# **Microsoft Power Tools for Data Analysis #6**

# 3 Important Power Query Transformations: Merge, Append, UnPivot Notes from Video:

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# 1. Example1: Merge 2 Tables to Replace VLOOKUP or Relationship

1) **Goal** is to take two related tables from two different files (one is an Excel File and the other is a Text File) and Merge them into one single table using the Merge feature, as seen in this picture:

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	ARM	Arnenta		1	Selectorpity	Saleatiophane	e divedate D fermulyib	Destiliting.
	AUT	Austria			872-44-12	Sel Marroquin	2/3/1994 NUD	wetberlands
	AZE	Azerbaijan		1 1	872-89-42	Sharsene Melender	1/28/2007 NLD	Antherlands
	SEL	Bangladech		1 12	872.44.33	Seature Lander	altaliant arts	Mananatan
	ISGR	6ulgaria			873.44.22	Rouse Boothy	3/33/2004 000	Boland
	<b>BHR</b>	Bahrain			873-54-02	Manife Worldy	10/5/2011 POL	Poland
005 \$450704 ++	815	Bahamas	mar recording		873-44-42	Elinore flees	6/8/1995 HND	Hooduras
000-IMSPTDADt	(BTH	903H18 4H0	ner zegovina		872-50-22	Rondell Spellman	1/a/2007 HND	Homburan
006-MSPTDA-visx					872-44-52	Reported Mercier	6/14/1995 GRC	Givers
pose mer rerrinnen					872-47-52	Florine Grubbs	9/14/2004 ARG	Argenting
	A	a state out that have	State of the local division of the	0 11	872-48-82	Bethanie Connors	2/20/2006 ABS	Argentina
-	1 Leveloptic	Lateritapitame		13	872-51-72	Emil Calloway	5/6/2009 ARG	Argentina
_	1 177-44-12	Slave Merroquin	BUSSING ARY	34	872-55-52	Party Hunt	10/28/2013 ARG	Argentina
	4 877.44 97	Recent Beatty	1/25/2545 (0)		872-44-62	Listly Meadmick	30/12/1995 ZAF	South Africa.
	5 873-44-42	Elizate Dees	6/8/1995 1440	16	872-46-52	Desitiny Asher	12/23/2003 ARM	Armenta
	0 077-44-52	Broanty Merciar	6/14/1995 (34)	1	872-50-72	Long Bartlett	11/22/2007 ARM	Armenia
	3 872-64-67	Lafe Heatrick	10/12/1995 7AF	10	872-44-72	<b>Early Deruting</b>	1/15/1996 EST	Estoria
	8 872-44-72	Farmy Denning	1/15/1996 217		872-56-12	Mark Coleman	6/1/2014 EST	Estonia
	9 872-44-82	Zika Foley	9/5/1996 (NL	20	872-48-22	Elubeth Tejeda	3/38/3003 AUS	Australia
	10 872-44-92	Lesha Nobles	9/23/1997 IDN					
	15 473-45-02	Mini Locksonnil	2/6/1996 SLV					

# 2) What does Merge feature do?

- i. When we have a Foreign Key in one table and a Primary Key in the other table, Merge will allow us to pull data from the Primary Key Side to the Foreign Key side, as if were building a helper column with the VLOOKUP function.
- ii. There are other things that Merge can do also, and we will learn about this in the next video.

#### 3) The Benefit of using Merge will be:

- i. In Excel is we can avoid using the VLOOKUP function and thus avoid having many formulas in our spreadsheet solution.
- ii. In the Data Model (in Excel Power Pivot or Power BI Desktop) we can avoid using Relationships and create a more compact Star Schema Data Model.

# Steps in Merge:

1) The Two Files we need to import look like this:



2) The Excel File contains the Excel Table named "dSalesRep", as seen here:

1.4	A	B	C C	D
1	SalesRepID	SalesRepName	HireDate	TerritoryID
2	872-44-12	Sol Marroquin	2/3/1994	NLD
3	872-44-22	Kiera Mcfall	9/10/1994	MEX
4	872-44-32	Raven Beatty	3/19/1995	POL

3) The Tab Delimited Text File looks like this:

Territ AFG ALB APR	oryID Territory Afghanistan Albania Aprine	TerritoryID in the Tab Delimited Text File (Lookup Table) is the Primary Key
ARE	United Arab Emirates	

4) Import Excel File. To import the Excel File named "006-MSPTDA-

StartFilePowerQueryMergeAppendUnPivot.xlsx":

- i. Click on the Data Ribbon Tab.
- ii. In the Get & Transform group, click the dropdown arrow for Get Data.
- iii. Then point to From File.
- iv. Click on From Workbook, as seen here:



5) Navigate to the Excel File and double-click file to bring it into the Navigation window. In the Navigation window, select the Excel Table named "dSalesRep" on the left and then click the Transform Data button in the lower right, as seen here:

	Q	dSalesRep	1	[]a		
Select multiple items		SalesRepID	SalesRepName			
Display Options 🔹	20	872-44-12	Sol Marroquin	~		
	anTable view [7]	872-44-22	Kiera Mcfall	(=)		
	epidolexisx [2]	872-44-32	Raven Beatty			
🖽 dSalesRep1		872-44-42	Elinore Dees			
🖽 dSalesRep		872-44-52	Roxanna Mercier		2) Click	
	1) Select	872-44-62	Lady Headrick		Transform Dat	
	I) Select	872-44-72	Fanny Denning			
E	Excel Table	872-44-82	Zita Foley			
		872-44-92	Lesha Nobles	-		

6) In the Power Query Editor window, change the Query Name to "Sales Representative", as seen here:

		Epares	nehicke	unite - chin	er que y cu	oren -													
111		Home	Transf	orm Ada	f Column	View												8	
Close Load Close	8. I	Refresh review *	Adva	esties mord Editor age =	Manage Columns •	Reduce Rows *	24 24 Sort	Split Column *	Group By	Data Type: Te	et = Row as H Whites	Seaders +	Combine	Manage Parameters * Parameters	Deta source settings Data Source	D R	ew Source - ecent Sourc		
2		V	f#	- Table.T	ransformC	alumnTy;	pes (dSa	alesRep_	Table,	{{"SalesRep	ID°, ty	pe text},	¥	Query S	iettings		Name	e the Query	
2	100+	AC Sal	esRepiD	* ACS	alesRepNan	it M	Hir Hir	reDate	- A	TerritoryID				and the second					
8	11	872-44	4-22 Sol Marroquin			2/3/2994 MLD		D		· PROPERTIES			115						
2	2	872-64	-22	Kiera	Mchil		9/10/2994			εx				Name	me 📕				
	3	872-44-	-52	Raver	Seatty		3/19/1995		2995 PC	85 POL				Sales Rep	precentative				
	4	872-44	42	Elinar	e Dees			5/8/	1995 HR	(D				All Propert	All Properties				
	5	872-44-	52	Rouge	na Mercier			6/24/	1995 GR	/ GRC									
	ō	872-44-	62	Lady	Headrick			10/32/	1995 ZA	F				* APPLIED :	SHP5				
	7	872-44	72	Fanny	Denning			1/15/	2996 ES	T				Source	e.		(P)		
	8	872-64-	-92	Zite ?	oley			9/5/	2996 H	£.				Navigation @			-0-		
	9	872-44	92	Lesta	Noties			9/23/	1997 ID	N				2 Chang	ed Type				

- 7) In the Home Ribbon Tab, in the Close group, click the dropdown arrow for Close & Load, then click on "Close & Load To...".
- 8) In the Import Data dialog box, select the dialog button for "Connection Only", as seen here:



9) In the Queries and Connections Task Pane, you can see our first Query loaded as a Connection, as seen here:

Queries & Conn 🔻	×										
Queries Connections											
1 query											
Sales Representative											
Connection only.											

10) Import Text File. To import the Text File named "006-MSPTDA-dTerritoryTable.txt":

- i. Click the Data Ribbon Tab.
- ii. In the Get & Transform group, click the dropdown arrow for Get Data.
- iii. Then point to From File.
- iv. Click on From Text File, as seen here:



11) Navigate to the Text File and double-click file to bring it into the next window. In the next window, verify that the Delimiter is Tab. Then click the Transform Data button in the lower right, as seen here:

ile Origin	(	Delimiter		Data Type De	etection		
1252: West	ern European (Windows) 🗸	Tab		<ul> <li>Based on fir</li> </ul>	st 200 rows	1.70	De
Column1	Column2					_	*
TerritoryID	Territory			1) Vorifi	Tab is Dolimi	tor	
AFG	Afghanistan		1	I) verity	Tab is Delimi	ter	=
ALB	Albania		L				
APR	Aprine						
ARE	United Arab Emirates						
ARG	Argentina						
ARM	Armenia	2	) Click Transf	orm Data	k		
AUS	Australia				<b>_</b> \		
AUT	Austria						

12) In the Power Query Editor, name the query "TerritoryLookupTable". Then Delete the Change Type Step in the Applied Steps List.

	5- y   ]	TerritoryLookup1	fable - Power Q	uery Editor	¢		0			
	Hos	ne Transform	n Add Colu	mn View						
Close Load	A Refr Previ	Propert	es ed Editor t* Colu	H Reduce	11 Split Column + By	Data Type: Text * $\label{eq:product} \square \ \mbox{Use First Row as Headers *} $$ $ $ $ $ $ $ $ $ $ $ $ $ $ $ $ $ $$	Combine	Manage Parameters *	Data source settings	New Source
Close	6	Query		and the second	Sort	Transform	11	Parameters	Data Sourc.,	New Query
>	8	√ f <sub>X</sub> =	Table.Transf	Query Settings						
in the	- AB	Column1 -	A <sup>B</sup> <sub>C</sub> Column2		-					
3	1 TerritoryID Territo		Territory					* PROPERTI		
	Z AF	G	Adghanistan		1) Name	Name				
	3 AL	Б	Albania			TerritoryLookupTable				
	A AP	u	Aprine			All Properties				
	5 AB	E.	United Arab En	ninates						
	6 AR	15	Argentina					* APPLIED S	TEPS	-
	7 AR	16AY	Armenia		2) Delete Chan	iged Type step 🗧	_	Source	No.	- <del>1</del>
	B AL	15	Austrelie		•	,				

- 13) **Promote Headers**. Power Query did not interpret the first row of text values in the Tab Delimited File as Field Names. In the above picture, you can see that the Column Headers (Field Names) have the unhelpful names of "Column1" and "Column2". So, we must "Use First Row as Headers". To do this:
  - i. Click on the dropdown arrow in the Table Icon in the tables upper left corner
  - ii. Then from the list select "Use First Row as Headers", as seen here:

1) Upper Left Corner	$\blacksquare_{\tau} A^{B}_{C}$ Column1 $\frown A^{B}_{C}$ Column2	
dropdown	Copy Entire Table	
	Use First Row as Headers	1) Promote Headers

14) After we "Use First Row as Headers", two steps are added to the Applied Steps Take Pane: 1) Promote Headers, and 2) Change Type, as seen here:

XUI		=   Terri	teryf.col	upTable	- Power C	Juery E	ditor		6			. Ø.			Col Hill Book
-		Home	Trans	form.	Add Colu	anis	View								
Close Load	čx =	Refresh Preview *	Adv Quely	perties anced Ed tage =	tor Mr Col	unage unage	Reduce Rows *	Sort	split Column	Group	Data Type: Text + Use First Row as Headers + d <sub>+1</sub> Replace Values Transform	Combine	Manage Parameters * Parameters	Data source settings Data Sourc	New Source
>	2	c sz	fx	- Tabi	le.Trans	formCo	lumnTyp	es(#	Promoties	Heade	rs",{{"TerritoryID", type	~	Query S	iettings	×
-	. All TenitoryID * All Tenitory										1.51.54.64.6	land and the second			
3	1	1 AFG At			Afghenistan							* PROPERTI	ES		
	2	ALS .			Albenia								Name		
	3	APR			Aprine								Territoryu	ookup aole	
	4	ARE			United An	ab Emir	ates.					. UI	All Propert	hes .	
	3	ANG			Argentina								- ADDITES	TIME	
	6	ARM			Armenia								* APPLIED	STEP5	
	7	AUS-			Australia								Source	Survey and	
		AUT			Austria								Promo	ited Headers	4
	0	AZE			Azerbaijar	s'							X Chang	ed Type	
	10	ant.			Balaiters										

15) Close the Query and Load it as a Connection Only. Now in the Queries and Connections Task Pane, you can see our first two Queries loaded as a Connection, as seen here:

Queries & Conn 🔻	×
Queries Connections	
2 queries	
Sales Representative Connection only.	
TerritoryLookupTable Connection only.	

- 16) Merge Two Queries. To Merge the two queries
  - i. Click the Data Ribbon Tab.
  - ii. In the Get & Transform group, click the dropdown arrow for Get Data.
  - iii. Then point to Combine Queries.
  - iv. Click on Merge, as seen here:

From Ble , ta From Database , B From Azure , From Online Services , From Other Sources ,	Q.
From Database  B  From Azure From Online Services From Online Services From Online Services	
From Azure   From Online Services  From Other Sources	
From Online Services *	
the Da	
Legacy Witzards	

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- 17) In the Merge dialog box:
  - i. For the first table select "Sales Representative".
  - ii. Click TerritoryID (Foreign Key).
  - iii. For the second table select "TerritoryLookupTable".
  - iv. Click TerritoryID (Primary Key in Lookup Table).
  - v. Join Kind = Left Outer.
  - vi. Click OK.

sales hepie.	sentative			
SalesRepID	SalesRepName	HireDate	TerritoryID	
872 <mark>-44</mark> -12	Sol Marroquin	2/3/1994	NLD	
872-44-22	Kiera Mcfall	9/10/1994	MEX 2 Terri	toryID (Foreign Ke
872-44-32	Raven Beatty	3/19/1995	POL	
872-44-42	Elinore Dees	6/8/1995	HND	
872-44-52	Roxanna Mercier	6/14/1995	GRC	
rentoryLoc	kupiable			
TerritoryLoc	Territory			
TerritoryLoc TerritoryID AFG	Territory Afghanistan			
TerritoryLoc TerritoryID AFG ALB	Territory Afghanistan 4 Inia			
TerritoryLoc TerritoryID AFG ALB APR	Territory Afghanistan 4 Inia Morine		TerritoryID (Primary Ke	201
TerritoryID AFG ALB APR ARE	Arghanistan Arghanistan Arghanistan United Arab Emirat	tes	TerritoryID (Primary Ke	ey)

18) The merge process should look like the picture below. If you click off to the side of the word "Table" in the TerritoryLookupTable Column, you can see the related record from the Primary Key side of the Merge in the left-lower ares of the Power Query Editor, as seen in the picture below:

1	872-44-12		Sol Marroquin	2/3/1994	NLD	Table	*	PROPERTIES
2	872-44-22		Kiera Mcfall	9/10/1994	MEX	Table	E	Name
3	872-44-32		Raven Beatty	3/19/1995	POL	Table	1	dSalesRep
4	872-44-42		Elinore Dees	6/8/1995	HND	Table		All Properties
5	872-44-52		Roxanna Mercier	6/14/1995	GRC	Table		
6	872-44-62		Lady Headrick	10/12/1995	ZAF	Table		AFFLIED STEPS
7	872-44-72		Fanny Denning	1/15/1996	EST	Table		Source
8	872-44-82		Zita Foley	9/5/1996	IRL	Table		
9	872-44-92		Lesha Nobles	9/23/1997	IDN	Table		
10	872-45-02		Wei Lockwood	2/9/1998	SLV	Table	π.	
erri	toryID	Territory						
<b>NEX</b>		Mexico						

19) To pull the Territory Name into the dSalesRep Table, click the expand button in the TerritoryLookupTable Column, then check the Territory Column name as seen in the picture below:

<u>}</u>	▼ A <sup>B</sup> <sub>C</sub> TerritoryID ▼	1 AND
	Search Columns to Expand	
	Expand O Aggregate	
	<ul> <li>(Select All Columns)</li> <li>TerritoryID</li> <li>Territory</li> </ul>	
	Use original column name as prefix	
	OK Cancel	

20) Then "Close & Load To..." the Worksheet named "Append", as seen in this picture.

A	A	D		D	E.	- 10 M	E	
1	SalesRepID	SalesRepName	HireDate 🔻	TerritoryID	Territory	*		Oueries & Conn *
2	872-44-12	Sol Marroquin	2/3/1994	NLD	Netherlands			
3	872-49-42	Sharlene Melendez	1/26/2007	NLD	Netherlands	1		Queries Connections
4	872-56-22	Beatrice Lambert	6/18/2014	AFG	Afghanistan	T.		
5	872-44-22	Kiera Mcfall	9/10/1994	MEX	Mexico			3 queries
6	872-44-32	Raven Beatty	3/19/1995	POL	Poland	1		
7	872-54-02	Mandie Worley	10/5/2011	POL	Poland			Sales Representative
8	872-44-42	Elinore Dees	6/8/1995	HND	Honduras	1		 Connection only.
9	872-50-22	Blondell Spellman	7/4/2007	HND	Honduras			
10	872-44-52	Roxanna Mercier	6/14/1995	GRC	Greece			III TerritoryLookupTable
11	872-47-52	Florine Grubbs	9/14/2004	ARG	Argentina			Connection only.
12	872-48-82	Bethanie Connors	2/20/2006	ARG	Argentina	i.		
13	872-51-72	Emil Calloway	5/6/2009	ARG	Argentina			
14	872-55-92	Patty Hunt	10/28/2013	ARG	Argentina	1		135 rows loaded.
15	872-44-62	Lady Headrick	10/12/1995	ZAF	South Africa			
16	872-46-52	Destiny Asher	12/23/2003	ARM	Armenia	1		
17	872-50-72	Long Bartlett	11/22/2007	ARM	Armenia	-		
18	872-44-72	Fanny Denning	1/15/1996	EST	Estonia			
19	872-56-12	Mark Coleman	6/3/2014	EST	Estonia			
20	872-46-22	Elizbeth Tejeda	3/28/2003	AUS	Australia			
-	030.46.00	0 10 0 000	E (2 (2002	AU 10	A. 4. 17		2	 4 [ m ]

21) **Change Data & Refresh**. To see that the Merge of the two tables between two different files is dynamic, open the Excel File named "006-MSPTDA-dSalesRepTable.xlsx" and add a new record, as seen below:

SalesRepID	SalesRepName	HireDate	TerritoryID
872-57-52	Sioux Radcoolinator	7/12/2018	USA

22) Now when you go back to the Query and refresh, you will see that this new record is added to the Merged Table Power Query Output, as seen here:

1	A	В	С	D	
1	SalesRepID	🖬 SalesRepName	HireDate	Territory	
136	872-57-52	Sioux Radcoolinator	7/12/2018	3 United States	

## 2. Example 2: Transform 3 Non-Uniform Sales Tables Then Append into Single Proper Data Set:

1) Goal is to take three Sales Tables that do not have the same number of columns or types of columns, and append them into a single Proper Data Set with the correct sales from all three tables using a number of Power Query features including the Append feature, as seen in this picture:

A	2.1	P	-						
12572017 East Catch	East	1 St.	0.94	38					
1/1/2017 Dame#	South	. 72	0.91	22			_		-
1/3/2017 Gued	West	132	0.96	43		2.2	A mar	2000	7
1/1/2017 Quel	West	72	8.9	43			4 D I	ena	
1/3/2017 Fast Catch	West	180	0.97	34			141		
A. A		c	D		<u>m</u> .	Date -	A <sup>B</sup> <sub>C</sub> Product	• A <sup>ll</sup> Region •	12 Revenue
1 Date	ntint	-Region	Revenue		1	1/1/2019	Caucta	Sonu	1494
2 1/1/2018 De	mell	South	\$1,965.60		- 2	1/1/2019	Dameil	East	2411.2
3 1/1/2018 Fai	st Catch	West	\$6,960.00	-	3	1/1/2019	Qualit	West	5335.44
4 1/1/2018 Qu	ad	East	55,221.92		4	1/1/2019	Aspen	South	1943.04
5 1/1/2018 Da	mell	West	\$2,052.00	_	5	1/1/2019	THEFTY	Weit	442.6
6 1/1/2018 Au	pen	East	57,138.40		6	1/1/2019	Yanaki	East	820.8
					2	1/1/2019	Aupen	West	992.64
	Т					1/2/2018	Qualt	South	2259.26
14 8	0	0	E.		9	1/1/2019	Quet	East	4228
	a faith	a plater	P. Cr. And Con		10	1/1/2019	Damell	South	1474.2
2 (3 (blan) Carlots	2000		1 51,411,10		141	1/1/2019	Bellen	East	1745
1/1/2019 Carkita 1/1/2019 Darnell	East		1 31.911.9M						
1/1/2019 Carkita 1/1/2019 Darnell 1/1/2019 Quest	Cest West	3	0 \$5,325.44		117	1/1/2640	Ballan	South	1607

#### 2) What does Append feature do? :

- i. The Append feature will take tables with the same Field Names and Data Types and stack then on top of each other to create a single table.
- ii. In Order to have a single Proper Data Set result from the Append process you must:
  - 1. Have the same number of columns.
    - a. If you have an extra column in one of the tables, then the resulting table with have one extra column that contains data from the originating table and null values for the tables that did not contain the column.
  - 2. Each table must have consistent Field Names that are spelled the same in each table.
  - 3. The Data Types for each column that will be appended, for example the Revenue columns, must have the same Data Types.
    - a. If you do not have the same Data Types, the column may result in a column without a Data Type and for columns with numbers you may not be able to make calculations on those columns.

- 3) **Source Excel Table Data**. If we look at the three tables that we are trying to Append, we can see that each table has a different set of columns:
  - i. In the 2017 table, we can see the three columns: Units, NetCostEquivalent and Price. The other two tables do not have these columns. The other two tables have a column name Revenue. This means that in the transformation process we will have to take the columns Units,

NetCostEquivalent and Price and perform multiplication to create a new column called Revenue.

1	A	В	C	D	E.	F
1	Date 🖵	Product	👻 Region 💌	Units 💌 Ne	etCostEqivalent 🗖	Price 💌
2	1/1/2017	Fast Catch	East	120	0.91	L 58
3	1/1/2017	Darnell	South	72	0.91	l 15
4	1/1/2017	Quad	West	132	0.98	3 43
5	1/1/2017	Quad	West	72	0.9	9 43
6	1/1/2017	Fast Catch	West	180	0.97	7 58
7	1/1/2017	Quad	South	144	0.94	4 43
	<mark>.</mark>	8-UP Merge	Append	2019 2018	2017 UnPivot	•

ii. In the 2018 table, we can see the correct four columns.

1	A	В	C	D	E	F	G
1	Date 🖵	Product	- Region -	Revenue 💌			
2	1/1/2018	Darnell	South	\$1,965.60			
3	1/1/2018	Fast Catch	West	\$6,960.00			
4	1/1/2018	Quad	East	\$5,221.92			
5	1/1/2018	Darnell	West	\$2,052.00			
6	1/1/2018	Aspen	East	\$2,138.40			
7	1/1/2018	Yanaki	East	\$2,257.20			
4	· 3	-UP Merge	Append	2019 2018	2017	UnPivot	÷

iii. In the 2019 table, we can see the correct four columns and one extra column named Color. This means that in the transformation process, we will have to delete the Colors Column.

1	A	В	С	D	E	F	G
1	Date 🖵	Product 🛛 💌	Region 💌	Color 💌	Revenue 🗖	8	
2	1/1/2019	Carlota	South	7	\$1,482.00	1	
3	1/1/2019	Darnell	East	1	\$1,411.20		
4	1/1/2019	Quad	West	10	\$5,335.44		
5	1/1/2019	Aspen	South	1	\$1,943.04		
6	1/1/2019	Tri Fly	West	10	\$441.60		
7	1/1/2019	Yanaki	East	9	\$820.80		
4	i 3	-UP Merge	Append	2019 2018	2017	UnPivot	<b>(</b>

4) Import the 2017 Excel Table. Using the "From Table/Range" button in the Get & Transform group in the Data Ribbon Tab, import the Excel Table named "Sales2017" from the Worksheet named 2017 into the Power Query Editor. Then change the Data Type for the Date Field to Date. The result should look like this:

1	8	Hame	Transf	arm	Add Column	View												
and bed Date		Retreith Preview	Prop	erties nced Edit age *	or Choose Columns *	Remove Columns *	Leep Rows Redu	Remase Rows *	24 51 Sort	Split Column*	Croup Ly 1	ta Type: Date - Use First Row as Heade Replace Values anoform	rs •	Combine	h Pari Po	Annage ameters *	Data source settings Data Source	New Source +
>	2	ici ie	fi.	- Yabla	e.TransformCo	lum(Types)	Source	.[["Date	r", type	date},	(*Product	t", type text}, ("0	gion	5.03	-	Ouen	y Settings	×
ç i	-	. III Os	ie.		A <sup>®</sup> C Product	• A <sup>#</sup> _ Re	ріон	- 123 (	wits	+ 12.8	letCostEnjly	slevit = 123 Frice	10					
5	1		2	2/2/2017	Paint Catch	East				120		0.93	. 20		•	+ PROPE	RTIES	
	2		3	1/2/2017	Damell	South				72		0.91	t	5		Name		
	3			1/1/2017	Qued	West				2.82		0.96	4	1	41	Saleci	017	
	14			1/1/2017	Quet	West				72		0.9	4	\$		Al Pro	perties	
	5			1/1/2017	Fast Catch	West				180		0.97	5	8 W		(Common	and the second	
	6		8	1/2/2017	Gued	touth				144		0.94	. 4	1		* APPLIE	05105	
	7		3	1/1/2017	Alpen	West				22		0.94	2	2		50	arce	
				1/2/2017	Fact Catch	Fouth				168		0.95	- 4	2		Xich	anged Type	

- 5) Add Custom Column for Multiplication. In order to add a new column and multiply the columns Units, NetCostEquivalent and Price, select the three columns, then:
  - i. Click on the Add Column Ribbon Tab.
  - ii. In the From Number group, click the dropdown arrow in the Standard button, then from the dropdown menu, click on Multiply, as seen here:

	H	ome Transfo	orm	Add Column		<u>'</u>				
olum Exam	n From ples *	Custom Invoke Column Fund Ge	fx Custom ction eneral	Conditiona	al Colu I <b>mn +</b> Colum	mn Format	Harge Columns	$\overline{\chi}_{\Sigma}^{\sigma}$ Statistics	Standard Add	Trigonometry • Rounding • Information •
>	$f_x$ $f_x$ = Table.TransformColumnTypes(Source,{{"Date", type date},								Multiply Subtract	2 egio
ries	-	Date		A <sup>B</sup> <sub>C</sub> Product	*	A <sup>B</sup> <sub>C</sub> Region	✓ 1 <sup>2</sup> <sub>3</sub> Units	- 1.2 Ne	Divide	Price
Que	1	1/1/201		Fast Catch		East	-	120	Divide (Integer)	
	2	1	1/1/2017	Darnell	South		72	Modulo	1	
	3	1	1/1/2017	Quad		West	4	132	Percentage	
	4	1	1/1/2017	Quad		West		72	Percent Of	
	5	1	1/1/2017	Fast Catch		West		180	0.97	
	6	1	1/1/2017	Quad		South		144	0.94	4
	7	1	1/1/2017	Aspen		West		72	0.94	3

6) In the below picture you can see that the step "Inserted Multiplication" was added to the Applied Steps list, a new Column was added and you can see the formula in the formula bar, as seen here:

N √ f <sub>2</sub> = Table.AdsColume(#*Changed Type*, "Multiplication", each List.Product(([units], [MetCostEdivalent], [Mrice])), type number) ∨							Query Settings >
Formula ca	an be seen in Fo	ormula Bar.	120 120 131	0.81 0.81 0.51	54 13 47	8222.0	PROPERTIES Name Sen:2017 Millionarian
5.	1/1/2017 Fast Catch 1/1/2017 Guid	West South	189 244	New Column		2786 4 20126 # 3820 48	+ APPLIED STEPS
7	1/1/2017 Alpen 1/1/2017 Paul Catch	West South	72	0.65	м	1488.96 8258.8	Changed Type
9	5/3/2017 Fast Catch 3/3/2017 Fast Catch	East West	258	0.9 0.9	18 29	5627.6 8342.2	No. Noning weathernon
11	1/1/2017 Canona 1/1/2017 Canona	East South	208 24	0.91 0.97	26 43	Inserted Multip	ication step
13	2/2/2027 Part Catch	2ast	80	() 54 () 42	58	mserteu Multip	ication step

7) In the Formula Bar, double click the word "Multiplication" and then replace it with the new Field Name "Revenue". The result is seen here:

f <sub>x</sub>	= Table.AddColum	ın <mark>(</mark> #"Changed Ty	pe",	"Revenue",	each List.Product({	[Unit	s], [NetCo	ostEqi	ivalent], [	Price]}
-	A <sup>B</sup> <sub>C</sub> Product	A <sup>B</sup> <sub>C</sub> Region	12	3 Units 💌	1.2 NetCostEqivalent		123 Price		1.2 Revenue	
/1/2017	Fast Catch	East	/	120		0.91		58	/	6333.6
1	L) Field Name "Reve	enue" is changed i	n the	e Formula Bar		2	New Field I	Name	appears here	2

8) Taking a closer look at the Table.AddColumn Function:

= Table.AddColumn(#"Changed Type", "Revenue", each List.Product({[Units], [NetCostEqivalent], [Price]}), type number)

- i. In the first argument we see #"Changed Type". This argument lists the previous step that the function is acting on.
- ii. In the second argument we see "Revenue". This is the name of the new column.
- iii. The third argument lists the formula that will be calculated for each row in the table.
- iv. The fourth argument defines the Data Type for the column and we can see that it defines it as "number", which is the Decimal Data Type.
- 9) Taking a closer look at the List.Product Function:

List.Product({[Units], [NetCostEqivalent], [Price]})

- i. List.Product function will take items from a list and multiply them to yield a product.
- ii. Inside the List.Product function was see the Curly Brackets being used to house a list of Field Names that will be multiplied.
- iii. For each one of the Field Names, the Lookup Operator (Square Brackets [ and ]) are being used so that for each row in the table, the formula can lookup the correct number for the Units, NetCostEquivalent and Price Columns.

10) Next we need to remove the Units, NetCostEquivalent and Price Columns. To do this, select the three columns and then right-click any one of the columns and from the menu click on Remove Columns, as seen here:

▼ 1 <sup>2</sup> 3 Units	1.2 NetCostEqivale	ent 🔽 1 <sup>2</sup> 3	Price	▼ 1.2 Revenue ▼
	120	0.91	EB	Сору
	72	0.91	LU.	Remove Columns
Ĩ.	132	0.98	~	

#### 11) Import the 2018 Excel Table.

- i. Using the "From Table/Range" button in the Get & Transform group in the Data Ribbon Tab, import the Excel Table named "Sales2018" from the Worksheet named 2018 into the Power Query Editor.
- ii. Then change the Data Type for the Date Field to Date.
- iii. Then Close and Load as a Connection Only.

#### 12) Import the 2019 Excel Table.

- i. Using the "From Table/Range" button in the Get & Transform group in the Data Ribbon Tab, import the Excel Table named "Sales2019" from the Worksheet named 2019 into the Power Query Editor.
- ii. Then change the Data Type for the Date Field to Date.
- iii. Then Remove the Color Column.
- iv. Then Close and Load as a Connection Only.
- 13) After you have imported and transformed the three tables, the Queries & Connections Task Pane should look like this:



#### 14) Append feature. To Append the three Sales tables,

- i. Click the Data Ribbon Tab.
- ii. In the Get & Transform group, click the dropdown arrow for Get Data.
- iii. Then point to Combine Queries.
- iv. Then click on Append, as seen here:

File	e Home Insert	Page	Layout For	mulas Dat	•
2 2 Data	From From From T Text/CSV Web Ran	able/ I ge S	Recent Exis	ting Refre	3 sh
	From <u>File</u>	×	a : 🗙 🗸	<i>f</i> ∗ Co	c lo
	From Database	×	С	D	Ĩ
	From <u>A</u> zure	Þ	Region - South	Color - 7	R
	From Online Services	×	East West	1 10	1
	From Other Sources		South	1	4
	Legacy Wizards	×	West East	10 9	
	(		West	11	
3	Combine Queries	۲	Merge	7	
	Launch Power Query Editor	tu.	Annen		1
£	Data <u>C</u> atalog Search	Į	тррен	4	

# 15) In the Append dialog box:

- i. Click dialog button for "Three or more tables".
- ii. On the left select the three Sales tables.
- iii. Click the Add button.
- iv. Click OK.

TerritoryLookupTable Sales2018 dSalesRep Sales2019 Sales2017 Sales2018 Add >> Sales2019		pales2017	
dSalesRep Sales2019 Sales2017 Sales2018 Add >> Sales2019	TerritoryLookupTable	Sales2018	
Sales2017 Sales2018 Add >> Sales2019	dSalesRep	Sales2019	
Add >> Sales2019	Sales2017 Sales2018		
	Sales2010 Sales2019	Add >>	
		$\frown$	
		(3)	

16) The final Appended Proper Data Set can be seen in the picture below. Be sure to name this query "ThreeYearsData. Notice the Function, Table.Combine which uses a List that contains the names of the three queries used to import and transform the tables.

	$\times$	√ f <sub>x</sub>	= Table.Comb	~	Query Settings >			
	1	Date •	A <sup>B</sup> Product Fast Catch	¥	A <sup>B</sup> <sub>C</sub> Region -	1.2 Revenue <b>•</b> 6333.6		PROPERTIES
Tab	ole.Co	ombine Fur	nction		South	982.8		Name ThreeYearsData
	4	1/1/2017	Quad		West	2786.4		All Properties
	5	1/1/2017	Fast Catch		West	10126.8		
	6         1/1/2017         Quad           7         1/1/2017         Aspen			South	Norse the surger (Three)		arcData"	
				West	Name the query 1	meere		
	8	1/1/2017	Fast Catch		South	9256.8		

17) Finally, Close and Load the Proper data Set to the Worksheet named Append.

#### 3. Example 3: UnPivot to Convert Cross Tabulated Data Tables into Proper Data Set:

1) Goal is to take a table of cross tabulated data and convert it to a Proper Data Set using the UnPivot Feature, as seen in this picture:

Example 3: U	nPivot to	Conv	ert Ci	ross	Tabulated	d Data	Tables inte	o Pro	oper Data S
								-	
Student/Quantitative Class	Burn 216 Bust	1515 - Bur	0210 - 01		1ath 142 20		Student	Class	Carade 🔤
Abdi Hyde	3.7	3	3.9	3.6	2.4		Gigi Espinal	BI 348	19
Tyrone Lord	3.6	3.4	4	3.6	3.4		Tawanda Redmon	BI 348	3.8
Tawanda Redmon	3.8	3.5	37	3.8	3.8		Abdi Hyde	BI 348	3.6
Farnestine Graff	3.0	4	17	2.0	3.1		Tyrone Lord	BI 348	3.6
Zana Dellatiet	21	11	23	0.5	3.2		Delma Fortner	BI 348	3.5
Elnis Enss	3.8	2.1	2.8	3	0.1		Kenton Reardon	BI 348	3.5
Marinda Hairston	2.9	03	33	3	27		Luciano Neville	BI 348	3.5
Then Advanta	1.0	10	0.6	22	17		Lizabeth Solis	BI 348	3.4
Cad Hea	2.6	2.4	2.1	2.2	2.5		Carl Hsu	BI 348	3.3
Dion Matter	37	3.4	3.6	2.2	4		Dion Mattes	Bi 348	3.2
Shonda Whitmore	27	20	2.2	25			Elois Foss	BI 348	3
Shonda Writtmure	2.7	2.9	3,6	2.0	7.4		Marinda Hairston	BI 348	3
Laveta runney	3.3	3.0	0.5	2.4	2.4		Famestine Graff	BI 348	29
Bema Harwood	2.0	3.3	3	2.4	2.5		Landta Turney	10 2.49	20
Adria Wall	8.5		3	0.9	2.9		Laveta Harriey	01 340	2.5

#### 2) Idea Behind UnPivot.

- i. In the below Cross Tabulated Data Table, the first column contains a unique list of student names.
- ii. Columns 2 to 8 contain the grades for each student for a particular class.
- iii. For columns 2 to 8, the Column Headers are the names for each class.
- iv. The problem with the below data set is that it is not a Proper Data Set, and so we cannot easily perform tasks like sorting.
- v. Our goal is to transform the below table into a three-column table with the Field Names: Student, Class and Grade.
- vi. To UnPivot this non-Proper Data Set, we must tell Power Query:
  - 1. To use the first column for a new column named Students.
  - 2. Take the Column Names for columns 2 to 8 and use those values for a second column named Classes.
  - 3. Take all the values for grades and use those values for a third column named Grades.

Grades:							
Student/Quantitative Class	5usn 216 •	Buan135	Busn218	81 348 🕞	Math 148	Math 115	Bure 210 🖻
Abdi Hyde	3.7	. 1	3.9	16	2.4		2.6
Tyrone Lord	3.6	3.4	-4	3.6	3.4	-4)	3.1
Tawanda Redmon	.3.8	3.5	3.7	3.8	3.8	3.6	3.6
Earnestine Graff	3,9	4	1.7	2.9	3.1	2.6	3
Zena Pelletier	2.1	11	2.3	0.5	3.2	1.9	0.8
Elois Foss	3.8	3.1	2.8	3	0.1	2.6	1.6
Marinda Hairston	2.9	0.3	3.3	3	2.7	2.8	3.1
Thea Marvin	1.8	1.9	0.6	2.7	1.7	3.4	3.1
Carl Hsu	3.5	3.4	3.1	3.3	2.6	2.4	2.8
Dion Mattos	3.7	3	2	3.2	4	2.9	2.5
Shonda Whitmore	2.7	2.9	3.2	2.5	4	0.7	2.7
Laveta Turney	3.3	3.6	0.5	2.9	2.4	2	3.1
Beula Harwood	2.6	3.3	- 3	2.4	1.5	2.2	3.5
Adria Wall	2.8	4	3	0.9	2.9	3	3.4
Nadene Lantz	.2	23	0.5	2.4	3	3.7	2.2
Delma Forther	3.4	3.5	2.6	3.5	3.1	3.2	0.1
Shalanda Mcadams	31	3	2.7	0.6	2.5	0.5	2.8
Harriette Cloutier	2.2	4	з	2.4	2.5	2.2	2.1
Hang Lancaster	2.6	2.5	3.6	0.9	3	3	1.1
Kenton Reardon	3.7	3	2.6	3.5	3.3	3	2.8
Uzabeth Solis	2.6	2.8	0	3.4	2.4	15	3.8
Luciano Neville	3.7	1.1	3.6	3.5	0.1	2.7	2.8
Gigi Espinal	1.3	2.7	1.8	3.9	3.9	2.9	2
Alethea Rodrigues	2.6	3.2	2.8	2.7	0.7	1.2	0
Veta Mejia	2.3	3.2	3.5	2.6	3.7	3.4	2.6

vii. To Further see how we need to "UnPivot" this table, look at the first grade of 3.7 in the table in the below picture:

Grades:			
Student/Quantitative Class 🕶	Busn 216 🔽	Busn135	Busn218
Abdi Hyde	3.7	3	3.9
Tyrone Lord	3.6	3.4	4

viii. Then imagine it as a record in a three-column table, as seen here:

Student	Class	Grade
Abdi Hyde	Busn 216	3.7

ix. Now look at the second grade of 3 in the table in the below picture:

Grades:			-
Student/Quantitative Class	Busn 216 🔽	Busn135 👻	Busn218
Abdi Hyde	3.7	3	3.9
Tyrone Lord	3.6	3.4	4

x. Then imagine it as a record in a three-column table, as seen here:

Student	Class	Grade
Abdi Hyde	Busn 216	3.7
Abdi Hyde	Busn135	3

xi. The Process of Unpivoting a table in Power Query will be simple because all we will have to do is select the first column and then click the "UnPivot Other Columns" button.

# **Steps to UnPivot Table**

- 1) **Import the Cross Tabulated Data Table**. Using the "From Table/Range" button in the Get & Transform group in the Data Ribbon Tab, import the Excel Table named "GradeTable" from the Worksheet named UnPivot into the Power Query Editor.
- 2) Name the query "FinalProperDataSetGradeTable".
- 3) Delete the automatically created "Changed Type" step from Applied Steps list.
- 4) **Unpivot Other Columns**. Select the first column, and right-click, then from the menu, click on "Unpivot Other Columns", as seen here:



5) **Table.UnpivotOtherColumns function**. The Three-Column Table result can be seen in the below picture. Notice the "Unpivoted Other Columns" step in the Applied Steps list, and notice the Table.UnpivotOtherColumns function in the Formula Bar.



## 6) To Finalize the three-column grade table, Change the Field Names and Data Types, as seen in the picture below:

	A <sup>B</sup> <sub>C</sub> Student	Ŧ	A <sup>B</sup> <sub>C</sub> Class		1.2 Grade							
1	Abdi Hyde		Busn 216			3.7	<u>*</u>	PROPERTIES				
2	Abdi Hyde		Busn135			3	1.11	Name				
3	Abdi Hyde		Busn218			3.9	THE REAL PROPERTY IN	FinalProperDataSetGradeTable				
4	Abdi Hyde		BI 348			3.6		All Properties				
5	Abdi Hyde		Math 148			2.4						
6	Abdi Hyde		Math 111			3		A AFFLIED STEPS				
7	Abdi Hyde		Busn 210			2.6		Source				
8	Tyrone Lord		Busn 216			3.6		Unpivoted Other Columns				
9	Tyrone Lord		Busn135			3.4		Renamed Columns				
10	Tyrone Lord	ord Busn218				4		X Changed Type				
11	Tyrone Lord		BI 348			3.6						

## 7) **Load to Worksheet**. Load the transformed grade table to cell K4 on the sheet named UnPivot, as seen below:

AL.	A	8	c	D	E	Ŧ	G	н	1	3	ж	1	M
1											4.41		
2		Grades:											
3		A AZ REPORT											
4		Student/Quantitative Class	Busii 216 -	Busn135 💌	8usn218 -	01 348 🗶	Math 148	Math 111	Bush 210 📼		Student	Class -	Grade 💌
5		Abdi Hyde	3.7	3	3.9	3.6	24	1 3	2.6		Gigi Espinal	BI 348	3.9
6		Tyrone Lord	3.6	3.4	4	3.6	3.4	1 A	3.1		Tawanda Redmon	BI 348	3.8
7		Tawanda Redmon	3.8	3.5	3.7	3.8	3.8	3.6	3.6		Abdi Hyde	BI 348	3.6
8		Earnestine Graff	3.9	-4	1.7	2.9	3.1	2.6	3		Tyrone Lord	81 348	3.6
9		Zena Pelletier	2.1	1.1	2.3	0.5	3.3	2. 1.9	0.8		Delma Fortner	BI 348	3.5
10		Elois Foss	3.8	3.1	2.8	3	0.1	1 2.6	1.6		Kenton Reardon	81 348	3.5
11		Marinda Hairston	2.9	0.3	3.3	3	2.7	7 2.8	3.1		Luciano Neville	BI 348	3.5
12		Thea Marvin	1.8	1.9	0.6	2.2	1.7	7 3.4	3.1		Lizabeth Solis	BI 348	3.4
13		Carl Hsu	3.5	3.4	3.1	3.3	2.6	5 2.4	2.8		Carl Hsu	BI 348	3.3
14		Dion Mattos	3.7	3	2	3.2	- 4	2.9	2.1		Dion Mattos	BI 348	3.2
15		Shonda Whitmore	2.7	2,9	3.2	2.5	4	0.7	2.7		Elois Foss	BI 348	3
16		Laveta Turney	3.3	3.6	0.5	2.9	2.4	1 2	3.1		Marinda Hairston	BI 348	3
17		Beula Harwood	2.6	3.3	3	24	2.5	5 2.2	3.5		Earnestine Graff	BI 348	2.9
18		Adria Wall	2.8	4	3	0.9	2.5	3 3	3.4		Laveta Turney	BI 348	2.9
19		Nadene Lantz	2	3.3	0.5	2.4	13	1. 3.7	2.2		Alethea Rodrigues	81 348	2.7
20		Delma Fortner	3.4	3.5	2.6	3.5	3.1	1 3.2	0.1		Veta Mejia	BI 348	2.6
21		Shalanda Mcadams	3.1	3	2.7	0.6	2.5	0.5	2.8		Shonda Whitmore	BI 348	2.5
22		Harriette Cloutier	2.2	4	3	2.4	2.5	5 2.2	2.1		Beula Harwood	81 348	2.4
23		Hang Lancaster	2.6	2.5	3.6	0.9	1.11	1/ 1	1.1		Nadene Lantz	BI 348	2.4
24		Kenton Reardon	3.7	3	2.6	3.5	3.3	) 1	2.8		Harriette Cloutier	81348	2.4
25		Lizabeth Solis	2.6	2.8	0	3.4	2.4	1.5	1.8		Thea Marvin	BI 348	2.2
26		Luciano Neville	3.7	1.1	3.6	3.5	0.3	L 2.7	2.8		Adria Wall	81.348	0.9
27		Gigi Espinal	1.3	2.7	1.8	3.9	3.5	2.5	2		Hang Lancaster	BI 348	0.9
28		Alethea Rodrigues	2.6	3.2	2.8	2.7	0.7	7 1.7	0		Shalanda Mcadams	81 348	0.6
29		Veta Mejia	2.3	3.2	3.5	2.6	3.7	7 3.4	2.6		Zena Pelletier	BI 348	0.5
30									1		Lizabeth Solis	Bush 210	3.8
31											Tawanda Redmon	Busn 210	3.6
32											Beula Harwood	Busn 210	3.5