

# 5 MORE ON THE USE OF THE SPREADSHEET

## Making changes to existing spreadsheets

### LEARNING OUTCOMES

In Lesson 4 you created a grade sheet for a class of 4th graders based on a template you had put together at the beginning of the same lesson. You learned that you can easily adapt a template for use with other classes that you might teach. You learned also about the organization of spreadsheets, about rows and columns, and the cells at the intersection of those rows and columns. You learned how to select cells and how to address cells using row and column coordinates. You learned how to enter formulas into certain cells in order to have *Calc* do calculations for you—totals and percentages in particular.

You filled the rows and columns with labels and grades. You had a first introduction to the idea that a spreadsheet can be a powerful tool for handling numeric data that requires mathematical or statistical processing.

In this tutorial you will have the opportunity to reinforce what you learned in Lesson 4. At the same time you will learn how to maintain a spreadsheet. This you will do by making enhancements to the spreadsheet you created in Lesson 4.

You will also learn about some of the logical processing capabilities of spreadsheets, capabilities which enable you to give an "intelligent" flavor to the applications that you build. In particular, you will learn about the following features of *Calc*.

- Updating an existing spreadsheet
- Making changes to the look of a spreadsheet
- Using the LOOKUP function
- Creating charts based on spreadsheet data
- Printing the updated spreadsheet

**A caveat before you begin:** You'll find it easiest to use the tutorial if you follow the directions carefully. On computers there are always other ways of doing things, but if you wander off on your own be sure you know your way back!

## 5.1 GETTING STARTED

### Setting up for the tutorial

If you completed Lesson 1 of these tutorials, you may recall that it assumed that you received a copy of the set of *Work Files for LibreOffice* that accompany these tutorials, and it also helped you create a new folder called Data Files. If you did not complete Lesson 1, then you must do this now, before proceeding with Lesson 5. If you did complete Lesson 1, then you can skip the rest of this section and proceed directly to the next section (Continuing with the tutorial, on page 146).

The set of *Work Files for LibreOffice* ideally should be stored on a Flash drive (USB drive) in three folders named *Base Files*, *Impress Files*, and *Miscellaneous Files*. You need to create a fourth folder for the *data files* that you will be creating while working your way through the tutorials. This fourth folder will be called *Data Files*.

If you do not have these four folders and files ready, prepare them now before proceeding with this tutorial. Here are the steps to take:

First, **Unzip** the set of **Work Files for LibreOffice** by double clicking on the File name on your computer (your instructor will help you with this if you are working with a class) and **Extract** them onto your flash drive

**Double click** on the **Work Files for LibreOffice** folder to **open** it

Now, inside the *Work Files for LibreOffice* folder you need to create a new, *fourth*, folder called *Data Files*. Here's how you do this.

In the **Work Files for LibreOffice** folder, select **New Folder** (Fig. 5.1).

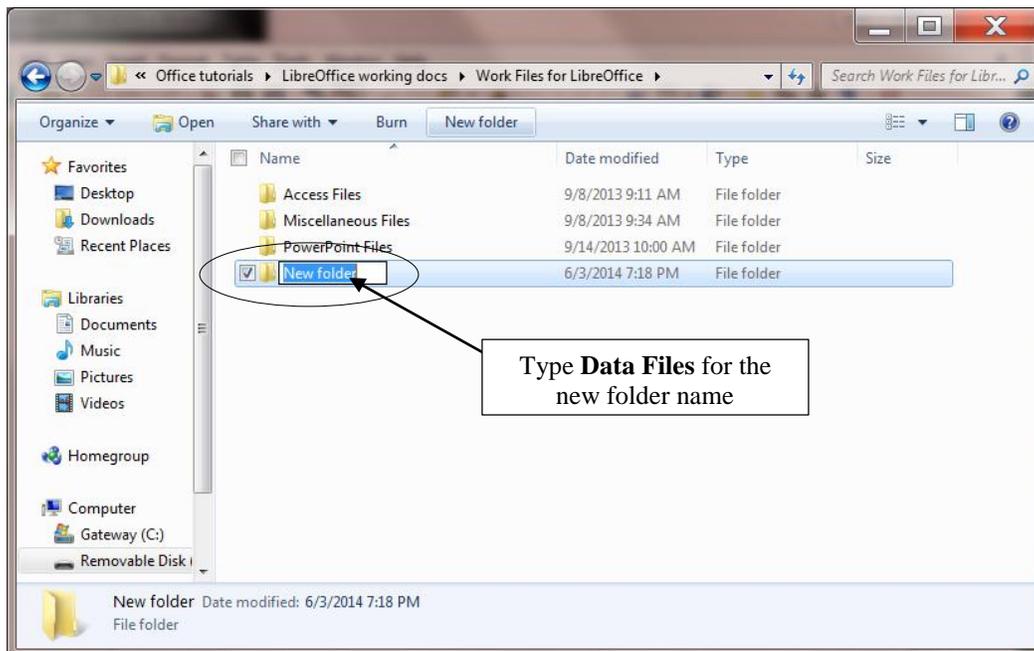


Fig. 5.1 Creating a New Folder

The system will create a new folder for you and then wait for you to give it a name of your choice (Fig. 5.1 above).

Call the new folder **Data Files**

During the course of these tutorials you will be storing many files in this Data Files folder.

### Continuing with the tutorial

You're going to work with a Gradebook document very similar to the one you created in Lesson 4. If you completed Lesson 4, for the exercises that follow **DO NOT USE** the Gradebook Template or Grade 4 2014 spreadsheet that you created in that lesson. For the sake of uniformity, and to avoid confusion, you're going to use a Grade Book template and Grade Book spreadsheet specially prepared for use with this lesson.

As an exercise at the end of the tutorial you will have the opportunity to incorporate these changes into your own Gradebook documents (Grade4 2014 and Gradebook Template) which you created when you completed Lesson 4.

You are going to make some improvements to the layout of the Gradebook, after which you will learn about the LOOKUP function as an introduction to the logic capability of *Calc*. At the end of the lesson you will learn how to create and modify charts of various kinds.

**Open LibreOffice > Calc** then make sure the storage medium (flash drive or external disk drive or hard drive) on which you have your **Work Files for LibreOffice** folder is accessible

You are going to update two documents:

- a grade book template (called *Gradebook Template*, which is stored on your USB drive in the *Work Files for LibreOffice* folder > *Miscellaneous Files* folder > *Templates* folder);
- an actual grade book filled with data (this document has the name *Gradebook* and is stored in the *Work Files for LibreOffice* folder > *Miscellaneous Files* folder > *Other Documents* folder)

You will work on the Gradebook document first.

By now you should know the steps to open a document, so go to your **Work Files for LibreOffice > Miscellaneous Files > Other Documents** folder and **Open** the **Gradebook** document

Before proceeding with the tutorial, you need to save this spreadsheet on your USB drive in the *Data Files > Spreadsheet Documents* folder.

Go to **File > Save As**, then navigate to your **USB drive > Work Files for LibreOffice > Data Files > Spreadsheet Documents** folder and **Save** the **Gradebook** document there

## 5.2 RECAPITULATION AND REINFORCEMENT

The following sections give you an opportunity to refresh your memory of the basic spreadsheet skills you learned in Lesson 4.

### Moving from cell to cell in the spreadsheet

In Lesson 4, you checked out some of the more useful commands for moving around in the *Calc* spreadsheet (check Lesson 4, page 113). Alternatively, you can use the chart that is included at the end of this text (*LibreOffice Shortcuts*).

In *Calc* spreadsheet terminology, the cell that is selected (surrounded by a heavier border) is called the current (or active) cell. Take a moment now to reacquaint yourself with the methods for changing the position of the currently active cell.

The **arrow keys** move the **current cell** to the **adjacent cell** left, right, above, or below the current cell—press all four of the arrow keys a few times, and watch how the current cell moves around

The **TAB key (forward)** and the **Shift-TAB command (back)** also move the cursor to the adjacent cell, but only in a **horizontal** (right or left) direction—try these two commands now.

The **RETURN key (forward)** and the **Shift-RETURN command (back)** also move the cursor to the adjacent cell, but only in a **vertical** (up or down) direction—try these two commands now

Use the **scroll bars** when you want to move around the spreadsheet without changing the location of the current cell—try this, too

### More cell selection commands

#### *Selecting sets of cells in a spreadsheet*

You occasionally may want to highlight all the cells in the spreadsheet—in order to change a font, the font size, or the overall cell background, for example. Here's how you do this.

Click in the **small box** right **above** the **Row headings** and to the **left** of the **Column headings** (Fig. 5.2)

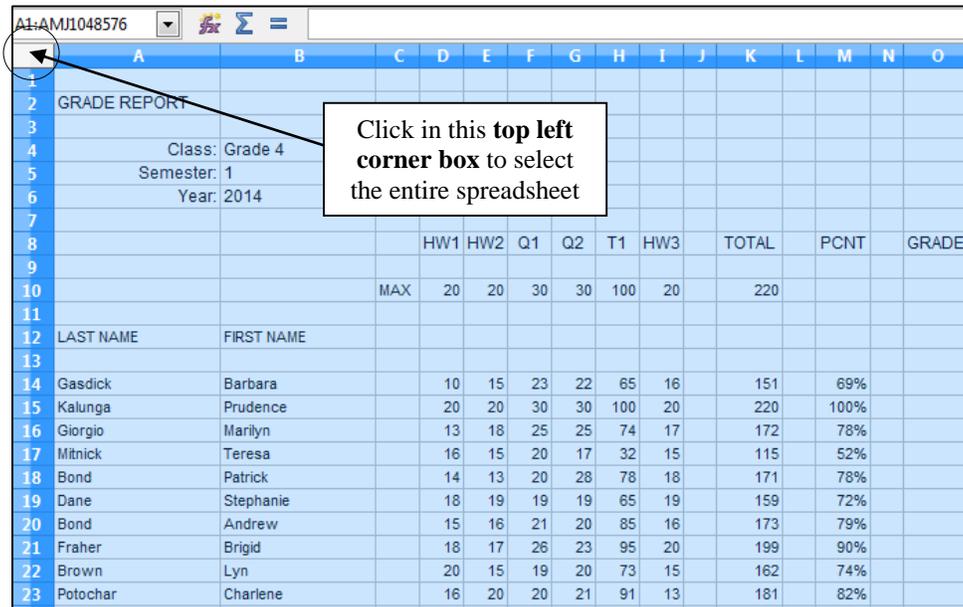


Fig. 5.2 Selecting an entire spreadsheet

The entire spreadsheet is now highlighted. However, perhaps you want to select only the cells that you're working in. There are a couple of ways to do this.

Click anywhere in the spreadsheet to **de-select** the selected cells

Now, starting at **cell A1**, use the mouse to **drag diagonally down** from cell **A1** to cell **O24**

That's one way. Here's another way of doing the same thing.

Click anywhere to **de-select** the selected cells

Now, click in cell **A1**, hold down the **Shift** key, and click in cell **O24**

The same set of cells is selected. The *Shift key* is very useful for selecting an especially large range of *cells* in *Calc*, or a range of *text* in *Writer*, or even a range of *slides* in *Impress*, which you'll learn about soon enough. Dragging with the mouse can get tedious and error prone when you have to select hundreds or thousands of adjacent cells, dozens of pages, or scores of slides. Remember this *Shift key* trick.

*Going to a specific cell anywhere in a spreadsheet*

If you are working in a large spreadsheet (consisting of thousands of cells, say) and you know the approximate coordinates of a cell you want to find, it is sometimes quicker to let *Calc* find the cell for you. The following simple steps will show you how to make the cell that intersects *Column AJ* and *Row 423*—a location quite deep inside the spreadsheet—the current (or selected) cell.

Click again in the **small box** right **above** the **Row headings** and to the **left** of the **Column headings** (Fig. 5.1 on the previous page), type **AJ423** (you can use either upper case (AJ) or lower case (aj) for the column coordinate), then click on **OK**

There you go! Remember that the first (alphabetic) coordinate (AJ) is always the column; the second (numerical) coordinate is always the Row.

Click again in the **small box** right **above** the **Row headings** and to the **left** of the **Column headings** (Fig. 5.2 on the previous page), then type **A1**, and click on **OK**

You are now back at the first cell (A1) in the spreadsheet. Some of the options for moving about the spreadsheet are considerably slower than others, which is why you should take the time to familiarize yourself with *all* the different methods for moving around the spreadsheet, especially if you become a regular user of *Calc*.

### 5.3 UPDATING AN EXISTING SPREADSHEET

The Gradebook document would benefit from some cosmetic changes, such as the following.

1. There should be *double lines* to set off different parts of the spreadsheet. It is often useful, for example, to include extra space (but not too much space) between the headings above the columns of data and the data itself, and also before summary totals at the bottom of columns of data.
2. It would be useful to include *more formulas* to increase the information content of the spreadsheet. For example, you could add a formula that calculates an *average* for each of the sets of grades so that your students can see where they stand in relation to the rest of the class on any particular assignment or test. A *highest score* and *lowest score* for each set of grades would also be useful.
3. It would be a good idea to *protect cells* containing data that you consider especially important. Protecting cells prevents you or someone else from accidentally losing or changing cell contents. It takes time to put together spreadsheet templates and other documents. Some cells will contain functions that are tricky to figure out. Protecting them will make it difficult to lose your work.

4. Finally, *Calc* can do some of the thinking for you if you include a *LOOKUP Table* to figure out the *Letter grades* for your students based on their percentage score at the end of a reporting period.

Let's deal with these problems one at a time. In this section you'll learn how to handle the first three improvements. Later in the lesson you'll have the opportunity to learn how to create and use the LOOKUP function.

### Dividing up the spreadsheet to make it easier to read

After you have fixed change #1, the Gradebook document will look similar to Fig. 5.3.

GRADE REPORT											
Class: Grade 4											
Semester: 1											
Year: 2014											
			HW1	HW2	Q1	Q2	T1	HW3	TOTAL	PCNT	GRADE
			MAX	20	20	30	30	100	20		220
LAST NAME	FIRST NAME										
Gasdick	Barbara		10	15	23	22	65	16	151	69%	
Kalunga	Prudence		20	20	30	30	100	20	220	100%	
Giorgio	Marilyn		13	18	25	25	74	17	172	78%	
Mitnick	Teresa		16	15	20	17	32	15	115	52%	
Bond	Patrick		14	13	20	28	78	18	171	78%	
Dane	Stephanie		18	19	19	19	65	19	159	72%	
Bond	Andrew		15	16	21	20	85	16	173	79%	
Fraher	Brigid		18	17	26	23	95	20	199	90%	
Brown	Lyn		20	15	19	20	73	15	162	74%	
Potochar	Charlene		16	20	20	21	91	13	181	82%	

Fig. 5.3 Gradebook document after update #1

Breaks between sections of a spreadsheet help the eye locate important data when scanning the page, whether on screen or on paper. In *Calc*, the easiest way to do this is to use an extra row or column at the point where you want to create a division between different parts of the spreadsheet, and then put a border along the edges of the empty row and also reduce the width of the inserted row or column so it appears as a double line (Fig. 5.3 above). Follow these steps to update the spreadsheet along these lines.

On the left edge of the screen, in **row 13**, click on the **row number (13)** to select the entire empty row

First you want to put a border around the set of cells in Row 13.

Right click on the **Row number 13** and, in the context menu, select **Format Cells...**, then in the **Format Cells** dialog box click on the **Borders** tab, then click on the tool to **Set Outer Border Only** (Fig. 5.4 on the next page), and click **OK**

Now you want to reduce the *row height* so the whole row looks like a double line separating Rows 12 and 14.

**Right click** again on the **Row Number 13** and, in the context menu, select **Row Height...**, then in the **Row Height** dialog box type the value **0.05** to replace the default height, and click **OK**

You need to create a similar dividing line after Row 23, which holds the data for the last student in the roster. This is because you are shortly going to include new formulas in Rows 25 thru 27.

Right click on the **Row number 24** and, in the context menu, select **Format Cells...**, then in the **Format Cells** dialog box click on the **Borders** tab, then click on the **Set outer border only** tool (Fig. 5.4), and click **OK**

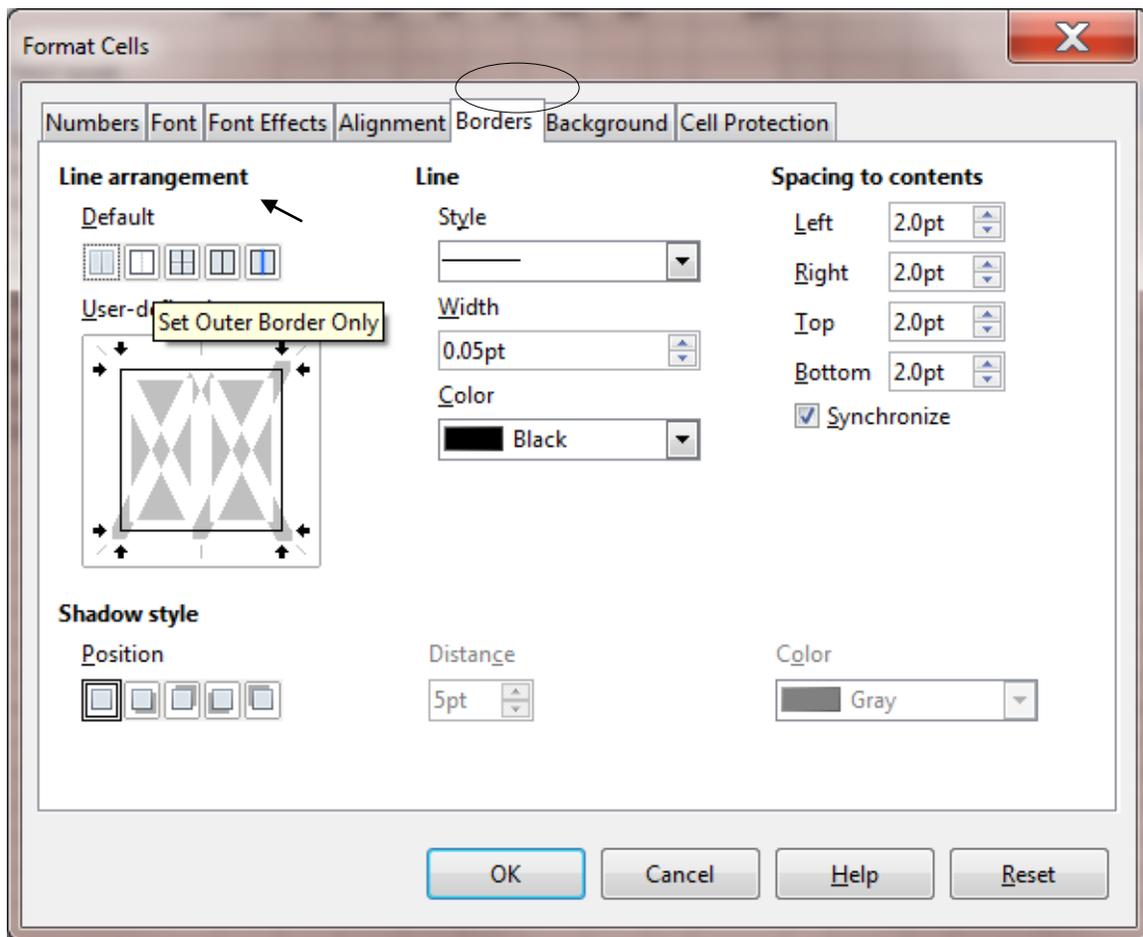


Fig. 5.4 Putting a border around a row of cells

Right click again on the **Row Number 24** and, in the context menu, select **Row Height...**, then in the **Row Height** dialog box type the value **0.05"** to replace the default height, in the **Shadow style** section click on the **first (no shadow)** button, and click **OK**, then **save your work (Ctrl-s)**

### Adding functions to the spreadsheet

As you learned in Lesson 4, *Calc* comes with many built-in functions for the spreadsheet. Let's look at some of the built-in functions so that you know how to find them when you need them.

Start this exercise by clicking in cell **A1**, right at the top left of the spreadsheet, then, in the **Formula Bar**, click on the **Function Wizard** tool (Fig. 5.5)

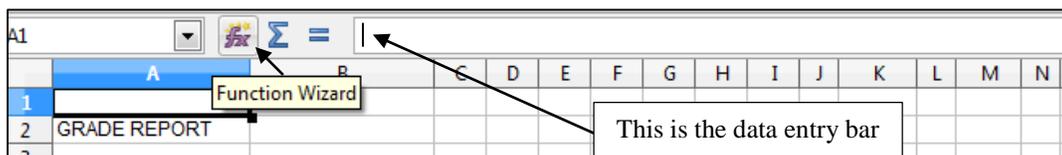


Fig. 5.5 The Function Wizard tool in the Formula Bar

Clicking on the **Function Wizard** tool will bring up the **Function Wizard dialog box** (Fig. 5.6)

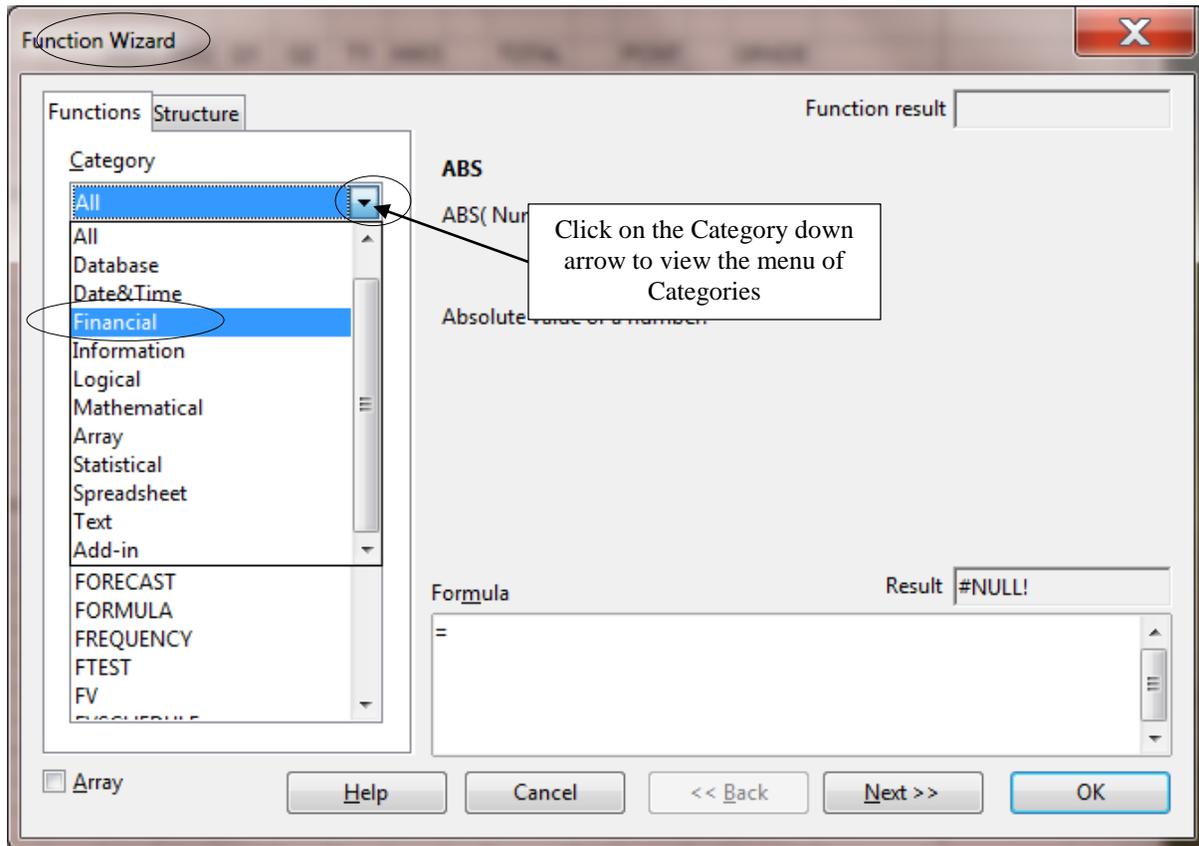


Fig. 5.6 The Function Wizard dialog box

In the **Category section**, click on the **down arrow** to bring up the various **Categories of Functions** available in *LibreOffice*

Select the **Financial** category, then, in the **Function section** of the dialog box, check out the **several dozen Financial functions** available to you there

Do the same with the *Calc* **Database, Date&Time, Information, Logical, Mathematical, Statistical, Spreadsheet, and Text** sets of **built-in Functions**

If you're feeling overwhelmed, relax. Complete the exercises that follow and you'll start to get the hang of using functions such as these.

Click on the **Cancel** button to close the **Function Wizard** dialog box

Experience is the best way to learn how some of these functions work. In Lesson 4 you already learned to use the *Sum* function, and also you created your own formula to calculate the *Percentage* for each student.

You are going to add three new functions to the Gradebook document: the *Average*, the *Max*, and the *Min* functions. Let's start with the *Average* function, which will calculate the *average score* for a set of student scores.

### Calculating an average for each of the Grade columns

In Row 25 of the Gradebook spreadsheet, at the bottom of each of the columns that contain scores, you are going to put the value representing the *average* of the scores for that column, as illustrated in Fig. 5.7.

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
1															
2	GRADE REPORT														
3															
4	Class: Grade 4														
5	Semester: 1														
6	Year: 2014														
7															
8				HW1	HW2	Q1	Q2	T1	HW3		TOTAL		PCNT		GRADE
9															
10			MAX	20	20	30	30	100	20		220				
11															
12	LAST NAME	FIRST NAME													
13															
14	Gasdick	Barbara		10	15	23	22	65	16		151		69%		
15	Kalunga	Prudence		11	20	30	30	100	20		211		96%		
16	Giorgio	Marilyn		12	18	25	25	74	17		171		78%		
17	Mitnick	Teresa		13	15	20	17	32	15		112		51%		
18	Bond	Patrick		14	13	20	28	78	18		171		78%		
19	Dane	Stephanie		15	19	19	19	65	19		156		71%		
20	Bond	Andrew		16	16	21	20	85	16		174		79%		
21	Fraher	Brigid		17	17	26	23	95	20		198		90%		
22	Brown	Lyn		18	15	19	20	73	15		160		73%		
23	Potochar	Charlene		19	20	20	21	91	13		184		84%		
24															
25		Average		14.5	16.8	22.3	22.5	75.8	16.9						
26															
27															
28															
29															
30															
31															
32															
33															
34															
35															

Fig. 5.7 Average scores for each column

Notice in Fig. 5.7 that cell B25, right under the column of first names, has the row label *Average*. You need to put the same cell entry in your Gradebook document.

Select cell **B25**, type the label **Average**, and press **Tab twice** to move to cell **D25**

### A word about automatic calculation

When **Automatic Calculation** is switched on, *Calc* immediately carries out any calculations that are necessary when you make any changes to the data in the spreadsheet.

With automatic calculation, you don't have to remember to do this yourself. If *Automatic Calculation* is not already on by default, it will be good for you to turn it on, so here's how you do it.

In the **Tools** menu > **Cell Contents...**, check to see, in the **Cell Contents** sub menu, that there is a **check mark** next to **AutoCalculate** (Fig. 5.8)

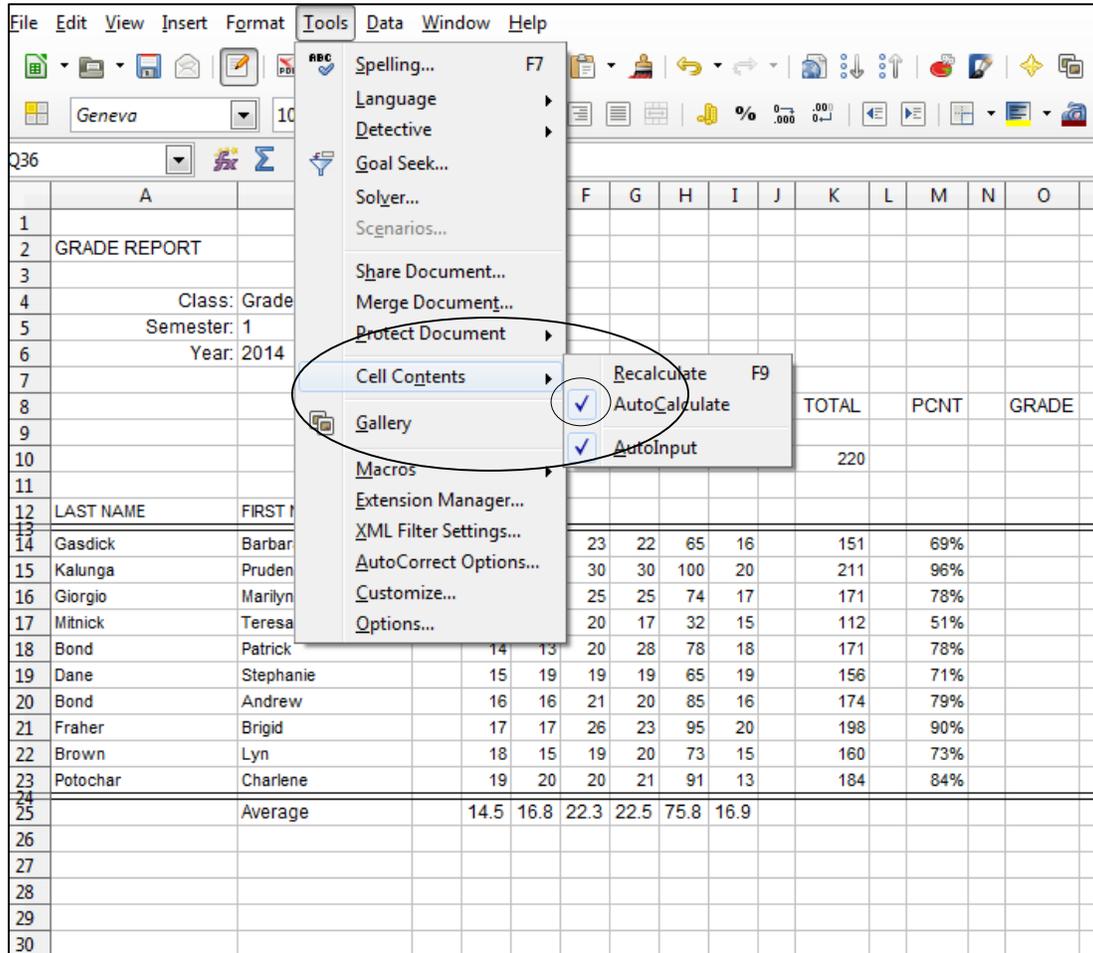


Fig. 5.8 Automatic Calculation

*Back to the task at hand*

An average is computed by *adding* (SUMming) the set of scores for an assignment or test, and then *dividing the total by the number of scores in the set*. You *could* put together this formula yourself, of course. If you know what the formula would be for the first column of scores, write it in the box below. Remember, a function or formula always begins with the equals (=) sign.

Check the footnote below to see if you got the answer right<sup>1</sup>. But since *Calc* has a built-in Average function, you may as well use it. Here are the steps to include the Average function in your spreadsheet.

Make sure cell **D25** is still selected (the cell under the first column of scores), then click on the **Function Wizard (fx)** icon in the **data entry** bar and, in the

<sup>1</sup> Your formula should look something like this: =SUM(D14:D23)/10

**Function Wizard dialog box**, from the list of **Categories**, select the **Statistical** category (Fig. 5.9)

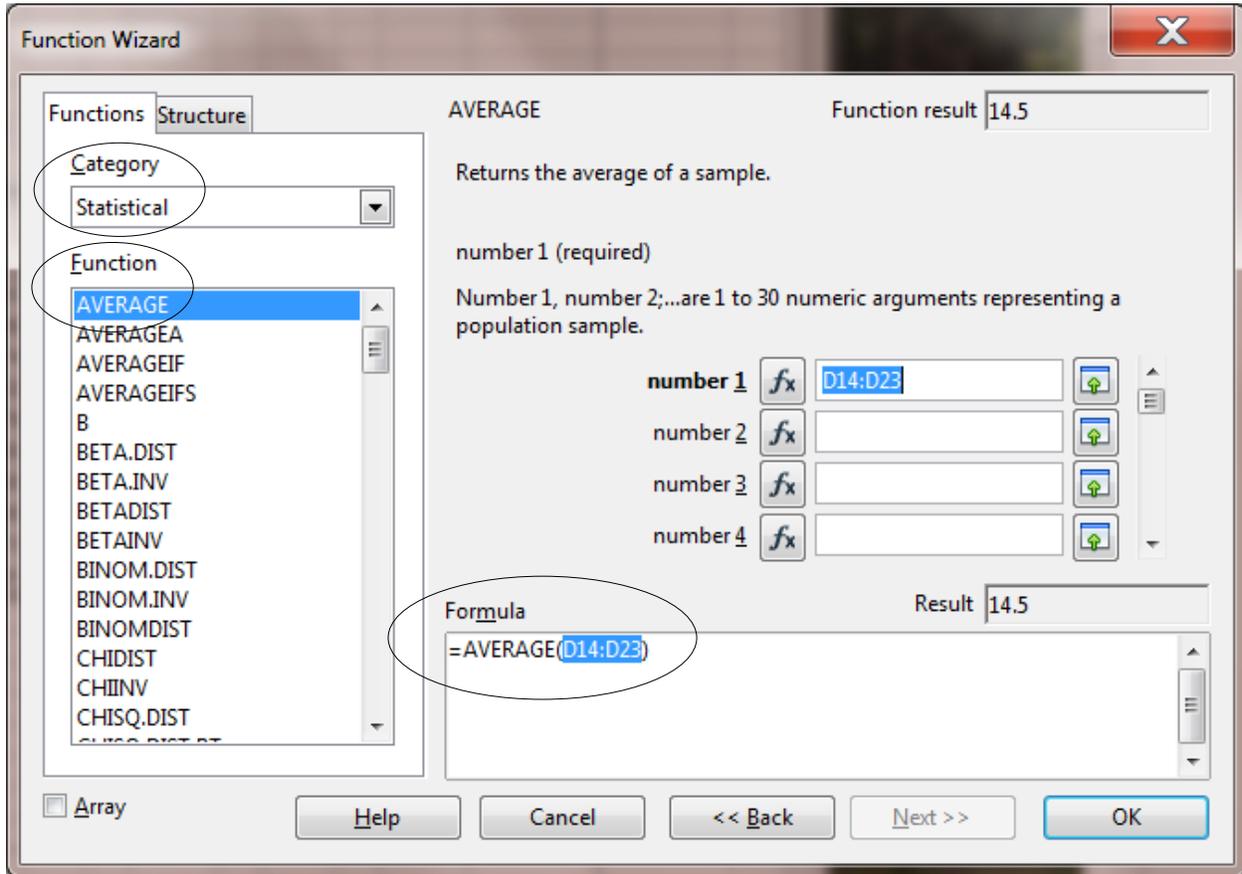


Fig. 5.9 The Insert Function dialog box showing the Statistical category of Functions

From the list of **Statistical functions**, **double click** on the **AVERAGE** function to select it

*Calc* pastes the function into the Formula area of the dialog box, followed by a set of empty brackets. The brackets are for the set of cells that contain the scores that are to be averaged. Notice that the cursor is waiting between the brackets for you to select that set of cells.

Type **D14:D23** (Fig. 5.8) then click on **OK**

Alternatively, you could use the mouse to drag down the set of cells from D14 to D23 with the same result. Look at the data entry bar at the top of the spreadsheet and notice that the formula `=AVERAGE (D14:D23)` is copied there, too.

Now look at cell **D25**. It should contain the average for the scores in Column D. At this stage there are three problems that can occur:

1. If you see a series of pound signs (###), this indicates that there's not enough room in the column to show the value, so you might need to *widen* the column a little to make enough

- space for the average score to appear. If this is the case (where you see ### instead of an average score), make the column wider.
2. If a **Bad Formula** prompt pops up on the screen, check the formula in the entry bar again, compare it to the correct Average formula `=AVERAGE(D14:D23)`, and make any corrections.
  3. It is always possible that the values being averaged yield a result that turns out to be a whole number (no fractions). But it would be useful to show at least one decimal place, regardless of the outcome of the Average calculation. If the average displayed in your Gradebook is rounded to a whole number (no decimal places), here are the steps to change the precision of the Average value to 1 decimal place.

In the **Format menu** select **Cells...** and in the **Format Cells** dialog box, make sure, in the **Options area**, that the number of **Decimal places** is set to **1**

Assuming all is well, your next task will be to copy this *Average formula* into the cells immediately to the right of *cell D25*, so that you have an average score under the other columns of scores (cells E25 through I25).

Cell **D25** should still be selected (click on it if it is not selected)

Fig. 5.10 shows you that you're going to use the mouse to grab hold of the handle in the lower right corner of cell **D25** (you practiced doing this in Lesson 4) and drag it across all the way to cell I25.

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
4	Class: Grade 4														
5	Semester: 1														
6	Year: 2014														
7															
8				HW1	HW2	Q1	Q2	T1	HW3		TOTAL		PCNT		GRADE
9															
10			MAX	20	20	30	30	100	20		220				
11															
12	LAST NAME	FIRST NAME													
13															
14	Gasdick	Barbara		10	15	23	22	65	16		151		69%		
15	Kalunga	Prudence		11	20	30	30	100	20		211		96%		
16	Giorgio	Marilyn		12	18	25	25	74	17		171		78%		
17	Mitnick	Teresa		13	15	20	17	32	15		112		51%		
18	Bond	Patrick		14	13	20	28	78	18		171		78%		
19	Dane	Stephanie		15	19	19	19	65	19		156		71%		
20	Bond	Andrew		16	16	21	20	85	16		174		79%		
21	Fraher	Brigid		17	17	26	23	95	20		198		90%		
22	Brown	Lyn		18	15	19	20	73	15		150		72%		
23	Potochar	Charlene		19	20	20									
24															
25		Average		14.5											
26															
27															
28															
29															
30															
31															
32															

Fig. 5.10 Cell copy handle

Use the mouse to point at the **handle** in the **lower right** corner of cell **D25** (Fig. 5.10), and drag the handle across to **Column I**—so that the formula is copied across to cells **E25, F25, G25, H25, and I25**, which will all now have the correct Average score for their respective columns

That's all there is to it. If necessary (though it shouldn't be the case with this exercise) adjust the column widths if you see pound signs (###) in any cell instead of averages.

Time to save all your hard work (**Ctrl-s**)

### **Displaying the Highest (MAX) and Lowest (MIN) scores for each column of scores**

Now that you know how to use the Insert Function icon (*fx*) next to the Data Entry bar, and in particular since you just used it to put the Average function in your spreadsheet, you should be able to complete the exercise that follows without much help.

In cell **B26** put the heading **Max score** and in cell **B27** put the heading **Min score**

Make sure cell **D26** is selected (the cell under the first Average calculation), then click on the **Function Wizard (*fx*)** icon in the **data entry** bar and, in the **Function Wizard dialog box**, from the list of **Categories**, select the **Statistical** category (Fig. 5.9 on page 154)

From the list of **Statistical functions**, **double click** on the **MAX** function to select it

*Calc* again pastes the function into the *Formula area* of the dialog box, followed by a set of empty brackets. The brackets are for the set of cells that contain the scores that are to be averaged. Notice that the cursor is waiting between the brackets for you to select that set of cells.

Type **D14:D23** (Fig. 5.9—p. 154) then click on **OK**

Look at the data entry bar at the top of the spreadsheet and notice that the formula `=MAX(D14:D23)` is copied there, too. Now look at cell **D26**. It should contain the maximum score in Column D. Check to confirm that that is indeed the case. You should be starting to feel comfortable building functions in the spreadsheet.

Now make sure cell **D27** is selected (the cell where you're going to put the MIN formula), then click on the **Function Wizard (*fx*)** icon in the **data entry** bar and, in the **Function Wizard dialog box**, from the list of **Categories**, select the **Statistical** category (Fig. 5.9 on page 154)

From the list of **Statistical functions**, **double click** on the **MIN** function to select it

*Calc* again pastes the function into the *Formula area* of the dialog box, followed by a set of empty brackets. As you now know, the brackets are for the set of cells that contain the scores that are to be averaged. Notice again that the cursor is waiting between the brackets for you to select that set of cells.

Type **D14:D23** (Fig. 5.9—p. 154) then click on **OK**

Look at the data entry bar at the top of the spreadsheet and notice that the formula `=MIN(D14:D23)` is copied there, too. Now look at cell **D27**. It should contain the maximum score in Column D. Check to confirm that that is indeed the case.

At this stage, the last task is to copy the Functions across to the other cells in rows 26 and 27. You probably already know how to do this, but here are the steps in case you need help.

With **cell D26** selected, grab hold of the **handle** in the **lower right corner** of the cell and **drag across** with the mouse to select cells **E26 through I26**—the cells in which you want to include the **Max** function, and click **OK**

Now, with **cell D27** selected, grab hold of the **handle** in the **lower right corner** of the cell and **drag across** with the mouse to select cells **E27 through I27**—the cells in which you want to include the **Min** function, and click **OK**

Better Save your work (**Ctrl-s**)

When you're done, your spreadsheet should look much the same as Fig. 5.11.

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
4	Class: Grade 4														
5	Semester: 1														
6	Year: 2014														
7															
8				HW1	HW2	Q1	Q2	T1	HW3		TOTAL		PCNT		GRADE
9															
10			MAX	20	20	30	30	100	20		220				
11															
12	LAST NAME	FIRST NAME													
13															
14	Gasdick	Barbara		10	15	23	22	65	16		151		69%		
15	Kalunga	Prudence		11	20	30	30	100	20		211		96%		
16	Giorgio	Marilyn		12	18	25	25	74	17		171		78%		
17	Mitnick	Teresa		13	15	20	17	32	15		112		51%		
18	Bond	Patrick		14	13	20	28	78	18		171		78%		
19	Dane	Stephanie		15	19	19	19	65	19		156		71%		
20	Bond	Andrew		16	16	21	20	85	16		174		79%		
21	Fraher	Brigid		17	17	26	23	95	20		198		90%		
22	Brown	Lyn		18	15	19	20	73	15		160		73%		
23	Potochar	Charlene		19	20	20	21	91	13		184		84%		
24															
25		Average		14.5	16.8	22.3	22.5	75.8	16.9						
26		Max Score		19	20	30	30	100	20						
27		Min score		10	13	19	17	32	13						
28															
29															
30															
31															
32															
33															
34															
35															

Fig. 5.11 The Gradebook document after adding the functions (your data will be different)

**Protecting (locking) important cells**

*Calc* allows you to protect the contents of a cell or cells. This means that neither you nor anyone else will be able to change the contents unless you remove the protection. This feature is useful to prevent accidental loss of data, and will also help prevent others from interfering with the data you have collected.

Since all the data in a Grade book are important, it would be a good idea to protect everything. The process to do this is the same as if you were protecting a single cell, or a few cells, except that you select every cell.

Press **Ctrl-a** to **Select All** the cells in the spreadsheet

From the **Tools** menu > **Protect Document** select **Sheet** to put a check mark there—to select protection for the sheet (Fig. 5.12)

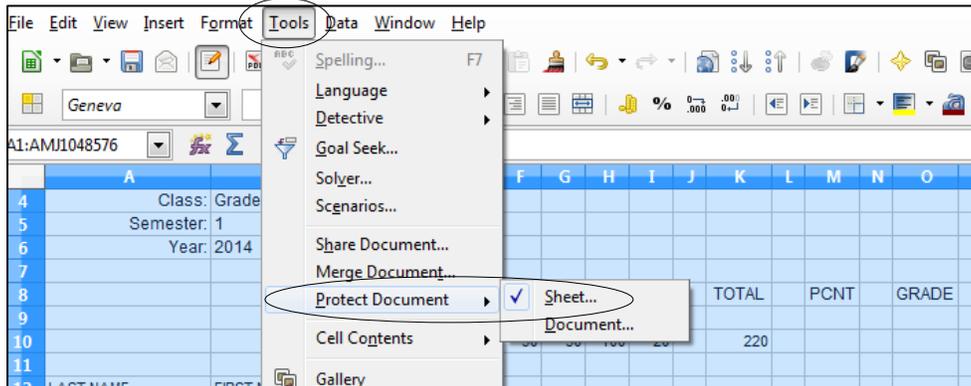


Fig. 5.12 Protecting the spreadsheet data

This brings up the *Protect Sheet* dialog box (Fig. 5.13).

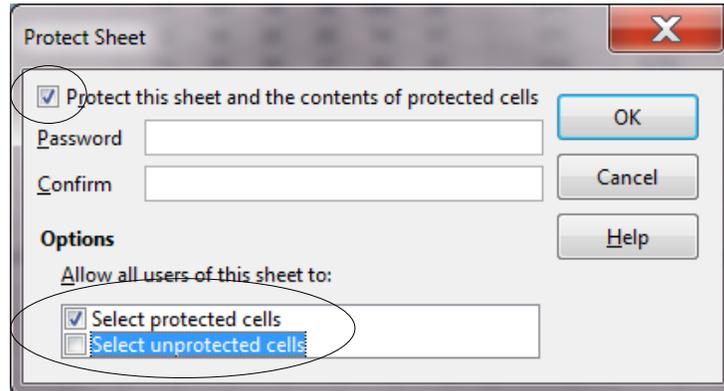


Fig. 5.13 Protect Sheet dialog box

Take a look at this dialog box. Notice that the option to “Protect this sheet and the contents of protected cells” is checked by default, which is fine because that’s what you want to do. Notice, too, that you have the option to include a *password* for the protection, which would be important if this were a real world spreadsheet. But for the sake of this exercise, we’ll not use a password. We’ll return to the subject of password protection when you’re done with this exercise.

But you *do* need to remove the check mark next to *Select unprotected cells*. This is because you have opted to protect *every* cell in the spreadsheet.

So, click to **remove** the **check mark** next to **Select unprotected cells**, then click on **OK**

Now, even if you try to click on a cell, the system won’t let you. Every cell in the spreadsheet is protected against unwarranted attack.

### Password protection

Of course, someone who knows how to use *Calc* will know how to unlock the protection—unless it’s protected by a password, of course. So if you really want to prevent someone else from messing with the data in the spreadsheet, you may need to take advantage of the option to include a password.

This is a necessary feature if you want to lock the cells in your spreadsheet in a way that prevents others from changing data you have stored in the spreadsheet, such as scores or grades.

Passwords provide protection against unauthorized access. Choose a password carefully; one that would be difficult to guess, of course, but also one that you would be sure to remember! The weirder the password the better—it should include upper case letters as well as numbers and special characters such as the @ symbol or whatever. Remember, the weirder your password the better—as long as you can remember it. However, there’s no need to use a password in this exercise unless you want to, of course.

Now all the cells in the Gradebook spreadsheet are unable to be changed unless, in the Tools menu > Protect Document, you remove the check mark next to Sheet in the sub menu.

Time to **Save** the changes to the Gradebook document (**Ctrl-s**)

### Dividing the spreadsheet into panes

Often a spreadsheet will be too long or too wide to view all the data at once on the screen. For this purpose, *Calc* has a useful feature (*Split*), which allows you to compare separate parts of a sheet side-by-side. You can split any window horizontally and vertically into sections (or Panes—like window panes). This allows you, while working or scrolling in one section, to keep other section(s) fixed in place. This applies whether the spreadsheet is protected or not.

To see how this works, first click in cell **P28** to give *Calc* a pivot for the split screen, then in the **Window menu** select **Split**

*Calc* immediately divides up the worksheet into four sections, using a vertical and a horizontal split bar (Fig. 5.14).

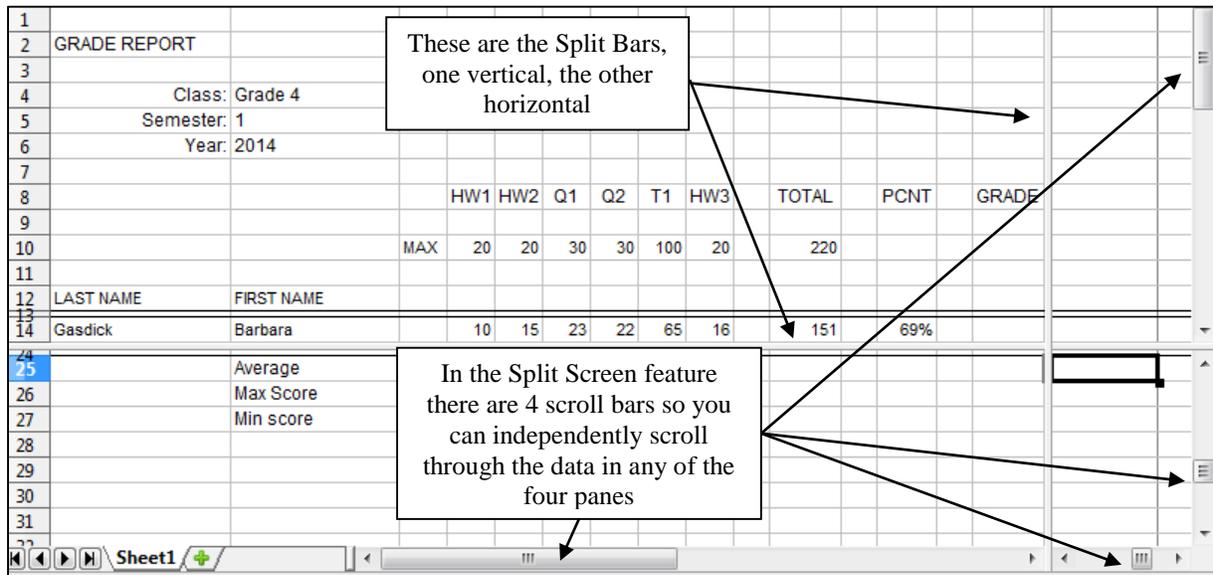


Fig. 5.14 *Calc*’s vertical and horizontal split bars

The split bars are grey so not that obvious, especially with other cell lines all over the place, but look carefully and you’ll see them well enough.

The vertical and horizontal split occurs at the point in the spreadsheet where you have a cell selected. You can change the position of the split bars by positioning the mouse arrow on a split bar and dragging across or down the screen. Try this for practice

Position the mouse arrow on either the vertical or horizontal **split bar** (you'll get a **cross-hair cursor**) and drag across or down the screen

Now grab each of the **scroll bars** and check out the data in each of the four panes

Notice how easy it is to compare different parts of a spreadsheet in this way.

Finally, in the **Window menu** select **Split** again to **turn off** the panes option

## 5.4 MAKING CHANGES TO THE LOOK OF THE SPREADSHEET

In Lesson 4 you learned how to change the width of columns and the height of rows. Now you are going to learn how to put borders around selected cells and how to remove the grid lines and column and row headings.

### Putting a border around a cell or set of cells

Before you can make any changes, you need to remove Protection from the worksheet. Let's do that before proceeding with the tutorial.

In the **Tools menu** select **Protect Document** and in the **sub menu** select **Sheet** to **remove the check mark** there, thus **removing Protection** on the **Gradebook** sheet

Now let's make some more changes to the Gradebook document. For example, you may want to put a box around certain sections of your spreadsheet, such as the Class info in cells A4 through B6. This will make the information stand out on the sheet. Try this now.

Drag across the six cells **A4 through B6** to select the set of **Class info**, then, in the **Format menu** select **Cells...** to bring up the **Format Cells** dialog box (Fig. 5.15)

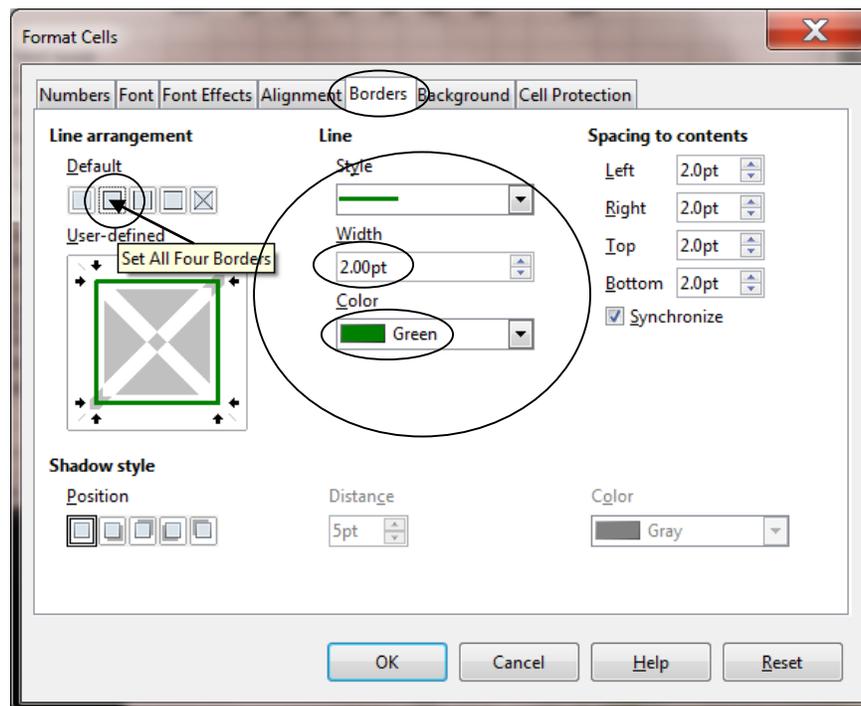


Fig. 5.15 *Calc*'s Borders options for cells or groups of cells

In the dialog box, click on the **Borders** tab (Fig. 5.15 above)

As you can see, the Borders dialog box gives you various options.

In the **Line Arrangement** section, click on the icon to **Set Outer Border Only** then, in the **Line** section (see Fig. 5.15 above), increase the **Line Width** to **2.00pt** and the **Line Color** to **Green**, then click on **OK**

The Class Info now has a distinctive green border around it, setting it off from the rest of the data in the Gradebook document (Fig. 5.16).

2	GRADE REPORT		
3			
4	Class: Grade 4		
5	Semester: 1		
6	Year: 2014		
7			
8			
9			

Fig. 5.16 Spreadsheet cell with border

### Removing grid lines and column and row headings

Grid lines and column and row headings are essential when developing a spreadsheet or when you are updating the data. But for reporting purposes it may look better, perhaps even easier to read, if they are removed. You may recall doing this in Lesson 4, specifically in order to print the spreadsheet without column and row headers and gridlines. Here, however, you want to remove the column and row headers and gridlines in the spreadsheet as it appears on the computer screen.

In the **View menu** select **Column and Row Headers** to remove the headers then, in the **Formatting toolbar**, click on the tool to **Toggle Grid Lines for Current Sheet** (Fig. 5.17)

		HW1	HW2	Q1	Q2	T1	HW3	TOTAL	PCNT	GRADE
		MAX	20	20	30	30	100	20		
LAST NAME	FIRST NAME									
Gasdick	Barbara	10	15	23	22	65	16	151	69%	
Kalunga	Prudence	11	20	30	30	100	20	211	96%	
Giorgio	Marilyn	12	18	25	25	74	17	171	78%	
Mitnick	Teresa	13	15	20	17	32	15	112	51%	
Bond	Patrick	14	13	20	28	78	18	171	78%	
Dane	Stephanie	15	19	19	19	65	19	156	71%	
Bond	Andrew	16	16	21	20	85	16	174	79%	
Fraher	Brigid	17	17	26	23	95	20	198	90%	
Brown	Lyn	18	15	19	20	73	15	145	66%	
Potochar	Charlene	19	20	20	21	91	13	184	84%	
Average		14.5	16.8	22.3	22.5	75.8	17.1			
Max Score		19	20	30	30	100	20			
Min score		10	13	19	17	32	13			

Fig. 5.17 Removing grid lines and column and row headings

No problem. The spreadsheet now looks quite different, as you can see. For the next exercise, however, it will be best to have the Gridlines and Headers showing in the Gradebook document.

In the **View** menu select **Column and Row Headers** again to put back the headers, then, in the Formatting toolbar, click on the tool to **Toggle Grid Lines for Current Sheet** (Fig. 5.16 on previous page)

### Updating the Grades Template spreadsheet

You are now going to make the same changes to the Gradebook Template that you just made to the Gradebook document. To do this, it will be easiest if you have both spreadsheets side-by-side on your screen.

Click on **File > Open**, then navigate to your **disk drive/USB drive > Work Files for LibreOffice > Miscellaneous Files > Templates** folder and open the **Gradebook Template** document

Now you should have both the Gradebook and the Gradebook Template open on your screen.

If you have a large enough screen, use the mouse to drag each window so they are side-by-side (Fig. 5.18)

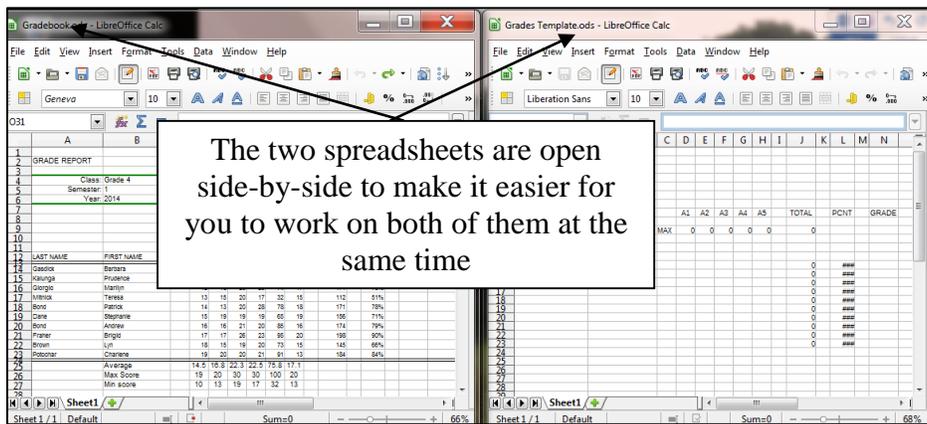


Fig. 5.18 Spreadsheets arranged side-by-side

If you are using a computer with a smaller screen, the two spreadsheets can be layered on top of one another and you can toggle back and forth using the Window menu (Fig. 5.19).

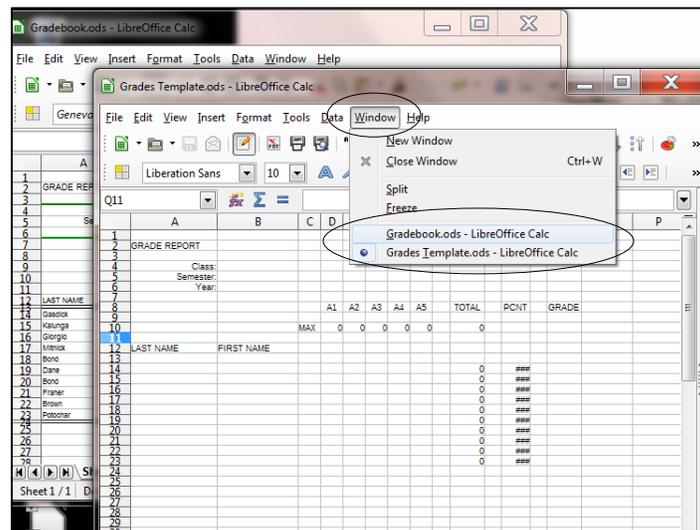


Fig. 5.19 Using the Window menu to toggle back and forth between spreadsheets



Your next task is to once again protect the cells in the Gradebook spreadsheet and also reset the protection on the worksheet. First you must make the Gradebook the active document on the screen.

In the **Window menu**, click on the **Gradebook.ods** so as to make this the current spreadsheet on the Desktop

Now you can go ahead and protect the Gradebook spreadsheet.

Press **Ctrl-a** to **Select All** the cells in the spreadsheet (this is the quickest way to select all the cells in the spreadsheet, but you may recall that you can also click in the small box in the top left corner of the row and column headings)

From the **Tools menu** select **Protect Document** and click **Sheet...** in the sub menu

In the **Protect Sheet dialog box** that pops up, click to remove the check mark next to **Select unprotected cells** (see Fig. 5.12 and 5.13 on page 158) then click on **OK**, and **Save** your work

It might be a good idea to take a break at this point in the tutorial. But if you feel up to it, feel free to proceed directly to the next section, Section 5.5 on the next page.

**TIME FOR A BREAK?**  
**FEEL FREE TO TAKE ONE...**  
**THIS MIGHT BE ENOUGH FOR ONE DAY!**

## 5.5 USING THE LOOKUP FUNCTION

### The concept of the LOOKUP function

The spreadsheet LOOKUP function is a little tricky to understand, so stand up, step back from the keyboard for a while and stretch some of those muscles that are stiff from sitting through the first part of this tutorial. When you are ready, read quietly through this section to understand how the LOOKUP function works.

The LOOKUP function is a simple logic tool that you can use to automatically assign grades to your students based on the numbers in the Percentage column of your spreadsheet (column L).

You are probably aware by now that if you have the automatic calculation option selected, *Calc* carries out function-based calculations as you make changes in a spreadsheet. Thus, once you have programmed *Calc* to LOOKUP the grades, the system will automatically update each student's Letter Grade, along with Totals and Percentages, even as you enter new scores for assignments, homework, tests, and so forth.

Thus, with no effort on your part, you will be able to keep students informed at any time during the semester as to exactly what grade they currently carry for the class.

Such information is invaluable. *Knowledge is power*. When a student is aware of an inadequate grade early on, extra effort can be applied to improve the situation before it is too late. It is surprising how often students are unaware of how they stand with regard to their progress through a course. The teacher who fails to provide adequate feedback when directing students in their pursuit of academic objectives deserves at least some of the blame if students do not progress as well as they should. When students are kept apprised at all times of where they stand they tend to take more responsibility for the outcomes of their efforts—or lack of them.

Fig. 5.2 illustrates the LOOKUP Table that will be the outcome of this exercise.

P	Q
Range (%)	Grade (A-E)
0.00%	E
60.00%	D
70.00%	C
80.00%	B
90.00%	A
100.00%	A

Fig. 5.22 LOOKUP table

You are going to tell *Calc* to compare a student's percentage with the range of values in the first column of the table. These are control percentages. *Calc* will search through this first column, looking for the highest value (percentage) that is *less than or equal to* the student's percentage. Once that value is located in the first column, the function will assign the student the letter grade that is adjacent to it in the second column.

Does that make sense? An example will help. Suppose the student's percentage is 87%. Well, in the table above, the *highest* value in the first column that is still *less than or equal to* 87% is 80%, is it not? 70%, 60%, and 0% are less than or equal to 87%, but they are not the *highest* value that is less than or equal to 87%. So 80% is the value that *Calc* will select from the Range column in its LOOKUP of the table. The letter grade from the corresponding cell in the second column—in this case a "B"—will then be posted to the **GRADE** column of the Gradebook document proper.

Once you understand the concept of "the highest value less than or equal to another number", the rest is easy. Here are a few student percentages to try for yourself. Complete the exercise that follows.

From Fig. 5.22, column 1,

What is the highest value less than or equal to 45%, and what is the resulting letter grade? \_\_\_\_\_

What is the highest value less than or equal to 67%, and what is the resulting letter grade? \_\_\_\_\_

What is the highest value less than or equal to 59%, and what is the resulting letter grade? \_\_\_\_\_

What is the highest value less than or equal to 100%, and what's the resulting letter grade? \_\_\_\_\_

The answers are in the footnote at the bottom of the page.<sup>1</sup>

There are two parts to incorporating the *Calc* LOOKUP function into your Gradebook document. First you must build the LOOKUP Table into the spreadsheet. Second you must enter into the appropriate cells the LOOKUP function that will instruct *Calc* to carry out the LOOKUP operation.

### Building the LOOKUP Table

You'll need both the **Gradebook document** (which you saved in the **Data Files** folder in the **Spreadsheet Documents** folder) and the **Gradebook Template** (which you also saved in the **Data Files** folder in the **Spreadsheet Documents** folder) to complete the remainder of this tutorial, so if these documents are not already open, open them both from your **Work Files for LibreOffice** folder before proceeding

Next, in the **Window menu** select the **Gradebook** document, if it is not already the active window on the screen

Since all the cells are protected in the Gradebook document, you'll need to unlock them first in order to make changes.

From the **Tools menu** select **Protect Document**, then make sure, in the sub menu, that there is **no check mark** next to **Sheet**

Now, let's build the Lookup table that's illustrated in Fig. 5.22 above (page 165). The first column of the LOOKUP Table (the lookup vector) has a set of numbers which *Calc* calls the *Search vector*.

A vector is just another name for a single column of numbers. The *Search vector* contains the set of values against which *Calc* compares the data from a selected cell in the Gradebook document.

Let's create this column (vector) of the LOOKUP table first. As you work your way through this exercise, be sure to hit the *number* 0, NOT the *letter* O; they are so close together on the keyboard that some students hit the wrong character by mistake.

Select cell **P1** and type the column header **Range (%)** then press **Enter** to move down to cell **P2**

Type **0** (the number zero (0) that is) in cell **P2** and press **Enter** to move down to cell **P3**

Type **0.6** (this is equivalent to 60% in mathematical terms) and press **Enter** again to select cell **P4**

---

<sup>1</sup> 0% (E); 60% (D); 0% (E); 100% (A)

Type **0.7** and press **Enter** to make **P5** the current cell

Type **0.8** and press **Enter** once more

Type **0.9** in cell **P6** and press **Enter** again to make **PrANGE (%)7** the current cell

Finally type **1** (this is equivalent to 100% in mathematical terms) and click on the **Accept** (✓) button

Now you must change the cell attributes of this first column of the table so as to display the numbers in percent form (with the percent (%) symbol). You did this before in Lesson 4, so the following is just a reminder of how to do this.

Drag down to highlight **all 6** of the scale values from cell **O2** to cell **O7**

In the **Formatting toolbar** click on the **% (Percent)** symbol to change the format of the decimal numbers to percentages

That completes the first column of the table. Now for the second column with the letter grades—what *Calc* calls the *result vector*. The *result vector* contains the values which *Calc* returns to the Gradebook cell which contains the formula which calls on the LOOKUP function.

Select cell **Q1** and type the header **Grade (A-E)**, then press **Enter** to move down to cell **Q2**

Type the letter **E** (or whatever you would use for a failing grade) and press **Enter** to go to cell **Q3**

Type a **D** and move down to cell **Q4**, then type a **C** and move down to cell **Q5**

Type a **B** and move on down to cell **Q6**, then type an **A** and move down to cell **Q7**

Finally type an **A** again in cell **Q7** and click on the **Accept** (✓) button

The table is now almost ready for use. A couple of cosmetic adjustments will improve its appearance.

Select columns **P** and **Q** by dragging across the **column headers P** and **Q** at the top of the columns

Your LOOKUP Table should now look like Fig. 5.22 on page 165.

**Save** all your hard work before proceeding with the tutorial

### **Using the clipboard to copy cells from one document to another**

Now that you have completed the task of building the LOOKUP Table in the Gradebook document you should update the Gradebook Template along the same lines. The easiest way to do this is to copy the relevant cells from the Gradebook document into the Gradebook Template document using Copy and Paste.

First you must copy the relevant cells (those used for the LOOKUP Table) from the Gradebook document to the clipboard. Here are the steps.

Select cell **P1** and drag down diagonally across the **LOOKUP Table** to cell **Q7**

Press **Ctrl-c** to copy the **LOOKUP Table** to the clipboard

Now switch to the **Gradebook Template** document by **switching windows** in the **View Ribbon > Window Group** or, more simply, just clicking in any cell in the Gradebook Template

In the **Gradebook Template**, click on cell **P1** to make it the current cell

Press **Ctrl-v** to paste the **LOOKUP Table** from the clipboard to the **Gradebook Template**, then **Save** your work (**Ctrl-s**) once more

### Entering the LOOKUP function into the Grade column of the spreadsheet

Take a moment to understand the next step in using the LOOKUP table. Recall that the LOOKUP function instructs *Calc* to look up a table that you have built and come back with a corresponding result to store in the spreadsheet proper. Still confused? Maybe the following will help you figure it out.

The LOOKUP function has the following parts to it:

**=LOOKUP(Search criterion,Search vector,result\_vector)**

Let's examine each part of this function in order to understand how it works.

- As you know by now, the "=" symbol at the start of the function simply tells *Calc* that a function or formula is in the cell, as opposed to ordinary data such as numbers or labels.
- The word **LOOKUP** tells *Calc* what task it has to carry out (**look** something **up** in a list).
- **Search criterion**, **Search vector**, and **result\_vector** are variables (control values) that *Calc* uses when it is looking up the table in columns P and Q:
  - the **Search criterion** is either a number or text (such as a person's name); this **value** will be the "key" that *Calc* will use as it searches through the cells in the **Search vector** or column;
  - the **Search vector** is the column of cells that *Calc* has to check in its lookup of the table (column P in Fig. 5.22 on page 165);
  - the **result\_vector** is the column of cells in which *Calc* will find the result of the LOOKUP operation (Column P in Fig. 5.22 on page 165).

Still confused? Don't feel bad; this is definitely tricky stuff. Maybe an example will help you understand how the Lookup function works. It will be easiest for you to follow the next exercise if you have an actual grade book to work with.

The Gradebook Template and Gradebook spreadsheets should still be side-by-side on your screen, so begin by switching back to the **Gradebook document** (use the **Window menu** to **Switch Windows** for this or click on any cell in the **Gradebook** document)

As you follow along, make sure you have at least the LOOKUP Table (columns **P** and **Q**) showing on the screen, as well as columns **M** thru **O**) of the Gradebook document containing the PCNT and eventual GRADE data.



Notice in Fig. 5.24 on the previous page that the cursor is positioned between the brackets after the word =LOOKUP (|) in the formula area of the dialog box. The three sets of data for the LOOKUP function will appear there as you complete the steps that follow.

If the **Function Wizard dialog box** is covering the cells you need to work with (**column M** and the **Lookup Table** in **columns P and Q**), slide the **Function Wizard dialog box** down and off to the right or left on the screen so that the dialog box is out of the way

On the *right side* of the *Function Wizard dialog box* in Fig. 5.24 on the previous page, you see three data entry boxes for the set of arguments (*Search criterion*, *Search vector*, *result\_vector*) which you need to fill out. In Fig. 5.25 below you see the end result of this task, with the set of arguments (*Search criterion*, *Search vector*, *result\_vector*) filled out relative to cell M14. Your task now is to reproduce this yourself.

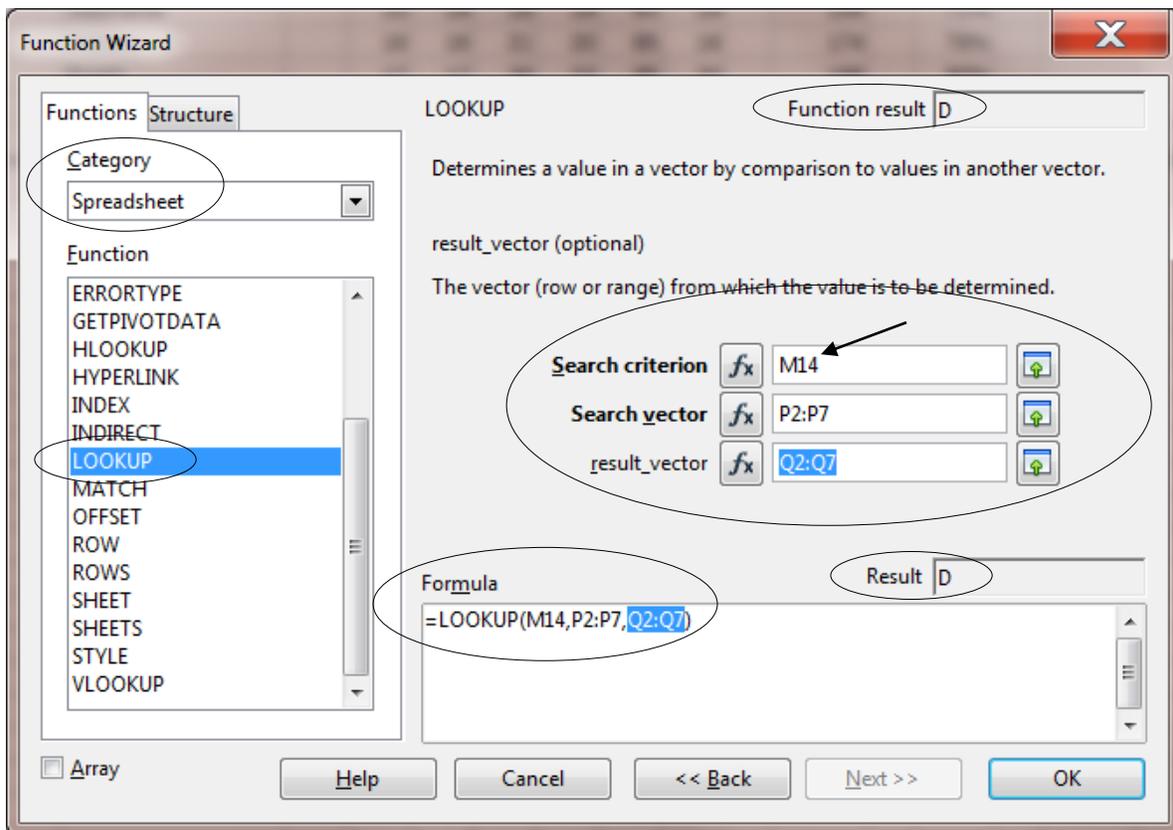


Fig. 5.25 Function Wizard dialog box showing Spreadsheet > Lookup function

#### *Entering the Search criterion in the dialog box*

Each student's Percentage will determine the Letter Grade, so the percentage is what we want *Calc* to use as the Search criterion to find the letter grade from the Lookup Table.

In the **Gradebook** spreadsheet, click on cell **M14** and notice that **M14** is immediately entered into the **Search criterion data entry box** and also **between the brackets after =LOOKUP (|)**—you should now see **=LOOKUP (M14)** there

So *Calc* enters this cell's coordinates as the first of the LOOKUP parameters, the *Search criterion*. You are telling *Calc* that it must use this first student's percentage as the value to check against the first column of the LOOKUP Table (cells P2 through P7).

*Entering in the Search vector*

Cells P2 through P7 are the Search vector for the LOOKUP Table.

In the **Function wizard dialog box**, click to position the cursor in the **second** data entry box—the **Search vector** entry area (see Fig. 5.25 above)—so you can enter the cells which contain the **Search vector**

Now, in the **Gradebook** spreadsheet, use the mouse to drag down **from cell P2 to cell P7**

Notice that in the data entry bar *Calc* fills in the second of the LOOKUP parameters for the LOOKUP function, namely the *Search vector*. It also appears between the brackets after =LOOKUP (M14,P2:P7). Check that it also appears in the Gradebook spreadsheet in the Data entry bar, too. You are almost done with building the LOOKUP function.

*Entering the result\_vector*

Cells Q2 through Q7 are the result\_vector for the LOOKUP Table.

Click to put the cursor in the **third** data entry box so you can specify the cells that contain the **result\_vector**, then, in the **Gradebook** spreadsheet, drag down **from cell Q2 to cell Q7**

Notice, once again, that *Calc* fills in the third of the =LOOKUP (M14,P2:P7,Q2:Q7) parameters, the result\_vector.

In the **Gradebook spreadsheet** itself, check the **data entry bar** to see that the LOOKUP function is now complete—at this stage it should read **=LOOKUP(M14,P2:P7,Q2:Q7)**

Finally, click on **OK** and **Save** your work

*Applying the function*

*Calc* will look for "the highest value in cells P2 through P7 that is less than or equal to the student's percentage".

Take a look at cell **O14** now and **verify** that it contains the correct **letter grade** according to the value in cell **M14** (the percentage for this first student)

As you see, once the LOOKUP function has located the correct cell in column 1 of the Lookup Table (the Range column), all that remains is for *Calc* to make a note of the letter grade that is in the corresponding cell in column 2 of the table (the Grade column), and the LOOKUP function copies that grade into cell O14.

Don't feel bad if your eyes are starting to glaze over; this is kinda nerdy stuff. But hang in there, we're nearly done.

**Copying the LOOKUP function into the rest of the GRADE column**

The first student's grade is taken care of. The next task is to copy this function from cell O14 down to the other cells in the GRADE column (column O), but this is not as simple as it seems because we have to consider the problem of *Absolute* and *Relative* cell references.

If you want to try and do this on your own (you will need to understand the concept of Absolute and Relative references!), go ahead. If you are successful you can skip the rest of this sub-section and go to the *Practice makes perfect* section on the next page.

If you need help completing the LOOKUP function, read on to follow the steps to *correctly* fill down the LOOKUP function to the remaining cells in column O.

First you must make a small change to the function itself. You also need to put your thinking cap on, because if this is the first time you've used a LOOKUP function, it can get mighty confusing.

You may recall learning about Relative and Absolute cell references in Lesson 4. The function `=LOOKUP(L14,P2:P7,Q2:Q7)` will work fine for the first student, but if you copy it to the other cells as is, *Calc* will assume that *all* the cell references in the function are relative to the cell into which they are being copied, and will adjust them accordingly, resulting in the WRONG letter grades. If you enjoy math or logic, you'll be enjoying this; but if not, bear with us, OK?

What you have to bear in mind is that the references to the LOOKUP Table (cells P2:P7 and Q2:Q7) must be *absolute* references—which means any references to those cells *must not* change—because the data for the LOOKUP Table will *absolutely always* be found in these specific cells.

So you need to tell *Calc* to leave these LOOKUP Table references unchanged when copying the LOOKUP function into the other cells in column N. You do this by surrounding the LOOKUP Table's cell coordinates with \$ (dollar) signs. Like this:

`=LOOKUP(L14,$P$2:$P$7,$Q$2:$Q$7)`

You did this in Lesson 4 when you were creating the formula for the cells in the Percentage column (Column M).

The reference to the lookup value (cell M14 for the first student) is *relative*, and will be different for each student (M15, M16, and so on), so it doesn't need to have dollar signs around it. But the references to the Search vector and to the result\_vector are *absolute*—fixed because they refer to the LOOKUP table in columns P and Q.

Here is a reminder of the steps to tell *Calc* to treat references as Absolute References when referring to the LOOKUP Table.

Click on cell **O14**

Take a look at the Data Entry bar at the top of the screen and you'll see that the LOOKUP function is spelled out in full (Fig. 5.26). It just needs all those \$ signs around the references to the cells that make up the LOOKUP table.

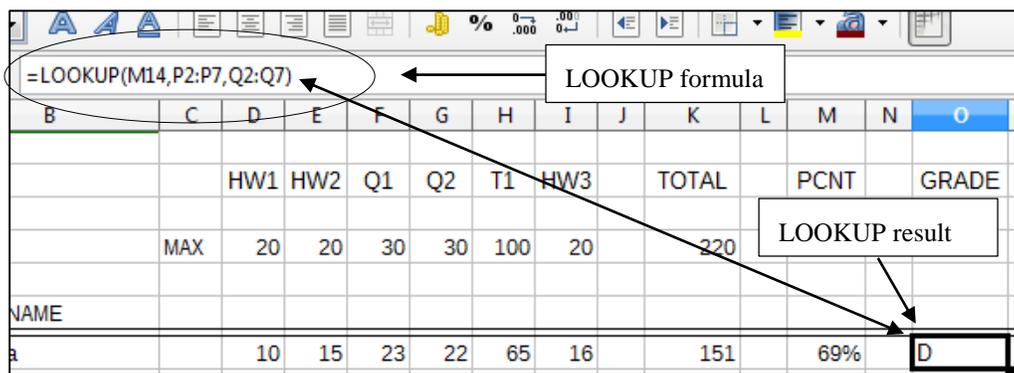


Fig. 5.26 LOOKUP function for cell N14

In the **Data entry bar** (Fig. 5.26 above), in the **LOOKUP formula**, click to put the cursor immediately before the reference to **cell P2**

Now put a dollar (\$) sign in front of **every coordinate** (rows *and* columns) for the LOOKUP Table (**8 \$ signs** in all) as illustrated in Fig. 5.27

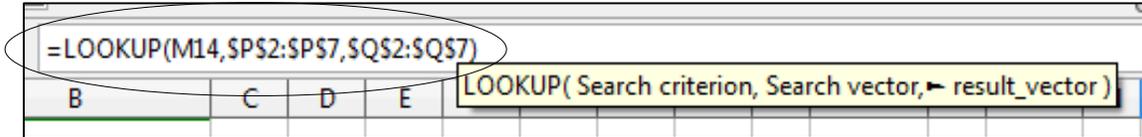


Fig. 5.27 Absolute references are preceded by dollar (\$) signs

This will ensure that this part of the function will remain unchanged ("absolute") when you copy it shortly into the other cells in column O.

Click the **Accept button** (✓) to accept the LOOKUP function into cell **O14**

Here now are the steps to copy the function from cell O14 into the remaining cells of the GRADE column (Column N).

Make sure the current cell is still cell **O14**

Grab hold of the small **Fill handle** in the **lower right** corner of **cell O14**, drag down to **cell O23** and let go of the mouse button (or take your finger tip off the screen if you're using a touch screen)

You now should see the correct letter grade for each student in column O.

While you have the cells in **column O** highlighted, **center** the grades in the column (**Formatting toolbar > Center icon**)

**Save** the changes you have made to the **Gradebook** spreadsheet

If you need to think about the LOOKUP function a little more, go carefully back over what you have just done. Once you have a clear idea of how the LOOKUP function works, you and your students will be able to apply it in myriad situations when you build spreadsheets of your own.

### *Practice makes perfect*

Your task now is to switch to the Gradebook Template document again, and add the LOOKUP function there, too. You do not have any data in the template (or at least you shouldn't have!), so your LOOKUP function will produce a column of meaningless grades (all E's!) in the GRADE column, just as was the case when you built a function into the PCNT column of the Gradebook Template document when you were working on Lesson 4. This is no problem, because the data will be relevant and correct when you use the spreadsheet with an *actual class of your own* and enter *meaningful* sets of scores, as is the case in the Gradebook document itself.

You either can add the functions to the Gradebook Template document the long way, by repeating all the steps you just carried out for the Gradebook document cell by cell, or you can use the Copy (*Ctrl-c*) and Paste (*Ctrl-v*) functions as you did a short while ago to copy the LOOKUP Table from the one document to the other.

Go ahead and **copy the grades formulas in column O** from the **Gradebook** to the **Gradebook Template**; don't forget, when you're done, to **Save** the changes you have made to the **Gradebook Template** spreadsheet, then close the **Gradebook Template** document

Finally in this exercise you must *protect* the Gradebook worksheet so that no one can make unauthorized changes to the data in the cells.

Select all the cells in the **Gradebook** worksheet (**Ctrl-a**), then, in the **Tools menu > Protect Document** click, in the sub menu, to put a **check mark** back in front of **Sheet...**

Do the same for the **Gradebook Template** worksheet

**Save** your work and **close just the Gradebook Template** document

You should now have only the *Gradebook* document open on your screen.

## 5.6 PRINTING THE UPDATED SPREADSHEET

You're going to print out the Gradebook document twice. Here are the steps for the first printout.

It is usually best to print a spreadsheet in landscape (sideways) orientation.

In the **Format menu > Page...** dialog box, in the **Orientation section**, click on the **radio button** next to **Landscape Orientation**

You need to take care of a couple of other details before clicking on the Print button. The printed spreadsheet will look better if you remove *column and row headings* as well as the *cell gridlines*.

In the **View menu** click on **Column & Row Headers** to remove the **check mark** there, thus removing column and row headers from the spreadsheet

Next remove the gridlines by clicking, in the **Formatting toolbar**, on the **Toggle Grid Lines for Current Sheet** icon (Fig. 5.28)

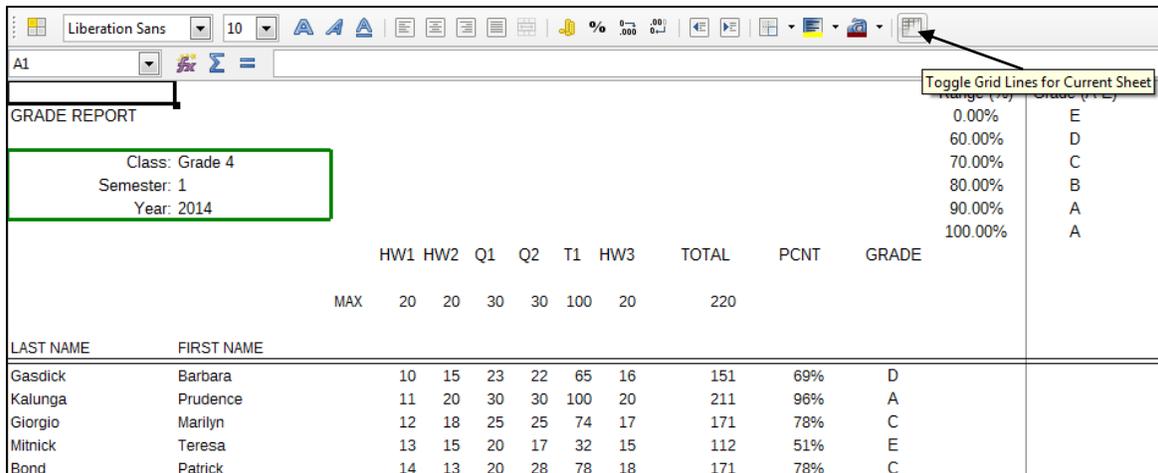


Fig. 5.28 Toggling gridlines on and off

### Selecting a section of the spreadsheet for printing

When you first print out your Gradebook document, you do not want the LOOKUP Table to appear on the printed report. You want to print only that block of cells that contains the data pertaining to student grades for the semester. This includes columns A through O and Rows 1 through 27.

The steps that follow will show you how to select just this block of cells for printing. First you must select (highlight) the range of cells that you want to print.

Drag down diagonally from cell **A1** to cell **O27** (this will include the **Average**, **Max Score**, and **Min Score** summary lines at the bottom of the Gradebook document, but **not** the cells with the LOOKUP table)

Now, from the **File** menu select **Print** to bring up the **Print dialog box** (Fig. 5.29)

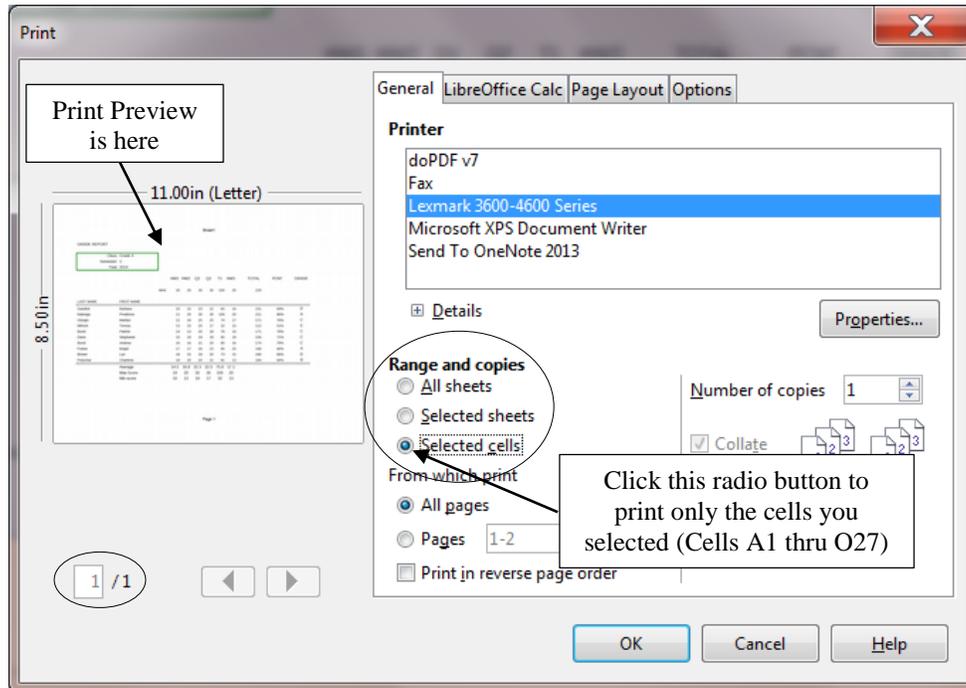


Fig. 5.29 Setting the Print area in the Print dialog box

Notice that in the Print dialog box you have a Preview of the worksheet before printing. Your spreadsheet has just one page. If you wanted to check how many pages there are in your spreadsheet before printing, you would find the answer *underneath* the Print Preview window (it reads 1 of 1 for this spreadsheet).

Check out how the spreadsheet looks in the **Preview window**, then click on **OK** to print out the first hardcopy of the **Gradebook document**

Now you are going to print a second copy of the Gradebook document, but this time you will include the LOOKUP table, the Column and row headers and the gridlines.

In the **Gradebook document**, drag down diagonally from cell **A1** to cell **Q27** (this will include the **LOOKUP table** in columns P and Q)

In the **View** menu select **Column & Row Headers** to put back the **check mark** there, then **bring back** the **gridlines** by clicking, in the **Formatting toolbar**, on the **Toggle Grid Lines for Current Sheet** icon (Fig. 5.28 on page 174)

Now, from the **File** menu select **Print** and, in the **Print dialog box** make sure the **radio button** next to **Selected cells** is **on** (check the **Print Preview window** to make sure the **LOOKUP table** is included in this **second** printout), then click on **OK** to print this **second copy** of the **Gradebook** spreadsheet

If you are completing the lesson for a class at school, hand in **both hardcopies** of the spreadsheet to your instructor

## 5.7 CREATING CHARTS BASED ON SPREADSHEET DATA

### The *Calc* charting capability

Today we are in danger of being overwhelmed by too much data, the raw material of information. We even have an acronym for it—TMI—too much information. It is a genuine problem.

One of many solutions to TMI is charts—graphic, colorful, eye-catching. Charts—quality charts that don't mess with the data—try to reduce the masses of data on any particular subject to a meaningful analysis of what's going on. This applies as much to the meaning of world events as it does to the progress of an individual student in your class. Charts, in other words, are a powerful way to convey what would otherwise be complex information.

*Calc* makes it easy to create dozens of different types of charts. You can create a chart from information gathered in most any spreadsheet. It is not an exaggeration to say that your ability to use *Calc*'s charting capability will make you a more effective teacher.

A spreadsheet user can take advantage of charts based on the numbers stored in its rows and columns of cells. The numbers on their own may not provide much information. Charts based on those numbers, on the other hand, may enable the user to *visualize* the data. "A picture," as they say, "is worth a thousand words."

A well-designed chart can help you (and your students) make sense of a thousand numbers. Charts are also useful when you need to increase the impact of any oral or written presentation. Think of the many charts that you now see presented on TV and in other media; their purpose is to help you make sense of all the data out there, whether it's business data, weather data, data related to politics, and so on.

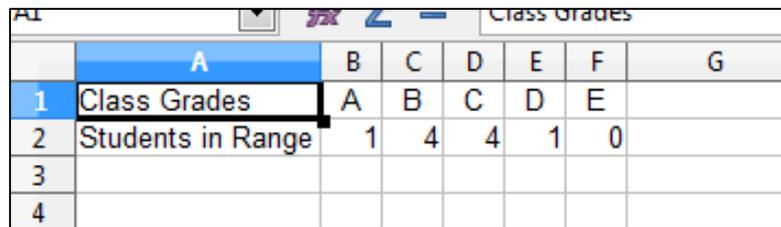
We must be wary of charts, of course, because, like statistics, they can be guilty of purveying, well, lies. But charts that are well-designed and honestly-designed will help your students understand what they need to know. More to the point, if you teach your students how to create charts, they will be able to include them in assignments related to every subject area under the sun.

### Creating a Column chart

For this exercise, we'll set aside the work we've been doing with the Gradebook documents. You are going to open a new spreadsheet document with data related to Grades so that you can practice creating charts.

Go to **File > Open** and navigate to your **Removable Disk > Work Files for LibreOffice > Miscellaneous Files > Other Documents** folder and open the **Charts** document

Your Charts spreadsheet should look like Fig. 5.30.



	A	B	C	D	E	F	G
1	Class Grades	A	B	C	D	E	
2	Students in Range	1	4	4	1	0	
3							
4							

Fig. 5.30 Data for Charts document

The values represented in a chart are called a *data series* or a *data set*. In the chart you are about to create, the number of students in the various grade ranges (A, B, C, etc.) will be represented by bars. The chart will have a *title* and a *legend* with names descriptive of the *data series*.

Most charts, except pie charts, have *axes*, which are the perpendicular lines along which the data are plotted or displayed. The Y axis is the *vertical axis* (running from top to bottom). The X axis is the *horizontal axis* (running from left to right).

To create a chart in *Calc*, you must first designate the set of cells in the spreadsheet that you want included in the chart. This is called the *chart range*. Let's select the Chart Range now.

Select, by dragging and highlighting, cells **A1 through F2**

Now, let's check out each of the various categories of *LibreOffice* charts.

In the **Standard toolbar**, click on the **Chart** tool (Fig. 5.31)

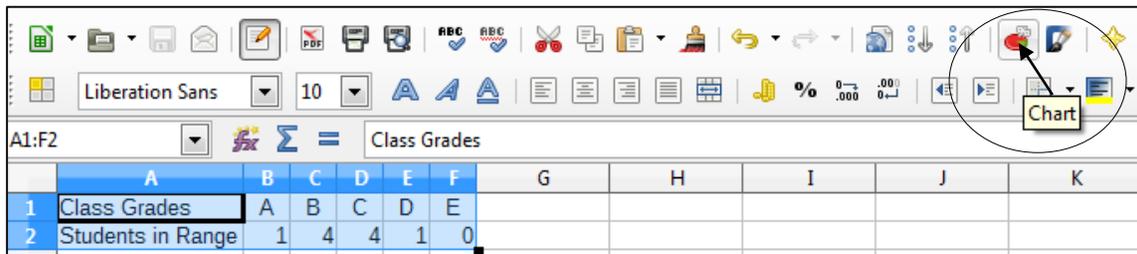


Fig. 5.31 The Chart tool in the Standard toolbar

This immediately brings up a basic chart (a bar chart) based on the data highlighted in the spreadsheet, and also offers the *Chart Wizard dialog box* (Fig. 5.32).

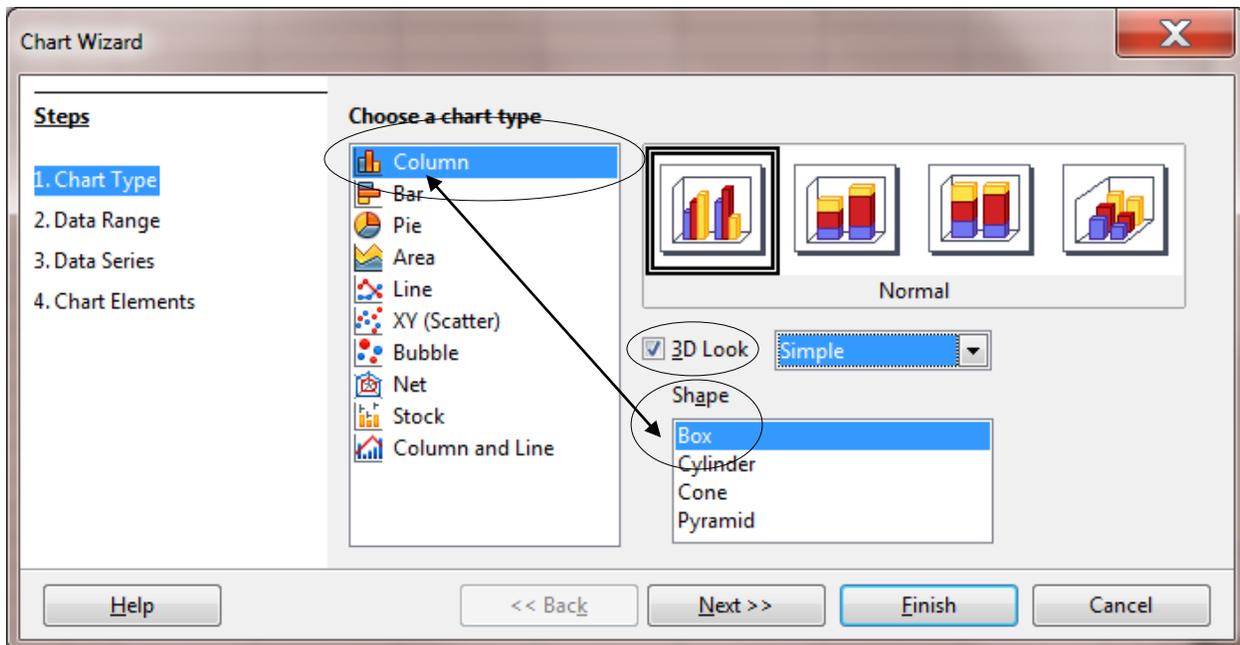


Fig. 5.32 The *LibreOffice* Chart Wizard

The Chart Wizard dialog box opens up a world of opportunities to create other eye-catching and, more importantly, *effective* chart styles—effective, that is, in the sense of getting the *true* meaning of the data across.

In the **Chart Wizard dialog box** > **Choose a chart type menu**, click on **Column** (Fig. 5.33 on previous page), and look at the many different types of **Column Charts** you can work with, from **Plain** to **3D charts** (including Box, Cylinder, Cone, and Pyramid charts)

Click on the **Bar chart type** and look at the different types of **Bar Charts**

Click on the **Pie chart type** and look at the different types of **Pie Charts**

Click on the **Area chart type** and look at the different types of **Area Charts**

Click on the **Line chart type** and look at the different types of **Line Charts**

Click on the **XY (Scatter) chart type** and look at the different types of **Scatter Charts**

Click on the **Bubble chart type** and look at the different types of **Bubble Charts**

Click on the **Net chart type** and look at the different types of **Net Charts**

Click on the **Stock chart type** and look at the different types of **Stock Charts**

Finally, click on the **Column and Line chart type** and look at the different types of **Column and Line Charts**

Quite a selection—dozens of different kinds of charts. But let's focus for now on the Column charts.

After you have checked out the various chart types, in the **Chart Wizard dialog box**, click on the **Column charts type**

In the **Column Charts** options, click to put a **check mark** in the box next to **3D Look** (Fig. 5.31 on the previous page) then, in the **Shape menu**, click on **Box** (Fig. 5.31 again), and then click on the **Normal** type

Immediately *Calc* creates the chart and displays it on the screen (Fig. 5.33).

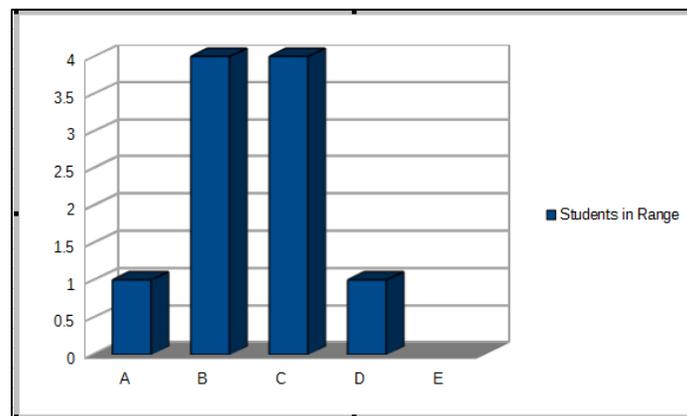


Fig. 5.33 A 3D Normal Box chart based on the spreadsheet data

Notice that *Calc* has automatically put the grades along the (horizontal) X axis and the scale indicating the number of students “in Range”—i.e. the number of students with each grade—along the (vertical) Y axis.

One change you need to make right now is to the chart title. It should say something like “Class Grades Distribution.” While we’re doing that we can make a couple of other changes as well.

In the **Chart Wizard > Steps section**, click on **4. Chart Elements** (Fig. 5.34)

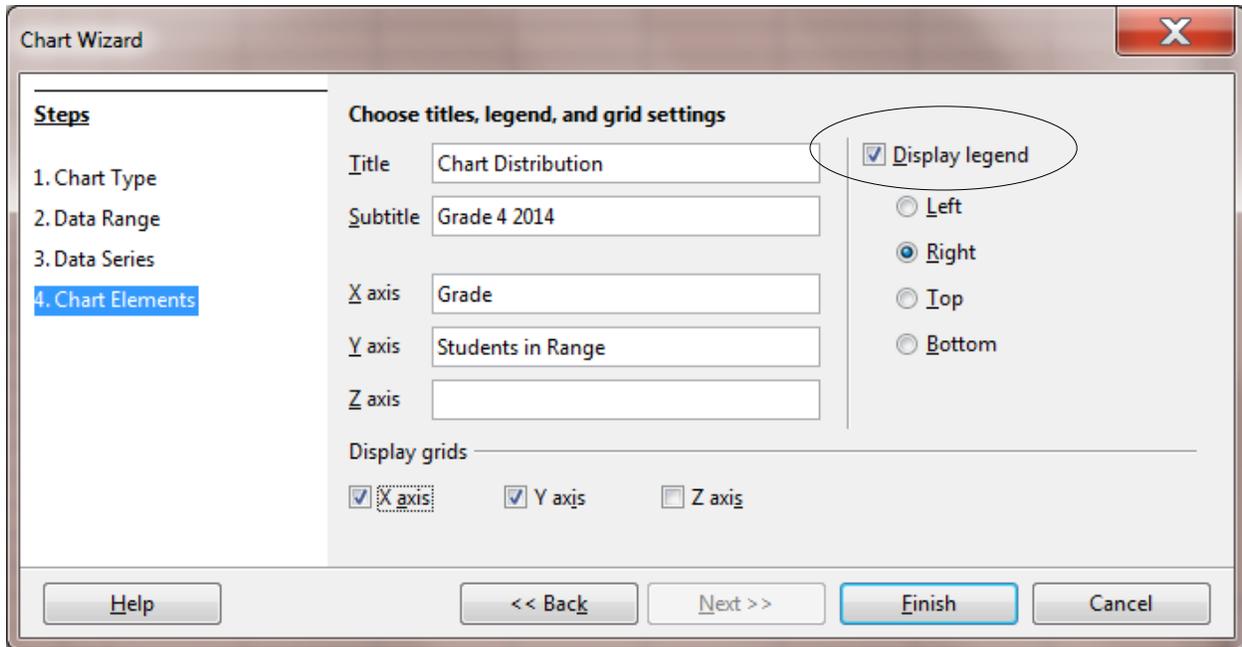


Fig. 5.34 Chart Wizard > Chart Elements dialog box

In the **Chart Elements dialog box**, fill out the **Title**, **Subtitle**, **X axis**, and **Y axis** as per the data in Fig. 5.34—leave the **check mark** in the box next to **Display legend** and click on **Finish**

The end result will look like Fig. 5.35.

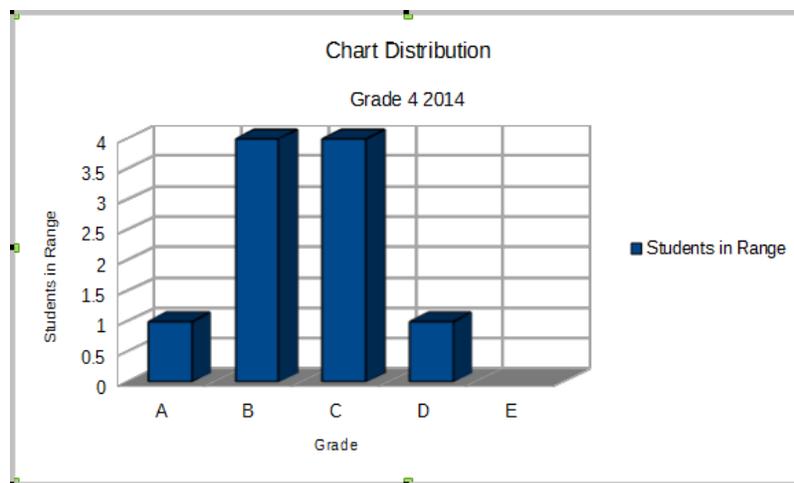


Fig. 5.35 The final version of the 3D Column chart

Go to **File > Save As...** and, in your **Work Files for LibreOffice > Data Files > Spreadsheet Documents** folder, save the chart with the name **Column Chart**, then remove it from the spreadsheet window before the next exercise

## Creating a pie chart

Creating a pie chart is straightforward (not to say easy) if you just successfully completed the Column chart exercise. You will use the same set of data for the exercise that follows.

Drag to select cells **A1** through **F2**, then, in the **Standard toolbar**, click on the **Chart tool** to bring up the **Chart Wizard** (Fig. 5.32 on page 177), and then, in the **Choose a chart type** menu, click on **Pie**

In the **Pie Charts** dialog, click to put a **check mark** next to **3D Look** and, in the **3D Look** menu select the **Simple** option

In the **Chart Wizard**, click on each of the four Pie Chart styles and check them out

The style of Pie Chart you are going to work with is the *Exploded Pie Chart* (Fig. 5.36).

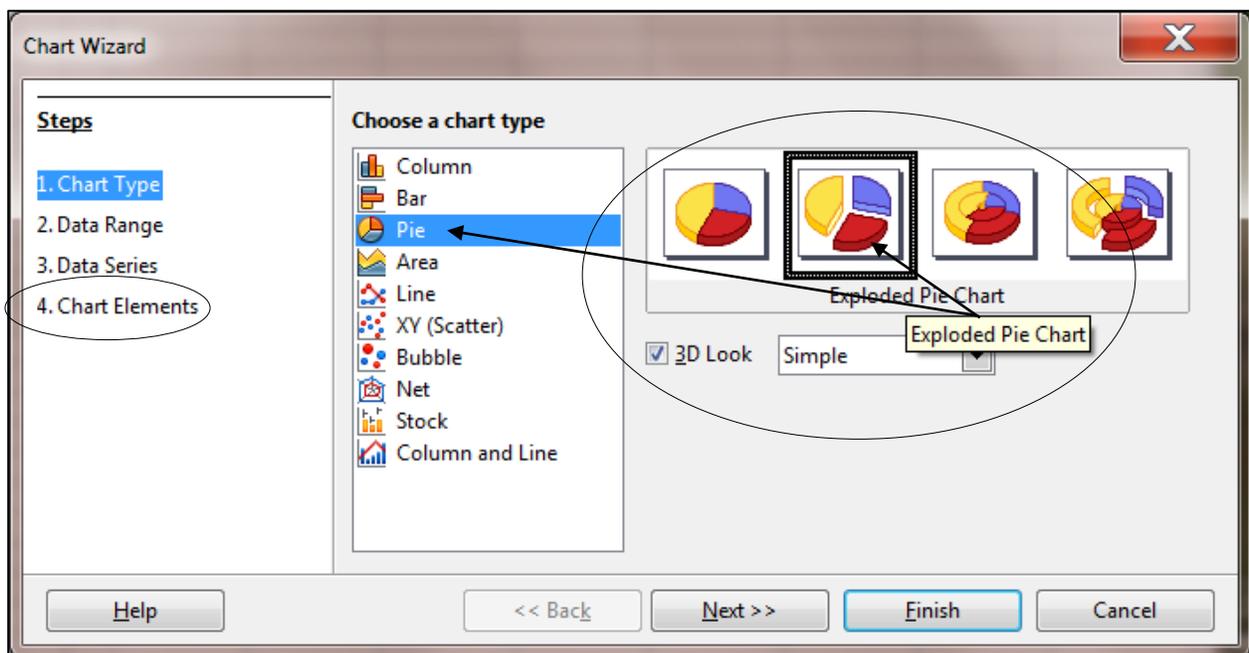


Fig. 5.36 Exploded Pie Chart Style

In the **Steps** section on the **left** of the **Chart Wizard** dialog box, click on **4. Chart Elements** and change the **Title** to **Class Grades Distribution** as you did for the Column Chart, with a **Subtitle** of **Grade 4 2014**

Leave the **check mark** in the box next to **Display legend** and click on **Finish**

Now, **right click** on any of the **slices** in the **Pie chart** and, in the **context menu** that pops up, select the option to **Insert Data Labels**

This puts a label on each of the slices indicating how many students got that particular grade, thus adding information to the chart. It would be helpful if the Font size were bigger on each of those slices and maybe the color white would stand out more against the colors of the various slices. This is easy enough to do.

**Right click** again on the **number** on any one of the slices in the **Pie chart** and, in the **context menu** that pops up, select the option to **Format Data Labels**

This brings up the dialog box titled *Data Labels for Data Series "Students in Range"* (Fig. 5.37).

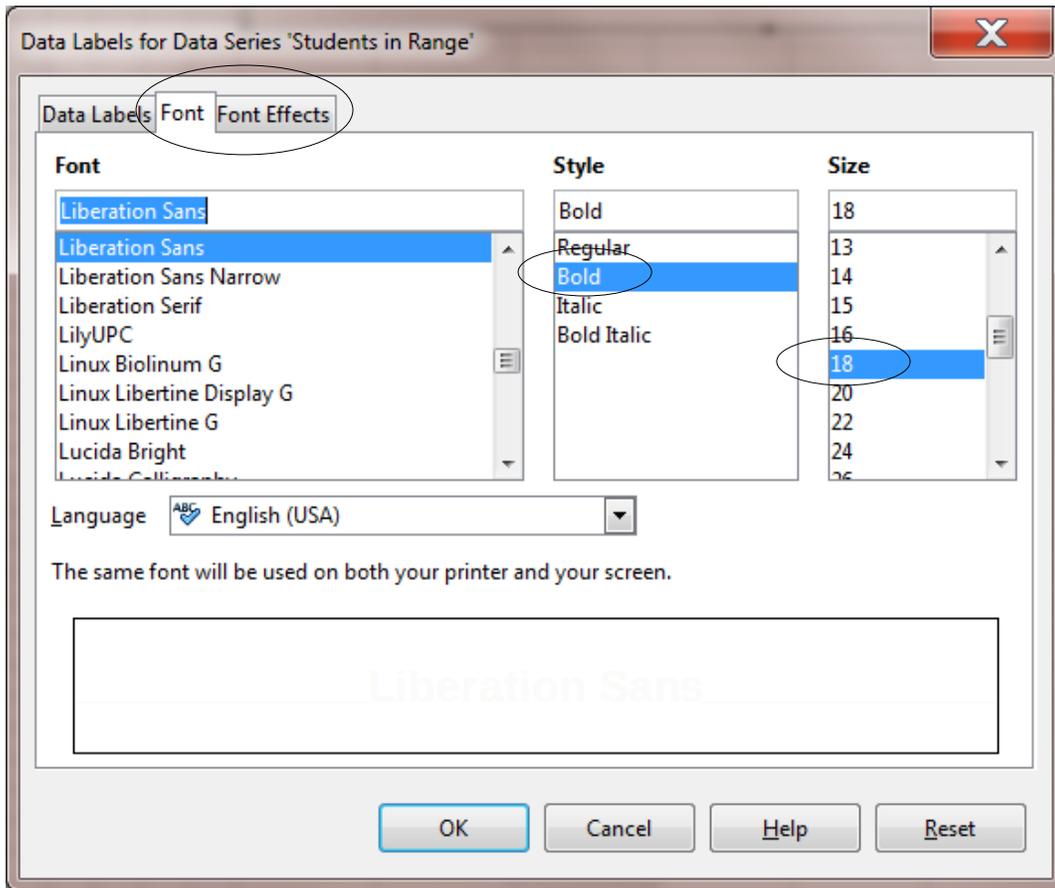


Fig. 5.37 Changing the Font and Size of the Data labels in a Pie chart

Click on the **Font** tab and change the **Style** to **Bold** and the **font size** to **18**, then click on the **Font Effects** tab and change the **Font Color** to **White**

There, that's better (Fig. 5.38).

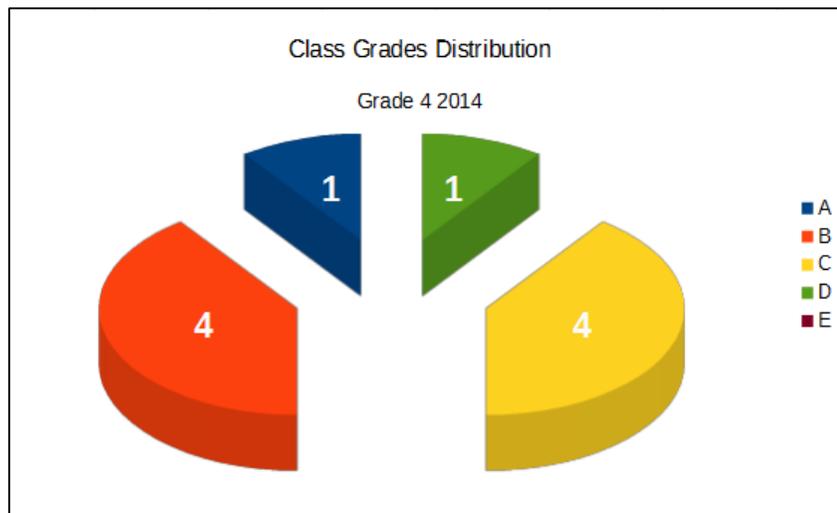


Fig. 5.38 Final version of the Pie Chart

**Save** the chart in your **Data Files > Spreadsheet Documents** folder with the name **Pie Chart**

That's all you want to do with the pie chart, so you might as well remove it from the spreadsheet window before the next exercise.

**Left click** on the border of the **Pie chart** to select the **whole chart** and not some piece of the chart's contents, then hit the **Del(ete)** key

### Creating a Bar chart

One last Chart type will suffice for you to get the hang of creating charts using spreadsheet data. This time you'll create a 3D Bar chart.

If necessary, drag to select cells **A1** through **F2**, then, in the **Standard toolbar**, click on the **Chart tool** to bring up the **Chart Wizard** (Fig. 5.34 on page 179), and then, in the **Choose a chart type** menu, click on **Bar**

In the **Bar Charts** dialog, click to put a **check mark** next to **3D Look**, then in the **3D Look menu** select the **Simple** option, and in the **Shape section** select **Cylinder**

Of the four **Styles of Cylinder Bar Charts**, select the first (**Normal**) style, then, in the **Steps** section of the Chart Wizard, click on **Chart Elements** and type the Title **Class Grades Distribution**, with the Subtitle **Grade 4 2014**

Click the **Finish** button, then **right click** on any of the **Bars** in the **Bar chart** and, in the **context menu** that pops up, select the option to **Insert Data Labels**

In the **Data Labels** dialog box, click on the **Font tab** and change the **Style** to **Bold** and the **font size** to **18**, then click on the **Font Effects tab** and change the **Font Color** to a **color of your choice**

The end result might look something like Fig. 5.39.

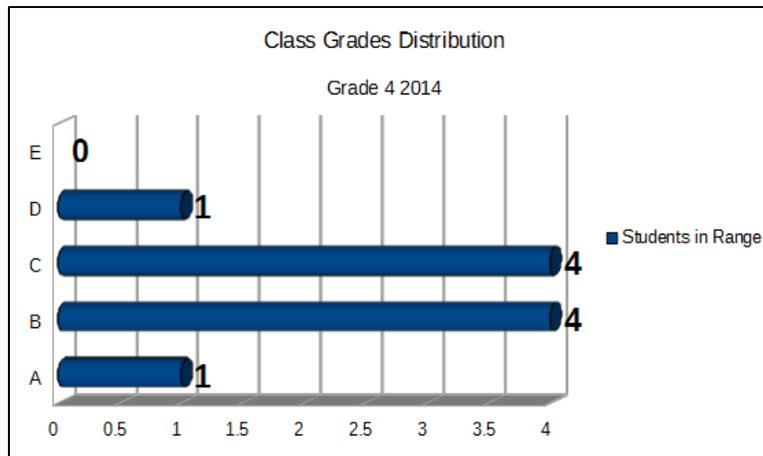


Fig. 5.39 Final version of the Bar Chart

**Save** the chart in your **Data Files > Spreadsheet Documents** folder with the name **Bar Chart**, then **close** the spreadsheet

## LOOKING BACK

Most people take advantage of only a fraction of the functionality of computer software. This tutorial, and the others that you have worked your way through thus far, have introduced you to a wider range of features of *Calc* than most *Calc* users are aware of. However, you still cannot consider yourself an expert, even though you are becoming a sophisticated user.

To become an expert you must first of all *use* the software a great deal, taking advantage of the features you have learned so that you don't forget them. You also might study the User's Guide that *LibreOffice* provides along with the *Calc* software.

Having said that, you should always bear in mind that expertise like this is ephemeral. "Use it, or lose it," as they say. It's not like riding a bike, where once you've learned how you can do it forever. You have to practice; you have to *use* the software so that you become more and more proficient.

## LOOKING FORWARD

Lessons 7 and 8 will help you learn to use the *Base* database application. But before learning this new *LibreOffice* program, it will be good to return to *Writer* in order to learn how to use the mail merge feature of the word processor. This will be the subject of Lesson 6.

If you have completed all the tutorials in this book up to this point, you have spent a considerable amount of time at the computer. This is the only way to master the machine. Yet it is not enough. You must be prepared to strike out on your own, creating documents using the productivity tools you are learning in these tutorials to meet your needs both in and out of the classroom.

Deep, assimilated learning takes place only once you are working independently, because to do this you have to show that you have *understood* everything you have learned. Understanding leads to transference and acquisition of skills. Tutorials will open the doors to knowledge, and hold your hand while you make those first steps toward the acquisition of specific skills.

But you must have the desire to let go of the hand that guides you. *Without* this desire, the exercises that you are following will be wasted and yield no fruit. *With* this desire, you will be motivated to *understand* what you are learning so that you can apply it to new situations in your own professional experience.

## SKILL CONSOLIDATION

Complete these exercises to reinforce what you have learned in Lesson 5.

1. List at least 5 applications, other than those presented in these tutorials, for which you think you would use the *Calc* spreadsheet in a classroom environment.
2. Either alone, or with a group, develop templates for each of the five spreadsheets identified in exercise 1. This could be an excellent class project. Each team would develop a different set of templates. Then all groups would present their results for review by everyone else in the class, and the complete set of templates could be made available on disk for everyone to take away from the course.
3. Load the Gradebook document to the Desktop.

- Add the function to calculate the average score for each of the tests, quizzes, homework, etc. The system will add up all the scores and divide by the number of cells that contain scores to arrive at the average. You should use the copy function to duplicate the functions across the spreadsheet.
  - Save the updated document
  - Print out only the columns that contain the student names and the final totals and percentages (so you will need to temporarily delete the columns in between—don't save this document!)
4. Load the Gradebook document onto the Desktop.
    - Add a new column for another set of scores
    - Add a new row for another student
    - Update the functions where necessary
    - Sort the student records based on the First and Last Name columns
    - Save the updated document
  5. Create a line chart based on a set of values for populations in several cities in the U.S. Generate a Bar chart from the data. Research the populations on the web at <http://www.census.gov/popest/states/NST-ann-est.html>
  6. Create a pie chart based on a set of values for the amount of rainfall for each of any ten cities world wide. Research the rainfall data at this web address: <http://www.worldclimate.com>