

**PLEASE SILENCE ALL CELL PHONES**

## **Excel PivotTables**

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### **Introduction**

PivotTables are dynamic version of basic Excel lists. They allow the user to sort, filter, and rearrange their worksheets to emphasize different aspects of their data. In a very real way PivotTables are an advanced method of filtering. Proper design of a PivotTable results in data that can quickly be filtered based on several different categories. The big differences between PivotTables and other filters are 1) the design and forethought required by PivotTables 2) the wider functionality they provide. Primarily used as an accounting tool, PivotTables can also be an excellent way to analyze data.

### **Creating Dynamic Lists with PivotTables**

When creating a PivotTable the data must be organized in such a way that every row can represent a cell in the body of the finished PivotTable. This is to say that every category that will be used as a selection choice in the PivotTable must have a value in every entry. If there's ever a blank spot Excel can't maintain relationships (what numbers connect to each other) among the data. What does this mean? Let's look at some examples (next page):

Region	East	Quarters	Grand Total
Meat	Dodsworth	15,376.89	34,997.19
	Fuller	7,189.59	12,216.09
	Suyama	13,013.79	19,171.83
Meat Total		35,580.27	66,385.11
Seafood	Dodsworth	30,753.78	69,994.38
	Fuller	14,379.18	24,432.18
	Suyama	26,027.58	38,343.66
Seafood Total		71,160.54	132,770.22
Grand Total		106,740.81	199,155.33

Pretty intimidating? I certainly think so, but if we walk through the parts of this step by step it will become clearer. Start with lots of raw data. The rule of thumb is you need at least two criteria of data to work with or you won't have anything to pivot. PivotTables are particularly well suited to taking huge amounts of data and summarizing it in a way that makes useful reports. Take a look at this data, noting that it's hard to understand:

Month	Campaign	City	Cost	Quantity Redeemed	Resulting Sales	Profit
July	Coupon	Columbus	9,500	93	11,067	1,567
July	Direct Mail	Columbus	7,000	100	11,900	4,900
July	Radio Spot	Columbus	9,500	93	11,067	1,567
July	Direct Mail	Columbus	7,000	100	11,900	4,900
July	Coupon	Columbus	4,000	88	10,472	6,472
July	Radio Spot	Columbus	9,500	93	11,067	1,567
July	Direct Mail	New York	12,500	288	34,272	21,772
July	Radio Spot	New York	4,000	88	10,472	6,472
July	Radio Spot	New York	12,500	288	34,272	21,772
July	Coupon	New York	4,000	88	10,472	6,472
July	Radio Spot	New York	12,500	288	34,272	21,772
July	Local Ads	New York	3,300	276	32,844	29,544
October	Direct Mail	Atlanta	12,500	61	7,259	(5,241)
October	Direct Mail	Atlanta	8,800	455	54,145	45,345
October	Coupon	Columbus	9,500	29	3,451	(6,049)
October	Coupon	Columbus	11,000	334	39,746	28,746
October	Coupon	Columbus	11,000	334	39,746	28,746
October	Radio Spot	New York	8,800	455	54,145	45,345
October	Local Ads	New York	11,000	334	39,746	28,746
October	Direct Mail	New York	8,800	455	54,145	45,345
October	Local Ads	New York	11,000	334	39,746	28,746

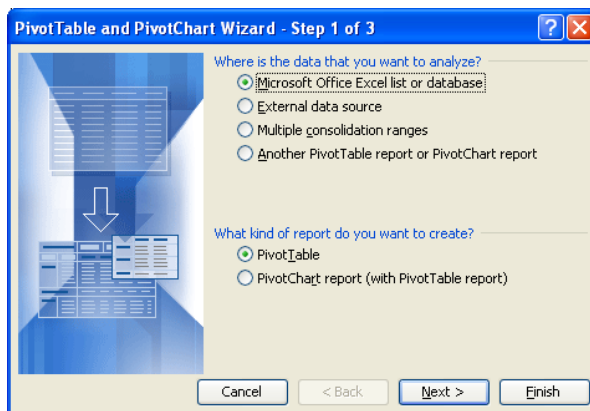
Looking at this we can't tell how well Direct Mail worked or how the month of October treated us. Now let's take a look at the information after we use the

wizard to create a PivotTable:

	A	B	C	D	E	F
1						
2						
3	Sum of Resulting Sales	Month				
4	Campaign	January	April	July	October	Grand Total
5	Coupon	37485	101507	64855	82943	286790
6	Direct Mail	27846	45101	58072	115549	246568
7	Local Ads	67116	62713	77588	54264	261681
8	Radio Spot	19992	117691	101150	61047	299880
9	Grand Total	152439	327012	301665	313803	1094919
10						

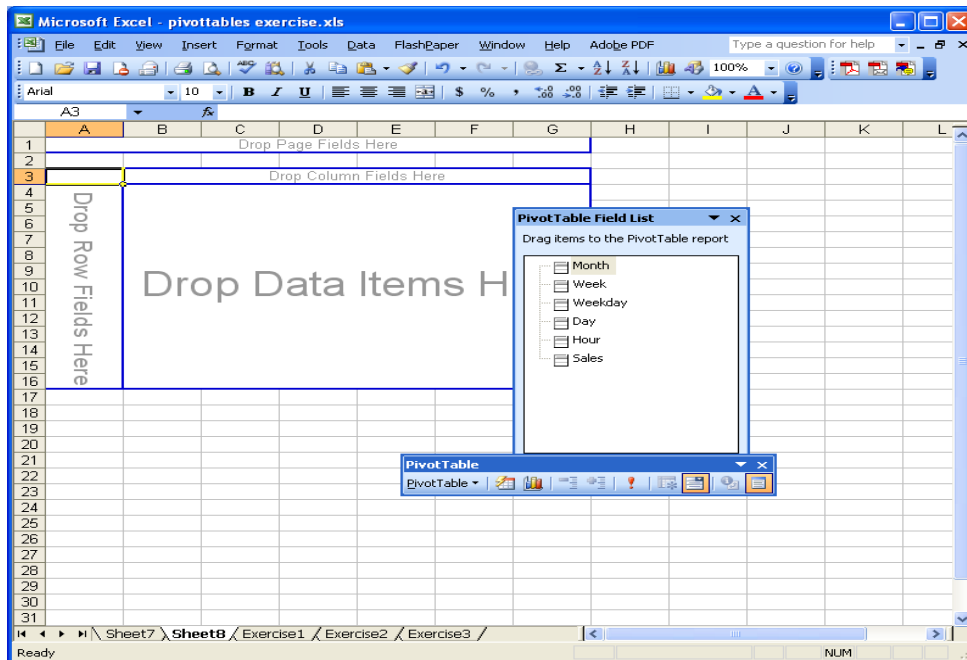
It's summarized for us month by month and method by method (Coupon, Direct Mail, etc.) so we can quickly get a look at how each category's totals worked out. Obviously this is a much cleaner way to present the data. You could create a chart like this with elaborate sumif() formulas and complex filters, but PivotTables take care of all of that with a few Drag and Drops. We just need to learn the proper way to manage this information.

1. Using Exercise 1 (shown below) left-click on the "data" menu
2. Select "PivotTable & PivotChart Report..."
3. A wizard will open showing this screen:



4. Select the default choices and click "Next >"

5. Excel should automatically highlight all of your data, if it does this correctly click “Next >” to go on to the next step. If it doesn’t, change the data range and then click Next
6. Select “New worksheet” and click Finish
7. A new tab will appear in your Excel workbook with this screen visible:

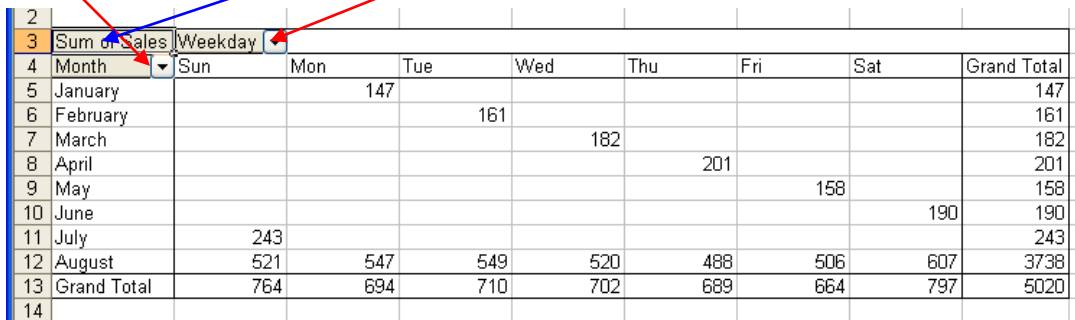


8. To control the data that appears use the Field List to choose one category and add it to the Rows area
9. Then select a different category and add it to the columns area
10. Finally, select the information you want to calculate (sales) and add it to the data area
11. Close the Field List and your table is created

More complex tables can be created but we’ll begin with this basic chart.

## Working with PivotTables

So we've gone through our exercise and now we're looking at this:

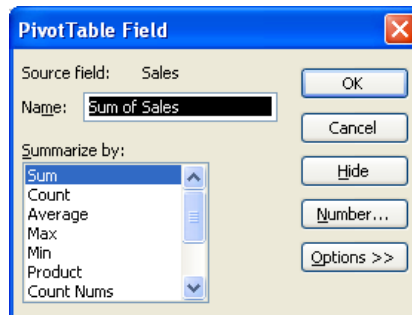


	Sum of Sales	Weekday							
Month	Sun	Mon	Tue	Wed	Thu	Fri	Sat	Grand Total	
January		147						147	
February			161					161	
March				182				182	
April					201			201	
May						158		158	
June							190	190	
July	243							243	
August	521	547	549	520	488	506	607	3738	
Grand Total	764	694	710	702	689	664	797	5020	

Notice the pull down menus (red arrows), these allow you to control what portion of the data will be displayed. So if your chart shows all of the past 2 years but you only want to display the last quarter of 2004 vs. the last quarter of 2005 there's no need to delete or hide any of the information, just use the pull down menus to uncheck all the months that distract from the information.

### Modifying the Reports

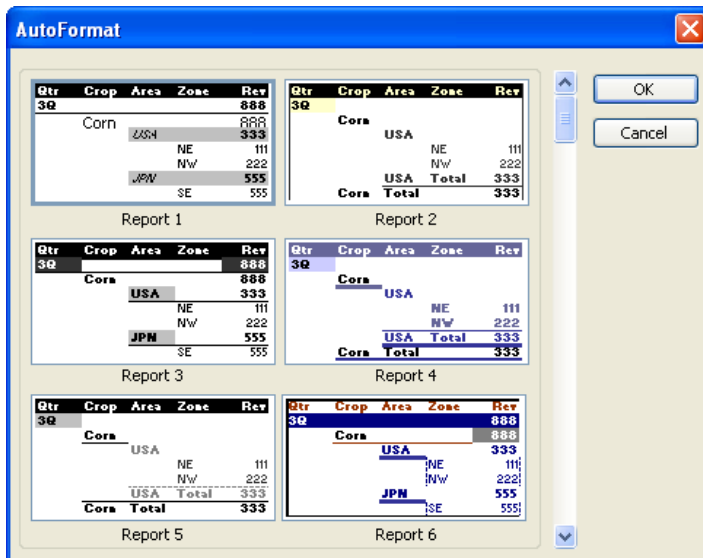
Consider a situation where you didn't want to calculate the sum of the data; you want to know the average sales per day. In this case it's not the month or week day fields that need to be edited; it's the data field – the Sales numbers. To make changes to how the data field is handled right-click on the “Sum of Sales” box (blue arrow) and select “Field Settings...” from the menu that appears. This box should open up:



This window allows the user to control how this data is summarized as well as giving the option to format the appearance of the numbers or hide the field entirely (not useful in this situation but very helpful when dealing with more complex PivotTables).

### Auto Formatting

The next step in learning PivotTables is understanding how to use automatic formatting controls to make data clean up go quickly. Left-click the “Format” menu and select “Auto Format”, causing this menu to appear:



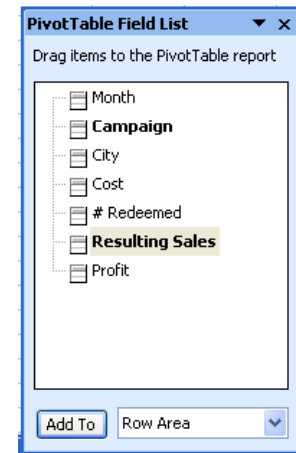
This menu, similar to most wizards and templates, provides a variety of pre-packaged appearances built to improve and clarify the look of the PivotTable. Change the table’s appearance by selecting (left-clicking) one of the formats and left-clicking “OK”.

## Pivoting

To further manipulate our data and create different impressions or demonstrations we need to learn to add and remove fields. This is called pivoting, and is the main idea behind the creation of a PivotTable in the first place.

Take the Exercise 3 PivotTable:

3	Sum of Resulting Sales	Month		
4	Campaign	July	October	Grand Total
5	Coupon	32011	82943	114954
6	Direct Mail	58072	54145	112217
7	Local Ads	32844	39746	72590
8	Radio Spot	101150	54145	155295
9	Grand Total	224077	230979	455056



Drag “Month” back to the Field List (shown to the right)

Next drag “City” into the columns area (where month was)


Completely different way of looking at and analyzing the data appears with two simple mouse movements.

## Advanced PivotTable Options

### Keeping PivotTable Information Updated

When a basic PivotTable is created it works off of the data that is currently on the spreadsheet, if the data has been changed it is necessary to refresh the PivotTable.

To refresh immediately use the PivotTable toolbar and left-click the exclamation

point (  ). To set the table to refresh every time the file is opened go to the PivotTable options and check “Refresh on open”.

## Linking PivotTables to External Sources

It's a step quickly glossed over in all previous examples but it is possible to create a PivotTable from an external data source. Whether it's a dBase File, Excel file, or Access database; this can be reached in the first step of the PivotTable Wizard by selecting External data source (showing here)

