

# PIVOT TABLE

# WHY PIVOT TABLES?

	A	B	C	D
1	State	Year	Total Population	Student Population
2	New Mexico	2002	1,903,289	310,117
3	Nebraska	2003	1,826,341	313,968
4	Maryland	2004	5,884,563	359,210
5	California	2003	37,253,956	8,965,848
6	Montana	2002	926,865	163,067
7	D.C.	2004	917,092	183,811
8	Alaska	2002	655,435	153,920
9	Minnesota	2001	4,919,479	1,195,975
10	Louisiana	2001	4,468,976	626,279
11	Montana	2001	902,195	208,952
12	New Mexico	2004	2,085,538	631,320
13	West Virginia	2004	1,855,413	244,566
14	Louisiana	2004	4,601,893	326,680
15	Arizona	2003	6,329,013	1,837,525
16	Maryland	2001	5,296,486	1,399,498
17	Tennessee	2002	5,900,962	595,648
18	Texas	2002	23,764,231	5,246,483
19	Rhode Island	2003	1,052,567	173,937
20	Utah	2001	2,233,169	388,385
21	Wisconsin	2001	5,363,675	1,415,261
22	Kansas	2004	2,885,905	872,769
23	D.C.	2001	783,600	166,161
24	California	2002	35,893,799	3,598,863
25	Ohio	2003	11,536,502	3,361,193
26	Texas	2003	25,145,561	7,561,350
27	Alabama	2002	4,530,182	1,273,375
28	Utah	2002	2,389,039	460,374
29	Virginia	2003	8,001,024	1,445,224



Looking at a raw data set like the one here, how would you answer the following?

1. Which state had the highest population in 2002?
2. In which year was overall US population the highest?
3. Which states saw a decline in student population rate between 2003 and 2004?

What if you don't even **know** what you're looking for?

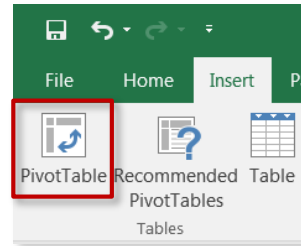
# PIVOT TABLE 101

**PivotTables** allow you to easily **organize**, **filter**, **summarize**, and **analyze** raw data

*“Analyzing data without a Pivot is like hammering a nail with a noodle”*

-Albert Einstein\*

	A	B	C	D
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2	New Mexico	2002	1,903,289	310,117
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11	Montana	2001	902,195	208,952
12	New Mexico	2004	2,085,538	631,320
13	West Virginia	2004	1,855,413	244,566
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15	Arizona	2003	6,329,013	1,837,525
16	Maryland	2001	5,296,486	1,399,498
17	Tennessee	2002	5,900,962	595,648
18	Texas	2002	23,764,231	5,246,483
19	Rhode Island	2003	1,052,567	173,937
20	Utah	2001	2,233,169	388,385
21	Wisconsin	2001	5,363,675	1,415,261
22	Kansas	2004	2,885,905	872,769
23	D.C.	2001	783,600	166,161
24	California	2002	35,893,799	3,598,863
25	Ohio	2003	11,536,502	3,361,193
26	Texas	2003	25,145,561	7,561,350
27	Alabama	2002	4,530,182	1,273,375
28	Utah	2002	2,389,039	460,374
29	Virginia	2003	8,001,024	1,445,224



	A	B	C	D	E
1	State	Year	Total Pop	% of State Pop	Student Population %
2	Alabama		18,579,040	100.00%	19.15%
3		2001	4,447,100	23.94%	21.33%
4		2002	4,530,182	24.38%	28.11%
5		2003	4,779,735	25.73%	10.39%
6		2004	4,822,023	25.95%	17.42%
7	Alaska		2,724,047	100.00%	12.99%
8		2001	626,932	23.01%	10.72%
9		2002	655,435	24.06%	23.48%
10		2003	710,231	26.07%	7.75%
11		2004	731,449	26.85%	10.63%
12	Arizona		23,756,734	100.00%	17.32%
13		2001	5,130,632	21.60%	27.22%
14		2002	5,743,834	24.18%	6.10%
15		2003	6,329,013	26.64%	29.03%
16		2004	6,553,255	27.58%	8.09%

# KEY BENEFITS

1

## POWERFUL

*- Uncover insights and answer key questions about your data*

2

## BEAUTIFUL

*- Apply custom styles and conditional formatting rules to bring your Pivots to life*

3

## FAST

*- Create custom views, filters, and calculated fields on the fly*

4

## ACCURATE

*- Automate calculations to minimize human error*

5

## FLEXIBLE

*- Manipulate table layouts and create dynamic views in seconds*

# DATA STRUCTURE

**GOOD!**



	A	B	C	D	E	F	G	H	I	J
1	Satisfaction	Airline Status	Age	Age Range	Gender	Flight Date	Destination City	Destination State	Type of Travel	Class
2	5	Blue	21	20-29	Male	3/18/2014	Dallas/Fort Worth, TX	Texas	Business travel	Business
3	4	Blue	56	50-59	Male	1/11/2014	Dallas/Fort Worth, TX	Texas	Business travel	Business
4	3	Blue	21	20-29	Female	1/25/2014	Dallas/Fort Worth, TX	Texas	Personal Travel	Business
5	4	Blue	43	40-49	Male	2/20/2014	Dallas/Fort Worth, TX	Texas	Business travel	Eco
6	5	Silver	49	40-49	Male	2/25/2014	Dallas/Fort Worth, TX	Texas	Business travel	Eco
7	5	Gold	49	40-49	Female	1/15/2014	Dallas/Fort Worth, TX	Texas	Business travel	Eco
8	3	Gold	35	30-39	Male	3/6/2014	Dallas/Fort Worth, TX	Texas	Business travel	Eco
9	4	Silver	33	30-39	Male	2/5/2014	Dallas/Fort Worth, TX	Texas	Business travel	Eco
10	4	Blue	44	40-49	Female	1/21/2014	Dallas/Fort Worth, TX	Texas	Business travel	Eco
11	4	Blue	51	50-59	Female	1/19/2014	Dallas/Fort Worth, TX	Texas	Business travel	Eco
12	4	Blue	28	20-29	Male	3/19/2014	Dallas/Fort Worth, TX	Texas	Business travel	Eco
13	2	Blue	39	30-39	Female	2/4/2014	Dallas/Fort Worth, TX	Texas	Business travel	Eco
14	5	Platinum	46	40-49	Female	1/15/2014	Dallas/Fort Worth, TX	Texas	Business travel	Eco
15	3	Silver	26	20-29	Female	2/5/2014	Dallas/Fort Worth, TX	Texas	Business travel	Eco
16	3	Blue	52	50-59	Female	2/17/2014	Dallas/Fort Worth, TX	Texas	Mileage tickets	Eco
17	3	Blue	46	40-49	Male	1/9/2014	Dallas/Fort Worth, TX	Texas	Mileage tickets	Eco
18	3	Silver	62	60-69	Female	1/4/2014	Dallas/Fort Worth, TX	Texas	Personal Travel	Eco
19	2	Blue	24	20-29	Female	2/9/2014	Dallas/Fort Worth, TX	Texas	Personal Travel	Eco
20	1	Blue	75	70-79	Female	3/8/2014	Dallas/Fort Worth, TX	Texas	Personal Travel	Eco
21	3	Blue	19	0-19	Female	2/15/2014	Dallas/Fort Worth, TX	Texas	Personal Travel	Eco
22	3	Blue	38	30-39	Female	1/19/2014	Dallas/Fort Worth, TX	Texas	Personal Travel	Eco
23	2	Blue	62	60-69	Male	1/24/2014	Dallas/Fort Worth, TX	Texas	Personal Travel	Eco
24	3	Blue	16	0-19	Male	1/15/2014	Dallas/Fort Worth, TX	Texas	Personal Travel	Eco
25	1	Blue	67	60-69	Female	3/6/2014	Dallas/Fort Worth, TX	Texas	Personal Travel	Eco
26	2	Blue	47	40-49	Female	3/29/2014	Dallas/Fort Worth, TX	Texas	Personal Travel	Eco
27	3	Blue	62	60-69	Female	1/21/2014	Dallas/Fort Worth, TX	Texas	Personal Travel	Eco

**BAD!**

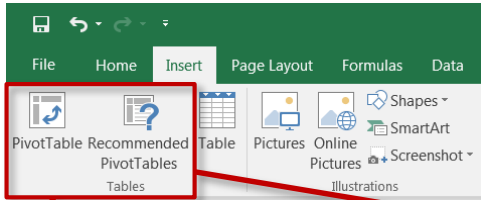


	A	B	C	D	E	F	G	H	I
1	MARKETING DATA								
2		Period1	Period2	Period3	Period4	Period5	Period6	Period7	Period8
3	Impressions	1,286,982	2,873,987	1,266,721	1,236,237	2,122,113	2,145,532	2,516,782	2,981,727
4	Clicks	627	374	827	263	912	662	723	1283
5	CTR	0.049%	0.013%	0.065%	0.021%	0.043%	0.031%	0.029%	0.043%
6	Column3	79	67	0	88	66	79	95	85
7	Column4	20	6	20	15	12	15	18	17
8	CVR	25%	9%	#DIV/0!	17%	18%	19%	19%	20%
9		Monthly Costs							
11		Jan	\$395						
12		Feb	\$350						
13		Mar	\$206						
14		Apr	\$214						
15		May	\$385						
16		Jun	\$301						
17		Jul	\$263						

- Rectangular (variables as columns, observations as rows)
- No extra formatting
- Contains only dimensions & measures
- Clear column headers
- No extra headers, footers, sub-totals or calculated fields

- Transposed (variables as rows, observations as columns)
- Unnecessary formatting
- Contains calculated fields
- Confusing column header names
- Extra header rows

# INSERTING A PIVOT TABLE



From the “Insert” menu, select **PivotTable** to create a blank Pivot, or use the **Recommended PivotTables** option to browse pre-populated starting points

Create PivotTable

Choose the data that you want to analyze

☒ Select a table or range

Table/Range:

☐ Use an external data source

Connection name:

☐ Use this workbook's Data Model

Choose where you want the PivotTable report to be placed

☐ New Worksheet

☒ Existing Worksheet

Location:

Choose whether you want to analyze multiple tables

☐ Add this data to the Data Model

What data are you analyzing?

Where will the PivotTable live?

(Insert → PivotTable)

Sum of IMDb Score (1-10...

Row Labels	Sum of IMDb Score (1-10)
Afghanistan	7.4
Argentina	22.8
Aruba	4.8
Australia	252.2
Belgium	13.4
Brazil	38.8
Canada	391.9
Chile	6.9

Sum of Lead Actor FB Li...

Row Labels	Sum of Lead Actor FB Likes
Afghanistan	30
Argentina	1995
Aruba	635
Australia	207117
Belgium	31324
Brazil	2350
Canada	238025
Chile	562

Sum of Movie FB Likes, ...

Row Labels	Sum of Movie FB Likes	Sum of
Afghanistan	0	
Argentina	33057	
Aruba	471	
Australia	448828	
Belgium	14080	
Brazil	39278	
Canada	246425	
Chile	0	

Sum of IMDb Score (1-10...

Row Labels	Sum of IMDb Score (1-10)
Action	5653.3

Blank PivotTable [Change Source Data...](#)

Sum of IMDb Score (1-10) by Country

Row Labels	Sum of IMDb Score (1-10)
Afghanistan	7.4
Argentina	22.8
Aruba	4.8
Australia	252.2
Belgium	13.4
Brazil	38.8
Canada	391.9
Chile	6.9
China	98.2
Colombia	7.5
Czech Republic	20.9
Denmark	65.1
Finland	7.2
France	705.2
Georgia	5.6
Germany	497.6
Hong Kong	89.5
Hungary	12.9
Iceland	13.8
India	97.6

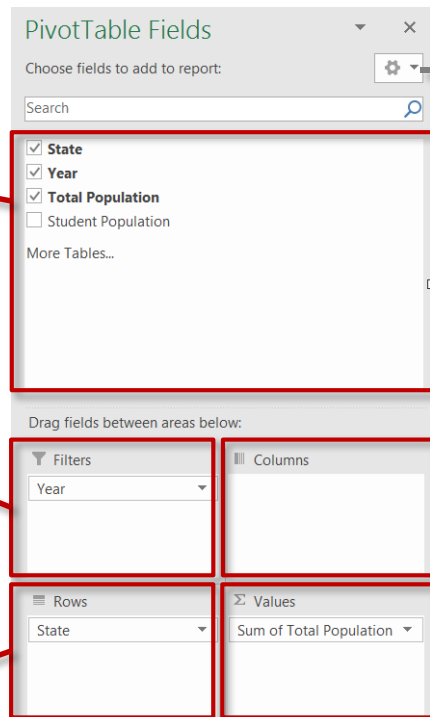
(Insert → Recommended PivotTables)

# THE FIELD LIST

The **Field List** shows all the variables in your dataset, and which ones are currently included in the Pivot

If there are fields that you want to use to filter the whole data set, drag them to the **Filters** box

Variables included in the **Rows** field will appear as individual rows within the Pivot



Layout options allow you to adjust the look and feel of the field list

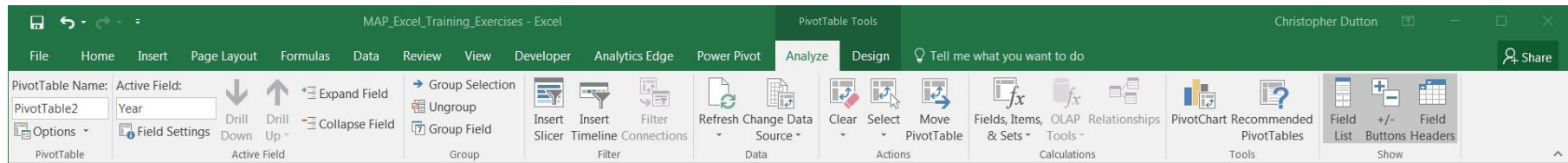
Variables included in the **Columns** field appear as individual *columns* within the Pivot

Numerical variables are almost always included in the **Values** field

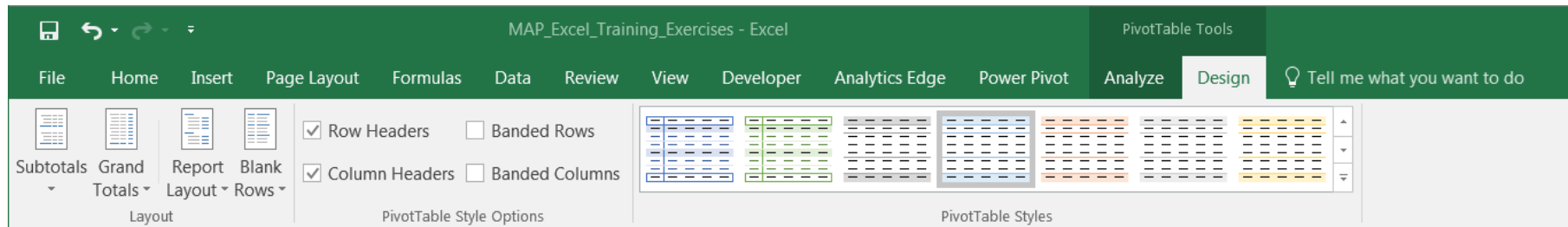
*(These are the quantitative measures that you care about: sales, revenue, clicks, etc.)*

# ANALYZE & DESIGN OPTIONS

## The “Analyze” Tab:

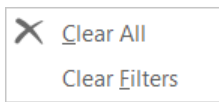
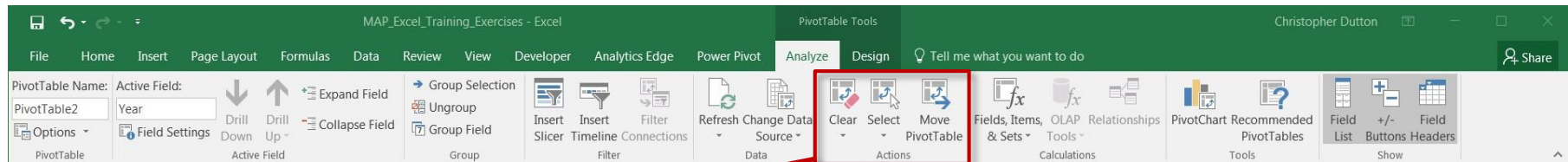


## The “Design” Tab:

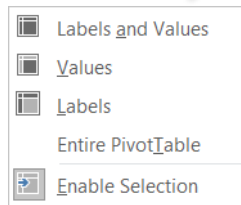




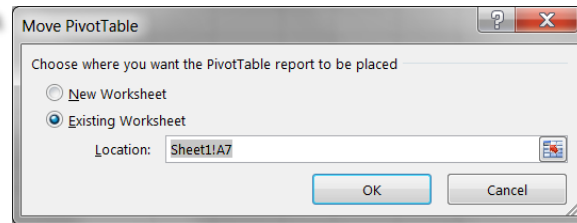
# SELECTING, CLEARING & MOVING PIVOTS



**Clear** options allow you to clear all fields and values from a table, or just any filters that have been applied



**Select** options (allow you to select entire sections of the PivotTable (or the entire table itself)



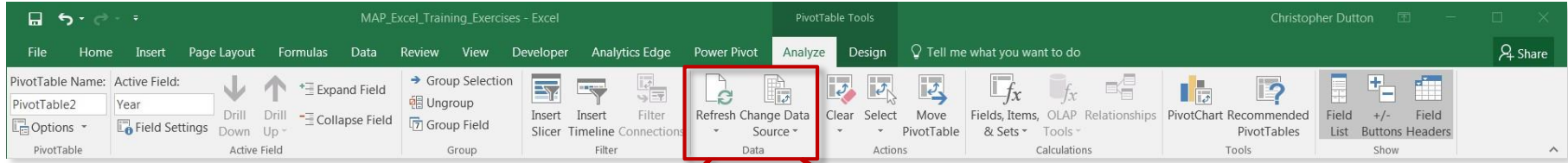
**Move** options allow you to relocate an existing PivotTable to a new worksheet or a new location within the existing one



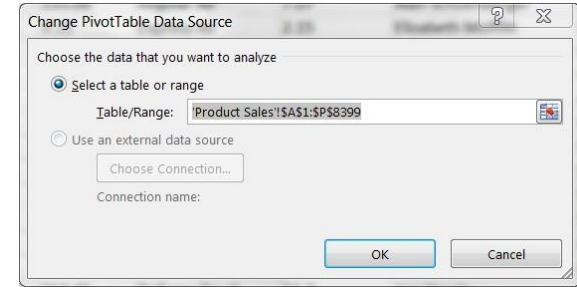
## PRO TIP:

*Select → Entire PivotTable, then copy and paste to duplicate an entire Pivot*

# REFRESHING & UPDATING PIVOTS



**Refresh** updates the PivotTable based on changes made *within* the defined source data range or table



## PRO TIP:

*Format your source data as a table to dynamically adjust as new columns or rows are added, or use a column-only range reference (i.e. \$A:\$G)*

**Change Data Source** allows you refresh the Pivot to reflect changes *outside* of the defined source range or table (i.e. new columns or rows)

# HOW DO PIVOTS ACTUALLY WORK?

	A	B
1	Age	(All)
2		
3	State	Average of Total Population
4	Alabama	719
5	Alaska	103
6	Arizona	973
7	Arkansas	440
8	California	5,672
9	Colorado	763
10	Connecticut	545
11	Delaware	139

## STEP 1: Detect/evaluate coordinates

- State = **Arizona**
- Measure = **Total Population**
- Filter = **All ages**

Excel isolates relevant source data

	A	B	C	D
1	State	Age	Total Population	Total Citizen I
2	Alabama	18 to 24	439	428
3	Alabama	25 to 34	576	535
4	Alabama	35 to 44	615	582
5	Alabama	45 to 64	1297	1275
6	Alabama	65+	667	660
7	Alaska	18 to 24	63	61
8	Alaska	25 to 34	109	103
9	Alaska	35 to 44	86	80
10	Alaska	45 to 64	186	182
11	Alaska	65+	72	69
12	Arizona	18 to 24	586	545
13	Arizona	25 to 34	859	709
14	Arizona	35 to 44	870	713
15	Arizona	45 to 64	1656	1502
16	Arizona	65+	892	846
17	Arkansas	18 to 24	288	281
18	Arkansas	25 to 34	362	336

## STEP 2: Apply arithmetic

- Summarize Values By: **AVERAGE**
- (vs. SUM, COUNT, MAX, MIN, etc.)

## STEP 3: Display result

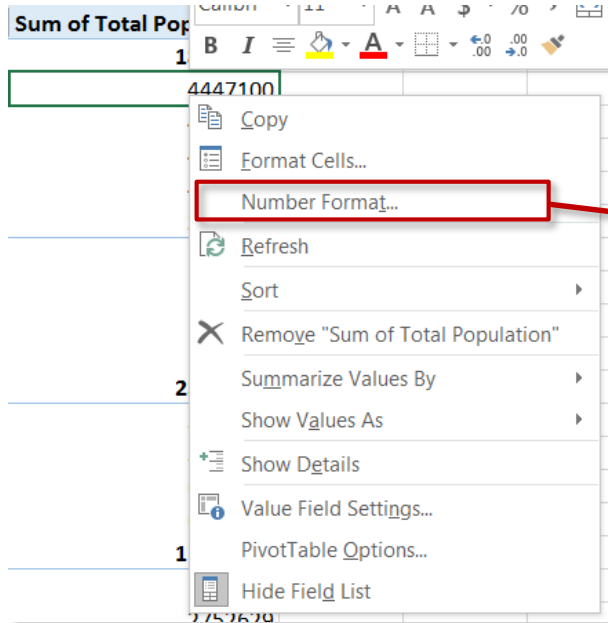
- $(586+859+870+1656+892)/5 = 973$

	A	B
1	Age	(All)
2		
3	State	Average of Total Population
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5	Alaska	103
6	Arizona	973
7	Arkansas	440

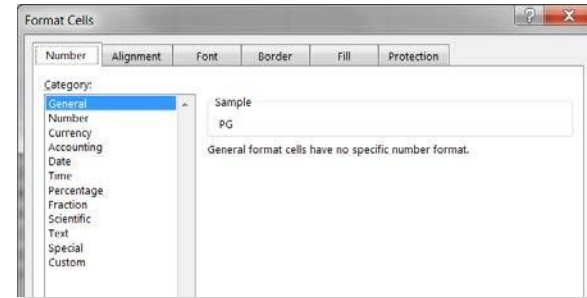
**NOTE:** You can **double-click** any specific value in a Pivot to generate a new tab showing the exact source data used to calculate it

# PIVOT FORMATTING

# NUMBER FORMATTING



Right-click a column header or any individual value within a field to change the **number format** (*number, currency, percentage, date, etc.*)



## PRO TIP:

**Right click, select PivotTable Options, and select the "Layout & Format" tab to customize how you want to display blank or error values**

# TABLE STYLES

The screenshot shows an Excel workbook with a PivotTable. The PivotTable has 'State' as the row label and 'Average of Total Population' as the data field. The PivotTable is currently using the 'Light' style. The PivotTable Style gallery is open, showing various styles categorized by 'Custom', 'Light', and 'Medium'. A red box highlights the 'New PivotTable Style...' button at the bottom of the gallery, with a red arrow pointing to the 'New PivotTable Style' dialog box on the right.

Excel PivotTable Exercises\_WIP\_v2 - Excel

PivotTable Tools: Design

Subtotals: Grand Totals, Report Layout, Blank Rows, Rows

PivotTable Style Options: Row Headers, Banded Rows, Column Headers, Banded Columns

PivotTable: State

Age	(All)
State	Average of Total Population
Alabama	719
Alaska	103
Arizona	973
Arkansas	440
California	5,672
Colorado	763
Connecticut	545
Delaware	139
District Of Columbia	103
Florida	3,007
Georgia	1,436
Hawaii	202
Idaho	226
Illinois	1,930
Indiana	971
Iowa	464
Kansas	424
Kentucky	658
Louisiana	664
Maine	208
Maryland	890

New PivotTable Style...

Select from a range of styles (right-click to make default), or customize your own:

The 'New PivotTable Style' dialog box is shown. It has a 'Name' field set to 'PivotTable Style 2'. The 'Table Element' list includes: Whole Table, Report Filter Labels, Report Filter Values, First Column Stripe, Second Column Stripe, First Row Stripe, Second Row Stripe, First Column Header Row, and Header Row. The 'Element Formatting' section is empty. There are 'Format' and 'Clear' buttons. A checkbox at the bottom is labeled 'Set as default PivotTable style for this document'. 'OK' and 'Cancel' buttons are at the bottom right.

Name: PivotTable Style 2

Table Element:

- Whole Table
- Report Filter Labels
- Report Filter Values
- First Column Stripe
- Second Column Stripe
- First Row Stripe
- Second Row Stripe
- First Column Header Row
- Header Row

Element Formatting:

☐ Set as default PivotTable style for this document

OK Cancel

# TABLE LAYOUTS: COMPACT VS. OUTLINE

## Compact Form (default):

	A	B
1	Order Priority	(All) ▾
2	Region	(All) ▾
3		
4	Row Labels	Sum of Order Quantity
5	Furniture	4,563
6	Bookcases	1,347
7	O'Sullivan 3-Shelf Heavy-Duty Bookcases	500
8	Bush Mission Pointe Library	442
9	O'Sullivan Elevations Bookcase, Cherry Finish	405
10	Chairs & Chairmats	1,674
11	Global High-Back Leather Tilter, Burgundy	666
12	Global Troy™ Executive Leather Low-Back Tilter	550
13	Office Star - Mid Back Dual function Ergonomic High Back Chair	458
14	Tables	1,542
15	Bevis 36 x 72 Conference Tables	619
16	BoxOffice By Design Rectangular and Half-Moon Meeting Room	516
17	Bretford CR8500 Series Meeting Room Furniture	407
18	Office Supplies	4,137
19	Binders and Binder Accessories	1,400
20	Wilson Jones Hanging View Binder, White, 1"	585
21	Storex DuraTech Recycled Plastic Frosted Binders	412
22	Avery Flip-Chart Easel Binder, Black	403
23	Paper	1,379
24	Computer Printout Paper with Letter-Trim Perforations	502

VS.


## Outline Form (recommended):


	A	B	C	D
1	Order Priority	(All) ▾		
2	Region	(All) ▾		
3				
4	Product Category	Product Sub-Category	Product Name	Sum of Order Quantity
5	Furniture			4,563
6		Bookcases		1,347
7			O'Sullivan 3-Shelf Heavy-Duty Bookcases	500
8			Bush Mission Pointe Library	442
9			O'Sullivan Elevations Bookcase, Cherry Finish	405
10		Chairs & Chairmats		1,674
11			Global High-Back Leather Tilter, Burgundy	666
12			Global Troy™ Executive Leather Low-Back Tilter	550
13			Office Star - Mid Back Dual function Ergonomic High	458
14		Tables		1,542
15			Bevis 36 x 72 Conference Tables	619
16			BoxOffice By Design Rectangular and Half-Moon Me	516
17			Bretford CR8500 Series Meeting Room Furniture	407
18	Office Supplies			4,137
19		Binders and Binder Accessories		1,400
20			Wilson Jones Hanging View Binder, White, 1"	585
21			Storex DuraTech Recycled Plastic Frosted Binders	412
22			Avery Flip-Chart Easel Binder, Black	403
23		Paper		1,379
24			Computer Printout Paper with Letter-Trim Perforatic	502
25			Xerox 210	473


- Nested fields/dimensions condensed into one column, with one filter option


- Each field/dimension broken out into its own column, with separate column headers and filter options
- Allows you to apply custom filters to each field (i.e. label filters on the **Product Category** field and value filters on the **Product Sub-Category** field)


# TABLE LAYOUTS: TABULAR FORM

 Show in Compact Form

 Show in Outline Form

 Show in Tabular Form

 Repeat All Item Labels

 Do Not Repeat Item Labels

## Tabular Form (non-repeating):

2	Player	(All)		
3				
4	Team	Position	Sum of Salary	Sum of Games
5	☒ Anaheim Angels	Catcher	\$2,082,500	341
6		First Baseman	\$5,250,000	225
7		Outfielder	\$23,725,000	623
8		Pitcher	\$37,304,167	1307
9		Second Baseman	\$2,270,000	109
10		Shortstop	\$1,150,000	146
11		Third Baseman	\$7,250,000	83
12	☒ Baltimore Orioles	Catcher	\$3,830,000	282
13		First Baseman	\$8,375,000	396
14		Outfielder	\$22,975,000	591
15		Pitcher	\$29,142,500	1478
16		Shortstop	\$2,850,000	398
17		Third Baseman	\$6,705,000	197
18	☒ Boston Red Sox	Catcher	\$5,505,000	246
19		First Baseman	\$3,250,000	259

## Tabular Form (repeating):

2	Player	(All)		
3				
4	Team	Position	Sum of Salary	Sum of Games
5	☒ Anaheim Angels	Catcher	\$2,082,500	341
6	Anaheim Angels	First Baseman	\$5,250,000	225
7	Anaheim Angels	Outfielder	\$23,725,000	623
8	Anaheim Angels	Pitcher	\$37,304,167	1307
9	Anaheim Angels	Second Baseman	\$2,270,000	109
10	Anaheim Angels	Shortstop	\$1,150,000	146
11	Anaheim Angels	Third Baseman	\$7,250,000	83
12	☒ Baltimore Orioles	Catcher	\$3,830,000	282
13	Baltimore Orioles	First Baseman	\$8,375,000	396
14	Baltimore Orioles	Outfielder	\$22,975,000	591
15	Baltimore Orioles	Pitcher	\$29,142,500	1478
16	Baltimore Orioles	Shortstop	\$2,850,000	398
17	Baltimore Orioles	Third Baseman	\$6,705,000	197
18	☒ Boston Red Sox	Catcher	\$5,505,000	246
19	Boston Red Sox	First Baseman	\$3,250,000	259
20	Boston Red Sox	Outfielder	\$33,500,000	530
21	Boston Red Sox	Pitcher	\$40,109,000	1355

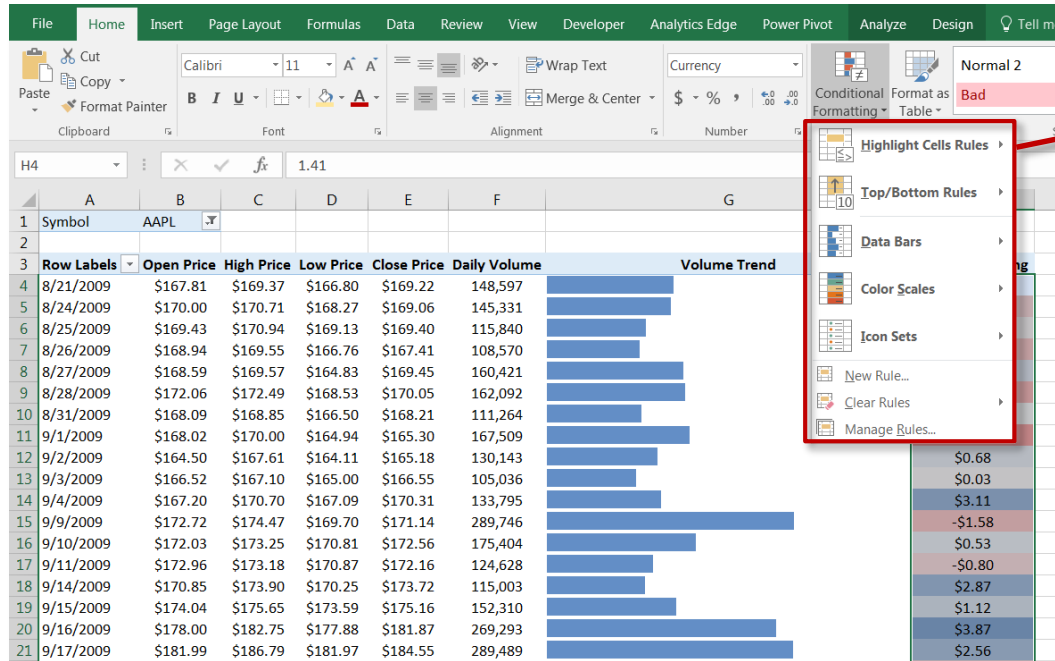


## PRO TIP:

*Use Outline Form when you are manipulating data within a Pivot, and switch to Tabular form with repeating labels (and no grand totals or subtotals) if you want to create a new raw dataset*



# CONDITIONAL FORMATTING



**Conditional Formatting** rules can be applied to PivotTables just like normal data ranges

(Home → Conditional Formatting)

**Options include:**

- **Text and Value-based Formats**
- **Data Bars**
- **Color Scales**
- **Icon Sets**
- **Formula-Based Rules**

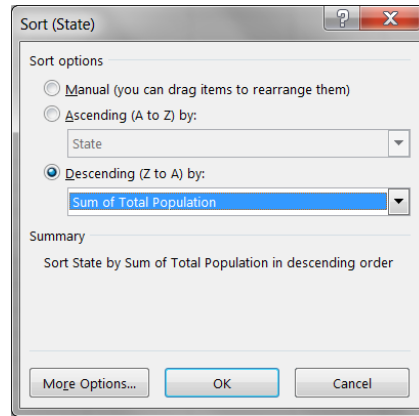
# **SORTING, FILTERING & GROUPING**

# SORTING & FILTERING

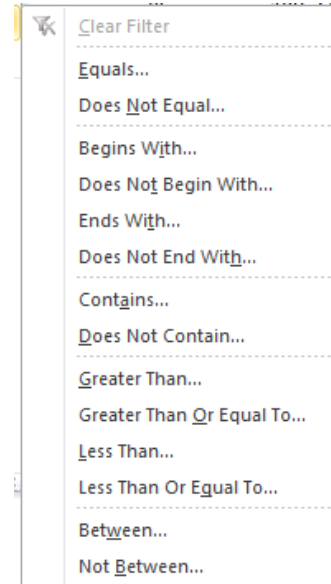
2	Student Population	(All)	
3			
4	State	Year	Sum of Total Population
	Sort A to Z		18579040
	Sort Z to A		4447100
	More Sort Options...		4530182
	Clear Filter From "State"		4779735
	Label Filters		4822023
	Value Filters		2724047
	Search		626932
	(Select All)		655435
	Alabama		710231
	Alaska		731449
	Arizona		23756734
	Arkansas		5130632
	California		5743834
	Colorado		6329013
	Connecticut		6553255
			11291081
			2673400
			2752629
			2915921
24	2004		2949131
25	California		145060833

Hit this button (or right-click one of the values) to drill into **Sorting & Filtering** options

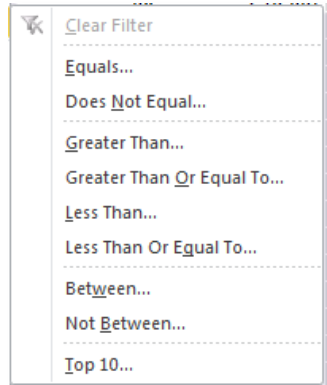
## More Sort Options:



## Label Filters:



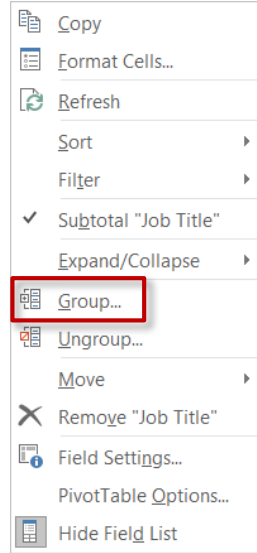
## Value Filters:



Manual  
Selections

# GROUPING DATA

	A	B	C
1	Year	2012	
2	Employee Name	(All)	
3			
4	Job Title	Sum of Base Pay	Sum of Overtime Pay
5	Fusion Welder	\$187,928	\$4,230
6	Forensic Autopsy Technician	\$73,899	\$530
7	Food Service Worker	\$832,014	\$236,773
8	Food Service Supervisor	\$120,515	\$12,307
9	Firefighter	\$15,547,896	\$3,740,214
10	Fire Safety Inspector li	\$249,959	\$1,854
11	Fire Safety Inspector 2	\$523,823	\$153,958
12	Fire Protection Engineer	\$77,376	\$0
13	Fire Fighter Paramedic	\$3,275,200	\$485,124
14	Fire Alarm Dispatcher	\$25,720	\$0
15	Fingerprint Technician li	\$94,278	\$6,587
16	Fingerprint Technician 3	\$65,894	\$998
17	Fingerprint Technician 2	\$172,595	\$9,040
18	Feasibility Analyst, Port	\$89,376	\$0
19	Farmer	\$61,625	\$0
20	Fare Inspections Supervisor/Investigator	\$107,439	\$0
21	Fare Collections Receiver	\$228,800	\$46,455



	A	B
1	Year	2012
2	Employee Name	(All)
3		
4	Job Title2	Job Title
5	Fusion Welder	Fusion Welder
6		
7	Forensic Autopsy Technician	Forensic Autopsy Technician
8		
9	Food Service Worker	Food Service Worker
10		
11	Food Service Supervisor	Food Service Supervisor
12		
13	Group1	
14		Firefighter
15		Fire Safety Inspector li
16		Fire Safety Inspector 2
17		Fire Protection Engineer
18		Fire Fighter Paramedic
19		Fire Alarm Dispatcher
20	Fingerprint Technician li	
21		Fingerprint Technician li

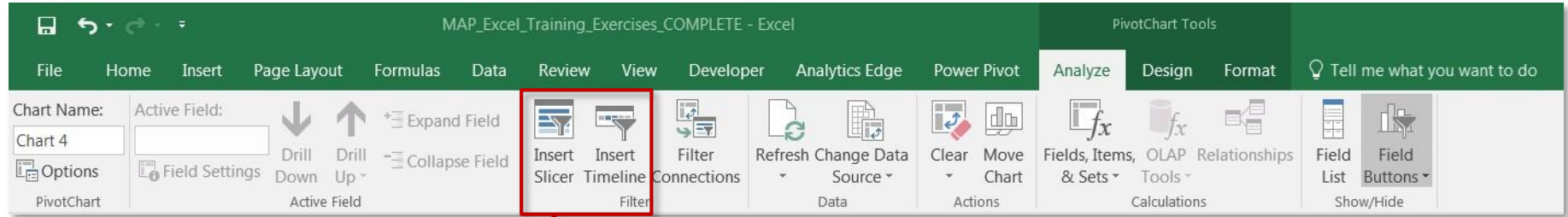
**Select values that you'd like to group**  
(in this case fire-related job titles)

**Right-click and select *Group***

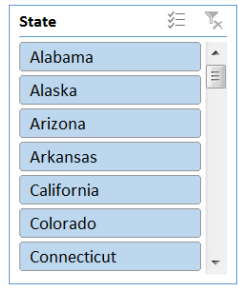
**A new field is created ("*Job Title2*") containing the new group ("*Group1*")**

*Note: Both names can be customized*

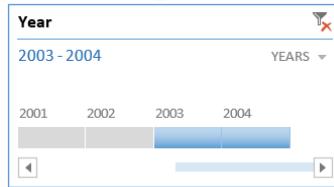
# SLICERS & TIMELINES



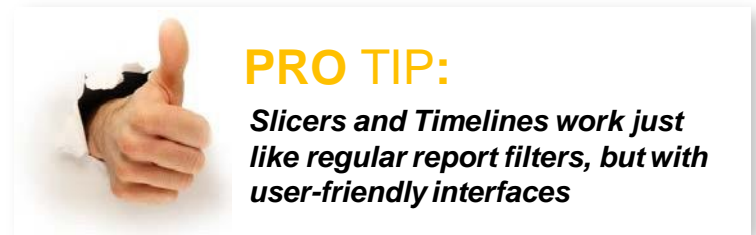
Insert **Slicers** or **Timelines**



*Basically a prettier version of a filter!*

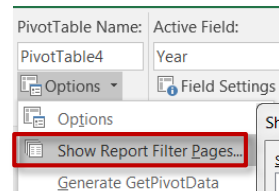


*A filter designed specifically for dates*

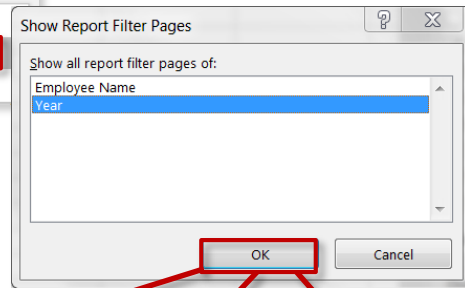


# REPORT FILTER PAGES

1	Year	(All)		
2	Employee Name	Search		
3				
4	Job Title	(All)	Sum of Overtime Pay	Sum of Other Pay
5	Account Clerk	2011	\$16,160	\$26,448
6	Accountant	2012	\$0	\$0
7	Accountant I	2013	\$0	\$0
8	Accountant II		\$0	\$31,851
9	Accountant III		\$0	\$9,318
10	Accountant Intern		\$0	\$6,715
11	Accountant IV		\$0	\$29,264
12	Acupuncturist		\$0	\$1,220
13	Admin Analyst 3		\$0	\$5,826
14	Admin Hearing Examiner		\$223,203	\$2,230
15	Administrative Analyst		\$4,439,753	\$140
16	Administrative Analyst I		\$5,416	\$0
17	Administrative Analyst II		\$118,747	\$4,247
18	Administrative Engineer		\$836,305	\$9,742
19	Administrative Services Mgr		\$183,985	\$0
				\$470



(PivotTable Tools → Analyze)



1	Year	2011		
2	Employee Name	(All)		
3				
4	Job Title	Sum of Base Pay	Sum of Overtime Pay	Sum of Other Pay
5	Account Clerk	\$830,012	\$1,922	\$7,908
6	Accountant I	\$135,063	\$0	\$0
7	Accountant II	\$1,663,777	\$0	\$10,813
8	Accountant III	\$1,400,133	\$0	\$2,806
9	Accountant Intern	\$258,000	\$0	\$4,468
10	Accountant IV	\$963,333	\$0	\$0
11	Acupuncturist	\$1,212,694	\$0	\$9,035
12	Admin Analyst 3	\$5,330	\$0	\$0
13	Admin Analyst I	\$275,056	\$0	\$0
14	Admin Analyst II	\$183,980	\$0	\$470
15	Admin Hearing Examiner	\$176,900	\$12,099	\$18,873
16	Administrative Analyst	\$213,634	\$11,120	\$15,683
17	Administrative Analyst I	\$72,490	\$8,090	\$402
18	Administrative Analyst II	\$425,335	\$0	\$0
19	Administrative Engineer	\$680,860	\$0	\$0
20	Administrative Services Mgr	\$897,352	\$28,802	\$12,444
21	Acupuncturist	\$490,000	\$11,288	\$2,717

Year = 2011

1	Year	2012		
2	Employee Name	(All)		
3				
4	Job Title	Sum of Base Pay	Sum of Overtime Pay	Sum of Other Pay
5	Account Clerk	\$690,207	\$0,796	\$4,904
6	Accountant I	\$71,005	\$0	\$0
7	Accountant II	\$662,179	\$0	\$5,398
8	Accountant III	\$1,364,800	\$0	\$3,074
9	Accountant Intern	\$185,458	\$0	\$2,042
10	Accountant IV	\$352,773	\$0	\$0
11	Acupuncturist	\$60,374	\$0	\$1,030
12	Admin Analyst 3	\$09,124	\$0	\$0
13	Admin Analyst I	\$1,507,899	\$0	\$6,488
14	Admin Analyst II	\$43,162	\$0	\$4,479
15	Admin Hearing Examiner	\$438,407	\$0	\$4,917
16	Administrative Analyst	\$230,846	\$41	\$41
17	Administrative Analyst I	\$240,124	\$0	\$12,003
18	Administrative Analyst II	\$80,277	\$3,687	\$7,089
19	Administrative Engineer	\$33,569	\$0	\$2
20	Administrative Services Mgr	\$48,788	\$0	\$0
21	Acupuncturist	\$155,843	\$11,514	\$15,877

Year = 2012

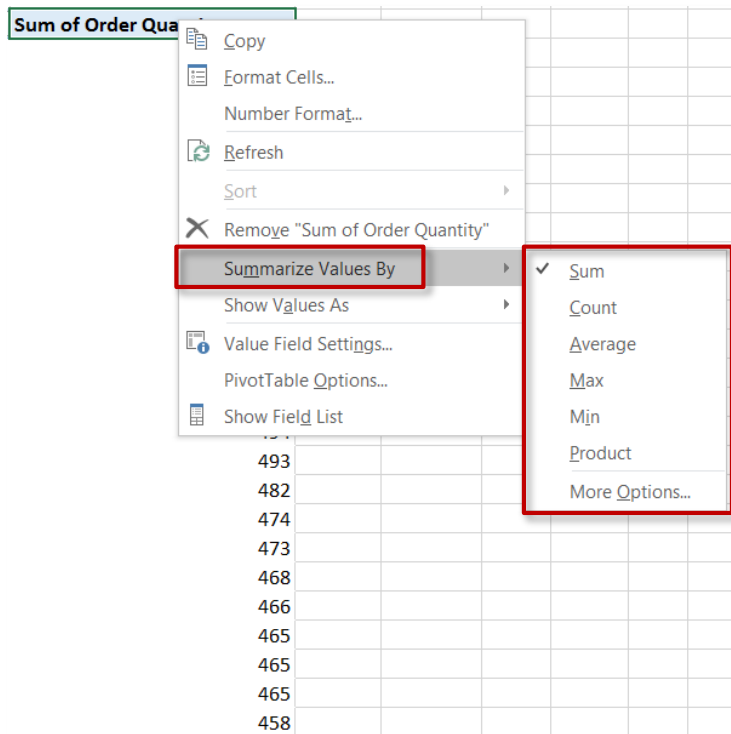
1	Year	2013		
2	Employee Name	(All)		
3				
4	Job Title	Sum of Base Pay	Sum of Overtime Pay	Sum of Other Pay
5	Account Clerk	\$897,056	\$7,443	\$18,055
6	Accountant I	\$45,212	\$0	\$0
7	Accountant II	\$843,708	\$0	\$9,044
8	Accountant III	\$823,725	\$0	\$2,888
9	Accountant Intern	\$394,800	\$0	\$5,207
10	Accountant IV	\$351,486	\$0	\$29,264
11	Acupuncturist	\$222,203	\$0	\$2,230
12	Admin Analyst 3	\$1,714,150	\$140	\$9,199
13	Admin Analyst I	\$275,056	\$0	\$0
14	Admin Analyst II	\$183,980	\$0	\$470
15	Admin Hearing Examiner	\$176,900	\$12,099	\$18,873
16	Administrative Analyst	\$213,634	\$11,120	\$15,683
17	Administrative Analyst I	\$72,490	\$8,090	\$402
18	Administrative Analyst II	\$425,335	\$0	\$0
19	Administrative Engineer	\$680,860	\$0	\$0
20	Administrative Services Mgr	\$897,352	\$28,802	\$12,444
21	Acupuncturist	\$490,000	\$11,288	\$2,717

Year = 2013

Use the **“Show Report Filter Pages”** option to create new tabs for each value that a given filter (i.e. Year) can take

# **CALCULATED VALUES & FIELDS**

# SUMMARIZE VALUES BY



**Summarize Values By** determines how numbers should be treated when they are rolled up or aggregated (*sum, count, average, max, etc.*)

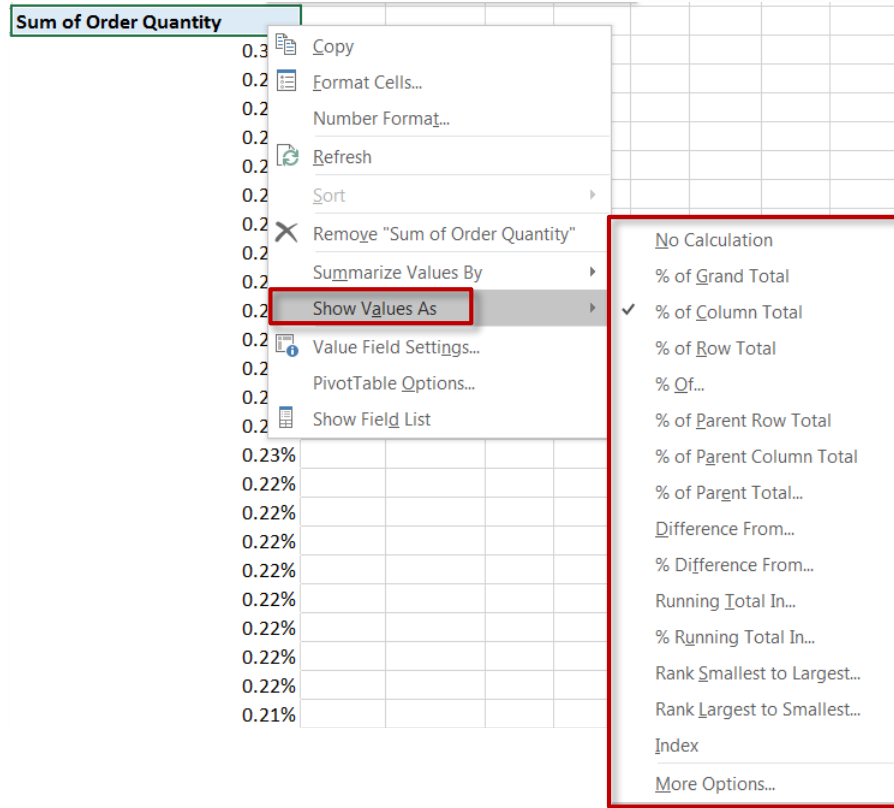


## PRO TIP:

*Excel will default to “Count Of” if a data column contains blanks or non-numerical values. Typically you will want to change this field setting to “Sum Of”*



# SHOW VALUES AS



**Show Values As** options allow you to apply additional calculations to change the way values are shown, such as the Percent of a Total or Subtotal, Running Value, Rank, etc.

*In this case, we're showing **Order Quantity** values as **% of Column Total**, rather than whole numbers*

# SHOW VALUES AS - EXAMPLES

In this example we're summarizing the same Revenue field **6 different ways**:

		Value (no calculation)	% of Total Column	% of Parent (genre)	% Difference (prev. year)	Running Total (by year)	Rank (Large → Small)
Genre	Year	Revenue	Revenue2	Revenue3	Revenue4	Revenue5	Revenue6
⊟ Action		<b>\$12,521,476,890</b>	<b>58.01%</b>	<b>100.00%</b>			
	2010	\$2,939,932,519	13.62%	23.48%		\$2,939,932,519	4
	2011	\$3,326,029,678	15.41%	26.56%	13.13%	\$6,265,962,197	1
	2012	\$3,181,127,752	14.74%	25.41%	-4.36%	\$9,447,089,949	2
	2013	\$3,074,386,941	14.24%	24.55%	-3.36%	\$12,521,476,890	3
⊟ Adventure		<b>\$8,130,146,101</b>	<b>37.67%</b>	<b>100.00%</b>			
	2010	\$2,194,189,209	10.17%	26.99%		\$2,194,189,209	3
	2011	\$1,180,009,072	5.47%	14.51%	-46.22%	\$3,374,198,281	4
	2012	\$2,346,041,792	10.87%	28.86%	98.82%	\$5,720,240,073	2
	2013	\$2,409,906,028	11.16%	29.64%	2.72%	\$8,130,146,101	1
⊟ Animation		<b>\$933,080,437</b>	<b>4.32%</b>	<b>100.00%</b>			
	2010	\$251,501,645	1.17%	26.95%		\$251,501,645	2
	2011	\$10,134,754	0.05%	1.09%	-95.97%	\$261,636,399	4
	2012	\$183,600,836	0.85%	19.68%	1711.60%	\$445,237,235	3
	2013	\$487,843,202	2.26%	52.28%	165.71%	\$933,080,437	1
<b>Grand Total</b>		<b>\$21,584,703,428</b>	<b>100.00%</b>				

# SHOW VALUES AS - INDEX

The **Index** calculation uses an aggregated weighted average to reveal the impact of one number within the context of a data set

Revenue Genre	Country				
	Australia	Canada	France	UK	USA
Action	\$843,261,855	\$718,355,657	\$1,076,178,688	\$3,099,974,501	\$59,778,470,770
Adventure	\$274,765,505	\$260,123,835	\$73,505,978	\$2,823,401,894	\$26,748,337,472
Animation	\$63,992,328		\$11,517,100	\$132,206,052	\$3,528,074,076
Biography	\$40,246,592	\$33,855,526	\$53,902,093	\$950,806,244	\$6,288,688,296
Comedy	\$77,873,417	\$231,856,600	\$159,028,092	\$980,270,042	\$35,675,230,901
Crime	\$2,300,604	\$1,882,581	\$8,478,574	\$366,995,069	\$7,485,361,502
Documentary		\$24,784	\$107,581,601	\$5,352,503	\$435,104,871
Drama	\$150,361,951	\$103,169,476	\$360,552,216	\$1,236,661,845	\$17,705,898,861
Family					\$447,481,433
Fantasy		\$123,792,202		\$14,564,027	\$1,257,990,540
Horror	\$49,460,140	\$101,747,280	\$3,658,281	\$195,236,323	\$4,729,877,904
Musical					\$184,168,000
Mystery	\$4,717,455	\$489,220	\$15,523,168		\$1,036,780,660

*Documentaries index very high in France, meaning that a global increase in Documentary ticket prices would impact the French film industry significantly more than any other country*

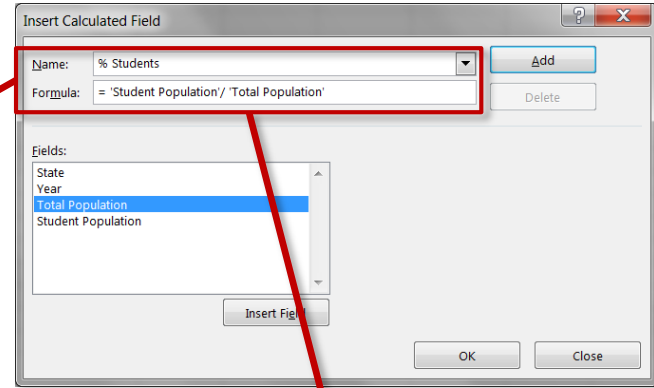
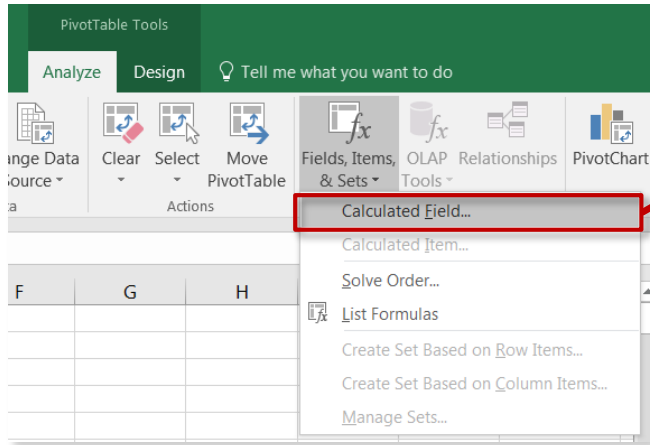
Revenue Genre	Country				
	Australia	Canada	France	UK	USA
Action	1.54	1.25	1.58	0.87	0.99
Adventure	1.09	0.99	0.23	1.72	0.97
Animation	2.05	0.00	0.30	0.65	1.03
Biography	0.65	0.53	0.70	2.37	0.93
Comedy	0.25	0.71	0.41	0.48	1.05
Crime	0.03	0.03	0.10	0.86	1.04
Documentary	0.00	0.01	18.90	0.18	0.86
Drama	0.92	0.60	1.78	1.16	0.99
Family	0.00	0.00	0.00	0.00	1.09
Fantasy	0.00	10.13	0.00	0.19	0.98
Horror	1.16	2.29	0.07	0.71	1.01
Musical	0.00	0.00	0.00	0.00	1.09
Mystery	0.53	0.05	1.41	0.00	1.07

Each Revenue number is converted to an **Index** representing it's importance within each column, using the following formula:

**(Cell Value \* Grand Total) / (Row Total \* Column Total)**

# CALCULATED FIELDS

**Calculated Fields** allow you to create new measures based on existing, numerical fields:



*In this case I've added a measure called **% Students**, equal to **Student Population / Total Population***



## PRO TIP:

***Don't calculate rate metrics (i.e. CTR, CPC) in your raw data, use calculated fields in your Pivot. This ensures that they calculate properly no matter how your data is rolled up***

# CALCULATING USING COUNTS

Calculated fields are *always* based on the **SUM** of other fields (even if they are shown as a count, max, average, etc.). But what if you want to make a calculation based on the **COUNT** of a field?

Ex) Create a field to calculate the **Likes per Post** on each date

STEP 1: Create a new “Count” column (=1) in the source data

STEP 2: Create a calculated field defined as **Likes/Count**

A	B	C
Page	Spartan Race	
Post Type	photo	
Date of Post	Post Copy	Sum of Likes
10/1/2016		2,286
	If you missed the #SpartanWC16, you missed	336
	Tap that bell then celebrate with a refreshin	218
	The biggest race of the Spartan calendar is h	604
	Your 2016 #SpartanWC16 top finishers: Zuz	1,128
10/2/2016		7,266
	"Couldn't wait to get home and put it all tog	534
	#SpartanRace founder practicing what he pr	1,467
	Tahoe had one last surprise for us Spartans	2,000
	The 26+ mile, 70+ obstacle #SpartanWC16 U	1,743
	This #SpartanMedal is one for the mantle! P	572
	Your top finishers at this year's #SpartanWC	663
	Your top finishers at this year's #SpartanWC	287
10/3/2016		12,022
	AROO to all the racers, fans and volunteers	749
	As the sun sets on another World Champion	1,079
	Cold, mud, obstacles and snow could not st	865
	How many Spartans out there are feeling so	963
	Start the week off strong, and keep it going	2,926
	When Randy Moss, one of the greatest footb	5,440

A	B	C	D
Count	Page	Date of Post	Pos
1	Spartan Race	8/30/2016	vi
1	Spartan Race	8/30/2016	vi
1	Spartan Race	8/30/2016	vi
1	Spartan Race	8/30/2016	vi
1	Spartan Race	8/30/2016	vi
1	Spartan Race	8/31/2016	vi
1	Spartan Race	8/31/2016	vi
1	Spartan Race	8/31/2016	vi
1	Spartan Race	8/31/2016	ph
1	Spartan Race	8/31/2016	vi
1	Spartan Race	8/31/2016	st
1	Spartan Race	8/31/2016	st
1	Spartan Race	8/31/2016	st
1	Spartan Race	8/31/2016	st
1	Spartan Race	9/1/2016	st
1	Spartan Race	9/1/2016	vi
1	Spartan Race	9/1/2016	vi
1	Spartan Race	9/1/2016	vi
1	Spartan Race	9/1/2016	vi
1	Spartan Race	9/1/2016	vi

Insert Calculated Field

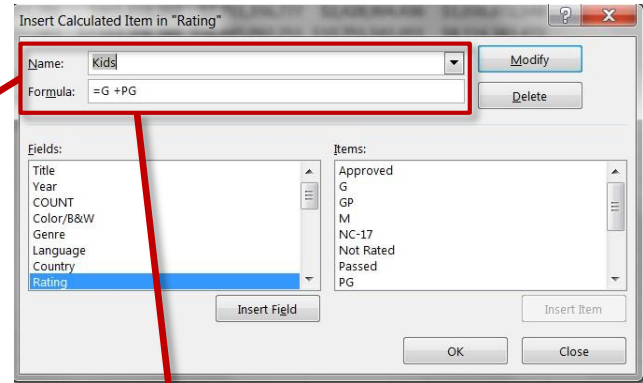
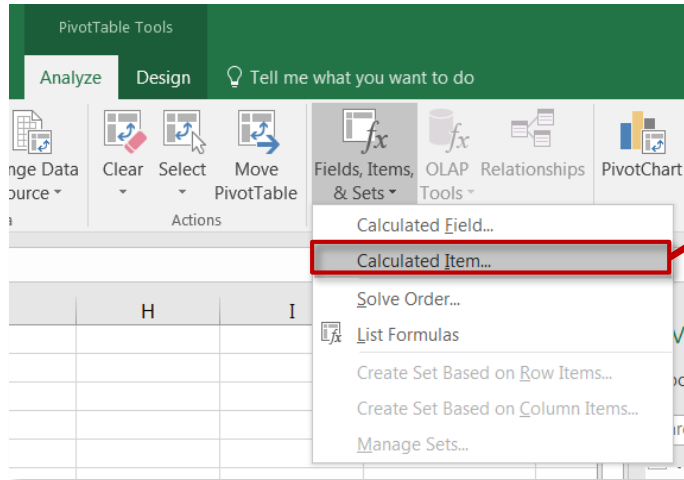
Name: Likes/Post

Formula: = Likes/ Count

Date of Post	Post Copy	Sum of Likes	Sum of Likes/Post
10/1/2016		2,286	572
	If you missed the #SpartanWC16, you missed	336	336
	Tap that bell then celebrate with a refreshin	218	218
	The biggest race of the Spartan calendar is h	604	604
	Your 2016 #SpartanWC16 top finishers: Zuz	1,128	1,128
10/2/2016		7,266	1,038
	"Couldn't wait to get home and put it all tog	534	534
	#SpartanRace founder practicing what he pr	1,467	1,467
	Tahoe had one last surprise for us Spartans	2,000	2,000
	The 26+ mile, 70+ obstacle #SpartanWC16 U	1,743	1,743
	This #SpartanMedal is one for the mantle! P	572	572
	Your top finishers at this year's #SpartanWC	663	663
	Your top finishers at this year's #SpartanWC	287	287

# CALCULATED ITEMS

**Calculated Items** allow you to create new dimensions or categories based on existing dimensions:



*In this case I've added a new category called "Kids", which combines G and PG movie ratings*



## PRO TIP:

**DON'T USE CALCULATED ITEMS UNLESS YOU NEED TO;** you're usually better off simply grouping fields or adding new category columns within your source data itself

# SOLVE ORDER

Excel\_PivotTable\_Exercises\_WIP\_v2 - Excel

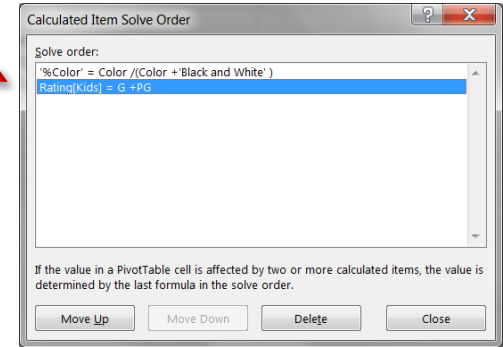
PivotTable Tools: Analyze, Design, Tell me what you want to do

PivotTable Name: Active Field: Sum of Gross Revenue

Options: Field Settings, Drill Down, Drill Up, Expand Field, Collapse Field, Group Selection, Ungroup, Group Field, Insert Slicer, Insert Timeline, Filter Connections, Refresh Change Data Source, Clear, Select, Move PivotTable, Fields, Items, & Sets, OLAP Relationships, PivotChart

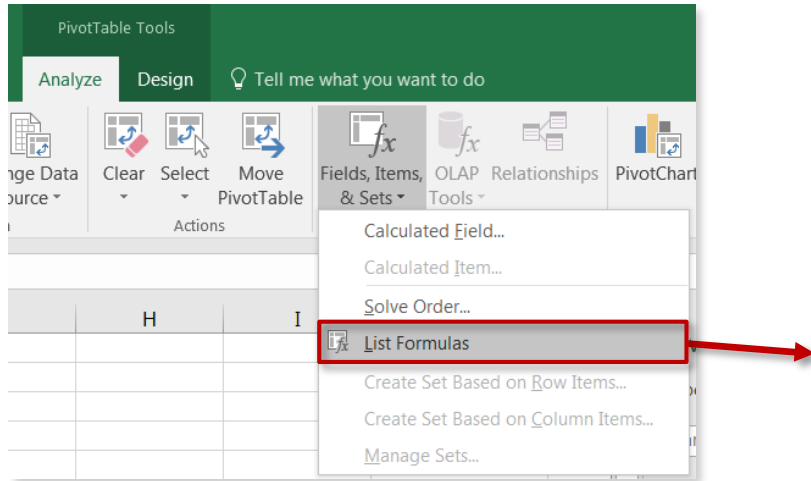
F10: =G + PG

	A	B	C	D	E	F	G	H	I
1	Year	(All)							
2	Country	USA							
3	Language	(All)							
4	Title	(All)							
5									
6	Sum of Gross Revenue	Rating							
7	Color/B&W	G	PG	PG-13	R		Kids		
8	Black and White	\$163,245	\$607,540,245	\$1,671,131,048	\$1,016,898,017		\$607,703,490		
9	Color	\$6,984,837,347	\$36,016,414,525	\$72,851,333,140	\$45,446,884,984		\$43,001,251,872		
10	%Color	100.00%	98.34%	97.76%	97.81%		198.34%		
11									



If you've defined multiple calculated items, the **Solve Order** can be used to determine which calculations to prioritize (*value is determined by the last formula in the list*)

# LIST FORMULAS



	A	B	C	D	E	F
1	<b>Calculated Field</b>					
2	<b>Solve Order</b>	<b>Field</b>	<b>Formula</b>			
3		1 Profit	= 'Gross Revenue' - Budget			
4		2 Weighted IMDB Score	= 'Raw Score' / 'Total Reviews'			
5		3 Lead Actor Like %	= 'Lead Actor FB Likes' / 'Cast Total FB Likes'			
6						
7	<b>Calculated Item</b>					
8	<b>Solve Order</b>	<b>Item</b>	<b>Formula</b>			
9		1 '%Color'	= Color / (Color + 'Black and White' )			
10		2 Rating[Kids]	= G + PG			
11						
12						
13	<b>Note:</b>					
14			When a cell is updated by more than one formula,			
15			the value is set by the formula with the last solve order.			
16						
17			To change the solve order for multiple calculated items or fields,			
18			on the Options tab, in the Calculations group, click Fields, Items, & Sets, and then click Solve Order.			

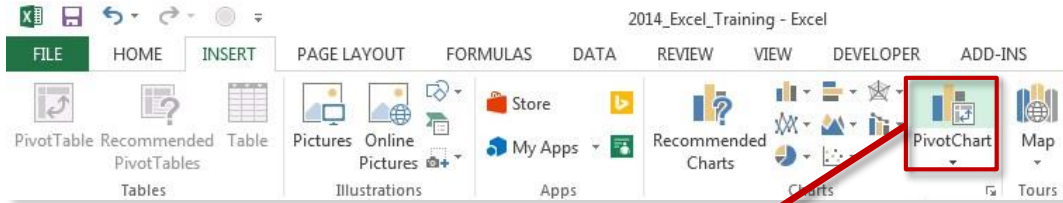
The **List Formulas** tool produces a new tab summarizing all calculated fields and items associated with a given Pivot, along with the current solve order



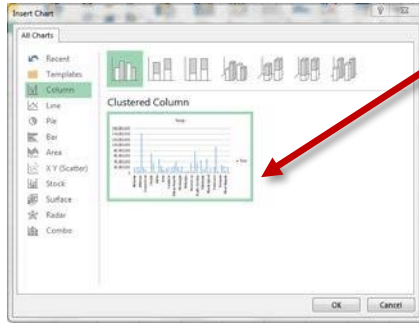
# PIVOT CHARTS

# PIVOT CHART 101

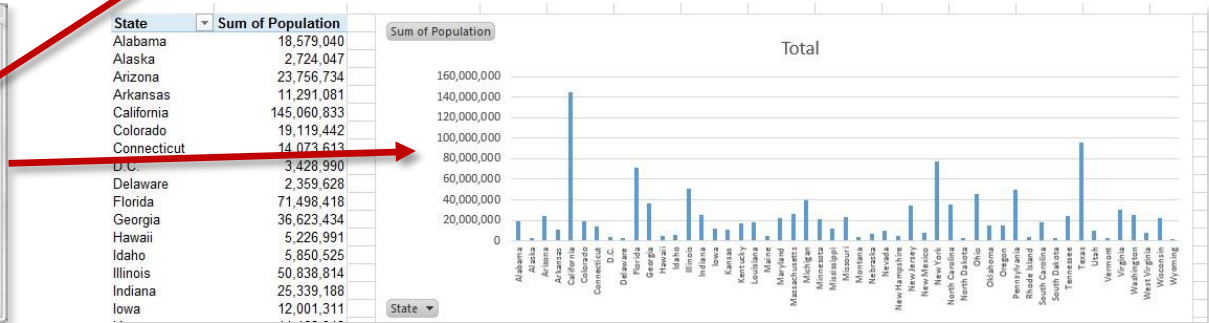
A **PivotChart** is simply a chart that is tied to a specific PivotTable; as you adjust filters and fields in your Pivot, the PivotChart updates dynamically



1) Select your pivot and choose PivotChart from either the “**Insert**” tab or the “**Analyze**” tab



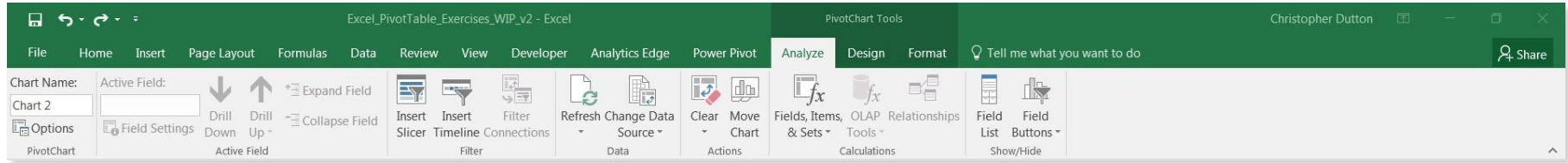
2) Select a chart type



3) The PivotChart will be inserted, and dynamically tied to the pivot (note: you can filter the view using either the pivot table or the chart itself)

# PIVOT CHART OPTIONS

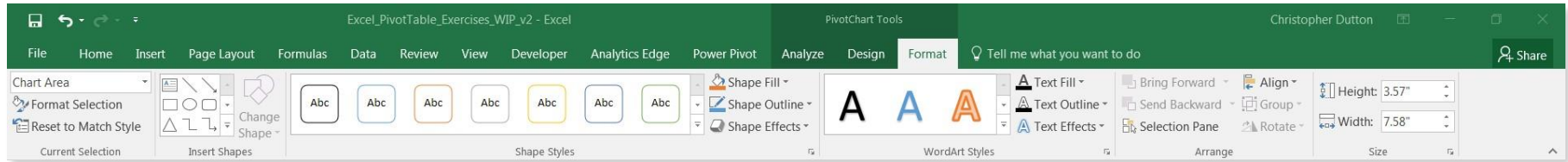
## The “Analyze” Tab:



## The “Design” Tab:



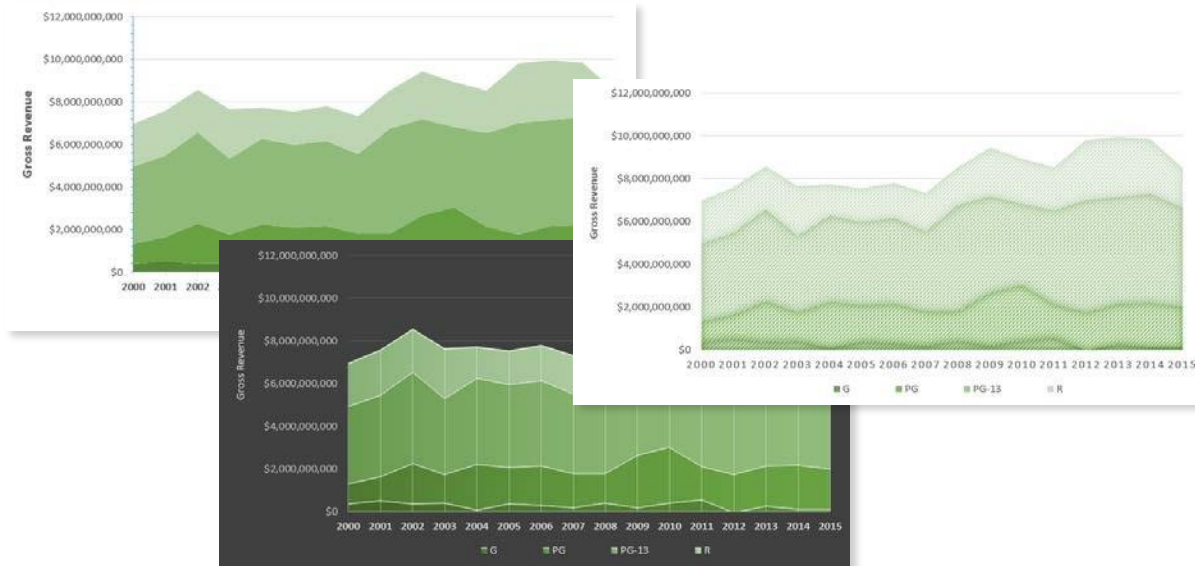
## The “Format” Tab:



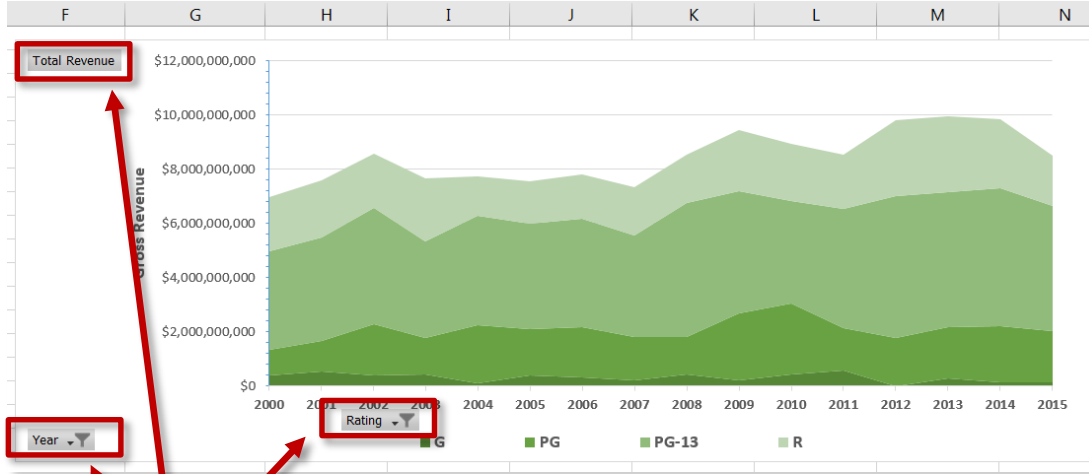
# PIVOT CHART LAYOUTS & STYLES



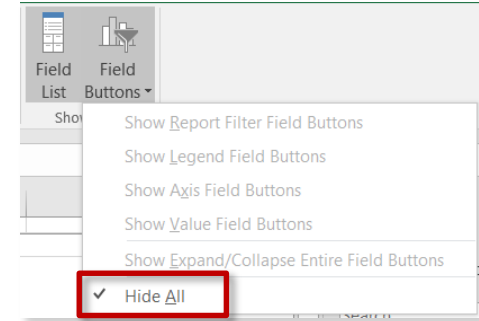
**Chart Layouts & Styles** allow you to adjust the look and feel of a PivotChart, including adding elements, changing color palettes, or applying pre-set templates



# PIVOT CHART FIELD BUTTONS



**Field Buttons** allow you to apply or adjust filters directly within the chart



Select **PivotChart Tools** → **Analyze** → **Field Buttons** to hide them from the chart (or right click one of them from the chart itself)



## PRO TIP:

*You can format PivotCharts exactly like normal Excel charts – the only difference is that PivotCharts are dynamically tied to a PivotTable*

# ADDING SLICERS

A **Slicer** is basically a “prettier” version of a PivotTable filter; it works exactly the same way by filtering the data you see in your PivotTable and PivotCharts

The screenshot illustrates the process of adding a slicer to a PivotTable. The 'PivotTable Tools' ribbon is active, with the 'Insert Slicer' button highlighted. The 'Insert Slicers' dialog box is open, showing the 'State' field selected for filtering. The PivotTable shows the 'Sum of Population' by 'State'. A slicer for 'State' is inserted next to the table, and a PivotChart is displayed to the right, showing the population distribution by state.

State	Sum of Population
Arizona	23,756,734
California	145,060,833
Colorado	19,119,442
D.C.	3,428,990
Florida	71,498,418
<b>Grand Total</b>	<b>262,864,417</b>

State	Sum of Population
Alabama	
Alaska	
Arizona	
Arkansas	
California	
Colorado	
Connecticut	
D.C.	
Delaware	
Florida	

Sum of Population

Total

160,000,000  
140,000,000  
120,000,000  
100,000,000  
80,000,000  
60,000,000  
40,000,000  
20,000,000  
0

Arizona California Colorado D.C. Florida

State

1) Select a PivotTable and choose “**Insert Slicer**” from the “**PivotTable Tools**” tab

2) Select the field(s) that you want to filter

3) The Slicer will be inserted next to your table, allowing you to filter on specific values (or combinations, using the **CTRL** key)

# ADDING TIMELINES

A **Timeline** works just like a Slicer – it's just formatted to work specifically with Date & Time fields

The screenshot illustrates the steps to add a timeline to a pivot table. The 'PivotTable Tools' ribbon is active, and the 'Insert Timeline' button is highlighted with a red box. A red arrow points from this button to the 'Insert Timelines' dialog box, which has 'Year' selected. Another red arrow points from the dialog box to the 'Year' timeline control in the pivot table, which shows a bar chart of population by state and a timeline for the years 2001-2004.

State	Sum of Population
Alabama	12,882,268
Alaska	75,295,386
Arizona	10,216,778
Arkansas	1,815,026
California	38,118,879
Colorado	138,328,337
Connecticut	
Delaware	
Florida	
Georgia	
Hawaii	
Idaho	
Illinois	

Sum of Population

Year

2003 - 2004

2001 2002 2003 2004

1) Select your pivot table and choose **"Insert Timeline"** from the **"PivotTable Tools"** tab

2) Select the date/time field(s) that you want to filter

3) The Timeline is inserted, allowing you to filter on specific time frames (**Note:** may need to adjust unit of time (month, year, etc.))