



University
of Glasgow

Excel 2016 (BSc Med Sci)

V1.0)

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Introduction

It is assumed that you are already familiar with the *Windows* environment and have a basic understanding of *Microsoft Excel*. The course will be based on *MS Excel 2010*.

General benefits to be gained from the course are intended as:

- to acquire the basic skills of using a spreadsheet program.
- gain an awareness of the potential of a spreadsheet functions & charts and for organising data.

Session 1 Course Overview, AutoFill, Use of Functions, Conditional Formula, Charting Data; Evaluating Charts; What-If Analysis: Scenarios, Data Tables and Goal Seeking; Pivot Tables; Search Techniques, Sorting Data; Integrate *Word* and *Excel* files

Assessment *Submission of the course work is usually voluntary but you will find that completion of it will help you understand better the skills taught on the course.*

Sometimes, these units are offered as part of IT induction packages for specific university schools. *In these instances, the school often requires that their students complete and submit the course work for assessment.* If you find you have difficulty in completing any part or parts of the course work tasks, your tutor will give advice and guidance.

Objectives

On successful completion of this course participants will be able to:

- using Autofill for lists and copying data
- use Paste Special features
- use a variety of Functions
- use conditional formulae
- create and edit Charts
- use Scenarios, Data Tables and Goal Seek
- create Pivot Table Reports
- carry out simple searches
- using simple searching and sorting techniques
- exporting Excel files and data
- use the Help facility

Excel 2016 (BSc Med Sci)

Exercise: Preparing Your Practice Files

Before you begin your first tasks you must download and save some files which you will use on this course.

Go to <http://www.gla.ac.uk/services/it/training/courseresources/> and download the file named *excel_workbook.xlsx* (this contains the worksheets: *weather*, *postcode*, *grades*, *products* and *payroll*).

These worksheets will be used for various tasks throughout the course. Save these to your My Documents folder.

1 Using Autofill

a. Basic Usage

When you need to copy data or a formula from one cell into immediately adjoining cells, the quickest and simplest way to do so is to use Autofill.

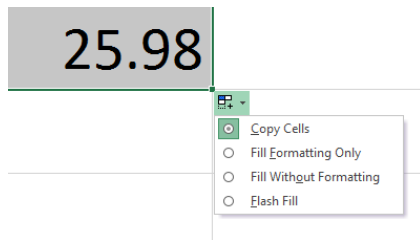
- 1 Move the mouse cursor to the bottom right hand corner of the cell, which you want to copy.
- 2 It will change into a cross-hair icon; then drag down holding the left button pressed, if you wish to copy into a column, or across, if you wish to copy into a row.

C	D	E
Price	Value	
24.99	74.97	
12.99	25.98	

- 3 When you release the mouse, the data (or formula) will be copied into the other cells.
- 4 If a formula is copied over, any cell references will be adjusted to match the relative position of the cell into which it has been copied, *unless* you have made the reference absolute. So if the copied formula refers to data in a cell (or cells) at the top of a column of data, then each copy will refer to the next data cell down from the previous one.

Note: If you double click on the bottom right corner of the cell, the Autofill tool will copy down to the end of your table of data

- 5 When you complete your autofill, there will be a small box (called a smart tag) created, it sits below and to the left of the cells that just copied. Click  if you wish to change the behaviour of the Autofill tool.



Depending on the data that Autofill has copied you will have different options revealed here.

Another useful feature of **Autofill** is that it will recognise simple patterns of data. So, if you typed in two different numbers in adjacent cells, selected them, and then dragged down or along (depending on how the data was arranged: column or row) using **Autofill**, instead of copying the data, it would insert a list of figures which incremented (or decremented, if the second number was smaller than the first) according to the initial difference between the two numbers.

Exercise: Using the Autofill Tool

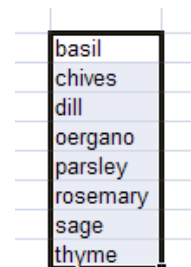
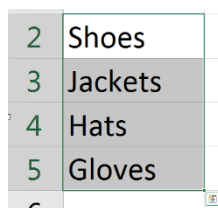
- 1 Open a new workbook in *Excel*, call it **student** and save it to your **My Documents** folder. Type in a number; in the cell below type in another, slightly bigger, number. Using **Autofill**, create a sequential numerical list.
- 2 Now produce 2 lists. One should be a sequence of numbers, which increment by **2** or more steps; the other list should increment by a fraction, e.g. **0.25**. What happens if you use **Autofill** with equivalent numbers; or if one number is negative?
- 3 A few columns along enter a simple formula adding the figure in the first cell of the list you just created to some other numbers (e.g. **C2+7**). Use **Autofill** to copy the formula into the cells below it, then:
 - Reduce the first list by highlighting the area containing the area you wish to amend.
 - Move the mouse pointer to the bottom right hand corner of the highlight, when the pointer will be changed to a black cross.
 - Drag the cross up the column. When you let go the portion, which was “greyed out”, it will disappear.

b. Custom Lists

The **AutoFill** feature can also be applied to data you would normally think of as text, rather than numbers – but the text must have a numerical meaning, e.g. date or time, or a logical order.

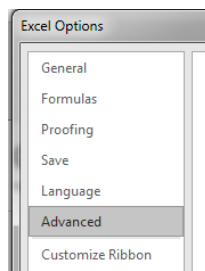
You can create and add new lists of your own.

- 1 Type the list data/text into a column or row and select them.

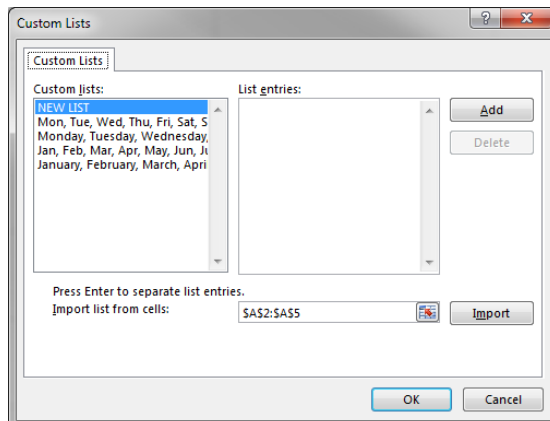


- 2 Then from the **File** tab choose **Options**.

3 Select **Advanced**



4 Scroll down and click the **Edit Custom Lists** button.



The cell references where your list data were entered will appear in the **Import from cells** box.

5 Click the **Import** button and the list will be added.

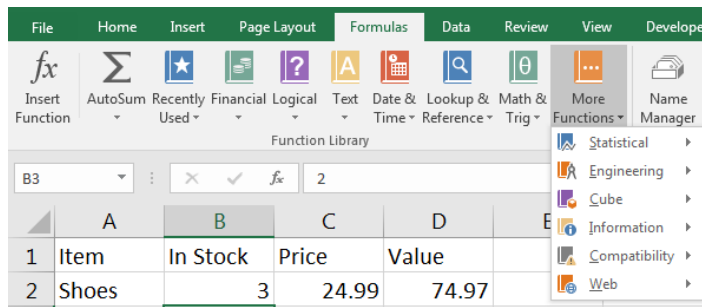
6 You can also simply type in a list in the List Entries window and click the Add button.

Exercise: Using Custom Lists

- 1 Move to a new column; type today's day (example: **Tuesday**). Now use **Autofill** to create a sequence of dates by dragging down with the mouse.
- 2 In a new column enter a list of terms. These should represent a logical sequence (e.g. First, Second, Third...). Select this list then use the **Custom Lists** option to add this list to *Excel's* memory.
- 3 Delete the list column then type in the first term in your new list to the head of a column. Use **Autofill** to enter the list. Save the file and close it.

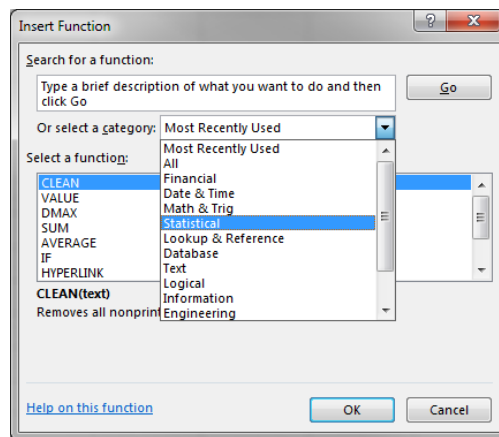
2 Functions

You can use the Function Library group under the Formulas tab to access the full range of *Excel* functions. There are drop down menus here for the various Function categories (e.g. Logical, Text, Math & Trig).



However, if you prefer the traditional dialog box, click on the Insert Function fx button.

This has three elements:



- If you know the name of the function you require, you can search for it. Type in the Search for a function box and then press Go.
- If you know what kind of function you want but can't recall its exact name, look for it by using the Select a category drop-down menu.
- For each category, a list of Functions will appear in the Select a function menu; these are the specific functions which you select.

For example, under Statistical you can find:

MAX is used to find the maximum value of a range of cells, e.g. =MAX(A1:A10)

MIN is used to find the minimum value of a range of cells, e.g. =MIN(A1:A10)

AVERAGE finds the average of values in a range of cells, e.g.
=AVERAGE(A1:A10)

TODAY can be used to insert today's date into the current cell, e.g. =TODAY()

Exercise: Using Statistical Functions

- 1 Open the worksheet **weather**. Select cell **B16** in the worksheet. Now:
- 2 Choose **Function** from the **Insert** menu.
- 3 Select the **Statistical** function **Average** and the cell range **B3 to B14**. *The selected range will appear in the **Number 1** box (**B3:B14**).*
- 4 Click on **OK**.

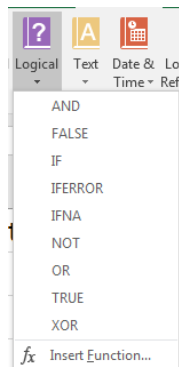
- 5 Repeat the above process to enter the **maximum**, **minimum**, **modal**, and **median** precipitation for the data into cells **B17** to **B20**. Be careful to select the same data column for each. Highlight cells **B16** to **B20**.
- 6 Use **Autofill** to copy the functions in these cells into the equivalent cells in columns **C** to **E**. Select a cell in this range: note how the function now appears in the **Formula bar**.

3 Logical Functions

Most functions display a **Function Arguments** dialog box which allows you to enter or select the data which the functions will operate on. Some also require you to enter options and conditions that will affect the results.

One example of this is with the **Logical** functions. Here the dialog box opens to offer you a choice of conditional operators (e.g. **AND**, **OR**, **IF**, etc.). When **IF** is selected you are then shown a dialogue box into which you enter the logical test and the values resulting depending on whether the condition test returns a **TRUE** or **FALSE** value.

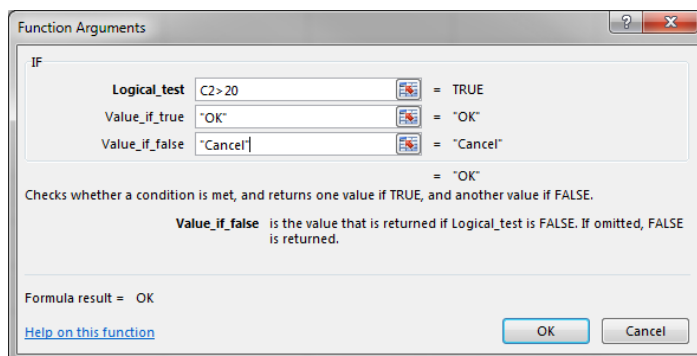
First you select the cell you want the result to appear in



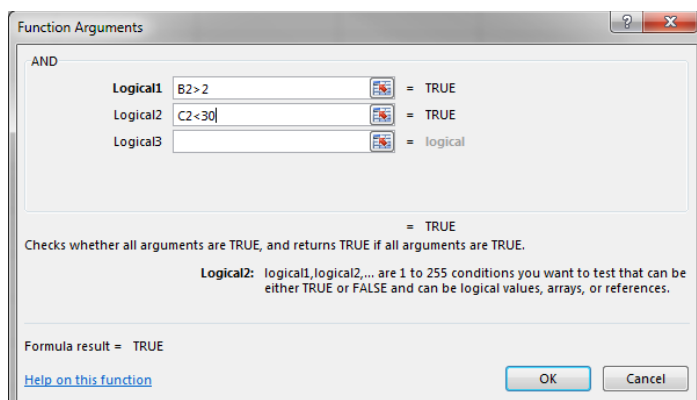
Choose the **Logical** category then the specific **Logical** function (e.g. **IF**, **And**)

In the **Function Arguments** dialog box which opens, enter the logical test (i.e. If a cell's data matches [=] or is greater [>] or less [<] than a particular value).

Then enter what result will appear if the test is true (i.e. is equal to the value you are looking for) and also what result will appear if not true.



The other logical functions are: **AND**; **FALSE**; **NOT**; **OR**; **TRUE**. The most generally useful are **AND** and **OR**.



Note: each time you enter a logical statement (e.g. "C3>=50") and text box for another logical statement will appear. So you can continue entering as many "Anded" statements as you like.

Exercise: Using Logical Functions

- 1 Click on cell **F3**; into this cell we are going to put a conditional formula which will tell us whether the overall month was dry or wet. Choose the **If** conditional function from the **Logical** functions,
- 2 Into the box marked **Logical_test** we need to put the criteria we wish to use for the answer to be true, in this case **B3>2.5**.
- 3 Into the **Value_if_true** box we want to type the word “wet”.
- 4 Into the **Value_if_false** box we need to type “dry”.
- 5 Fill the formula down column **F** using **AutoFill**.
- 6 Put a conditional formula into column **G** to say “*sunny*” if there were more than **4.5** hours of sunshine and “*cloudy*” if there were not.

Exercise: More Logic Functions

- 1 Access the worksheet, **grades**. Enter an **IF** statement in cell **M3** to return **TRUE** if the Average grade is greater or equal to 75% and **FALSE** if it is not. Use **Autofill** to repeat this for the whole column.
Note: make sure you enter TRUE/FALSE exactly as stated in the task and **not**, e.g. “True”/”False”.
- 2 In cell **N3** use **AND** to test whether the student gained at least 50% in all exams. Again repeat this for the whole column.
- 3 In cell **O3** use **AND** to test whether *both* **M3** and **N3** returned TRUE; if they did the value must be TRUE, if not then the value must be FALSE. Again repeat this for the whole column.
- 4 Finally in cell **P3** enter a simple **IF** statement to test if **O3** returned TRUE; if so, then the cell should display “Award”, if not then it displays “Pass”.
- 5 Logical operations are sometimes combined with other functions. In cell **Q3**, enter **COUNTIF** (from the **Statistical** functions) for the range **C3-H3** and set it to count marks greater than **90**. Repeat for the other rows and save the file.

Note tasks the above exercise. These are designed to perform actions which might have been described in words as “Find the students with the very best average grades (i.e. greater than 75%), who also gained more than 50% in each of the exams they sat. Then mark them as being eligible to receive an award.”

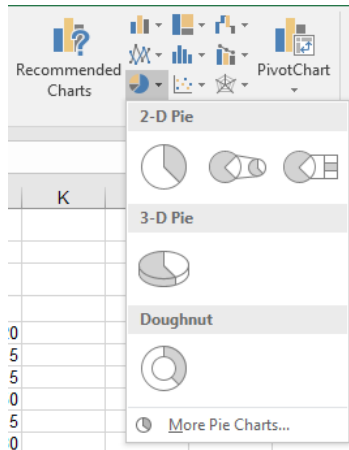
If you had wanted to use a single Boolean statement to perform the basic task behind this, you would have had to create something very complicated with which it would be easy to make mistakes. By breaking the exercise down into a number of simpler tasks things become much easier and errors are less likely.

Of course the above exercise is artificial – there are no ‘fail’ marks – but the *idea* is what is important and this demonstrates how you can use *Excel* logical functions to do quite sophisticated analysis of data.

4 Spreadsheet Charts

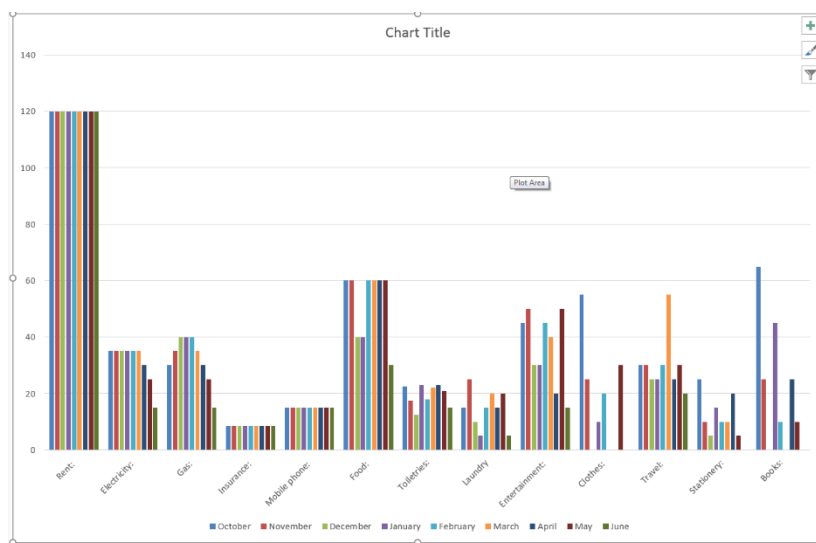
a. Basics

Charts enable you to show data in a graphic format. A chart can be created on a worksheet so that it appears alongside the data it represents, or as a separate worksheet.

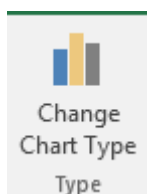


To create a chart using a keyboard shortcut, select the data to be charted and press **F11**.

Creating a chart this way adds a new worksheet to the workbook called **Chart 1**.



The chart that is produced uses all the current defaults. If you haven't changed any of the default settings, the chart you will get by pressing **F11** is a **Column Cluster Chart**.

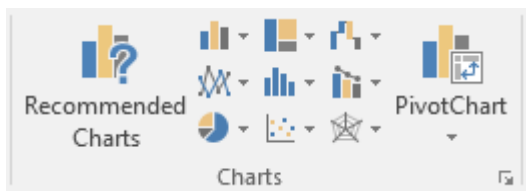


If this isn't the type of chart you want to produce then you need to change the default chart type. To do this, click the **Change Chart Type** button. (When you press **F11**, the new sheet containing the chart opens with **Chart Tools** active – as they are whenever you select a chart).

b. More on Charts

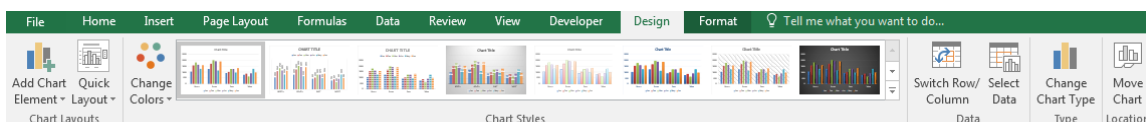
There are two other methods of creating charts, giving immediate access to a range of different chart types.

Select the data to be charted, including row or column headings to be used as labels, and then access the **Charts** group under the **Insert** tab.



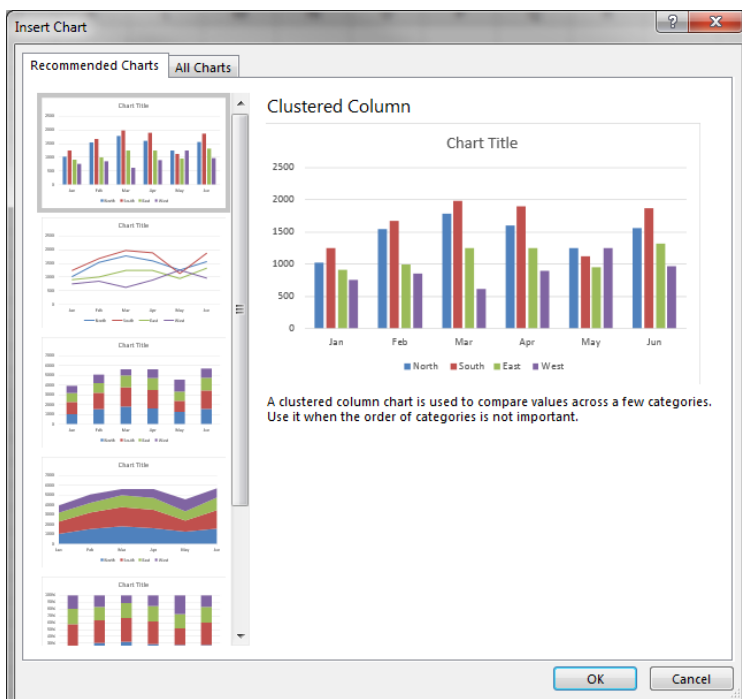
When you have made your selection of the chart options (selecting first general chart type, then subtype from the chosen menu), the chart automatically appears in the same worksheet as the selected data.

At the same time new chart options appear on the Ribbon.



These options affect the way your charts will appear – so you should choose carefully as good choices will make it easier for others to understand what your chart represents.

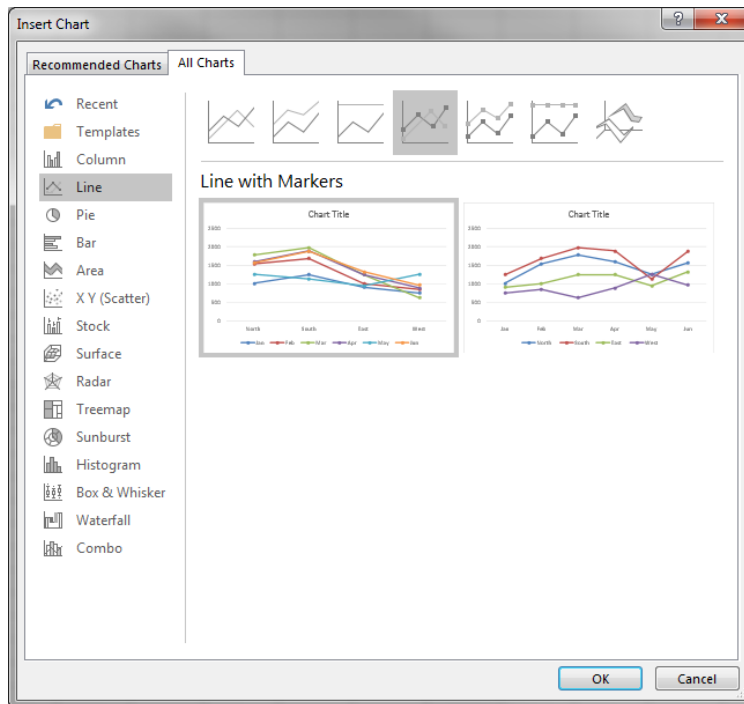
If you prefer the more traditional style of chart selection, use the **Insert Chart**  dialog box. **Note:** unlike the earlier version this dialog box does not allow you to format the layout of charts you choose nor add labels, legends or gridlines. However **Chart Tools** has options that allow you to do this (see below).



The **Insert Chart** dialogue has two tabs that you can choose from, **Recommended charts** and **All Charts**.

Recommended Charts is a feature included in Excel 2013 and Excel 2016. When the tab is selected (or the button from the **Charts** group) Excel will analyse your selected data and present suggestions of charts that may be useful to you. If you see a chart that meets your needs you can select it on the left hand pane and click **OK**.

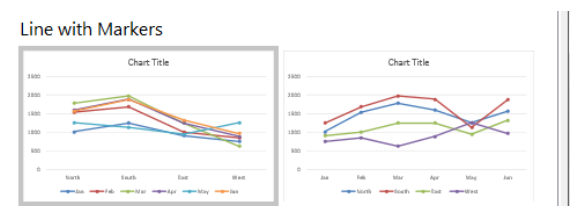
The **All Charts** tab presents options for all the possible charts that are available in Excel, including some that are not available within the ribbon.



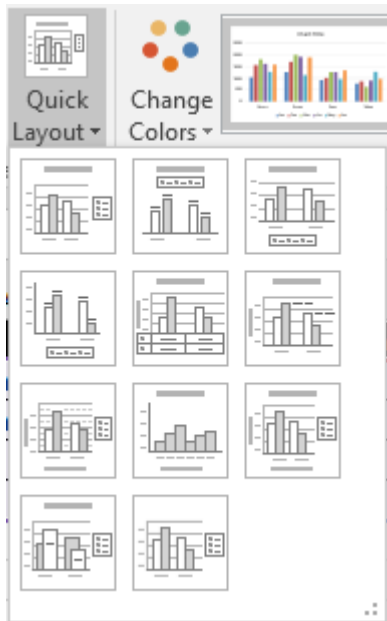
On the right hand side is a pane listing categories of charts.



On the top left is a list of the charts that you can add within the selected category.



Below this is a label to tell you what chart you have selected and then usually additional choices as to the layout that you want for your chart.

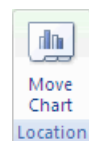


The **Quick Layout** option (under the **Design** tab) allows you to choose different chart designs, for instance, below you see one which displays the data in a table below the chart.

The **Chart Styles** option under the **Design** tab lets you to choose from a variety of colour styles.



Clicking once on a chart selects it and places sizing handles around it so that you can change its location or size on the screen, or delete it if you wish to replace it. You can also move a chart to a separate worksheet via the **Move Chart** button.

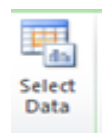


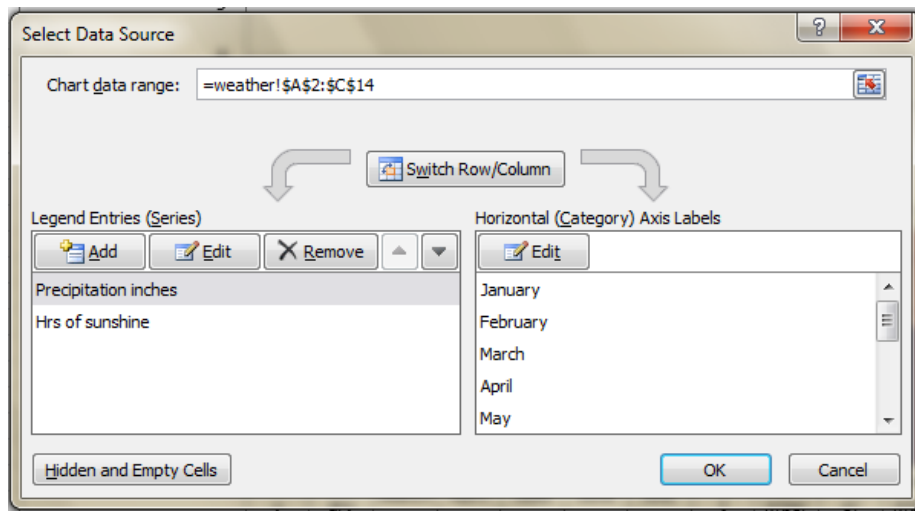
Exercise: Create a Chart

- 1 Go to your **autofill** worksheet in your *Excel* work file. You should now have at least 2 columns of figures in this worksheet. Select two columns and then access the **Chart** group on the **Insert** tab.
- 2 Select the **Column** option then select a **Clustered Column** sub-type.
- 3 All the different chart types (e.g. **Bar**, **Pie**, **Column**, **Scatter**, etc.) available on the Ribbon are seen in the left-hand pane with the sub-types in the main pane accessible for selection.

c. Adding Extra Data to Charts

To add extra data to a chart – or change the data completely –select the chart and then click the **Select Data** button in the **Data** group. This can be useful – e.g. if you create a chart one year, when new data is added for the following year you can select it (using **Ctrl** key if necessary) to show a comparison for the two years.



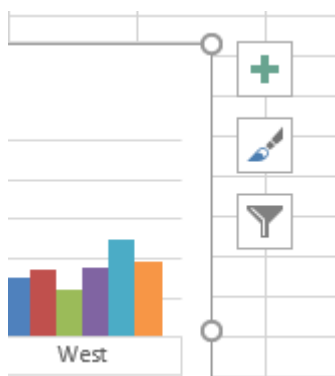


The **Select Data Source** dialog box opens, which displays your selections. You can make a selection by typing in the cell references the **Chart data range** box or by dragging over the data with the mouse.

Exercise: Adding More Data to a Chart

- 1 Go the **Weather** worksheet and select the **A** and **B** columns.
- 2 Now create a simple **Line** style **chart** using this data.
- 3 Move the chart to a separate worksheet.
- 4 Select the chart
- 5 then under **Chart Tools** ➔ **Design** use **Select Data** to extend the data used to include the next column of data (**Hrs of sunshine**).

d. Chart Layout and Format

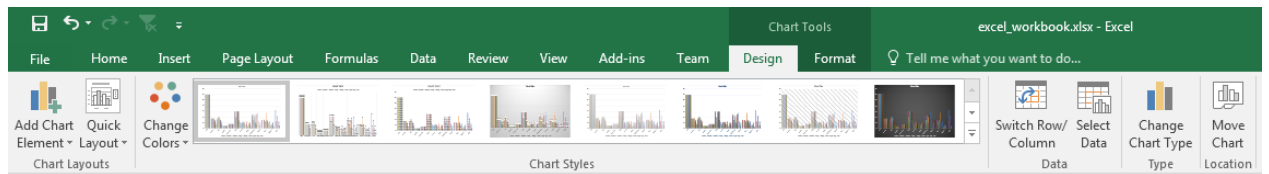


A lot of the editing of the chart can now be done from the chart object itself

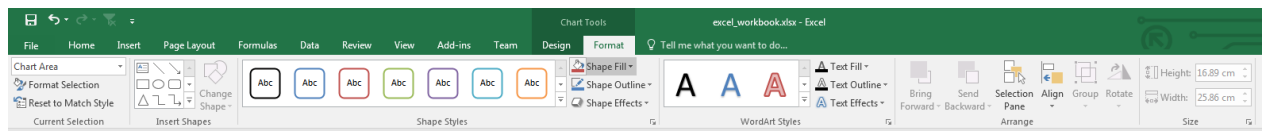
Use the **Chart Elements**, **Chart Styles**, and **Chart Filters** buttons next to the upper-right corner of the chart to add chart elements like axis titles or data labels, to customize the look of your chart, or to change the data that's shown in the chart.

The majority of the elements that you would wish to add to a chart can be done so by clicking on the green plus sign.

As well as using the charts own controls, two ribbons become available when a chart is selected. The Chart Tools ribbons are:



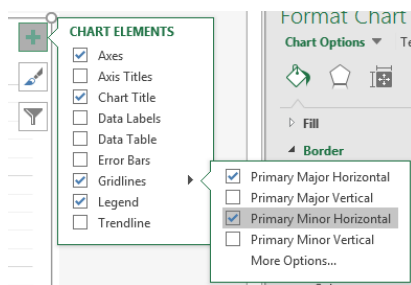
Design: The design ribbon contains tools that allow you to alter the appearance of the overall chart. Chart elements can be added from here, layouts selected and the overall appearance altered by **Chart Styles**. Other tools here allow you to **Select Data** that is used in the creation of the chart as well as **Change Chart Type**.



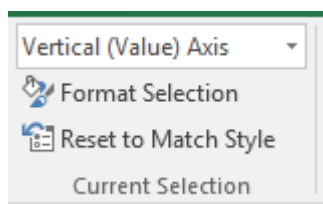
Format: The tools included in the format ribbon are mostly used for altering the appearance of individual objects contained within the chart area.

e. To adjust gridlines

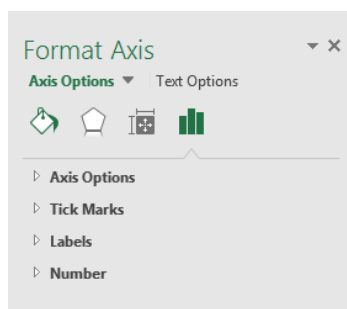
Adjusting the gridlines is done using two sets of tools in Excel 2016. First we create some gridlines and then we modify the units using the Format Axis tool.

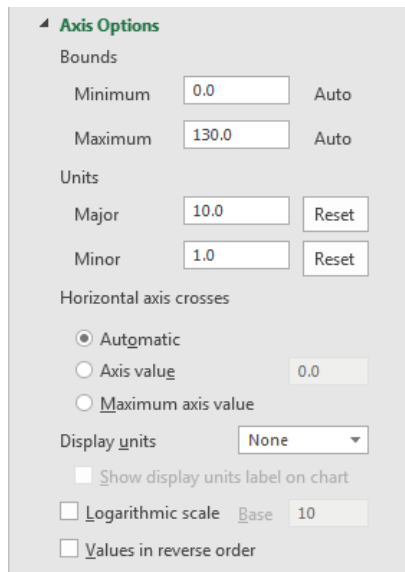


- 1 Click on the **chart elements** control
- 2 Click on the right facing arrow next to the **Gridlines** item
- 3 From the submenu that appears select the types of gridlines that you would like to appear in your chart



- 4 Click on the **Format Tab**
- 5 Under **Current Selection**, select the axis that you need to adjust
- 6 Click **Format Selection**,
- 7 On the right hand side the **Format Axis** pane will appear
- 8 Click the **Axis Options** button if it is not already selected
- 9 Click on the **Axis Options** heading to expand the selection





- 10 To alter the gridlines in your chart adjust the values in the **Major** and **Minor** text boxes to suit your needs

Exercise: Working With Charts

- 1 Add a title to the **Line** chart and add **minor gridlines** for the X and Y axes.
- 2 Select the **month/precipitation** data and create a new chart, but this time select the **Pie Chart** option.
- 3 Select for the chart to appear as an object in a separate worksheet.
- 4 Next select the **Chart Layout** option that will make the chart display values and legend keys (e.g. percentages and labels for each pie “slice”).

Take note: A Pie chart fits onto any page layout whether **Portrait** or **Landscape**, whereas most other formats are best printed in **Landscape** view.

Exercise: Format a Chart

- Select the chart and apply a new chart layout from the **Chart Layout** options under the **Design** tab (under **Chart Tools**) on the Ribbon.
- Apply a new **Chart Style** to the chart: make sure the style doesn’t obscure what the chart represents.

f. What chart type should you use?

Pie charts	are best used to <i>compare parts of a whole</i> ; in other words, they help divide a group into the components that make it up.
Bar charts	work best to emphasize the <i>contrast</i> between different quantities or groups. They give a horizontal display.
Column charts	work well for comparing categories at different times. They are similar to Bar charts except they give a vertical display.
Line charts	best indicate, in continuing sequence of data, the relationship of one variable to another e.g. costs over time.
Scatter charts	display series as a set of points. They are typically used to <i>examine the relationship of one variable to another e.g. height to weight of</i>

many people. Generally, a Scatter chart shows discrete values that don't occur at regular intervals or belong to a series unlike a line chart drawn which usually plots a regular series of points.

Area charts

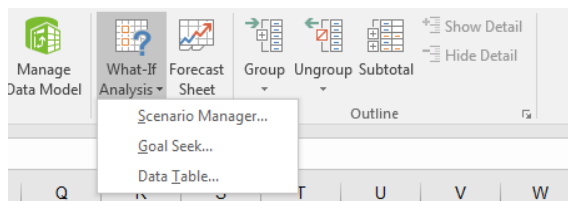
display series as a set of points connected by a line, with all the area filled in below the line. The height of these points is determined by the series value. Area charts *emphasize the magnitude of change over time*.

Charts should be based on appropriate data and should not include ranges of data which are irrelevant to what you are trying to demonstrate. Keep the chart as simple as possible and make sure it is labelled properly. For some charts, e.g. Bar charts, having a proper scale is important (avoid showing one quantity that is drastically larger or smaller than the rest). Here's a quick guide to what you should look out for:

- Appropriate choice of chart type
- Chart has appropriate title
- X and Y axes labelled clearly (where relevant)
- Axes scaled to data
- Legends labelled clearly
- Colours chosen to aid understanding
- Data marks clear
- Overall chart portrays pattern of data
- Clear explanation of reasons for pattern of data
- Grid lines aid chart clarity

5 “What if”: Scenarios, Data Tables and Goal Seeking

Excel can be of particular use in examining various possibilities. Once a model of a system has been set up using a spreadsheet it can then be used for “What-if” analysis. As the name suggests, the user can alter a value on a worksheet to see what effect it has on the rest of the values. *In a What-if analysis, you test values in order to predict results*. This is very useful in complex situations where a change in one value affects several other values.



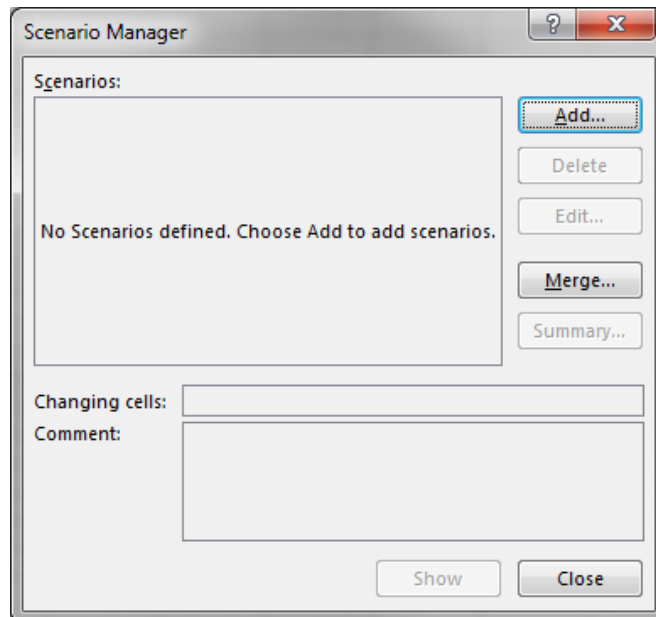
Excel allows you to do this through the **What-If Analysis** menu in the **Forecast** group under the **Data** tab.

Here you see the menu options: **Scenario Manager**, **Goal Seek** and **Data Table**.

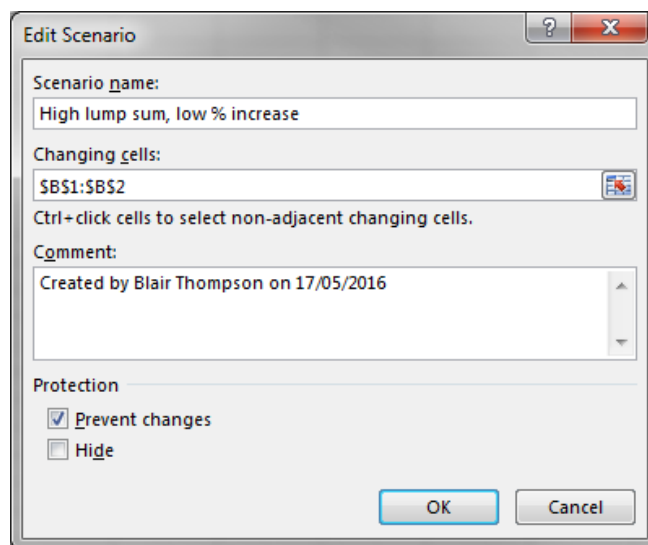
a. Scenarios

Scenarios allow you to try out and record several different sets of figures within a spreadsheet. They are saved with your spreadsheet and can be recalled at will. This allows you to explore different “scenarios” without fear of losing any of the “good answers” that you find.

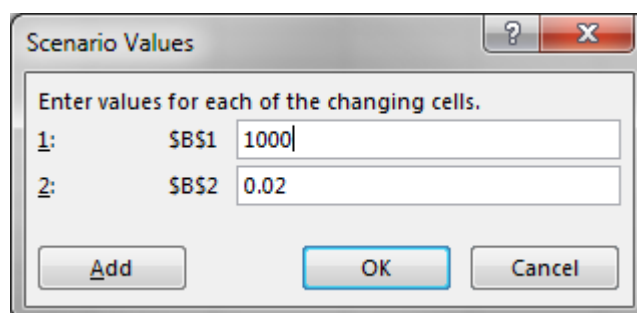
- 1 **Scenario Manager** will open a window which will allow you to create a "scenario" in which you can change data that goes into a formula (or formulas). Click **Add** to create a new scenario.



- 2 Enter a name and select the cells whose data will be changed then click **OK**.



- 3 The **Scenario Values** window will appear: here enter the new values for the selected cells.



When you complete your changes, the output of all formulas which use this data is altered accordingly.

- 4 To see the changes, click the **Show** button in the worksheet or click the **Summary** button to see a **Summary Report** in a new worksheet. This will show the current status beside an outline of how the changed data will affect the output. You can create several Summary Reports and compare them to see which fits your requirements best.

You can call up the same **scenario** any number of times, and change it by clicking the **Edit** button to alter it as you wish.

Exercise: Scenario Manager

- a) Access the worksheet **payroll**. This file shows the payroll for a small company, which is proposing to increase employees' pay.
- b) The initial proposal is for a lump sum of **£500** and an increase of **10%**. The proposed new salaries and salary totals have been filled in for this – look at the cell formulas.
- c) Now call up the **Scenario Manager** option from the **What-If Analysis** menu. Create a scenario (*new salary*) with a lump sum value of **£750** and the percentage to **15%**. Create a **Summary Report** now.
- d) Now create a new scenario (*employees*) to show the effect of changing the number of employees as follows: **Grade 1 = 10; Grade 2 = 6; Grade 3 = 9; Grade 4 = 4; Grade 5 = 2**.
- e) Again, create a **Summary Report** and view it. Save the file.

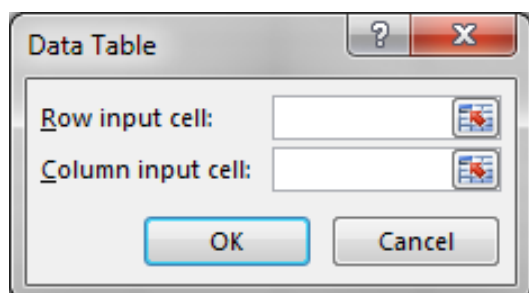
6 Data Tables

Using Data Tables makes it easy to examine a range of possibilities at a glance. Because you focus on only one or two variables, results are easy to read and share in tabular form.

A Data Table cannot accommodate more than two variables. If you want to analyse more than two variables, you should instead use scenarios.

Although it is limited to only one or two variables (one for the row input cell and one for the column input cell), a Data Table can include as many different variable *values* as you want.

These *potential variable values* are entered in the worksheet adjacent to the function which makes use of the variable – so make sure your data is laid out to allow this to happen. They can be arranged in a row or a column, whichever best suits the layout of your other data.



So, once you have done the above, select the cells that contain the variable values along with the adjacent cell containing the function/formula which will use the variable.

Then enter the cell reference for where the original variable is stored. Click OK and a list of outcomes will appear showing what the result of using each value is.

Exercise: Create a Data Table

- 1 Access the work sheet **Loan**. In cell **E3** enter the following formula:
- 2 **=PMT(B3 / 12, B4, -B5)**. (PMT is a standard built-in formula in *Excel*).
- 3 **Note:** spaces are given in the formula above to make it clearer BUT you should type this in without any spaces.
- 4 Type in the following in cells **D4-D7**: 18%; 20%; 22%; 24%.
- 5 Select the cells **D3-E7** then the open **Data Table** dialog box. In the **Column input cell** type: **B3**.
- 6 Click **OK** and the list of results will appear. Save your file.

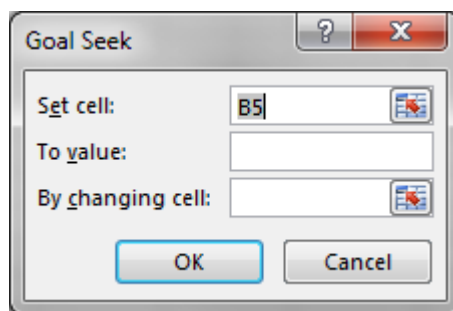
7 Goal Seek

Goal Seeking is a different kind of 'What-if' analysis. It enables the user to define a goal (or desired outcome) and the spreadsheet will calculate the input value required to achieve this goal.

This allows you to set a target result, which you wish to achieve, and then have *Excel* work out what data must be input to achieve that result. For instance, you might want to calculate how much of your money you must save over a year in order to afford a new computer.

You would set up a spreadsheet with the price of the computer, your pay and a possible savings figure entered. Then:

- 1 Select **Goal Seek** from the **What-If Analysis** menu (under the **Data** tab): you will be presented with the dialog box shown here.



- 2 In the **Set Cell** text box, enter the cell which will contain the figure you wish to achieve.
- 3 In the next box (**To value**), enter the value which you wish to achieve (e.g. price of computer you wish to buy).
- 4 Finally in the **By changing cell** box, enter the cell which contains the value which must be adjusted to achieve the figure you wish to achieve (e.g. the amount you must save each month). Then click **OK**.

Exercise: Goal Seek

- 1 In the model set up in the **payroll** worksheet assume the management can only allocate £450,000 to the new pay bill.
- 2 Goal Seek can work out the percentage increase which can be offered to achieve this. First you must sum the proposed totals (in F11).
- 3 Select **Goal Seek** from the **What-IF Analysis** menu. Fill in the dialog box as follows. (*You can either enter the cell references, or point and click on the appropriate cell.*)
- 4 Set Cell **\$F\$11** *the proposed pay bill*
- 5 To value **450000** *the target pay bill value*
- 6 By changing cell **\$B\$2** *the percentage increase.*
- 7 Click on **OK**. A dialog box will be displayed telling you that *Excel* has found a solution. Click on **OK**. Cell **B2** will have changed to the new percentage increase to give a pay bill of **£450,000**.
- 8 If there is time, try some other goal values. Save the file.

Of course, you could easily calculate this example exercise without using **Goal Seek** but this same method can be applied to much more complicated sets of data.

8 What is a Pivot Table?

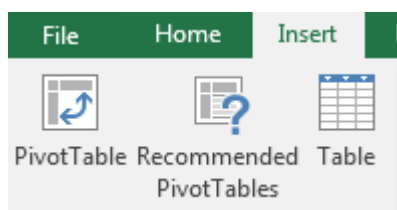
A PivotTable Report is an interactive table that you can use to quickly summarize large amounts of data. You can rotate its rows and columns to see different summaries of the source data, filter the data by displaying different pages, or display the details for areas of interest.

When to use a PivotTable Report

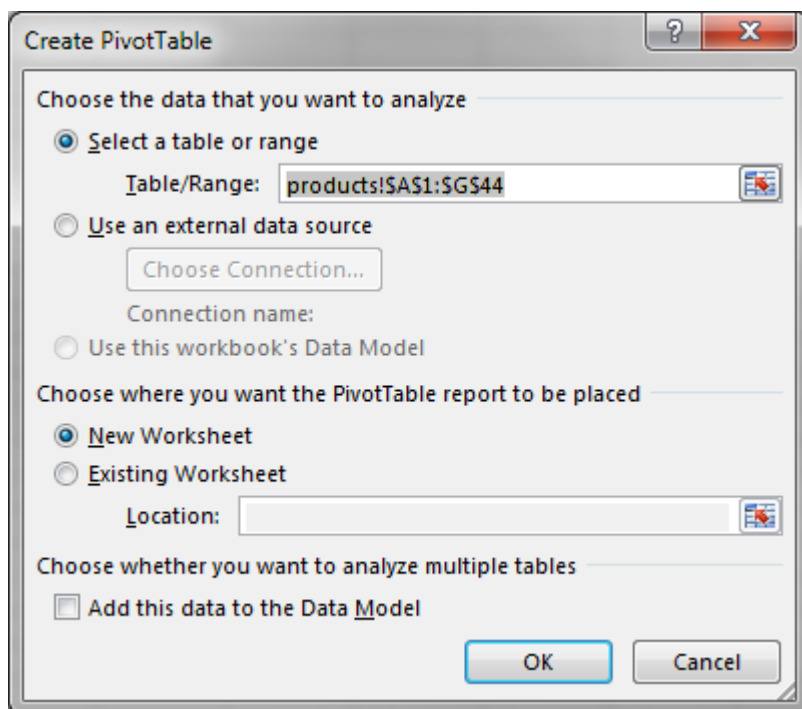
Use a PivotTable Report when you want to compare related totals, especially when you have a long list of figures to summarize and you want to compare several facts about each figure. Use PivotTable Reports when you want *Excel* to do the sorting, subtotalling, and totalling for you. You can also display a PivotTable Report in indented format, to view all the summary figures of the same type in one column. You can create a PivotTable Report to view the data graphically as a PivotTable Chart.

a. Creating a Pivot Table Report

You must have headings at the tops of the columns of data – and don't include any blank rows or columns in the table of data that you intend to use.

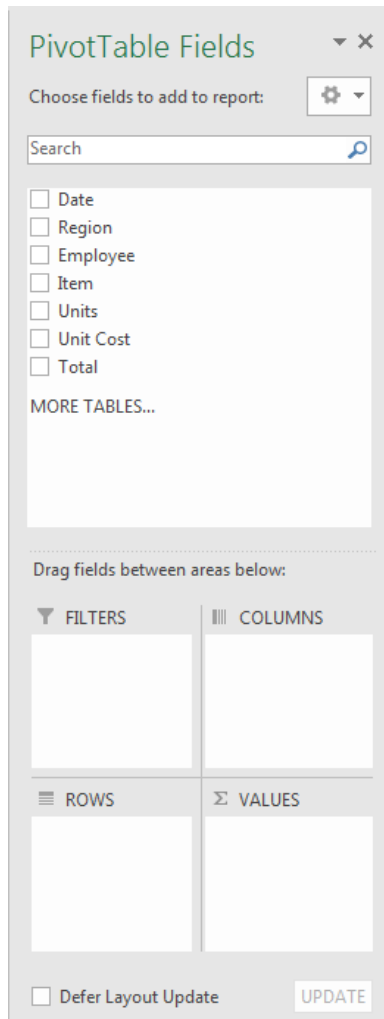


Choose the **Insert** tab then under the **Tables** group select **Pivot Table**.



The data should automatically be selected - if not, drag over the cells that hold your data.

After this you are given the option to choose whether the Pivot Table should appear on the current worksheet or on a new one. (If on the current worksheet, select or enter the cell which will be the start point of your Pivot Table).



Once you've made your choice, click **OK** and the unpopulated Pivot Table will appear in the worksheet you've selected.

On the right side of the view the window you will see is the **PivotTable Field List**.

You drag the fields you wish to select into four boxes (e.g. **Filters**, **Columns**, **Rows** and **Values**)

A field dropped into the **Values** area will have all its cells summed or counted. (If it is a numeric field it will be summed, if not it will be counted).

Fields dropped into the **Column** and/or **Row** areas decide how the results and what aspects of the data will be analysed and displayed.

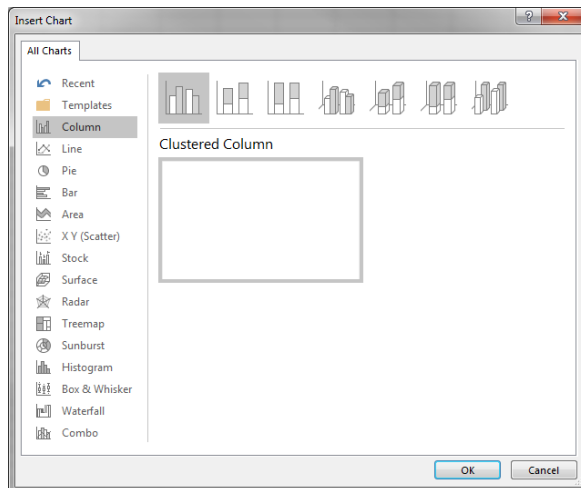
Exercise: Create a Pivot Table

- 1 Access the **products** worksheet. You should see a table containing data on product sales. Select the top left cell then choose **Pivot Table** from the **Table** group under the **Insert** tab.
- 2 Your data should be automatically selected; if not, drag with the mouse to do so now. Select the **Existing Worksheet** option and select (or type in) the starting point cell where your report will be placed and click **OK**.
- 3 The *blank Pivot Table* will appear now, beside the **PivotTable Field List**. The field list will become visible and active each time you select the table.
- 4 Drag the **Region** option into the **Column** area, the **Item** option into the **Row** area and the **Units** option into the **Values** area.
- 5 You can adjust your report by adding or removing fields, using the **Pivot Table** window. For instance, drag the **Total** field and drop it into the **Values** area.

- 6 You will see that the table automatically adjusts to show the unit cost totals under each item, as well as the sums of items. To make the data clearer, set the numeric type of **Total** to **currency (£s)**.

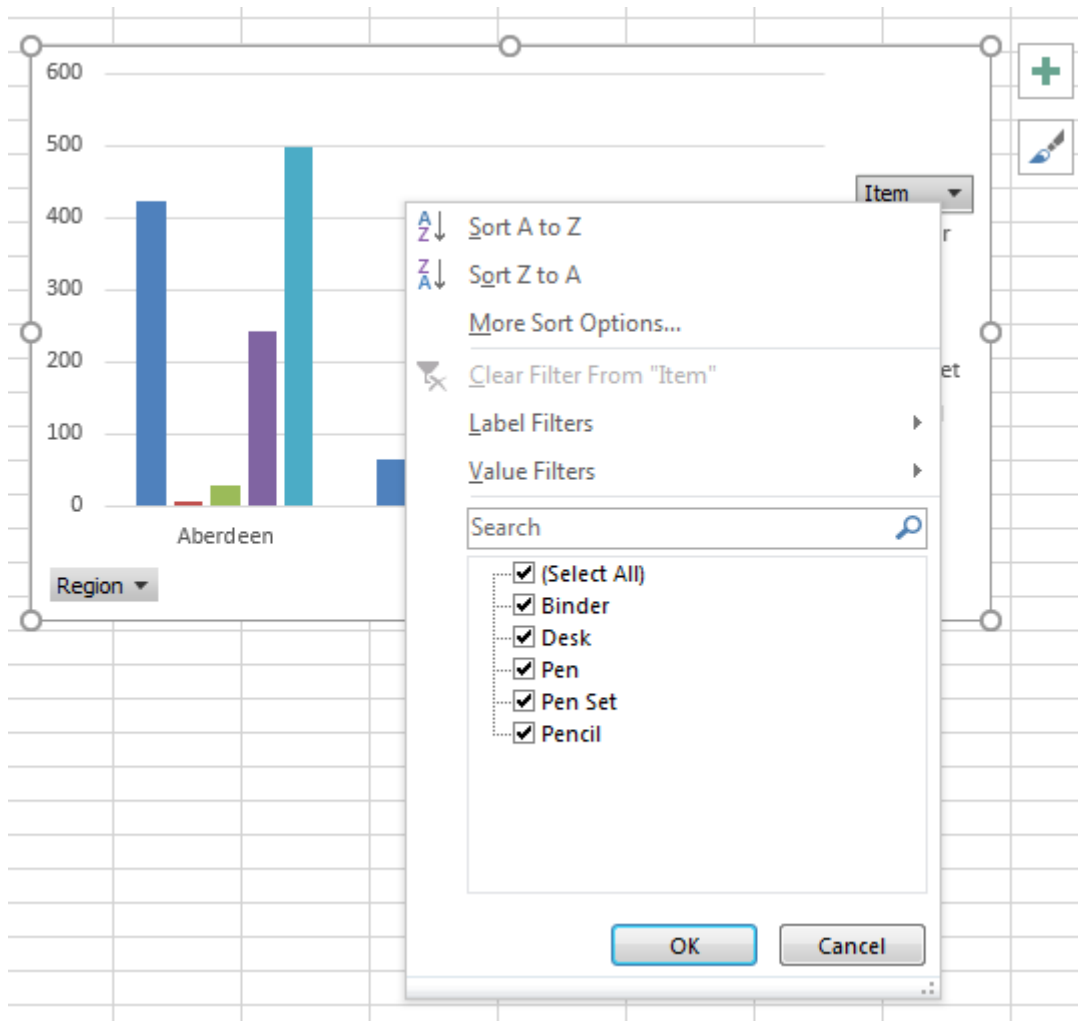
b. Pivot Table Charts

Pivot Table Reports can easily be used to create **Pivot Table Charts**. Simply select the Pivot Table Report and the **Pivot Table Tools** will appear. Then choose **PivotChart** from the **Tools** group under the **Analyze** tab.



When the **PivotChart** option is clicked, the usual **Insert Chart** dialog box opens.

Choose your chart type – note, only certain options, such as column charts are sensible to use.



Drop-down menus in Pivot Chart allow you to filter the results that the chart displays. Be aware that filters you apply from within your pivot chart also affect the pivot table that the chart is based upon.

Exercise: Create a Pivot Chart

- 1 Now create a chart using the Pivot Table Report: select the Report then click on **PivotChart** from the **Tools** group under **Pivot Table Tools**.
- 2 In the **Insert Chart** window that opens, select a suitable chart type. It must be one that represents the different sets of data clearly in the chart.
- 3 Click **OK** and your PivotChart will appear on the worksheet.

Once the chart is created you can adjust it in the usual way (see the section on chart above) and you can also change how the data is shown on the chart, using the **PivotChart Filter Pane** which appears whenever the chart is selected.

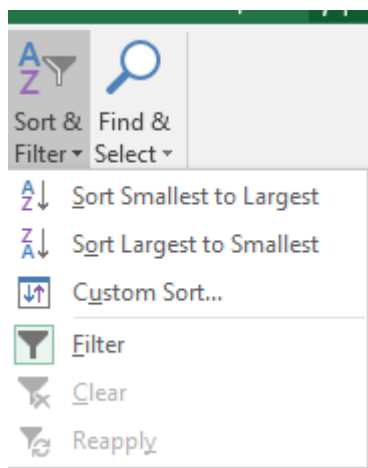
Exercise: Editing the Pivot Chart

This chart allows you to see the data in different ways. By clicking on one of the down-arrow buttons beside the chart you can choose to view only selected data.

- 1 Click on the **Region** button and deselect one of the **Regions**: this allows you to compare any two together or even see the data for a single region. To see all the data for all the Regions again, use the menu to choose **Select All**.
- 2 Now try this again with the **Item** menu (if you have any problems, use the **Undo** button on the **Quick Access** toolbar).
- 3 Restore your chart to its original state. Save the file and close it.

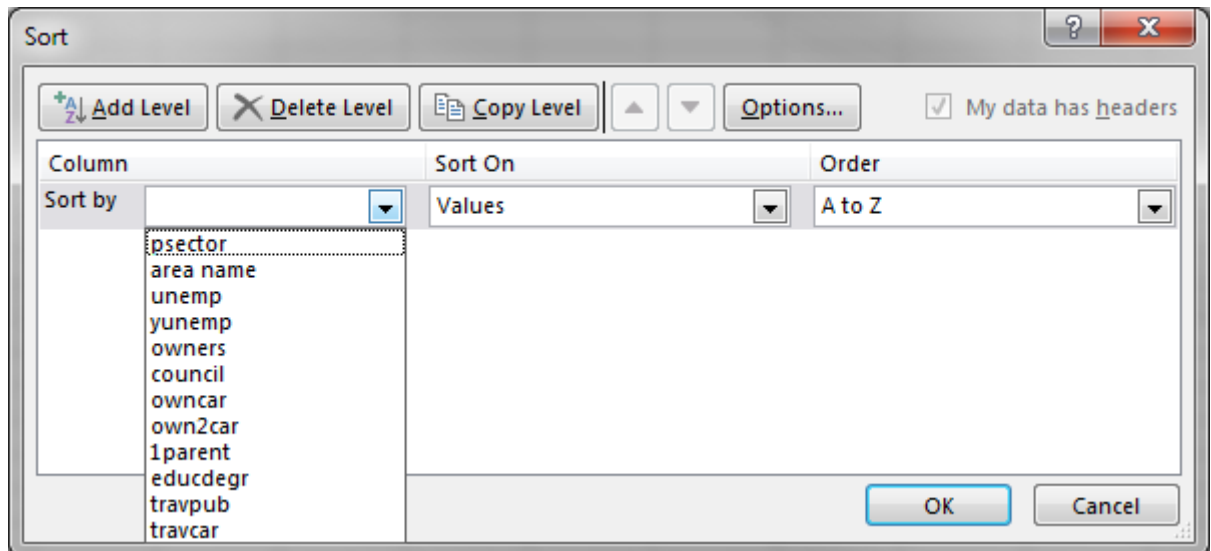
9 Sorting Data

Spreadsheet data can be reordered rapidly and easily. Data is usually sorted alphabetically or numerically in either ascending or descending order. You can sort the data by using the options in the **Sort & Filter** menu in the **Editing** group under the **Home** tab.



You can use one of the **AZ/A Sort** options; but first you must select a cell in the column you wish to sort on. These only sort on one column: to sort on more than one column you must use the **Custom Sort** option.

Before you sort, you must select a cell within the data and this will be expanded to select all the data when you choose **Sort**. In the **dialog box**, select which column or columns you wish the data sorted upon, then click **OK**. Note: if the data in a column is text you will sort **A to Z** or **Z to A**; if it is numerical you will sort **Largest to Smallest** or **Smallest to Largest**.

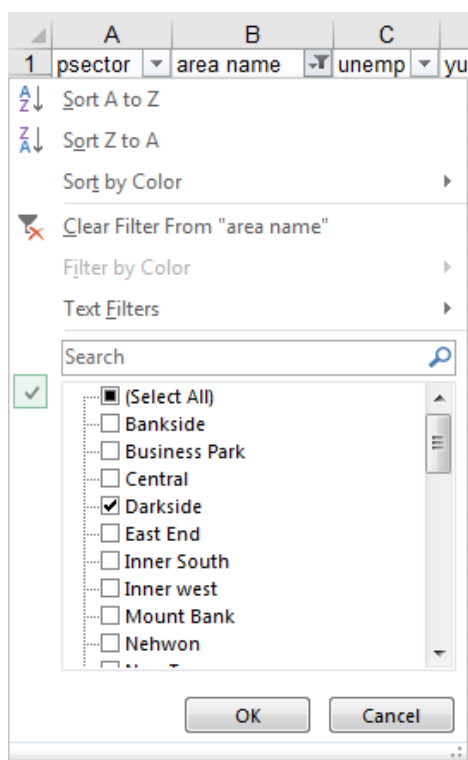


Exercise: Sorting Data

- 1 Access your **postcode** worksheet. Select the first cell in the table of data.
- 2 From the **Editing** group under the **Home** tab select **Sort & Filter** and then **Custom Sort**. A dialog window will open and the same time your data will be selected.
- 3 Ensure the **My data has headers** check box is selected. *This will make sure that the column titles are not included in the sort.*
- 4 Select the field **yunemp** in the **Sort by** box and choose **Largest to Smallest**. Click on **OK**. The data will now appear sorted into order with the area of highest youth unemployment first.
- 5 If you want to sort the information further, i.e. by more than one field, choose the field names in the second and third boxes before choosing **OK**. Try this now. *After each sort, set the data back to its previous order – but leave the final sort as it is.*

10 Searching for Data

a. AutoFilter



Excel has a built-in data search tool called **Autofilter**. To use this *you must ensure that a cell is selected from the data to be used*: there are two methods of applying a filter.

From the **Home** tab, select **Sort & Filter** and then **Filter** and drop down menu arrows (▼) will appear by each column heading in your worksheet.

The drop-down menus, display all or part of the data in each column. You can select/deselect an individual item, or a range of items using the **Text/Number Filters** option.

When there is a filter working on a field, the header will display the filter icon and not a down arrow.

To remove the filter, select **Sort & Filter** and then undo the **Filter** option.

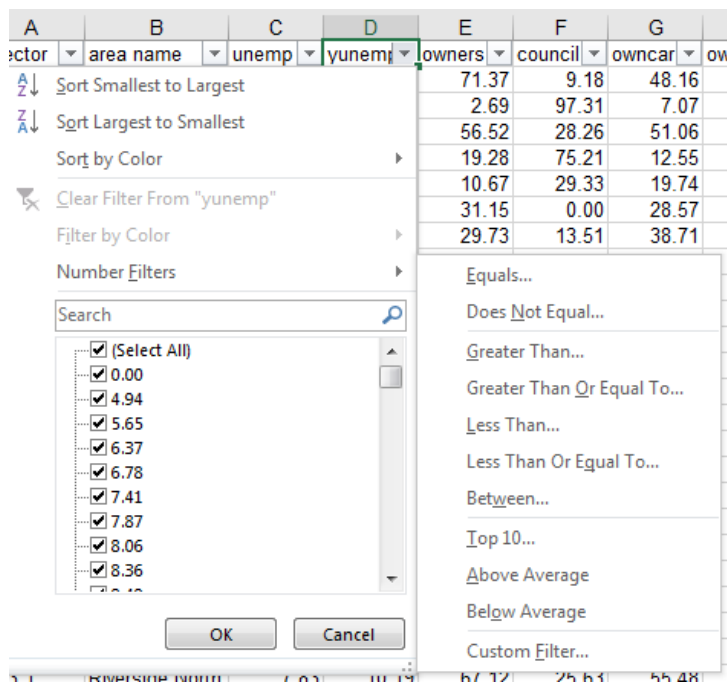
You can also apply a filter by selecting **Filter** from the **Sort & Filter** group under the **Data** tab.

Exercise: Auto Filter

- 1 Click on the first heading in your **postcode** worksheet. Under the **Data** tab select **Filter**, in the **Sort & Filter** group.
- 2 Next to each of the headings there will now be an arrow. Open the **Filter** menu at the **area name** column.
- 3 Deselect **Select All** (remove the tick). Now tick to select several areas and click **OK**.
- 4 *By selecting the data that you want, the spreadsheet will be displayed with only that criteria listed.* Restore view of the full data by choosing **Select All** once again.

b. Custom AutoFilter

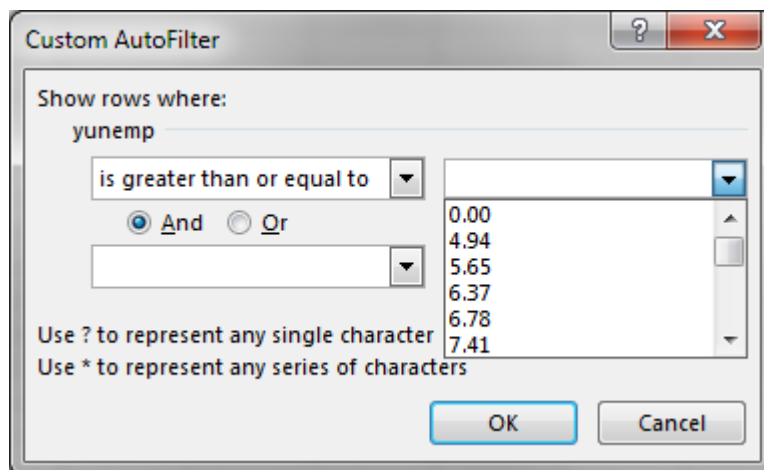
The method you've just seen is fine for columns with a limited number of options, but if there are hundreds of possible values then a better tool is required.



Each **Filter** menu has a *context related* filtering option: e.g. numeric options such as **Less Than**, **Greater Than**; text options such as **Begins With**, **Ends With**, **Contains**.

Choosing one of these options will open the **Custom AutoFilter** dialog box where you can enter a value for the filter (or select one from the drop down menu).

By clicking on **Custom Filter...**, you will be offered the choice of selecting data by the same series of conditions, using the drop down menus.



In a series of numbers you could choose to view all records with a value greater than 100. By selecting choices from more than one drop down menu, you can limit the view of data to a set of different conditions relating to data in the different columns.

For instance, to show records with a value of less than 50 in one field (column) and a value greater than 10 in another.

Exercise: Custom Autofilter

- 1 Access your **postcode** worksheet. Select the **AutoFilter** menu under the **area name** column.

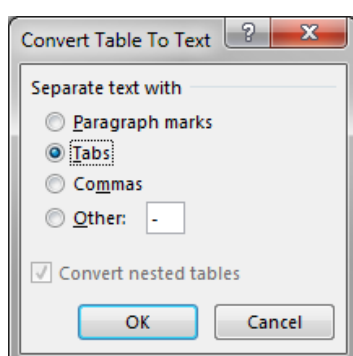
- 2 Click on the **Begins with** option and enter the letter “S”. Click **OK** and view the filtered data.
- 3 Select the **AutoFilter** menu for the field **yunemp**. Click on the **Greater Than** option and enter the value “25”. Click on **OK**.
- 4 *As you see, you can combine filters to narrow down a search for data. To undo the filters, click on the **Clear Filter** option in the **Filter** menu. **Note:** you need to clear any applied filters before adding a new filter to data, unless you intend combining more than one in a particular search.*

11 Integrating Word and Excel Files

You can copy *Excel* files into *Word* documents to create an integrated report. This can be done in several ways. If the files are linked any changes made to the spreadsheet will be reflected in the report. Note that both files must be in the same drive or you will not be able to create a link.

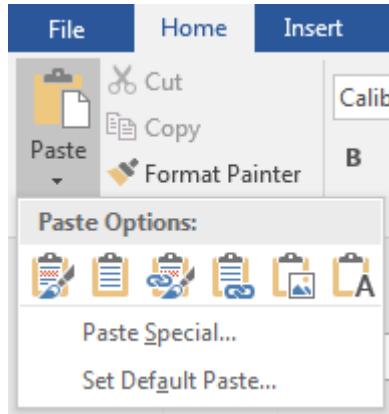
psector	area name	unemp	yunemp		owners	council	owncar
G1 1	Central	7.42	5.65		71.37	9.18	48.16
G1 2	Central	24.72	21.43		2.69	97.31	7.07
G1 4	Central	6.78	0.00		56.52	28.26	51.06
G1 5	Central	43.71	27.03		19.28	75.21	12.55
G2 3	East End	42.34	35.71		10.67	29.33	19.74
G2 4	East End	20.00	17.95		31.15	0.00	28.57
G2 6	East End	27.69	57.14		29.73	13.51	38.71

The simplest way to add spreadsheet data to a *Word* document is to use a straightforward **Copy** and **Paste**. The table you see above was pasted into this document from the **postcode** worksheet. It is now in the form of a *Word* table with gridlines and shading added. This is the default option.



You can change this by selecting the table and under **Table Tools**, on the **Layout** tab, in the **Data** group, click **Convert to Text**. In the dialog box which appears, select the data divider option – **Tabs** is usually most suitable.

Another option is to use **Paste Special** from the **Home** tab → **Clipboard** group. First, copy the relevant data from the spreadsheet then select **Paste Special** in the *Word* document. (Note that the dialog box for this is slightly different and has different options in *Word* than in *Excel*). There are several options available here.

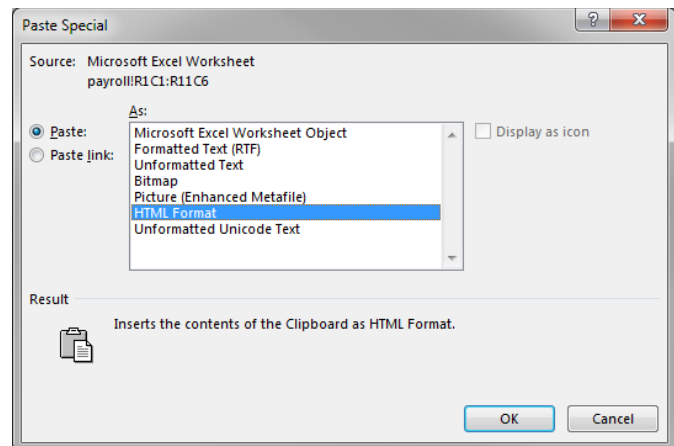


You can paste the data into the document in several formats: e.g. **Excel Worksheet Object**, **Formatted Text**, etc. The **Picture** option is suitable when you require high-quality printing. Inserting the data as a **Worksheet Object** means editing can be done (including calculations) from within the document.

If entered as **Formatted Text**, it will be shown as a table; if as **Unformatted Text** it will be shown as plain text separated by tabs.

Selecting the **Paste Link** radio button to the side of the dialog box, means that the data that you paste into the document will be linked to the original file.

If the data in the original worksheet is edited and saved, the linked object will automatically be updated when you next open the *Word* document.



Exercise: Importing Spreadsheets in Word

Open a blank *Word* document and **Copy** some of the data in the **payroll worksheet** and **Paste** it into this *Word* document. Type a brief sentence or two describing what it shows. Save this document as **link.docx**.

- 1 Select the data in the *Word* document and convert it from a *table* format into *plain text* separated by *tabs*. Now move to the top of a new page.
- 2 **Copy** the same *Excel* data again. Now, insert it into your *Word* document using **Paste Special** from the **Edit** menu and choosing the **Paste Link** and **Formatted Text** options. Type a sentence describing what you just added.
- 3 Select the data you have just added and right click with the mouse. In the menu, which appears, choose **Linked Worksheet Object** then **Edit Link**.
- 4 Change the number of **Grade 1** employees. This will alter other totals in the worksheet. Save the worksheet and close it.

- 5 Now save your *Word* file and close it. Open it again and you should see the changes reflected in the worksheet object.
- 6 Add a Footer to the **link.docx** document containing your *name*, *course code* and *student ID number*. Now save and close both files.

Course Review and Revision

You should now have completed all the units in this course. If you still find you have a problem with anything, please ask your tutor for advice.

Even if you do feel confident after completing this course, it is still worthwhile to regularly practice the skills you have gained through completing this course. The more you use the applications, the more confident and able you will become in using them.

Appendix I

Printing in *Excel*

Before printing a worksheet, it is important to check how it looks. This can be done using the **Print** command under the **File** tab. Most printing on campus is now by **Pull Printing** which are linked to a shared server. This means you can print out your document from any one of a number of printers and so avoid queues. See: <http://goo.gl/W0Vo2U>

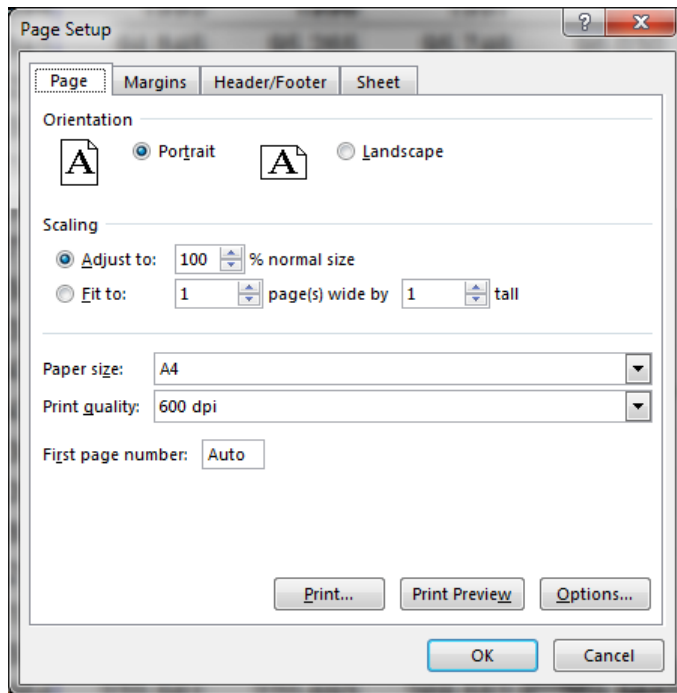
File menu **Print Options** **Print Preview**

Printer Properties
link (opens dialog box) to adjust print out options.

Page Setup link
(opens dialog box)

Grade	No of Employees	Present Salary	Present Totals	Proposed Salary	Proposed Totals
1	12	£ 45,000.00	£ 540,000.00	£ 45,000.00	£ 540,000.00
2	4	£ 45,000.00	£ 180,000.00	£ 45,000.00	£ 180,000.00
3	8	£ 45,000.00	£ 360,000.00	£ 45,000.00	£ 360,000.00
4	5	£ 45,000.00	£ 225,000.00	£ 45,000.00	£ 225,000.00
5	3	£ 45,000.00	£ 135,000.00	£ 45,000.00	£ 135,000.00
Total Paybill			£ 1,380,000.00		£ 1,380,000.00

The **Preview** will indicate the number of pages at the bottom left-hand corner of the screen. The *orientation* of the paper can be set to *landscape* or *portrait*.

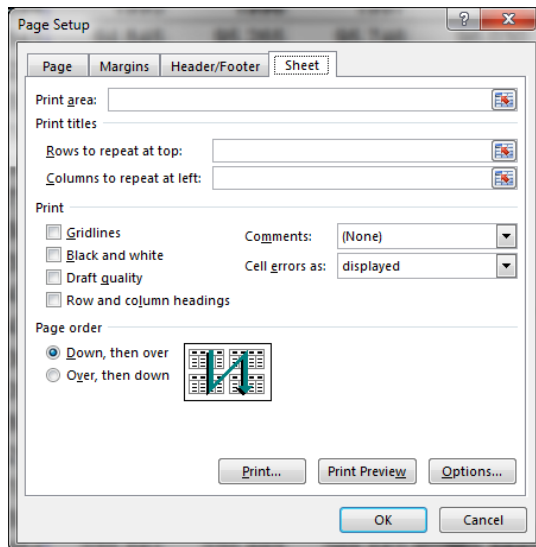


Your tutor will demonstrate various layout options, such as page fit and margins which can be accessed by clicking the **Page Setup** link which opens a dialog box.

Tabs let you select printing options:

- The default, **Page** option, allows you to select orientation, and adjust the fit of the worksheet so it will fit into a page.
- The **Margins** option allows you to adjust the margins on the worksheet.
- The **Header/Footer** option displays a window in which you can type a header and/or footer, which will be printed out on your spreadsheet.
- Click the **Custom Header** or **Custom Footer** button to add text or select options like date/page numbering.
- The **Sheet** option allows you to hide/display the gridlines or column and row headings, or *change the order in which pages will be printed*.

NOTE: the **Print area** and **Print Titles** options are “frozen” in this dialog box and you cannot change it. You can, however, set these options if you open the **Page Setup** dialog box by selecting **Page Layout** → **Page Setup** then clicking on the dialog box launcher.



Your tutor will show you some of these but spend some time exploring the possibilities for yourself.

If a spreadsheet is too wide to fit across one sheet of A4 paper in Portrait orientation, the Landscape option can be selected. The Scaling options under the Page tab of Page Setup can be used to decrease or increase the scale so that more or less data fits on a page.

b. Page Break

Sometimes scaling can't give a good fit without compromising readability and you'll need to print data over several pages. Note: if your data extends over several pages breaks will automatically be added. This won't always be where you'd prefer it however.

In Page Break Preview (under the View tab) you can adjust page breaks to get a better division of the data. You can move a page break by dragging it with the mouse.

	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Council	84,446	85,822	87,198	88,573	89,949	91,325	92,691	93,841	94,845	95,285	95,746	96,030	96,420	96,765	96,944	97,424	97,824
Aberdeen C	72,831	74,742	76,652	78,563	80,473	82,384	83,905	85,226	86,040	87,077	87,548	88,386	89,386	90,036	90,902	92,317	93,727
Angus	41,049	41,738	42,427	43,116	43,806	44,495	45,179	45,695	46,068	46,066	46,192	46,467	46,641	46,712	46,948	47,175	47,591
Argyll & But	39,046	38,699	38,352	38,004	37,657	37,310	37,326	37,744	37,989	38,108	38,340	38,529	38,723	38,713	39,037	39,270	39,988
Clackmannans	17,979	18,198	18,418	18,637	18,857	19,076	19,289	19,587	19,760	19,916	20,112	20,230	20,345	20,452	20,572	20,747	20,979
Dumfries & G	56,817	57,438	58,059	58,679	59,300	59,921	60,513	60,772	61,336	61,807	62,227	62,754	63,007	63,262	63,899	64,264	65,019
Dundee City	66,743	68,814	68,886	68,957	67,028	67,099	66,965	66,589	67,015	67,410	67,504	67,279	67,036	66,933	66,851	67,267	67,385
East Ayrshire	47,918	48,134	48,349	48,564	48,779	48,994	49,204	49,337	49,531	49,598	49,631	49,631	49,631	49,631	49,631	49,631	50,967
East Dunbart	38,448	38,708	38,964	39,222	39,479	39,737	40,014	40,471	41,000	41,221	41,221	41,221	41,221	41,221	41,221	41,221	42,260
East Kilbride	51,698	52,254	52,811	53,368	53,925	54,482	54,987	55,474	55,954	56,421	56,421	56,421	56,421	56,421	56,421	56,421	58,427
East Lothian	33,188	33,452	33,716	33,980	34,245	34,509	34,880	35,384	35,888	36,115	36,115	36,115	36,115	36,115	36,115	36,115	38,966
East Renfrie	30,991	31,296	31,602	31,907	32,212	32,518	32,824	33,099	33,500	33,749	34,037	34,293	34,478	34,746	35,024	35,164	35,329
Edinburgh	184,294	185,399	186,504	187,609	188,714	189,819	191,298	192,802	195,355	197,067	198,712	200,294	201,737	203,388	204,956	206,361	207,552
Eliean Sier	10,765	10,819	10,872	10,926	10,980	11,034	11,137	11,210	11,230	11,270	11,199	11,228	11,240	11,224	11,283	11,224	11,302
Falkirk	54,819	55,309	55,799	56,290	56,780	57,271	57,653	58,155	58,779	59,480	60,120	60,808	61,531	61,974	62,689	63,534	64,394
Fife	133,654	134,905	136,156	137,407	138,658	139,910	141,337	142,598	143,605	144,037	145,055	146,234	147,319	148,608	150,530	151,760	152,888
Glasgow C	275,149	274,385	273,621	272,857	272,092	271,328	271,148	271,364	270,561	270,693	269,552	269,861	269,765	269,103	271,953	271,700	271,348
Highland	42,000	42,350	42,001	42,351	42,002	42,352	42,003	42,353	42,004	42,354	42,005	42,355	42,006	42,356	42,007	42,357	42,008
Inverclyde	35,864	35,999	36,135	36,271	36,407	36,543	36,505	36,538	36,585	36,341	36,430	36,515	36,570	36,608	36,698	36,569	36,558
Midlothian	29,807	29,702	29,797	29,893	29,988	30,083	30,400	30,656	30,937	31,267	31,716	32,117	32,479	32,767	32,939	33,032	33,142
Moray	30,255	30,857	31,459	32,060	32,662	33,263	33,762	34,338	34,553	34,631	34,811	34,976	35,233	35,448	35,870	36,230	36,513
North Ayrsh	52,637	53,088	53,540	53,992	54,443	54,895	55,361	55,748	56,402	56,885	57,416	57,869	58,254	58,418	58,781	58,443	57,833
North Lanar	117,311	118,380	119,449	120,518	121,587	122,656	123,458	124,628	125,974	126,939	128,331	129,491	130,689	131,636	132,765	134,564	136,214
Orkney Isle	7,356	7,451	7,546	7,640	7,735	7,829	7,902	7,980	8,076	8,136	8,218	8,238	8,258	8,301	8,344	8,427	8,515
Perth & Kin	47,611	48,631	49,652	50,672	51,692	52,712	53,407	54,266	55,062	55,577	56,328	56,946	57,573	57,940	58,370	58,943	59,885
Renfrewshi	68,591	69,078	69,564	70,051	70,537	71,024	71,639	72,280	73,311	74,055	74,517	74,950	75,204	75,511	75,773	76,329	76,947

You can even divide your worksheet up into smaller sections by inserting new page breaks. You do this by selecting the row or column below/right of where you want to insert the break then click **Breaks** in the **Page Setup** group, on the **Page Layout** tab.

You should move breaks/insert breaks to create logical divisions within the worksheet.

In the Library and Reading Room **Pull Printing** printers are available on all floors so you can collect your printouts from any one of a number of printers; see: <http://goo.gl/W0Vo2U>

Appendix II

Basic Elements:

www.homeandlearn.co.uk/excel2007/Excel2007.html (2007-2010)

ist.mit.edu/sites/default/files/services/training/Excel%202010%20Introduction_32.pdf

office.microsoft.com/en-us/excel-help/basic-tasks-in-excel-2010-HA101829993.aspx

office.microsoft.com/en-us/excel-help/CH010373791.aspx

Functions:

office.microsoft.com/en-us/excel/HP052042111033.aspx

spreadsheets.about.com/od/excelfunctions/qt/excel-2010-if-function.htm

spreadsheets.about.com/od/excelformulas/Excel_Formulas_How_to_Create_Excel_Formulas.htm

spreadsheets.about.com/od/excelformulas/ss/2010-12-25-excel-2010-basic-tutorial-pt1.htm

Basic Statistics with Excel:

spreadsheets.about.com/od/excelstatisticalfunctions/Excel_Statistical_Functions.htm

office.microsoft.com/en-us/excel-help/statistical-functions-HP005203066.aspx

office.microsoft.com/en-us/excel-help/about-statistical-analysis-tools-HP005203873.aspx

www.practicalstats.com/xlsstats/excelstats.html

Charts in Excel

<http://tinyurl.com/ltzuulr>

<http://spreadsheets.about.com/od/excelcharts/>

office.microsoft.com/en-us/excel-help/CH010369060.aspx

www.tutorial9.net/tutorials/web-tutorials/selecting-the-right-chart-type-for-your-data/

office.microsoft.com/en-us/help/HP052623191033.aspx

<http://cas.illinoisstate.edu/jpda/>

www.extremepresentation.com/uploads/images/choosing_a_good_chart.jpg

Scenarios and Goal Seek

office.microsoft.com/en-us/excel-help/CH010369111.aspx

www.dummies.com/how-to/content/how-to-evaluate-scenarios-with-excel-2010s-scenari.html

www.homeandlearn.co.uk/excel2007/excel2007s7p4.html (2007-2010)

www.homeandlearn.co.uk/excel2007/excel2007s7p1.html (2007-2010)

Pivot Tables and Charts

office.microsoft.com/en-us/excel-help/quick-start-create-a-pivottable-report-HA010359471.aspx

spreadsheets.about.com/od/datamanagementinexcel/ss/8912pivot_table.htm

www.homeandlearn.co.uk/excel2007/excel2007s7p7.html (2007-2010)

seogadget.co.uk/how-to-make-a-pivot-table-and-chart-in-excel/

Excel for a Database

www.dummies.com/how-to/content/an-overview-of-excel-2010s-database-functions.html

www.dummies.com/how-to/content/how-to-filter-records-in-an-excel-2010-table-with-.html

www.homeandlearn.co.uk/excel2007/excel2007s3p1.html (2007-2010)

www.homeandlearn.co.uk/excel2007/excel2007s8p3.html (2007-2010)

www.homeandlearn.co.uk/excel2007/excel2007s8p1.html (2007-2010)

Printing and Breaks

www.dummies.com/how-to/content/how-to-repeat-row-and-column-headings-when-you-print.html

office.microsoft.com/en-us/excel-help/CH010369019.aspx

www.dummies.com/how-to/content/adjusting-page-breaks-in-excel-2010.html

www.dummies.com/how-to/computers-software/ms-office/Excel/Excel-2010/Printing.html

Useful Shortcut keys

Using keyboard shortcuts can help you become more efficient when creating documents in Microsoft applications. Most keyboard shortcuts require you to use two or more keys at the same time. To use a keyboard shortcut first press and hold down the modifier key or keys (i.e. SHIFT, CTRL, ALT) and then press the corresponding standard key on your keyboard.

Function	Shortcut
Go to "Tell me what you want to do"	ALT+Q
Open	CTRL+O
Save	CTRL+S
Close	CTRL+W
Cut	CTRL+X
Copy	CTRL+C
Paste	CTRL+V
Select all	CTRL+A
Bold	CTRL+B
Italic	CTRL+I
Underline	CTRL+U
Cancel	Esc
Undo	CTRL+Z
Re-do	CTRL+Y