

PIVOT TABLE

WHY PIVOT TABLES?

1	A State	B Year	C Total Population	D 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

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
State	Year	Total Population	Student Population
New Mexico	2002	1,903,289	310,117
Nebraska	2003	1,826,341	313,968
Maryland	2004	5,884,563	896,848
California	2003	37,253,956	8,965,848
Montana	2002	926,865	163,067
D.C.	2004	917,092	188,811
Alaska	2002	655,435	153,920
Minnesota	2001	4,919,479	1,195,975
Louisiana	2001	4,468,976	626,279
Montana	2001	902,195	208,952
New Mexico	2004	2,083,538	631,320
West Virginia	2004	1,855,413	244,566
Louisiana	2004	4,601,893	826,680
Arizona	2003	6,329,013	1,837,525
Maryland	2001	5,206,486	1,389,498
Tennessee	2002	5,900,962	995,848
Texas	2002	23,764,231	5,246,483
Rhode Island	2003	1,052,507	173,937
Utah	2001	2,233,169	388,385
Wisconsin	2001	5,383,675	1,415,281
Kansas	2004	2,885,905	872,769
D.C.	2001	783,600	166,161
California	2002	35,893,799	3,598,863
Ohio	2003	11,536,502	3,361,193
Texas	2003	25,145,561	7,561,350
Oklahoma	2002	4,530,182	1,273,375
Utah	2002	2,389,099	460,374
Virginia	2003	8,001,024	1,445,224



A	B	C	D	E
State	Year	Total Pop	% of State Pop	Student Population %
Alabama	2001	18,579,040	100.00%	19.15%
	2002	4,447,100	23.94%	21.33%
	2003	4,530,182	24.38%	28.11%
	2004	4,779,735	25.73%	10.39%
Alaska	2001	2,724,047	100.00%	12.99%
	2002	626,932	23.01%	10.72%
	2003	655,435	24.06%	23.48%
	2004	710,231	26.07%	7.75%
Arizona	2001	731,449	26.85%	10.63%
	2002	5,130,632	21.60%	27.22%
	2003	5,743,834	24.18%	6.10%
	2004	6,329,013	26.64%	29.03%
		6,553,255	27.58%	8.09%

*Quote not confirmed

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!



C	A	B	D	E	F	G	H	I
S	Segmentation	Age Group	Gender	Flight Date	Destination City	Destination State	Type of Travel	Class
2	3	Blue	21	30-39	Male	3/18/2014	Dallas/Fort Worth, TX	Tour
3	4	Blue	56	50-59	Male	3/12/2014	Dallas/Fort Worth, TX	Tour
4	3	Blue	23	20-29	Female	3/25/2014	Dallas/Fort Worth, TX	Tour
5	4	Blue	43	40-49	Male	3/20/2014	Dallas/Fort Worth, TX	Tour
6	3	Gold	49	40-49	Male	2/21/2014	Dallas/Fort Worth, TX	Tour
7	3	Gold	99	40-49	Female	1/10/2014	Dallas/Fort Worth, TX	Tour
8	3	Gold	99	30-39	Male	3/9/2014	Dallas/Fort Worth, TX	Tour
9	4	Silver	51	50-59	Male	3/19/2014	Dallas/Fort Worth, TX	Tour
10	4	Blue	44	40-49	Female	3/23/2014	Dallas/Fort Worth, TX	Tour
11	4	Blue	53	50-59	Female	3/18/2014	Dallas/Fort Worth, TX	Tour
12	4	Blue	28	20-29	Male	3/13/2014	Dallas/Fort Worth, TX	Tour
13	2	Blue	56	50-59	Female	2/24/2014	Dallas/Fort Worth, TX	Tour
14	2	Platinum	48	40-49	Female	1/15/2014	Dallas/Fort Worth, TX	Tour
15	2	Silver	26	20-29	Female	3/5/2014	Dallas/Fort Worth, TX	Tour
16	4	Blue	52	50-59	Female	3/13/2014	Dallas/Fort Worth, TX	Tour
17	4	Blue	96	40-49	Male	3/9/2014	Dallas/Fort Worth, TX	Tour
18	4	Silver	45	40-49	Female	3/4/2014	Dallas/Fort Worth, TX	Tour
19	3	Blue	24	20-29	Female	3/19/2014	Dallas/Fort Worth, TX	Tour
20	3	Blue	76	50-59	Female	3/9/2014	Dallas/Fort Worth, TX	Tour
21	3	Blue	19	40-49	Female	3/18/2014	Dallas/Fort Worth, TX	Tour
22	3	Blue	58	50-59	Female	3/13/2014	Dallas/Fort Worth, TX	Tour
23	3	Blue	62	60-69	Male	3/12/2014	Dallas/Fort Worth, TX	Tour
24	3	Blue	18	40-49	Male	3/13/2014	Dallas/Fort Worth, TX	Tour
25	3	Blue	87	60-69	Female	3/4/2014	Dallas/Fort Worth, TX	Tour
26	3	Blue	47	40-49	Female	3/13/2014	Dallas/Fort Worth, TX	Tour
27	3	Blue	62	60-69	Female	3/13/2014	Dallas/Fort Worth, TX	Tour

- 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*

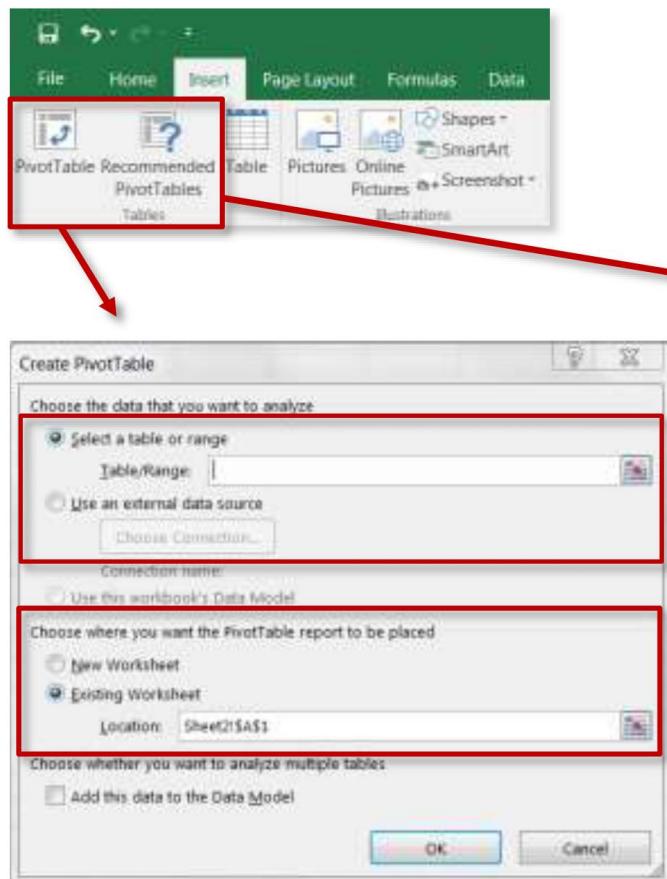
BAD!



MARKETING DATA								
Impressions	Period1	Period2	Period3	Period4	Period5	Period6	Period7	Period8
	1,286,982	3,873,987	1,286,721	1,295,237	2,122,113	2,145,532	2,516,782	2,981,727
Clicks	627	374	827	263	912	662	723	1,283
CTR	0.049%	0.013%	0.065%	0.021%	0.043%	0.031%	0.020%	0.043%
Column3	79	67	0	88	66	79	95	85
Column4	30	6	20	15	12	15	18	17
CVR	25%	9%	#DIV/0!	17%	28%	19%	19%	20%
Monthly Costs								
Jan	\$395							
Feb	\$350							
Mar	\$206							
Apr	\$214							
May	\$385							
Jun	\$101							
Jul	\$263							

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

INSERTING A PIVOT TABLE



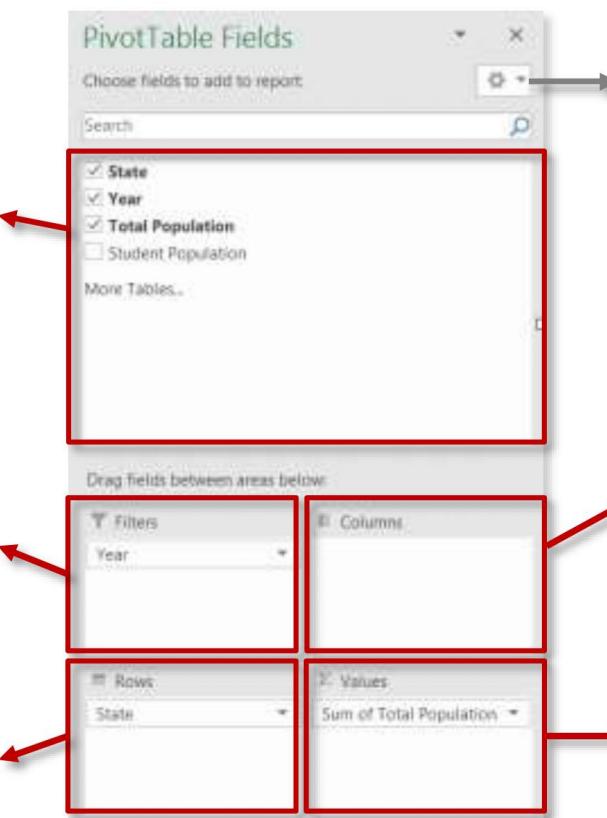
(Insert → PivotTable)

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



(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.)

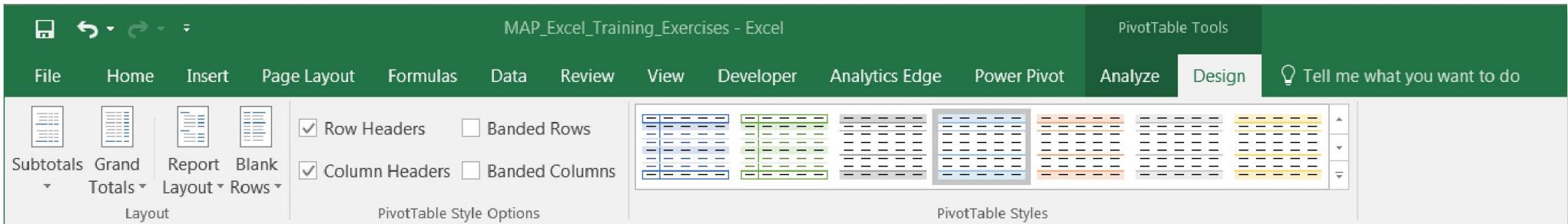
Detailed description: The image shows a screenshot of the 'PivotTable Fields' dialog box from Microsoft Excel. At the top, it says 'Choose fields to add to report'. Below is a search bar. A red box highlights the list of fields: State (checked), Year (checked), Total Population (checked), and Student Population (unchecked). Below this is a 'More Tables...' button. The main area is divided into four sections: 'Filters' (Year), 'Columns' (empty), 'Rows' (State), and 'Values' (Sum of Total Population). Arrows point from each descriptive text block to its corresponding section in the dialog box.

ANALYZE & DESIGN OPTIONS

The “Analyze” Tab:



The “Design” Tab:



SELECTING, CLEARING & MOVING PIVOTS

The screenshot shows the Microsoft Excel ribbon with the 'PivotTable Tools' tab selected. Under the 'Analyze' tab, the 'Data' group is highlighted with a red box. Three arrows point from this group to callout boxes: one arrow points to a 'Clear All' button, another to a list of selection options, and a third to a 'Move PivotTable' dialog box.

- Clear All**
- Select Options:**
 - Labels and Values
 - Values
 - Labels
 - Entire PivotTable
 - Enable Selection
- Move PivotTable**

Choose where you want the PivotTable report to be placed

New Worksheet

Existing Worksheet

Location: Sheet1!A2

OK Cancel

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)

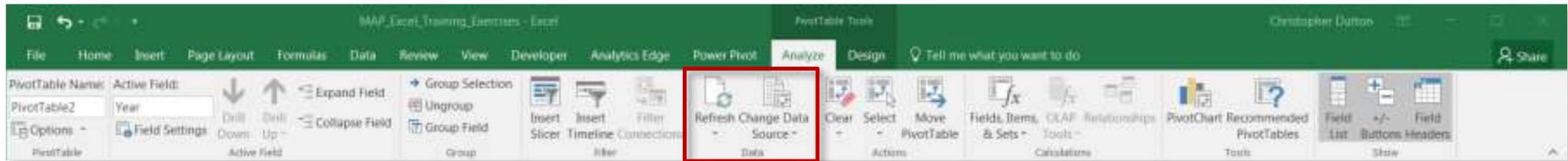
Move options allow you to relocate an existing PivotTable to a new worksheet or a new location within the existing one



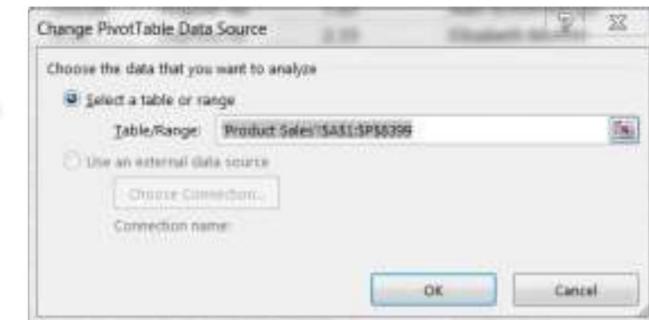
PRO TIP:

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	I
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

$$(586+859+870+1656+892)/5 = \textcolor{red}{973}$$

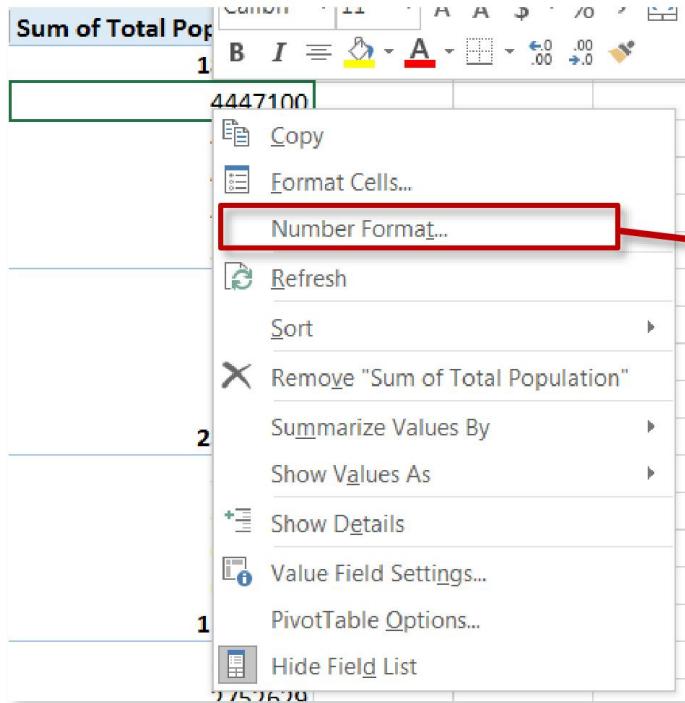
A	B
1	Age (All)
2	
3	State Average of Total Population
4	Alabama 719
5	Alaska 103
6	Arizona 973
7	Arkansas 440

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 a Microsoft Excel window with the title "Excel_PivotTable_Exercises_WIP_v2 - Excel". The ribbon is visible with the "PivotTable Tools" section selected, specifically the "Design" tab. A PivotTable is displayed on the worksheet, showing data for US states and their average total population. The "PivotTable Style Options" dropdown menu is open, showing various style categories like "Custom", "Light", and "Medium". At the bottom left of the style gallery, there is a button labeled "New PivotTable Style...". A red arrow points from this button to a second "New PivotTable Style..." button located in a separate dialog box.

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

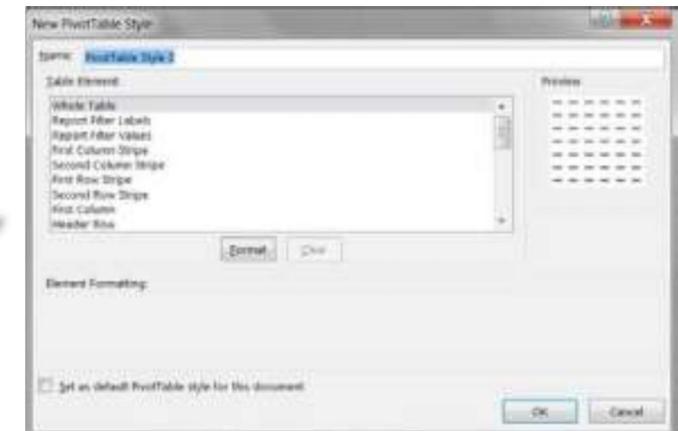


TABLE LAYOUTS: COMPACT VS. OUTLINE

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.

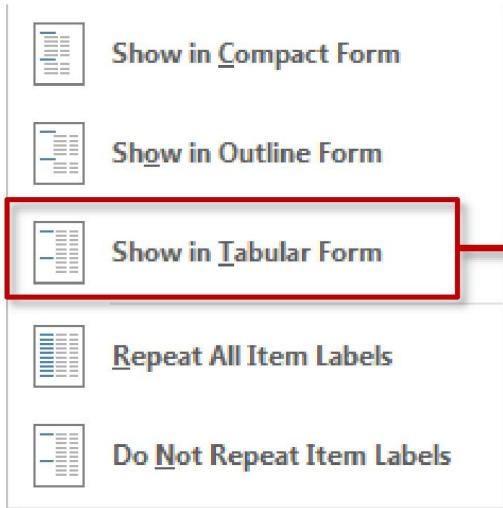
Outline Form (recommended):

	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 Back Chair		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 Perforat		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



Tabular Form (non-repeating):

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

Tabular Form (repeating):

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

A screenshot of Microsoft Excel showing a PivotTable for Apple (AAPL) stock prices from August 21, 2009, to September 17, 2009. The PivotTable includes columns for Date, Symbol, Open Price, High Price, Low Price, Close Price, Daily Volume, and Volume Trend. The 'Conditional Formatting' dropdown menu is open on the Home tab, highlighting the 'Highlight Cells Rules' option.

Date	Symbol	Open Price	High Price	Low Price	Close Price	Daily Volume	Volume Trend
8/21/2009	AAPL	\$167.81	\$169.37	\$166.80	\$169.22	148,597	Up
8/24/2009		\$170.00	\$170.71	\$168.27	\$169.06	145,331	Up
8/25/2009		\$169.43	\$170.94	\$169.13	\$169.40	115,840	Up
8/26/2009		\$168.94	\$169.55	\$166.76	\$167.41	108,570	Up
8/27/2009		\$168.59	\$169.57	\$164.83	\$169.45	160,421	Up
8/28/2009		\$172.06	\$172.49	\$168.53	\$170.05	162,092	Up
8/31/2009		\$168.09	\$168.85	\$166.50	\$168.21	111,264	Up
9/1/2009		\$168.02	\$170.00	\$164.94	\$165.30	167,509	Up
9/2/2009		\$164.50	\$167.61	\$164.11	\$165.18	130,143	Up
9/3/2009		\$166.52	\$167.10	\$165.00	\$166.55	105,036	Up
9/4/2009		\$167.20	\$170.70	\$167.09	\$170.31	133,795	Up
9/9/2009		\$172.72	\$174.47	\$169.70	\$171.14	289,746	Up
9/10/2009		\$172.03	\$173.25	\$170.81	\$172.56	175,404	Up
9/11/2009		\$172.96	\$173.18	\$170.87	\$172.16	124,628	Up
9/14/2009		\$170.85	\$173.90	\$170.25	\$173.72	115,003	Up
9/15/2009		\$174.04	\$175.65	\$173.59	\$175.16	152,310	Up
9/16/2009		\$178.00	\$182.75	\$177.88	\$181.87	269,293	Up
9/17/2009		\$181.99	\$186.79	\$181.97	\$184.55	289,489	Up

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

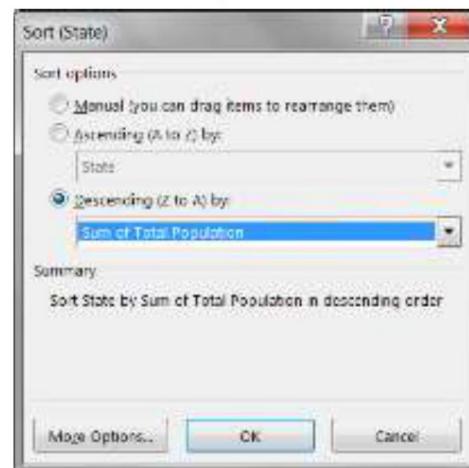


SORTING & FILTERING

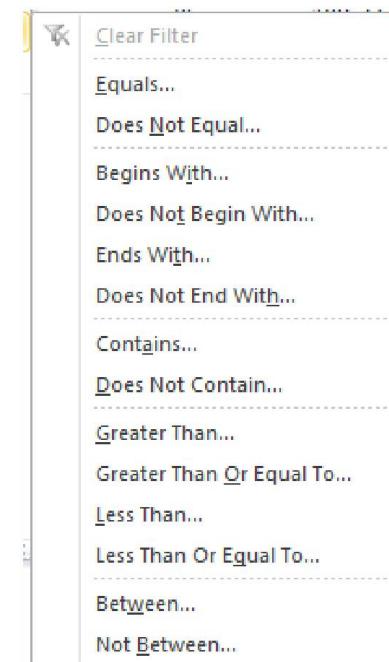
2	Student Population (All)	
3		
4	State	Year Sum of Total Population
	A↓	Sort A to Z
	Z↓	Sort Z to A
		More Sort Options...
	X	Clear Filter From "State"
		Label Filters
		Value Filters
		Search <input type="text"/>
		<input checked="" type="checkbox"/> (Select All) <input checked="" type="checkbox"/> Alabama <input checked="" type="checkbox"/> Alaska <input checked="" type="checkbox"/> Arizona <input checked="" type="checkbox"/> Arkansas <input checked="" type="checkbox"/> California <input checked="" type="checkbox"/> Colorado <input checked="" type="checkbox"/> Connecticut
		OK Cancel
24		2004
25	California	145060833

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

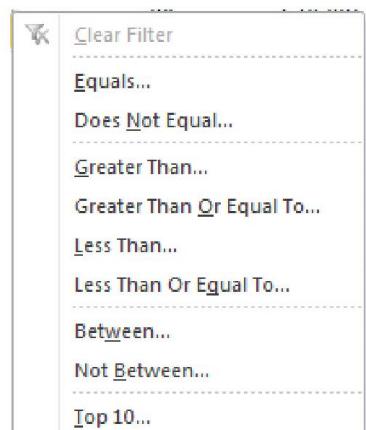
More Sort Options:



Label Filters:



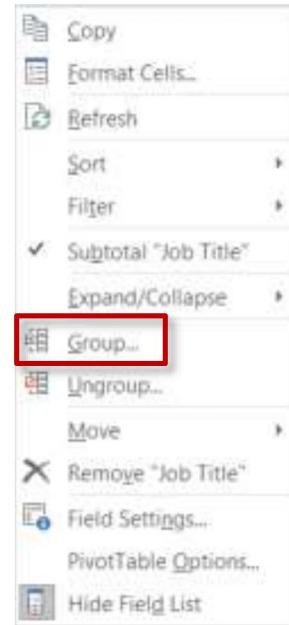
Value Filters:



Manual Selections

GROUPING DATA

A	B	C
1 Year	2012	
2 Employee Name	(All)	
3		
4 Job Title	T	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 II		\$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 II		\$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 =Forensic Autopsy Technician	Forensic Autopsy Technician
7 =Food Service Worker	Food Service Worker
8 =Food Service Supervisor	Food Service Supervisor
13 =Group1	Firefighter Fire Safety Inspector II Fire Safety Inspector 2 Fire Protection Engineer Fire Fighter Paramedic Fire Alarm Dispatcher
20 =Fingerprint Technician II	Fingerprint Technician II
21	

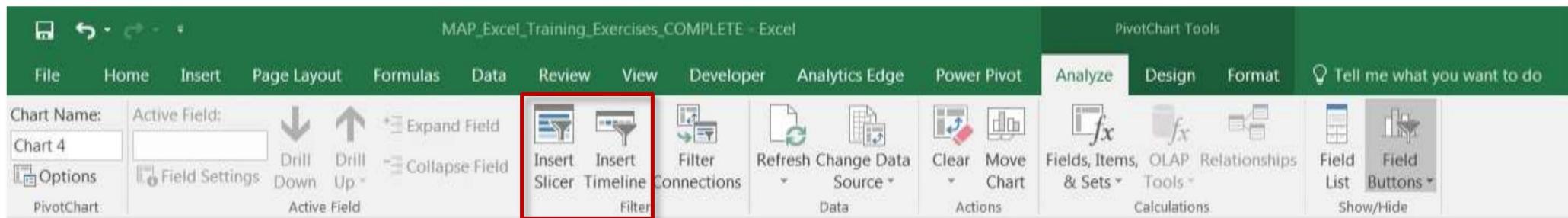
Select values that you'd like to group
(in this case fire-related job titles)

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



The screenshot shows the Microsoft Excel ribbon with the 'Analyze' tab selected. In the 'Data' tab group, there are two icons highlighted with a red box: 'Insert Slicer' and 'Insert Timeline'. Below the ribbon, there are two small preview images: one showing a list of states and another showing a timeline from 2001 to 2004.

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



Basically a prettier
version of a filter!



A filter designed
specifically for dates



PRO TIP:

Slicers and Timelines work just like regular report filters, but with user-friendly interfaces

REPORT FILTER PAGES

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

(PivotTable Tools → Analyze)

Year	Employee Name	Job Title	Sum of Overtime Pay	Sum of Other Pay
2011	(All)		\$16,160	\$26,448
2012	(All)		\$0	\$0
2013	(All)		\$0	\$0
	Search		\$0	\$31,851
			\$0	\$9,318
			\$0	\$6,715
			\$0	\$29,264
			\$0	\$1,220
			\$0	\$5,826
			\$0	\$2,230
			\$0	\$140
			\$0	\$18,873
			\$0	\$0
			\$0	\$0
			\$0	\$4,247
			\$0	\$836,305
			\$0	\$183,985
			\$0	\$470

PivotTable Name: Active Field: Year	PivotTable4	Field Settings
<input checked="" type="checkbox"/> Show Report Filter Pages...		
<input type="checkbox"/> Options		
<input type="checkbox"/> Generate GetPivotData		

Show Report Filter Pages
Show all report filter pages of:
Employee Name
Year

Year	Employee Name	Job Title	Sum of Base Pay	Sum of Overtime Pay	Sum of Other Pay
2011	(All)		\$16,160	\$26,448	\$26,448
2012	(All)		\$0	\$0	\$0
2013	(All)		\$0	\$0	\$0
	Account Clerk	Account Clerk	\$16,160	\$0	\$0
	Accountant	Accountant	\$0	\$0	\$0
	Accountant I	Accountant I	\$0	\$0	\$0
	Accountant II	Accountant II	\$0	\$0	\$0
	Accountant III	Accountant III	\$0	\$0	\$0
	Accountant Intern	Accountant Intern	\$0	\$0	\$0
	Accountant IV	Accountant IV	\$0	\$0	\$0
	Acupuncturist	Acupuncturist	\$0	\$0	\$0
	Admin Analyst 3	Admin Analyst 3	\$0	\$0	\$0
	Admin Hearing Examiner	Admin Hearing Examiner	\$223,203	\$0	\$0
	Administrative Analyst	Administrative Analyst	\$4,439,753	\$140	\$18,873
	Administrative Analyst I	Administrative Analyst I	\$5,416	\$0	\$0
	Administrative Analyst II	Administrative Analyst II	\$118,747	\$0	\$4,247
	Administrative Engineer	Administrative Engineer	\$836,305	\$0	\$9,742
	Administrative Services Mgr	Administrative Services Mgr	\$183,985	\$0	\$470

Year	Employee Name	Job Title	Sum of Base Pay	Sum of Overtime Pay	Sum of Other Pay
2012	(All)		\$0	\$0	\$0
	Account Clerk	Account Clerk	\$0	\$0	\$0
	Accountant	Accountant	\$0	\$0	\$0
	Accountant I	Accountant I	\$0	\$0	\$0
	Accountant II	Accountant II	\$0	\$0	\$0
	Accountant III	Accountant III	\$0	\$0	\$0
	Accountant Intern	Accountant Intern	\$0	\$0	\$0
	Accountant IV	Accountant IV	\$0	\$0	\$0
	Acupuncturist	Acupuncturist	\$0	\$0	\$0
	Admin Analyst 3	Admin Analyst 3	\$0	\$0	\$0
	Admin Hearing Examiner	Admin Hearing Examiner	\$223,203	\$0	\$0
	Administrative Analyst	Administrative Analyst	\$0	\$0	\$0
	Administrative Analyst I	Administrative Analyst I	\$0	\$0	\$0
	Administrative Analyst II	Administrative Analyst II	\$0	\$0	\$0
	Administrative Engineer	Administrative Engineer	\$0	\$0	\$0
	Administrative Services Mgr	Administrative Services Mgr	\$0	\$0	\$0

Year	Employee Name	Job Title	Sum of Base Pay	Sum of Overtime Pay	Sum of Other Pay
2013	(All)		\$0	\$0	\$0
	Account Clerk	Account Clerk	\$0	\$0	\$0
	Accountant	Accountant	\$0	\$0	\$0
	Accountant I	Accountant I	\$0	\$0	\$0
	Accountant II	Accountant II	\$0	\$0	\$0
	Accountant III	Accountant III	\$0	\$0	\$0
	Accountant Intern	Accountant Intern	\$0	\$0	\$0
	Accountant IV	Accountant IV	\$0	\$0	\$0
	Acupuncturist	Acupuncturist	\$0	\$0	\$0
	Admin Analyst 3	Admin Analyst 3	\$0	\$0	\$0
	Admin Hearing Examiner	Admin Hearing Examiner	\$223,203	\$0	\$0
	Administrative Analyst	Administrative Analyst	\$0	\$0	\$0
	Administrative Analyst I	Administrative Analyst I	\$0	\$0	\$0
	Administrative Analyst II	Administrative Analyst II	\$0	\$0	\$0
	Administrative Engineer	Administrative Engineer	\$0	\$0	\$0
	Administrative Services Mgr	Administrative Services Mgr	\$0	\$0	\$0

CALCULATED VALUES & FIELDS



SUMMARIZE VALUES BY

The screenshot shows a Microsoft Excel ribbon interface. A context menu is open over a cell containing the value 'Sum of Order Qua'. The menu items include: Copy, Format Cells..., Number Format..., Refresh, Sort, Remove "Sum of Order Quantity", Summarize Values By (which is highlighted with a red box), Show Values As, Value Field Settings..., PivotTable Options..., and Show Field List. A secondary dropdown menu is open under 'Summarize Values By' with the following options: Sum (which has a checked checkmark), Count, Average, Max, Min, Product, and More Options... A red box also highlights the 'Sum' option in this secondary menu. To the right of the menu, there is a list of numerical values: 493, 482, 474, 473, 468, 466, 465, 465, 465, and 458.

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

A screenshot of a Microsoft Excel PivotTable context menu. The menu items listed vertically are: Copy, Format Cells..., Number Format..., Refresh, Sort, Remove "Sum of Order Quantity", Summarize Values By, Show Values As (which is highlighted with a red box), Value Field Settings..., PivotTable Options..., Show Field List, and several rows of numerical data starting with 0.23% and 0.22%. A secondary menu is open under 'Show Values As' with many options, also highlighted by a red box. These options include: No Calculation, % of Grand Total, % of Column Total (which has a checkmark), % of Row Total, % Of..., % of Parent Row Total, % of Parent Column Total, % of Parent Total..., Difference From..., % Difference From..., Running Total In..., % Running Total In..., Rank Smallest to Largest..., Rank Largest to Smallest..., Index, and More Options... A red arrow points from the main text block to this secondary menu.

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**:

Genre	Year	Revenue	Revenue2	Revenue3	Revenue4	Revenue5	Revenue6
Action	2010	\$12,521,476,890	58.01%	100.00%			
	2011	\$2,939,932,519	13.62%	23.48%		\$2,939,932,519	4
	2012	\$3,326,029,678	15.41%	26.56%	13.13%	\$6,265,962,197	1
	2013	\$3,181,127,752	14.74%	25.41%	-4.36%	\$9,447,089,949	2
Adventure	2010	\$3,074,386,941	14.24%	24.55%	-3.36%	\$12,521,476,890	3
	2011	\$8,130,146,101	37.67%	100.00%			
	2012	\$2,194,189,209	10.17%	26.99%		\$2,194,189,209	3
	2013	\$1,180,009,072	5.47%	14.51%	-46.22%	\$3,374,198,281	4
Animation	2010	\$2,346,041,792	10.87%	28.86%	98.82%	\$5,720,240,073	2
	2011	\$2,409,906,028	11.16%	29.64%	2.72%	\$8,130,146,101	1
	2012	\$933,080,437	4.32%	100.00%			
	2013	\$251,501,645	1.17%	26.95%		\$251,501,645	2
Grand Total	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
		\$21,584,703,428	100.00%				



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	

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

$(\text{Cell Value} * \text{Grand Total}) / (\text{Row Total} * \text{Column Total})$

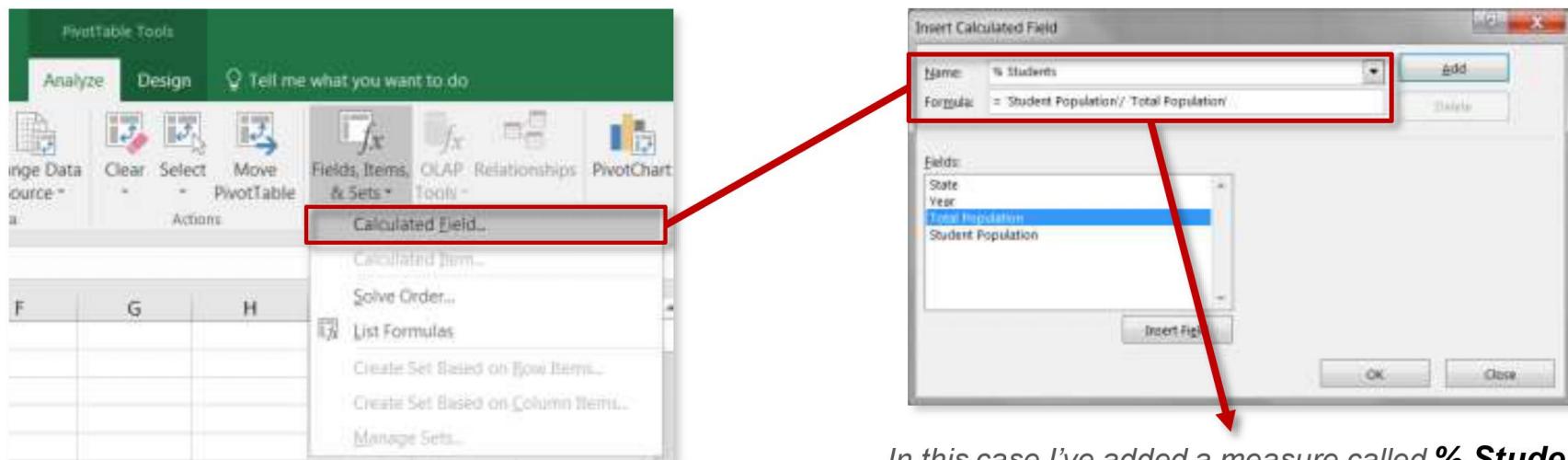
Documentaries index very high in France, meaning that a global increase in Documentary ticket prices would impact the French film industry significantly more than any other country

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



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 account, 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

A	B	C
1	Page	Spartan Race
2	Post Type	photo
3	Date of Post	Post Copy
4	= 10/1/2016	Sum of Likes
		2,286
5		If you missed the #SpartanWC16, you misse
6		Tap that bell then celebrate with a refreshin
7		The biggest race of the Spartan calendar is h
8		Your 2016 #SpartanWC16 top finishers: Zuzka
9		1,128
10	= 10/2/2016	7,266
11		"Couldn't wait to get home and put it all tog
12		#SpartanRace founder practicing what he pr
13		Tahoe had one last surprise for us Spartans t
14		The 26+ mile, 70+ obstacle #SpartanWC16 U
15		This #SpartanMedal is one for the mantle! P
16		Your top finishers at this year's #SpartanWC
17		Your top finishers at this year's #SpartanWC
18	= 10/3/2016	12,022
19		All OCR to all the racers, fans and volunteers t
20		As the sun sets on another World Champion:
21		Cold, mud, obstacles and snow could not sto
22		How many Spartans out there are feeling so
23		Start the week off strong, and keep it going z
24		When Randy Moss, one of the greatest footb

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

A	B	C	D
1	Count	Page	Date of Post
2	1	Spartan Race	8/30/2016
3	1	Spartan Race	8/30/2016
4	1	Spartan Race	8/30/2016
5	1	Spartan Race	8/30/2016
6	1	Spartan Race	8/30/2016
7	1	Spartan Race	8/31/2016
8	1	Spartan Race	8/31/2016
9	1	Spartan Race	8/31/2016
10	1	Spartan Race	8/31/2016
11	1	Spartan Race	8/31/2016
12	1	Spartan Race	8/31/2016
13	1	Spartan Race	8/31/2016
14	1	Spartan Race	8/31/2016
15	1	Spartan Race	8/31/2016
16	1	Spartan Race	8/31/2016
17	1	Spartan Race	9/1/2016
18	1	Spartan Race	9/1/2016
19	1	Spartan Race	9/1/2016
20	1	Spartan Race	9/1/2016
21	1	Spartan Race	9/1/2016

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

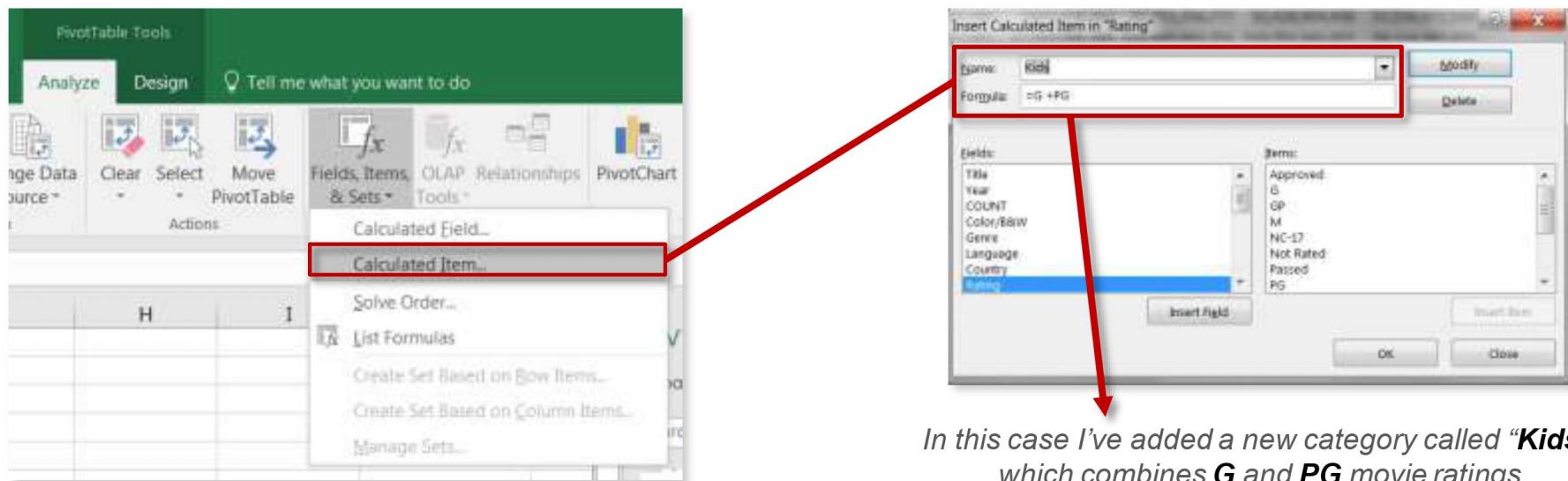
Insert Calculated Field

Name:	Likes/Post
Formula:	= Likes/Count

A	B	C	D	E
4	Date of Post	Post Copy	Sum of Likes	Sum of Likes/Post
5	= 10/1/2016		2,286	572
6		If you missed the #SpartanWC16, you misse	336	336
7		Tap that bell then celebrate with a refreshin	218	218
8		The biggest race of the Spartan calendar is h	604	604
9		Your 2016 #SpartanWC16 top finishers: Zuzka	1,128	1,128
10	= 10/2/2016	7,266	7,266	1,038
11		"Couldn't wait to get home and put it all tog	534	534
12		#SpartanRace founder practicing what he pr	1,467	1,467
13		Tahoe had one last surprise for us Spartans t	2,000	2,000
14		The 26+ mile, 70+ obstacle #SpartanWC16 U	1,743	1,743
15		This #SpartanMedal is one for the mantle! P	572	572
16		Your top finishers at this year's #SpartanWC	663	663
17		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

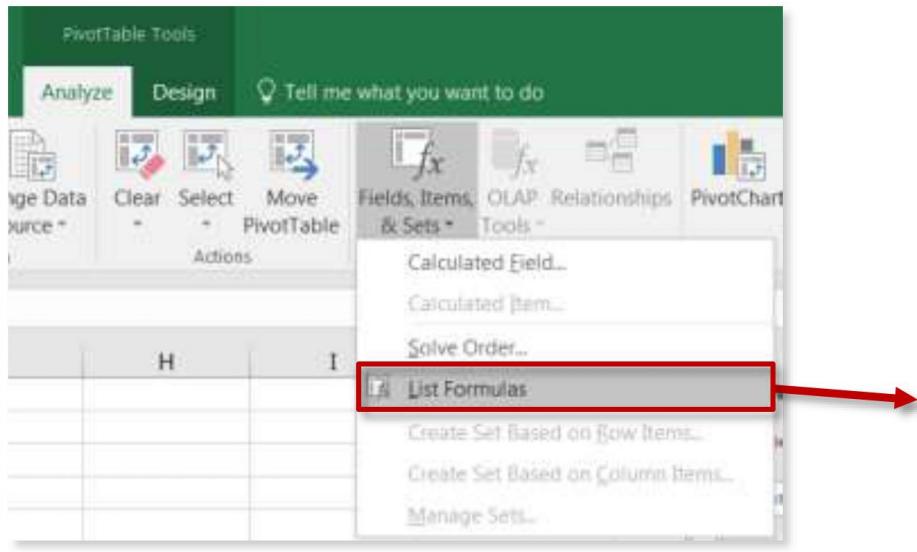
The screenshot shows a Microsoft Excel window with the title "Excel PivotTable Exercises WIP v2 - Excel". The ribbon is visible at the top, with the "PivotTable Tools" tab selected. A context menu is open over a PivotTable, with the "Calculated Item..." option highlighted. A red box and arrow point to the "Solve Order..." option in this menu. To the right, a "Calculated Item Solve Order" dialog box is displayed, listing two formulas: "%Color" = Color / (Color + Black and White) and %NColor = B1 * 100. The dialog includes buttons for "Move Up", "Move Down", "Delete", and "Close".

	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	PG	PG-13	R	Kids			
7	Color/B&W	- G	\$163,245	\$607,540,245	\$1,671,131,048	\$1,016,898,017	\$607,703,490		
8	Black and White								
9	Color		\$6,984,837,347	\$36,016,414,525	\$72,851,333,140	\$45,446,884,984	\$43,001,251,872		
10	NColor		100.00%	98.34%	97.78%	97.81%	98.34%		

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



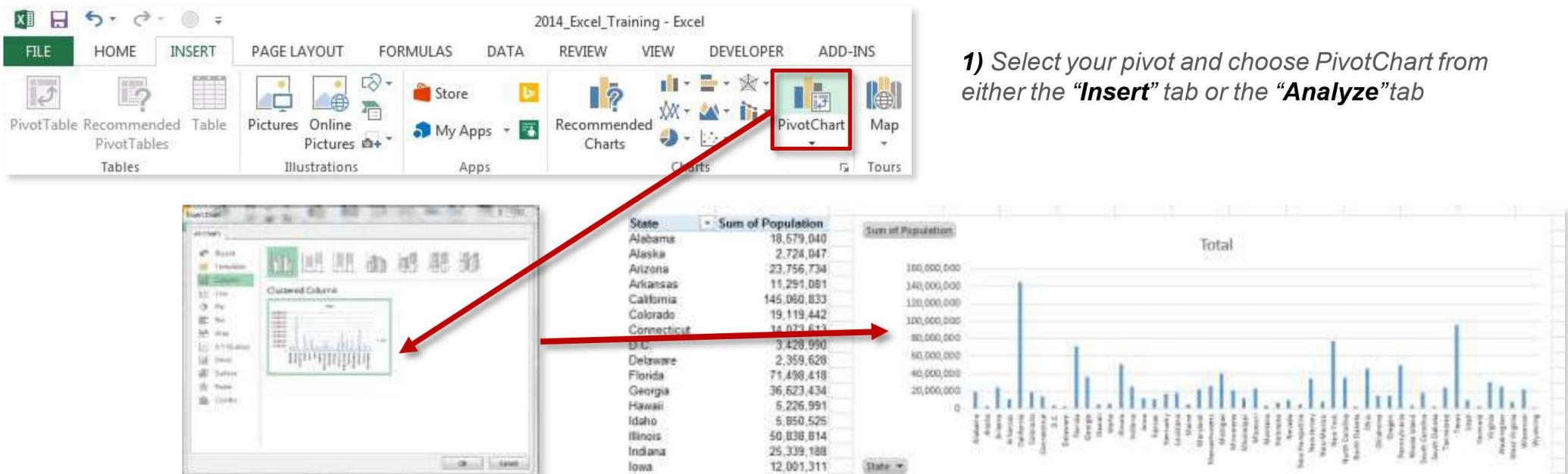
A	B	C	D	E	F		
Calculated Field							
1	Solve Order		Field	Formula			
3	1		Profit	= 'Gross Revenue' - Budget			
4	2		Weighted IMDB Score	= 'Raw Score' / 'Total Reviews'			
5	3		Lead Actor Like %	= 'Lead Actor FB Likes' / 'Cast Total FB Likes'			
6							
7	Calculated Item						
8	Solve Order		Item	Formula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

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

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

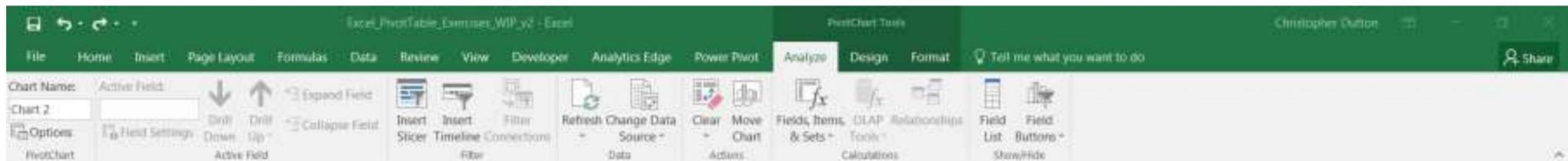


2) Select a chart type

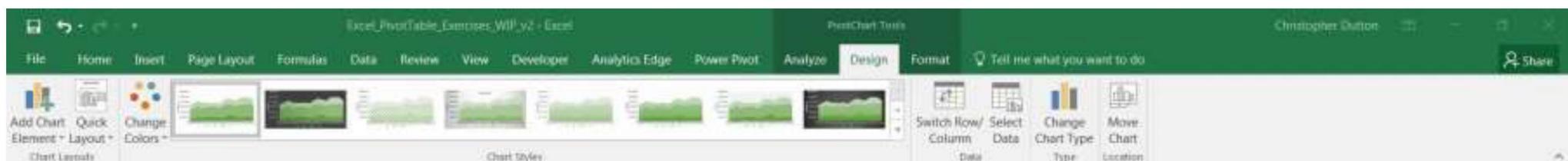
3) The PivotChart will be inserted, and dynamically tied to the pivot
(note: you can filter the view using either the pivot table or the chart itself)

PIVOT CHART OPTIONS

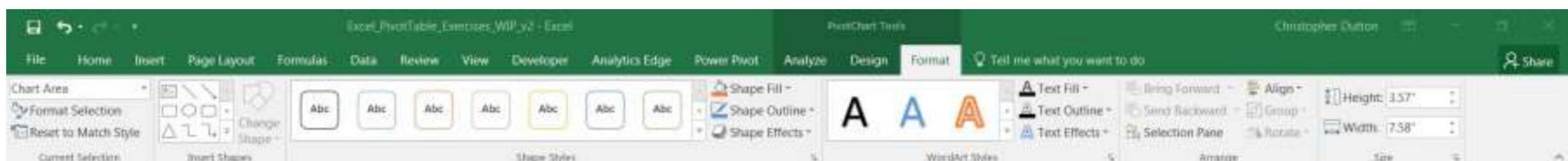
The “Analyze” Tab:



The “Design” Tab:



The “Format” Tab:



PIVOT CHART LAYOUTS & STYLES

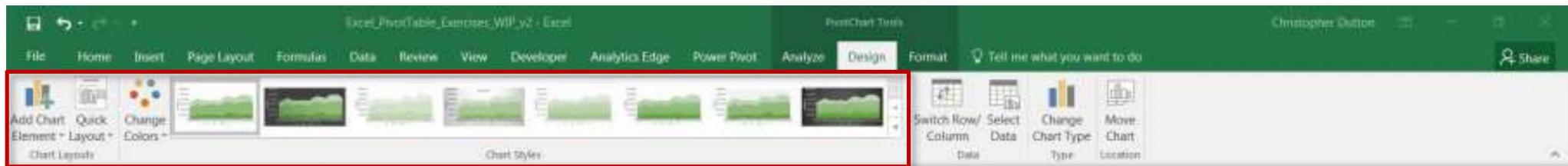
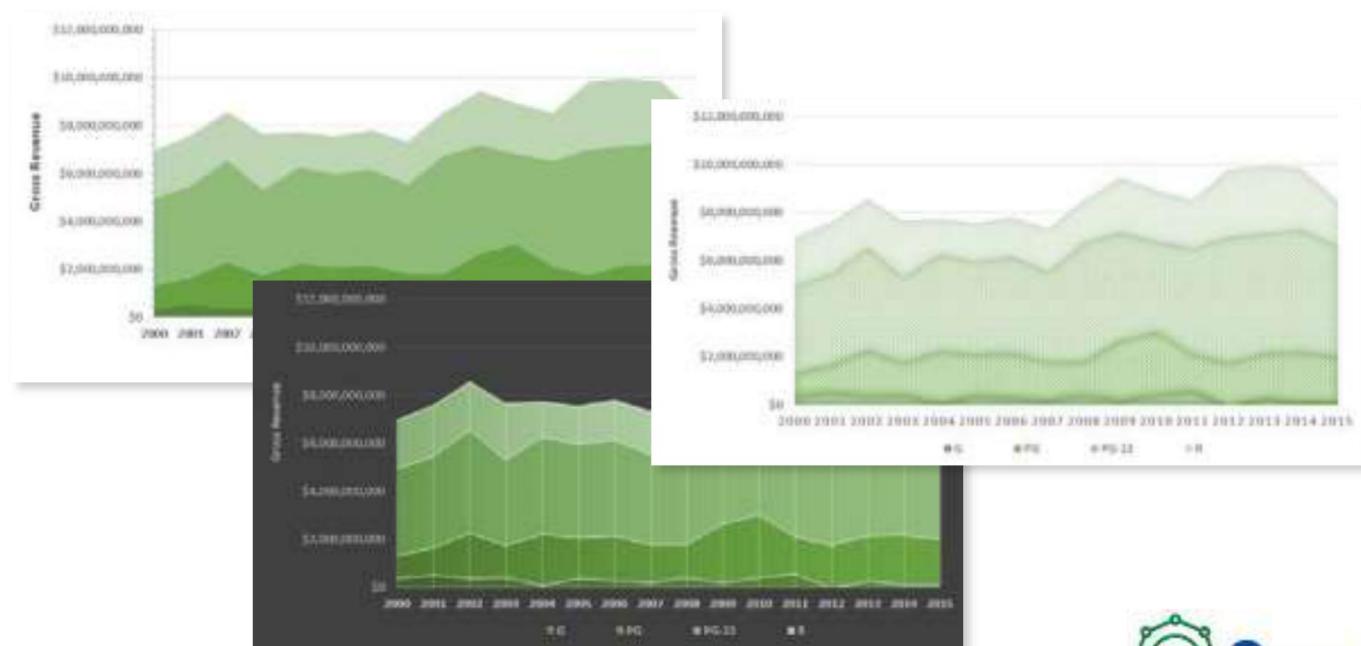
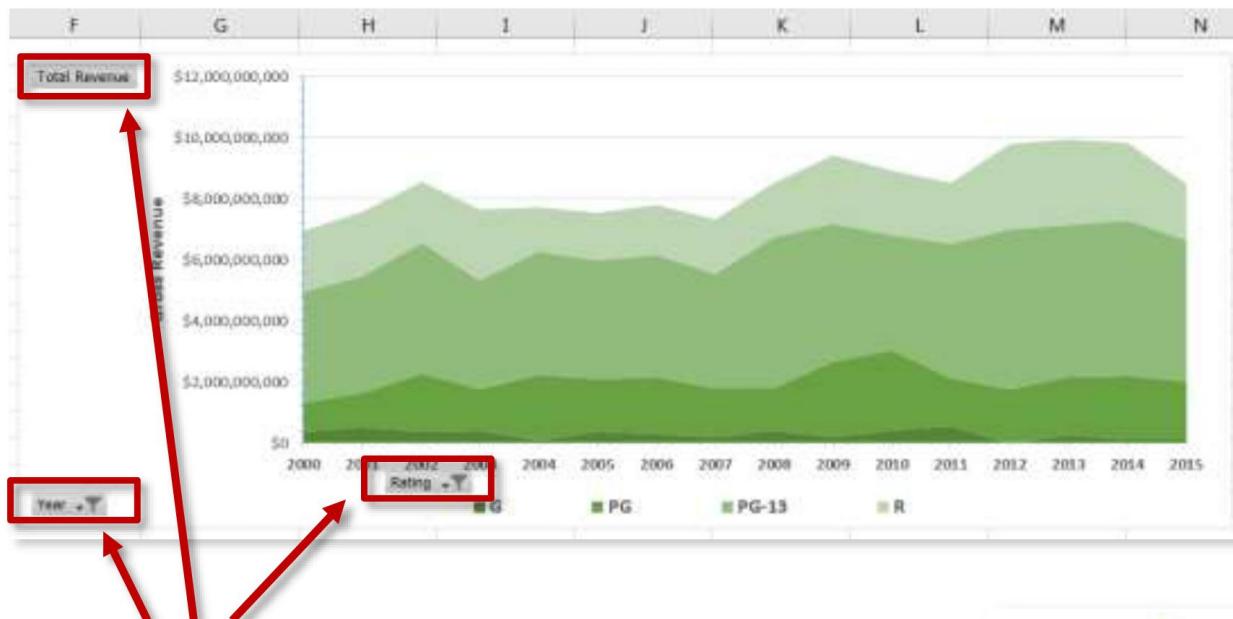


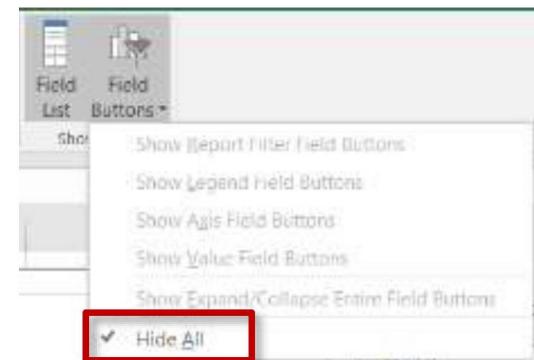
Chart Layouts & Styles
allow you to adjust the look
and feel of a PivotChart,
including adding elements,
changing color palettes, or
applying pre-set templates



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 shows a Microsoft Excel interface with a PivotTable and its corresponding PivotChart. The PivotTable displays population data for various US states. A 'PivotTable Tools' ribbon tab is visible, showing the 'PivotTable Name' as 'PivotTable3'. An 'Insert Slicers' dialog box is open, listing 'State', 'Year', and 'Population' fields, with 'State' checked. A red arrow points from the 'Insert Slicer' button in the ribbon to the 'Insert Slicers' dialog. Another red arrow points from the dialog to the PivotTable area, indicating the selection of the 'State' field for filtering.

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
Grand Total	262,864,417

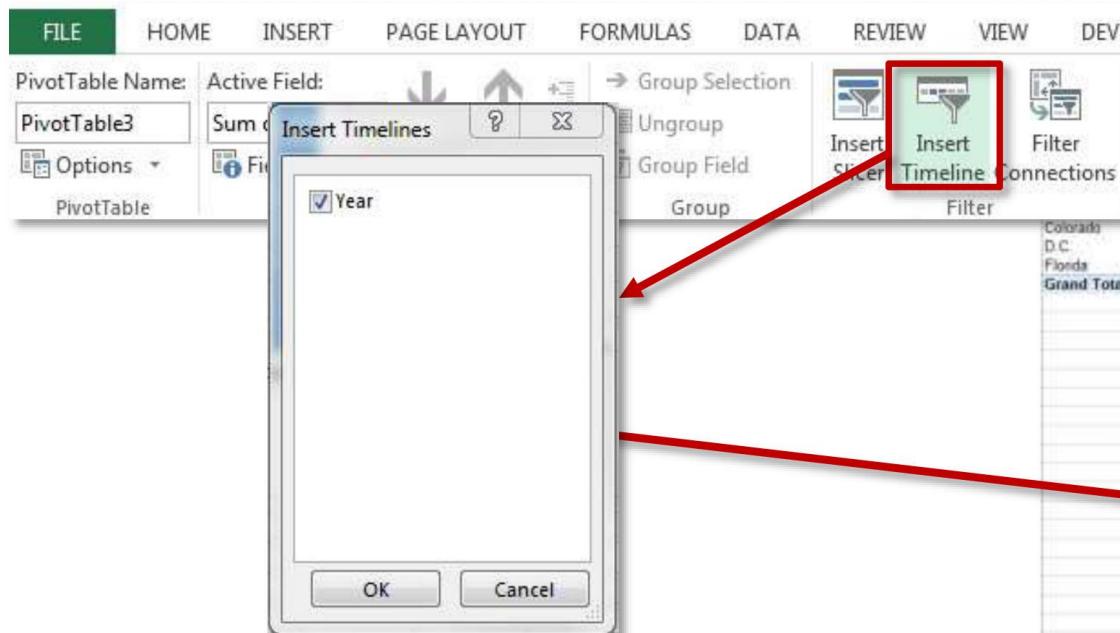
1) Select a PivotTable and choose “Insert Slicer” from the “PivotTable Tools” tab

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)**

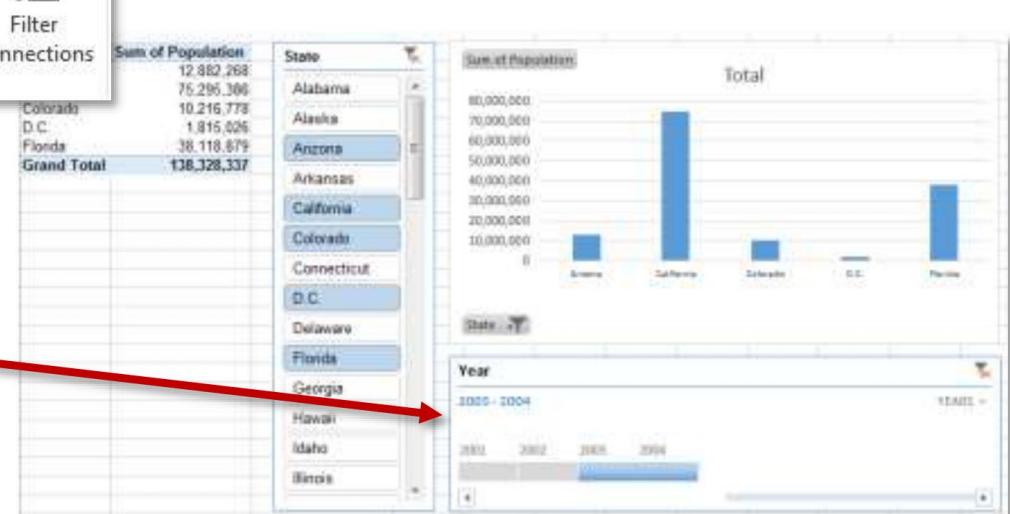
ADDING TIMELINES

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



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

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



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