BASIC VLOOKUP

brought to you by:

JKJL EXCEL SERVICES

N.B. VLOOKUP is a fantastic function but it takes a little getting-used-to. If you have Excel 365 or later, there is a better, more efficient, and EASIER function than VLOOKUP, called XLOOKUP (see separate document.)

Most Excel users have had a need to use lookups, whether they've recognized it or not.
Many users are at least vaguely aware of powerful Excel functions such as VLOOKUP but are unsure or uncomfortable about how to use them. Here are a couple of examples that will help you understand when and how to use the 2 most common types of lookups:

1. Range Lookup
2. Exact Lookup

The detail is below, but the bottom-line on the 2 types of lookups is: when the lookup value is text, you'll use Exact; when the lookup value is data (and you can't match the data value directly), you'll use the Range (also known as Approximate) lookup.

Range Lookup

Suppose you wish to assign letter grades to students based on a range of test scores. A score of 90 or above is an 'A', 80 or above is a 'B', and so forth. On a spreadsheet, the range of scores is shown in columns A-B, and the lookup table is shown in columns C-D, as follows:

Figure1:

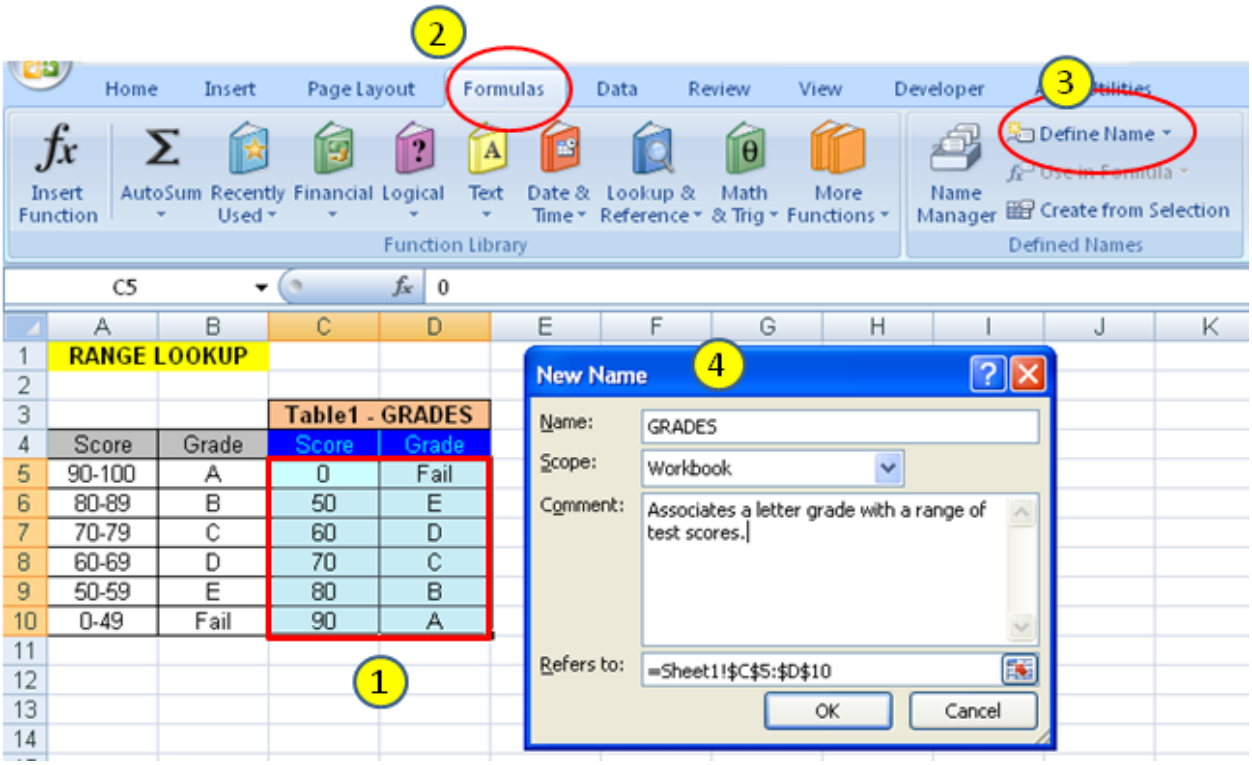
	A	B	C	D
1	RANGE LOOKUP			
2				
3			Table1 - GRADES	
4	Score	Grade	Score	Grade
5	90-100	A	0	Fail
6	80-89	B	50	E
7	70-79	C	60	D
8	60-69	D	70	C
9	50-59	E	80	B
10	0-49	Fail	90	A

Figure1 shows the 1st lookup table – named GRADES – which includes the range of cells C5:D10.

Setting up this named range in Excel 2007 is easy; just follow these steps as indicated by the yellow reference points in Figure2:

1. Highlight the range of cells C5:D10
2. Click on the Formulas option on the ribbon tab at top
3. Within the Formulas ribbon, click Define Name
4. In the New Name dialog box, enter GRADES for the name. The Scope and 'Refers to:' areas are already filled in; enter a Comment if you wish.

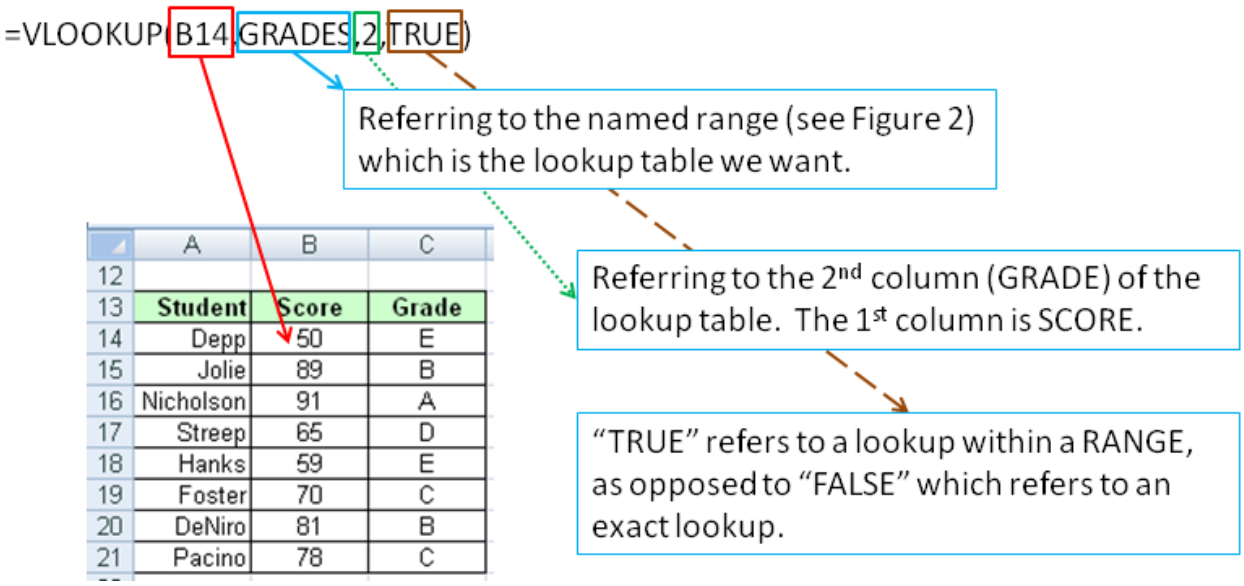
Figure2:



Note: it is not mandatory that you create this named range; however, things will be much easier for you if you do.

The objective is to write a formula (in column C, below) which will lookup the proper Grade for each student (in column A) based on the student's score (in column B.) The formula for C14 will be:
=VLOOKUP(B14,GRADES,2,TRUE) …this will "lookup" the score in B14 against the table named GRADES to return the Grade in the 2nd column of that table.

There are 4 parameters to the function:



	A	B	C
12			
13	**Student**	**Score**	**Grade**
14	Depp	50	E
15	Jolie	89	B
16	Nicholson	91	A
17	Streep	65	D
18	Hanks	59	E
19	Foster	70	C
20	DeNiro	81	B
21	Pacino	78	C

Figure3:

You would then replicate (copy) this formula from cell C14 down to the other cells in column C.
Important note: when you're doing a lookup within a RANGE, column 1 of the lookup range (in this case, SCORE) must be sorted in ascending order, or else you may get an error.
If you did not create a named range, then the formula would be:

=VLOOKUP(B14,$C$5:$D$10,2,TRUE) …see how much uglier and harder to understand this is now?
Ok, so was that as difficult as you thought?
Next up – EXACT LOOKUP.

Exact Lookup

In the Range lookup above, DeNiro's score of 81 could not be found precisely in the GRADES lookup table, but it was found within a range. If the VLOOKUP function specified FALSE as the 4th parameter, then it would have tried to find 81 in the lookup table but it would not have found it, therefore, it would have returned an error. In this next example, we have a list of employees, their salary, and tax withholding code:

Figure4:

	A	B	C	D	E
1	Name	Employee #	Salary	Code	tax rate
2	Ruth	369	72000	0	0.0%
3	Koufax	666	63500	1	20.3%
4	Mantle	157	49500	3	33.3%
5	Maris	742	80000	1	20.3%
6	Gehrig	777	54000	2	25.0%
7	Ryan	999	81500	1	20.3%
8	Mays	792	69000	2	25.0%
9	Aaron	355	48500	3	33.3%

We want to write a formula, starting with cell E2, that will return the correct tax rate based on the Code in column D. The code field refers to withholding tax rates but the actual rate may change from time to time; those rates are found in the following table:

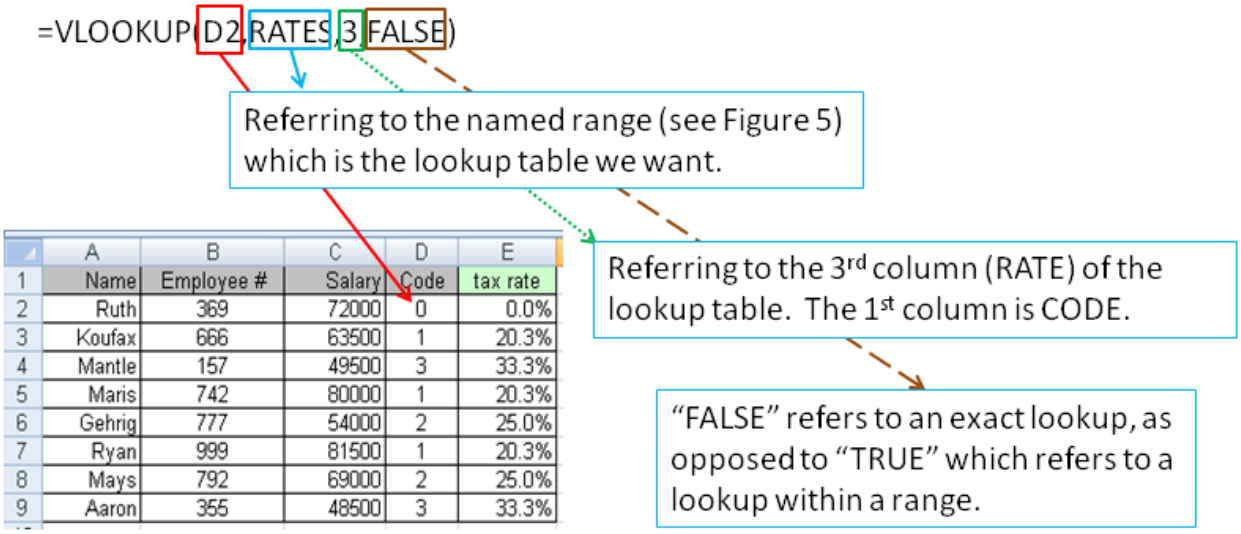
Figure5:

	A	B	C
10			
11	Table2 - RATES		
12	Code	Description	Withholding rate
13	3	>2 kids	33.3%
14	2	1-2 kids	25.0%
15	1	Wife only	20.3%
16	0	No dependents	0.0%

Using the same procedure as described above, the cell range A13:C16 has been named RATES.
The withholding rates in column C are subject to change while the employee table in Figure4 is generated monthly and must always reflect the current rates.

The formula for E2 in Figure4 will be: =VLOOKUP(D2,RATES,3,FALSE) …this will "lookup" the code in D2 against the table named RATES to return the tax rate in the 3rd column of that table. See explanation below:

Figure6:



	A	B	C	D	E
1	Name	Employee #	Salary	Code	tax rate
2	Ruth	369	72000	0	0.0%
3	Koufax	666	63500	1	20.3%
4	Mantle	157	49500	3	33.3%
5	Maris	742	80000	1	20.3%
6	Gehrig	777	54000	2	25.0%
7	Ryan	999	81500	1	20.3%
8	Mays	792	69000	2	25.0%
9	Aaron	355	48500	3	33.3%

Note that for both versions of VLOOKUP, the column that is being "matched" must always be the 1st column in the lookup table. However, with the Exact lookup, that column does not have to be sorted, while with the Range lookup, that column must be sorted ascendingly (low to high.)
Also note that if the 1st parameter of the function cannot be found in the lookup table, an error will result. There are ways around this – but that's another article!

Some users have inquired how to handle lookups that don't start with column1 or must go from right to left, rather than left to right. There are ways of dealing with those situations but those are advanced uses of Excel which very few people actually need.

Think of the "power" that these lookups can give you – here's an example:

	A	B	C	D
21				
22		Monthly Payroll Slip for:		Gehrig
23				
24	Staff #	Gross Pay	Tax	Net Pay
25	777	$ 4,500.00	$ 1,125.00	$3,375.00

You could easily create a "payroll slip" for any given employee. The figures in row25 are all "looked-up" from the same tables as above. Net Pay in column D is a simple formula: B25-C25.
Just enter the employee name in D22, and the payroll slip automatically updates. You could use Excel Data Validation to generate a pick-list of names so you wouldn't have to type it in yourself, but that's another article!