

STUDENT MANUAL



Introduction to Microsoft Power BI

Microsoft Office 2016 Training Materials

Introduction to Microsoft Power BI

Introduction to Microsoft Power BI

Courseware Release Version 4.0

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ABOUT THIS COURSE

Course Prerequisites

This manual assumes the user has an intermediate knowledge of Microsoft Excel and Microsoft Access, as well as a basic knowledge of Windows and web browsers.

Course Overview

Welcome to Introduction to Microsoft Power BI! This powerful collection of software, apps, and services will help you analyze your organization's data and uncover insights and trends. This course will show you how to link and model data in Power BI and create visual reports that reveal data insights. Although the Power BI desktop client will be the primary focus, an introduction to the Power BI web app will also be provided.

Course Objectives

By the end of this course, users should be comfortable with:

- The purposes and basic functions of the core Power BI components
- Using the Power BI desktop client and web app
- Connecting to a data source using either the Power BI desktop client or the web app
- Modeling data
- Creating reports and visualizations

How To Use This Book

This course is divided into five lessons. Each lesson focuses on several key topics, each of which are broken down into easy-to-follow concepts. At the end of each topic, you will be given an activity to complete. At the end of each lesson, we will summarize what has been covered and provide a few review questions for you to answer. Supplemental learning for selected topics is provided in the form of Lesson Labs at the end of this book.

Before you begin, download the course's Exercise Files to a convenient location. They will be referenced throughout this course and are a key part of your learning experience.

The samples referenced throughout this course have been provided by obviEnce (<u>www.obvience.com</u>) through Microsoft. More information is available at <u>https://docs.microsoft.com/en-us/power-bi/sample-datasets</u>.

Please note that the Power BI desktop client is updated monthly and the web app is updated weekly. Therefore, the images you see in this course may differ from the current services. This manual uses the January 2018 version of the desktop client and web app.

Before beginning, users should install the Power BI desktop client and sign up for the service.

LESSON 1: GETTING STARTED

Lesson Objectives

In this lesson you will learn how to:

- Describe the components of Power BI
- Work with Power BI files
- Connect to data sources with the Power BI desktop client
- Create a report and visualizations
- Work with visualizations

TOPIC A: An Introduction to Power BI

To start this course, you will learn about the different elements of the Power BI service and its fundamental components. You will also take your first look at desktop client and web app interfaces.

Topic Objectives

In this topic, you will learn:

- What Power BI is
- About the Power BI building blocks
- About the desktop client interface
- When to expect Power BI updates

What is Power BI?

Power BI is a collection of software, apps, and services designed to aggregate data so users can easily report on and interpret it. It offers many easy-to-use visualization and reporting tools. It also supports a wide range of data sources, from Facebook analytics to Azure data warehouses and everything in between.

There are three key parts to Power BI, which are all supported by the Power BI service:



Power BI also offers many different connectors so that its data can be shared with, and embedded into, Microsoft apps such as SharePoint and Teams.

Typically, users will start by creating a **report** in Power BI from connected data sources. The user then publishes that report to the service and shares it, making it available to other users via the web interface and mobile apps. The web interface and mobile apps also support **dashboards**, which provide a customized summary of report visualizations, and **workspaces**, which allow users to create custom dashboard collections.

The Building Blocks of Power BI





It all starts with the **dataset**, which simply means the data you have connected to. This might be an Excel workbook, Facebook analytics, and/or an SQL database (just to name a few of the options). These datasets are then added to **reports** as **visualizations**, which present that data in a graphical way.

For example, sales by region might be presented as a map, with a bubble representing each amount:



The Power BI web and mobile apps go a step further with **dashboards**, which allow you to collect visualizations from different reports into a single location. (The desktop client does not offer this feature.) For example, you might have a different dashboard for each region in your company, or a separate dashboard for revenue and expenses.

Each dashboard is made up of tiles, which are simply visualizations linked back to the original report. These dashboards can be collected into workspaces.

The Power BI Desktop Interface

To use the Power BI desktop client, get the installation package from the Windows Store or the Power BI website (<u>https://powerbi.microsoft.com/en-us/desktop/</u>). Once you have installed it, double-click the icon to start it:



The app will then launch and display the Start screen:



Here, you can explore what's new, find help, watch videos, and create and open reports.

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When this window is closed, the main interface will be displayed:

Let's explore each part.

1: Title Bar

The name of the program and the currently open file are displayed here.

2: Quick Access Toolbar

As the name implies, the Quick Access toolbar gives you quick access to frequently used commands. Use the drop-down arrow to remove icons or change its position.

3 and 4: Ribbon Interface

Displays tab commands organized into groups. If you click the different tabs (4), you will see the commands (3) change. Some of the commands might be grayed out (unavailable) if they are only usable in certain situations.

Power BI also features **contextual tabs**, which appear when you are working with a specific object or group of information. These tabs are usually denoted by a different color:



5: Program and Account Management

Using the top set of icons in the top right-hand corner of the screen, you can change how the ribbon is displayed, minimize the window, maximize/restore the window, or close the current file. Below this, you will see your Microsoft account name (or a command to sign in), a chevron to minimize the ribbon, and a help icon.

6: Navigation Pane

From top to bottom, choose if you want to work with reports, data, or relationships.

7: Canvas

The data in the currently open file will be shown here. In Report view, this is where you will create and work with visualizations.

8: Task Panes

Additional commands appear in these vertical task panes. Here, you can see the two default task panes: Visualizations/Filters and Fields.

9: Page Navigator and Status Bar

Navigate through and manage pages in your report.

Important Information About Power BI Updates

The Power BI desktop client is updated monthly and the web app is updated weekly. Therefore, the images you see in this course may differ from the current services. However, the general instructions should stay the same. If you are using the desktop client, the Start screen will prompt you if updates are available. You can also access a link to see new features:



Activity 1-1: An Introduction to Power BI

In this activity, learners will install and launch the Power BI desktop client. They will also explore the Power BI web app.

- ← Microsoft Store □ × -... ρ Home Apps Games Movies & TV Search Power BI Desktop Microsoft Corporation • ★★★★★ Free Everyone Power BI Desktop E Description Available on Power BI Desktop puts visual analytics at your fingertips. With this powerful PC PC authoring tool, you can create interactive data visualizations and reports. Connect, mash up and model, and visualize your data. Place visuals exactly where you want them, analyze and explore your data, and share content with your team by publishing to the Power BI web service. Power BI Desktop is part of the Power BI product suite. Use Power BI Desktop to create and distribute BI content. To monitor key data and share dashboards and reports, use the Power BI web service. To view and interact with your data on...
- **1.** Download and install the Power BI desktop client from the Microsoft Store:

- (If you have already downloaded and installed the app, skip to the next step.)
- 2. Double-click the icon to launch it:



3. Click "Sign in:"

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Desktop		this month's update.	
8		POWER BI BLOG	
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Recent sources		apdates from the Power Bi team.	
	Sign in to collaborate and	FORUMS	
der open other reports	Sign in to conaborate and	Visit the Power BI Forum to ask questions or interact with other users in the Power BI community	
	share content		
	Power BI Pro enables you to collaborate across	TUTORIALS	
	departments and distribute content to your	Ready to learn more about Power BI?	
	trial.		
	Try free		
	Sian in		
Page 1 Page 1			

(If you are already signed in, close the Start screen and skip to Step 6.)



4. Enter your email address and click "Sign in:"

5. Enter your password and click "Sign in:"

Sign in to your account	×
Microsoft	
jsmith@acmewidgets.onmicrosoft.com	
Enter password	
•••••	
Sign in	
بری Forgot my password	
Sign in with another account	
©2018 Microsoft Terms of use Privacy & cookies ····	

6. The Power BI interface will now be displayed. Review the parts of the interface and move your mouse over some of the commands to see more information:



 Next, launch Microsoft Edge and navigate to <u>https://app.powerbi.com/</u>. Sign in when prompted to see the Power BI web app:



8. Take a moment to explore the app:



9. Close all open windows to complete this activity.

TOPIC B: Working with Power BI Desktop Files

Like many other Office programs, Power BI has its own file format (.pbix), as well as the ability to create, open, and save standalone files. It also syncs with the Power BI web app so that your data can be accessed from anywhere, including Power BI mobile apps.

Topic Objectives

In this section, you will learn how to:

- Create, save, and open Power BI files
- Publish files to the Power BI web app

Opening Files

To open a file, click File \rightarrow Open:

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(You can also click a shortcut in the "Recent items" list to open it directly.) Next, navigate to your file, select it, and click Open:

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		Open	Cancel	

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The file will now open in a new instance of Power BI, ready for use:

Saving Files

To save a file, click File \rightarrow Save or Save As:

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The Save As dialog will open. Here, you can choose a location and name for your file. Click Save when you are ready:

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Documents Comments	mer IT Spend Microsoft Power BI Deskto 567 KB	
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Save as type:	Power Bl file (*.pbix)	~
∧ Hide Folders		Save Cancel

The file will now be saved.

Creating a New File

To create a new Power BI file, click File \rightarrow New:

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	1991	12517	7								
	1996	13476	3								
	1994	11883	2								
	1996	13006	2								
	1995	13159	5						Ļ		
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A new Power BI instance will open:



You can now work with the file.

Publishing to the Power BI Web App

To publish your data to the Power BI web app, click File \rightarrow Publish \rightarrow Publish to Power BI, or click the Publish command on the Home tab:

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If prompted, save your changes:



And sign in if prompted:

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when you're	signed in.	,
		7
jsmith@acme	widgets.onmicrosoft.com	

Next, select a destination for the file. We will use the default "My workspace:"

Publish to Power BI		×
Select a destination		
My workspace		
	Select Cancel	

When the process is complete, you will see a notification:



You can open the data in the Power BI web app or click "Got it" to return to the Power BI desktop client. We will learn more about the Power BI web app in Lesson 5.

Activity 1-2: Working with Power BI Desktop Files

In this activity, you will open an existing Power BI file and use it to set up a new file.

1. Open Power BI:



2. Close the Start screen if it appears. Then, click File \rightarrow Open:

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Options and settings >							Values Drag data fields here		
Help →							FILTERS		
Get started							Page level filters Drag data fields here		
What's new							Drillthrough filters Drag drillthrough fields bere		
Sign out							Report level filters		
							Urag data tields nere		
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PAGE 1 OF 1									

3. Navigate to your Exercise Files folder. Select Activity 1-2 and click Open:

📶 Open				×
← → • ↑ 📙 « P	Power_BI > ExerciseFiles > Starting Files for Activities > Lesson 1	ٽ ~	Search Lesson 1	م
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 Email attachmer Music Pictures 	Activity 1-5 Microsoft Power BI Deskto 2.87 MB			
This PC				
 Documents Downloads 				
Music Pictures				
Videos	,			
File	name: Activity 1-2	~	Power Bl files (*.pbix)	✓ Cancel

4. Now, let's save a copy of this file so we can modify it. Click File \rightarrow Save As:

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	Save <u>As</u> Import Export Publish Options and settings Help Get started What's new		or focused on Microsoft Business Intelligence.	Search Search					
2	Sign out E <u>x</u> it		tices and thought leadership for jump-starting and Drag drilbrough fields here Drag data fields here						
	This file and associated data is property of obviEnce IIc and has been shared solely for the purpose of demonstrating Power BI functionality with industry sample data. Any uses of this workbook and/or data must include the above attribution. The workbook and any visualization pages must be accompanied by the following copyright notice: obviEnce ©.								
PAGE 1	< → Info	eam Scorecard Industry Margin Analysis	Executive Scorecard						

5. Navigate to your desktop. Then, enter "<Your Name> Sample File" as the file name. Click Save:

III Save As							×
\leftarrow \rightarrow \checkmark \uparrow \blacksquare \Rightarrow This PC \Rightarrow Des	sktop > 🗲			✓ Ö Sea	arch Desktop		P
Organize 🔻 New folder							?
🐔 OneDrive ^ Name	^	Date	Туре	Size	Tags		
Documents Work	ing Files	7/27/2017 8:59 AM	File folder				
🌏 Email attachmer							
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Pictures							
💻 This PC							
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Documents							
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Pictures							
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File name: John Smith Sampl	le File						~
Save as type: Power BI file (*.pbi	ix)						\sim
∧ Hide Folders					Save	Cancel	

6. Now we are ready to publish this file to the Power BI web app. Click Home \rightarrow Publish:


7. First, you will be asked to choose a destination for the file. The default location is fine, so click Select:

Publish to Power BI	×
Select a destination	
My workspace	
Select Ca	ancel

(If you are prompted to sign in, do so.)

8. When you receive a completion notification, click the top link to see it in the web app:



9. The Power BI web app will open and display the report. Click any of the tabs at the bottom to see a sample page:



10. Review the report page, and then close your Internet browser to complete this activity:



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TOPIC C: Connecting to Data Sources with Power BI Desktop

Your first step after creating a Power BI file will be to connect your data to it. We will cover the two most common scenarios (Excel workbooks and Access databases) and show you where to find additional options if you need them. We will also discuss creating a manual dataset and managing data sources.

Topic Objectives

In this section, you will learn:

- How to connect to an Excel workbook or Access database
- How to view all connection options
- How to create a manual dataset
- How to manage data sources

Connecting to an Excel Workbook

To connect to an Excel workbook, open the target Power BI file. (Here, we are starting from a new file.) Click Home \rightarrow Get Data arrow \rightarrow Excel:



The Open dialog will appear. Navigate to your file, select it, and click Open:

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← → ~ ↑ <mark> </mark> →	This PC \rightarrow OS (C:)	 Power BI Samples (Excel) 			∨ Č Sea	rch Power Bl Samples (Exc 🔎
Organize 🔻 New f	folder					s: • 🔟 ?
> 🖈 Quick access	Ŷ	Customer Profitability Sample Microsoft Excel Worksheet	x	Human Resources Sample Microsoft Excel Worksheet 10.0 MB	x	IT Spend Analysis Sample Microsoft Excel Worksheet 1.54 MB
 This PC 3D Objects 	x	Opportunity Tracking Sample Microsoft Excel Worksheet	x	Procurement Analysis Sample Microsoft Excel Worksheet	×	Raw IT Spend Data Microsoft Excel Worksheet 5.76 MB
> Desktop B Documents V Downloads	×	Retail Analysis Sample Microsoft Excel Worksheet 13.0 MB	x	Sales and Marketing Sample Microsoft Excel Worksheet 8.37 MB	x	Supplier Quality Analysis Sample Microsoft Excel Worksheet
> 🁌 Music > 📰 Pictures > 🎆 Videos						
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	~					
Fi	ile name: Retail Analy	sis Sample			✓ Exc	el Files (*.xl;*.xlsx;*.xlsm;*.xls ∨ Open v Cancel

Next, the Navigator will appear. On the left side, check the items you want to load into the current Power BI data model. (You can also click any item to preview it.) Click Load when you are ready:

	Q	IT Area			
Display Options 🔹	C.	IT Area	IT Sub Area	IT Sub Area ID	
🖌 📕 Raw IT Spend Data.xlsx [9]		BU Support	Distribution	3	
Business Area		BU Support	Development	7	
Cast Flament		BU Support	Core	8	
		BU Support	Emerging	9	
Country Region		BU Support	Planning	21	
🖌 🏢 Date		BU Support	Manufacturing	22	
🗹 🖽 Department		BU Support	Production	28	
✓ ⊞ Fact		BU Support	R&D	33	
∠ Info		Enablement	Business Intelligence	4	
		Enablement	Data Management	6	
V 🛄 II Area		Enablement	Enterprise Capabilities	10	
🖌 🛄 Scenario		Enablement	Portals	11	
		Enablement	EIM	16	
		Enablement	Innovation	18	
		Enablement	Document Management	20	
		Enablement	Mobility	23	
		Enablement	Six Sigma	36	
		Enablement	Solution Services	37	
		Infrastructure	Data Centers	5	
		Infrastructure	SSO	15	
		Infrastructure	Core Infrastructure	17	
		Infrastructure	Licensing	25	
		Infrastructure	Networking	27	~
		Infrastructure	Help Desk	35	

Your data will then be loaded. You can view it by clicking the Data icon in the navigation pane:



You can change the table currently being displayed by clicking any item in the Fields pane on the left side of the window.

Connecting to an Access Database

To connect to an Access database, click Home \rightarrow Get Data:

	ald 🕞 亏 🏞 = Untitled - Power BI Desktop												
	File Home V	iew Modeling	Help										
F	Paste X Cut Paste Format Painter	Getty Data + Sources +	Enter Edit Data Queries •	Refresh	New N Page • V	New Visual CR Shapes •	From From Store	Manage Relationships	📋 New Measure	Publish			
	Clipboard	Ext	ternal data			Insert	Custom visuals	Relationships	Calculations	Share			

You will now see a list of all connection options. Click "Access database" to select it and then click Connect:

Search	All	
ΔΙΙ	X Excel	~
File	Text/CSV	
Database	الله XML	
Azure	ISN JSON	
Online Services	Folder	
Other	SharePoint folder	
	SQL Server database	
	Access database	
	SQL Server Analysis Services database	
	Oracle database	
	iBM DB2 database	
	iBM Informix database (Beta)	
	iBM Netezza	
	MySQL database	
	PostgreSQL database	
	Sybase database	~

Just as before, the Open dialog will appear. Navigate to your file, select it, and click Open:

al Open				×
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Videos 3. 1. 0S (C:)				
~				
File name:	Northwind Data	~	Access Databases (*.mdb;*.md	€ ~

Next, the Navigator will appear. On the left side, check the items you want to load into the current Power BI data model. (You can also click any item to preview it.) Click Load when you are ready:

	P	Employees Exter	nded			Ľ
Display Options 🔻	C.	File As	Employee Name	ID	Company	La
Northwind Data.accdb [44]		Cencini, Andrew	Andrew Cencini	2	Northwind Traders	Ce
✓ 🦳 Customers Extended		Freehafer, Nancy	Nancy Freehafer	1	Northwind Traders	Fre
✓ □ Employees Extended		Giussani, Laura	Laura Giussani	8	Northwind Traders	Gi
	_	Hellung-Larsen, Anne	Anne Hellung-Larsen	9	Northwind Traders	He
		Kotas, Jan	Jan Kotas	3	Northwind Traders	Ko
L Inventory on Order		Neipper, Michael	Michael Neipper	6	Northwind Traders	Ne
✓ I Inventory Purchased		Thorpe Steven	Steven Thorne		Northwind Traders	Th
✓ l─ Inventory Sold		Zare, Robert	Robert Zare	7	Northwind Traders	Za
 Order Subtotals Order Summary Product Category Sales by Date Product Orders Product Purchases Product Sales by Category Product Sales Qty by Employee and D Product Sales Total by Date Products on Back Order Purchase Details Extended 	Ja					
🔽 🧮 Duushaas Duise Tatala	\sim					-

The data will now be loaded and will be accessible via Data view, just as when we imported an Excel workbook.

Viewing All Connection Options

Let's take a closer look at the Get Data dialog, which appears when you click Home \rightarrow Get Data:

Get Data		×
	All	
All	X Excel	~
File	Text/CSV	
Database	🖻 XML	
Azure	JSN JSON	
Online Services	Folder	
Other	SharePoint folder	
	SQL Server database	
	Access database	
	SQL Server Analysis Services database	
	Oracle database	
	IBM DB2 database	
	IBM Informix database (Beta)	
	IBM Netezza	
	MySQL database	
	PostgreSQL database	
	Sybase database	~
	Connect Cano	cel

Simply choose a source from the list on the right and click Connect to see the related options for specifying details about the source. On the left side, you can use the categories or the search field to narrow down the list on the right.

Creating a Manual Dataset

If your data does not yet exist, you can create a manual dataset that will be stored within Power BI. To start, click Home \rightarrow Enter Data:



The Create Table window will appear:

Create Table		×
Column1 * 1		
Ivame: Lable I	Cancel	

To start, rename the table columns by double-clicking them. (You should also enter a table name in the field at the bottom of the dialog.) Then, enter your data into the table. (You can add more rows by pressing the down arrow key from the last row, and more columns with the right arrow key from the last column.) Once your data is entered, click Load to complete the process:

re	eate Tak	ole		
	Year	Amount	Business Area	*
1	1993	11911	7	
2	1990	14999	6	
3	1996	10109	3	
4	1991	14663	2	
5	1996	12453	4	
6	1995	9032	6	
7	1997	6497	4	
8	1996	11767	5	
9	1990	12958	7	
10	1990	6899	2	
11	1990	7505	7	
12	1992	6341	6	
13	1995	6486	6	
14	1993	12851	6	
15	1991	13027	1	
16	1994	6058	6	
17	1996	6149	7	
18	1996	15711	4	
19	1991	12199	4	
20	1994	7033	4	
21	1993	10560	5	
22	1990	7373	7	
23	1996	13417	5	
24	1004	12004		
lame	Archived E	Data		
	-			

The table will now be added:

al I g		IT Spend - Po	ower BI Desktop									- 0	×
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ш	\times \checkmark										\sim	FIELDS	
	Year Ai	mount l	Business Area										
Ħ	1993	11911	7								^		
_0	1990	14999	6										
- ⁻	1996	10109	3									Archived Data	
	1991	12453	4									∑ Amount	
	1995	9032	6									Business Area	
	1997	6497	4									∑ Year	
	1996	11767	5									Business Area	
	1990	12958	7									Cost Element	
	1990	6899	2									Country Region	
	1990	7505	7									▶ III Date	
	1992	6341	6									▶ III Department	
	1995	6486	6									b III East	
	1993	12851	6									> III lace	
	1991	13027	1										
	1994	6140	0									F III II Area	
	1996	15711	4									Scenario	
	1991	12199	4										
	1994	7033	4										
	1993	10560	5										
	1990	7373	7										
	1996	13417	5										
	1994	12994	4										
	1993	6632	5										
	1994	10623	6										
	1990	15208	2										
	1992	6983	7										
	1996	12517	0										
	1991	1251/	3										
	1994	11883	2										
	1990	15077	1										
	1996	13006	2										
	1995	13159	5								~		
TABLE: A	rchived Data (69)	rows)											

Managing Data Sources

To manage the data sources in a Power BI file, click Home \rightarrow Edit Queries drop-down arrow \rightarrow Data source settings:



Here, you can view and edit the data sources currently connected to this file:

Data source settings	×
Manage settings for data sources that you have connected to using Power BI Desktop.	
Data sources in current file O Global permissions	
Search data source settings	₽↓
C:\power bi samples (excel)\raw it spend data.xlsx	
Change Source Edit Permissions Clear Permissions *	
	Close

Activity 1-3: Connecting to Data Sources with Power BI Desktop

In this activity, you will connect two data sources to a new file.

- **1.** Open Power BI. A new file should be displayed.
- **2.** First, let's import our main sales workbook. Click Home \rightarrow Get Data arrow \rightarrow Excel:



3. Navigate to the Lesson 1 folder of your Exercise Files. Click to select the Sales Data file and click Open:



4. The Navigator will open. Check all four worksheets on the left side:

	Q	Timetable				[
Display Options 🔹	Lo 2	Reporting Period ID	Period	FiscalYear	FiscalMonth	Month
🖌 📕 Sales Data.xlsx [4]		20130101	1	2013	Jan	1/1/2013
Item Information		20130102	1	2013	Jan	1/2/2013
		20130103	1	2013	Jan	1/3/2013
Sales Information		20130104	1	2013	Jan	1/4/2013
✓ Ⅲ Store Information		20130105	1	2013	Jan	1/5/2013
🗹 💷 Timetable		20130105	1	2013	Jan	1/6/2013
63		20130107	1	2013	Jan	1/7/2013
		20130108	1	2013	Jan	1/8/2013
		20130109	1	2013	Jan	1/9/2013
		20130110	1	2013	Jan	1/10/2013
		20130111	1	2013	Jan	1/11/2013
		20130112	1	2013	Jan	1/12/2013
		20130113	1	2013	Jan	1/13/2013
		20130114	1	2013	Jan	1/14/2013
		20130115	1	2013	Jan	1/15/2013
		20130116	1	2013	Jan	1/16/2013
		20130117	1	2013	Jan	1/17/2013
		20130118	1	2013	Jan	1/18/2013
		20130119	1	2013	Jan	1/19/2013
		20130120	1	2013	Jan	1/20/2013
		20130121	1	2013	Jan	1/21/2013
		20130122	1	2013	Jan	1/22/2013
		20130123	1	2013	Jan	1/23/2013
		<				>

5. Click Load:

	Timetable				
Display Options 👻	Reporting Period	D Period	FiscalYear	FiscalMonth	Month
A is Sales Data.xlsx [4]	2	0130101	1 2013	Jan	1/1/2013
V III Item Information	2	0130102	1 2013	Jan	1/2/2013
	2	0130103	2013	Jan	1/3/2013
Sales Information	2	0130104	1 2013	Jan	1/4/2013
Store Information	2	0130105	2013	Jan	1/5/2013
✓ 📖 Timetable	2	0130106	1 2013	Jan	1/6/2013
	2	0130107	2013	Jan	1/7/2013
	2	0130108	1 2013	Jan	1/8/2013
	2	0130109	2013	Jan	1/9/2013
	2	0130110	1 2013	Jan	1/10/2013
	2	0130111	2013	Jan	1/11/2013
	2	0130112	1 2013	Jan	1/12/2013
	2	0130113	2013	Jan	1/13/2013
	2	0130114	1 2013	Jan	1/14/2013
	2	0130115	1 2013	Jan	1/15/2013
	2	0130116	1 2013	Jan	1/16/2013
	2	0130117	1 2013	Jan	1/17/2013
	2	0130118	2013	Jan	1/18/2013
	2	0130119	1 2013	Jan	1/19/2013
	2	0130120	2013	Jan	1/20/2013
	2	0130121	1 2013	Jan	1/21/2013
	2	0130122	2013	Jan	1/22/2013
	2	0130123	1 2013	Jan	1/23/2013
	<				>

6. The data will be loaded (this may take a moment). When it is complete, you will see a summary of the operation:

📕 🖶 🥱 🏕 = Untitled - Power Bl Desktop		- 🗆 ×
File Home View Modeling Help		John Smith 🗠 🔮
A Cut Paste Copy Paste Format Painter Clobard	Cutton time Cutton time Cutton Cutton	
	воста солин пови повилири солинения элек	VISUALIZATIONS > FIELDS >
		Image: Constrained on the second
	Load	Values Drag data fields here
	A 1 of the loaded queries contained errors. View errors	FILTERS Page level filters
	✓ Item Information ▶ 122,517 rows loaded. 4 errors.	Drag data fields here
	✓ Sales Information 3,169 rows loaded.	Drag drillthrough fields here
	✓ Store Information 104 rows loaded.	Report level filters Drag data fields here
	✓ Timetable 734 rows loaded.	
	Close	
	·	
↔ Page 1 +		
PAGE 1 OF 1		

In this case, we had a few errors, which is not uncommon when importing data from other applications. We will learn how to manage these errors in the next lesson. For now, close the dialog box.

7. Next, we need to import the district information, which is in an Access database. Click Home \rightarrow Get Data:

File Home V	iew Modeling Help		
Paste Sorrat Painter	Get Recent Enter Data Sources Data	New New Page + Visual & Shapes +	Manage Relationships
Clipboard	External data	Insert Custom visual	Relationships Calculations Share

8. You will now see a list of all connection options. Click "Access database" to select it and then click Connect:



9. The Open dialog will appear, and Lesson 1 of your Exercise Files should be displayed. (If it is not, navigate to it now.) Click the District Directory file to select it and click Open:

📶 Open				×
← → · ↑ 📙 « ExerciseFi	iles > Starting Files for Activities > Lesson 1	v Ö	Search Lesson 1	Q,
Organize 👻 New folder				•
 OneDrive Documents Email attachmer Music Pictures This PC 3D Objects Desktop Documents Downloads Music Pictures Videos OS (Ci) 	District Directory Microsoft Access Database 480 KB			
File name:	District Directory	~	Access Databases (*.mdb;*.i	md∉ ∽ cel

10. Check the single table in this database (District List) and click Load:

	PD	istrict List		E
Display Options 🔹	Da	District	DM	DM_Pic_fl
District Directory.accdb [1]		1 FD - 01	Valery Ushakov	http://farm6.staticflickr.com/5502/11550929
V III District List		2 FD - 02	Tina Lassila	http://farm3.staticflickr.com/2811/11551022
- District List		3 FD - 03	Carlos Grilo	http://farm4.staticflickr.com/3682/11550895
		4 FD - 04	Andrew Ma	http://farm6.staticflickr.com/5537/11550895
		5 LI - 01	Allan Guinot	http://farm4.staticflickr.com/3672/11550895
		6 LI - 02	Chris McGurk	http://farm8.staticflickr.com/7428/11549627
		7 LI - 03	Chris Gray	http://farm4.staticflickr.com/3833/11549608
		8 LI - 04	Brad Sutton	http://farm6.staticflickr.com/5506/11549608
		9 LI - 05	Annelie Zubar	http://farm8.staticflickr.com/7358/11549627

11. The data will be loaded. We can see it in the Fields pane, but click the Data icon in the navigation pane to take a closer look:



12. Click each of the tables to see the data they contain:

a 1 (titled - Power BID	esktop							- 0	×
File	Home	Modeling h	lelp							John Smith	~ 0
Paste	Cut Copy Format Painter	Get Recen Data * Source	t Enter s* Data Etternal data	New Visual C Shapes -	From From Store File	Manage Relationships Relationships	New Measure	Publish			
1.00	XV								~		
uu I										FIELDS	
	itemID Segn	nent Category	Buyer Column5	Column6 Column7							
	542	\$101 090-Hom	a Darking Thor							C Search	
-12	541	8901 090-Hom	a Darking Thor							Item Information	1
	545	8901 090-Hom	e Perkins Thor								
	547	8901 090-Hom	e Perkins Thor							🕜 🎹 İtem İnformati	
	548	8901 090-Hom	e Perkins Thor							Buyer	
	1895	8301 090-Hom	e Perkins Thor							Category	
	1952	8301 090-Hom	e Perkins Thor							Column5	
	4691	8301 090-Hom	e Perkins, Thor							Column6	
	4695	8301 090-Hom	e Perkins Thor							Column7	
	4704	8301 090-Hom	e Perkins Thor							∑ ItemID	
	4706	8301 090-Hom	e Perkins, Thor							∑ Segment	
	4710	8301 090-Hom	e Perkins, Thor							4 III Saler Informati	ico
	4729	8301 090-Hom	e Perkins, Thor								
	4877	8301 090-Hom	e Perkins Thor							∑ ItemID	
	4886	8301 090-Hom	e Perkins, Thor							LocationID	
	4889	8301 090-Hom	e Perkins, Thor							> MonthiD	
	4893	8301 090-Hom	e Perkins, Thor							∑ KeportingPhodID	
	4898	8301 090-Hom	e Perkins Thor							∑ ScenanolD	
	4901	8301 090-Hom	e Perkins, Thor							Sum_GrossMargin	1A
	4906	8301 090-Hom	e Perkins, Thor							Sum Markdown S	pal
	4907	8301 090-Hom	e Perkins, Thor							Sum_Markdown_S	jal
	4909	8301 090-Hom	e Perkins Thor							Sum_Regular_Sale	5
	4914	8301 090-Hom	e Perkins, Thor							Sum_Regular_Sale	×
	4930	8301 090-Hom	e Perkins, Thor							Store Informat	ion
	4959	8301 090-Hom	e Perkins, Inor							Timetable	
	4960	8302 090-Hom	e Perking Inor								
	4902	8201 090-Hom	e Perking Inde								
	4202	8001 090-Hom	a Darking Thor								
	4954	8101 090-Hom	a Darking Thor								
	4955	8901 090-Hom	e Perkins Thor								
	4973	8901 090-Hom	e Perkins Thor								
	4975	8301 090-Hom	e Perkins Thor								
	4977	8301 090-Hom	e Perkins Thor								
	4980	8301 090-Hom	e Perkins Thor								
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	4997	8301 090-Hom	e Perkins Thor								
	4938	8301 090-Hom	e Perkins Thor								
	and a factor of the second second second second second second second second second second second second second	1717							×		

13. Save your file as Activity 1-3 Complete and close Power BI.

TOPIC D: Creating a Report with Visualizations

Now that we understand how to use Power BI and connect data to it, it is time for the fun part: creating a report with visualizations. Visualizations are simply graphics that represent data from one or more sources connected to a Power BI file.

Topic Objectives

In this topic, you will learn how to:

- Use the Visualizations and Fields task panes
- Create, move, and resize visualizations
- Interact with visualizations
- Change the visualization type

Using the Visualizations Pane

First, let's look at the task panes you will use when creating a visualization. The first task pane is Visualizations:



The **top** of the task pane **(1)** shows both the name and an arrow to collapse or expand it. Next, there is a **gallery (2)** of available visualizations. (Click the ellipses to see options to manage visualizations.)

The **tabs** (3) in the middle of the pane control what tools appear in the bottom part. Here, you can see the Fields and Format icons, respectively. Depending on the visualization you are working with, you may also see an Analytics icon.

In the bottom of the pane, you will see commands related to the selected tab. Here, we have focused on the Fields and Filter commands, since we will explore the Format tab in the

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next topic. These commands allow you to specify data to be displayed in the visualization(4) and filtering options (5), and will differ depending on the visualization selected.

Using the Fields Pane

The second task pane is Fields:



Just like the Visualizations pane, at the **top (1)** you will see the task pane name and an arrow that allows you to collapse it. Below this is a **search field (2)**. Entering a term here will show matching terms in the bottom part of the pane (the field display list).

By default, the field display list will group items by table, query, or a custom hierarchy. You can use the arrows to expand (3) or collapse (4) these lists. When a group is expanded, you will see the individual data fields (5).

Creating a Visualization

To create a visualization, click the related icon in the Visualizations pane:



We want to see the number of stores in each territory, so we have chosen Map, which will show the value for each location as a bubble of relative size.

Once you click an icon, a placeholder will appear for that visualization. Now, we can add data to it by dragging and dropping items from the Fields pane. First, let's expand the Store category so we can see all the fields:



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Next, we will click and drag the Territory field to the Location well:

The map will populate with this data, showing where the territories are. Now, let's drag the Total Stores field to the Size well:



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We can now see the total stores by territory, with each data point (number of stores) represented as a bubble:



We can easily see that North Carolina has the largest number of stores, while Kentucky and Delaware have the fewest.

Interacting with Visualizations

You can hover over different parts of a visualization to see more information. For example, in the visual we created earlier, we can hover over any bubble to see the name of the territory and the total stores:



You can also add fields to the Tooltips well to display their data here. For example, here we have added the New Stores field, so we can see also how many of the total stores are new stores:



We can use the mouse or keyboard to move around the map. The plus and minus keys (or the scroll wheel on the mouse) allow you to scroll in or out to see a larger or smaller area:



If there is more than one visualization on a page, they will act as a filter on each other. For example, this report shows an overview of store sales. If we only want to see the values for Lindseys, we can click that item from the pie chart:



Now, the other visualizations will update and show only the data related to the Lindseys chain:



To return to the overall view, click the filtered item again.

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You can also use the Filters section of the Visualizations pane to customize the data:

Changing the Visualization Type

You can change the visualization type by clicking another icon in the Visualizations task pane:



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The change will be applied, and Power BI will keep the same data fields where possible:

If you do not like the new visualization, use the Undo command on the Quick Access toolbar, or click the previous visualization icon in the Visualizations task pane.

Moving and Resizing Visualizations

To move a visualization, click and drag it by its title bar to the desired location:



If you click the visualization's border to select it, you will see handles around its edges:





Click and drag these handles to change the visualization's size:

Activity 1-4: Creating a Report with Visualizations

In this activity, we will continue working with our retail report and add some visualizations. Note that we have included a more comprehensive data set than what was previously imported, for illustration purposes.

1. Open Power BI and open Activity 1-4:



2. Ensure Page 1 is displayed, providing a blank canvas:



(If it is not displayed, click its tab at the bottom of the screen.)

3. We want to create two visualizations that show a revenue breakdown by both division and state. A treemap might be a good way to show the breakdown by division, so click the Treemap icon in the Visualizations pane:



4. A treemap placeholder will be added. We want to see the total revenue value, so expand the Fact category and find the Total Revenue field:



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5. Drag it to the Values well in the Visualizations pane:

6. The visualization will start to populate:



7. Since we want to see a breakdown by division, let's search for that field:



8. Next, click and drag the bottom result to the Group well in the Visualizations pane:





9. The visualization will now show total revenue by division:

10. We also want to see total revenue by state. Ensure the visualization is selected (showing a border around it). Then, click Home \rightarrow Copy:

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12. A copy of the visual will appear on top of the original. Click its title bar and drag it to the right side of the canvas:



13. Now we can change the breakdown to state, instead of division. Click the X next to the Division field in the Visualizations pane to remove it:



14. Now, search for "state" in the Fields pane:

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15. Drag the State field from the State group to the Group well in the Visualizations pane:



16. The total revenue by state will now be shown:



17. A map visualization might be better for this data. Click the "Filled map" icon in the Visualizations pane:



18. The visualization will update:

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19. Click and drag the visualization's bottom left handle down and to the left to make it larger:



20. Save your work as Activity 1-4 Complete to finish this activity.

TOPIC E: Doing More with Visualizations

In the last topic, we explored how to create a report with a visualization. In this topic, we will take a closer look at some of the viewing and formatting options available when working with visualizations.

Topic Objectives

In this section, you will learn how to:

- Format visualizations
- View visualization data
- Use Focus Mode and Spotlight
- Remove a visualization

Formatting Visualizations

To format a visualization, click the Format tab in the Visualizations task pane:

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The options in the bottom part of the pane will change, and will be slightly different for each visualization:

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Note that if you open this pane without anything selected, you will see options to modify the page itself:

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In either situation, you can click a category to expand it, and then use the related controls to modify the selected visualization. For example, let's say we want to add a border to our map. We will start by clicking the Border category to expand it:



After toggling this feature to On, we can click the color picker and choose a color:



(Note the "Revert to default" link. This option is available in most formatting categories and is very useful for resetting a visualization to its default appearance.)

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Here is what our visualization looks like with the new border:

Viewing Visualization Data

Although we can see what fields are displayed in a visualization via the Fields section of the Visualizations pane, it does not show the specific data. To see the data, move your mouse over the visualization, click the ellipses in the top right corner (called the "More options" menu), and click Show Data:





You can now see a table of the related data at the bottom of the window:

When you are finished, click "Back to Report" to close this view.

Using Focus Mode and Spotlight

There are two additional tools that you can use to focus on a visualization. The first is Focus Mode, accessible by moving your mouse over the visualization and clicking the icon next to the "More options" menu:





This will show the visualization in a full-screen style:

Just as when viewing visualization data, you can click "Back to Report" to return to the regular canvas view.



Spotlight is accessed from the "More options" menu:

This dims the rest of the report, putting the focus on the selected visualization:



Click the Spotlight command again or press Esc on your keyboard to return to regular view.

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Removing a Visualization



To remove a visualization, click the ellipses and click Remove:

The visualization will be removed from the page. This does not affect the underlying data in any way.

Activity 1-5: Doing More with Visualizations

In this activity, you will continue working with your map visualization.

1. Open Power BI and open Activity 1-5:



2. First, let's view the data for the map to confirm it is correct. Move your mouse over the visualization and click the ellipses to open the "More options" menu:



3. Click Show Data:



4. Review the data at the bottom of the screen. Then, click "Back to Report:"



5. Now, let's change the map's colors. Click the Format tab in the Visualizations task pane:



6. Click the "Data colors" category to expand it:

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- 7. Click the Minimum color picker:

8. Choose a light shade of red:





9. The map will now show lower values in red, and higher values in green:

10. Now, let's place a focus on this visualization. Click the "More options" menu and click Spotlight:





11. The effect will be applied:

12. Save your work as Activity 1-5 Complete to finish this activity.

Summary

In this lesson, you learned the basics of working with Power BI. We learned how to use the interface, work with Power BI files, connect to data sources, create a report, and create visualizations.

Review Questions

- 1. What are the six building blocks of Power BI?
- 2. How do you connect to an Excel workbook from Power BI?
- 3. What are the two task panes used when creating a visualization?
- 4. How do you see the data related to a visualization?
- 5. True or False: Removing a visualization also removes the related data.

LESSON 2: WORKING WITH DATA

Lesson Objectives

In this lesson you will learn how to:

- Transform and sanitize data
- Use the Query Editor
- Model data
- Manage relationships

TOPIC A: Transforming and Sanitizing Data

In the last lesson, we learned how to import a data source and create visualizations from it. However, we also saw that sometimes data will not import correctly. You may also need to clean up (sanitize) data or modify it in order to be of the most value in Power BI.

Topic Objectives

In this section, you will learn how to:

- Use Data view
- Clean irregularly formatted data
- Manage columns
- Sort table data

Using Data View

To access Data view, click the second icon in the navigation pane:

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On the right side, you will see the Fields task pane (1), which we saw in the last lesson. The selected table will be displayed in the main window (2). At the top, the expression editor (3) is where you will enter functions, and the status bar (4) shows the current table name and the number of rows.

Cleaning Irregularly Formatted Data

To clean up table data, start by selecting the desired column:

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Next, use the appropriate tools on the Modeling tab:



Here, you can set the data type, format, category, and summarization.

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In this example, the Data Category is not set. Let's set it to Country/Region:

Now, Power BI knows how to best use this data – for example, we could now create a map visualization from it.

Here is another example. The Date column in this table also includes the time, which is unnecessary. We can change the data type to just date:

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(All of the data will be retained; it will simply not be displayed.)

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TABLE: Date (48 rows) COLUMN: Date (48 dis	tinct values)					

We can also simplify the date format:

This makes the date much easier to read:

Date	Year	Period	Month
1/1/2011	2011	1	Jan
2/1/2011	2011	2	Feb
3/1/2011	2011	3	Mar
4/1/2011	2011	4	Apr
5/1/2011	2011	5	May
6/1/2011	2011	6	Jun
7/1/2011	2011	7	Jul
8/1/2011	2011	8	Aug
9/1/2011	2011	9	Sep
10/1/2011	2011	10	Oct
11/1/2011	2011	11	Nov
12/1/2011	2011	12	Dec
1/1/2012	2012	1	Jan
2/1/2012	2012	2	Feb
3/1/2012	2012	3	Mar
4/1/2012	2012	4	Apr

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Managing Columns

You can also choose to show or hide fields or even entire tables from Report view. Simply right-click the item in the Fields pane and select "Hide in Report View:"



(You can also right-click columns in Data view to access this option.) Notice that you can also delete or rename columns and tables from this right-click menu. To display a hidden field, de-select the "Hide in Report View" option.

Sorting Table Data

When viewing table data, you can choose what column is sorted by using the "Sort by column" menu:

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Manage Relationships	New Net Measure Colu	v New mn Table	New Parameter What If	Sort by Column	Data type: Text * Format: Text * \$ ~ % \$	Home Table: - Data Category: Uncategorized - Default Summarization: Don't summarize - Properties	Manage View as Roles Roles	New Edit Group Groups			
	/ Menth		(Date)		Nontri (Deladit) matering	Hoperacs	Secondy	oroups			
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Date	Year	Period	I Monti	h Ye	ear						
1/1/20	011 2	011	1 Jan	✓ P	eriod				^		
2/1/20	011 2	011	2 Feb								
3/1/20	011 2	011	3 Mar						4 🔳 Busi	ness Area	
4/1/20	011 2	011	4 Apr						Busine	s Area	
5/1/20	011 2	011	5 May						Busine	s Area ID	
0/1/20	011 2	011	o Jun							Flement	
8/1/20	011 2	011	2 Aug								
9/1/20	011 2	011	9 Sen							ntry kegion	
10/1/20	011 2	011	10 Oct	_					Date	2	
11/1/20	011 2	011	11 Nov) 🛄 Dep	artment	
12/1/20	011 2	011	12 Dec						→ 🎞 Fact		
1/1/20	012 2	012	1 Jan						→ III IT A	rea	
2/1/20	012 2	012	2 Feb						→ 🎞 Ran	ge	
3/1/20	012 2	012	3 Mar						> 📰 Scer	nario	
4/1/20	012 2	012	4 Apr								
5/1/20	012 2	012	5 May								
6/1/20	012 2	012	6 Jun								
7/1/20	012 2	012	7 Jul								
8/1/20	012 2	012	8 Aug								
9/1/20	012 2	012	9 Sep								
10/1/20	012 2	012	10 Oct								
11/1/20	012 2	012	11 Nov								
12/1/20	012 2	012	12 Dec								
1/1/20	013 2	013	1 Jan								
2/1/20	013 2	013	2 Feb								
3/1/20	013 2	013	3 Mar								
4/1/20	013 2	013	4 Apr								
5/1/20	013 2	013	5 May								
6/1/20	013 2	013	6 Jun								
7/1/20	013 2	013	7 Jul								
8/1/20	013 2	013	8 Aug						~		
TABLE: Date (48 ro)	ws) COLUMN:	vonth (12 di	istinct values)								

You can also right-click any column header and choose an ascending or descending sort.

Activity 2-1: Transforming and Sanitizing Data

In this activity, you will begin working with a retail data set.

- 1. Open Power BI and open Activity 2-1:
 - Activity 2-1 Microsoft Power Bl Deskto... 200 KB
- 2. Click the Data view icon in the navigation pane:



3. First, let's hide tables that are for reference purposes only (meaning we will not use them to create reports or visualizations). Right-click the Order Details Status table and click "Hide in Report View:"

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File Horr	ne Mod	eling Help											Jol	nn Smith	~ 👩
Paste Forma	at Painter D	Set Recent Ent ata • Sources • Da	ter Edit Queries •	Refresh New Page - Visual	Text box	From From File	Manage Relationships	👔 New Measure	Publish						
Clipboard	1	Exten	nal data	Insi	ert	Custom visuals	Relationships	Calculations	Share			_	_		
													FIELDS		>
	Company	Last Name	First Name	Job Title	Business Phone	Home Phone	Fax Number	Address	City	State/Province	ZIP/Postal Code	Country/H	egion		_
#	1 Company A	Bedecs	Anna	Owner	(123)555-0100		(123)555-0101	123 1st Street	Seattle	WA	99999	USA			
	2 Company I	Gratacos Solsona	Antonio	Owner	(123)555-0100		(123)555-0101	123 2nd Street	Boston	MA	99999	USA			
	3 Company 0	Axen	Thomas	Purchasing Representative	(123)555-0100		(123)555-0101	123 3rd Street	Los Angelas	CA	99999	USA	Usto	mers	
	4 Company I	D Lee	Christina	Purchasing Manager	(123)555-0100		(123)555-0101	123 4th Street	New York	NY	99999	USA	→ III Empl	oyees	
	5 Company t	O'Donnell	Martin	Owner	(123)555-0100		(123)555-0101	123 Sth Street	Minneapolis	MN	99999	USA	> III Invoi	es	
	6 Company i	Perez-Olaeta	Francisco	Purchasing Manager	(123)555-0100		(123)555-0101	123 6th Street	Milwaukee	wi	99999	USA		• Details	
	7 Company 0	5 Xie	Ming-Yang	Owner	(123)555-0100		(123)555-0101	123 7th Street	Bolse	ID	99999	USA			
	8 Company I	Andersen	Elizabeth	Purchasing Representative	(123)555-0100		(123)555-0101	123 8th Street	Portland	OR	99999	USA	New measure	iis Sta	itus
	9 Company I	Mortensen	Sven	Purchasing Manager	(123)555-0100		(123)555-0101	123 9th Street	Salt Lake City	UT	99999	USA	New column		
	10 Company J	Wacker	Roland	Purchasing Manager	(123)555-0100		(123)555-0101	123 10th Street	Chicago	L.	99999	USA		us	
	11 Company I	Krschne	Peter	Purchasing Manager	(123)555-0100		(123)555-0101	123 11th Street	Miami	FL	99999	USA	Refresh data		
	12 Company I	Edwards	John	Purchasing Manager	(123)555-0100		(123)555-0101	123 12th Street	Las Vegas	NV	99999	USA	Edit Query		
	13 Company I	A LUCICK	Andre	Purchasing Representative	(123)555-0100		(123)555-0101	456 13th Street	Memphis	IN	99999	USA	Conv Table		
	14 Company i	4 Grilo	Carlos	Purchasing Representative	(123)555-0100		(123)555-0101	456 14th Street	Deriver		99999	USA			
	15 Company (у киркома	Helena	Purchasing Manager	(125)555-0100		(123)555-0101	456 15th Street	Honolulu	HI .	ааааа	USA	Rename		
	16 Company F	Goldschmidt	Daniel	Purchasing Representative	(123)555-0100		(123)555-0101	456 16th Street	San Francisco	CA	99999	USA	Delete		
	1/ Company C) Bagel	Jean Philippe	Owner	(123)555-0100		(123)555-0101	456 17th Street	Seattle	WA	99999	USA	Hide in Report View		
	18 Company I	Auther Miconi	Catherine	Purchasing Representative	(123)555-0100		(123)555-0101	456 18th Street	Boston	MA	99999	USA		-{hr	
	19 Companys	Eggerer	Alexander	Accounting Assistant	(123)555-0100		(123)555-0101	789 19th Street	Los Angelas	CA	99999	USA	Unhide all	Ŭ	
	20 Company		George	Purchasing Manager	(123)555-0100		(123)555-0101	789 20th Street	New York	NY	99999	USA			
	21 Company i	J Inam	Bernard	Accounting Manager	(123)555-0100		(123)555-0101	789 21th Street	Minneapolis	MN	99999	USA			
	22 Company	Ramos	Luciana	Purchasing Assistant	(125)555-0100		(123)555-0101	789 22th Street	Minwaukee	WI	ааааа	USA			
	25 Company i	v Enon	Michael	Purchasing Manager	(125)555-0100		(123)555-0101	789 25th Street	Portiand	UR	33333	USA			
	24 Company)	Hasselberg	Jonas	Owner	(123)555-0100		(123)555-0101	789 24th Street	Salt LakeCity	UI	99999	USA	-		
	25 Company	Rodman	John	Purchasing Manager	(123)555-0100		(123)555-0101	789 25th Street	Chicago	10	99999	USA			
	28 Company a		Run	Accounting Assistant	(125)555-0100		(125)555-0101	789 2801 50 660	Miami	PL .	99999	USA			
	2/ Company /	ia ion	Karen	Purchasing Manager	(123)555-0100		(123)555-0101	789 27th Street	Las vegas	NV	33333	USA			
	28 Companys	IB Kagnav	Amritansn	Purchasing Manager	(123)555-0100		(123)555-0101	789 28th Street	Memphis	IN	99999	USA			
	29 Company (L Lee	Soo Jung	Purchasing Manager	(125)555-0100		(123)555-0101	789 29th Street	Deriver	0	99999	USA	_		
K TABLE Customers (29 rows)												>		

4. Notice that the table name is now gray, meaning it is hidden from Report View. Repeat Step 4 for the Orders Status table:

	Painter Data	Recent Ent • Sources • Dat	er Edit ta Queries •	Refresh New New Page - Visual	Text box	From From File	Manage Relationships	🕼 New Measure	Publish				
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1.0	Company A	Berlers	Arroa	Owner	(123)555-0100	nome ritoire	(123)555-0101	123 1st Street	Seattle	State/Provance	00000	USA	
2	Company R	Gratacos Solsona	Antonio	Owner	(123)555-0100		(123)555-0101	123 2nd Street	Boston	MA	999999	LISA	> search
3	Company C	Axen	Thomas	Purchasing Representative	(123)555-0100		(123)555-0101	123 3rd Street	Los Aprelas	CA	99999	USA	
4	Company D	Lee	Christina	Purchasing Manager	(123)555-0100		(123)555-0101	123 4th Street	New York	NY	99999	USA	Customers
5	Company F	0/Donnell	Martin	Owner	(123)555-0100		(123)555-0101	123 5th Street	Minneapolis	MN	99999	LISA	Employees
6	Company F	Pérez-Olaeta	Francisco	Purchasing Manager	(123)555-0100		(123)555-0101	123 6th Street	Milwaukee	WI	99999	USA	Invoices
7	Company G	Xie	Ming-Yang	Owner	(123)555-0100		(123)555-0101	123 7th Street	Boise	ID	99999	USA	Order Details
8	Company H	Andersen	Elizabeth	Purchasing Representative	(123)555-0100		(123)555-0101	123 8th Street	Portland	OR	99999	USA	🔶 🔲 🛛 Order Details
9	Company I	Mortensen	Sven	Purchasing Manager	(123)555-0100		(123)555-0101	123 9th Street	Salt Lake City	UT	99999	USA	▶ Ⅲ Orders
10	Company J	Wacker	Roland	Purchasing Manager	(123)555-0100		(123)555-0101	123 10th Street	Chicago	L.	99999	USA) III Onlare Statue
11	Company K	Krschne	Peter	Purchasing Manager	(123)555-0100		(123)555-0101	123 11th Street	Miami	FL	99999	USA N	New measure
12	Company L	Edwards	John	Purchasing Manager	(123)555-0100		(123)555-0101	123 12th Street	Las Vegas	NV	99999	USA	
15	Company M	Ludick	Andre	Purchasing Representative	(123)555-0100		(123)555-0101	456 13th Street	Memphis	TN	99999	USA	lew column
14	Company N	Grilo	Carlos	Purchasing Representative	(123)555-0100		(123)555-0101	456 14th Street	Denver	00	99999	USA R	lefresh data
15	Company O	Kupkova	Helena	Purchasing Manager	(123)555-0100		(123)555-0101	456 15th Street	Honolulu	н	99999	USA E	dit Query
16	Company P	Goldschmidt	Daniel	Purchasing Representative	(123)555-0100		(123)555-0101	456 16th Street	San Francisco	CA	99999	USA	
17	Company Q	Bagel	Jean Philippe	Owner	(123)555-0100		(123)555-0101	456 17th Street	Seattle	WA	99999	USA	.opy lable
18	Company R	Autier Miconi	Catherine	Purchasing Representative	(123)555-0100		(123)555-0101	456 18th Street	Boston	MA	99999	USA R	lename
19	Company S	Eggerer	Alexander	Accounting Assistant	(123)555-0100		(123)555-0101	789 19th Street	Los Angelas	CA	99999	USA D	Delete
20	Company T	u	George	Purchasing Manager	(123)555-0100		(123)555-0101	789 20th Street	New York	NY	99999	USA	lists in Descent Minus
21	Company U	Tham	Bernard	Accounting Manager	(123)555-0100		(123)555-0101	789 21th Street	Minneapolis	MN	99999	USA	ide in Report view
22	Company V	Ramos	Luciana	Purchasing Assistant	(123)555-0100		(123)555-0101	789 22th Street	Milwaukee	WI	99999	USA U	Inhide all
23	Company W	Entin	Michael	Purchasing Manager	(123)555-0100		(123)555-0101	789 23th Street	Portland	OR	99999	USA	
24	Company X	Hasselberg	Jonas	Owner	(123)555-0100		(123)555-0101	789 24th Street	Salt Lake City	UT	99999	USA	
25	Company Y	Rodman	John	Purchasing Manager	(123)555-0100		(123)555-0101	789 25th Street	Chicago	IL .	99999	USA	
26	Company Z	Liu	Run	Accounting Assistant	(123)555-0100		(123)555-0101	789 26th Street	Miami	FL	99999	USA	
27	Company AA	Toh	Karen	Purchasing Manager	(123)555-0100		(123)555-0101	789 27th Street	Las Vegas	NV	99999	USA	
28	Company BB	Raghav	Amritansh	Purchasing Manager	(123)555-0100		(123)555-0101	789 28th Street	Memphis	TN	99999	USA	
29	Company CC	Lee	Soo Jung	Purchasing Manager	(123)555-0100		(123)555-0101	789 29th Street	Denver	co	99999	USA	

5. Next, let's review the data and see where we can sanitize it to make it easier to work with. We will start with the Customers table. Click the first entry in the Fields task pane to see this table (if it is not already displayed):

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												~	FIELDS	
	Compa	ny Last Name	First Name	e Job Title	Business Phone	Home Phone	Fax Number	Address	City	State/Province	ZIP/Postal Code	Country/Region		
	Compar	y A Bedecs	Anna	Owner	(123)555-0100		(123)555-010	1 123 1st Street	Seattle	WA	99999	USA	C Search	
-0	2 Compar	IV B Gratacos S	oisona Antonio	Owner Duskering Deserted	(123)555-0100		(123)555-010	123 2nd Street	Boston	MA	99999	USA		
	f Compa	ND Lee	Christian	Purchasing Representative	(123)555-0100		(123)555-010	123 Std Street	LUS Argends	NY	99999	LISA	Customers	
	5 Compa	v F O'Doppell	Martin	Owner	(123)555-0100		(123)555-010	123 Sth Street	Minneanolis	MN	99999	LISA	→ 🎟 Emp	
	5 Compar	v F Pérez-Olae	ta Francisco	Purchasing Manager	(123)555-0100		(123)555-010	123 6th Street	Milwaukee	WI	99999	USA	Invoices	
	7 Compar	v G Xie	Ming-Yang	Owner	(123)555-0100		(123)555-010	123 7th Street	Boise	ID	99999	USA	Order Details	
	6 Compar	y H Andersen	Elizabeth	Purchasing Representative	(123)555-0100		(123)555-0101	123 8th Street	Portland	OR	99999	USA	Order Details	
	9 Compar	y I Mortenser	n Sven	Purchasing Manager	(123)555-0100		(123)555-0101	123 9th Street	Salt Lake City	UT	99999	USA	Orders	
1	0 Compar	y J Wacker	Roland	Purchasing Manager	(123)555-0100		(123)555-0101	123 10th Street	Chicago	IL.	99999	USA	 Orders Status 	
1	1 Compar	y K Krschne	Peter	Purchasing Manager	(123)555-0100		(123)555-0101	123 11th Street	Miami	FL	99999	USA		
1.	2 Compar	y L Edwards	John	Purchasing Manager	(123)555-0100		(123)555-010	123 12th Street	Las Vegas	NV	99999	USA		
1	6 Compar	y M Ludick	Andre	Purchasing Representative	(123)555-0100		(123)555-0101	456 13th Street	Memphis	TN	99999	USA		
1	Compar	y N Grilo	Carlos	Purchasing Representative	(123)555-0100		(123)555-0101	456 14th Street	Denver	co	99999	USA		
1:	5 Compar	y O Kupkova	Helena	Purchasing Manager	(123)555-0100		(123)555-0101	456 15th Street	Honolulu	HI	99999	USA		
1	5 Compar	y P Goldschmi	dt Daniel	Purchasing Representative	(123)555-0100		(123)555-0101	456 16th Street	San Francisco	CA	99999	USA		
1	7 Compar	yQ Bagel	Jean Philip	pe Owner	(123)555-0100		(123)555-0101	456 17th Street	Seattle	WA	99999	USA		
1	8 Compar	y R Autier Mio	oni Catherine	Purchasing Representative	(123)555-0100		(123)555-0103	456 18th Street	Boston	MA	99999	USA		
1	9 Compar	y S Eggerer	Alexander	Accounting Assistant	(123)555-0100		(123)555-0103	1 789 19th Street	Los Angelas	CA	99999	USA		
21	0 Compar	NYT LI	George	Purchasing Manager	(123)555-0100		(123)555-0103	1 789 20th Street	New York	NY	99999	USA		
2.	2 Compar	vV Inam	bernard	Accounting Manager	(123)555-0100		(123)555-010	789 21th Street	Minneapoils	MIN	99999	USA		
2	2 Compa	wW/ Kantos	Atiskasi	Purchasing Assistant	(123)555-0100		(123)555-010	789 2201 50 660	Restland	00	00000	USA		
2	4 Compa	v X Hasselberg	loozs	Owner	(123)555-0100		(123)555-010	789 24th Street	Salt Lake City	UT	99999	1154		
2	5 Compar	vY Rodman	John	Purchasing Manager	(123)555-0100		(123)555-010	789 25th Street	Chicago	L.	99999	USA		
2	5 Compar	v Z Liu	Run	Accounting Assistant	(123)555-0100		(123)555-010	789 26th Street	Miami	FL	99999	USA		
2.	7 Compar	y AA Toh	Karen	Purchasing Manager	(123)555-0100		(123)555-010	789 27th Street	Las Vegas	NV	99999	USA		
2	6 Compar	y BB Raghav	Amritansh	Purchasing Manager	(123)555-0100		(123)555-010	789 28th Street	Memphis	TN	99999	USA		
2	9 Compar	y CC Lee	Soo Jung	Purchasing Manager	(123)555-0100		(123)555-010	789 29th Street	Derver	co	99999	USA		
< TABLE: Customers (25	9 rows)											>		

6. You can see that the Home Phone field is empty in all rows. Right-click it and click Delete:

26	Activity 2-	I - Power BI Desk	top											- 0	×
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Gut Copy Format	Painter Data	Recent En	ter Edit ta Queries •	Refresh New New Visual	Text box	From From Store File	Manage Relationships	iiii New Measure	Publish						
pboard		Exter	nal data	Ins	ert	Custom visuals	Relationships	Calculations	Share						
												~	FIFI	ns	
_	Company	Last Name	First Name	Job Title	Business Phone	Home Phone	Fax Number	Address	Gty	State/Province	ZIP/Postal Code	Country/Region			
1	Company A	Bedecs	Anna	Owner	(123)555-0100		(123)555-0101	123 1st Street	Seattle	WA	99999	USA	Q	Search	
2	Company B	Gratacos Solsona	a Antonio	Owner	(123)555-0100		(123)555-0101	123 2nd Street	Boston	MA	99999	USA	<u> </u>	Jearch	
3	Company C	Axen	Thomas	Purchasing Representative	(123)555-0100	Sort	Ascending	23 3rd Street	Los Angelas	CA	99999	USA		Curtamore	
4	Company D	Lee	Christina	Purchasing Manager	(123)555-0100	Sort	Descending	23 4th Street	New York	NY	99999	USA		Customers	
5	Company E	O'Donnell	Martin	Owner	(123)555-0100	Chu	- (23 5th Street	Minneapolis	MN	99999	USA	· •	Employees	
6	Company F	Pérez-Olaeta	Francisco	Purchasing Manager (123)555-0100		Clea	1 3010	23 6th Street	Milwaukee	WI	99999	USA	· •	Invoices	
7	Company G	Xie	Ming-Yang	Owner	(123)555-0100	Сору		23 7th Street	Boise	ID	99999	USA	→ Ⅲ	Order Details	
8	Company H	Andersen	Elizabeth	Purchasing Representative	(123)555-0100	Copy Table		23 8th Street	Portland	OR	99999	USA	→ Ⅲ		
s	Company I	Mortensen	Sven	Purchasing Manager	(123)555-0100	New Measure		23 9th Street	Salt Lake City	UT	99999	USA	→ Ⅲ	Orders	
10	Company J	Wacker	Roland	Purchasing Manager	(123)555-0100	THE W	measure	23 10th Street	Chicago	IL.	99999	USA	→ =		
11	Company K	Krschne	Peter	Purchasing Manager	(123)555-0100	New	Column	23 11th Street	Miami	FL	99999	USA	_		
12	Company L	Edwards	John	Purchasing Manager	(123)555-0100	Refr	esh Data	23 12th Street	Las Vegas	NV	99999	USA			
15	Company M	Ludick	Andre	Purchasing Representative	(123)555-0100	Edit	Query	56 13th Street	Memphis	TN	99999	USA			
14	Company N	Grilo	Carlos	Purchasing Representative	(123)555-0100	con	query	56 14th Street	Denver	co	99999	USA			
15	Company O	Kupkova	Helena	Purchasing Manager	(123)555-0100	Ren	ame	56 15th Street	Honolulu	HI	99999	USA			
16	Company P	Goldschmidt	Daniel	Purchasing Representative	(123)555-0100	Dele	te Im	56 16th Street	San Francisco	CA	99999	USA			
17	Company Q	Bagel	Jean Philippe	Owner	(123)555-0100	Hide	in Report View	56 17th Street	Seattle	WA	99999	USA			
18	Company R	Autier Miconi	Catherine	Purchasing Representative	(123)555-0100		The inneport view		Boston	MA	99999	USA			
19	Company S	Eggerer	Alexander	Accounting Assistant	(123)555-0100	Unh	ide All	39 19th Street	Los Angelas	CA	99999	USA			
20	Company T	Li	George	Purchasing Manager	(123)555-0100	New	Group	39 20th Street	New York	NY	99999	USA			
21	Company U	Tham	Bernard	Accounting Manager	(123)555-0100		(123)555-0101	789 21th Street	Minneapolis	MN	99999	USA			
22	Company V	Ramos	Luciana	Purchasing Assistant	(123)555-0100		(123)555-0101	789 22th Street	Milwaukee	WI	99999	USA			
23	Company W	Entin	Michael	Purchasing Manager	(123)555-0100		(123)555-0101	789 23th Street	Portland	OR	99999	USA			
24	Company X	Hasselberg	Jonas	Owner	(123)555-0100		(123)555-0101	789 24th Street	Salt Lake City	UT	99999	USA			
25	Company Y	Rodman	John	Purchasing Manager	(123)555-0100		(123)555-0101	789 25th Street	Chicago	IL.	99999	USA			
26	Company Z	Llu	Run	Accounting Assistant	(123)555-0100		(123)555-0101	789 26th Street	Miami	FL	99999	USA			
27	Company AA	Toh	Karen	Purchasing Manager	(123)555-0100		(123)555-0101	789 27th Street	Las Vegas	NV	99999	USA			
28	Company BB	Raghav	Amritansh	Purchasing Manager	(123)555-0100		(123)555-0101	789 28th Street	Memphis	TN	99999	USA			
20	Company CC	Lee	Soo Jung	Purchasing Manager	(123)555-0100		(123)555-0101	789 29th Street	Derver	со	99999	USA			

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7. When you are prompted to confirm the operation, click Delete:



8. Next, click the Modeling tab:



9. Click the Address column. Confirm that the Data Category menu entry matches the column name:

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E Company	A Dedecs	Anna	Owner	(123)555-0100	(125)555-0101	125 Ist Street	Destro	WA	99999	USA			Search	
	Gratacos solson	a Antonio	Owner Durchening Descentation	(123)555-0100	(125)555-0101	123 2nd Street	BUSIDII	MA CA	33333	USA				
Company	O Lee	Christian	Purchasing Nepresentative	(123)555-0100	(123)555-0101	123 Stu Street	Los Argelas	NV NV	33333	USA		→ Ⅲ	Customers	
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Company	E Dáxos Olasta	Francisco	Durchasing Manager	(123)555-0100	(123)555-0101	123 Sth Street	Millum kee	MIL	00000	USA		→ Ⅲ	Invoices	
Company	G Vie	MiceVaca	Ouroec	(123)555-0100	(123)555-0101	122 Oth Street	Rolen	ID	999999	USA		→ =	Order Details	
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Company	Warker	Poland	Purchasing Manager	(123)555-0100	(123)555-0101	123 10th Street	Chicago		00000	USA				
Company	K Krschoe	Peter	Purchasing Manager	(123)555-0100	(123)555-0101	123 11th Street	Miami	FI	99999	USA		· •		
Company	Edwards	lohn	Purchasing Manager	(123)555-0100	(123)555-0101	123 12th Street	LacVegas	NV	99999	LISA				
Company	M Ludick	Andre	Purchasing Representative	(123)555-0100	(123)555-0101	456 13th Street	Memohis	TN	99999	USA				
Company	N Grib	Carlos	Purchasing Representative	(123)555-0100	(123)555-0101	456 14th Street	Denver	00	99999	USA				
Company	O Kupkova	Helena	Purchasing Manager	(123)555-0100	(123)555-0101	456 15th Street	Honolulu	HI	99999	USA				
Company	P Goldschmidt	Daniel	Purchasing Representative	(123)555-0100	(123)555-0101	456 16th Street	San Francisco	CA	99999	LISA				
Company	O Barel	Jean Philippe	Owner	(123)555-0100	(123)555-0101	456 17th Street	Seattle	WA	99999	USA				
Company	R Autier Miconi	Catherine	Purchasing Representative	(123)555-0100	(123)555-0101	456 18th Street	Boston	MA	99999	USA				
Company	S Epperer	Alexander	Accounting Assistant	(123)555-0100	(123)555-0101	789 19th Street	Los Anzelas	CA	99999	USA				
Company	T Li	George	Purchasing Manager	(123)555-0100	(123)555-0101	789 20th Street	New York	NY	99999	USA				
Company	U Tham	Bernard	Accounting Manager	(123)555-0100	(123)555-0101	789 21th Street	Minneapolis	MN	99999	USA				
Company	V Ramos	Luciana	Purchasing Assistant	(123)555-0100	(123)555-0101	789 22th Street	Milwaukee	WI	99999	USA				
Company	W Entin	Michael	Purchasing Manager	(123)555-0100	(123)555-0101	789 23th Street	Portland	OR	99999	USA				
Company	X Hasselberg	Jonas	Owner	(123)555-0100	(123)555-0101	789 24th Street	Salt Lake City	UT	99999	USA				
Company	Y Rodman	John	Purchasing Manager	(123)555-0100	(123)555-0101	789 25th Street	Chicago	il.	99999	USA				
Company	Z Liu	Run	Accounting Assistant	(123)555-0100	(123)555-0101	789 26th Street	Miami	FL	99999	USA				
Company	AA Toh	Karen	Purchasing Manager	(123)555-0100	(123)555-0101	789 27th Street	Las Vegas	NV	99999	USA				
Company	BB Raghav	Amritansh	Purchasing Manager	(123)555-0100	(123)555-0101	789 28th Street	Memphis	TN	99999	USA				
Company	CC Lee	Soo Jung	Purchasing Manager	(123)555-0100	(123)555-0101	789 29th Street	Denver	co	99999	USA				
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10. Repeat for the remaining columns to the right. All columns should be correct except Web Page. Choose the correct categorization for this column:

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Company Company	Last Name Redect	First Name	Job Title	Business Phone	Cou	ntry/Region	City	State/Province	2iP/Postal Code	Country/Region	Web Page	Notes			
Company B	Gratacos Solsona	Antonio	Owner	(123)555-0100	Cou	nty	Boston	MA	99999	USA			2	Search	
Company C	Aven	Thomas	Purchasing Representative	(123)555-0100	Latit	ude	Los Angelas	CA	99999	USA					
Company D	Lee	Christina	Purchasing Manager	(123)555-0100	Lon	jitude	New York	NY	99999	USA				Customers	
Company E	O'Donnell	Martin	Owner	(123)555-0100	Plac		Minneapolis	MN	99999	USA				Employees	
Company F	Pérez-Olaeta	Francisco	Purchasing Manager	(123)555-0100	Post	al Code	Milwaukee	WI	99999	USA			> ⊞	Invoices	
Company G	Xie	Ming-Yang	Owner	(123)555-0100	Stat	e or Province	Boise	ID	99999	USA			→ Ⅲ	Order Details	
Company H	Andersen	Elizabeth	Purchasing Representative	(123)555-0100	Wet		Portland	OR	99999	USA			> Ⅲ		
Company I	Mortensen	Sven	Purchasing Manager	(123)555-0100	Ima	e URL	Salt Lake City	UT	99999	USA			> III	Orders	
Company J	Wacker	Roland	Purchasing Manager	(123)555-0100	Bar	ode	Chicago	IL.	99999	USA			> Ⅲ		
Company K	Krschne	Peter	Purchasing Manager	(123)555-0100	(123)555-0	101 125 11th Street	Miami	FL	99999	USA					
Company L	Edwards	John	Purchasing Manager	(123)555-0100	(123)555-0	101 123 12th Street	Las Vegas	NV	99999	USA					
Company M	Ludick	Andre	Purchasing Representative	(123)555-0100	(123)555-0	101 456 13th Street	Memphis	TN	99999	USA					
Company N	Grilo	Carlos	Purchasing Representative	(123)555-0100	(123)555-0	101 456 14th Street	Denver	00	99999	USA					
Company O	Kupkova	Helena	Purchasing Manager	(123)555-0100	(123)555-0	101 456 15th Street	Honolulu	HI	99999	USA					
Company P	Goldschmidt	Daniel	Purchasing Representative	(123)555-0100	(123)555-0	101 456 16th Street	San Francisco	CA	99999	USA					
Company Q	Bagel	Jean Philippe	Owner	(123)555-0100	(123)555-0	101 456 17th Street	Seattle	WA	99999	USA					
Company R	Autler Miconi	Catherine	Purchasing Representative	(123)555-0100	(123)555-0	101 456 18th Street	Boston	MA	99999	USA					
Company S	Eggerer	Alexander	Accounting Assistant	(123)555-0100	(123)555-0	101 789 19th Street	Los Angelas	CA	99999	USA					
Company I	LI There	George	Purchasing Manager	(123)555-0100	(123)555-0	101 789 20th Street	New TOPK	INT	33333	USA					
Company U	Inam Damos	Lucinen	Accounting Manager	(123)555-0100	(120)000-0	101 789 21th Street	Minneapoils	MIN	99999	USA					
Company V	Fotio	Michael	Purchasing Assistant	(122)555-0100	(123)555.0	101 789 22th Street	Porthod	08	00000	LIEA					
Company X	Hasselberg	lonas	Owner	(123)555-0100	(123)555-0	101 789 24th Street	Salt Lake City	UT	99999	1154					
Company Y	Rodman	John	Purchasing Manager	(123)555-0100	(123)555-0	101 789 25th Street	Chicago	L	99999	USA					
Company Z	Liu	Run	Accounting Assistant	(123)555-0100	(123)555-0	101 789 26th Street	Miami	FL	99999	USA					
Company AA	Toh	Karen	Purchasing Manager	(123)555-0100	(123)555-0	101 789 27th Street	Las Vegas	NV	99999	USA					
Company 88	Raghav	Amritansh	Purchasing Manager	(123)555-0100	(123)555-0	101 789 28th Street	Memphis	TN	99999	USA					
Company CC	Lee	Soo June	Purchasing Manager	(123)555-0100	(123)555-0	101 789 29th Street	Denver	00	99999	USA					

11. Finally, let's sort by customer last name instead of company name. Right-click this column and click Sort Ascending:

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File	Home	dodeling	Help													John Smith	~ 📀
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##	1 Company	A Bedecs	Sort Ascen	ding _Ռո		(123)555-0100	(123)555-0101	123 1st Street	Seattle	WA	99	999	USA		R		
_	2 Company	B Gratacos Sol	Is Sort Desce	nding 🔾		(123)555-0100	(123)555-0101	123 2nd Street	Boston	MA	99	999	USA				
88	3 Company	C Axen	Clear Sort		epresentative	(123)555-0100	(123)555-0101	123 3rd Street	Los Angelas	CA	99	999	USA		> III	Customers	
	4 Company	O Lee	Copy		lanager	(123)555-0100	(123)555-0101	123 4th Street	New York	NY	99	999	USA		> Ⅲ	Employees	
_	5 Company	E O'Donnell				(123)555-0100	(123)555-0101	123 5th Street	Minneapolis	MN	99	999	USA		> ≡	Invoices	
	6 Company	Perez-Olaeti	a Copy lable		lanager	(123)555-0100	(123)555-0101	123 6th Street	Milwaukee	WI	99	999	USA		→ 	Order Details	
	 Company Company 	G Ale	New Meas	ure	operatorius	(123)555-0100	(123)555-0101	123 /th Street	Dotte	00	99	900 999	USA				
	9 Company	Mortensen	New Colun	nn	lanager	(123)555-0100	(123)555-0101	123 9th Street	Salt Lake City	UT	93	999	1154			Ordere	
	10 Company	Wacker	Refresh Da	ta	lanager	(123)555-0100	(123)555-0101	123 10th Street	Chicago	L	99	999	USA			Outers	
	11 Company	K Krschne	543 O		lanager	(123)555-0100	(123)555-0101	123 11th Street	Miami	FL	99	999	USA		1 -		
	12 Company	L Edwards	Edit Query		lanager	(123)555-0100	(123)555-0101	123 12th Street	Las Vegas	NV	99	999	USA				
	13 Company	M Ludick	Rename		epresentative	(123)555-0100	(123)555-0101	456 13th Street	Memphis	TN	99	999	USA				
	14 Company	N Grilo	Delete		epresentative	(123)555-0100	(123)555-0101	456 14th Street	Denver	co	99	999	USA				
	15 Company	O Kupkova	Hide in Rep	ort View	lanager	(123)555-0100	(123)555-0101	456 15th Street	Honolulu	HI	99	999	USA				
	16 Company	P Goldschmid	t		epresentative	(123)555-0100	(123)555-0101	456 16th Street	San Francisco	CA	99	999	USA				
	17 Company	Q Bagel	Unnide All			(123)555-0100	(123)555-0101	456 17th Street	Seattle	WA	99	999	USA				
	18 Company	R Autler Mico	n New Group		epresentative	(123)555-0100	(123)555-0101	456 18th Street	Boston	MA	99	999	USA				
	19 Company	S Eggerer	Alexander	Accounting	Assistant	(123)555-0100	(123)555-0101	789 19th Street	Los Angelas	CA	99	999	USA				
	20 Company	ти	George	Purchasing	Manager	(123)555-0100	(123)555-0101	789 20th Street	New York	NY	99	999	USA				
	21 Company	U Tham	Bernard	Accounting	Manager	(123)555-0100	(123)555-0101	789 21th Street	Minneapolis	MN	99	999	USA				
	22 Company	V Ramos	Luciana	Purchasing	Assistant	(123)555-0100	(123)555-0101	789 22th Street	Milwaukee	WI	99	999	USA				
	25 Company 24 Company	W Entin	Michael	Owen	Manager	(123)555-0100	(123)555-0101	789 23th Street	Portiand Salt Lake City	UT	99	999 999	USA				
	25 Company	Y Podman	John	Purchasing	Manager	(123)555-0100	(123)555-0101	789 25th Street	Chicago		99	999 000	LISA				
	25 Company	7 Liu	Run	Accounting	Accietant	(123)555-0100	(123)555-0101	789 26th Street	Miami	FI	90	000	1154				
	27 Company	AA Toh	Karen	Purchasing	Manager	(123)555-0100	(123)555-0101	789 27th Street	Las Vegas	NV	99	999	USA				
	28 Company	88 Raghav	Amritansh	Purchasing	Manager	(123)555-0100	(123)555-0101	789 28th Street	Memphis	TN	99	999	USA				
	29 Company	CC Lee	Soo Jung	Purchasing	Manager	(123)555-0100	(123)555-0101	789 29th Street	Denver	co	99	999	USA				
K TABLE: Custom	ers (29 rows) Ci	OLUMN: Last <u>Nan</u>	ne (28 distinct <u>value</u>	5)													

12. The change will be implemented:

	Company	Last Name 👘 📫	First Name	Job Title	Business Phone	Fax Number	Address	City	State/Province	ZIP/Postal Code	Country/Region
8	Company H	Andersen	Elizabeth	Purchasing Representative	(123)555-0100	(123)555-0101	123 8th Street	Portland	OR	99999	USA
18	Company R	Autier Miconi	Catherine	Purchasing Representative	(123)555-0100	(123)555-0101	456 18th Street	Boston	MA	99999	USA
3	Company C	Axen	Thomas	Purchasing Representative	(123)555-0100	(123)555-0101	123 3rd Street	Los Angelas	CA	99999	USA
17	Company Q	Bagel	Jean Philippe	Owner	(123)555-0100	(123)555-0101	456 17th Street	Seattle	WA	99999	USA
1	Company A	Bedecs	Anna	Owner	(123)555-0100	(123)555-0101	123 1st Street	Seattle	WA	99999	USA
12	Company L	Edwards	John	Purchasing Manager	(123)555-0100	(123)555-0101	123 12th Street	Las Vegas	NV	99999	USA
19	Company S	Eggerer	Alexander	Accounting Assistant	(123)555-0100	(123)555-0101	789 19th Street	Los Angelas	CA	99999	USA
23	Company W	Entin	Michael	Purchasing Manager	(123)555-0100	(123)555-0101	789 23th Street	Portland	OR	99999	USA
16	Company P	Goldschmidt	Daniel	Purchasing Representative	(123)555-0100	(123)555-0101	456 16th Street	San Francisco	CA	99999	USA
2	Company B	Gratacos Solsona	Antonio	Owner	(123)555-0100	(123)555-0101	123 2nd Street	Boston	MA	99999	USA
14	Company N	Grilo	Carlos	Purchasing Representative	(123)555-0100	(123)555-0101	456 14th Street	Denver	CO	99999	USA
24	Company X	Hasselberg	Jonas	Owner	(123)555-0100	(123)555-0101	789 24th Street	Salt Lake City	UT	99999	USA
11	Company K	Krschne	Peter	Purchasing Manager	(123)555-0100	(123)555-0101	123 11th Street	Miami	FL	99999	USA
15	Company O	Kupkova	Helena	Purchasing Manager	(123)555-0100	(123)555-0101	456 15th Street	Honolulu	HI	99999	USA
4	Company D	Lee	Christina	Purchasing Manager	(123)555-0100	(123)555-0101	123 4th Street	New York	NY	99999	USA
29	Company CC	Lee	Soo Jung	Purchasing Manager	(123)555-0100	(123)555-0101	789 29th Street	Denver	со	99999	USA
20	Company T	Li	George	Purchasing Manager	(123)555-0100	(123)555-0101	789 20th Street	New York	NY	99999	USA
26	Company Z	Liu	Run	Accounting Assistant	(123)555-0100	(123)555-0101	789 26th Street	Miami	FL	99999	USA
15	Company M	Ludick	Andre	Purchasing Representative	(123)555-0100	(123)555-0101	456 13th Street	Memphis	TN	99999	USA
9	Company I	Mortensen	Sven	Purchasing Manager	(123)555-0100	(123)555-0101	123 9th Street	Salt Lake City	UT	99999	USA
5	Company E	O'Donnell	Martin	Owner	(123)555-0100	(123)555-0101	123 5th Street	Minneapolis	MN	99999	USA
6	Company F	Pérez-Olaeta	Francisco	Purchasing Manager	(123)555-0100	(123)555-0101	123 6th Street	Milwaukee	WI	99999	USA
28	Company BB	Raghav	Amritansh	Purchasing Manager	(123)555-0100	(123)555-0101	789 28th Street	Memphis	TN	99999	USA
22	Company V	Ramos	Luciana	Purchasing Assistant	(123)555-0100	(123)555-0101	789 22th Street	Milwaukee	WI	99999	USA
25	Company Y	Rodman	John	Purchasing Manager	(123)555-0100	(123)555-0101	789 25th Street	Chicago	IL.	99999	USA
21	Company U	Tham	Bernard	Accounting Manager	(123)555-0100	(123)555-0101	789 21th Street	Minneapolis	MN	99999	USA
27	Company AA	Toh	Karen	Purchasing Manager	(123)555-0100	(123)555-0101	789 27th Street	Las Vegas	NV	99999	USA
10	Company J	Wacker	Roland	Purchasing Manager	(123)555-0100	(123)555-0101	123 10th Street	Chicago	IL	99999	USA
7	Company G	Xie	Ming-Yang	Owner	(123)555-0100	(123)555-0101	123 7th Street	Boise	ID	99999	USA

13. Save your work as Activity 2-1 Complete and close Power BI.

TOPIC B: Using the Query Editor

If you have more advanced data transformation requirements, you can use Power BI's Query Editor. Here, you can transform data in bulk, perform merge and append operations, and much more.

Topic Objectives

In this section, you will learn how to:

- Open the Query Editor
- Use the Query Editor interface, including the Query Settings pane
- Use Merge and Append queries

Opening the Query Editor

To open the Query Editor, click Home \rightarrow Edit Queries:

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<u> </u>	Company	Last Name	First Name	E-mail Address	Job Title	Business Phon	e Home Pho	ne Mobile Phone	Fax Number	Address	City	State/Province		_
1	Company A	Bedecs	Anna		Owner	(123)555-0100			(123)555-0101	123 1st Street	Seattle	WA		
2	Company B	Gratacos Solsona	Antonio		Owner	(123)555-0100			(123)555-0101	123 2nd Street	Boston	MA		_
■ <u>₩</u> 3	Company C	Axen	Thomas		Purchasing Representative	(123)555-0100			(123)555-0101	123 3rd Street	Los Angelas	CA		
4	Company D	Lee	Christina		Purchasing Manager	(123)555-0100			(123)555-0101	123 4th Street	New York	NY	Address	
5	Company E	O'Donnell	Martin		Owner	(123)555-0100			(123)555-0101	123 5th Street	Minneapolis	MN	Rusians Dhana	
6	Company F	Pérez-Olaeta	Francisco		Purchasing Manager	(123)555-0100			(123)555-0101	123 6th Street	Milwaukee	WI	Dusiness Phone	
7	Company G	Xie	Ming-Yang		Owner	(123)555-0100			(123)555-0101	123 7th Street	Boise	ID	City	
8	Company H	Andersen	Elizabeth		Purchasing Representative	(123)555-0100			(123)555-0101	123 8th Street	Portland	OR	Company	
9	Company I	Mortensen	Sven		Purchasing Manager	(123)555-0100			(123)555-0101	123 9th Street	Salt Lake City	UT	Country/Region	
10	Company J	Wacker	Roland		Purchasing Manager	(123)555-0100			(123)555-0101	123 10th Street	Chicago	IL.	E-mail Address	
11	Company K	Krschne	Peter		Purchasing Manager	(123)555-0100			(123)555-0101	123 11th Street	Miami	FL	Fax Number	
12	Company L	Edwards	John		Purchasing Manager	(123)555-0100			(123)555-0101	123 12th Street	Las Vegas	NV	First Name	
13	Company M	Ludick	Andre		Purchasing Representative	(123)555-0100			(123)555-0101	456 13th Street	Memphis	TN	Home Phone	
14	Company N	Grilo	Carlos		Purchasing Representative	(123)555-0100			(123)555-0101	456 14th Street	Denver	со	ID	
15	Company O	Kupkova	Helena		Purchasing Manager	(123)555-0100			(123)555-0101	456 15th Street	Honolulu	н	Job Title	
16	Company P	Goldschmidt	Daniel		Purchasing Representative	(123)555-0100			(123)555-0101	456 16th Street	San Francisco	CA	Last Name	
17	Company Q	Bagel	Jean Philippe		Owner	(123)555-0100			(123)555-0101	456 17th Street	Seattle	WA	Mobile Phone	
18	Company R	Autier Miconi	Catherine		Purchasing Representative	(123)555-0100			(123)555-0101	456 18th Street	Boston	MA	Notes	
19	Company S	Eggerer	Alexander		Accounting Assistant	(123)555-0100			(123)555-0101	789 19th Street	Los Angelas	CA	State/Province	
20	Company T	Li	George		Purchasing Manager	(123)555-0100			(123)555-0101	789 20th Street	New York	NY	Web Page	
21	Company U	Tham	Bernard		Accounting Manager	(123)555-0100			(123)555-0101	789 21th Street	Minneapolis	MN	ZIP/Postal Code	
22	Company V	Ramos	Luciana		Purchasing Assistant	(123)555-0100			(123)555-0101	789 22th Street	Milwaukee	WI	Employeer	
25	Company W	Entin	Michael		Purchasing Manager	(123)555-0100			(123)555-0101	789 23th Street	Portland	OR	Linpioyees	
24	Company X	Hasselberg	Jonas		Owner	(123)555-0100			(123)555-0101	789 24th Street	Salt Lake City	UT	· · · · · · ·	
25	Company Y	Rodman	John		Purchasing Manager	(123)555-0100			(123)555-0101	789 25th Street	Chicago	IL.	Order Details	
26	Company Z	Liu	Run		Accounting Assistant	(123)555-0100			(123)555-0101	789 26th Street	Miami	FL	Order Details S	Status
27	Company AA	Toh	Karen		Purchasing Manager	(123)555-0100			(123)555-0101	789 27th Street	Las Vegas	NV	Orders	
28	Company BB	Raghav	Amritansh		Purchasing Manager	(123)555-0100			(123)555-0101	789 28th Street	Memphis	TN	Orders Status	
29	Company CC	Lee	Soo Jung		Purchasing Manager	(123)555-0100			(123)555-0101	789 29th Street	Denver	со		
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The Query Editor Interface

When the Query Editor opens, you will see the following interface:

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Image Columns +	File Home	Transform	n i	Add Column	View H	elp													^ 🕐
Oueries (7) Image columns Image columns Reduce kows Joint Image columns Combine Queries (7) Image columns Image col	Close & Apply •	Recent Sources +	Enter Data	Data source settings	Manage Parameters •	Refres	Properties	Choose R Columns + Co	Remove	Keep Remov Rows + Rows	e Z↓ Z↓	Split Column	Group By	Data Type: Wr Use First F 2 Replace Vi	iole Nu low as alues	mber • Headers •	Merge Queries	• •	2
Queries [7] K III. P(2) ID A ² C Company Company A ² C Email Address A ² C Do Title A ² C OUERY SETTINGS X III I Northwind Traders I Northwind Traders Freehafer Nancy nancy@northwindtraders.com Sales Representative [1] PROPERTIES IIII Customers 1 Northwind Traders Cencini Andrew andrew@northwindtraders.com Sales Representative [12] PROPERTIES IIII Customers 3 Northwind Traders Sales Sales Representative [12] Name IIII Invoices 4 Northwind Traders Sergienko Mariya mariya@northwindtraders.com Sales Representative [12] Employees 3ales	Close	New Query		Data Sources	Farameters		Quely	Manage Co		-	3010			mansronn			Combine		
1 1 Northwind Traders Freehafer Nancy nancy@northwindtraders.com Sales Representative (12 2 2 Northwind Traders Cencini Andrew andrew@northwindtraders.com Vice President, Sales (12 PROPERTIES 3 Northwind Traders Korthwind Traders Korta Jan jan@northwindtraders.com Sales Representative (12 Name Employees 3 Northwind Traders Segienko Mariya mariya@northwindtraders.com Sales Representative (12 Representative (12 PROPERTIES Name Employees 3 Northwind Traders Segienko Mariya <	Queries [7]	<	-	1 ² 3 ID 💌	A ^B C Company	-	A ^B C Last Name	A ^B C First Name	× /	A ^B C E-mail Addres	s	≚ A ^B C	Job Title	~	A ^B C	QUERY SE	TTINGS		
Image: Second	-		1	1	1 Northwind Tr	aders	Freehafer	Nancy		nancy@northwind	traders.co	om Sale	es Represe	ntative	(12				
Image: Customers 3 Northwind Traders Kotas Jan jan@northwindtraders.com Sales Representative (12 Name) Image: Invoices 4 Northwind Traders Sergienko Mariya mariya@northwindtraders.com Sales Representative (12 Employees Sales	Employees		2	1	2 Northwind Tr	aders	Cencini	Andrew	i	andrew@northwii	dtraders.	com Vic	e Presiden	t, Sales	(12	PROPERT	IES		
Invoices 4 Northwind Traders Sergienko Mariya mariya@northwindtraders.com Sales Representative (12 Employees 3	Customers				3 Northwind Tr	aders	Kotas	Jan	j	jan@northwindtra	ders.com	Sale	es Represe	ntative	(12	Name			
	Invoices				4 Northwind Tr	aders	Sergienko	Mariya	1	mariya@northwin	dtraders.c	om Sale	es Represe	ntative	(12	Employee	25	_3	
The Order of S S Northwind Traders Thorpe Steven steven@northwindtraders.com Sales Manager (12 All Properties			5	1	5 Northwind Tr	aders	Thorpe	Steven	1	steven@northwin	dtraders.c	om Sale	es Manage	r	(12	All Proper		U	
6 6 Northwind Traders Neipper Michael michael@northwindtraders.com Sales Representative (12			6		6 Northwind Tr	aders	Neipper	Michael		michael@northwi	ndtraders.	com Sale	es Represe	ntative	(12	<u></u>			
Orders Status 7 7 Northwind Traders Zare Robert robert@northwindtraders.com Sales Representative (12 APPLIED STEPS	Urders Statu	IS	7		7 Northwind Tr	aders	Zare	Robert		robert@northwin	itraders.c	om Sale	es Represe	ntative	(12 -	APPLIED	STEPS		
III Order Details 8 8 Northwind Traders Glussani Laura laura@northwindtraders.com Sales Coordinator (12 Source 4	Order Details		8	1	8 Northwind Tr	aders	Giussani	Laura	1	laura@northwind	raders.co	m Sale	es Coordin	ator	(12	Sourc	e		*
III Order Details Status 9 9 Northwind Traders Hellung-Larsen Anne anne@northwindtraders.com Sales Representative (12 🗙 Navigation 🚸	Order Details	s Status	9	1	9 Northwind Tr	aders	Hellung-Larsen	Anne	1	anne@northwind	raders.co	m Sale	es Represe	ntative	(12	× Navig	ation		#

On the left (1), you will see a list of queries, with the data displayed in the center pane. Its settings can then be modified using the commands on the ribbon (2). These settings are

listed in the Query Settings pane (3), which we will take a closer look at in a moment. Once you have finished making your changes, click Home \rightarrow Close & Apply (4). (You can also click the drop-down arrow to apply your changes and stay in the window or close the window without applying your changes.)

Using the Query Settings Pane

Let's take a closer look at the Query Settings pane:

QUERY SETTINGS	×
▲ PROPERTIES	
Name	
Employees	
All Properties	
▲ APPLIED STEPS	
APPLIED STEPS Source	*
APPLIED STEPS Source Navigation	*
 APPLIED STEPS Source Navigation Removed Columns 	* *
 APPLIED STEPS Source Navigation Removed Columns Split Column by Delimiter 	* *

The Properties section of the Query Settings pane shows the name of the current item and a link to view all its properties. Then, the Applied Steps section shows each action. You can click the cog icon on the right of an action to see the settings or move your mouse over the item to make the X available (which will undo this action). You can also right-click any action to see more options:



Using Merge Queries

Just as in Microsoft Access, merge queries will join two tables together. In this example, we want to merge the two Orders Status tables together:

Qu	eries [8] <	
	Employees	
	Customers	
	Invoices	
	Orders	
	Orders Status	
	Order Details	
	Order Details Status	
	Manual Orders	

To start, we will select the Orders Status table (which we want to keep) and click Home \rightarrow Merge Queries:

ad I 层	≂ Nor	thwind Dat	a - Quer	y Editor								- 0	3	×
File	Home	Transfo	rm	Add Column	View He	elp								^ 🕐
Close & Apply •	New Source •	Recent Sources •	Enter Data	Data source settings	Manage Parameters •	Refresh Preview - Manage -	Choose Remove Columns * Columns *	Keep Remove Rows • Rows •	A↓ X↓	Split G Column •	Data Type: Decimal Number • Use First Row as Headers • By 1/2 Replace Values	Merge Queries Append Areries Combine Files		
Close	1	New Query		Data Sources	Parameters	Query	Manage Columns	Reduce Rows	Sort		Transform	Combine		

The Merge dialog will open. You will see the current table at the top. We can now select the table to be merged with it:

	15			C
Status ID	Status Name			
0	New			
1	Invoiced			
2	Shipped			
3	Closed			
Invoices				
Employees				
	ers			
Manual Ord			No preview is available	
Manual Ord Order Detai	s			
Manual Ord Order Detai Order Detai	s Is Status			
Manual Ord Order Detai Order Detai Orders	ls Status	L3		
Manual Ord Order Detai Order Detai Orders Orders Statu	ls Status us (Current)	2		
Manual Ord Order Detai Order Detai Orders Orders Statu oin Kind	ls Is Status Js (Current)	6		

Now, click the column which will be matched from both tables:

ruers statt	12	
tatus ID	Status Name	
0	New	
1	Invoiced	
2	Shipped	
3	Closed	
Order Detai	ls Status Status Name	 [
Drder Detai	ls Status Status Name	 [
Drder Detai	ls Status Status Name None	
Drder Detai tatus ID	ls Status Status Name None Allocated	[
Drder Detai	Is Status Status Name None Allocated Invoiced	 [
Drder Detai	Is Status Status Name None Allocated Invoiced Shipped	[
Drder Detail tatus ID 1 2 3 4	Is Status Status Name None Allocated Invoiced Shipped On Order	

Finally, change the type of join (if necessary – Left Outer will be selected by default) and click OK:

		Lá
Status ID	Status Name	
0	New	
1	Invoiced	
2	Shipped	
3	Closed	
Status ID	Status Name	
0	None	
1	Allocated	
	Invoiced	
2		
2	Shipped	
2 3 4	Shipped On Order	

The merge will now be completed:

ad I 🖯	≂ Northwind [)ata - Que	ry Editor								- C	× נ
File	Home Tran	sform	Add Column	View He	elp							~ ?
Close & Apply *	New Recent Source + Sources	t Enter T Data	Data source settings	Manage Parameters •	Refresh Preview + Manage +	Choose Remove Columns + Columns	Keep Remove Rows * Rows *	A↓ Z↓	Split Column - By Split	v as Headers ▼ es	Gambing Couries →	
Close	New Que		Data Sources	Parameters	quely	Manage Columns	Reduce Rows	3011	iransionii		Combine	
Querie	s [8]	<	 1.2 Status ID 	✓ A ^B _C St	atus Name 🛛 🛨 Orders	See Strain Strai	Status 11만			QUERY S	ETTINGS	×
				1 Invoice	ed Table	Table						
ttt Emp	loyees	2		2 Shippe	d Table	Table				▲ PROPER	TIES	
⊞ Cust	omers									Name		
Invo 🔠	ices									Orders S	itatus	
III Orde	ers									All Prope		
🔠 Orde										▲ APPLIED	STEPS	
III Orde	er Details									Sour	re.	*
I Orde	er Details Status									Navi	nation	÷
III Man	ual Orders									× Merc	red Queries	*

Using Append Queries

An Append query works a bit differently – it adds one data source into another, while keeping the original data. In this example, we want to append our Manual Orders table to the Orders table:



To start, we will select the primary table (Orders) and click Home \rightarrow Append Queries:

ad I 🖯	↓ Nort	hwind Data	- Quer	y Editor									-		×
File	Home	Transform	m	Add Column	View He	lp									^ 🕐
Close & Apply •	New Source •	Recent Sources •	Enter Data	Data source settings	Manage Parameters •	Refresh Preview • III Manage •	Choose Remove Columns + Columns +	Keep Remove Rows • Rows •	2↓ X↓	Split Column •	Group By	Data Type: Whole Number ▼ Use First Row as Headers ▼ 1→2 Replace Values	Merge Queries • Append Queries	•	
Close	N	lew Query		Data Sources	Parameters	Query	Manage Columns	Reduce Rows	Sort			Transform	Combine		

Now, the Append dialog box will open. You can choose to append two tables together, or three or more. For this example, we only have two tables, so we can choose the Manual Orders table and then click OK:

Append			×
● Two tables ○ Three or mo	re tables		
Table to append			
Manual Orders	-		
		OK Cancel	

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The data will now be appended:

III	- Query Editor	View Hel	p								- 0	× ^ 🕐
Close & Apply* Close Mexernt El Source * Sources * D New Query	nter Data source settings Data Sources	Manage Parameters • Parameters	Refresh Preview + Advanced Editor Query	Choose Columns Manag	Remove • Columns • ge Columns	Keep Rer Rows V Ro Reduce Ro	move ws ▼ ows Sort	Split Column • By	Data Type: Whol ∭ Use First Rov 1 _{→2} Replace Valu Transform	le Number 👻 w as Headers 👻 Jes	Merge Queries - Append Queries - Combine Files	
Queries [8] <	123 Order ID	✓ 1 ² 3 Emp	Noyee ID 🔽 1 ² 3 Customer ID	▼ 12 12	BC Order Date	- 2	Shipped D	ate <mark>▼</mark> 1 ² 3 S	hipper ID 🗾	QUERY S	ETTINGS	
Employees		21	2	21	1/20/2000 12	2:00:00 AN	1/22/2000	12:00:00 AM	^		TIFE .	
Employees	2	32	A	12	1/22/2006 12	2:00:00 AM	1/22/2000	12:00:00 AM		Name		
	3	33	6	8	1/30/2006 12	2:00:00 AM	1/31/2006	12:00:00 AM		Orders		
	5	34	9	4	2/6/2006 12	2:00:00 AM	2/7/2006	12:00:00 AM		All Deserve		
H Orders	6	35	3	29	2/10/2006 12	2:00:00 AM	2/12/2006	12:00:00 AM		<u>All Prope</u>		
Orders Status	7	36	4	3	2/23/2006 12	2:00:00 AM	2/25/2006	12:00:00 AM		▲ APPLIED	STEPS	
Order Details	8	37	8	6	3/6/2006 12	2:00:00 AM	3/9/2006	12:00:00 AM		Sour	te	*
🔠 Order Details Status	9	38	9	28	3/10/2006 12	2:00:00 AM	3/11/2006	12:00:00 AM		Navio	gation	*
III Manual Orders	10	39	3	8	3/22/2006 12	2:00:00 AM	3/24/2006	12:00:00 AM		Х Арре	nded Query	*
	11	40	4	10	3/24/2006 12	2:00:00 AM	3/24/2006	12:00:00 AM				
	12	41	1	7	3/24/2006 12	2:00:00 AM		null	nı			
	13	42	1	10	3/24/2006 12	2:00:00 AM	4/7/2006	12:00:00 AM				
	14	43	1	11	3/24/2006 12	2:00:00 AM		null				
	15	44	1	1	3/24/2006 12	2:00:00 AM		null	nı			
	16	45	1	28	4/7/2006 12	2:00:00 AM	4/7/2006	12:00:00 AM				
	17	46	7	9	4/5/2006 12	2:00:00 AM	4/5/2006	12:00:00 AM				
	18	47	6	6	4/8/2006 12	2:00:00 AM	4/8/2006	12:00:00 AM				
	19	48	4	8	4/5/2006 12	2:00:00 AM	4/5/2006	12:00:00 AM				
	20	50	9	25	4/5/2006 12	2:00:00 AM	4/5/2006	12:00:00 AM				
	21	51	9	26	4/5/2006 12	2:00:00 AM	4/5/2006	12:00:00 AM				
	22	55	1	29	4/5/2006 12	2:00:00 AM	4/5/2006	12:00:00 AM				
	23	56	2	6	4/3/2006 12	2:00:00 AM	4/3/2006	12:00:00 AM				
	24	57	9	27	4/22/2006 12	2:00:00 AM	4/22/2006	12:00:00 AM				
	25	58	3	4	4/22/2006 12	2:00:00 AM	4/22/2006	12:00:00 AM				
	26	59	4	12	4/22/2006 12	2:00:00 AM	4/22/2006	12:00:00 AM				
	27	60	6	8	4/30/2006 12	2:00:00 AM	4/30/2006	12:00:00 AM				
	28	61	9	4	4/7/2006 12	2:00:00 AM	4/7/2006	12:00:00 AM				
	29	62	3	29	4/12/2006 12	2:00:00 AM	4/12/2006	12:00:00 AM				
	30	63	4	3	4/25/2006 12	2:00:00 AM	4/25/2006	12:00:00 AM				
	31	64	8	6	5/9/2006 12	2:00:00 AM	5/9/2006	12:00:00 AM				
	32	65	9	28	5/11/2006 12	2:00:00 AM	5/11/2006	12:00:00 AM				
	33	66	3	8	5/24/2006 12	2:00:00 AM	5/24/2006	12:00:00 AM				
	34	67	4	10	5/24/2006 12	2:00:00 AM	5/24/2006	12:00:00 AM	~			
	35 <								>			
35 COLUMNS, 96 ROWS											PREVIEW DOWNLOADED	AT 1:18 PM

Activity 2-2: Using the Query Editor

In this activity, you will use the Query Editor to modify and append data.

1. Open Power BI and open Activity 2-2:



2. Click Home \rightarrow Edit Queries:



3. First, let's append new data to the Customers table. Click the Customers entry on the left side of the window:

📶 拱 🖛 Activity	2-2 - Quer	ry Edit	tor										-		х
File Home	Transform		Add Column	View H	elp										^ 🕐
Close & New Re Source * Source	ecent En urces + Da	ter ata	Data source settings	Manage Parameters • Parameters	Refrest Preview	Advanced Editor	Choose Remove Columns - Columns Manage Columns	Keep Remove Rows * Rows * Reduce Rows	Ž↓ Ž↓ Co	Split Group 1 olumn + By	ita Type: Whole Use First Row 2 Replace Values ransform	Number • as Headers •	Merge Queries	• s •	
Queries [8]	<		1 ² 3 10 -	A ^B C Company	- -	A ^B C Last Name	A ^B C First Name	A ^B _C E-mail Address		▼ A ^B _C Job Title	▼ A ^B c	QUERY S	ETTINGS		×
## Employees		2		2 Northwind Tr	aders	Cencini	Andrew	andrew@northwindta	raders.com	Note President. S	ales (12		TIES		
Customers		3	3	8 Northwind Tr	aders	Kotas	Jan	jan@northwindtrade	rs.com	Sales Representa	ative (12	Name			
Invoices		4	4	Northwind Tr	aders	Sergienko	Mariya	mariya@northwindtr	aders.com	Sales Representa	ative (12	Employe	es		
T Orders			5	5 Northwind Tr	aders	Thorpe	Steven	steven@northwindtr	aders.com	Sales Manager	(12	All Prope			
Orders Status		6	6	5 Northwind Tr	aders	Neipper	Michael	michael@northwind1	raders.com	n Sales Representa	ative (12		erene		
TT Order Details			7	7 Northwind Tr	aders	Zare	Robert	robert@northwindtr	aders.com	Sales Representa	ative (12	▲ APPLIED	STEPS		
		8	8	8 Northwind Tr	aders	Giussani	Laura	laura@northwindtra	ders.com	Sales Coordinato	or (12	Sour	ce		*
Urder Details Stati	us	9	5	9 Northwind Tr	aders	Hellung-Larsen	Anne	anne@northwindtra	ders.com	Sales Representa	ative (12	× Navi	gation		*
H New Customers															

📶 д 👻 Activity 2-2 - Que	ery Editor										- 0	×
File Home Transform	n Ado	d Column	View He	lp								~ 🕐
Close & Apply Close Wew Recent E Source + Sources + D New Query	inter D Data Da	ata source settings ata Sources	Manage Parameters • Parameters	Refresh Preview + Manage + Query	or Choose Rem Columns + Colur Manage Colur	vove nns * Reduce Rows \$	2↓ ∡↓ Sort	Split, Group 1, 2 Rep Column + By Transf	pe: Whole I First Row a lace Values orm	Number • as Headers •	Merge Queries • Append Queries • Combine Files Combine	
Queries [8] <	.	3 ID 👻	A ^B C Company	▼ A ^B _C Last Name ▼	A ^B _C First Name	A ^B _C Job Title	~	A ^B C Business Phone	A ^B C Fax	QUERY SE	TTINGS	×
Employees		1	Company A	Grataros Solsona	Anna	Owner		(123)555-0100	(123)55		ICC	
	2	4	Company C	Aven	Thomas	Purchasing Representative	P	(123)555-0100	(123)55	Name	65	
	4	4	Company D	Lee	Christina	Purchasing Manager		(123)555-0100	(123)55	Customer	s	
	5	5	Company E	O'Donnell	Martin	Owner		(123)555-0100	(123)55	All Propert		
	6	6	Company F	Pérez-Olaeta	Francisco	Purchasing Manager		(123)555-0100	(123)55	Airriopen		
Orders Status	7	7	Company G	Xie	Ming-Yang	Owner		(123)555-0100	(123)55	A APPLIED	STEPS	
Urder Details	8	8	Company H	Andersen	Elizabeth	Purchasing Representative	e	(123)555-0100	(123)55	Source		*
Order Details Status	9	9	Company I	Mortensen	Sven	Purchasing Manager		(123)555-0100	(123)55	Navig	ation	*
New Customers	10	10	Company J	Wacker	Roland	Purchasing Manager		(123)555-0100	(123)55	× Remo	ved Columns	
	11	11	Company K	Krschne	Peter	Purchasing Manager		(123)555-0100	(123)55			
	12	12	Company L	Edwards	John	Purchasing Manager		(123)555-0100	(123)55			
	13	13	Company M	Ludick	Andre	Purchasing Representative	e	(123)555-0100	(123)55			
	14	14	Company N	Grilo	Carlos	Purchasing Representative	e	(123)555-0100	(123)55			
	15	15	Company O	Kupkova	Helena	Purchasing Manager		(123)555-0100	(123)55			
	16	16	Company P	Goldschmidt	Daniel	Purchasing Representative	e	(123)555-0100	(123)55			
	17	1/	Company Q	bagei	Jean Philippe	Owner Durchasian Danasatati		(123)555-0100	(123)55			
	18	18	Company K	Autier Miconi	Catherine	Purchasing Representative	e	(123)555-0100	(123)55			
	19	19	Company S	cggerer	George	Accounting Assistant		(123)555-0100	(123)55			
	20	20	Company II	Tham	Bernard	Accounting Manager		(123)555-0100	(123)55			
	21	22	Company V	Pamos	Luciana	Purchasing Assistant		(123)555-0100	(123)55			
	22	23	Company W	Entin	Michael	Purchasing Manager		(123)555-0100	(123)55			
	24	24	Company X	Hasselberg	Jonas	Owner		(123)555-0100	(123)55			
	25	25	Company Y	Rodman	John	Purchasing Manager		(123)555-0100	(123)55			
	26	26	Company Z	Liu	Run	Accounting Assistant		(123)555-0100	(123)55			
	27	27	Company AA	Toh	Karen	Purchasing Manager		(123)555-0100	(123)55			
	28	28	Company BB	Raghav	Amritansh	Purchasing Manager		(123)555-0100	(123)55			
	29	29	Company CC	Lee	Soo Jung	Purchasing Manager		(123)555-0100	(123)55			
		k							>			
15 COLUMNS, 29 ROWS											PREVIEW DOWNLOADED	AT 1:28 PM

4. Note the current table size in the status bar:

5. Click Home \rightarrow Append Queries:

ad I B	च ∣ Activ	/ity 2-2 - Qu	uery Edi	itor								- 0	×
File	Home	Transfor	m	Add Column	View H	elp							~ ?
Close & Apply •	New Source -	Recent Sources +	Enter Data	Data source settings	Manage Parameters •	Refresh Preview + Manage +	Choose Remove Columns • Columns •	Keep Remove Rows • Rows •	A↓ X↓	Split Group Column - By	Data Type: Whole Number ▼	Merge Queries Append Queries Combine Files	
Close	N	lew Query		Data Sources	Parameters	Query	Manage Columns	Reduce Rows	Sort		Transform	Combine	

6. The Append dialog box will open. Click the "Table to append" menu and click New Customers:

📶 拱 🗧 Activity 2-2 - Query	/ Editor							- 0	\times
File Home Transform	Add Column	View Help							^ (
Close & Apply • Close Ware and the source • Source • Close Area and the source • Source • Close Area and the sourc	er Data source settings Data Sources	Manage Parameters • Refr Parameters	Advanced Edito	r Choose Remov Columns - Column Manage Column	re Keep Remove Rows * Rows * s Reduce Rows Sort	Split Column - By	a Type: Whole Number ~ Use First Row as Headers ~ Replace Values ansform	Merge Queries ~ Append Queries ~ Combine Files Combine	
0	-	.B.o.	Bran	B et an	Barren	Botos		SETTINOS	
uueries (8) <	1 1 ⁻³ 10	A ^o C Company	A ^v _C Last Name	A ^o C First Name	A ^v C Job Title	A°C Business Phone	A ^o C Fax UUERY 3 (123)55	SETTINGS	×
Employees	2	2 Company B	Gratacos Solsona	Antonio	Owner	(123)555-0100	(123)55 4 PROPER	TIFS	
A Customers	3	3 Company C	Axen	Thomas	Purchasing Representative	(123)555-0100	(123)55 Name		
	4	4 Company D	Lee	Christina	Purchasing Manager	(123)555-0100	(123)55 Custom	iers	
III Orders	5	5 Company E	O'Donnell I	Martin	Owner	(123)555-0100	(123)55 All Prop		
	6	6 Company F	Pérez-Olaeta	Francisco	Purchasing Manager	(123)555-0100	(123)55		
	7	7 Company G	Xie I	Ming-Yang	Owner	(123)555-0100	(123)55 A APPLIE	O STEPS	
Urder Details	8	8 Company H	Andersen I	Elizabeth	Purchasing Representative	(123)555-0100	(123)55 Sou	rce	*
Urder Details Status	9	9 Company I	Mortensen	Sven	Purchasing Manager	(123)555-0100	(123)55 Nav	igation	*
	13 14 15 16 17 18 19 20	• Two tables Table to append Customers (Curr Employees Invoices Orders	 Three or more tables ent) 			OK Can	55 55 55 55 55 75 75 75		
	21 2.	1 Cr Orders Status		mard .	Accounting Manager	(123)555-0100	(123)55		
	22 2.	2 C Order Details Sta	itus	jiana thaol	Purchasing Assistant	(123)555-0100	(123)55		
	23 24	A C New Customers		inder	Purchasing Manager	(123)555-0100	(123)55		
	24 2.	5 Company Y	Rodman	Customers	Purchasing Manager	(123)555-0100	(123)55		
	25 2	6 Company Z	Liu	Run	Accounting Assistant	(123)555-0100	(123)55		
	27 2	7 Company AA	Toh I	Karen	Purchasing Manager	(123)555-0100	(123)55		
	28 2	8 Company BB	Raghav	Amritansh	Purchasing Manager	(123)555-0100	(123)55		
	29 2	9 Company CC	Lee	Soo Jung	Purchasing Manager	(123)555-0100	(123)55		
	<						<u> </u>		
15 COLUMNS, 29 ROWS								PREVIEW DOWNLOADED	AT 1:28 PM

7. Click OK to complete the operation:

	ок	Cancel
		OK

8. The data will be appended. Note the action item in the Applied Steps portion of the Query Settings pane:

📶 拱 🖛 Activity 2-2 - Que	ery Editor							- 0	×
File Home Transform	n Add Column	View Help							~ 👩
Close & Apply* Close New Recent E Source * Sources * E New Query	inter Data source settings Data Sources	Manage Parameters - Pres Parameters	Fresh Query	Choose Remov Columns - Column Manage Columns	e Keep Remove s r Rows r Rows r a Reduce Rows Sort	Split Group 1,2 F Column + By 1,2 F	Type: Whole Number • Jse First Row as Headers • Replace Values nsform	Herge Queries Append Queries Combine Files Combine	
Queries [8] <	123 ID	A ^B C Company	A ^B _C Last Name A	B _C First Name	A ^B _C Job Title	A ^B _C Business Phone	✓ A ^B _C Fax QUERY S	ETTINGS	
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	12 1	2 Company L	Edwards Jo	ohn	Purchasing Manager	(123)555-0100	(123		
	13 1	3 Company M	Ludick A	indre	Purchasing Representative	(123)555-0100	(123		
	14 1	4 Company N	Grilo C	arlos	Purchasing Representative	(123)555-0100	(123		
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	20 2	0 Company T	Li G	George	Purchasing Manager	(123)555-0100	(123		
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	25 2	5 Company Y	Rodman Jo	ohn	Purchasing Manager	(123)555-0100	(123		
	26 2	6 Company Z	Liu R	lun	Accounting Assistant	(123)555-0100	(123		
	27 2	7 Company AA	Toh K	aren	Purchasing Manager	(123)555-0100	(123		
	28 2	8 Company BB	Raghav A	Imritansh	Purchasing Manager	(123)555-0100	(123		
	29 2	9 Company CC	Lee S	oo Jung	Purchasing Manager	(123)555-0100	(123		
	30	1 Company U	Harold N	Aargaretha	Data Coordiator	(716) 2114246	(641		
	31	2 Company A	Barwick V	filhelmina	Help Desk Operator	(415) 8217016	(937		
	32	3 Company U	L'argent K	ally	Budget/Accounting Analyst III	(919) 5617020	(212		
	33	4 Company S	Sproston T	obi	Account Coordinator	(706) 5912662	(408		
	34	5 Company U	Bunnell	Javey	Associate Professor	(585) 2372096	(509		
	35	6 Company U	Soldan S	tacee	Cost Accountant	(407) 2915048	(786		
	36	7 Company B	Sole G	Sabriel	Design Engineer	(310) 2767450	(832		
	37 <						>		

9. You can see that the Web Page and Notes columns are empty for both the existing and new data. Hold the Ctrl key and click both columns to select them:

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15 COLUMNS, 279 ROWS						PREVIEW DOWNLOADED	AT 1:28 PM

10. Click Home \rightarrow Remove Columns:

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11. The action will now appear in the Query Settings pane:



12. On second thought, we may need those columns. Click this entry and click the X to undo the action:

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13. Click Home \rightarrow Close & Apply to apply your changes and return to Power BI:



14. Once the operation is complete, save your work as Activity 2-2 Complete and close Power BI.

TOPIC C: Data Modeling

In addition to basic data management tools, Power BI also includes the ability to create tables, calculated columns, and measures. It is also important to know that Power BI uses DAX (Data Analysis Expression) as its formula language.

Topic Objectives

In this topic, you will learn:

- About DAX
- How to create tables, calculated columns, and measures

What is DAX?

DAX (Data Analysis Expression) is a type of formula language used to create custom calculations and measures. It is designed to work based on data relationships, referring to tables and columns to provide relational analysis and more complex functions than traditional formulas.

Creating a New Table

To create a new table that returns specified values from the dataset, click Modeling \rightarrow New Table:



The expression editor will now become active. Replace the word "Table" with the name of the new table:

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Now, you can type the DAX function. We are going to use the VALUES function to return a list of distinct values. As we start typing, Power BI will try to automatically complete the function. Press Enter to select the highlighted function, or if there is more than one function listed, use the arrow keys to select a different item:



Once this function has been entered, we can choose the table and field it will apply to:



We can now add the closing bracket and press Enter or click the checkmark to create the function:

X ✓ RegionList = VALUES ('Country Region'[Sales Region])
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The table will now be created:

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You can continue to add more columns to this table. It can also be uses it in visualizations and reports like any other dataset.

Creating a New Calculated Column

To create a new table column that returns a particular set of values from your data, open the table, choose the column you want the new column to be placed after, and click Modeling \rightarrow New Column:



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Just as when we were creating a table, the column will be created using the expression editor with a DAX function. We are going to create a new column that displays the value in the Period column as the proper month name.

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We will start by changing the placeholder "Column" text to "MonthName:"

Next, we will add the FORMAT function:



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Now, we will choose the Date field from the current table:

And enter "MMM" as we want a three-letter month:



After adding the closing parenthesis and pressing Enter, our new column will be created:

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Creating a New Measure

A **measure** is a formula that shows a value calculated from specified data. When you create a new measure, it will be stored within whichever table is currently active. Although it does not really matter where the measure is stored, we recommend storing it with the related table so you can find it later if needed. To start, select the active table and click the New Measure command on the Home or Modeling tab:

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6/1/2014 12:00:00 A	AM	0	277 153		50	6	22	5				E Plan	
7/1/2014 12:00:00 A	AM	0	277 153		50	6	22	5				Scenario ID	
8/1/2014 12:00:00 A	AM	0	277 153		50	6	22	5				T Value	
9/1/2014 12:00:00 A	AM	0	277 153		50	6	22	5				Z Value	
1/1/2014 12:00:00 A	AM	0	277 15		50	6	22	5				Var LET	
10/1/2014 12:00:00 A	AM	0	277 15		50	6	22	5				Var LET 76	
11/1/2014 12:00:00 A	AM	0	277 15		50	6	22	5				Var LE2	
12/1/2014 12:00:00 A	M	0	277 15		50	6	22	5				Var LE2 %	
2/1/2014 12:00:00 A	AM	0	277 15		50	6	22	5				Var LE3	
3/1/2014 12:00:00 A	AM	0	277 15		50	6	22	5				Var LE3 %	
4/1/2014 12:00:00 A	AM	0	277 15		50	6	22	5				🐠 Var Plan %	
5/1/2014 12:00:00 A	AM	0	277 15		50	6	22	5				🕨 🎹 IT Area	
6/1/2014 12:00:00 A	AM	0	277 15		50	6	22	5				🕨 🎹 Range	
7/1/2014 12:00:00 A	M	0	277 15		50	6	22	5		 	~	E Sconorio	
TABLE: Fact (166 216 rows) COL	ULIMN: Var Plan	(0 distinct valu	es)										

Now, enter the name of the measure, enter the function, and choose the data:



In this case, we have created a measure called "Var Plan," which will show the variance between the actual data and the planned data.

We can now use this measure to create a simple visualization showing the variance by month:



Activity 2-3: Data Modeling

Your sales team has asked you to help them answer three questions about your organization's retail data. In this activity, you will answer these questions using data modeling tools.

1. Open Power BI and open Activity 2-3:



2. The first question the sales team has is how to easily see which orders are past due. (Invoices are always due at the end of the quarter in which they were issued.) Let's use a calculated column for this purpose. To begin, switch to Data view:



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D		Company	Last Name	First Name	Job Title		6	usine ss Phone	Fax Nu	umber	Address	City	State/Province	ZIP/Postal Code	Cour			
	30	Company A	Bawden	Emory	Recruiting N	Manager	(8	05) 9178677	(979) 5	5377200	0 Chinook Hill	Santa Barbara	CA	93111	U^		Search	
	51	Company A	Horder	Cristen	Analog Circ	uit Design m	anager (8	50) 7884226	(915) 1	1419980	94 Stang Terrace	Pensacola	FL	32590	U			
	32	Company C	Gianolini	Audrey	Quality Eng	ineer	(3	40) 9151265	(901) 6	5652414	3473 Atwood Terrace	Silver Spring	MD	20910	U		Curtomo	
	33	Company A	Splevin	Idell	Food Chem	ist	(3	15) 1649518	(661) 1	1613137	90 Scott Alley	Philadelphia	PA	19151	U	÷.	e .	15
	34	Company A	Palatini	Charmine	Cost Account	ntant	(9	01) 2173071	(214) 6	5758787	7 Swallow Street	Memphis	TN	38109	U		Employe	25
	35	Company U	Castlake	Truda	Structural A	Analysis Engi	neer (3	10) 1506876	(860) 5	5357056	51761 Eagan Center	Los Angeles	CA	90040	U		Invoices	b
	36	Company R	Davenall	Joyann	VP Account	ting	(8	01) 6896096	(970) 5	5962550	11930 Eastlawn Crossing	Salt Lake City	UT	84145	U		New Cus	ner
	37	Company P	Kraut	Blanche	Pharmacist		(4	12) 39 25 090	(806) 9	9393090	9333 Mayer Trail	Pittsburgh	PA	15250	U →		Order De	tails
	38	Company Z	Martugin	Gay	Computer S	Systems Ana	lyst III (4	40) 9866459	(801) 1	1731517	20 Sage Point	Cleveland	он	44130	U →			
	39	Company P	Boissier	Kristofer	Structural A	Analysis Engi	neer (8	12) 55 30793	(858) 5	5543948	9655 Maple Hill	Evansville	IN	47705	U		Orders	
	40	Company S	Giannazzi	Josephina	Director of	Sales	(2	60) 2980320	(803) 8	8696542	0931 Mayer Parkway	Fort Wayne	IN	46862	U ,	-		
	41	Company R	Boc	Shayne	Structural E	ingineer	(5	12) 3243915	(918) 6	5369761	4 Northfield Hill	Austin	тх	78715	U			
	42	Company C	Starsmeare	Ingelbert	Staff Scienti	ist	(9	79) 5766926	(757)	7312885	70624 Merchant Court	College Station	TX	77844	U			
	43	Company U	Dunphy	Aleen	Food Chem	lst	(9	10) 90 33 729	(314) 9	9031806	1771 Esker Court	Wilmington	NC	28410	U			
	44	Company R	McKerlie	Codie	Director of	Sales	(9	20) 7394700	(217) 5	5054802	6462 Rigney Drive	Appleton	WI	54915	U			
	45	Company Z	Brockman	Steffane	Internal Au	ditor	6	19) 49 24 160	(432) 5	5224404	10038 Lighthouse Bay Alle	y Colorado Springs	со	80930	U			
	46	Company AA	Fugere	Tab	Civil Engine	er	(5	18) 2011405	(571) 3	3390206	7855 Michigan Point	Shreveport	LA	71166	U			
	47	Company P	Tawse	Lucias	Assistant M	lanager	(5	03) 7884197	(903) 1	1019435	8 Goodland Park	Aurora	со	80045	U			
	48	Company U	Egarr	Laughton	Editor		(5	12) 2624386	(202) 8	8121251	98 Ridge Oak Trail	Austin	тх	78721	U			
	49	Company A	Lombard	Jodee	Accounting	Assistant IV	(5	36) 4664896	(678) 1	1630287	24003 Clarendon Alley	Winston Salem	NC	27116	U			
	50	Company L	Lanchberry	Dodi	Assistant M	ledia Planne	. ()	04) 3126361	(937) 2	2586086	6 Garrison Way	Charlotte	NC	28205	U			
	51	Company AA	Bradock	Aldon	Electrical Er	ngineer	(8	43) 6885866	(615) 4	4067957	424 Esch Circle	Charleston	SC	29411	U			
	52	Company R	Thunderman	Sydel	Product Eng	gineer	(9	89) 1136308	(214) 3	3814216	605 Elgar Lane	Saginaw	MI	48609	U			
	53	Company AA	DeNormanville	Orel	Accounting	Assistant III	6	14) 3636343	(773) 4	4670777	0 Arapahoe Drive	Fullerton	CA	92835	U			
	54	Company B	Comizzoli	Bruno	Structural A	Analysis Engi	neer (S	03) 8878544	(903) 7	7079208	53 East Trail	Englewood	со	80150	U			
	55	Company U	Strickland	Sileas	SoftwareCo	onsultant	(9	15) 8805207	(310) 1	1643036	2 Kensington Circle	El Paso	TX	88519	U			
	56	Company S	Petrello	Joice	VP Product	Manageme	nt (á	02) 4701873	(510) 6	5905097	60405 Bowman Point	Washington	DC	20319	U			
	57	Company A	Camies	Montague	Nuclear Por	wer Enginee	r (5	40) 1240134	(415) 3	3437875	786 Union Trail	Roanoke	VA	24034	U			
	58	Company Z	Van Salzberger	Pansy	Environmen	ntal Specialis	t (6	51) 6811855	(202) 8	3283772	90 Glendale Circle	Saint Paul	MN	55172	U			
	59	Company B	Volet	Dolf	Desktop Su	pport Techn	ician (8	16) 8067793	(415) 1	1013888	278 Vidon Crossing	Kansas City	мо	64109	U			
	60	Company R	Wild	Gena	Payment Ac	djust ment Co	ordinator (S	61) 2632728	(803) 6	5419686	0937 Blaine Plaza	Corpus Christi	тх	78470	U			
	61	Company C	Petican	Maurice	Design Engi	ineer	(9	14) 1639370	(304) 3	3181458	3083 Barnett Pass	White Plains	NY	10606	U			
	62	Company AA	Parsons	Wolf	Pharmacist		(5	73) 3552343	(210) 9	9323357	41562 Marquette Pass	Jefferson City	мо	65110	U			
		C	F	C1									-					

3. Since we want to work with invoice data, select that table from the Fields pane:

4. Now, click Home \rightarrow New Column:

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File Home	Modeling	Help							
Paste	Get Rece Data + Source	nt Enter es V Data	Refresh	New New Page + Visual	Text box	From From File	Manage Relationships	New Measure New Column	Publish
Clipboard		External data		Ins	ert	Custom visuals	Relationships	Calculations	Share

5. The new column will be created, ready to accept the expression that will define its data:

ad I B	- 🔿 🔿 🖛 Ad	tivity 2-3	- Power BI Desktop									-	
File	Home	Modeling	, Help									John S	Smith ^
Paste	X Cut E⊉ Copy ≪ Format Painter	Get Data	Recent Enter Sources Data	dit ries -	New Page * A	New Visual C Shapes -	From From Store File	Manage Relationships	📋 New Measure	Publish			
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ա	×	olumn =									~	FIELDS	
$ -\bar{2} $	nvoiceID Orde	r ID	Invoice Date T	ax Shi	pping	Amount Due Colu	imn						
##	5	31	3/22/2006 4:08:59 PM	\$0	\$0	\$0					^		
_	6	32	3/22/2005 4:10:27 PM	\$0	\$0	50						L	
88	7	40	3/24/2006 10:41:41 AM	\$0	\$0	<u>\$0</u>	_					Custome	ers
	8	39	3/24/2006 10:55:46 AM	\$0	\$0	50						→ Employe	Nec
	9	38	3/24/2006 10:56:57 AM	\$0	\$0	50						t in the second	
	10	37	3/24/2006 10:57:38 AM	\$0	<i>S0</i>	50	_					- m invoices	
	11	36	3/24/2006 10:58:40 AM	50	\$0	50						∑ Amount Du	JC SL
	12	35	3/24/2006 10:59:41 AM	\$0	<i>S0</i>	<i>S0</i>	_					🕞 Column	
	13	34	3/24/2006 11:00:55 AM	\$0	\$0	\$0	_					Invoice Dat	te
	14	33	3/24/2006 11:02:02 AM	\$0	<i>\$0</i>	50	_					Σ Invoice ID	
	15	30	3/24/200611:03:00 AM	\$0	<i>\$0</i>	<i>\$0</i>	_					Order ID	
	16	56	4/3/2006 1:50:15 PM	\$0	\$0	\$0	_					Σ Shipping	
	17	55	4/4/2006 11:05:04 AM	\$0	<i>S0</i>	50	_					Σ Tax	
	18	51	4/4/2006 11:05:13 AM	\$0	\$0	\$0	_					New Cu:	
	19	50	4/4/2006 11:06:56 AM	\$0	\$0	50	_					Drder D	utaile
	20	48	4/4/2006 11:07:37 AM	\$0	\$0	\$0	_						cours
	21	47	4/4/2006 11:08:14 AM	\$0	\$0	\$0	_					• Order D	
	22	46	4/4/2006 11:08:49 AM	\$0	\$0	\$0	_					Orders	
	23	45	4/4/2006 11:09:24 AM	\$0	\$0	\$0	_					🕨 🧮 Orders S	
	24	79	4/4/2006 11:35:54 AM	\$0	\$0	\$0	_						
	25	78	4/4/2006 11:36:21 AM	\$0	\$0	\$0	_						
	26	77	4/4/2006 11:36:47 AM	SO	\$0	\$0	_						
	27	76	4/4/2006 11:37:09 AM	\$0	\$0	\$0	_						
	28	75	4/4/2006 11:37:49 AM	\$0	<i>S0</i>	SO	_						
	29	74	4/4/2006 11:38:11 AM	\$0	\$0	50	_						
	30	73	4/4/2006 11:38:32 AM	\$0	<i>S0</i>	<u>so</u>	_						
	31	72	4/4/2006 11:38:53 AM	SO	\$0	SO	_						
	32	71	4/4/2006 11:39:29 AM	\$0	\$0	50	_						
	33	70	4/4/2006 11:39:53 AM	\$0	<i>S0</i>	SO							
	34	69	4/4/2006 11:40:16 AM	\$0	\$0	SO							
	35	67	4/4/2006 11:40:38 AM	50	50	50							
	36	42	4/4/2006 11:41:14 AM	SO	\$0	SO							
	37	60	4/4/2006 11:41:45 AM	\$0	\$0	50							
	38	63	4/4/2006 11:42:26 AM	SO	SO	SO							
TABLE: In	voices (35 rows) CO	LUMN: Co	lumn (1 distinct values)										

6. Replace the word "Column" with "InvoiceDue:"



7. Now, we want to return the end of the quarter date, based on the value of another column. Type the letter "E" and then double-click the "ENDOFQUARTER" function from the list:

X V	InvoiceD	ue = E							
Invoice ID	Order ID	Invoi 🖉	EARLIER	^	Ret	urns the valu	e in the column	prior to the s	pecified
5	31	3/22 (fx	EARLIEST		50	SU	Scans (default is	1).	
6	32	3/22 fx	ENDOFMONTH		\$0	\$0	\$0		
7	40	3/24/ fx	ENDOFQUARTER		\$0	\$0	\$0		
8	39	3/24/ fx) ENDOFYEAR	•	\$0	\$0	\$0		
9	38	3/24/ <i>f</i> x	EOMONTH		\$0	\$0	\$0		
10	37	3/24/ ^{fx}	ERROR		\$0	\$0	\$0		
11	36	3/24/ ^{fx}) EVEN		\$0	\$0	\$0		
12	35	3/24	EXACT		\$0	\$0	\$0		
13	34	3/24	EXCEPT	~	\$0	\$0	\$0		

8. Now we can choose what data this value should be based on. Type "Inv" and then double-click the "Invoice Date" field from the Invoices table:

XV	InvoiceD	ue = ENDOFQUARTER(Inv			
Invoice ID	Order ID	ENDOFQUARTER(Dates) of quarter. Shipping	1	Amount Due <mark>Column</mark>
5	31	3/22/2006 4:08:59 PN	Invoices		\$0
6	32	3/22/2006 4:10:27 PN	Invoices[Amount Due]		\$0
7	40	3/24/200610:41:41 AN	Invoices[Invoice Date]		\$0
8	39	3/24/200610:55:46 AN	Invoices[Invoice ID]	~3	\$0
9	38	3/24/2006 10:56:57 AN	Invoices[Order ID]		\$0
10	37	3/24/2006 10:57:38 AN	Invoices[Shipping]		\$0
11	36	3/24/2006 10:58:40 AN	Invoices[Tax]		\$0
12	35	3/24/2006 10:59:41 AN	'Order Details'[Inventory ID)]	\$0

9. Double-click "Date" to return a full date:

XV	InvoiceD	<pre>InvoiceDue = ENDOFQUARTER(Invoices[Invoice Date]</pre>								
Invoice ID	Order ID	ENDOFQUARTE	R(Dates) d of quarter.	Shipping	.[Date]	Column				
5	31	3/22/2006 4:08:59 PM	50		.[Month]	D				
6	32	3/22/2006 4:10:27 PM	\$0		.[MonthNo]	0				
7	40	3/24/2006 10:41:41 AM	\$0		[Quarter]	0				
8	39	3/24/2006 10:55:46 AM	\$0		[QuarterNo]	p I				
9	38	3/24/2006 10:56:57 AM	\$0		.[Year]	p				

10. Add a closing bracket, double-check the expression, and press Enter:



11. The InvoiceDue column will now be created. It will return the end date of each quarter based on the Invoice Date field:

InvoiceDue = ENDOFQUARTER Invoices[Invoice Date].[Date]								
Invoice ID	Order ID	Invoice Date	Tax	Shipping	Amount Due	InvoiceDue		
5	31	3/22/2006 4:08:59 PM	\$0	\$0	\$0	3/31/200612:00:00 AM		
6	32	3/22/2006 4:10:27 PM	\$0	\$0	\$0	3/31/200612:00:00 AM		
7	40	3/24/200610:41:41 AM	\$0	\$0	\$0	3/31/200612:00:00 AM		
8	39	3/24/200610:55:46 AM	\$0	\$0	\$0	3/31/200612:00:00 AM		
9	38	3/24/2006 10:56:57 AM	\$0	\$0	\$0	3/31/200612:00:00 AM		
10	37	3/24/200610:57:38 AM	\$0	\$0	\$0	3/31/200612:00:00 AM		
11	36	3/24/200610:58:40 AM	\$0	\$0	\$0	3/31/200612:00:00 AM		
12	35	3/24/200610:59:41 AM	\$0	\$0	\$0	3/31/200612:00:00 AM		
13	34	3/24/200611:00:55 AM	\$0	\$0	\$0	3/31/200612:00:00 AM		

12. The next question comes from the sales manager, who wants to restructure the districts and would like a list of where current customers are located. This will require a new table, so click Modeling → New Table:

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File Home Modeling Help									
Manage Relationships	New N Measure Co	New New Table	New Parameter	Sort by Column -	Data type: Date/Time ▼ Format: *3/14/2001 1:30:55 PM (G) ▼ \$ ~ % ,	Home Table: Data Category: Uncategorized Default Summarization: Don't summarize			
Relationships	Calcu	ilations h	S What If	Sort	Formatting	Properties			



13. The new table will be created. Enter "District Summary" as the table name:

14. We want to return unique values from the State/Province field of the Customers table. This means we will use the VALUES function:



15. Type an opening bracket. A field list will then appear. Scroll down slightly and double-click the State/Province field from the Customers table:



16. Close the bracket and press Enter:



17. The table will now be created:

NA Image: Control of the second of the sec	$\times \checkmark$	District Summary = VALUES[Customers[State/Province]]	FIELDS	>
WA Result Percent CA Result IIII Contents W1 IIIII Contents IIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIII	State/Province			
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D Monta 07 Monta 1 Mo	WI		State/Province	
0R Image: Im	ID		🕨 🧮 Employees	
UT IL IL FL NV NV TO CO HI CO CO CO CO CO CO CO CO	OR		4 📰 Invoices	
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NV Tit Tit C0 H MC MD RA C0 RA RA <td>FL</td> <td></td> <td>∑ Invoice ID</td> <td>_</td>	FL		∑ Invoice ID	_
TM Million Co Order Dial MD Dial MD Dial MD Dial MD Dial MD Dial MD Dial MD Dial MD Dial MD Dial MD Dial MD Dial MD Dial NC	NV		InvoiceDue	
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18. Finally, the team wants to know the total unit price from all sales (excluding taxes and shipping). To do this, we will create a measure and then display it as a visualization. Let's place it in the Order Details table, which contains the unit price values. Click this table to select it:



19. Now, click New Measure on either the Home or Modeling tabs:

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20. Name the new measure "TotalOrderValue:"


21. Type SUM for the function:



22. Type a bracket, type the letter "O," and double-click the Unit Price field in the Order Details table:

×	TotalOrd	erValue = SUM(
ID	Order ID	Product ID Ad	A(ColumnName)		Status ID
27	30	34	Order Details'[Discount]	^	2
28	30	80	Order Details"[ID]		2
29	31	7	Order Details'[Inventory ID]		2
30	31	51	'Order Details'[Order ID]		2
31	31	80	Order Details'[Product ID]		2
32	32	1	'Order Details'[Purchase Order ID]		2
33	32	43	Order Details'[Quantity]		2
34	33	19	Order Details'[Status ID]		2
35	34	19	Order Details [Unit Price]		2
36	35	48	Under Details Status'		2
47	25			×	

23. Type a closing bracket and then press Enter to complete the measure:



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	~	TotalOrderVal	ue = SUM(*Or	der Detai	Ls'[Unit Pr	ice])						~	
k p	Or	der ID Produ	act ID Quan	tity Un	it Price Di	scount Stat	as ID Date Allocated	Purchase Order I	D Invent	ory ID			///////////////////////////////////////
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	30	31	51	10	\$53	0	2			65	5		4 III District Summary
	31	\$1	80	10	\$3.5	0	2			66	6		State/Drovince
	32	32	1	15	\$18	0	2			67	7		state/Province
	33	32	43	20	\$46	0	2			68			Employees
	34	33	19	30	59.2	0	2		97	81			Invoices
	35	34	48	10	\$12.75	0	2			70			∑ Amount Due
	87	36	41	200	\$9.65	0	2		98	79	• •		Invoice Date
	38	37	8	17	\$40	0	2			71	1		Σ Invoice ID
	39	38	43	300	\$46	0	2		99	77	7		177 InvoiceDue
	40	39	48	100	\$12.75	0	2		100	75	5		Order ID
	41	40	81	200	\$2.99	0	2		101	73	3		∑ Shipping
	42	41	43	300	\$46	0	1		102	104	4		∑ Tax
	43	42	6	10	\$25	0	2			84	4		New Customers
	44	42	4	10	\$22	0	2			85	5		4 🔟 Order Details
	45	42	19	10	\$9.2	0	2		103	110	0		Date Allocated
	46	43	80	20	\$3.5	0	1			86	6		∑ Discount
	47	43	81	50	\$2.99	0	1			87	2		
	48	44	1	25	518	0	1			88			∑ Inventory ID
	49	44	43	25	546	0	1			89			Order ID
	51	44	41	50	59.65	0	2		104	116	6		∑ Product ID
	52	45	40	50	\$18.4	0	2			91	1		∑ Purchase Order ID
	53	46	57	100	\$19.5	0	2		105	101	1		∑ Quantity
	54	46	72	50	\$34.8	0	2		106	114	4		Status ID
	55	47	34	300	\$14	0	2		107	108	8		TotalOrderValue
	56	48	8	25	\$40	0	2		108	106	6		∑ Unit Price
	57	48	19	25	\$9.2	0	2		109	112	2		Order Details Status
	59	50	21	20	\$10	0	2			92	2		Orders
	60	51	5	25	\$21.35	0	2			93	3		Orders Status
	61	51	41	30	\$9.65	0	2			94	4		
	62	51	40	30	\$18.4	0	2			95	5		
TABLE: Order D	66 etails (58 m	56 ws) COLUMN: Tot	48 alOrderValue (0	10 distinct value	\$12.75	0	2		111	99	9		

24. Now, let's display this new measure as a visualization. Switch back to Report view:

25. Click the Card visualization from the Visualizations pane:

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														Drag data fields here	$\square \Sigma$ Product ID
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															🔲 \Sigma Quantity
															Status ID
															TotalOrderValue
															Unit Price
															• III Orders
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PAGE 1 OF 1															

26. Check the new TotalOrderValue measure:

27. The total will be displayed:



28. Save your work as Activity 2-3 Complete and close Power BI.

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TOPIC D: Managing Relationships

Just as in Access, relationships define how the tables and fields in your database relate to each other. Once these relationships have been defined, reports and visualizations will be able to draw information from all of them just as if they were one large dataset.

Topic Objectives

In this section, you will learn how to:

- Use the Relationships view
- Create, edit, and delete relationships
- Use the Manage Relationships dialog

Using the Relationships View

To access Relationships view, click the third icon in the navigation pane:



You will then see a view of all the tables and fields in the current data sources, and how they are linked:



Creating Relationships

To create a relationship between two fields, drag one field to the other. Here, we are linking two Employee ID fields:



The relationship will then be created, as indicated by a white arrow:



As in Access, the direction of the arrow and the symbols on it provide more information about the relationship.

Editing Relationships

To edit a relationship, double-click it:



The "Edit relationship" dialog will open:

Orders	s				- 🕕				
Order	Employee ID	Custome	r ID	Orde	er Date	Shipped Date		Shipper ID	Ship Name
	30	9	27	1/15/200	6 12:00:00 AM	1/22/2006 12:00:	00 AM	2	Karen Toh
	31	3	4	1/20/200	6 12:00:00 AM	1/22/2006 12:00:	00 AM	1	Christina Lee
	32	4	12	1/22/200	06 12:00:00 AM	1/22/2006 12:00:	00 AM	2	John Edward
<									>
1	Northwind Traders	Freehafer	Nan	cy	nancy@northwindtraders.com		Sales Representative		(123)555-01
ID	2 mpany	Last Name	First	Name	E-mail /	Address	Job Title		Business Pho
2	Northwind Traders	Cencini	And	ew	andrew@northwindtraders.com		Vice President. Sales		(123)555-01
3	Northwind Traders	Kotas	Jan		ian@northwin	dtraders.com	Sales I	Representative	(123)555-01
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Here, you can specify the **tables (1)** and **fields (2)** that are related. At the bottom, you can **set options (3)** like cardinality. Click OK when you are finished editing the relationship to apply the changes.

Deleting Relationships

To delete a relationship, right-click it and click Delete:

Order ID Employee ID Customer ID Order Date Chinned Date	^ * *	a	X Delete		- <u>-</u>
		Employee	25		
		ID		^	
		Compa	ny		
		Last Na	me		
		First Na	me		
		E mail (Addrose	~	

Then, click Delete to confirm the operation:



Always be very careful when deleting relationships, as they may adversely affect the integrity of your data, and therefore your ability to build visualizations!

Using the Manage Relationships Dialog

You can quickly access the Manage Relationships dialog from the Home tab in any view:

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File Home Vi	iew Modeling Help		
Paste Cut Paste Format Painter	Get Recent Enter Data + Sources + Data	New New Visual & Shapes +	Manage Relationships
Clipboard	External data	Insert Custom visuals	Relationships Calculations Share

This dialog allows you to create, manage, view, and edit relationships:

Active	From: Table (Column)	To: Table (Column)
 ✓ 	Invoices (Order ID)	Orders (Order ID)
	Order Details (ID)	Customers (ID)
~	Order Details (Order ID)	Orders (Order ID)
~	Order Details (Status ID)	Order Details Status (Status ID)
	Order Details (Status ID)	Orders Status (Status ID)
~	Orders (Customer ID)	Customers (ID)
~	Orders (Employee ID)	Employees (ID)
	Orders (Status ID)	Order Details Status (Status ID)
✓	Orders (Status ID)	Orders Status (Status ID)
New	Autodetect Edit Delete	

There is also a command here to automatically detect and build relationships – useful if you have imported several different data sources that are not yet related.

Activity 2-4: Managing Relationships

In this activity, we will review and update the relationships in our sample file.

1. Open Power BI and open Activity 2-4:



2. Click the Relationships icon in the navigation pane:

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Paste Copy Copy Clipboard	iet Recent Enter ta • Sources • Data External di	Edit Queries •	New New Visual C Shapes *	From From Store File	Manage Relationships Relationships	New Measure	Publish		
Relationships Relationships TotalOrder	PK Value							VISUALIZATIONS > Image: Ima	FIELDS >
← → Page 1 🕂									

3. Review the relationships in this data file. You can see that the New Customers table, which we appended to the Customers table earlier in this lesson, was erroneously linked to the Employees table:





4. Right-click the relationship line and click Delete:

5. Click Delete to confirm the operation:



6. We can also see that the Customers table is not linked to the Orders table. Click and drag the Order ID field from the former table to the latter:





7. The relationship will be created. Double-click the line to see its details:

8. Review the cardinality options and confirm that the relationship type is set correctly. (Many orders can belong to one customer.) Click OK to close the dialog box:

Order	s					-							
Order	ID	Employ	yee ID	Customer ID		Order Date	2	Shippe	d Date	Shipper	ID	Ship N	ame
	30		9	2	7 1/.	15/2006 12:0	0:00 AM	1/22/2006	5 12:00:00 AM		2	Karen 1	Toh
	31		3	4	1/2	20/2006 12:0	0:00 AM	1/22/2006	5 12:00:00 AM		1	Christi	na Lee
	32		4	1	2 1/.	22/2006 12:0	0:00 AM	1/22/2006	5 12:00:00 AM		2	John E	dward
<													>
30	Comp	any A	Bawden	Emory		Recruiting	Manager		(805) 9178677	7 (9	79) 53	77200	0 Chi
31	Comp	any A	Horder	Cristen		Analog Circ	uit Desig	n manager	(850) 7884226	5 (9	15) 14	19980	94 St
32	Comp	any C	Gianolini	i Audrey		Quality Eng	gineer	-	(240) 9151265	5 (9	01) 66	52414	3473
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V IVId								-					

 Let's do a final check to make sure all relationships are configured correctly. Click Home → Manage Relationships:

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Paste 🍼 Format Painter	Get Recent Enter Edit Refresh Data ▼ Sources ▼ Data Queries ▼	New New Page Visual 💀 Shapes 🗸	From From Ma Store File Relati	nage Publis onships	h
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Active	From: Table (Column)	To: Table (Column)	
	Customers (ID)	New Customers (ID)	
~	Invoices (Order ID)	Orders (Order ID)	
	Order Details (ID)	Customers (ID)	
	Order Details (ID)	New Customers (ID)	
~	Order Details (Order ID)	Orders (Order ID)	
~	Order Details (Status ID)	Order Details Status (Status ID)	
	Order Details (Status ID)	Orders Status (Status ID)	
~	Orders (Customer ID)	Customers (ID)	
~	Orders (Employee ID)	Employees (ID)	
	Orders (Status ID)	Order Details Status (Status ID)	
✓	Orders (Status ID)	Orders Status (Status ID)	
New	Autodetect Edit Delete		

10. The Manage Relationships dialog box will open. Click Autodetect:

11. Power BI should detect two new relationships. Click Close when you see the notification:



Active	From: Table (Column)	To: Table (Column)	
~	Invoices (Order ID)	Orders (Order ID)	~
	Order Details (ID)	Customers (ID)	
	Order Details (ID)	New Customers (ID)	
~	Order Details (Order ID)	Orders (Order ID)	
~	Order Details (Status ID)	Order Details Status (Status ID)	
	Order Details (Status ID)	Orders Status (Status ID)	
~	Orders (Customer ID)	Customers (ID)	
~	Orders (Employee ID)	Employees (ID)	
	Orders (Status ID)	Order Details Status (Status ID)	
~	Orders (Status ID)	Orders Status (Status ID)	
	Employees (ID)	Customers (ID)	
 ✓ 	Employees (ID)	New Customers (ID)	~
~	Employees (ID)	New Customers (ID)	

12. Review the two new relationships added. Close the dialog box:

13. Save your work as Activity 2-4 Complete and close Power BI.

Summary

In this lesson, we learned how to prepare data before creating visualizations. You should now be familiar with transforming and sanitizing data using Data view and the Query Editor. You should also be familiar with data modeling using DAX and managing relationships.

Review Questions

- 1. What is DAX?
- 2. Where should a measure be stored?
- 3. Which tab contains commands to set the data type, format, category, and summarization?
- 4. How do you create a relationship between two fields in Relationships view?
- 5. How do you open the Query Editor?

LESSON 3: WORKING WITH REPORTS AND VISUALIZATIONS

Lesson Objectives

In this lesson you will learn how to:

- Manage report pages
- Change report view options
- Work with visualizations and their data
- Add static objects to a report

TOPIC A: Managing Report Pages

In this lesson, we will turn our focus back to Report view. You can add multiple pages to a report, and add, delete, and modify them as required.

Topic Objectives

In this topic, you will learn how to:

- Navigate through report pages
- Show and hide pages
- Add, delete, and rename pages
- Change page order

Navigating Through Pages

To view a different report page, simply click its tab at the bottom of Report view:



Its contents will then be displayed.

Showing and Hiding Pages

To temporarily hide a page, right-click its tab and click Hide Page:



The page tab will then be grayed out. You can show it again by right-clicking the page tab again and de-selecting Hide Page:



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Adding Pages

There are two ways to add a new page. You can create a duplicate of the current page from the right-click menu:



Or, you can create a blank page using the plus sign at the end of the page tab list:



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Deleting Pages

To permanently delete a page, move your mouse over the page tab and click the X:





You can also delete a page from the right-click menu:

In either case, you will be prompted to click Delete to confirm the operation:



Renaming Pages

The final command on the right-click menu is Rename Page:

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Base Cut	
	VISUALIZATIONS > FIELDS >
EE	■ ■ ■ ■ ■ ● P Search ■ ■ ■ ■ ■ ■ Search ■ ■ ● ■ ■ Search ■ ■ ● ■ Search ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ □ ■ ■ ■ ■ □ ■ ■ ■ ■ □ ■ ■ ■ ■ □ ■ ■ ■ ■ □ ■ ■ ■ ■ □ ■ ■ ■ ■ □ ■ ■ ■ ■ □ ■ ■ ■ ■ □ ■ ■ ■
NAA DE HONE DE	Drag data fields here FILTERS Page level filters Drag data fields here Drilltbrough filters
Very Very Very Very Very Very Very Very	Drag drifftrough fields here Report level filters Drag data fields here
Dupikate Page Rename Page Delete Page	
() Info Overview District Monthly Sales New Stores Pag	

This command will change the page tab name into an editable field. Simply type the new name and press Enter to apply it:



Changing Page Order

Finally, to change the order of pages, simply click and drag the tab:

	\leftarrow	Info	Overview Territory istrict Monthly Sales	New Stores	Territory Map	+
--	--------------	------	--	------------	---------------	---

Release your cursor when you have reached the desired location.

Activity 3-1: Managing Report Pages

In this activity, we will set up the report that will be used throughout this lesson.

Open Power BI and open Activity 3-1: 1.



- Microsoft Power BI Deskto... 1.88 MB
- 2. The Info page should be displayed by default. This is important information but does not need to be displayed to our report users. Right-click the page tab and click Hide Page:



3. Click the Page 1 tab to view it:

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	be science of making hings obvious
	<u>www.obvience.com</u>
	Obvience is an ISV and an Intellectual Property (IP) Incubator focused on Microsoft Business Intelligence. obviEnce works closely with Microsoft to develop best practices and thought leadership for jump-starting and deploying Microsoft Business Intelligence solutions.
	This file and associated data is property of obviEnce IIc and has been shared solely for the purpose of demonstrating Power BI functionality with industry sample data.
	Any uses of this workbook and/or data must include the above attribution. The workbook and any visualization pages must be accompanied by the following copyright notice: obvi $Ence \mathcal{G}$.
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	Info Page 1 N

4. There are two different visualizations on this page. Let's create a separate page for each of them. First, let's set up the pages. Right-click the Page 1 tab and click Rename Page:



5. Type, "Report by Division" in the field and press Enter:

\rightarrow	Info	Report by Division	+
---------------	------	--------------------	---

6. Now, click the plus sign to create a new page:



7. Right-click this new tab and click Rename Page:



8. Type, "Report by State" in the field and press Enter:

	• •	Info	Report by Division	Report by State	+
--	-----	------	--------------------	-----------------	---

9. Now, go back to the Report by Division page by clicking its tab. Click the border of the map visualization to select it and click Home \rightarrow Cut:



10. Go back to the Report by State tab. Click Home \rightarrow Paste:

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												State (All)		
												Total Revenue (All)		
					×	_						Page level filters		
	< → Info	Report by D	ivision	Report by S	State	+						Drag data fields here		
PAGE 3 0	OF 3													

11. The visualization will now be moved onto the new page:

12. Finally, let's move the Info page to the end of the page tab list. Click and drag the page tab to its new position:



13. Save your work as Activity 3-1 Complete and close Power BI.

TOPIC B: Changing Report View Options

One tab we have not yet explored is the View tab. Here, you can change the view and layout of the current report.

Topic Objectives

In this section, you will learn:

- How to set page view options
- How to customize your view
- About phone and desktop layout

Setting Page View Options

To set page view options, click Home \rightarrow Page View:



This menu allows you to fit the current canvas to the page, the screen width, or to its actual size.

Customizing Your View

Next, let's look at the Show group on the View tab:



The three options on the left allow you to customize the canvas and its objects, allowing you to show gridlines, turn on snap, and lock the objects on the current page.

The Field Properties option allows you to show or hide the related task pane, where you can customize the field name and description:



The Selection Pane option will also show a task pane:



Here, you can select objects by clicking them from the task pane. You can also show, hide, and change the order of objects.

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Using Phone vs. Desktop Layout

So far, we have been using desktop layout, which is the standard view for the Power BI desktop client. This presents the report in a standard landscape-style format:



However, if you are designing reports that will be used in Power BI mobile apps, you may want to add a mobile view. To start, click View \rightarrow Phone Layout:



You will now see a blank, scrollable canvas in the shape of a smartphone, with the existing visualizations listed in a pane on the right:
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File View	John Smith \land 🔞
Show Gridlines Field Properties	
Snap Objects to Grid Selection Pane	
Layout View- Lock Objects	
View Show	
La VISUALIZATIONS C REM	VE ALL VISUALIZATIONS
Analysis	
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	Trans
Info Overview District Monthly Sales New Stores Page 1	
AGE4 OF 5	

Click and drag the visualizations to the canvas to add them. You can also size and place them as desired:

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Not Field Properties		, jann smithn 🤲 😈
Image: State	New Stores Analysis	

(You cannot create new visualizations in this view.) When you are finished, click Desktop Layout on the View tab to return to the full interface.

Now, when users access this report on a smartphone, they will see the phone layout instead of the desktop layout.

Activity 3-2: Changing Report View Options

In this activity, we will create a smartphone view for one of our reports, and modify our view options.

1. Open Power BI and open Activity 3-2:



2. Ensure the "Report by Division" page is selected, as this is the report we want to create the smartphone view for. Click View \rightarrow Phone Layout:



3. The new view will be displayed, with a blank layout in the canvas area and the visualizations to the right:



4. Now, drag the chart onto the smartphone canvas, lining it up as shown here:

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	File View	John Smith 🔗 🚷
	Show Gridlines Field Properties Shap Objects to Grid Selection Pane Layout View Show	
Report by Division Report by State Info		VISUALIZATIONS 🖉 REMOVE ALL VISUALIZATIONS
Report by Division Report by State Info		
() Report by Division Report by State Info		
AGE 10F3	Report by Division Report by State	
	PAGE 1 OF 3	

5. If necessary, click the visualization to select it. Then, drag the bottom right handle down and to the right to make it slightly larger, as shown here:



6. Return to desktop layout using the View tab:



7. Notice that our original report has not changed. However, it could use some layout improvements. Check the "Show Gridlines" and "Snap Objects to Grid" options on the View tab:



8. Click and drag the visualization to the position shown here:





9. Now, resize the visualization to the dimensions shown here:

10. Save your work as Activity 3-2 Complete and close Power BI.

TOPIC C: Working with Visualizations

Next, we are going to take a closer look at working with visualization data. This is the biggest strength of Power BI: the ability to quickly and easily view your data in different ways.

Topic Objectives

In this section, you will learn how to:

- Drill through data
- Change category and summarization options
- Arrange visualizations
- Edit interactions
- Add custom visualizations to Power BI

Understanding Drillthrough Options

When a report has time data, Power BI automatically breaks it down by time period. For example, this dataset originally had only the ReportingPeriodID field, but Power BI broke it down into the remaining components:

ReportingPeriodID	Period	FiscalYear	FiscalMonth	Month
20130101	1	2013	Jan	1/1/13
20130102	1	2013	Jan	1/2/13
20130103	1	2013	Jan	1/3/13
20130104	1	2013	Jan	1/4/13
20130105	1	2013	Jan	1/5/13
20130106	1	2013	Jan	1/6/13
20130107	1	2013	Jan	1/7/13
20130108	1	2013	Jan	1/8/13
20130109	1	2013	Jan	1/9/13
20130110	1	2013	Jan	1/10/13
20130111	1	2013	Jan	1/11/13

This breakdown can then be used to drill through data in different ways using either the visualization itself or the Visual Tools – Data/Drill tab:



The single arrows allow you to move through a single hierarchy of data, while the double arrows allow you to move through multiple hierarchies (if available – otherwise they will navigate through the single hierarchy).



For example, if we drill all the way through the data, we will see a total for the fiscal year:

Notice that the visualization title has updated, too.

Changing Category and Summarization Options

Earlier, we looked at setting the category and summarization options when working with raw data in Data view. You can also change these options on the fly from the Modeling tab while in Report view:



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You can also right-click field(s) in the Value well of the Visualizations pane and customize how to show it:



Arranging Visualizations

So far, we have been working with the Visual Tools – Data/Drill tab. Let's look at the Format tab; specifically, the Arrange group:



If you have worked with graphics in other Office applications, these commands work in a similar way. For example, if we want to left-align these two text cards, we can hold Ctrl, click each of them to select them, and then click Align \rightarrow Align left:



The cards' left borders will now be aligned:



Editing Interactions

The Interactions group of the Visual Tools – Format tab controls how visualizations affect each other:



If you have a visualization with drilldown options, you can uncheck the "Drilling filters other visuals" option so that it does not affect the other visuals.

To customize how visualizations interact with each other, select the target visualization and click the "Edit interactions" command. This will show additional options on each visualization:



(Note that the selected visual, the pie chart in the top left, does not have these options. This indicates that we are modifying its interaction with the other visualizations.)

The highlighted icon on each item indicates what type of interaction it has with the selected visualization. Typically, you can choose Filtering or None, but these options may vary by visualization. (For example, the chart has a Highlight icon.) Simply click the icon that defines how you want the selected visualization to interact with it. Here, we are turning filtering off in the Total Sales Variance chart:



When you have finished setting your options, click "Edit interactions" on the Visual Tools – Format tab to return to normal view.

About Custom Visualizations

If you have custom visualizations available through your organization, or need a custom visualization from the Microsoft Store, you can access them through the Home tab or the ellipses in the Visualizations pane:



Simply choose your source, and then browse for the desired visual. It will then be available in the Visualizations pane just like the default visualization options.

Activity 3-3: Working with Visualizations

In this activity, we will adjust the position of a visualization, add drilldown options to it, and customize its interactions.

1. Open Power BI and open Activity 3-3:



2. The "Report by Division" page should be displayed. (If not, click its tab to view it.) Notice that we have added a pie chart to this page that displays the number of customers. We have also turned off the canvas gridlines:





3. First, let's align these two objects. Hold the Ctrl key and click each visualization:

4. Click Visual Tools – Format \rightarrow Align \rightarrow Align middle:



5. The objects will now be aligned at their middle point. Click the bar chart to select it:



6. Now, let's add a time value to the chart. This will add more meaning to the data and provide drilldown options. In the Fields pane, expand the Date table and check the YQM data hierarchy to add it to the chart:



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7. Drilldown options will now appear on the chart. We want our other chart to remain static while drilling down, however, so click Visual Tools – Format and ensure the "Drilling filters other visuals" option is unchecked:



8. Right now, we are seeing the total revenue by division. Let's drill down a level, to see the revenue by year. Click the double down arrow to do this:





9. Drill down once more to see the revenue by quarter:

10. Review the data. Then, click the up arrow twice to return to the original view:



11. Save your work as Activity 3-3 Complete and close Power BI.

TOPIC D: Adding Static Objects to a Report

To wrap up this lesson, we will look at some of the static objects you can add to a report, such as shapes, images, and text boxes. We will also take a quick look at working with static objects and arranging them on the page.

Topic Objectives

In this section, you will learn how to:

- Insert pictures, text boxes, and shapes
- Work with static objects

Inserting Pictures

To add a picture to a report, click Home \rightarrow Image:

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Then, navigate to the file, click to select it, and click Open:

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The image will then be added to the page:

Inserting Text Boxes

To add a static text box to a page, click Home \rightarrow Text box:





The text box will be inserted and selected:

Simply type your text, and use the mini toolbar to format it as necessary:



Inserting Shapes

The last option we will look at is drawing a shape. Click Home \rightarrow Shapes and choose the shape you want to add:



It will be added to the page, and can be moved and resized as desired:



Working with Static Objects

You can manage static objects just like visualizations. For example, use the handles to resize an object:



Click and drag it to move it:





Click the "More options" icon to see options to remove or spotlight it:

You can also use the Visual Tools – Format tab to arrange and distribute objects:

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Activity 3-4: Adding Static Objects to a Report

In this activity, we will add a picture and a text box to the report we have been working on.

- 1. Open Power BI and open Activity 3-4:
 - Activity 3-4 Microsoft Power BI Deskto...

 The "Report by Division" page should be displayed. (If not, click its tab to view it.) Click Home → Text box:



3. The text box will be inserted. Click and drag the bottom right handle up and to the right to create a rectangle of approximately the size shown here:





4. Now, click and drag the text box, and move it to the position shown here:

(It should snap into place.)

5. Click inside the text box and type, "Report by Division:"



6. Select the text. Use the mini toolbar to increase the size to 28:



7. Add a bold effect:



8. The title is now complete:



 Click outside the text box to de-select it. Now, let's add an image. Click Home → Image:



 The Open dialog will appear. Navigate to your Exercise Files, open the Lesson 3 folder, select the Report Image file, and click Open:





11. The image will be inserted. Click and drag it to the top left corner of the canvas:

12. Click and drag the bottom right handle down and to the right to make it the same size as the canvas:



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Now, let's place the picture in the background. Click Visual Tools – Format → Send backward → Send to back:



14. The report background is now complete:



15. Save your work as Activity 3-4 Complete and close Power BI.

Summary

In this lesson, we learned more about reports and visualizations. You should now feel ready to set up report pages and view options, work with visualizations, and add static objects.

Review Questions

- 1. You have hidden a page in your report showing next year's budget. You are now ready to share it with others. How do you show it?
- 2. True or False: Always duplicate a page when creating a phone layout so the desktop layout is not lost.
- 3. You have a chart with drilldown enabled, but you do not want the other visualizations on the page to change when the user is drilling through the data. Where do you set this option?
- 4. How do you add a local picture to a report page?
- 5. How do you add an online picture to a report page?

LESSON 4: A CLOSER LOOK AT VISUALIZATIONS

Lesson Objectives

In this lesson you will learn how to create and manage the following types of visualizations:

- Matrixes
- Tables
- Charts
- Maps
- Gauges
- Cards
- KPIs
- Slicers
TOPIC A: Matrixes, Tables, and Charts

In this lesson, we will take a closer look at some of the visualizations available in Power BI. To begin, we will explore matrices, tables, and charts.

Topic Objectives

In this topic, you will learn how to:

• Create matrix, table, and chart visualizations

Creating a Table

First, let's look at creating a basic table:



Once we add the visualization, we can choose the fields to display by checking them in the Fields task pane. This will automatically add them to the Values well, which is the only well available for tables:



Note, however, that you can add filters to customize table display.

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For example, here we have added the TotalSales field to the table:

We can then add the FiscalMonth field to the "Page level filters" area:

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And then choose the month to see data for:

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(If we want the filter to be available for other visualizations on this page, we could add the filter to the "Page level filters" area. Or, add it to the "Report level filters" area to make it available across all pages.)

To clear the filter, click the eraser icon at the top of the list:



Creating a Matrix

A matrix is similar to a table but has additional flexibility and displays data in a crosstabstyle view. Its icon is next to the Table icon in the Visualizations pane:



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Let's add the same fields to the matrix that we used for the table:

We can see sales by business unit, separated by district, with a total for each. Drilldown options are also available as each business unit is separated into districts:

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As well, notice the scroll bar at the bottom of the matrix – use this to view more data.

The "Drillthrough filters" section also allows you to filter data, just as we did with tables. Simply check the data to view and uncheck the data to hide:

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Note that in this example, these filter options will affect the table as well since they are using the same data fields.

Overview of Chart Types

As of this writing, there are 16 types of charts available in the Visualizations pane:



Let's take a quick look at each type, moving from left to right and top to bottom.

Chart Type	Description
Stacked Bar	Display relationships between values.
Stacked Column	Display relationships between values within categories, or changes over time.
Clustered Bar	Display multiple relationships between values.
Clustered Column	Display multiple relationships between values within categories, or changes over time.
100% Stacked Bar	Display relationships between values within categories (or changes over time) as related to the whole.
100% Stacked Column	Display relationships between values as related to the whole.
Line	Show the progression of values over time.
Area	Show relationships between values over time.
Stacked Area	Show relationships between values over time as part of a whole.
Line and Stacked Column	Display relationships between values within categories, or changes over time, with a constant line.
Line and Clustered Column	Display relationships between values within categories, or changes over time, with a constant line.
Ribbon	Similar to a Line chart, but with a 3-D display and additional data options.
Waterfall	Displays the cumulative effect of positive or negative values.

Scatter	Displays values for two variables within a dataset.
Pie	Displays values as part of the whole.
Donut	Also displays values as part of the whole but allows comparison of more than one data series.

Creating Charts

All charts are created in a similar way and offer similar features. Let's create a simple line chart for this example:



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We will add the TotalSales field as the Values, and the FiscalMonth as the Axis:

Just as with other visualizations, we can add filters to customize the data. We can also add a legend to show another category:

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Here are the results:



You can change the chart type at any time by choosing another icon:

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Info Overview District Monthly Sales PAGE 7 OF 7	New Stores by Territory Last Year Sales Matrixes, Tables, and Charts 🕈	E Month

And do not forget about the Format tab, which you can use to customize your chart:

Activity 4-1: Matrices, Tables, and Charts

In this activity, you will begin creating a company scorecard report.

1. Open Power BI and open Activity 4-1:



Activity 4-1 Microsoft Power BI Deskto... 2.53 MB

2. The Company Scorecard page should be displayed. (Make sure it is selected.) Our first task is to show the sum of revenue, broken down by division and industry. Let's use a matrix to display this data. Click the Matrix icon in the Visualizations task pane:



 Since we want to see the total revenue as the matrix data, locate this field in the Fact category. Drag it to the Values well:



4. Add the Industry field (from the Industry group) to the Rows well and the Division field (from the BU group) to the Columns well:



5. Resize the matrix so all data is displayed:

Company Scorecard

		—		E1 ···
Industry	Core	Growth	Minor	Total
			\$1,015,863	\$1,015,863
CPG	\$2,429,919	\$15,446,872	\$548,587	\$18,425,378
Distribution			\$7,848,274	\$7,848,274
Energy	\$185,921	\$4,875,403	\$6,183,269	\$11,244,593
Federal-Civilian	\$6,249,886			\$6,249,886
Federal-DOD	\$42,081,190			\$42,081,190
Financial		\$147,147		\$147,147
High Tech	\$1,286,221	\$586,590	\$16,900	\$1,889,711
Industrial	\$111,130	\$3,940,596		\$4,051,726
Insurance		\$118,518		\$118,518
Materials			\$17,472	\$17,472
Metals		\$171,752	\$19,535,753	\$19,707,505
Oil & Gas	\$163,675	\$3,619,432	\$1,031,041	\$4,814,148
Paper			\$3,800,232	\$3,800,232
Pharma	\$4,043,481	\$10,944,579		\$14,988,060
Retail	\$961,584	\$567,437		\$1,529,021
Semiconductor		\$195,104	\$67,600	\$262,704
Services	\$76,744,580	\$12,453,539	\$2,751,584	\$91,949,703
Telecom		\$393,120	\$1,677,563	\$2,070,683
Transportation	\$286,885	\$1,409,383	\$971,804	\$2,668,072
Utilities	\$206,588	\$122,525		\$329,113
Total	\$134,751,059	\$54,991,998	\$45,465,942	\$235,208,999

2

6. Next, we want to know how much revenue varied from the budget, summarized by month. Let's use a waterfall chart to display this data. Click a blank area of the canvas to de-select the matrix. Click the Waterfall icon in the Visualizations pane:



7. Set up the fields as shown here:



 This does not show the data as clearly as we would like. Click the "Line chart" icon to change the visualization:



9. Review the results:



10. Resize and align the visuals as shown here:

Company Scorecard

Industry	Core	Growth	Minor	Total
			\$1,015,863	\$1,015,863
CPG	\$2,429,919	\$15,446,872	\$548,587	\$18,425,378
Distribution			\$7,848,274	\$7,848,274
Energy	\$185,921	\$4,875,403	\$6,183,269	\$11,244,593
Federal-Civilian	\$6,249,886			\$6,249,886
Federal-DOD	\$42,081,190			\$42,081,190
Financial		\$147,147		\$147,147
High Tech	\$1,286,221	\$586,590	\$16,900	\$1,889,711
Industrial	\$111,130	\$3,940,596		\$4,051,726
Insurance		\$118,518		\$118,518
Materials			\$17,472	\$17,472
Metals		\$171,752	\$19,535,753	\$19,707,505
Oil & Gas	\$163,675	\$3,619,432	\$1,031,041	\$4,814,148
Paper			\$3,800,232	\$3,800,232
Pharma	\$4,043,481	\$10,944,579		\$14,988,060
Retail	\$961,584	\$567,437		\$1,529,021
Semiconductor		\$195,104	\$67,600	\$262,704
Services	\$76,744,580	\$12,453,539	\$2,751,584	\$91,949,703
Telecom		\$393,120	\$1,677,563	\$2,070,683
Transportation	\$286,885	\$1,409,383	\$971,804	\$2,668,072
Utilities	\$206,588	\$122,525		\$329,113
Total	\$134,751,059	\$54,991,998	\$45,465,942	\$235,208,999



11. Save your work as Activity 4-1 Complete and close Power BI.

TOPIC B: Maps

The next type of visualization we will explore is maps. Bubble and filled maps are excellent for geographical breakdowns, while treemaps show parts of data as they relate to the whole.

Topic Objectives

In this section, you will learn how to:

• Create treemaps, bubble maps, and filled maps

Creating a Treemap

Treemaps show a visual breakdown of data as it relates to the whole. Let's try creating one to show how much each district contributed to annual sales. We will start by choosing the Treemap visual:



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Now, we can add the TotalSales and District fields as the Values and Group, respectively:

Notice the additional field areas in the Visualizations pane:

- **Details:** Add more text to the treemap shapes. For example, we could add the DM field to show the District Manager's name for each district.
- **Color Saturation:** Color fields in relation to a particular data set. For example, we could add Sales Per Square Foot to this well. Darker shades would represent a higher value, while lighter shades would represent a lower value.
- **Tooltips:** Similar to Details, but only shows the data when the user moves their mouse over the visualization.

Creating a Bubble Map

There are two types of geographical map visualizations in Power BI. The basic map visualization is also called a **bubble map** because of how it represents data:



Here, we have added the placeholder, and moved and resized it to make it easier to see. The next step is to add a location-based field to the Location well. If you have latitude and longitude values, you can use those wells instead:



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Next, we need to choose what will determine the size of each bubble. In this case, we will use the TotalSales field:



Here are the results:



Notice that you can add more fields in the Legend, Color saturation, and Tooltips fields to make your map even more meaningful. Filters are also available:

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As a final note, the Format tab of the Visualizations task pane contains lots of options to customize the appearance of your map. Of particular note is the Theme menu:

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By default, a road map is used, but several other options are also available.

Creating a Filled Map

A filled map works the same way as a bubble map, except it fills in geographical areas based on the data set. Let's try changing our bubble map to a filled map:



In this case, no data points are displayed as the PostalCode field is too specific. We can fix this by clicking the X next to this field to remove it, and adding the Territory field instead:



Filled maps have all the same options as previously discussed, including Legend, Color saturation, and Tooltips wells; filters; and a wide range of formatting options.

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Activity 4-2: Maps

In this activity, we will add two maps to our Company Scorecard report.

1. Open Power BI and open Activity 4-2:



Activity 4-2 Microsoft Power BI Deskto... 2,54 MB

2. First, let's create a treemap to show revenue by region. Click the Treemap icon in the Visualizations task pane:

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Total \$134,751,059 \$54,991,998 \$45,465,942 \$225,208,999									
Company Scorecard Report by Division Report by State Info									

 Add the Region field (from the State group) to the Group well. Add the Total Revenue field (from the Fact group) to the Values well:



4. Resize and position the visualization as shown here:



5. Next, let's add a similar visualization, but using the State field instead. De-select the treemap by clicking a blank area of the canvas. Then, click the Map icon from the Visualizations task pane:



6. Add the State field (from the State group) to the Location well. Add the Total Revenue field (from the Fact group) to the Size well:



7. Resize and position the visualization as shown here:



8. Let's customize this visualization. Click the Format tab in the Visualizations task pane:

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9. Click the Data Colors category. Then, click the color picker:

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- **10.** Click any color you like from the menu:

11. The color will then be applied. Now, use the Ctrl + Shift keyboard shortcut to zoom into the eastern continental U.S. If necessary, click and drag the map to change the focus as shown below:



12. Save your work as Activity 4-2 Complete and close Power BI.

TOPIC C: Cards, Gauges, and KPIs

The next set of visualizations we are going to explore show data points either on their own or as they relate to a target. This is particularly useful if you want to emphasize a particular value (such as sales to date) or progress towards a target (such as sales to date compared to sales targets).

Topic Objectives

In this section, you will learn how to:

- Create single and multiple row cards
- Create gauges and KPIs

Creating a Card

Cards show one or more rows of data. Like other visualizations, the card data updates if the source is refreshed or the user interacts with other visualizations on the page:



They are excellent for highlighting key points and creating data summaries.

Let's try creating a multi-row card; note that the single-row card icon is to its left.



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We can now check the fields we would like displayed:



You can use the Filters section of the Visualizations task pane, and the Format tab, to customize the card's display.

Creating a Gauge

The next visualization we will explore is the gauge, which shows progress towards a goal:

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•	> verview	District Monthly Sales	New Stores	New Stores by Territory	Last Year Sales	Matrixes, Tables, and Charts	Maps	Cards, Gauges, and KPIs	+	🕨 🎹 Time
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Now we can specify the fields to include. Our target value is our total units last year, while the value to be shown is the total units this year:



Notice that we can set minimum and maximum values based on other data fields. You can also manually specify these options under the Format tab of the Visualizations task pane:



Creating a KPI

A KPI visualization also displays progress towards a goal or the percentage of a value, but with more detail. Let's try creating this visualization to see if we are matching last year's sales:



We will add the TotalSales field as the Indicator (the value to measure), the TotalSalesLY field as the "Target goal" (the value to compare against), and the FiscalMonth as the "Trend axis" (to categorize progress):



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We can now see the progress, and that we are 91% above this KPI! Note that the KPI is formatted in green because we have met or exceeded it; it would be red if we have not yet met our goal.

This can be changed in the Format tab of the Visualizations pane. You can also set if high or low are the preferred values:

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Activity 4-3: Cards, Gauges, and KPIs

In this activity, we will add a gauge and a card to our Company Scorecard report.

1. Open Power BI and open Activity 4-3:



Activity 4-3 Microsoft Power BI Deskto... 2,54 MB

2. First, we want to show the total revenue as compared to last year. We will use a gauge to display this data, so click that icon from the Visualizations task pane:

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Transportation \$286,885 \$1,409,383 \$971,804 \$2,668,072	Total Revenue by Region			
Total \$134,751,059 \$54,991,990 \$45,465,942 \$235,200,999	NORTH SO	tal Revenue by State		
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Company Scorecard Report by Division Rep	ort by State Info 🍝			



3. Check the Total Revenue field to add it to the gauge:

4. We want to compare it to last year's revenue, which is not in this dataset. Click the Format tab of the Visualizations task pane to enter it manually:



5. Expand the "Gauge axis" section and enter "330500000" in the Max field:



6. Resize and position the gauge as shown here:



7. We also want to quickly see the percentage of revenue from subscriptions. We will use a card to display this data. De-select the gauge and click the Card visualization:



8. Check the "Sum of Subscription Revenue" field to add it to this card:



9. Resize and reposition the card as shown here:



10. Save your work as Activity 4-3 Complete and close Power BI.

TOPIC D: Slicers

The final visualization we will explore in this lesson is a bit different than the other types we have looked at. Slicers allow users to filter data on the fly, even with the Power BI web and mobile apps. (They are different from the Filters section of the Visualizations pane only in that users may not have access to these tools in the apps, and slicers are much more user-friendly.) If you have used slicers in Excel, the concept is the same.

Topic Objectives

In this section, you will learn how to:

- Create and use slicers
- Customize slicer display
- Change slicer mode and orientation

Creating a Slicer

To create a slicer, simply click the related icon from the Visualizations task pane:



Then, choose the slicer field:



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The slicer is now ready to use:



Using Slicers

Using a slicer is as easy as clicking the item you want to filter the data by:



Here, we have chosen to view data only for the Fashions Direct chain.

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Here is another example, where we have filtered sales data by month:

To clear the filter, uncheck the box or click the Clear Selections command in the top right corner of the slicer:

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Customizing Slicer Display

By default, users can only select one item from a slicer at a time. This option can be changed in the Format tab of the Visualizations task pane by setting the Single Select option to Off:

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An option to show a "Select All" control is also available here, along with many other formatting choices.

Changing Slicer Mode

By default, slicer values are shown as a list, where the user checks the data they want to view. However, you can change this display to a dropdown list. Click the arrow in the top right corner of the slicer and click Dropdown:

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Here is how the slicer now appears:

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Note that, however, it works in the same way. You can change it back to a list at any time by clicking the arrow icon and clicking List.

Changing Slicer Orientation

You can also display a slicer as a list of buttons, allowing the user to click the items they want to see. Click the Format tab in the Visualizations task pane, click the Orientation menu, and choose Horizontal:



Here is how our slicer now looks; we can click any month icon to see its data. Note the arrows that allow you to view more buttons:

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Activity 4-4: Slicers

In this activity, we will add the final element to our Company Scorecard report: a slicer.

1. Open Power BI and open Activity 4-4:



Activity 4-4 Microsoft Power BI Deskto... 2.54 MB

2. Click the Slicer icon from the Visualizations task pane:

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3. Resize and reposition it as shown here:



4. Add the Name field from the Executive group to the slicer:



5. Now, let's customize the slicer display. Click the Format tab in the Visualizations task pane:



6. Expand the General category. Change the orientation from Vertical to Horizontal:



7. This will display the slicer as a row of buttons:

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8. Click the "Outline color" color picker. Choose the top shade of teal:



9. Now, scroll down in the pane and expand the Selection Controls section. Ensure both options are set to "On:"



10. Now, try clicking one of the executives' names from the new slicer:

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11. Observe how the data changes:

12. Click the Clear Selection icon in the slicer:

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13. Save your work as Activity 4-4 Complete and close Power BI.

Summary

In this lesson, we looked at the different kinds of visualizations available in Power BI. You should now feel comfortable creating and customizing all types of visualizations.

Review Questions

- 1. What is the process for creating any kind of visualization?
- 2. How do you display a slicer as a list of buttons?
- 3. If you want to show the cumulative effect of positive or negative values, what chart type would you choose?
- 4. What is the difference between the KPI and gauge visualizations?
- 5. What are the two types of geographical map visualizations?

LESSON 5: INTRODUCTION TO THE POWER BI WEB APP

Lesson Objectives

In this lesson you will learn how to:

- Use the Power BI web app
- Connect to data sources from the Power BI app
- Use workspaces, dashboards, reports, and other Power BI app features

TOPIC A: Getting Started

So far, we have focused on the Power BI desktop client. However, Power BI also features a web app that is very useful for users who primarily need to view reports (rather than modifying the underlying data or report structure). In this topic, we will begin exploring the Power BI web app.

Topic Objectives

In this section, you will learn how to:

- Access and use the Power BI web app
- Identify differences between the web app and desktop client

Opening the Power BI Web App

To start, enter <u>https://app.powerbi.com</u> into your browser's address bar. You will be prompted to sign in and then the app will be displayed:



The Web App Interface

Let's take a closer look at the web app interface:



1: App Launcher

Click the yellow icon to see shortcuts to other Office 365 apps.

2: Breadcrumb Trail

Shows where you currently are in Power BI. Click a location to go to it.

3: Office 365 Commands

From left to right:

- View Office 365 notifications
- Manage Power BI settings
- Download Power BI tools
- Access help and support resources

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- Give feedback
- View your Office 365 profile

4: Search field

Search Power BI data.

5: Navigation pane

Access different parts of the Power BI app. Click a chevron to expand sub-categories; click the down arrow to collapse them. All workspaces will be displayed in this pane, with the related dashboards, reports, workbooks, and datasets listed as sub-items. Simply expand the desired workspace and then click the item you want to view.

6: Canvas

Visualizations in the current item (dashboard, report, etc.) will be shown here.

7: Get Data

Use this link to quickly import data sources. Samples can also be accessed from here.

Web App Building Blocks

Let's review the elements of Power BI:



The Power BI web app focuses on **dashboards**, which allow you to collect visualizations from different reports into a single location. Each dashboard is made up of **tiles**, which are simply visualizations linked back to the original report. As well, dashboards can be organized using **workspaces**.

Key Differences

To summarize, here is a list of some of the key differences between the Power BI desktop and web clients.

Power BI Desktop Client	Power BI Web App
 Runs off a single computer 	 Cloud-based (can be accessed from anywhere)
 Designed for managing data, building reports, and viewing reports 	 Designed for viewing and managing reports
 No sharing features 	• Extensive sharing features and integration with Office 365
Updated monthly	Updated weekly

Activity 5-1: Getting Started

In this activity, you will open and explore the Power BI web app.

1. Launch Microsoft Edge and navigate to <u>https://app.powerbi.com/</u>. Sign in when prompted to see the Power BI web app:



2. Click the "Shared with me" category from the navigation pane:



3. Do you have any shared items?



4. Now, click the chevron next to the Workspaces category:





5. What workspaces are available to you?

6. Click the chevron again to hide the Workspaces sub-menu:





7. Expand the "My Workspace" category:

8. Do you have any items in your workspace?



9. This activity is now complete. Leave your browser open for the next activity.

TOPIC B: Connecting to Data Sources with the Power BI Web App

You can also connect to data sources directly with the Power BI web app. It also offers some unique options, like sample data and content packs.

Topic Objectives

In this section, you will learn how to:

• Connect to local data files, live data sources, content packs, and samples

Connecting to Local Data

To connect to a file on your PC (such as an Excel workbook or Power BI desktop file), click the Get link in the Files section of the Start screen:



Now, click Local File:


Now, browse to the file, select it, and click Open:

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The data will now be connected:

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7	Get Data									

Connecting to Live Data

There is also an option on the Get Data page to connect to live data from a database service:



Now, choose your content service:





Click Connect to view available servers and connect to them:

Connecting to Content Packs

A content pack is like a set of templates for Power BI. It typically includes pre-defined visuals and reports based on a specific dataset (like Microsoft Dynamics or MailChimp.) Content packs can be provided by other organizations or developed by Power BI users and shared within your company. You can connect to content packs from the Getting Started screen:



If you click Get under the Services section, third-party content packs will be shown:

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Click the appropriate link for the pack you want to download for more information and connection options.

Connecting to Samples

You can also access samples from the Get Data page:



Once you click the Samples link, you will see a list of available items. Click any icon to continue:



Then, click Connect to confirm the operation:



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The dataset will then be added:



Activity 5-2: Connecting to Data Sources with the Power BI App

In this activity, you will connect the Power BI web app to a local data file. You will also check if there are any content packs available in your organization.

- **1.** Ensure Microsoft Edge is open and the Power BI app is displayed.
- 2. Click the Get Data link in the bottom left corner of the window:



3. Click Get in the Files section:



4. Click Local File:



5. Browse to the Lesson 5 folder of your Exercise Files. Select Activity 5-1 and click Open:

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6. The data file will now be imported:



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 My Workspace

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- 7. Now, let's explore available content packs. Click the Get Data link again:

8. Click Get in the "My organization" section:



9. The AppSource window will open. Are there any content packs for your organization?



10. Close the AppSource window:



11. This activity is now complete. Leave your browser open for the next activity.

TOPIC C: Using Workspaces, Dashboards, and Reports

Let's take a closer look at the object structure in Power BI. Remember, the Power BI web app is built around on **dashboards**, which allow you to collect visualizations from different **reports** into a single location. Dashboards can be organized using **workspaces**.

Topic Objectives

In this section, you will learn how to:

- View and manage Power BI content
- View workspaces, dashboards, and reports
- Manage reports

Viewing and Managing Power BI Content

To view and manage the content and data sources in your Power BI app, click My Workspace from the navigation pane:



You will now see an overview of your Power BI content. Notice the tabs that allow you to quickly view and manage each content type:

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Let's take a closer look at the options available:

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1: Create

Create a new report, dashboard, or dataset.

2: Search Field

Search all content sources for a particular term.

3: Sort

Change how the content list is sorted.

4: Content Icon

Dashboards, reports, workbooks, and datasets are identified by a unique icon.

5: Favorite

Click the star to favorite this item. Favorites can easily be accessed from the navigation pane:



6: New Item

An asterisk denotes a new item.

7: Actions

Shows what actions are available for this object. (Available actions depend on the content type and your permissions.) From left to right, here you can see icons to share the content, view related objects, change its settings, and remove it.

Note that you can quickly access content object options by clicking the chevron next to My Workspace in the navigation pane, moving your mouse over the target object, and clicking the ellipses:



(Remember, you can view the object's contents by clicking its link.)

Viewing a Workspace

First, let's take a closer look at workspaces. To view a workspace, click the Workspaces category in the navigation pane and click the target workspace from the menu:



(Note that here we have the default My Workspace, as well as workspaces for SharePoint groups and other apps. Workspaces must be created by the system administrator.)

The workspace contents will then be displayed:

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Now, click any item to see the related content.

You can also quickly view and access objects in the default My Workspace from the navigation pane by clicking the chevron and then clicking the object you want to view:



Viewing Dashboards and Reports

You can access dashboards and reports from the navigation pane or the Workspaces page:

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Sales and Marketing Sample		
REPORTS Sales and Marketing Sample		
WORKBOOKS		
You have no workbooks		
DATASETS Sales and Marketing Sample		

Just click the link for the object you want to view. Here, we have viewed the "Sales and Marketing Sample" report:



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Managing Reports

Although you must use the Power BI desktop client to create reports, the Power BI web app does contain many features to customize and edit these reports:



1 and 2: Action Bars

The commands at the top of the report are divided into two sections. The **left section (1)** contains file-related commands:

- The File menu contains additional commands to save, print, publish, download, and export this report.
- The View menu contains options to change the report display, as well as toggle task panes on or off.
- Click "Edit report" to access the Visualizations and Fields panes (which are the same as in the Power BI desktop client) and other advanced commands.
- The Explore button shows a menu with options to drill through and view data.

- Click Refresh to reconnect to the original data source and update the data, if necessary.
- Finally, **Pin Live Page** allows you to pin the entire page to a dashboard.

The **right section (2)** contains commonly used commands to view related data, add the report as a favorite, and subscribe to or share it. The "More options" menu (accessible from the ellipses icon) includes commands to export the data or generate a QR code for quick access.

3: Visualization Commands

Just as in the Power BI desktop client, you can move your mouse over a visualization to see commands to pin the visualization, switch to Focus Mode, and access the More Options menu. (This menu contains commands to export, show, spotlight, and sort data.)

4: Canvas

Visualizations are displayed in the main area of the report, called the canvas.

5: Page Tabs

Use these tabs to navigate through and view the report's pages.

6: Filters Task Pane

View and modify report filters.

Activity 5-3: Using Workspaces, Dashboards, and Reports

In this activity, you will explore the data in the file we imported in the last activity.

- **1.** Ensure you have completed Activity 5-2.
- 2. Click My Workspace in the navigation pane:



3. The workspace contents will be displayed. Click each tab to view the related contents:



4. First, let's explore the dashboard that was created when we imported this file. Click the Dashboards tab and click the Activity 5-1 link, or click the link in the navigation pane:

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5. This dashboard contains only one report. Click its icon:

6. Review the contents of the report:



7. Click the "Edit report" command:



8. Review the available options and task panes:





9. Move your mouse over any visualization. Notice that it can be edited:

10. Click "Reading view" to return to that mode:

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11. This activity is now complete. Leave your browser open for the next activity.

TOPIC D: Creating Custom Dashboards

We know that dashboards allow you to collect and organize report visualizations. These visualizations remain linked to their original report, ensuring you are always viewing the most up-to-date information. For example, your organization may have individual reports for sales, revenue, and expense data. You can collect the visualizations relating to your specific department or region on your own dashboard to make it easy to quickly access the information that is relevant to you.

Topic Objectives

In this section, you will learn how to:

- Create and manage dashboards
- Add custom tiles and visualizations to a dashboard

Creating a Dashboard

To create a new dashboard, click the chevron next to the Workspaces item in the navigation pane and click the target workspace:



Next, click Create \rightarrow Dashboard:



When prompted, type the name of your dashboard and click Create (or press Enter):



The dashboard will now be created, and can be accessed from the navigation pane:



Pinning Visualizations to a Dashboard

You can add any visualization you like to a dashboard from a report. For this example, let's navigate to the "Sales and Marketing Sample" report:



Now, we can move our mouse over any visualization and click the "Pin visual" icon:



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We will then be prompted to specify where to add the visualization to. For this example, we will choose the dashboard we just created, but note that you can create a new dashboard from here as well:



You can now go to the dashboard, or close the notifications and return to the report. Let's go to the dashboard:



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The visualization is now available on the selected dashboard:

You can:

- Click the visualization to go to the source report
- Move and resize the visualization
- Move your mouse over the visualization and click the ellipses menu in the corner to view additional options, including deleting it from the dashboard

Adding Custom Tiles

Power BI also allows you to add custom tiles to a dashboard, like images and text boxes. To start, open the dashboard from the navigation pane. Then, click the "Add tile" icon:





Now, choose what to add and click Next:

Finally, enter the object details (in this case, the title and URL) and click Apply:



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The tile will then be added:



You can work with these custom tiles in the same way as visualization tiles.
Managing Dashboards

In the top right corner, you will see options to manage your dashboard:

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From left to right, the commands are:

- Add a custom tile
- View content related to the visualizations on this dashboard
- Set this as your featured dashboard so it is automatically displayed when you open the workspace
- Mark this dashboard as a favorite
- Enable notifications when there are changes to this dashboard
- Share this dashboard
- Change to phone view
- Access more options, including commands to delete, print, and refresh the dashboard and change its settings

Activity 5-4: Creating Custom Dashboards

In this activity, you will create a custom dashboard.

1. Ensure you have completed Activity 5-3. The Activity 5-1 report should be displayed:



(If it is not displayed, click its link from the navigation pane.)

2. We want to create a dashboard summarizing revenue. First, let's add the KPI visualization to this dashboard. Move your mouse over the visualization and click the pin icon:



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3. The "Pin to dashboard" dialog will open. Click the "New dashboard" radio button:



4. Type, "Activity 5-4" for the dashboard name and click Pin:





5. You will see a notification that the dashboard has been created:

6. Move your mouse over the "Total Revenue by Region" visualization and click the pin icon:



- 7. Ensure that Activity 5-4 is selected as the dashboard and click Pin:

8. Repeat Steps 6 and 7 to pin the "Total Revenue by State" visualization to the new dashboard:





9. Now, use the notification link or the navigation pane to go to the new dashboard:

10. Close all notifications for a better view:



11. Review the dashboard:



12. Click the Favorite icon to add it to that category of the navigation pane:



13. This activity is now complete. Leave your browser open for the next activity.

TOPIC E: Power BI Web App Features

To wrap up this lesson, we will explore some of Power BI's data analysis features which, as of this writing, are unique to the web app.

Topic Objectives

In this section, you will learn about:

- Using Insights and Q & A
- Customizing Q & A suggestions

Using Insights

The Power BI web app features Insights, which provide related data and statistics for a particular visualization within a dashboard. To view these insights, move your mouse over the visualization and click the ellipses icon that appears:

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Then, click "View insights:"



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You will now see the data insights in a pane on the left side of the window:

You can pin this data as its own visualization, or click ellipses icon at the top of this pane to see more options, including exporting the data and generating a QR code for quick access:



Using Q & A

Another interesting feature is Q & A, which allows you to ask questions about your data:



If you click in this field, you will see a number of pre-populated questions:



Click to select one of these questions, or type your own question in the field. With either action, additional suggestions to refine the question will appear in an auto-complete menu. Click to select the desired criterion:

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Here we have asked for sentiment by geography, so a bubble map has automatically been created from the underlying data:

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We can pin this visual using the command in the top right corner of the screen, or click Exit Q & A to return to the dashboard.

Customizing Q & A Suggestions

To customize the suggestions presented by Q & A, move your mouse over the dashboard entry in the navigation pane, click the ellipses, and click Settings:



The Settings page for this dashboard will be displayed. Click the Datasets category:



Now, expand the "Featured Q & A questions" section and click the "Add a question" link:



Type the question and click Apply:

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DASHBOARDS Data for Eastern Region	Featured questions are shown as suggestions for this dataset in Q&A.	
Sales and Marketing Sample	What were the total sales in 2014 for Natura? $ imes$	
REPORTS Sales and Marketing Sample	Add a question	
WORKBOOKS You have no workbooks	Apply Discard	

Now, the question will be added to the Q & A list:

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U Workspaces	What were the total sales in 2014 for Natura? sentiment gap where rolling period is P-00 and running year is 1			
8 My Workspace	sentiment where rolling period is P-00 and running year is 1 % units market share where running year is 1			
DASHBOARDS Data for Eastern Region	total category volume where running year is 1 total category volume where manufacturer is VanArsdel and is 2014	total units by segment		
Sales and Marketing Samp REPORTS Sales and Marketing Samp	total units sales facts sales \$ See more			

Activity 5-5: Power BI Web App Features

In this activity, you will use Insights and Q & A.

1. Ensure you have completed Activity 5-4. The Activity 5-4 dashboard should be displayed:



(If it is not displayed, click its link from the navigation pane.)



2. Click the "Ask a question about your data" field:

3. We want to view a summary of customers by state, so click "customers" from the suggested list:



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4. Now, click "by state" from the auto-complete menu:

5. The data will now be displayed:

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7. Click a few visualization icons to experiment with different display options:



Return to the Table visualization when you are finished.

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8. Let's add this information to our dashboard. Click "Pin visual:"

9. Ensure that the Activity 5-4 dashboard is selected and click Pin:

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10. Click the notification link to go back to the dashboard:

11. The visualization will now be added to the dashboard. Move your mouse over it and click the ellipses icon:



12. Click "View insights:"



13. You will now see insights related to this data:

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14. Close your browser to complete this activity.

Summary

In this lesson, we took a closer look at the features in the Power BI web app. You learned how to open the app; connect to data in it; use workspaces, dashboards, and reports; create custom dashboards; and use Q & A and Insights to get even more out of your data.

Review Questions

- 1. Which Power BI client is designed for managing data?
- 2. How do you drill through data when viewing a report in the Power BI web app?
- 3. What is a content pack?
- 4. How do you view data insights?
- 5. How do you pin a visualization to a dashboard?

LESSON LABS

Lesson 1

Lesson Lab 1-1

Objective	To understand how to open and use Power BI files.	
Briefing	You have been given an existing Power BI data file. You want to see what data it contains and what reports have been created.	
Tasks	Open the Sample Data file.Explore the Visualizations and Fields task panes.	
Sample Data	Lesson Lab 1-1 Microsoft Power Bl Deskto 8.29 MB	
Follow-Up Questions	If you have access to the Power BI web app, publish the Sample	

Data file and review its contents.

Lesson Lab 1-2

Objective	To add an Excel file to your Power BI data source.	
Briefing	After reviewing the existing Power BI data file, you noticed that the regional list of directors is missing. You want to import this file and start creating a new report.	
Tasks	• Open the Power BI Sample Data file.	
	• Connect to the Excel Sample Data file.	
	 Add two visualizations to the Demographic Summary page: 	
	 A pie chart showing New Hires as the Values and Gender as the Legend 	
	 A donut chart showing New Hires as the Values and Ethnicity as the Legend 	
	 Format, place, and resize these visualizations however you like. 	
	 Try interacting with each visualization to see how they affect each other. 	
Sample Data	Lesson Lab 1-2 Microsoft Power BI Deskto 8.29 MB Regional Directors Microsoft Excel Worksheet 9.99 KB	
Follow-Up Questions	Review the other two report pages and see how the	

visualizations interact with each other.

Lesson 2

Lesson Lab 2-1

Objective	To manage the Excel data we imported in the last lesson.	
Briefing	You want to explore and update the Excel data you imported into your Power BI file in the last Lesson Lab.	
Tasks	 View the Directory table in Data view. Rename the "Phone Number" column to "Director's Number." 	
	 Ensure each column has the correct data category applied (if applicable). 	
	 Link the Region field in the Directory table to the Region field in the BU table. 	
Sample Data	Lesson Lab 2-1 Microsoft Power BI Deskto 8.30 MB	

Lesson Lab 2-2

Objective	To add information from the Directory table to the BU table.	
Briefing	You have some ideas for using calculated columns and measures to add more meaning to your Power BI file.	
Task	 Add a column to the BU table to show which director each VP reports to. 	
	 Use a measure to calculate the average tenure in years. (Hint: There is a similar measure for days and months.) 	
Hints	If you get stuck, review the completed Sample Data file.	
Sample Data	Lesson Lab 2-2 Microsoft Power Bl Deskto 8.30 MB	

Lesson 3

Lesson Lab 3-1

Objective	To create a scorecard that will look the same on all devices.	
Briefing	You want to create an easy-to-read scorecard that will show both new hires and separations (employees who have left the company).	
Task	 Create a new report page named Scorecard. Set the size. Move this page after the Info page. 	
	 Add a line chart with the New Hires and Separations fields as the Values. Add the YQM hierarchy as the axis. 	
	 Position this chart at the bottom of the page. Resize as necessary. 	
Hints	You can change page size in the Visualizations task pane, under the Format tab, when no visualizations are selected.	
Sample Data	Lesson Lab 3-1 Microsoft Power BI Deskto 8.31 MB	
Follow-Up Questions	Explore the drill-down feature. Leave the chart drilled to	

quarter.

Lesson Lab 3-2

Objective	To add a few final touches to your Scorecard report.	
Briefing	You want to finalize your scorecard report and create a phone view.	
Tasks	 Continue working with the Scorecard report. 	
	 Add a text box with the title "Hiring Scorecard." Feel free to use whatever font, color, and/or effects you like. 	
	 Add the Sample Data image. 	
	 Resize and position these objects as necessary. 	
	 Create a phone view that matches the desktop view we have already created. 	
Sample Data	Lesson Lab 3-2 Microsoft Power BI Deskto 8.31 MB	

Lesson 4

Lesson Lab 4-1

Objective	To create a new report in your sample file.
Briefing	You need to create a New Hires report for your manager that shows the progression of new hires over time, a geographical breakdown of new hires, and a chart of full-time vs. part-time new hires.
Task	Create a new report page named "New Hires Report." Add three visualizations to show the information requested.
Sample Data	Lesson Lab 4-1 Microsoft Power BI Deskto 8.98 MB
Follow-Up Questions	Use a text box to add a title to the report. Format it any way

you like.

Lesson Lab 4-2

Objective	You have sent your report to your manager. She has made two additional requests.
Briefing	Your manager wants to easily see how many active employees there are. She also wants to monitor bad hires (those who leave within 60 days of their start date) with the goal of keeping it under 15% of active employees.
Task	Add two visualizations to display this data. Rearrange the report visualizations if needed.
Sample Data	Lesson Lab 4-2 Microsoft Power BI Deskto 8.98 MB

Follow-Up Questions Add a slicer to filter the values by year.

Lesson 5

Lesson Lab 5-1

Objective	You are now ready to share your Power BI file with your organization.
Briefing	You need to connect your Power BI file to the web service and then share key information with your organization.
Tasks	 Log into the Power BI web app. Connect the Sample Data file. View the dashboard and report in this file.
Sample Data	Lesson Lab 5-1 Microsoft Power BI Deskto 8.98 MB

Follow-Up Questions Be sure to review all report pages.

Lesson Lab 5-2

Objective	To create a custom dashboard.	
Briefing	Your manager wants a summary that she can share with her director.	
Tasks	 Ensure you have completed Lesson Lab 5-1. Create a new dashboard named "Lesson Lab 5-2." Open the New Hires Report. Review all five pages and pin any three visualizations to the new dashboard. Add the new dashboard as a favorite and share it with a classmate. 	
Hints	If you are completing this course on your own, you can skip the sharing step.	

COURSE WRAP-UP

Keyboard Shortcut Quick Reference Sheet

(Power BI Desktop Client)

File Management	Create a new file	Ctrl + N
	Save a file	Ctrl + S
	Open the Save As dialog	F12
	Open a file	Ctrl + O
	Close current window	Alt + F4
	Get Help	F1
Editing Tools	Select all items on current page	Ctrl + A
	Copy selected object(s)	Ctrl + C
	Cut selected object(s)	Ctrl + X
	Paste selected object(s)	Ctrl + V
	Undo last action	Ctrl + Z
	Redo last action	Ctrl + Y

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Formatting Tools	Apply bold formatting	Ctrl + B
	Apply underlining	Ctrl + U
	Apply italic formatting	Ctrl + I

Post-Course Assessment

- 1. How do you connect to an Excel workbook from the Power BI desktop client?
 - a. File \rightarrow Connect \rightarrow Excel
 - b. Home \rightarrow Get Data arrow \rightarrow Excel
 - c. Tools \rightarrow Import \rightarrow Excel Workbook
 - d. All of the above
- 2. What are the basic steps for creating any visualization? (Select all that apply.)
 - a. Click the visualization icon from the Visualizations pane
 - b. Install the necessary visualizations package
 - c. Set the fields to display in the Fields pane
 - d. Ensure all fields are related
- 3. Which Power BI client is designed for managing data?
 - a. Desktop
 - b. Web
 - c. Mobile
- 4. What is DAX?
 - a. The Power BI file format
 - b. A type of formula language used to create custom calculations and measures in Power BI
 - c. An XML data schema
 - d. A legacy database file format
- 5. What types of content can you connect to with the Power BI web app?
 - a. Content packs
 - b. Local files (like Excel workbooks)
 - c. Live data (like SQL databases)
 - d. All of the above
- 6. What is a measure?
 - a. Table that returns specified values from a dataset
 - b. Column that returns specified values from a dataset
 - c. Formula that shows a value calculated from specified data
 - d. Editor that allows you to enter a DAX expression

- 7. You have a chart with drilldown enabled, but you do not want the other visualizations on the page to change when the user is drilling through the data. Where can you disable this feature in the Power BI desktop client?
 - a. Select the visual, click the Visual Tools Format tab, and uncheck "Drilling filters other visuals"
 - b. Ensure the visualization's fields are different than the other visualizations on the page
 - c. Click the ellipses and uncheck "Linked drilldown"
 - d. You cannot disable this feature for the other visualizations
- 8. If there is more than one visualization on a page, which of the following statements are true?
 - a. They will act as a filter on each other
 - b. They must use the same design theme
 - c. They must be the same size
 - d. All of the above
- 9. How do you see a visualization's data in the Power BI desktop client?
 - a. Click the ellipses in the top right corner of the visualization and click Show Data
 - b. Right-click it and click Show Data
 - c. Press Ctrl + D with the visualization selected
 - d. Any of the above

- 10. What is a slicer?
 - a. A drilldown type
 - b. A tool that allows the user to capture a static image of a visualization
 - c. A table filtering option only available for data imported from Excel
 - d. A visualization that allows users to filter data on the fly

Course Summary

Congratulations on completing Introduction to Microsoft Power BI training. During this course, you learned how to:

- Use the Power BI desktop client and web app
- Connect to data sources
- Create and manage visualizations, including:
 - Matrices and tables
 - Charts
 - Maps
 - Cards
 - Gauges
 - KPIs
 - Slicers
- Transform, sanitize, and model data
- Use the Query Editor
- Manage relationships
- Manage report pages
- Change report view options
- Add static objects to a report
- Use workspaces, dashboards, and reports in the Power BI web app
- Use Insights and Q & A in the Power BI web app

You should now feel comfortable linking and modeling data in Power BI, and then using that data to create visual reports and reveal data insights.

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ANSWER KEYS

Lesson 1 Review Questions

1. What are the six building blocks of Power BI?

Workspaces, dashboards, tiles, reports, visualizations, and datasets.

2. How do you connect to an Excel workbook from Power BI?

Click Home \rightarrow Get Data arrow \rightarrow Excel.

- What are the two task panes used when creating a visualization?
 Visualizations and Fields.
- 4. How do you see the data related to a visualization?

Move your mouse over the visualization, click the ellipses in the top right corner, and click Show Data.

5. True or False: Removing a visualization also removes the related data.

This statement is false. Removing a visualization does not affect the related data.

Lesson 2 Review Questions

1. What is DAX?

A type of formula language used to create custom calculations and measures.

2. Where should a measure be stored?

Ideally, with the related table. This is not a requirement of Power BI – it is simply so you can find it later if needed.

3. Which tab contains commands to set the data type, format, category, and summarization?

The Modeling tab.

4. How do you create a relationship between two fields in Relationships view?

Drag one field to the other.

5. How do you open the Query Editor?

Click Home \rightarrow Edit Queries.

Lesson 3 Review Questions

1. You have hidden a page in your report showing next year's budget. You are now ready to share it with others. How do you show it?

Right-click the page tab and click Hide Page to de-select it.

2. True or False: Always duplicate a page when creating a phone layout so the desktop layout is not lost.

This statement is false. Creating a phone layout will automatically create an alternate version of the report – there is no need to duplicate it.

3. You have a chart with drilldown enabled, but you do not want the other visualizations on the page to change when the user is drilling through the data. Where do you set this option?

Uncheck the "Drilling filters other visuals" option on the Visual Tools – Format tab.

4. How do you add a local picture to a report page?

Click Home \rightarrow Image.

5. How do you add an online picture to a report page?

As of this writing, all images must be stored locally to be added to a report.

Lesson 4 Review Questions

1. What is the process for creating any kind of visualization?

Click its icon from the Visualizations pane and then choose the fields to display.

2. How do you display a slicer as a list of buttons?

Click the Format tab in the Visualizations task pane, click the Orientation menu, and choose Horizontal.

- If you want to show the cumulative effect of positive or negative values, what chart type would you choose?
 Waterfall.
- What is the difference between the KPI and gauge visualizations?
 Both display progress towards a goal, but in different ways.
- What are the two types of geographical map visualizations?
 Bubble (standard) and filled.

Lesson 5 Review Questions

1. Which Power BI client is designed for managing data?

The Power BI desktop client.

- How do you drill through data when viewing a report in the Power BI web app?
 Click Explore on the top action bar.
- 3. What is a content pack?

A set of templates for Power BI that includes pre-defined visuals and reports based on a specific dataset.

4. How do you view data insights?

Move your mouse over the visualization, click the ellipses icon, and click "View insights."

5. How do you pin a visualization to a dashboard?

Move your mouse over the visualization and click the pin icon. In the dialog box that appears, select or create a dashboard and click Pin.

Post-Course Assessment

- 1. How do you connect to an Excel workbook from the Power BI desktop client?
 - a. File \rightarrow Connect \rightarrow Excel
 - b. Home \rightarrow Get Data arrow \rightarrow Excel
 - c. Tools \rightarrow Import \rightarrow Excel Workbook
 - d. All of the above

To connect to an Excel workbook, click Home \rightarrow Get Data arrow \rightarrow Excel.

2. What are the basic steps for creating any visualization? (Select all that apply.)

a. Click the visualization icon from the Visualizations pane

b. Install the necessary visualizations package

c. Set the fields to display in the Fields pane

d. Ensure all fields are related

Click its icon from the Visualizations pane and then choose the fields to display. No special package is required, and if a relationship is needed, Power BI will prompt you to create one.

- 3. Which Power BI client is designed for managing data?
 - a. Desktop
 - b. Web
 - c. Mobile

The Power BI desktop client is designed for managing data.

- 4. What is DAX?
 - a. The Power BI file format
 - A type of formula language used to create custom calculations and measures in Power BI
 - c. An XML data schema
 - d. A legacy database file format

DAX is a type of formula language used to create custom calculations and measures. It is used in Power BI, Excel, and many other data-related applications.

- 5. What types of content can you connect to with the Power BI web app?
 - a. Content packs
 - b. Local files (like Excel workbooks)
 - c. Live data (like SQL databases)
 - d. All of the above

The Power BI web app can connect to all of these data sources, and more.

- 6. What is a measure?
 - a. Table that returns specified values from a dataset
 - b. Column that returns specified values from a dataset
 - c. Formula that shows a value calculated from specified data
 - d. Editor that allows you to enter a DAX expression

A measure is a formula that shows a value calculated from specified data.

- 7. You have a chart with drilldown enabled, but you do not want the other visualizations on the page to change when the user is drilling through the data. Where can you disable this feature in the Power BI desktop client?
 - Select the visual, click the Visual Tools Format tab, and uncheck "Drilling filters other visuals"
 - b. Ensure the visualization's fields are different than the other visualizations on the page
 - c. Click the ellipses and uncheck "Linked drilldown"
 - d. You cannot disable this feature for the other visualizations

If you have a visualization with drilldown options, you can uncheck the "Drilling filters other visuals" option so that it does not affect the other visualizations.

- 8. If there is more than one visualization on a page, which of the following statements are true?
 - a. They will act as a filter on each other
 - b. They must use the same design theme
 - c. They must be the same size
 - d. All of the above

If there is more than one visualization on a page, they will act as a filter on each other.

- 9. How do you see a visualization's data in the Power BI desktop client?
 - Click the ellipses in the top right corner of the visualization and click Show Data
 - b. Right-click it and click Show Data
 - c. Press Ctrl + D with the visualization selected
 - d. Any of the above

To see the data in a visualization, click the ellipses in the top right corner (called the "More options" menu), and click Show Data.

10. What is a slicer?

- a. A drilldown type
- b. A tool that allows the user to capture a static image of a visualization
- c. A table filtering option only available for data imported from Excel
- d. A visualization that allows users to filter data on the fly

Slicers allow users to filter data on the fly, even with the Power BI web and mobile apps.

APPENDICES

Glossary

card

Visualization that shows one or more dynamic rows of data.

connectors

Software component that connects data with the Power BI apps.

content pack

Set of pre-defined visuals based on a specific dataset.

dashboard

In Power BI, a customized summary of report visualizations.

dataset

Another term for data source, such as an Excel workbook, Facebook analytics, or a SQL database.

DAX (Data Analysis Expression)

A type of formula language used to create custom calculations and measures.

gauge

Visualization that shows progress towards a goal.

KPI

Visualization that shows progress towards a key metric or goal.

matrix

Visualization that displays data in a crosstab format.

Power BI

a collection of software, apps, and services designed to aggregate data so users can easily report on and interpret it.

Q & A

Power BI web app feature that allows the user to ask natural-language questions about the data in a dashboard.

Query Editor

Power BI feature that provides advanced data transformation features.

Quick Access toolbar

Interface element that provides quick access to frequently used commands.

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report

Collections of visualizations.

slicer

Dynamic data filter.

table

Visualization that displays data in a standard row/column format.

tile

Dashboard component; visualization linked back to the original report.

treemap

Visualization that shows a visual breakdown of data as it relates to the whole.

visualization

Highly customizable object that presents data in a visual way.

Index

No index entries found.