

Class: MSc

Subject : Application of IT- Basics and Advance Excel

Chapter: Unit 1 Chapter 5

Chapter Name: Pivot Table

## **Meaning – Pivot Table**

- *You can think of a pivot table as a report. However, unlike a static report, a pivot table provides an interactive view of your data. With very little effort (and no formulas) you can look at the same data from many different perspectives. You can group data into categories, break down data into years and months, filter data to include or exclude categories, and even build charts.*
- *The beauty of pivot tables is they allow you to interactively explore your data in different ways.*

# Sample Data

- The sample data contains 452 records with 5 fields of information: Date, Colour, Units, Sales, and Region. This data is perfect for a pivot table.

B5							1/3/2016
	A	B	C	D	E	F	G
1							
2							
3							
4							
5							
6							
7							
8							
9							
10							
11							
12							
13							
14							
15							
16							

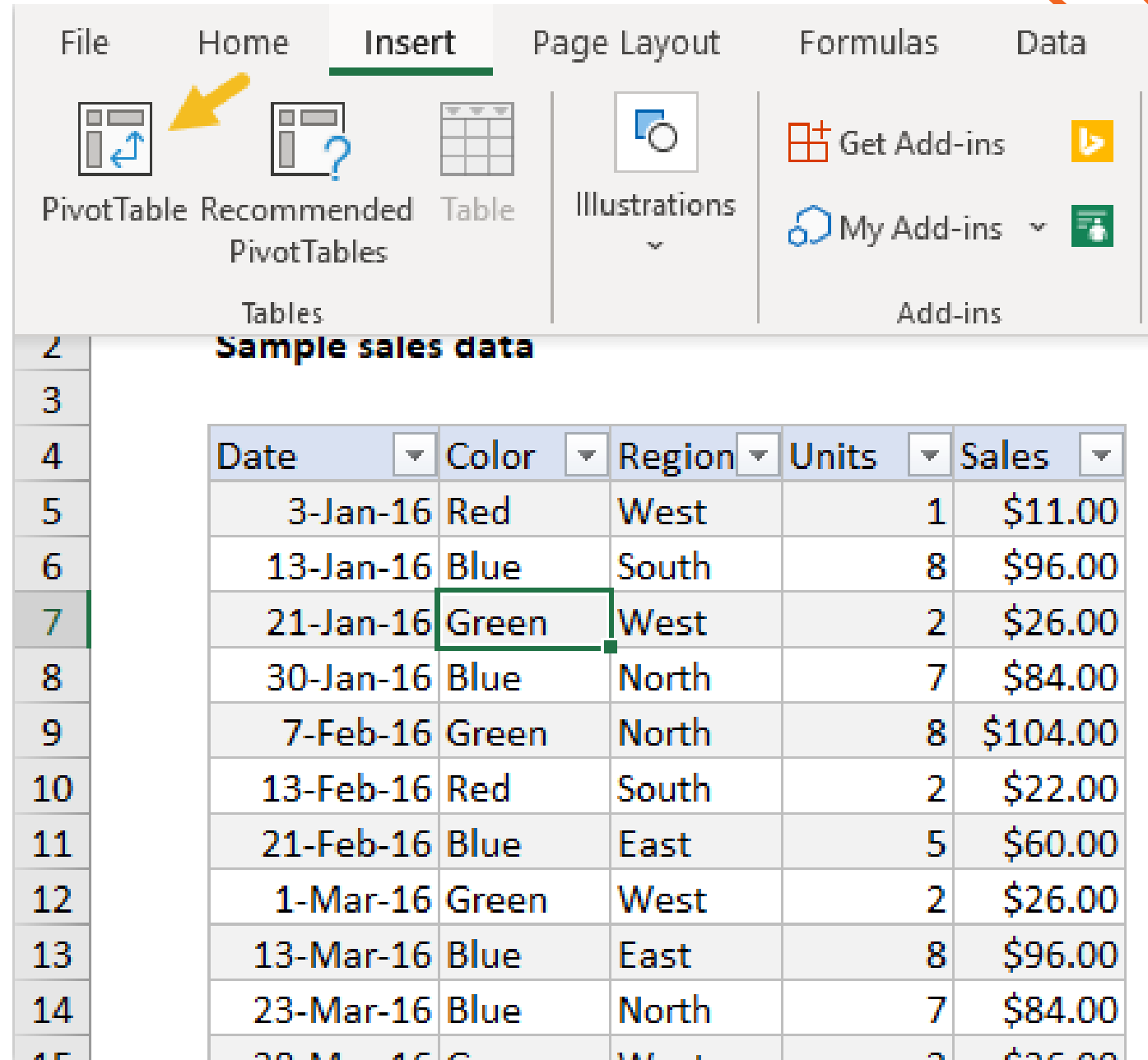
  

Sample sales data				
Date	Color	Region	Units	Sales
3-Jan-16	Red	West	1	\$11.00
13-Jan-16	Blue	South	8	\$96.00
21-Jan-16	Green	West	2	\$26.00
30-Jan-16	Blue	North	7	\$84.00
7-Feb-16	Green	North	8	\$104.00
13-Feb-16	Red	South	2	\$22.00
21-Feb-16	Blue	East	5	\$60.00
1-Mar-16	Green	West	2	\$26.00
13-Mar-16	Blue	East	8	\$96.00
23-Mar-16	Blue	North	7	\$84.00
28-Mar-16	Green	West	2	\$26.00
3-Apr-16	Blue	South	8	\$96.00

# Insert Pivot Table

1. To start off, select any cell in the data and click Pivot Table on the Insert tab of the ribbon:

Excel will display the Create Pivot Table window. Notice the data range is already filled in. The default location for a new pivot table is New Worksheet.



The screenshot shows the Excel ribbon with the 'Insert' tab selected. A yellow arrow points to the 'PivotTable' icon. Below the ribbon, a table of sample sales data is displayed.

Date	Color	Region	Units	Sales
3-Jan-16	Red	West	1	\$11.00
13-Jan-16	Blue	South	8	\$96.00
21-Jan-16	Green	West	2	\$26.00
30-Jan-16	Blue	North	7	\$84.00
7-Feb-16	Green	North	8	\$104.00
13-Feb-16	Red	South	2	\$22.00
21-Feb-16	Blue	East	5	\$60.00
1-Mar-16	Green	West	2	\$26.00
13-Mar-16	Blue	East	8	\$96.00
23-Mar-16	Blue	North	7	\$84.00

# Insert Pivot Table

2. Override the default location and enter H4 to place the pivot table on the current worksheet:

Create PivotTable

Choose the data that you want to analyze

☒ Select a table or range

Table/Range: Table1

☐ Use an external data source

Choose Connection...

Connection name:

☐ Use this workbook's Data Model

Choose where you want the PivotTable report to be placed

☐ New Worksheet

☒ Existing Worksheet

Location: H4

Choose whether you want to analyze multiple tables

☐ Add this data to the Data Model

OK Cancel

# Insert Pivot Table

3. Click OK, and Excel builds an empty pivot table starting in cell H4

*Note: there are good reasons to place a pivot table on a different worksheet. However, when learning pivot tables, it's helpful to see both the source data and the pivot table at the same time.*

	A	B	C	D	E	F	G	H	I	J
1	Sample sales data									
2										
3	Date ▼	Color ▼	Region ▼	Units ▼	Sales ▼					
4	3-Jan-16	Red	West	1	\$11.00					
5	13-Jan-16	Blue	South	8	\$96.00					
6	21-Jan-16	Green	West	2	\$26.00					
7	30-Jan-16	Blue	North	7	\$84.00					
8	7-Feb-16	Green	North	8	\$104.00					
9	13-Feb-16	Red	South	2	\$22.00					
10	21-Feb-16	Blue	East	5	\$60.00					
11	1-Mar-16	Green	West	2	\$26.00					
12	13-Mar-16	Blue	East	8	\$96.00					
13	23-Mar-16	Blue	North	7	\$84.00					
14	28-Mar-16	Green	West	2	\$26.00					
15	3-Apr-16	Blue	South	8	\$96.00					
16	12-Apr-16	Green	South	1	\$13.00					
17	16-Apr-16	Red	East	8	\$88.00					
18	23-Apr-16	Red	West	6	\$66.00					
19	30-Apr-16	Green	South	5	\$65.00					
20	9-May-16	Blue	South	7	\$84.00					
21	16-May-16	Red	South	5	\$55.00					

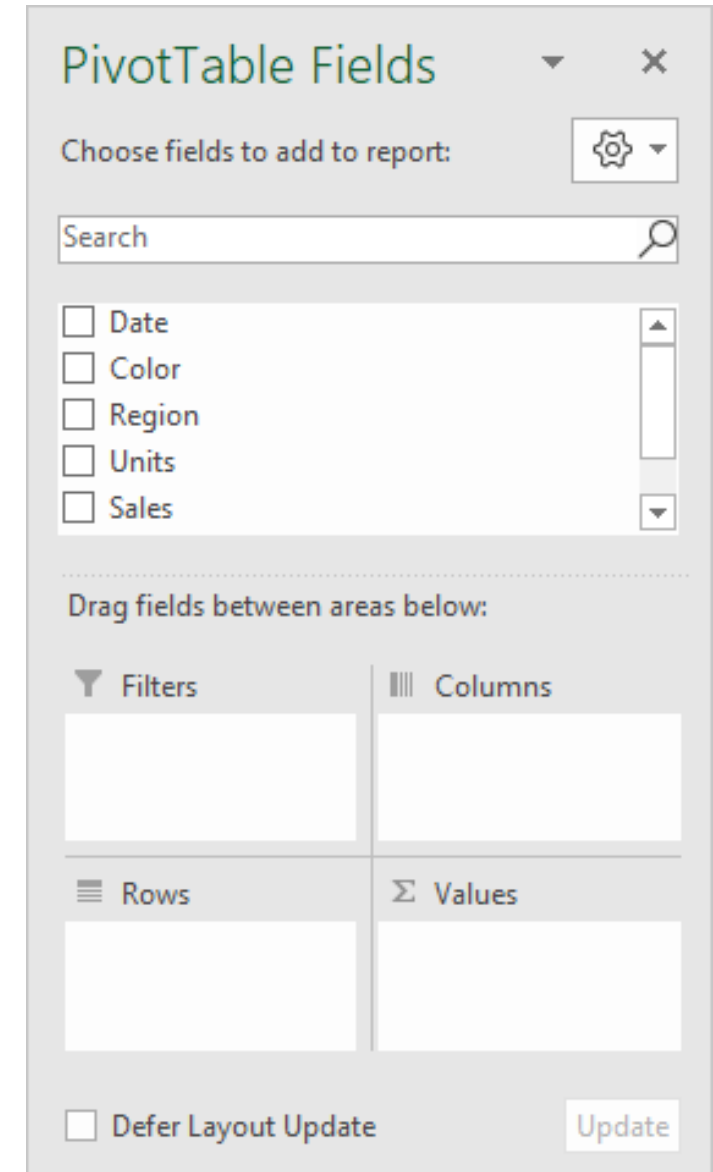
PivotTable1

Click in this area to work with the PivotTable report



# Insert Pivot Table

- Excel also displays the PivotTable Fields pane, which is empty at this point. Note all five fields are listed, but unused:
- To build a pivot table, drag fields into one the Columns, Rows, or Values area. The Filters area is used to apply global filters to a pivot table.



# Add Fields

1. Drag the Sales field to the Values area.

- Excel calculates a grand total, 26356. This is the sum of all sales values in the entire data set:

H4								Sum of Sales	
	A	B	C	D	E	F	G	H	I
1									
2									
3									
4									
5									
6									
7									
8									
9									
10									
11									
12									

Sample sales data					
Date	Color	Region	Units	Sales	
3-Jan-16	Red	West	1	\$11.00	
13-Jan-16	Blue	South	8	\$96.00	
21-Jan-16	Green	West	2	\$26.00	
30-Jan-16	Blue	North	7	\$84.00	
7-Feb-16	Green	North	8	\$104.00	
13-Feb-16	Red	South	2	\$22.00	
21-Feb-16	Blue	East	5	\$60.00	
1-Mar-16	Green	West	2	\$26.00	

<b>Sum of Sales</b>
26356

Grand total of ALL data



## Add Fields

2. Drag the Colour field to the Rows area.

- *Excel breaks out sales by Colour. You can see Blue is the top seller, while Red comes in last:*
- *Notice the Grand Total remains 26356. This makes sense, because we are still reporting on the full set of data.*

H4										
	A	B	C	D	E	F	G	H	I	J
1										
2										
3										
4										
5										
6										
7										
8										
9										
10										
11										
12										
13										
14										
15										
16										

Date	Color	Region	Units	Sales
3-Jan-16	Red	West	1	\$11.00
13-Jan-16	Blue	South	8	\$96.00
21-Jan-16	Green	West	2	\$26.00
30-Jan-16	Blue	North	7	\$84.00
7-Feb-16	Green	North	8	\$104.00
13-Feb-16	Red	South	2	\$22.00
21-Feb-16	Blue	East	5	\$60.00
1-Mar-16	Green	West	2	\$26.00
13-Mar-16	Blue	East	8	\$96.00
23-Mar-16	Blue	North	7	\$84.00
28-Mar-16	Green	West	2	\$26.00
3-Apr-16	Blue	South	8	\$96.00

Color	Sum of Sales
Blue	7464
Green	6414
Red	5508
Silver	6970
<b>Grand Total</b>	<b>26356</b>

# Add Fields

*Let's take a look at the fields pane at this point. You can see Colour is a Row field, and Sales is a Value field:*

The screenshot shows the 'PivotTable Fields' task pane. At the top, it says 'Choose fields to add to report:' with a search bar and a list of fields: Date, Color (checked), Region, Units, and Sales (checked). Below this, it says 'Drag fields between areas below:'. There are four areas: Filters, Columns, Rows, and Values. The 'Color' field is dragged to the 'Rows' area, and the 'Sum of Sales' field is dragged to the 'Values' area. Yellow arrows point to these two fields. At the bottom, there is a 'Defer Layout Update' checkbox and an 'Update' button.

PivotTable Fields

Choose fields to add to report:

Search

☐ Date

☒ Color

☐ Region

☐ Units

☒ Sales

Drag fields between areas below:

Filters

Columns

Rows

Color

Values

Sum of Sales

☐ Defer Layout Update

Update

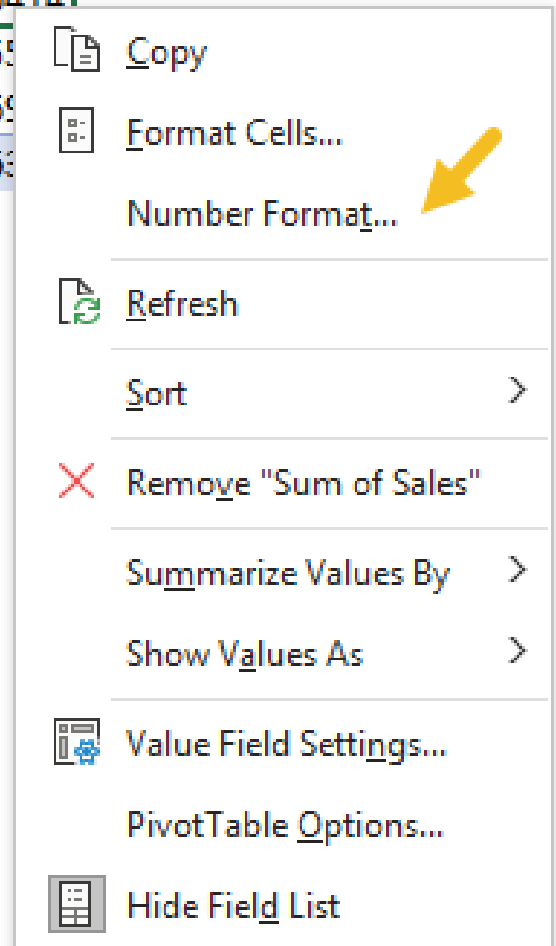
# Number Formatting

*Pivot Tables can apply and maintain number formatting automatically to numeric fields. This is a big time-saver when data changes frequently.*

*1. Right-click any Sales number and choose Number Format:*

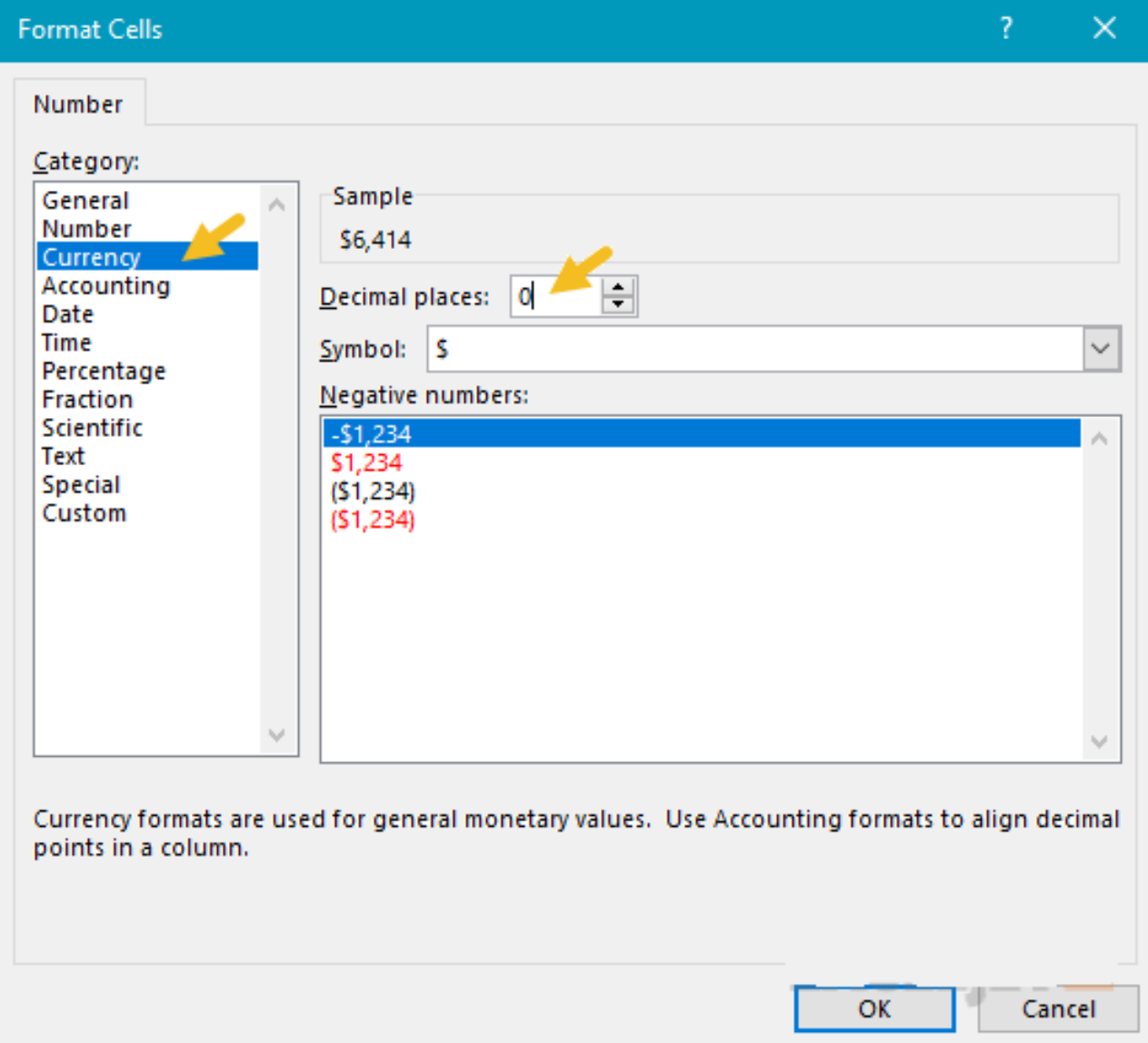
Color	Sum of Sales
Blue	7464
Green	6414
Red	59
Silver	69
Grand Total	269

*Right-click,  
select Number  
Format*



# Number Formatting

2. Apply Currency formatting with zero decimal places, then click OK:



The screenshot shows the 'Format Cells' dialog box with the 'Number' tab selected. The 'Category' list on the left has 'Currency' highlighted with a yellow arrow. The 'Sample' field shows '\$6,414'. The 'Decimal places' spinner is set to '0' with a yellow arrow pointing to it. The 'Symbol' dropdown is set to '\$'. The 'Negative numbers' list shows four options: '-\$1,234' (selected), '\$1,234', '(\$1,234)', and '(\$1,234)'. At the bottom, there is a note: 'Currency formats are used for general monetary values. Use Accounting formats to align decimal points in a column.' and buttons for 'OK' and 'Cancel'.

Format Cells

Number

Category:

- General
- Number
- Currency**
- Accounting
- Date
- Time
- Percentage
- Fraction
- Scientific
- Text
- Special
- Custom

Sample: \$6,414

Decimal places: 0

Symbol: \$

Negative numbers:

- \$1,234**
- \$1,234
- (\$1,234)
- (\$1,234)

Currency formats are used for general monetary values. Use Accounting formats to align decimal points in a column.

OK Cancel

# Sorting by value

1. Right-click any Sales value and choose Sort > Largest to Smallest.

➤ Excel now lists top-selling colours first. This sort order will be maintained when data changes, or when the pivot table is reconfigured.

Color	Sum of Sales
Blue	\$7,464
Green	\$6,114
Red	\$
Silver	\$
Grand Total	\$2

Right-click, select Sort

The screenshot shows the context menu for a PivotTable. The 'Sort' option is selected, opening a sub-menu. In the sub-menu, 'Sort Largest to Smallest' is highlighted with a yellow arrow. The main menu also includes options like 'Copy', 'Format Cells...', 'Number Format...', 'Refresh', 'Remove "Sum of Sales"', 'Summarize Values By', 'Show Values As', 'Value Field Settings...', 'PivotTable Options...', and 'Hide Field List'.

## Sorting by value

➤ *Excel now lists top-selling colours first. This sort order will be maintained when data changes, or when the pivot table is reconfigured.*

15    X    ✓    fx    7464

	A	B	C	D	E	F	G	H	I	J
1										
2										
3										
4										
5										
6										
7										
8										
9										
10										
11										
12										
13										
14										
15										
16										

**Sample sales data**

Date	Color	Region	Units	Sales
3-Jan-16	Red	West	1	\$11.00
13-Jan-16	Blue	South	8	\$96.00
21-Jan-16	Green	West	2	\$26.00
30-Jan-16	Blue	North	7	\$84.00
7-Feb-16	Green	North	8	\$104.00
13-Feb-16	Red	South	2	\$22.00
21-Feb-16	Blue	East	5	\$60.00
1-Mar-16	Green	West	2	\$26.00
13-Mar-16	Blue	East	8	\$96.00
23-Mar-16	Blue	North	7	\$84.00
28-Mar-16	Green	West	2	\$26.00
3-Apr-16	Blue	South	8	\$96.00

*Sorted largest to smallest*

Color	Sum of Sales
Blue	\$7,464
Silver	\$6,970
Green	\$6,414
Red	\$5,508
<b>Grand Total</b>	<b>\$26,356</b>

# Refresh Data

➤ Pivot table data needs to be "refreshed" in order to bring in updates. To reinforce how this works, we'll make a big change to the source data and watch it flow into the pivot table.

1. Select cell F5 and change \$11.00 to \$2000.

2. Right-click anywhere in the pivot table and select "Refresh".

Sample sales data

Right-click, select "Refresh"

Date	Color	Region	Units	Sales
3-Jan-16	Red	West	1	\$2,000.00
13-Jan-16	Blue	South	8	\$96.00
21-Jan-16	Green	West	2	\$26.00
30-Jan-16	Blue	North	7	\$84.00
7-Feb-16	Green	North	8	\$104.00
13-Feb-16	Red	South	2	\$22.00
21-Feb-16	Blue	East	5	\$60.00
1-Mar-16	Green	West	2	\$26.00
13-Mar-16	Blue	East	8	\$96.00
23-Mar-16	Blue	North	7	\$84.00
28-Mar-16	Green	West	2	\$26.00
3-Apr-16	Blue	South	8	\$96.00
12-Apr-16	Green	South	1	\$13.00
16-Apr-16	Red	East	8	\$88.00
23-Apr-16	Red	West	6	\$66.00
30-Apr-16	Green	South	5	\$65.00

Color	Sum of Sales
Blue	\$7,464
Silver	\$6,970
Green	
Red	
Grand	

Context menu options:

- Copy
- Format Cells...
- Refresh
- Sort >
- Filter >
- Subtotal "Color" ✓
- Expand/Collapse >
- Group...
- Ungroup...

## Refresh Data

➤ Notice "Red" is now the top selling colour, and automatically moves to the top:

Sample sales data

Date	Color	Region	Units	Sales
3-Jan-16	Red	West	1	\$2,000.00
13-Jan-16	Blue	South	8	\$96.00
21-Jan-16	Green	West	2	\$26.00
30-Jan-16	Blue	North	7	\$84.00
7-Feb-16	Green	North	8	\$104.00
13-Feb-16	Red	South	2	\$22.00
21-Feb-16	Blue	East	5	\$60.00
1-Mar-16	Green	West	2	\$26.00
13-Mar-16	Blue	East	8	\$96.00
23-Mar-16	Blue	North	7	\$84.00
28-Mar-16	Green	West	2	\$26.00
3-Apr-16	Blue	South	8	\$96.00
12-Apr-16	Green	South	1	\$13.00
16-Apr-16	Red	East	8	\$88.00

Color	Sum of Sales
Red	\$7,497
Blue	\$7,464
Silver	\$6,970
Green	\$6,414
<b>Grand Total</b>	<b>\$28,345</b>

*Red moves to the top as the best selling color*



## ***Refresh Data***

3. *Change F5 back to \$11.00 and refresh the pivot again.*

- *Note: changing F5 to \$2000 is not realistic, but it's a good way to force a change you can easily see in the pivot table. Try changing an existing colour to something new, like "Gold" or "Black". When you refresh, you'll see the new colour appear. You can use undo to go back to original data and pivot.*

1. Drag Units to the Value area to see Sales and Units together:

Units added as a Value field

# Percent of Total

There are different ways to display values. One option is to show values as a percent of total. If you want to display the same field in different ways, add the field twice.

1. Remove the Units from the Values area
2. Add the Sales field (again) to the Values area.
3. Right-click the second instance and choose "% of grand total":

Color	Sum of Sales	Sum of Sales2
Blue	\$7,464	7464
Silver	\$6,970	6970
Green	\$6,414	6414
Red	\$5,508	5508
Grand Total	\$26,356	26356

Changing calculation to show percent of total

The screenshot shows a PivotTable with two columns: 'Color' and 'Sum of Sales'. The 'Sum of Sales' column is selected, and a context menu is open. The 'Show Values As' option is selected, and a sub-menu is displayed. In the sub-menu, the '% of Grand Total' option is highlighted with a yellow arrow.

# Percent of Total

*The result is a breakdown by colour along with a percent of total:*

J5										
	A	B	C	D	E	F	G	H	I	J
1										
2	Sample sales data									
3										
4	Date	Color	Region	Units	Sales					
5	3-Jan-16	Red	West	1	\$11.00					
6	13-Jan-16	Blue	South	8	\$96.00					
7	21-Jan-16	Green	West	2	\$26.00					
8	30-Jan-16	Blue	North	7	\$84.00					
9	7-Feb-16	Green	North	8	\$104.00					
10	13-Feb-16	Red	South	2	\$22.00					
11	21-Feb-16	Blue	East	5	\$60.00					
12	1-Mar-16	Green	West	2	\$26.00					
13	13-Mar-16	Blue	East	8	\$96.00					
14	23-Mar-16	Blue	North	7	\$84.00					
15	28-Mar-16	Green	West	2	\$26.00					
16	3-Apr-16	Blue	South	8	\$96.00					
17	12-Apr-16	Green	South	1	\$13.00					
18	16-Apr-16	Red	East	8	\$88.00					

Color	Sum of Sales	Sum of Sales2
Blue	\$7,464	28.3%
Silver	\$6,970	26.4%
Green	\$6,414	24.3%
Red	\$5,508	20.9%
<b>Grand Total</b>	<b>\$26,356</b>	<b>100.0%</b>

*Second Sales field  
displays % of total*

# Group by Date

Pivot tables have a special feature to group dates into units like years, months, and quarters. This grouping can be customized.

1. Remove the second Sales field (Sales2).
2. Drag the Date field to the Columns area.
3. Right-click a date in the header area and choose "Group":

Right-click a date, select Group

Sum of Sales	Years	Quarters	Date	Grand Total
	+ 2016	+ 2017	+ 2018	+ 2019
Color				
Blue	\$1,764	\$2,000	\$2,000	\$7,464
Silver				\$6,970
Green	\$1,001	\$2,000		\$6,414
Red	\$682	\$2,000		\$5,508
Grand Total	\$3,447	\$6,000		\$26,356

## Group by Date

4. When the Group window appears, group by Years only (deselect Months and Quarters):

Grouping ? X

Auto

☒ Starting at: 1/3/2016

☒ Ending at: 8/4/2019

By

Seconds  
Minutes  
Hours  
Days  
Months  
Quarters  
Years

Number of days: 1

OK Cancel

## Group by Date

*We now have a pivot table that groups sales by colour and year:*

G	H	I	J	K	L	M
---	---	---	---	---	---	---

*Date grouped by Years only*

Sum of Sales	Date					
Color	2016	2017	2018	2019	Grand Total	
Blue	\$1,764	\$2,136	\$2,147	\$1,417	\$7,464	
Silver			\$3,565	\$3,405	\$6,970	
Green	\$1,001	\$2,431	\$1,330	\$1,652	\$6,414	
Red	\$682	\$2,024	\$1,986	\$816	\$5,508	
<b>Grand Total</b>	<b>\$3,447</b>	<b>\$6,591</b>	<b>\$9,028</b>	<b>\$7,290</b>	<b>\$26,356</b>	

# Two-way Pivot

Pivot tables can plot data in various two-dimensional arrangements.

1. Drag the Date field out of the columns area

2. Drag Region into the Columns area.

Excel builds a two-way pivot table that breaks down sales by colour and region:

G	H	I	J	K	L	M
---	---	---	---	---	---	---

Two-way Pivot table, Color by Region

Sum of Sales	Region				
Color	East	North	South	West	Grand Total
Blue	\$1,121	\$2,358	\$1,710	\$2,275	\$7,464
Silver	\$697	\$2,645	\$1,149	\$2,479	\$6,970
Green	\$1,198	\$1,678	\$1,059	\$2,479	\$6,414
Red	\$714	\$2,028	\$1,126	\$1,640	\$5,508
Grand Total	\$3,730	\$8,709	\$5,044	\$8,873	\$26,356



## Two-way Pivot

3. Swap Region and Colour (i.e. drag Region to the Rows area and Colour to the Columns area).

Excel builds another two-dimensional pivot table:

G	H	I	J	K	L	M	N
---	---	---	---	---	---	---	---

*Two-way Pivot table, Region by Color*

Sum of Sales		Color <span>▼</span>			
Region <span>▼</span>	Blue	Silver	Green	Red	Grand Total
East	\$1,121	\$697	\$1,198	\$714	\$3,730
North	\$2,358	\$2,645	\$1,678	\$2,028	\$8,709
South	\$1,710	\$1,149	\$1,059	\$1,126	\$5,044
West	\$2,275	\$2,479	\$2,479	\$1,640	\$8,873
Grand Total	\$7,464	\$6,970	\$6,414	\$5,508	\$26,356

# Key Pivot Table Benefit

## ➤ **Simplicity.**

*Basic pivot tables are very simple to set up and customize. There is no need to learn complicated formulas.*

## ➤ **Speed.**

*You can create a good-looking, useful report with a pivot table in minutes. Even if you are very good with formulas, pivot tables are faster to set up and require much less effort.*

## ➤ **Flexibility.**

*Unlike formulas, pivot tables don't lock you into a particular view of your data. You can quickly rearrange the pivot table to suit your needs. You can even clone a pivot table and build a separate view.*

# ***Key Pivot Table Benefit***

## ➤ ***Accuracy.***

*As long as a pivot table is set up correctly, you can rest assured results are accurate. In fact, a pivot table will often highlight problems in the data faster than any other tool.*

## ➤ ***Formatting.***

*A Pivot table can automatically apply consistent number and style formatting, even as data changes.*

## ➤ ***Updates.***

*Pivot tables are designed for on-going updates. If you base a pivot table on an Excel Table, the table resizes as needed with new data. All you need to do is click Refresh, and your pivot table will show you the latest.*

# ***Key Pivot Table Benefit***

## ➤ ***Filtering.***

*Pivot tables contain several tools for filtering data. Need to look at North America and Asia, but exclude Europe? A pivot table makes it simple.*

## ➤ ***Charts.***

*Once you have a pivot table, you can easily create a pivot chart.*