

Intermediate Microsoft *Excel*

(Demonstrated using Windows XP)

Using Spreadsheets in the Classroom

Adapted from *Taskstream* Word Tutorial (2003) < <http://www.taskstream.com> >
Updated 4/05 by Dr. Bruce Ostertag

What Can Microsoft *Excel* Do for Teachers?

Microsoft *Excel*, a spreadsheet application, is a very powerful tool for students and teachers to record and manipulate data.

Here are just a few things you can create in *Excel* for both teaching and classroom management:

- Worksheets
- Charts
- Data Analysis
- Problem Solving
- Grading Records
- Experiment Databases
- Class Surveys
- Organizing Information

What's In This Tutorial?

This tutorial will guide you through:

1. Calculating the speed of a number of cars using time and distance data.
2. Graphing your results.

Requirements

Hard or electronic copies of *Excel* (or equivalent) documents must be submitted for partial credit to meet the spreadsheet technology standards set by California for educators demonstrating usage of:

1. Charts with labels (two types)
2. A more extensive sample grade sheet (see previous *Basic Excel* exercise for possible example: 291_Grades.xls).

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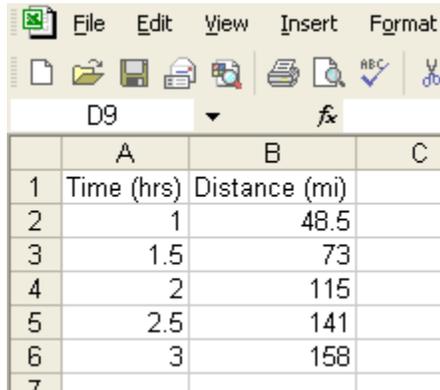
I. Getting Started

Open *Excel* from either the icon on your desktop or **Start** → **All Programs** → *Excel*.

II. Entering Your Data: Some Basic Procedures

This section will guide you through entering the data you will use in this tutorial. If you need to review how to enter and format data, complete the Basic Excel Tutorial before continuing.

Enter the following data into your spreadsheet.



	A	B	C
1	Time (hrs)	Distance (mi)	
2	1	48.5	
3	1.5	73	
4	2	115	
5	2.5	141	
6	3	158	
7			

Note: If you eventually want to use a number for calculations, it has to be simply a number with no labels or units attached. So, if you are entering data from measurements in an experiment, for example, enter the number only -- NO UNITS!

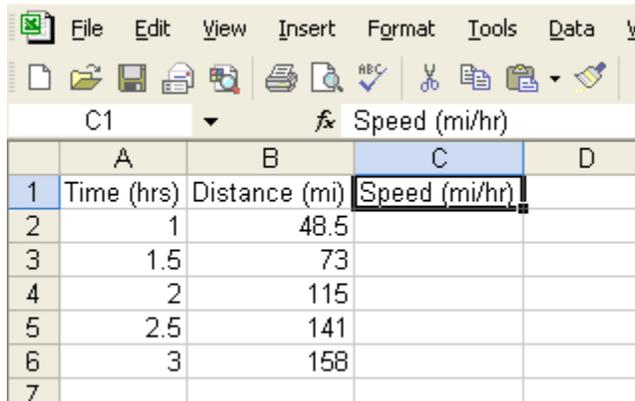
In this spreadsheet we have entered data taken from the time and distances of automobiles traveling on a street.

III. Using the Spreadsheet to Make Calculations

The power of a spreadsheet lies in its ability to perform a large number of calculations. Suppose we wish to find the speed of each car. Speed is distance divided by time. We want to divide each distance value in column B by the time value in the same row in column A.

Single Calculations: Formulas

Let's start by placing a "Speed (mi/hr)" label in the first row of column C, that is, in cell C1. Then press **Enter** to move to C2. Widen your new column to fit the label.



	A	B	C	D
1	Time (hrs)	Distance (mi)	Speed (mi/hr)	
2	1	48.5		
3	1.5	73		
4	2	115		
5	2.5	141		
6	3	158		
7				

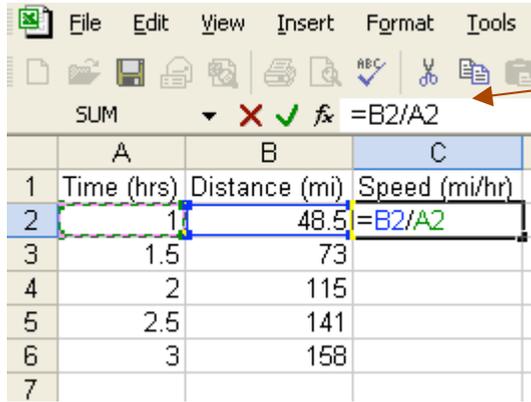
To tell the spreadsheet that you wish to do a calculation in a cell, you must always enter an equals symbol ("=") first.

With a spreadsheet, instead of entering the values, you enter the cell address of the values you wish to use in the calculation.

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You can type in the address in upper or lower case, as well as the arithmetic sign (called an operator).

To see exactly what we mean do the following:

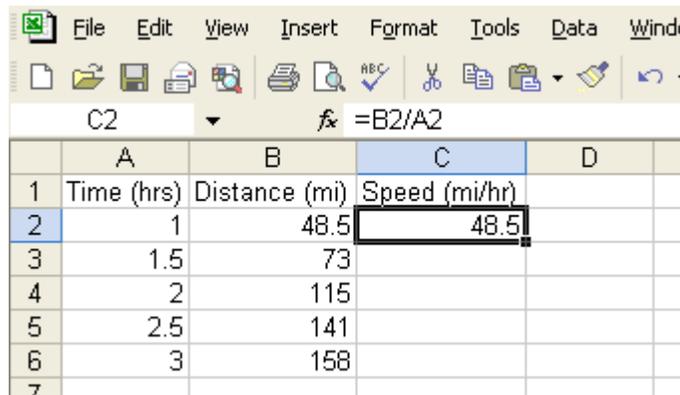


With cell C2 selected, type: **=B2/A2**

Note: Instead of typing "**=B2/A2**", you could type the **=** sign, then click on the B2 cell, type **/**, then click on the A2. By clicking on the cell, the cell's address will be immediately entered into the equation.

This directs **Excel** to divide the value in cell B2 by the value in cell A2.

When you press **Enter**, the spreadsheet does the calculation for you and displays the result in the cell C2:

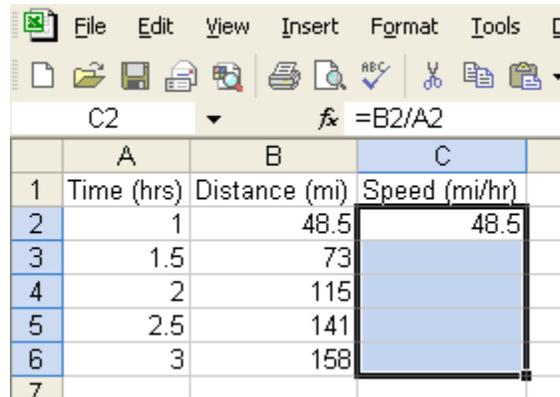


Many Calculations: Fill Down

Now comes the computational payoff. If we want to know the average speed of the car at any recorded moment in time, we could retype the same calculation for each row, or we can have the spreadsheet do them all at once using the **Fill Down** feature.

To use the **Fill Down** feature, click and hold on the C2 cell. Then, with the mouse button still held, drag down to select the cells below, through cell C6. The cell where you started -- in this case C2 -- will remain outlined and the remainder will be shaded in.

Your spreadsheet should now look like the image to the right.



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Click on the **Edit** menu located on the main menu bar, on the top of your screen. A dropdown menu should appear.

Move your mouse down until the **Fill** option is selected. A dropdown menu will appear, move the mouse over to the **Down** option, and click once.

BINGO! All the calculations are done for you by the spreadsheet.

While this is a minor time saver for our five-row data set, bear in mind that if we had 200 or 300 rows, the same process would work just as quickly.

Here is what the spreadsheet should now look like:

Click on any other cell to deselect the cells.

*Note: You can undo any operation you have just done by selecting Undo in the Edit menu. You can also undo by holding down the **CTRL** key on your keyboard and pressing the letter **Z**.*

	A	B	C
1	Time (hrs)	Distance (mi)	Speed (mi/hr)
2	1	48.5	48.5
3	1.5	73	48.66666667
4	2	115	57.5
5	2.5	141	56.4
6	3	158	52.66666667
7			

Formatting Cells

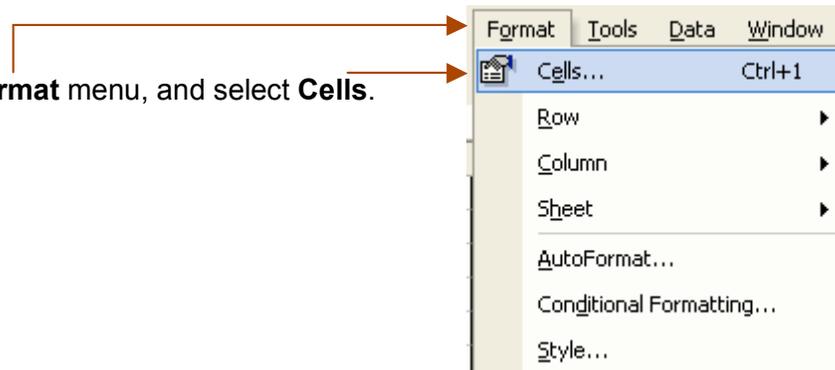
You probably noticed that the numbers in the **Speed** column are a little cumbersome, since so many digits appear after the decimal point. There are ways of formatting cells so that *Excel* will only display the number of places you want.

Here is how you can do this:

First, select the entire C column. You can do this the same way you did when filling down or you can simply click on the letter C until the whole column is selected.

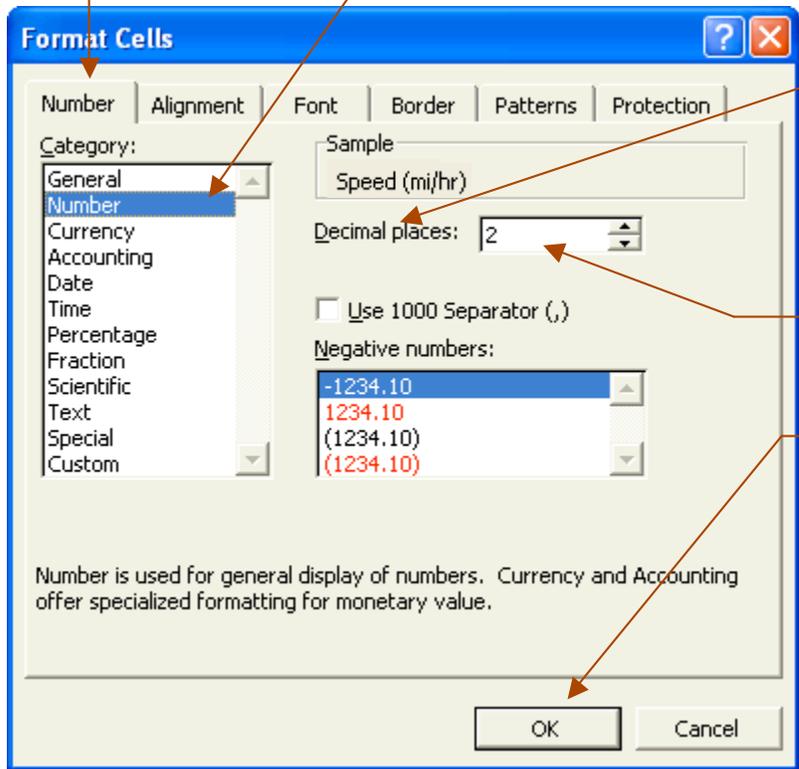
B	C
Distance (mi)	Speed (mi/hr)
48.5	48.5
73	48.66666667
115	57.5
141	56.4
158	52.66666667

Then go to the **Format** menu, and select **Cells**.



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Select the **Number** tab. Then select the **Number** item in the **Category** menu.



Note that in the **Decimal places**: field you can choose the number of decimal places you would like **Excel** to display. You can also choose how negative numbers will display.

Make sure the number **2** appears in the decimal places and press **OK**.

You will notice that the cells you have selected now only have two decimal points displayed.

Remember that this formatting only applies to the cells you have selected.

Experiment with other formats to display the information in the way you want it to look.

IV. Graphing

Excel offers a variety of options for the presentation of data in a graphical format using the **Chart Wizard** function. Though a powerful tool, the **Chart Wizard** can be daunting at first glance, so follow the directions in this example carefully. When you feel comfortable with it, you can go back and experiment with the many options that are presented.

	A	B	C
1	Time (hrs)	Distance (mi)	Speed (mi/hr)
2	1	48.5	48.50
3	1.5	73	48.67
4	2	115	57.50
5	2.5	141	56.40
6	3	158	52.67
7			

Using the mouse, select all of the cells in columns A and B that have number values. *Note: do not include the titles of the columns that appear in Row 1*

To do this, click and hold down the mouse button on the upper left-most cell with number values (A2) and drag down to the bottom right-most cell with number values (B6). All of the data to be included in the graph should now be highlighted. In this

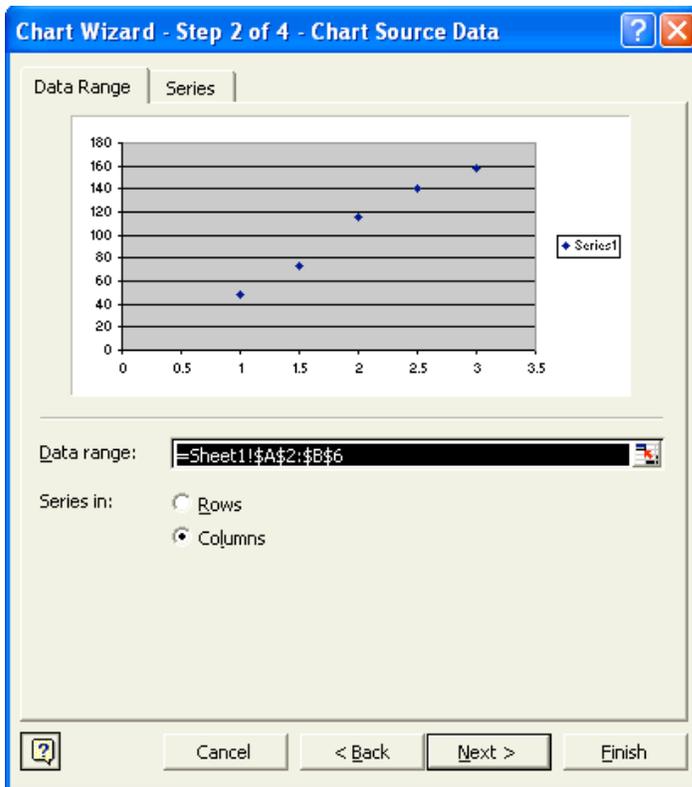
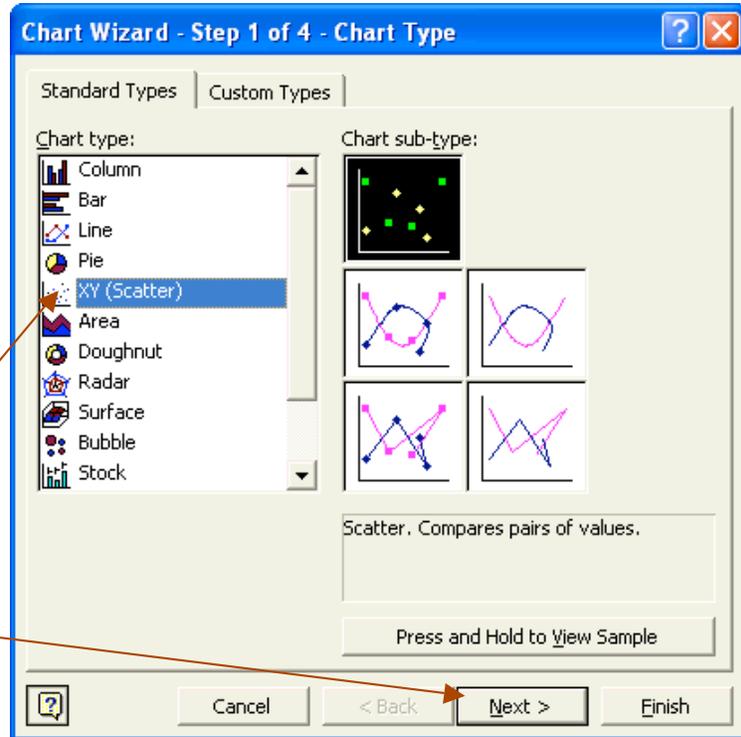
example, we are only graphing distance verses time.

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Go to the **Insert** menu and select **Chart**. A window will appear, similar to below, providing graphing options.

To plot **Time** (independent variable) against **Distance** (dependent variable):

In the space on the right-hand side of the window, a number of chart sub-types will be presented graphically. For many kinds of data, it is useful to select the graphing option in which the data points are not connected with a line. Select **XY (Scatter)** from the list of chart types. Click on this once and then click **Next**.



When doing an **XY Scatter** with more than one column of data, **Chart Wizard** makes the assumption that, of those columns selected, the one furthest to the left represents the data to be placed on the independent X axis.

In the case of this example, the **Time** data (column A) have been set to be the independent (X) variable and **Distance** the dependent (Y) variable.

This can easily be reversed in the **Chart Wizard** without having to rearrange the data in the spreadsheet itself. In this case do not change the axes. The explanation below is provided for future reference:

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How to Change the XY Axes

At the top of **Step 2** of the **Chart Wizard** dialog box, there are two tabs with the words **Data Range** and **Series**.

Clicking on the **Series** tab will take you to the screen shown to the left. In order to change the values for the X and Y-axes, the columns listed must be reversed.

This can be done here by clicking on the text boxes labeled **X Values** and **Y Values** and reversing the letters between the two: where it says "A" you delete and enter "B," and vice versa.

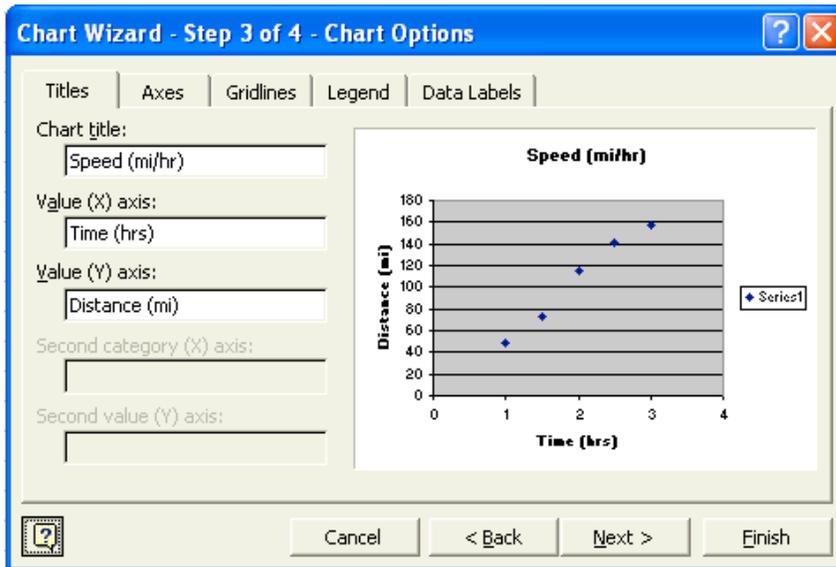
*Note: When you change the axes in the text fields, the preview picture of your graph will also change. Click **Next** when you are ready to move on.*

Also, you cannot use the arrow keys to move the cursor within the **X Values** and **Y Values** text boxes – you must use the mouse to move your cursor to the letters you want to change. If you use the arrow keys by mistake while in these boxes, click **Cancel**. Start over, beginning with the **Insert Chart** process described above.

The graph previews are a good qualitative way to judge whether you are presenting the data in the way you want. If the graph doesn't look quite right, or is completely nonsensical, it probably means that either the axes are reversed from the way they should be or that the wrong kind of chart or sub-chart was chosen. If need be, you can return to and readjust previous steps by clicking **Back** in the bottom of the **Chart Wizard** window.

Chart Options: Labels and Formats

The **Chart Wizard** window will now present you with several text fields for labeling the axes.



Go ahead and label the **Chart Title**, **Value (X) Axis**, and **Value (Y) Axis** as we have in the image below. We are using the same titles for the data as we did in the spreadsheet.

Along the top of the window are several options for changing the appearance of the graph. Flip through these

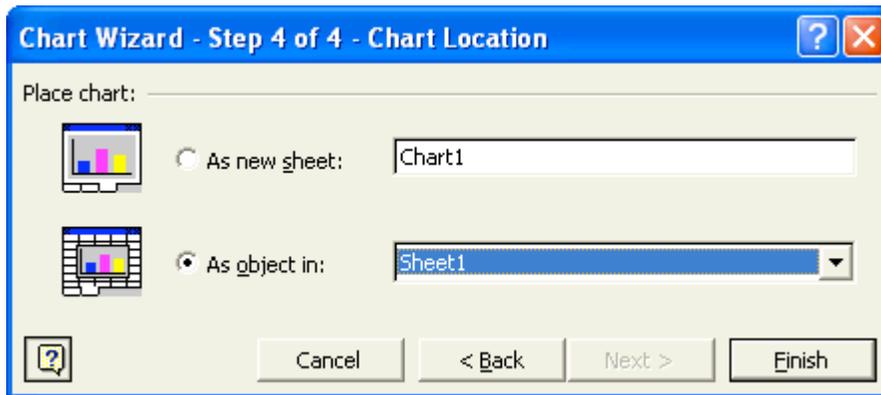
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options (**Axes, Grid**

Lines, Legend, Data Labels) and experiment with formats. Choose a format that appeals to you.

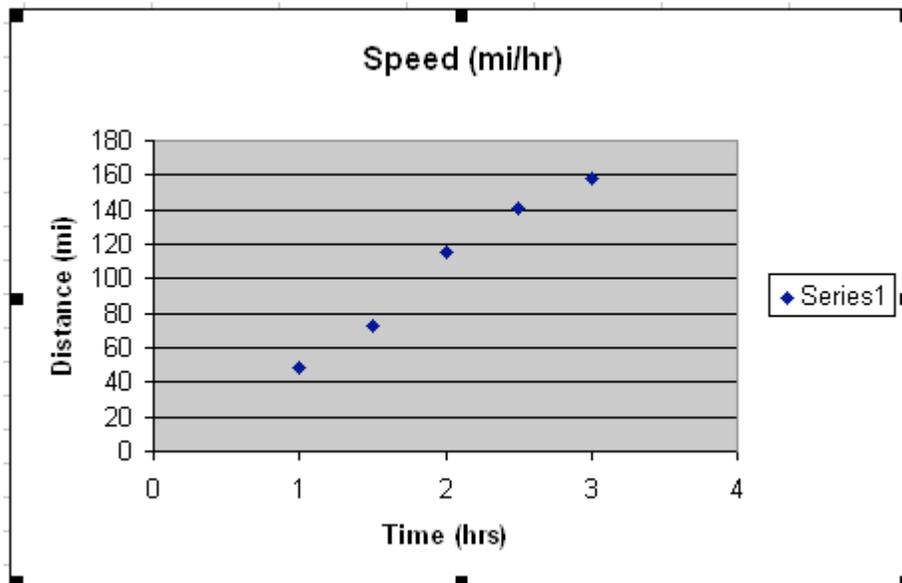
When you are done, click **Next**.

In this last window, you will be presented with the options of creating the graph as a document separate from the original spreadsheet or to create it in the spreadsheet itself. The latter option is chosen by default. Click **Finish** to create the graph in the spreadsheet.



You can change the size of the graph by clicking and dragging the black squares on the corners of the graph. Also, moving the pointer over a data point and holding it there for a second will cause a little yellow dialog box to appear, giving the x, y coordinates of that data point.

Once you have completed the graph, you can make changes to it by right clicking on the graph and selecting the characteristics that you want to change.

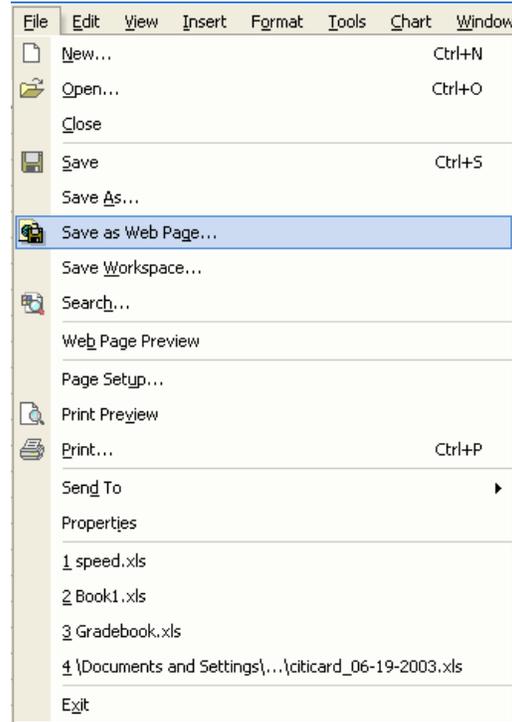


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V. Saving *Excel* as a Web Page Document [BONUS ACTIVITY]

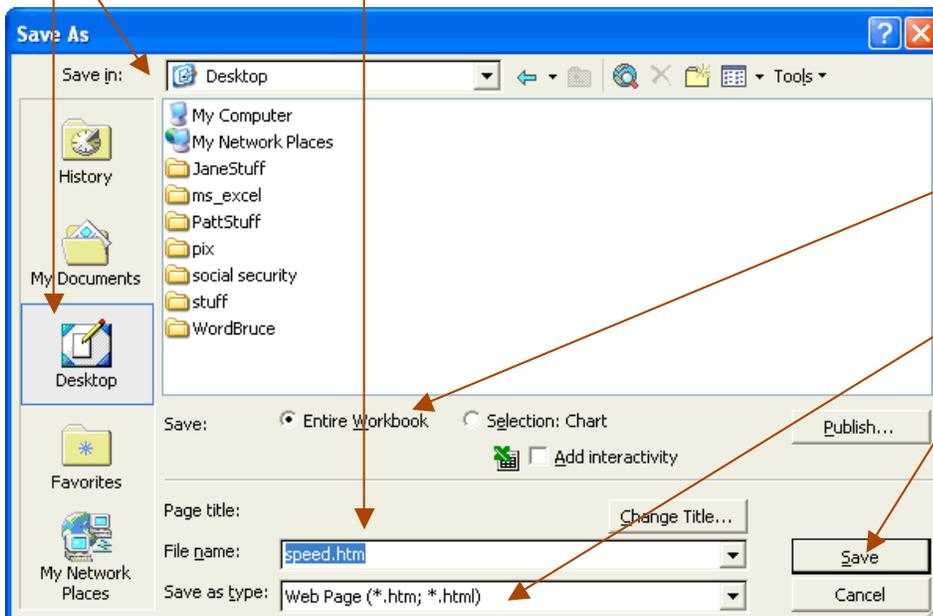
For more advanced users, you may wish to try and save your *Microsoft Excel* document for use as an internet web page. You can do this rather simply by the function you use under the **File** menu.

Open up **File** and scroll down to **Save as Web Page**. Select this option.



You will then see a dialog box that looks like the following.

Determine where the file should be saved. In this case, Desktop has been selected. You'll notice that *Excel* saves your document file name followed by **.htm**.



Entire Workbook is preselected, as is the **Save as type as Web Page**. Just click on **Save** to complete.

That's it!

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A note of caution: Microsoft *Excel* does not always save your web document exactly like it appears as a regular word-processed file. Spacing, graphics, fonts, borders, tables, graphs, etc., can appear differently on viewing computers using different browsers. It is recommended you “clean-up” the saved web page by opening your saved **htm** in a web page editor (e.g., *FrontPage*, *Claris Homepage*, *Dreamweaver*).

A special thanks to Jane Tillis for her invaluable technical support and consultation.

