

Microsoft® Excel® PivotTables: A Beginner's Guide to Organizing Data

COMPANION GUIDE



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PivotTables

This multi-part course is designed to provide compact explanations and relevant examples of the essential elements of mastering Microsoft® Excel® — a program that enables an array of mathematical and analytical solutions from simple formulas to complex PivotTable Reports that condense thousands of rows of data into meaningful information.

In this course, you'll go beyond basic “how-to” material and “step-by-step” instructions to best practices for designing professional-grade workbooks complete with numbers, text, formulas and functions.

Prerequisites

To fully benefit from this course, it's important for participants to:

- Be comfortable inputting data and writing simple formulas.
- Understand absolute and relative cell references.
- Be familiar with basic functions SUM, IF, AVERAGE.
- Have built basic PivotTable reports.

Learning objectives

At the end of this course, you'll be able to:

- Implement essential shortcuts, conditional formatting, functions and tables to build sheets quickly.
- Design and configure form controls to automate your workbook.
- Utilize data analysis and data mining tools.
- Develop effective charts and graphs.

Notes to readers

Throughout this workbook, you'll see study aids that will help you master Microsoft® Excel®.

- **SkillSteps:** The fundamental steps to get to a feature
- **SkillTips:** Special guidelines for becoming a power user
- **Strategies:** Techniques for mastering Microsoft® Excel®



SKILLTIP

This workbook was written using Microsoft® Excel® for Office 365® MSO Version 1904 Build 11601.20144
Click-to-Run Monthly Channel

Master the Basics of PivotTable Reports

SkillStep — To create a PivotTable: Table Tools > Design > Tools > Summarize with PivotTable.

Pivotology: Best practices

If you're not a "pivotologist" you might be building workbooks and spending too much time on formulas and formatting. This module presumes you are familiar with the fundamentals of PivotTable reports:

- Always start with a Table (not a "laddered" report or a crosstab report).
- Build helper columns.
- Build your workbooks in layers keeping your raw data on one sheet, reports on separate sheets (staging layer) and your dashboard (presentation layer) on another.

How to start with good data

To summarize data into a PivotTable report, you must start with good tabular data.

Master the Basics of Pivot Table Reports									
Drag and Drop	Ology	ID	Division	Dept	Position	L_Name	F_Name	Salary	Started
		1011	South	Manufact	Accountin	Gorton	Hazel	29565	4/20/1991
		1012	East	Sales	Mechanic	Preston	Liza	43394	2/11/1992
		1041	Central	R & D	Group Ad	Tercan	Robert	28043	11/23/1994
		1054	East	Manufact	Design As	Smith	Howard	25176	5/23/1991
		1055	North	Sales	Group Ad	Albert	Maxine	31678	5/9/1992
		1056	North	Manufact	Unit Mgr.	Gonzales	Joe	116511	9/10/1991
		1067	East	Manufact	Design Sp	Scote	Gail	36939	4/9/1991
		1068	East	R & D	Mechanic	Mann	Alyssa	47883	2/26/1994
		1075	East	Manufact	Design As	Kane	Sheryl	23239	4/15/1993
		1076	East	R & D	Lead Engi	McKormic	Molly	105753	8/5/1992
		1078	North	Sales	Admin. As	Hapsbuch	Kendrick	29982	10/24/1988
		1079	North	Manufact	Admin. As	Price	Ellen	29982	12/31/1995
		1080	Central	R & D	Research	Foss	Felix	67535	3/7/1995
		1152	South	Manufact	Accountin	Henders	Mark	26646	4/6/1992
		1153	South	Manufact	Group Ad	Plant	Allen	28043	2/15/1995
		1154	West	Manufact	Software	Solomon	Ari	56177	3/20/1994
		1167	South	Sales	Sales Rep.	Berwick	Sam	31913	1/17/1993

How to create a table from raw data

From there, you must format it as a Table.

ID	Division	Dept	Position	L_Name	F_Name	Salary	Started
1011	South	Manufact	Accounting	Gorton	Hazel	29565	4/20/1991
1012	East	Sales	Mechanical	Preston	Liza	43394	2/11/1992
1041	Central	R & D	Group Adm	Tercan	Robert	28043	11/23/1994
1054	East	Manufact	Design Assi	Smith	Howard	25176	5/23/1991
1055	North	Sales	Group Adm	Albert	Maxine	31678	5/9/1992
1056	North	Manufact	Unit Mgr.	Gonzales	Joe	116511	9/10/1991
1067	East	Manufact	Design Spei	Scote	Gail	36939	4/9/1991
1068	East	R & D	Mechanical	Mann	Alyssa	47883	2/26/1994
1075	East	Manufact	Design Assi	Kane	Sheryl	23239	4/15/1993
1076	East	R & D	Lead Engine	McKormick	Molly	105753	8/5/1992
1078	North	Sales	Admin. Ass	Hapsbuch	Kendrick	29982	10/24/1988
1079	North	Manufact	Admin. Ass	Price	Ellen	29982	12/31/1995
1080	Central	R & D	Research St	Foss	Felix	67535	3/7/1995

A PivotTable Report is a summary of the data that is in your table. You can drag and drop the fields from your table in either...

- The Rows drop zone
- The Columns drop zone
- The Values drop zone
- The Filters drop zone

For example, suppose you want to total the salary by region:

PivotTable Fields

Choose fields to add to report:

Search

MARKET
 STORE
 MODEL
 LINE OF BUSINESS
 REVENUE
 UNITS SOLD

More Tables...

Drag fields between areas below:

Filters: REGION

Columns: LINE OF BUSINESS, Σ Values

Rows: MARKET, STORE

Σ Values: Sum of REVENUE, Sum of UNITS SOLD

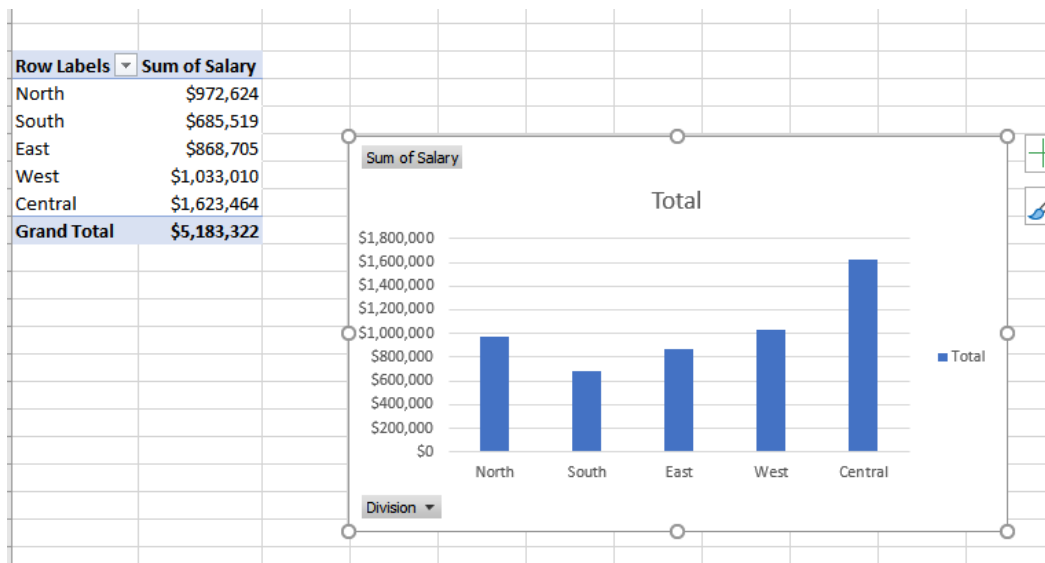
Defer Layout Update Update

How to summarize data in a report

Row Labels	Sum of Salary
North	\$972,624
South	\$685,519
East	\$868,705
West	\$1,033,010
Central	\$1,623,464
Grand Total	\$5,183,322

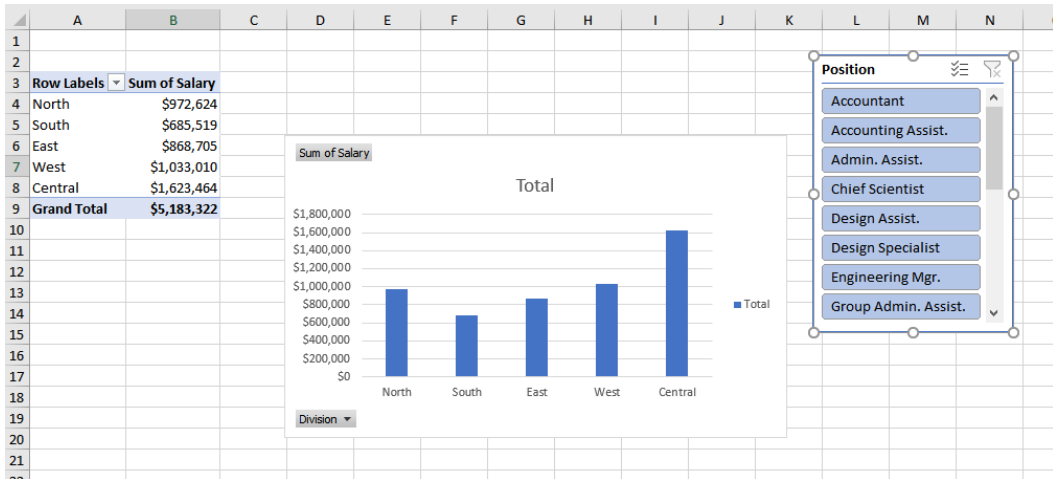
How to add a PivotTable chart

From there, you could easily build a chart:



How to add a slicer

You can even add a slicer.

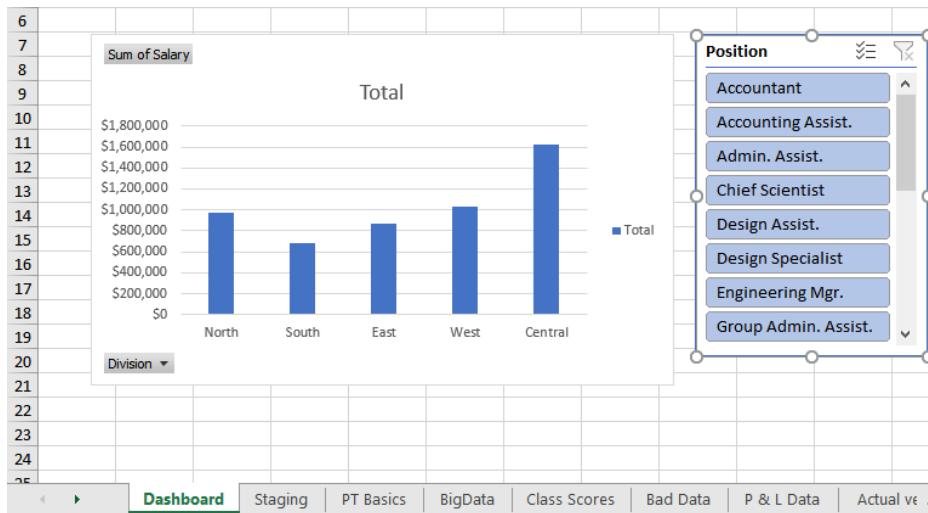


You can group your data, filter your data and summarize your data in nearly limitless combinations.

How to Build a Dashboard

Building a dashboard

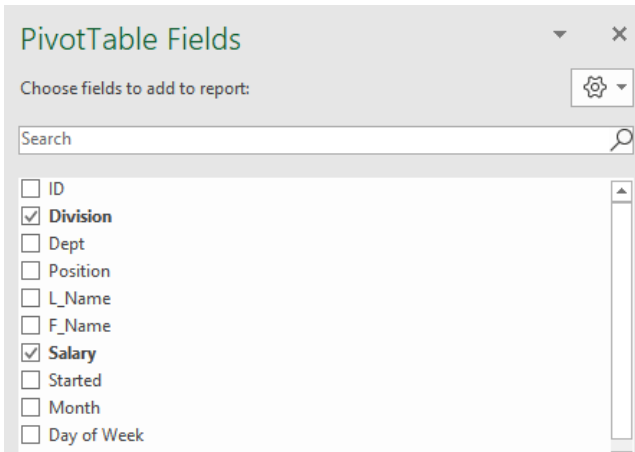
You can build a dashboard from your slicer and chart.



How to add helper columns

J	K	L	M	N
Started ▼	Month ▼	Day of Week ▼		
4/20/1991	Apr	=TEXT([@Started],"ddd")		
2/11/1992	Feb	Tue		
11/23/1994	Nov	Wed		
5/23/1991	May	Thu		

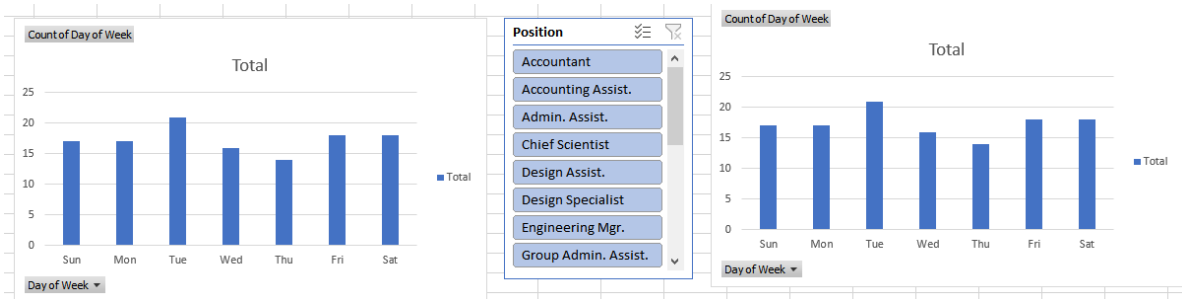
Why you must refresh your data



Now you can count hires by day of the week:

Row Labels	Count of Day of Week
Sun	17
Mon	17
Tue	21
Wed	16
Thu	14
Fri	18
Sat	18
Grand Total	121

And do a chart...and move it to your dashboard...



Using big data for reports

REGION	MARKET	STORE	MODEL	LINE OF BUSINESS	REVENUE	Units Sold
West	California	87088068	3002C	Service Plan	\$3,382	1
West	California	77177017	3002C	Service Plan	\$23,343	13
West	California	77172012	4055T	Parts	\$19,653	0
West	California	87088058	3002P	Parts	\$36,559	0
West	California	87088068	3002P	Service Plan	\$17,938	7
West	California	77172012	5001C	Service Plan	\$27,774	20
West	California	87088068	2500C	Copier Sale	\$25,348	6
West	California	87088028	5001C	Parts	\$6,413	0
West	California	77175015	3002P	Parts	\$614	0
West	California	77177017	2500C	Copier Sale	\$26,822	8
West	California	87088018	3002P	Parts	\$12,318	0
West	California	87088068	3002C	Parts	\$6,760	0
West	California	87088028	5001P	Service Plan	\$132,333	49
West	California	77172012	3002P	Service Plan	\$45,286	23
West	California	77172012	5001P	Parts	\$6,208	0
West	California	77175015	4500C	Service Plan	\$80,749	55
West	California	87088058	3002C	Parts	\$2,174	0
West	California	87088018	4500C	Service Plan	\$40,629	33

How to create report subtotals

Row Labels	Sum of REVENUE
North	\$225,930,743
Great Lakes	\$29,058,620
Maine	\$33,815,856
New England	\$29,478,368
New York North	\$32,211,652
New York South	\$23,391,976
Ohio	\$33,973,701
Vermont	\$44,000,570
South	\$213,859,235
Mississippi	\$35,983,599
Florida	\$37,258,934
Indiana	\$32,531,880
Kentucky	\$29,404,589
North Carolina	\$26,850,356
South Carolina	\$25,515,088
Tennessee	\$26,314,789
West	\$202,280,114
Arizona	\$23,332,379
California	\$48,940,204
Colorado	\$20,751,551
Idaho	\$31,477,398
Nevada	\$24,526,873
New Mexico	\$30,736,446
Washington	\$22,515,263
Grand Total	\$642,070,092

You can do percent of column totals.

Row Labels	Sum of REVENUE
North	35.19%
Great Lakes	4.53%
Maine	5.27%
New England	4.59%
New York North	5.02%
New York South	3.64%
Ohio	5.29%
Vermont	6.85%
South	33.31%
Mississippi	5.60%
Florida	5.80%
Indiana	5.07%
Kentucky	4.58%
North Carolina	4.18%
South Carolina	3.97%
Tennessee	4.10%
West	31.50%
Arizona	3.63%
California	7.62%
Colorado	3.23%
Idaho	4.90%
Nevada	3.82%
New Mexico	4.79%
Washington	3.51%
Grand Total	100.00%

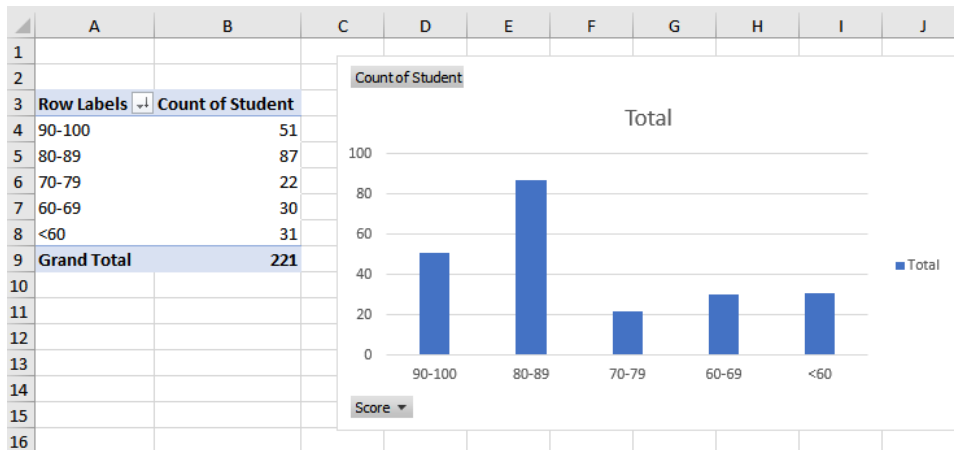
You can do percent of parent rows.

Row Labels	Overall Percent	TTL Revenue	Percent of Parent
North	35.19%	\$225,930,743	35.19%
Great Lakes	4.53%	\$29,058,620	12.86%
Maine	5.27%	\$33,815,856	14.97%
New England	4.59%	\$29,478,368	13.05%
New York North	5.02%	\$32,211,652	14.26%
New York South	3.64%	\$23,391,976	10.35%
Ohio	5.29%	\$33,973,701	15.04%
Vermont	6.85%	\$44,000,570	19.48%
South	33.31%	\$213,859,235	33.31%
Mississippi	5.60%	\$35,983,599	16.83%
Florida	5.80%	\$37,258,934	17.42%
Indiana	5.07%	\$32,531,880	15.21%
Kentucky	4.58%	\$29,404,589	13.75%
North Carolina	4.18%	\$26,850,356	12.56%
South Carolina	3.97%	\$25,515,088	11.93%
Tennessee	4.10%	\$26,314,789	12.30%
West	31.50%	\$202,280,114	31.50%
Arizona	3.63%	\$23,332,379	11.53%
California	7.62%	\$48,940,204	24.19%
Colorado	3.23%	\$20,751,551	10.26%
Idaho	4.90%	\$31,477,398	15.56%
Nevada	3.82%	\$24,526,873	12.13%
New Mexico	4.79%	\$30,736,446	15.19%
Washington	3.51%	\$22,515,263	11.13%
Grand Total	100.00%	\$642,070,092	100.00%

How to create custom groupings

Student	Score
Rhea Madsen	69
Jennifer Mendez	81
Brett Broyles	100
Shirley Smith	28
John Brown	93
Michael G. Welch	50
Donald Tse	100
Madeline Stevens	82
Howard Porter	86
Helen Craven	81
Lillie Schultz	75
Emily Li	80
Michael Long	71
Chris Herrman	88
Marshall Sherman	48
William Grindle	82
Pauline Haun	85
Lydia J. Evans	82
James Weaver	80
Barbara Billings	77
William Hernandez	35

How to group data and modify sorting



How to work with bad data

Sometimes you must fix data that's not tabular.

	A	B	C	D	E	F	G	H
1	Actor	Film				ACQUISITION DATE	LOCAL_OFFICE	Transformer ID
2	Julia Roberts	Mystic Pizza				1940	53	9338
3		The Mexican						9339
4		Ocean's Eleven					81	8443
5		Pretty Woman				1944	51	7585A
6	Brad Pitt	Thelma and Louise					61	6851A
7		The Mexican					79	9402
8		Ocean's Eleven				1945	11	1919D
9	George Clooney	Ocean's Eleven						5625C
10		Up In the Air						5864C
11		Good Night and Good Luck					12	1209D
12								1539A
13								2525D

This is what you need:

	A	B	C	D	E	F	G	H
1	Actor	Film				ACQUISITION DATE	LOCAL_OFFICE	Transformer ID
2	Julia Roberts	Mystic Pizza				1940	53	9338
3	Julia Roberts	The Mexican				1940	53	9339
4	Julia Roberts	Ocean's Eleven				1940	81	8443
5	Julia Roberts	Pretty Woman				1944	51	7585A
6	Brad Pitt	Thelma and Louise				1944	61	6851A
7	Brad Pitt	The Mexican				1944	79	9402
8	Brad Pitt	Ocean's Eleven				1945	11	1919D
9	George Clooney	Ocean's Eleven				1945	11	5625C
10	George Clooney	Up In the Air				1945	11	5864C
11	George Clooney	Good Night and Good Luck				1945	12	1209D
12						1945	12	1539A
13						1945	12	2525D

How to create a tabular report

2		
3	Actor	Film
4	Brad Pitt	Ocean's Eleven
5		The Mexican
6		Thelma and Louise
7	George Clooney	Good Night and Good Luck
8		Ocean's Eleven
9		Up In the Air
10	Julia Roberts	Mystic Pizza
11		Ocean's Eleven
12		Pretty Woman
13		The Mexican

Techniques That Apply to Financial Reports

Calculated items

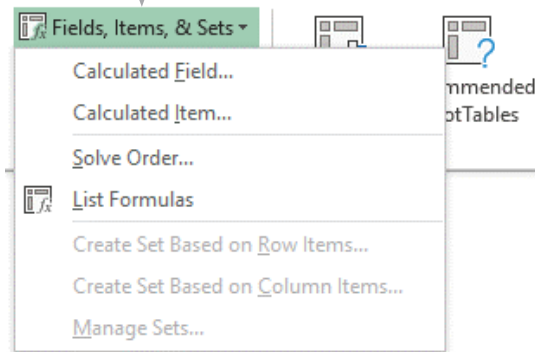
There are times when you need to create calculated items for your report — rather than build your formulas outside the report.



SKILLTIP

Always highlight a row item before building a formula based on that row item. If you select a value, Custom Item is not available.

Calculated Items and Calculated Fields are created from the Fields, Items, & Sets button on the Analyze tab of the ribbon.



SkillStep — To create a Calculated Item:

PivotTable Tools > Analyze > Calculations > Fields, Items, & Sets > Calculated Item.

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug
Revenue								
Books								
Consulting								
DVDs								
Videos								
COGS								
Gross Profit								
Expenses								
Advertising								
Depreciation								
Electricity								
Insurance								
Interest And Bank Charges								
Postage								
Printing And Stationary								
Professional Memberships								
Rent For Premises								
Repairs And Maintenance								
Training								
	112714	47673	53034	51556	120126	82915	77181	103161

Calculated fields

In addition to needing calculated items, there are times when you ‘ll need to develop custom value calculations. For example, perhaps you want to compare Planned Expenses to Actual Expenses. To calculate the variance in a cell, you would write a formula such as: Variance = Planned Expense – Actual Expense. However, to do that in a PivotTable report, you’ll need to create a Calculated Field.

SkillStep — To create a Calculated Field:

PivotTable Tools > Analyze > Calculations > Fields, Items, & Sets > Calculated Field.

P & L Category	Planned	Actual	Variance
Advertising	\$ 1,003,699	\$ 1,086,726	\$ (83,027) ▼
Depreciation	\$ 986,521	\$ 1,045,399	\$ (58,878) ▼
Electricity	\$ 1,125,844	\$ 1,170,268	\$ (44,424) ▼
Insurance	\$ 1,054,621	\$ 1,027,695	\$ 26,926 ▲
Interest And Bank Charges	\$ 1,020,364	\$ 972,066	\$ 48,298 ▲
Postage	\$ 1,105,180	\$ 1,159,851	\$ (54,671) ▼
Printing And Stationary	\$ 1,074,055	\$ 1,122,911	\$ (48,856) ▼
Professional Memberships	\$ 1,083,673	\$ 1,157,334	\$ (73,661) ▼
Rent For Premises	\$ 919,351	\$ 1,023,709	\$ (104,358) ▼
Repairs And Maintenance	\$ 982,383	\$ 1,017,526	\$ (35,143) ▼
Training	\$ 911,178	\$ 983,853	\$ (72,675) ▼
Vehicle Operating Costs	\$ 1,123,799	\$ 1,165,369	\$ (41,570) ▼
Wages And Salaries	\$ 1,125,244	\$ 1,142,921	\$ (17,677) ▼
Workers Compensation	\$ 1,204,565	\$ 1,176,081	\$ 28,484 ▲
Grand Total	\$ 14,720,477	\$ 15,251,709	\$ (531,232) ▼

Insert Calculated Field

Name: Variance Modify

Formula: ="Planned \$" - "Actual \$" Delete

Fields:

- Date
- Line Item
- Planned \$
- Actual \$
- P & L Category
- Year
- Variance

Insert Field

OK Close

Calculated fields are added to the Values drop zone and the Value area of your PivotTable report. They can also be enhanced with custom number formats — so that positive variances display a triangle pointing up ▲ and negative variances display a triangle pointing down ▼.



SKILLTIP

Experiment with different custom number formats. To append symbols to positive (▲) and negative values (▼), use: _("\$* #,##0_)▲;_("\$* (#,##0)▼;_("\$* “-”_);_(@_).

	A	B	C	D	E	F	G
1	Date	Line Item	Planned \$	Actual \$	P & L Category	Month	Year
2	11-Jan-16	Videos	\$ 430,211	\$ 369,199	Revenue	Jan	2016
3	17-Jan-16	Books	\$ 230,816	\$ 367,285	Revenue	Jan	2016
4	16-Jan-16	DVDs	\$ 298,454	\$ 227,804	Revenue	Jan	2016
5	18-Jan-16	Consulting	\$ 164,197	\$ 136,754	Revenue	Jan	2016
6	28-Jan-16	Cost Of Goods Sold	\$ 43,479	\$ 33,343	COGS	Jan	2016
7	14-Jan-16	Advertising	\$ 34,783	\$ 48,640	Expenses	Jan	2016
8	20-Jan-16	Depreciation	\$ 9,551	\$ 18,251	Expenses	Jan	2016
9	1/23/16	Electricity	\$ 48,905	\$ 38,647	Expenses	Jan	2016
10	1/20/16	Insurance	\$ 45,571	\$ 44,928	Expenses	Jan	2016
11	1/11/16	Interest And Bank Charges	\$ 33,646	\$ 33,400	Expenses	Jan	2016

Formatting a Financial Report

Sum of Actual \$	Column Labels												
Row Labels	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Grand Total
Revenue	\$3,418,949	\$3,066,368	\$3,366,959	\$3,555,535	\$4,675,511	\$3,666,752	\$3,622,413	\$4,000,898	\$3,895,544	\$3,490,594	\$3,145,934	\$3,572,535	\$43,477,992
Books	\$946,530	\$402,859	\$760,911	\$594,382	\$1,315,563	\$1,115,243	\$939,237	\$1,289,328	\$1,017,044	\$1,083,087	\$910,250	\$638,855	\$11,013,289
Consulting	\$818,340	\$703,430	\$899,510	\$1,052,118	\$1,106,253	\$898,620	\$1,000,636	\$899,194	\$1,062,778	\$593,789	\$683,582	\$1,008,450	\$10,726,700
DVDs	\$748,286	\$953,620	\$863,035	\$973,405	\$1,122,855	\$803,330	\$942,029	\$877,986	\$1,022,923	\$667,828	\$773,096	\$974,375	\$10,722,768
Videos	\$905,793	\$1,006,459	\$843,503	\$935,630	\$1,130,840	\$849,559	\$740,511	\$934,390	\$792,799	\$1,145,890	\$779,006	\$950,855	\$11,015,235
COGS	\$74,323	\$109,345	\$96,652	\$97,491	\$87,405	\$62,686	\$101,027	\$116,816	\$103,030	\$62,239	\$63,048	\$86,131	\$1,060,193
Expenses	\$1,284,835	\$1,174,201	\$1,145,310	\$1,250,925	\$1,268,565	\$1,306,878	\$1,427,168	\$1,196,064	\$1,291,429	\$1,265,049	\$1,338,874	\$1,302,411	\$15,251,709
Advertising	\$74,363	\$95,818	\$88,621	\$100,000	\$66,555	\$104,391	\$80,360	\$84,010	\$101,841	\$104,033	\$72,027	\$114,707	\$1,086,726
Depreciation	\$68,113	\$89,224	\$56,682	\$74,123	\$87,467	\$96,553	\$99,742	\$98,508	\$122,997	\$63,810	\$111,818	\$76,362	\$1,045,399

Calculating custom items in a financial report

Insert Calculated Item in "P & L Category" ? X

Name: Add

Formula: Delete

Fields:

- Date
- Line Item
- Planned \$
- Actual \$
- P & L Category**
- Month
- Year

Insert Field

Items:

- Revenue
- COGS**
- Expenses

Insert Item

OK Close

Dividing a multi-year report into separate annual reports

	A	B	C	D	E	F
1	Year	(All)				
2						
3	Sum of Actual \$		Column Labels			
4	Row Labels	Jan	Feb	Mar	Apr	May
5	Revenue	\$3,418,949	\$3,066,368	\$3,366,959	\$3,555,535	\$4,675,511
6	Books	\$946,530	\$402,859	\$760,911	\$594,382	\$1,315,563
7	Consulting	\$818,340	\$703,430	\$899,510	\$1,052,118	\$1,106,253
8	DVDs	\$748,286	\$953,620	\$863,035	\$973,405	\$1,122,855
9	Videos	\$905,793	\$1,006,459	\$843,503	\$935,630	\$1,130,840
10	COGS	\$74,323	\$109,345	\$96,652	\$97,491	\$87,405
11	Gross Profit	\$3,344,626	\$2,957,023	\$3,270,307	\$3,458,130	\$4,588,106
12	Expenses	\$1,284,835	\$1,174,201	\$1,145,310	\$1,250,925	\$1,268,565
13	Advertising	\$74,363	\$95,818	\$88,621	\$100,000	\$66,555
14	Depreciation	\$68,113	\$89,224	\$56,682	\$74,123	\$87,467

Show Report Filter Pages ? X

Show all report filter pages of:

- Year**

OK Cancel

How to Calculate Year-on-Year Variations in Expenses

The screenshot shows the 'Insert Calculated Field' dialog box. The 'Name' field is set to 'Variance' and the 'Formula' field contains '=Planned \$' - Actual \$'. The 'Fields' list includes Date, Line Item, Planned \$, Actual \$, P & L Category, Year, and Variance. The 'Insert Field' button is highlighted.

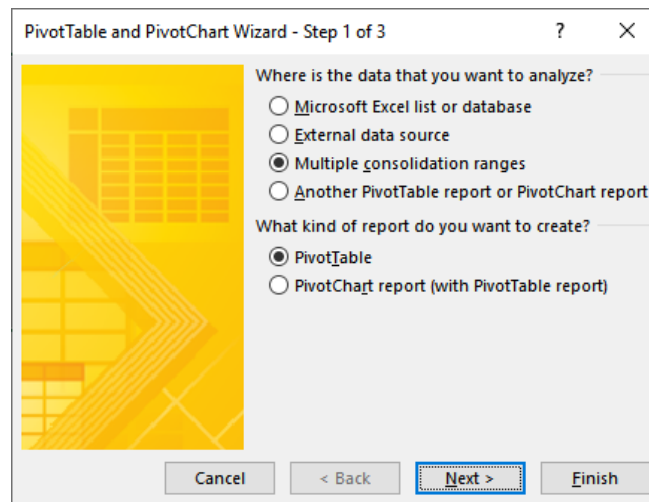
And report on it by year:

	A	B	C	D
1	P & L Category	Expenses	.Y	
2				
3	Variance	Column Labels		
4	Row Labels	2016	2017	2018
5	Advertising	\$ (8,864)	\$ (51,912)	\$ (22,251)
6	Depreciation	\$ (22,613)	\$ (13,791)	\$ (22,474)
7	Electricity	\$ 5,820	\$ 24,827	\$ (75,071)
8	Insurance	\$ (6,128)	\$ (3,097)	\$ 36,151
9	Interest And Bank Charges	\$ 8,499	\$ 23,893	\$ 15,906
10	Postage	\$ (14,832)	\$ (52,730)	\$ 12,891
11	Printing And Stationary	\$ (30,844)	\$ (26,949)	\$ 8,937
12	Professional Memberships	\$ (41,941)	\$ (24,509)	\$ (7,211)
13	Rent For Premises	\$ (41,603)	\$ (20,606)	\$ (42,149)
14	Repairs And Maintenance	\$ (26,876)	\$ 16,542	\$ (24,809)
15	Training	\$ (49,713)	\$ (19,536)	\$ (3,426)
16	Vehicle Operating Costs	\$ (54,001)	\$ 27,331	\$ (14,900)
17	Wages And Salaries	\$ (25,150)	\$ (6,196)	\$ 13,669
18	Workers Compensation	\$ 17,855	\$ (3,112)	\$ 13,741

How to Consolidate Multiple Datasets Into a Single PivotTable Report

There are times you will need to combine separate sheets into a single PivotTable report. To do so, you'll need to use the PivotTable and PivotChart Wizard.

SkillStep — To launch the PivotTable and PivotChart Wizard: ALT, D, P



SKILLTIP

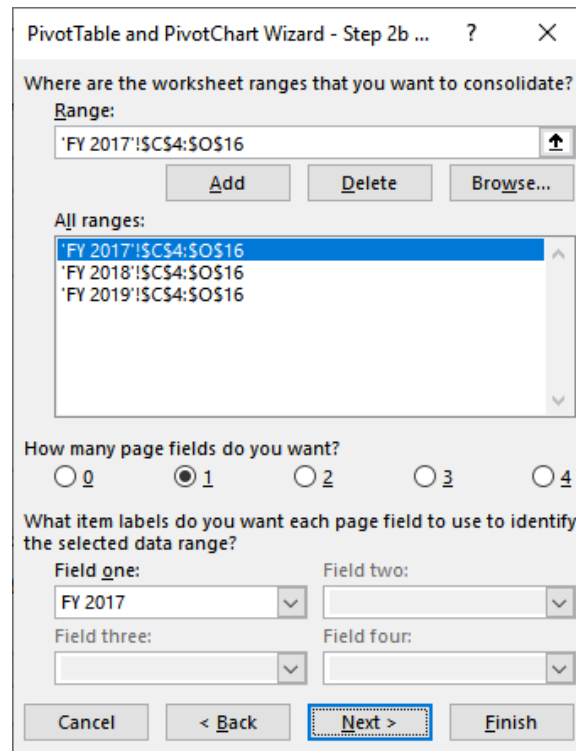
Rather than trying to remember ALT, D, P, you can add the Wizard to the Ribbon or the QAT. You'll find it under "Commands Not in the Ribbon."

When do I need this Wizard?

Let's say you've inherited a workbook whose data is divided into many tabs — yearly, monthly or weekly — and you need to create a single report.



With the Wizard, you can select the three different data ranges on the three tabs and label each using the Wizard's page field option.



When you finish combining the data, the report will have merged all your tab values.

	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Grand Total
Ken	11	3	3	3	9	3	3	3	12	3	9	62
Bob	3	3	3	3	3	3	3	3	3	3		39
Cathy			3	3				3	3	3		15
David	3	3	6	3	3	3			3	3		30
Ed	3	3	3		11			6	3	3	3	38
Fred	3	3		3	11	11	3	9	3			46
George		7			3	3	3	11		11	3	50
Henry		3		3	3		3	3	3	3	3	27
Ira	6	3	3		6	3	3	3	3	3	3	39
Jack	3		3	3	6	3	3			3		27
Ken	11	3	3	3	11	3		9	3	14	3	63
Lisa	3	3	3	9	3	6		3	3	17		53
Grand Total	39	40	34	27	33	55	38	38	47	45	41	489



SKILLTIP

If you need to modify the data ranges for your consolidated report, click in the report and re-press ALT, D, P to launch the Wizard. (Click the “< Back” button to revisit Step 2b of 3 in the Wizard to revise your report components.)

Totals	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Grand Total
Alan													
Bob													
Cathy													
David													
Ed													
Fred													
George													
Henry													
Ira													
Jack													
Ken													
Lisa													
Grand Total	39	40	34	27	33	55	38	38	47	45	41	489	



SKILLTIP

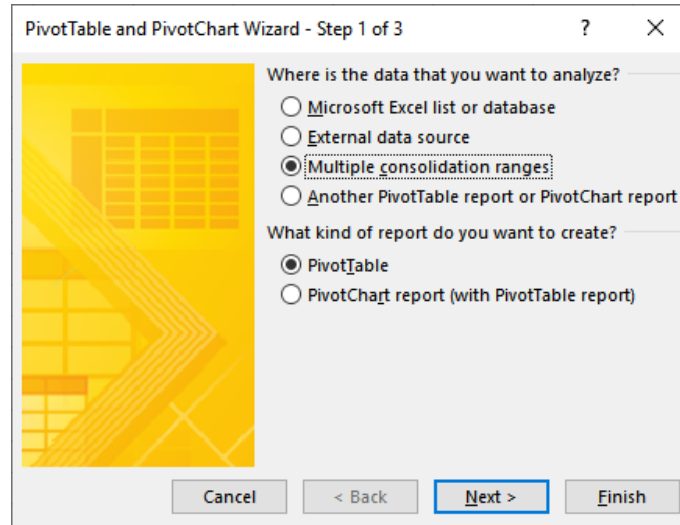
The PivotTable PivotChart Wizard is also useful to “reverse engineer” a table from cross-tabular data. To do so, consolidate the data into a report, then double-click on the grand total to generate the table.

(Note: See Part 1 of this series for more details on double-clicking summarized values in a PivotTable report.)

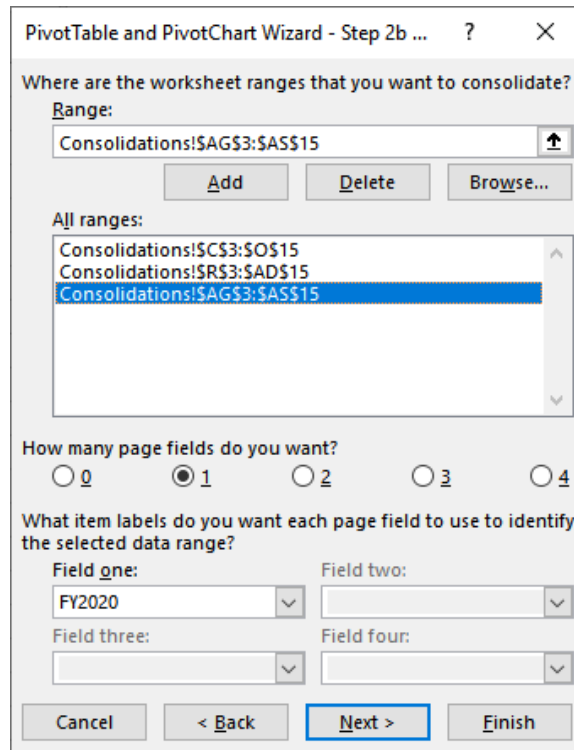


SKILLTIP

Power Query, a newer tool developed by Microsoft®, provides a wider array of commands that allow you to merge multiple datasets into a single report. For this example, the PivotTable PivotChart Wizard is enough.



Understanding filter pages and their usage in a consolidation



The Consolidation Report

	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Grand Total
	3	3	3	3	3	3	3	3	3	3	3	33
	3	3	3	3	3	3	3	3	3			30
			3	3				3	3	3		15
	3		3	3	3	3	3		3	3		27
	3	3	3		3			3	3	3	3	27
		3	3		3	3	3	3	3	3		24
					3	3	3	3		3	3	21
			3		3	3	3	3	3	3	3	27
	3	3	3		3	3	3	3	3	3	3	33
		3		3	3	3	3	3		3		24
15 Ken	3	3	3	3	3	3		3	3	3	3	30
16 Lisa	3	3	3	3	3	3	3		3	3	3	30
17 Grand Total	24	21	27	27	24	30	27	27	30	30	21	321

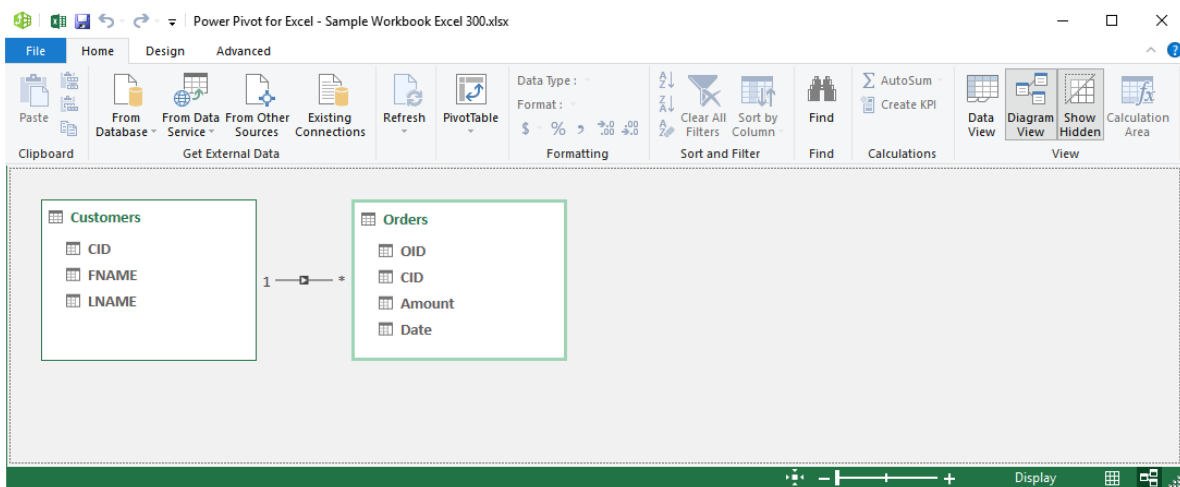
The secret to drilling down into a consolidation

	A	B	C	D
1	Row	Column	Value	Page1
2	Alan	Jan		FY2018
3	Alan	Jan		FY2019
4	Alan	Jan		FY2020
5	Alan	Feb		1 FY2018
6	Alan	Feb		1 FY2019
7	Alan	Feb		1 FY2020
8	Alan	Mar		1 FY2018
9	Alan	Mar		1 FY2019
10	Alan	Mar		1 FY2020
11	Alan	Apr		1 FY2018
12	Alan	Apr		1 FY2019
13	Alan	Apr		1 FY2020
14	Alan	May		1 FY2018
15	Alan	May		1 FY2019
16	Alan	May		1 FY2020

Relationships

You can also build reports from multiple tables that you link together with relationships. Relationships can be built with the Relationships button on the Data tab... or via Power Pivot.

The Fundamentals of Power Pivot



Power Pivot is the intersection of two power programs: Excel® and Access®.

What are the benefits of learning and using Power Pivot?

The benefits of using Power Pivot begin with being able to assemble massive amounts of Data – 100s of millions of rows of data — all in Excel® (technically Power Pivot).

The data your data can come from:

- Access® tables
- Excel® files
- Text files
- SQL servers
- The web

...and, if necessary, transformed by Power Query.

Power Pivot supports multiple tables and relationships. With relationships, VLOOKUP becomes a thing of the past.

While basic PivotTables have moderately useful formulas, Power Pivot utilizes Data Analysis Expressions (DAX) for writing formulas.

Conveniently, the Power Pivot interface looks like Excel®...complete with Formula bar, Ribbon and Status bar.

In short, with Power Pivot, you can:

- Work with massive amounts of data from many different sources.
- Combine the data together using relationships.
- Analyze the data with powerful DAX measures.
- Summarize the results with a familiar PivotTable interface.

The reasons you need Power Pivot and caveats

Here's a summary of the benefits and drawbacks to Power Pivot. As you'll see, the benefits outweigh the drawbacks.



ADVANTAGES

1. You can analyze massive amounts.
2. You can pull data from multiple sources.
3. You can link all your data sources together.
4. You can incorporate the powerful DAX (Data Analysis Expressions).
5. You still have the familiar Excel® PivotTable interface.
6. You can build visually rich dashboards from the data.



DISADVANTAGES

1. Unlike standard PivotTable grouping, grouping date fields requires a special table of dates with permutations of dates.
2. There's no editing of data (which could be an advantage!). You can't change data in the Power Pivot window. The display may look like cells, but you can't type anything. If you want to modify data, you must go back to the source and re-import the data — unless it's a linked table. If it's a linked data source, you can just refresh the link. The good news is this maintains the integrity of the data and reduces human error.
3. There's no backwards compatibility. When you open an old Power Pivot 2010 model in Excel® 2013 or 2016, the model is converted...and it's a one-way conversion.
4. Show Report Filter Pages not available! If you love splitting data using a PivotTable report filter, the command is unavailable to Power Pivot PivotTables.



SKILLTIP

Excel® 2013 Power Pivot is compatible with Excel® 2016 Power Pivot... with the exception that new DAX functions that come with Power Pivot 2016.

Power Pivot's Columnar Data Model

The primary reason for using Power Pivot is that Power Pivot's Data Model does not store imported tables in an Excel® sheet or in a table format. Power Pivot's Data Model has a behind-the-scenes Columnar Database where all data is stored.

When you import a table into the Data Model, each field in the imported table is stored separately with a unique list of values for the field. There is a sort of “map” that allows the database to reconstruct the original table and all the records.

The Columnar Database is a behind-the-scenes, In-Memory (RAM) Database.

The number of *unique* values in any one field determines the amount of RAM that is used. The Columnar Database allows you to import large data sets (millions of rows) that would not fit in an Excel® sheet. You can safely handle 100 million rows. The columnar database stores data efficiently and can dramatically reduce file size.

In comparison to a standard dataset, a Columnar Data Model only stores one copy of each unique value.

Standard Data Set

Sales	Sales Rep	Region
\$54.00	Jo	West
\$26.00	Nina	East
\$54.00	Jo	South
\$57.00	Kip	West
\$22.00	Gigi	West
\$59.00	Gigi	South
\$95.00	Kip	East
\$99.00	Kip	South
\$51.00	Nina	South
\$49.00	Nina	East
\$12.00	Jo	East
\$30.00	Jo	East
\$20.00	Nina	West
\$92.00	Kip	West
\$73.00	Gigi	South

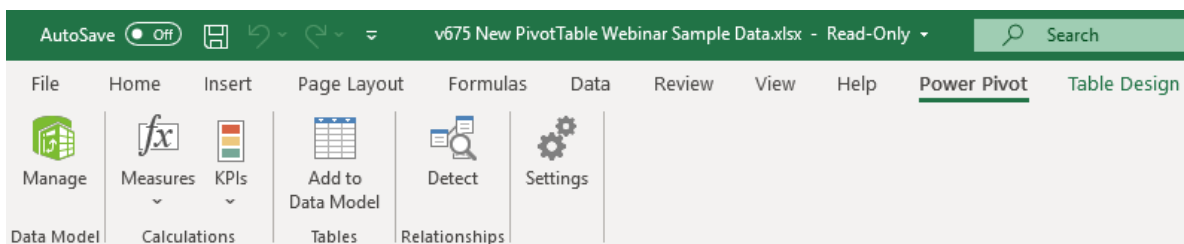
Imported into Data Model: Columnar Data Model

Sales	Sales Rep	Region
\$54.00	Jo	West
\$26.00	Nina	East
\$57.00	Jo	South
\$22.00	Kip	West
\$59.00	Gigi	
\$95.00		
\$99.00		
\$51.00		
\$49.00		
\$12.00		
\$30.00		
\$20.00		
\$92.00		
\$73.00		

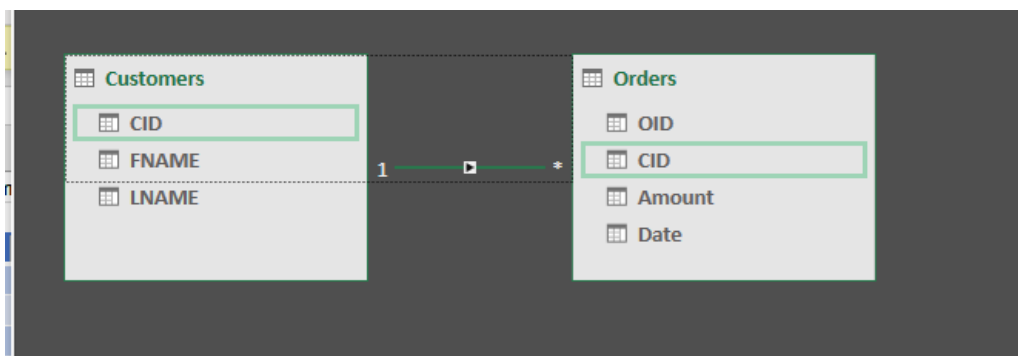
Synonyms for a columnar database:

- Columnar Database
- Data Model
- Power Pivot Database stored in an Excel® Workbook
- Power Pivot xVelocity engine
- Power Pivot engine
- xVelocity analytics engine
- VertiPaq

Linking tables together with Power Pivot



How to use Diagram View



Building a PivotTable with Power Pivot

FNAME	LNAME	Sum of Amount
Camille	Barnett	123
John	Smith	864
Mary	Jones	235
Tom	Stevens	234
Grand Total		1456

Notes



[skillpath.com](https://www.skillpath.com)