted chart. Notice the type of chart changes but the formatting remains the same.

**[CTRL S].**

Word should open with a new blank document by default.

The *Insert Chart* dialog opens. This is similar to the *Change Chart Type* dialog *Excel* uses.



**You Do This:**

25. Close the *Excel* window without changing the data.
26. In *Word*, select the chart.
27. Click the *Design Tab*.
28. Click the **[Change Chart Type]** button in the **Type Group**.
29. Click the *Templates* option in the categories listed on the left.
30. Choose the **SingleColAutoScale** template and click the **[OK]** button.
31. Close *Word* without saving the file.
32. Activate *Excel* by click the icon in the task bar at the bottom of your screen

**Results/ Comments:**

When you insert a chart in *Word*, it splits the screen with an *Excel* spreadsheet. The spreadsheet contains default base data that you modify by entering your real data. This can be done manually or by pasting copied *Excel* data into the spreadsheet.

Notice that there are the same tabs for working with chart is *Word* as there are in *Excel*.

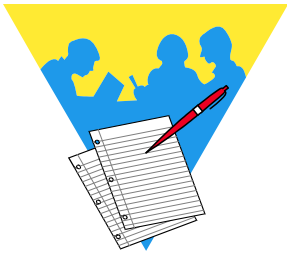
This tab offer the same set of commands.

The *Change Chart Type* dialog opens.

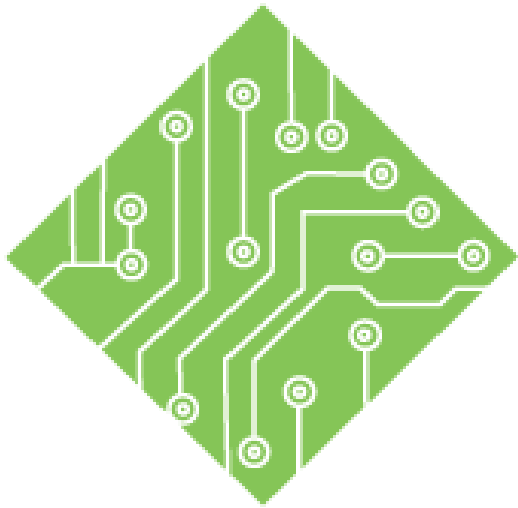
You should see both templates that were saved while working in *Excel*.

The chart now has the formatting of the template applied.

*Excel* should now be the program running on the screen.



## Tips and Notes

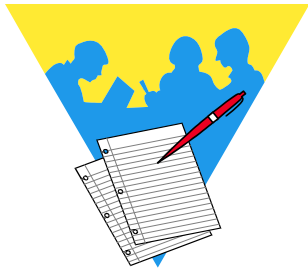


## Lesson 3: Charts Advanced

### Lesson Overview

You will cover the following concepts in this chapter:

- ◆ Sparklines
- ◆ Trendlines
- ◆ Error Bars
- ◆ Combination Charts



## Lesson Notes

## Sparklines

You may want to include a graphic representation of trends in the data, but adding a chart is not required or necessary. In situations like these, use a Sparkline to show trends. Create a simple line, column, or win/loss graph to visualize aspects within a data set. As Sparklines are not charts, but rather a small visual representation of the data in the background of a cell; making it possible to still enter text and apply formatting to the cell.

### Note

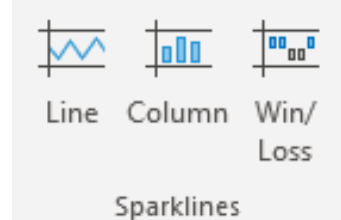
An advantage of using sparklines is, sparklines are printed when the worksheet is printed

With data presented across rows or columns, it is not easy to see existing trends. Sparklines are useful tools for showing those trends right beside the data. Consider showing seasonal increases or decreases as small graphics next to raw data, this easily reveals economic cycles. It is also possible to highlight maximum and minimum values within the Sparklines.

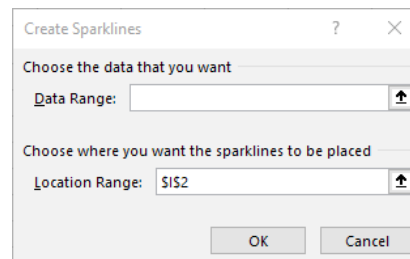
As the data is updated, those changes are reflected in the sparkline immediately.

## Creating a Sparkline

- On the **Insert Tab**, locate the **Sparkline Group** and click the **[Line]** button.



- The *Create Sparkline* dialog opens:



### Note

It is not necessary to select the location before inserting a Sparkline but, it is helpful.

- Click in the **Data Range:** field, then highlight the cells you want to show as a graph.
- Click in the **Location Range:** field the choose the cell where you want the sparkline to be placed.
- Click the **[OK]** button.



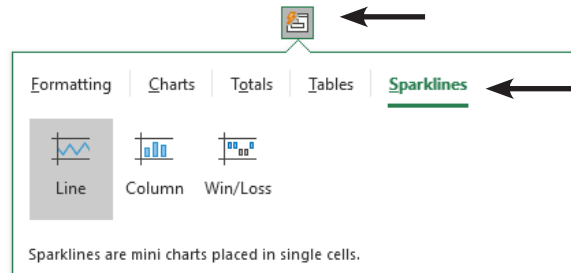
## Sparklines, continued

### Note

[Ctrl + Q] is the shortcut to open the *Quick Analysis* dialog.

- OR -

- ◆ Select the data range to be charted with a Sparkline.
- ◆ The *Quick Analysis Smart Tag* is displayed to the lower right of the selection.



- ◆ Click the *Quick Analysis Tag* and choose the *Sparkline* option at the top of the dialog.
- ◆ Choose any of the three type of Sparklines to add them beside the selected data.

### Things to Keep in Mind:

- ◆ Sparkline can be based off data in either rows or columns.
- ◆ The selected cell will automatically be placed in the **Location Range:** field.
- ◆ The location cell cannot be a merged set of cells.
- ◆ Multiple Sparklines can be created at the same time by selecting multiple cells that correspond to underlying data
- ◆ It is possible to create sparklines for additional rows of data by using the fill handle on the cell that containing a sparkline.

### Formatting Sparklines

Once a cell containing a Sparkline is selected, the *Sparkline Design Tab* becomes available. This tab allows type of Sparkline to be changed, markers to be added or removed, styles can be applied, and to modify the axis. Since a Sparkline is not a chart, they are formatted with the controls found on the *Sparkline Design Tab* only. Right-clicking a cell with a Sparkline will allow access to the *Format Cells* dialog but not a *Format Sparklines* pane.

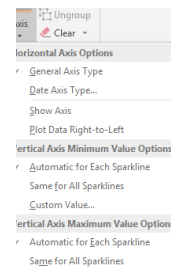




## Sparklines, continued

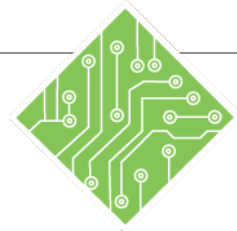
### Customizing Sparklines

While you are able to control the axis and would assume there would be an axis displayed in the sparkline, the axis controls are used to control the spacing of the markers and the vertical scale. If the sparkline data is based on an non-sequential series of dates, the axis can be defined using that series and will space the markers as if the missing dates were included in the data set.



- ◆ Select a *Sparkline* (or a range of Sparklines).
- ◆ Select the *Sparkline Tools Design Tab*.
- ◆ Locate the **Group Group**.
- ◆ Click the **[Axis]** drop-down button to display a list of choices.
- ◆ Select one of the following options to change the scaling and/or visibility of the horizontal and vertical axis of the Sparkline:
  - ◆ **General Axis Type** - displays the Sparkline as a 'general' horizontal axis type.
  - ◆ **Date Axis Type** - used if your data includes dates and you want to arrange the data on the data points to reflect any irregular time period.
  - ◆ **Show Axis** - shows the Sparkline horizontal axis.
  - ◆ **Plot Data Right-to-Left** - changes the direction that the data is plotted.
  - ◆ **Automatic for Each Sparkline** - specifies the automatic maximum and minimum values for all Sparklines.
  - ◆ **Same for All Sparklines** - specifies the same minimum and maximum values for all Sparklines.
  - ◆ **Custom Value** - specifies the custom minimum and maximum values for the Sparklines.

### Action 3.1 - Adding Sparklines



#### Instructions:

1. Open the **AdvancedCharts.xlsx** file from the data files folder.
2. Activate the *Sparklines* sheet.
3. Select cells **I2:I7**.
4. Activate the *Insert Tab*, in the **Sparklines Group** click the **[Line]** button.
5. Click into the **Data Range:** field and highlight cells **B2:F7** and click the **[OK]** button.
6. Click the *Sparklines Design Tab*.
7. In the **Type Group** try changing to both other types of sparklines. Change them back to the *Line* type.
8. In the **Show Group** check the check boxes for both the *High* and *Low points*.
9. Click the **[More]** button of the **Sparkline Style Gallery** and examine the available options but don't choose any.
10. Click the **[Sparkline Color]** button drop-down and choose *1.5* from the *Weight* menu.

#### Results/ Comments:

By clicking the *Sparkline* sheet tab at the bottom of the spreadsheet.

These are the cells the sparklines will be placed.

The *Create Sparklines* dialog opens.

This selects the cell range the sparklines will be based on. The **Location Range:** field should already be populated based on the selection. The sparklines are inserted in the selected cells. If you had added the sparkline to the first cell you could use the autofill handle to populate the other cells.

If necessary. All formatting changes to sparklines are done from this tab.

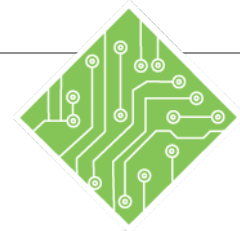
To see how they other types of sparklines display the data.

Two markers are added to the lines.

The gallery expands to reveal all the preformatted options.

From this drop-down menu you can choose line color and thickness. This is another chance for you to use brand colors in the document.

### Action 3.1 - Adding Sparklines, continued



#### Instructions:

11. Click the **[Marker Color]** button drop-down, choose the *High Point Color* option and choose the *Yellow* color from the *Standard Colors*.
12. Click the **[Marker Color]** button drop-down, choose the *Low Point Color* option and choose the *Red* color from the *Standard Colors*.
13. Click the **[Axis]** button drop-down and choose *Show Axis*.
14. Click the **[Axis]** button drop-down, from the *Vertical Axis Maximum Values Options* group and choose *Custom Value....*
15. Set the value to **65000** and click the **[OK]** button.
16. Select column I and widen it to twice its original width.
17. Select cells **A15:G21**.
18. Click the *Quick Analysis Smart Tag* and choose the *Sparkline* option at the top of the *Quick Analysis* window.
19. Choose *Line* from the list.
20. Click the *Sparklines Design Tab* and click the **[Edit Data]** button drop-down and choose *Edit Group Location and Data*.
21. Edit the **Data Range** to **A15:F21** and click the **[OK]** button.
22. Save the file as **MyAdvancedCharts**.

#### Results/ Comments:

The High Point marker is now yellow.

The Low Point marker is now red.

Nothing changes yet.

The *Sparkline Vertical Axis Settings* dialog box opens.

The sizing of the sparklines shifts in relations to the setting just entered.

The column is wider and the sparkline is easier to see and understand.

The second data set.

The *Quick Analysis* windows displayed.

The Sparklines are added in cells **H15:H21**.

The *Edit Sparkline* dialog is displayed.

The sparklines now reflect the correct data range.

**[CTRL + S]**.



## Trendlines

### Trendline Overview

Once data is in a chart, you may want to use *Excel's* tools for forecasting values based on the existing data. Trendlines can be used to forecast a data series graphically in the chart, they can be added to any and all data series in a chart.

A Trendline is a graphic representation of an existing trend in a data series, they are used to see how a current trend may possibly move in the future. These can help in making decisions, barring an unforeseen event, a trend should continue along predictable lines. Chart types which allow Trendlines to be added include:

- ◆ Column
- ◆ Line
- ◆ Bar
- ◆ Area
- ◆ Stock
- ◆ Bubble

### Choosing a Trendline Type

When you want to add a trendline to a chart in *Excel*, you can choose any one of these six different trend or regression types:

- ◆ Linear trendlines
- ◆ Logarithmic trendlines
- ◆ Polynomial trendlines
- ◆ Power trendlines
- ◆ Exponential trendlines
- ◆ Moving average trendlines

The type of data that you have determines the type of trendline that you should use.

A trendline is most accurate when its R-squared value is at or near 1. When you fit a trendline to your data, *Excel* automatically calculates its R-squared value. If you want to, you can display this value on your chart.

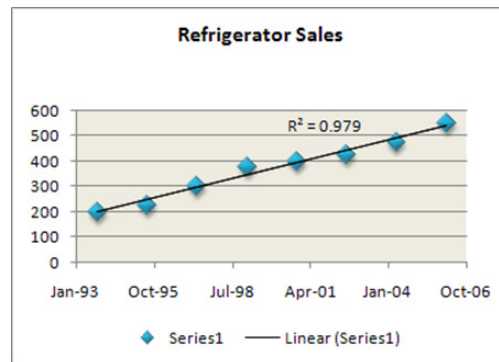


## Trendlines, continued

### Linear Trendlines

A linear trendline is a best-fit straight line that is used with simple linear data sets. Your data is linear if the pattern in its data points resembles a line. A linear trendline usually shows that something is increasing or decreasing at a steady rate.

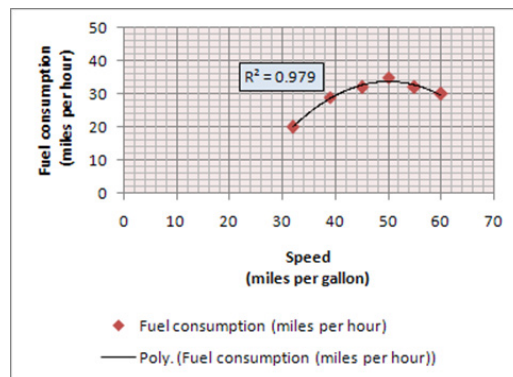
This example, a linear trendline illustrates that refrigerator sales have consistently risen over a 13-year period. Notice that the R-squared value is 0.979, which is a good fit of the line to the data.



### Logarithmic Trendlines

A logarithmic trendline is a best-fit curved line that is used when the rate of change in the data increases or decreases quickly and then levels out. A logarithmic trendline can use both negative and positive values.

This example uses a logarithmic trendline to illustrate predicted population growth of animals in a fixed-space area, where population leveled out as space for the animals decreased. Note that the R-squared value is 0.933, which is a relatively good fit of the line to the data.



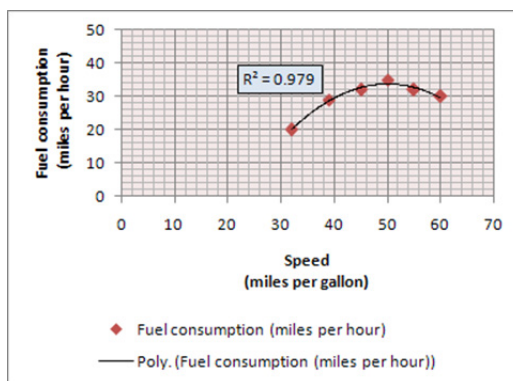


## Trendlines, continued

### Polynomial Trendlines

A polynomial trendline is a curved line that is used when data fluctuates. It is useful, for example, for analyzing gains and losses over a large data set. The order of the polynomial can be determined by the number of fluctuations in the data or by how many bends (hills and valleys) appear in the curve. An Order 2 polynomial trendline generally has only one hill or valley. Order 3 generally has one or two hills or valleys. Order 4 generally has up to three hills or valleys.

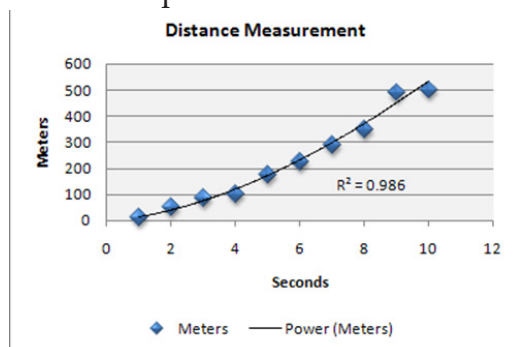
This example shows an Order 2 polynomial trendline (one hill) to illustrate the relationship between driving speed and fuel consumption. Notice that the R-squared value is 0.979, which is a good fit of the line to the data.



### Power Trendlines

A power trendline is a curved line that is used with data sets that compare measurements that increase at a specific rate — for example, the acceleration of a race car at 1-second intervals. You cannot create a power trendline if your data contains zero or negative values.

In this example, acceleration data is shown by plotting distance in meters by seconds. The power trendline clearly demonstrates the increasing acceleration. Note that the R-squared value is 0.986, which is an almost perfect fit of the line to the data.

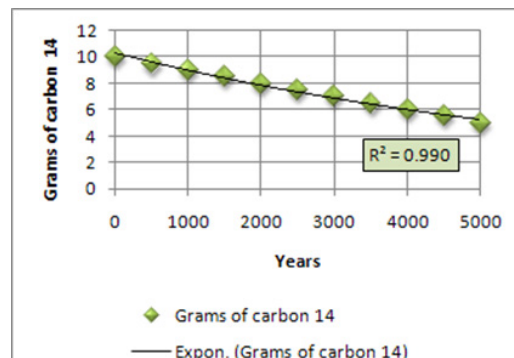


## Trendlines, continued

### Exponential Trendlines

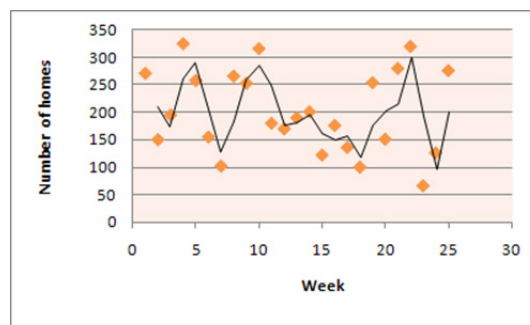
An exponential trendline is a curved line that is used when data values rise or fall at constantly increasing rates. You cannot create an exponential trendline if your data contains zero or negative values.

In this example, an exponential trendline is used to illustrate the decreasing amount of carbon 14 in an object as it ages. Note that the R-squared value is 0.990, which means that the line fits the data almost perfectly.



### Moving Average Trendlines

A moving average trendline smooths out fluctuations in data to show a pattern or trend more clearly. A moving average uses a specific number of data points (set by the Period option), averages them, and uses the average value as a point in the line. For example, if Period is set to 2, the average of the first two data points is used as the first point in the moving average trendline. The average of the second and third data points is used as the second point in the trendline, etc.



In this example, a moving average trendline shows a pattern in number of homes sold over a 26-week period.





## Trendlines, continued

### Note

You can also use the new [Add Chart Element] button to the right of chart or right click the data series to add trendlines.

### Note

You can right-click the Trendline and choose *Format Trendline* from the menu to open the *Format Trendline* pane.

## Creating and Formatting Trendlines

- ◆ Create your Chart.
- ◆ Select the series of data you want to plot a Trendline on.
- ◆ Navigate to the *Chart Tool's Design Tab* in the **Chart Layouts Group**, click the **[Add Chart Element]** button drop-down and select the desired **[Trendline]**.
- ◆ Continuing to select Trendlines this way will add more trendlines. Choosing **[None]** in the Trendline menu will clear all Trendlines.

## Customizing Trendlines

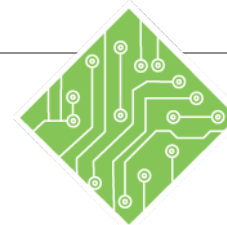
If you do not want the default settings, you can create a Trendline with your own settings.

- ◆ Create your Chart. Select the series of data you want to plot a trendline along. The contextual tabs should be displayed.
- ◆ On the *Design Tab*, locate the **Chart Layouts Group** and click the **[Add Chart Element]** button.
- ◆ From the drop-down, select **[Trendline]**, *More Trendline Options* (Located at the bottom of the drop-down list.)
- ◆ In the **Trend/Regression Type** section of the *Format Trendline* pane, choose a trendline.
- ◆ Check the **Trendline Name** section to make sure the name for your trendline is correct - if not, select the **Custom** option and in the *Custom Text box* type a name.
- ◆ In the **Forecast** section, use the **Forward** and **Backward** text boxes to specify how far ahead and how far behind you want to forecast and estimate respectively.
- ◆ Under **Format Trendline** in the Fill and Polygon Icons, choose options for line color, line style, shadow styles and glow effects.
- ◆ Click **[Close Icon]** (x) to close the pane.





### Action 3.2 - Adding Trendlines



#### Instructions:

1. **MyAdvancedCharts.xlsx** file should still be open.
2. Activate the *Trendlines* sheet.
3. Select the first data series in the chart.
4. On the *Design Tab* in the **Chart Design Group**, and click the **[Add Chart Element]** button drop-down and choose *Trendline, More Trendline Options....*
5. Choose the *Logarithmic Trendline* option.
6. Click the *Fill & Line* category under **Trendline Options** and choose *Solid* from the **Line** choices.
7. In the **Width** text box on the right side of the window, set the width to 1.5.
8. Click the **[Close]** button to the pane.
9. Click into a blank area of the **chart**.
10. Repeat steps 4 and 5 to add a second trend line.
11. Choose the *QTR 2* series and click **[OK]**.
12. Right-click the new trendline and choose *Format Trendline* from the menu.
13. Choose the *Logarithmic Trendline* option in the *Format Trendline Pane*.

#### Results/ Comments:

If not, re-open the file from the data files folder.

Click the sheet tab at the bottom of the spreadsheet.

Click the blue data bar to make it active.

The *Format Trendline* pane is displayed, showing the list of Trendline types and formatting controls.

The Trendline changes from a straight line to a curved line.

The color of the line changes to blue. You can change to color if you like.

The thickness of the line is doubled, making it easier to see.

The *Format Trendline* pane closes.

To deselect the trendline.

The *Add Trendline* dialog opens, displaying a list of all the data series in the chart.

A new Linear Trendline is added to the second data series in the chart.

The *Format Trendline* pane opens.

The Trendline changes from a straight line to a curved line.



**Instructions:**

14. Click the **Fill & Line** category under **Trendline Options** and choose *Solid line*. From the *Color* drop-down choose the *Dark Red* option.
15. In the **Width** textbox on the right side of the window and change the width to 1.5.
16. Click the **[Close]** button on the pane.
17. Repeat steps 10 through 16 to add Trendlines to the data series QTR 3 and then for QTR 4.
18. Click into a blank area of the chart.
19. Select and right-click the first trendline and choose *Format Trendline*.
20. In the *Format Trendline* pane locate the **Forecast Group**, set the **Forward** field value to 2 and click the **[Close]** button.
21. Save the file and leave it open.

**Results/ Comments:**

The color of the line changes to Dark Red.

The thickness of the line is doubled, making it easier to see.

The pane closes.

You have added a trendline for each data series in the chart. Set the colors of the lines to the same color as the data series.

To deselect all trendlines.

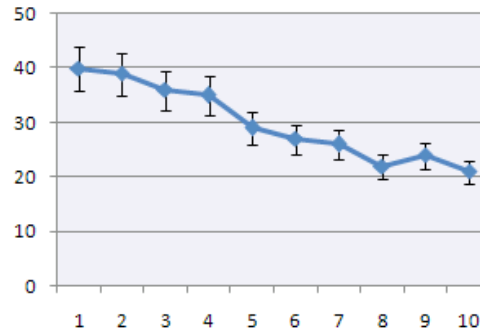
The *Format Trendline* pane opens.

The trendline now extents into two blank newly add years of the chart to predict possible future trends based on the current data of that data series.

**[CTRL + S].**

## Error Bars

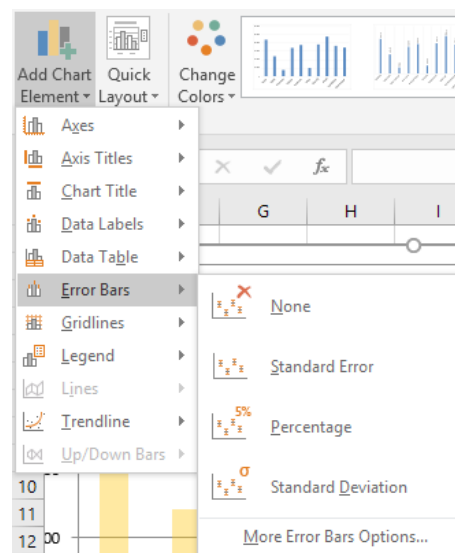
Error bars are used to express potential error amounts that are graphically relative to each data point or data marker in a data series. For example, you could show 5 percent positive and negative potential error amounts in the results of a scientific experiment:



### Add Error Bars

Error bars can be added to all the data series or to individual data series in 2-D area, bar, column, line, xy (scatter), or bubble charts:

- ◆ To add error bars to all data series in the chart, click the chart area.
- ◆ Click the **Design Tab**. In the **Chart Layouts Group**, click on the **[Add Chart Element]** button.



- ◆ Mouse-over *Error Bars* on the menu.
- ◆ From the Sub-menu, select a predefined error bar option, such as *Standard Error*, *Percentage*, or *Standard Deviation*.



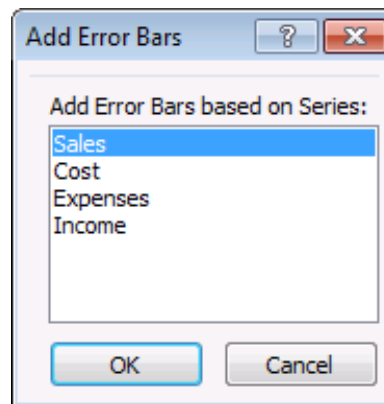
## Error Bars, continued

### To add error bars to a selected data point or data series

- ❖ Click the data point or data series.
- ❖ Select the *Design Tab* and from the **Chart Layouts Group**, click [Add Chart Element] button.
- ❖ Mouse-over *Error Bars* in the menu and click a predefined error bar option, such as *Standard*, *Percentage*, or *Standard Deviation* from the sub-menu.

- OR -

- ❖ Click the chart area to make sure no data points are selected.
- ❖ Select the *Design Tab* and from the **Chart Layouts Group**, click [Add Chart Element] button.
- ❖ Select *Error Bars* and from the sub-menu, select *More Error Bars Options*.
- ❖ The **Add Error Bar** dialog will be displayed. Choose the desired data series you want to use.



- ❖ The Error Bars are added to the Data Series selected. The dialog closes and the *Format Error Bars* pane is displayed.

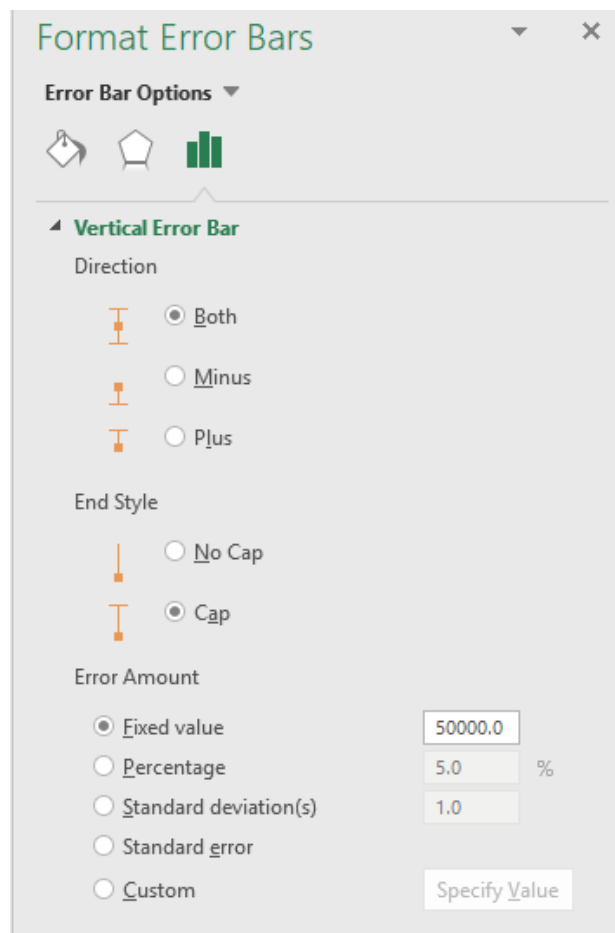


## Error Bars, continued

### Modifying the Error Bar

You are able to modify the error amount, display, and formatting of error bars.

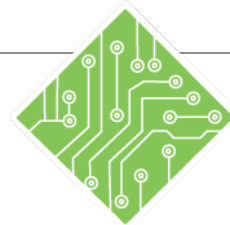
- ◆ Select the error bar and *right-click* the mouse.
- ◆ Choose *Format Error Bars* from the menu. You can also select the **Design Tab**, click the **[Add Chart Element]** Button and select *More Error Bar Options....*
- ◆ The *Format Error Bars* pane will be displayed.
- ◆ Make selections for Direction, End Style and Error Amount.



### Removing Error Bars

To remove error bars select the error bar and press the **[Delete]** key or from the **Error Bars** sub-menu choose *None*.

### Action 3.3 - Adding Error Bars



#### Instructions:

1. **MyAdvancedCharts.xlsx** file should still be open.
2. Activate the *Error Bars* sheet.
3. Select the chart.
4. Select the *Design Tab* and from the **Chart Layouts Group**, click **[Add Chart Element]** button.
5. Mouse-over *Error Bars* in the menu and choose *Standard Error*.
6. Right-click one of the Error Bars and choose *Format Error Bar...* from the menu.
7. In the **Error Amount Group** of options click the radio button for *Percentage* and set the value to *10*.
8. Click the *Fill & Line* category at the top of the pane and set the width to *1.5*.
9. Click the **[Close]** button for the pane.
10. Save the file and keep it open.

#### Results/ Comments:

If not, re-open the file from the data files folder.

Click the sheet tab at the bottom of the spreadsheet.

Click on the chart to make it active. Once active, the *Chart Tools Tabs* are displayed on the ribbon.

To display a menu of choices.

The Error Bars are added to each data point in the chart.

The *Format Error Bars* pane opens displaying the *Vertical Error Bar* category.

You are changing the error margin to a set value of your choosing. Note the length of the Error Bar is increased.

The Error Bars are now thicker and more easily viewed.

All the changes to the Error Bars are applied.

**[CTRL S]**.

## Combination Charts

Combination charts combine two or more chart types within a single chart, emphasizing relationships in information. By combining chart types and using secondary axis's will create visuals which make understanding data much easier.

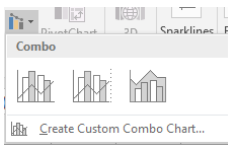
When the range of values for different data series in the chart varies widely, or when you have mixed types of data, you can plot one or more data series from a different chart type on a secondary vertical (value) axis.

### Create a Combination Chart

You can make combination charts with Column and Line, Column and Area, Bar and Area, and Bar and Line to name a few but the way the data is arranged plays a big role in the ability to create combination charts. The following instructions are for combining a Column and Line chart.

#### Note

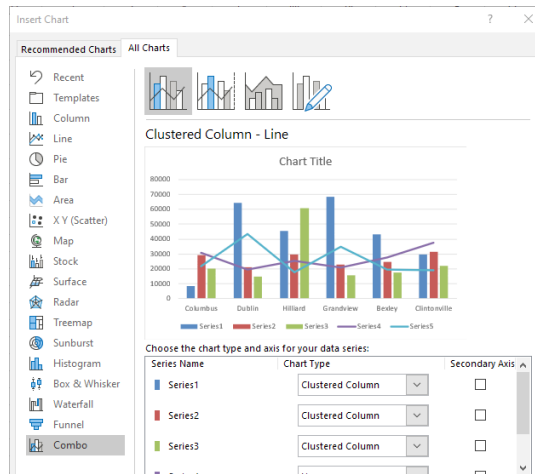
If your chart is not already created, you can simply highlight your data and select the **Insert Tab**, and click the drop-down for the **[Insert Combo Chart]** button and make desired selection



#### Note

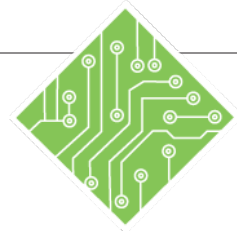
The Secondary Axis can be added after the chart is created using **Format Tab, Current Selection Group, [Format Selection]** to display the Format Data Series Pane.

- ❖ Select the Chart to change into a combination chart.
- ❖ Click the **Design Tab** and from the **Type Group**. Click the **[Change Chart Type]** button.



- ❖ Choose **Combo** from the list of chart types and choose the type desired (Clustered Column - Line, Clustered Column - Line on Secondary Axis, Stacked Area - Clustered Column or Custom Combination).
- ❖ At the bottom of the dialog, select the Chart Type for each Series and choose if you want a series to be the Secondary Axis.
- ❖ Click **[OK]**.

### Action 3.4 - Combining Charts



#### Instructions:

1. MyAdvancedCharts.xlsx file should still be open.
2. Activate the *Combination Chart* sheet.
3. Select the first chart.
4. Click the **[Change Chart Type]** button in the **Type Group** on the *Design Tab*.
5. Choose the *Combo* from the list of charts.
6. Select the second type of combination chart from the top of *Change Chart Type* dialog.
7. Change the **Chart Type** field of the *Homes Sold* data set.
8. Set the *Homes Sold* chart type to *Clustered Column*, the *Average Price* chart type as *Line*, and click the **[OK]** button.
9. Click the **[Chart Elements]** button, scroll down to *Axis Titles*, expand the set of options, and check both *Primary* and *Secondary Vertical* checkboxes.
10. Right-click the right side axis and choose *Format Axis...* from the menu.
11. In the *Axis Options* settings, set the **Display units** field to *Thousands*.
12. Expand the *Number* formatting controls.

#### Results/ Comments:

If not, re-open the file from the data files folder.

Click the sheet tab at the bottom of the spreadsheet.

The red bars represent Average Price, this is the data series that will be plotted as a Line Chart on a secondary axis.

The *Change Chart Type* dialog opens. Right-clicking the chart also offers the *Change Chart Type* option.

Custom Combination chart controls are displayed.

The *Average Price* data set chart type is set as a *Line* chart and placed on a secondary axis.

The preview shows how those changes will be represented in the chart.

The chart is converted.

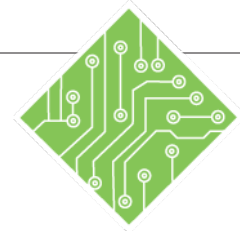
As the options are checked on, the object is added to the chart.

The *Format* pane opens.

The word Thousands is added beside the axis values, helping better define the data on displayed on this axis.

Located at the bottom of the *Axis Options* list of controls in the *Format* pane.





#### Instructions:

13. Set the **Category** field to *Currency* and Set the **Decimal places** field to 0.
14. Select the right side axis title object and replace the existing text with:  
**Average Price.**
15. Change the font color to a similar orange as the data series.
16. Select the left axis title, replace the existing text with:  
**Homes Sold.**
17. Change the font color to a similar blue as the data series.
18. Click the **[Chart Elements]** button, uncheck the *Legend* checkbox.
19. Close the *Format* pane.
20. Save the file.

#### Results/ Comments:

The Axis now displays the values as currency, adding further clarity to the chart.

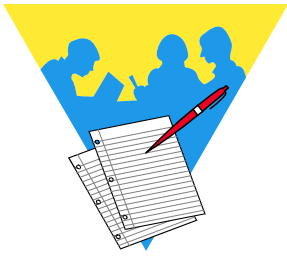
The secondary axis is now descriptively titled.

With the object selected, go to the *Home Tab* and use the **[Font Color]** button to make changes.

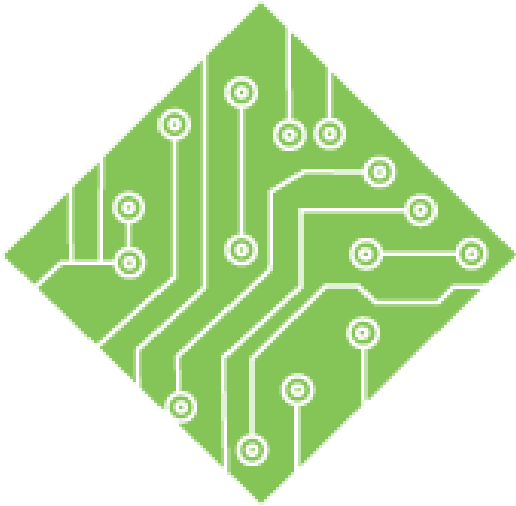
The primary axis is now descriptively titled.

The legend is remove from the chart.

**[CTRL + S].**



## Tips and Notes

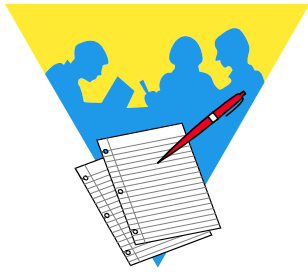


# Appendix A: Gauge Charts

## Lesson Overview

You will cover the following concepts in this chapter:

- ◆ Gauge Chart



## Lesson Notes

## Gauge Chart

Gauge charts or speedometer charts creating by combining a Doughnut chart and a Pie chart in a single chart. They require two separate data sets, the first will be used by the doughnut chart while the second is used for the pie chart on a second axis.

The first data set's values should total 360, this represents the 360 degrees of a circle. The last value in this set should be 180, this represents the bottom half of the doughnut chart which has no fill, giving the impression the doughnut chart is in fact a half circle dial face. The first value should be 0, as the starting point of the dial. The remaining values are used to break the dial into whatever sections the dial is to display.

The second data set will also involve a 360 value to location the dial pointer. This requires three values:

- ◆ First is the value you want represented by the pointer.
- ◆ Second is used to determine the width of the pointer (1 equals 1 degree of width).
- ◆ Third is used to establish the location of the pointer.  
Consider using the formula:  
**=360-(first value + second value).**

Gauge Ranges	Dial Values	Needle Location	
Dial Colors			
Red	15	35	Data point value
Orange	25	1	size of pointer
Yellow	53	324	location of pointer
Green	87		
bottom half of doughnut	180		
Total Degrees	360		

The dial color values should total 360 with the final value being 180. The final value uses no fill which creates the illusion of a half circle dial.

The location of point cell uses the formula  
**=360-(Pointer range cell + size of pointer cell)**  
The data point value cell can be a link to another cell containing an actual value.

Both charts will require some simple modifications to give the look of a dial gauge. Text elements defining the gauge ranges or other information you may want to add to the chart will be done by inserting text-boxes.

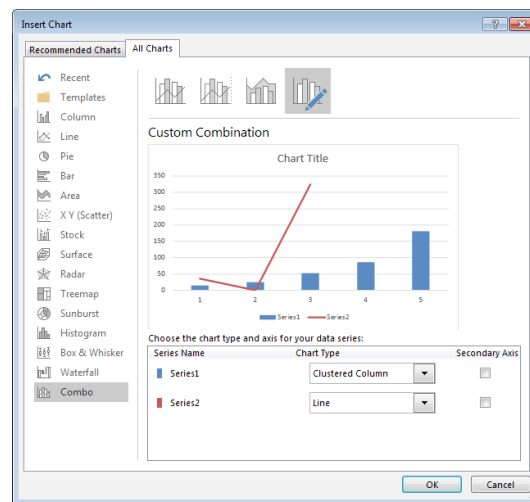
## Gauge Chart, continued

### Creating Gauge Charts

- ◆ Create the data set to represent the scale needed in the gauge face of the chart.
- ◆ Create the data set used to place the point on the gauge face.
- ◆ Select the numeric values of the first data set, no text values. These data sets can be beside each other or use the [Ctrl] to select in a noncontinuous manner.
- ◆ On the **Insert Tab** in the **Charts Group**, click the **[Combo Charts]** button drop-down and choose *Create Custom Combo Chart....*



- ◆ In the *Insert Chart* dialog:

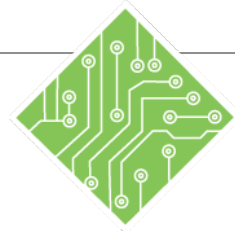


- ◆ Set the **Series1** chart type to *Doughnut*.
- ◆ Set the **Series2** chart type to *Pie* and click the **Secondary Axis** checkbox
- ◆ Click the [OK] button.
- ◆ Use the **[Chart Element]** button to remove the *Chart Title*, *Legend*, or any other chart elements by unchecking them.
- ◆ Right-click on the chart and choose *Format Chart Area* from the menu.

## Gauge Chart, continued

- ◆ Click the drop-down for *Chart Options* and choose the *Serie2* option, if necessary click the [Series Options] button.
- ◆ Set the **Angle of the first slice** to 270.
- ◆ Click the [Fill & Line] button in the *Format* pane.
- ◆ Click the large green data point and set the **Fill** to *None*. Use your right arrow key to move to the next data point of the pie chart and set the **Fill** to *None*. Use the Right Arrow key again to select the pointer data point and set the **Fill** to *Black*.
- ◆ Click the drop-down for *Chart Options* and choose the *Serie1* option, if necessary click the [Series Options] button.
- ◆ Set the **Angle of the first slice** to 270.
- ◆ Click the [Fill & Line] button in the *Format* pane.
- ◆ Click on the bottom slice of the doughnut and set the **Fill** category to *None*. Use your right arrow key to move to the next data point of the pie chart and set the **Fill** to *Solid fill* then use the color picker to assign the desired color. Keep using the Arrow key to move from one data point to the next until all the data points are formatted.
- ◆ Add text-boxes to define the gauge value ranges, if needed.
- ◆ Change the value of cell C3, the pointer value cell, to change the position of the dial.

### Action 3.5 - Creating a Gauge Chart



#### Instructions:

1. Select the *Gauge Chart sheet*.
2. Select the cells **B3:C7**.
3. On the Insert Tab, in the **Charts Group**, click the **[Combo Chart]** button drop-down and choose *Create Custom Combo Chart...*
4. Set the **Series1** chart type to *Doughnut*, set the **Series2** chart type to *Pie*, set the **Secondary Axis** checkbox check to *Series2* and click the **[OK]** button.
5. Click the **[Chart Elements]** button to the right of the chart.
6. Uncheck any actively checked checkboxes and click the **[Chart Elements]** button again.
7. Right-click in the chart area and choose *Format Chart Area* or whatever *Format* option is available.
8. Click the drop-down below the pane title and choose *Series 1* from the menu.
9. Click the **[Series Options]** button and set the **Angle of first slice** field to **270**.
10. Select the green data point and click the **[Fill & Line]** button.

#### Results/ Comments:

In this data set, the Doughnut series has 5 data points and the Pie series has 3 data points.

The *Insert Chart* dialog opens.

There should be a check in the **Secondary Axis** checkbox, you may have to click it twice. The Pie Chart is displayed above the Doughnut Chart and you are ready to begin formatting the charts.

The list of active and available elements are displayed.

All the chart elements are removed and the list of elements is collapsed.

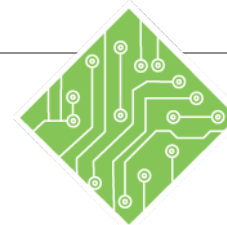
The *Format* pane opens

The options for Series 2 ( the Pie Chart) are displayed.

The chart is rotated 270°.

The **Fill & Line** options are displayed in the *Format* pane.





### Instructions:

11. Set the *Fill* to *None*, select the next data point of the pie chart and set the *Fill* to *None*. Set the next data point and set the fill to Black.
12. Click the drop-down below the pane title and choose *Series 1* from the menu.
13. Click the **[Series Options]** button and set the **Angle of first slice** field to **270**.
14. Select the large blue bottom data point and click the **[Fill & Line]** button.
15. Set the *Fill* to *None*, hold the **[Ctrl]** key and tap the left arrow key to select the next data point of the doughnut; set the fill to *Red* and **[Ctrl arrow]** key over to the next data point; set the fill to *Orange* and **[Ctrl arrow]** key over to the next data point; set the fill to *Yellow* and **[Ctrl arrow]** key over to the next data point; set the fill to *Green*.
16. Change the value in cell **C3** to **120**.
17. Save and close the file.

### Results/ Comments:

The only part of the Pie Chart still visible is the pointer. If you can not click to select the data point use the **[Ctrl]** key and tap the left or right arrow key to change the selection.

The options for Series 1 ( the Doughnut Chart) are displayed.

The chart is rotated 270°.

Use the **[Ctrl arrow]** keys to select the next part to modify.

The visible part of the Doughnut Chart is formatted. \*If you end up re-selecting the Pie chart, hold the **[Ctrl]** key down and tap the left and right arrow keys to change selection.

As the pointer value cells' value is changed, the pointer moves along the chart.

**[Ctrl + S]** and **[Ctrl + W]**.

Excel Level 1	L-1
Excel Level 2	L-2
Excel Level 3	L-3
Excel Formulas	FM
Excel Data Analysis	DA
Excel Charts	CH
Excel PivotTables	PT
Excel Data Analysis with PowerPivot	PPT

# MICROSOFT OFFICE EXCEL ASSOCIATE EXAM MO-200

## *Import data into workbooks*

Import data from .txt file	DA
Import data from .csv files	DA

## *Navigate within workbooks*

Search for data within a workbook	L-1
Navigate to named cells, ranges, or workbook elements	L-2
Insert and remove hyperlinks	L-3

## *Format worksheets and workbooks*

Modify page setup	L-1
Adjust row height and column width	L-1
Customize headers and footers	L-1

## *Customize options and views*

Customize the Quick Access toolbar	L-1
Display and modify workbook content in different views	L-2
Freeze worksheet rows and columns	L-2
Change window views	L-2
Modify basic workbook properties	L-2
Display formulas	L-1

## *Configure content for collaboration*

Set a print area	L-1
Save workbooks in alternative file formats	L-1
Configure print settings	L-1
Inspect workbooks for issues	L-1

## TCW BOOK CODES

Excel Level 1	L-1
Excel Level 2	L-2
Excel Level 3	L-3
Excel Formulas	FM
Excel Data Analysis	DA
Excel Charts	CH
Excel PivotTables	PT
Excel Data Analysis with PowerPivot	PPT

### ***Manipulate data in worksheets***

Paste data by using special paste options	L-1
Fill cells by using Auto Fill	L-1
Insert and delete multiple columns or rows	L-1
Insert and delete cells	L-1

### ***Format cells and ranges***

Merge and unmerge cells	L-1
Modify cell alignment, orientation, and indentation	L-1
Format cells by using Format Painter	L-1
Wrap text within cells	L-1
Apply number formats	L-1
Apply cell formats from the Format Cells dialog box	L-1
Apply cell styles	L-1
Clear cell formatting	L-1

### ***Define and reference named ranges***

Define a named range	L-2 / FM
Name a table	DA

### ***Summarize data visually***

Insert Sparklines	L-2
Apply built-in conditional formatting	L-2
Remove conditional formatting	L-2

### ***Create and format tables***

Create Excel tables from cell ranges	L-2
Apply table styles	L-2
Convert tables to cell ranges	L-2

### ***Modify tables***

Add or remove table rows and columns	L-2
Configure table style options	L-2
Insert and configure total rows	L-2

## TCW BOOK CODES

Excel Level 1	L-1
Excel Level 2	L-2
Excel Level 3	L-3
Excel Formulas	FM
Excel Data Analysis	DA
Excel Charts	CH
Excel PivotTables	PT
Excel Data Analysis with PowerPivot	PPT

### ***Filter and sort table data***

Filter records	L-2
Sort data by multiple columns	L-2

### ***Insert references***

Insert relative, absolute, and mixed references	L-1
Reference named ranges and named tables in formulas	L-2

### ***Calculate and transform datas***

Perform calculations by using the AVERAGE(), MAX(), MIN(), and SUM() functions	L-1
Count cells by using the COUNT(), COUNTA(), and COUNTBLANK() functions	DA
Perform conditional operations by using the IF() function	FM

### ***Format and modify text***

Format text by using RIGHT(), LEFT(), and MID() functions	DA
Format text by using UPPER(), LOWER(), and LEN() functions	DA
Format text by using the CONCAT() and TEXTJOIN() functions	DA

### ***Create charts***

Create charts	L-2 / CH
Create chart sheets	L-2 / CH

### ***Modify charts***

Add data series to charts	L-2 / CH
Switch between rows and columns in source data	L-2 / CH
Add and modify chart elements	L-2 / CH

### ***Format charts***

Apply chart layouts	L-2 / CH
Apply chart styles	L-2 / CH
Add alternative text to charts for accessibility	L-2 / CH

# MICROSOFT OFFICE EXCEL EXPERT EXAM MO-201

Excel Level 1	L-1
Excel Level 2	L-2
Excel Level 3	L-3
Excel Formulas	FM
Excel Data Analysis	DA
Excel Charts	CH
Excel PivotTables	PT
Excel Data Analysis with PowerPivot	PPT

## *Manage workbooks*

Copy macros between workbooks	L-3
Reference data in other workbooks	L-3
Enable macros in a workbook	L-3
Manage workbook versions	L-2

## *Prepare workbooks for collaboration*

Restrict editing	L-2
Protect worksheets and cell ranges	L-2
Protect workbook structure	L-2
Configure formula calculation options	FM
Manage comments	L-2

## *Use and configure language options*

Configure editing and display languages	L-1
Use language-specific features	L-1

## *Fill cells based on existing data*

Fill cells by using Flash Fill	L-1
Fill cells by using advanced Fill Series options	L-2

## *Format and validate data*

Create custom number formats	L-1
Configure data validation	L-3 / FM
Group and ungroup data	L-3
Calculate data by inserting subtotals and totals	L-3
Remove duplicate records	DA

## TCW BOOK CODES

Excel Level 1	L-1
Excel Level 2	L-2
Excel Level 3	L-3
Excel Formulas	FM
Excel Data Analysis	DA
Excel Charts	CH
Excel PivotTables	PT
Excel Data Analysis with PowerPivot	PPT

### *Apply advanced conditional formatting and filtering*

Create custom conditional formatting rules	L-2
Create conditional formatting rules that use formulas	L-2
Manage conditional formatting rules	L-2

### *Perform logical operations in formulas*

Perform logical operations by using nested functions including the IF(), IFS(), SWITCH(),	FM
SUMIF(), AVERAGEIF(), COUNTIF(), SUMIFS(), AVERAGEIFS(), COUNTIFS(), MAXIFS(),	FM
MINIFS(), AND(), OR(), and NOT() functions	FM

### *Look up data by using functions*

Look up data by using the VLOOKUP(), HLOOKUP(), MATCH(), and INDEX() functions	FM
--	----

### *Use advanced date and time functions*

Reference date and time by using the NOW() and TODAY() functions	FM
Calculate dates by using the WEEKDAY() and WORKDAY() functions	FM

### *Perform data analysis*

Summarize data from multiple ranges by using the Consolidate feature	L-3
Perform what-if analysis by using Goal Seek and Scenario Manager	L-3
Forecast data by using the AND(), IF(), and NPER() functions	FM
Calculate financial data by using the PMT() function	FM

## TCW BOOK CODES

Excel Level 1	L-1
Excel Level 2	L-2
Excel Level 3	L-3
Excel Formulas	FM
Excel Data Analysis	DA
Excel Charts	CH
Excel PivotTables	PT
Excel Data Analysis with PowerPivot	PPT

### ***Troubleshoot formulas***

Trace precedence and dependence	FM
Monitor cells and formulas by using the Watch Window	FM
Validate formulas by using error checking rules	FM
Evaluate formulas	FM

### ***Create and modify simple macros***

Record simple macros	L-3
Name simple macros	L-3
Edit simple macros	L-3

### ***Create and modify advanced charts***

Create and modify dual axis charts	CH
Create and modify charts including Box & Whisker, Combo, Funnel, Histogram, Map, Sunburst, and Waterfall charts	CH

### ***Create and modify PivotTables***

Create PivotTables	PT
Modify field selections and options	PT
Create slicers	PT
Group PivotTable data	PT
Add calculated fields	PT
Format data	PT

### ***Create and modify PivotCharts***

Create PivotCharts	PT
Manipulate options in existing PivotCharts	PT
Apply styles to PivotCharts	PT
Drill down into PivotChart details	PPT