



# Fast-track Power BI & DAX

Sample manual - first two chapters



**Wise Owl**  
Training

## TABLE OF CONTENTS (1 of 10)

1	GETTING STARTED	Page
1.1	Getting Started in Power BI Desktop	12
	<i>Example for this Chapter</i>	12
1.2	Working with Files	13
	<i>Creating New Files</i>	13
	<i>Opening and Saving Files</i>	13
1.3	Views in Power BI Desktop	14
	<i>Switching Panes</i>	14
	<i>Report, Table and Model View</i>	15
1.4	Getting Data	16
1.5	Transforming Data	17
	<i>Editing Queries / Transforming Data</i>	17
	<i>The Power BI Query Editor</i>	18
	<i>Promoting Row Headers</i>	18
	<i>Replacing Values</i>	19
	<i>Changing Data Types</i>	19
	<i>Removing Columns</i>	19
1.6	Creating Visuals	20
	<i>Inserting a Visual</i>	20
	<i>Assigning Grouping Fields to a Visual</i>	20
	<i>Assigning Numerical Fields</i>	21
1.7	Three Ways to Format Visuals	22
	<i>In Situ Selection</i>	22
	<i>Changing what's on your Chart</i>	22
	<i>The Format Pane</i>	23
1.8	Publishing your Report	24

2	IMPORTING DATA	Page
2.1	Our Example	25
2.2	Importing from Different Sources	26
	<i>Re-Using a Data Source</i>	26
2.3	Importing from Excel	27
2.4	Importing CSV or Text Files	28
2.5	Importing from SQL Server	28
	<i>Using Queries and Stored Procedures</i>	30
	<i>Passing Arguments to Stored Procedures</i>	30
2.6	Importing from a Website	31
2.7	Entering Data Manually	32
	<i>Pasting Data</i>	32
	<i>Typing in Data</i>	33

3	DATA MODELS	Page
3.1	Data Models	34
	<i>Viewing a Model</i>	34
	<i>Selecting Single Model Items</i>	35
	<i>Selecting Multiple Items</i>	35
	<i>Searching for Fields</i>	35
3.2	Model Diagrams	36
	<i>Arranging Tables in a Model</i>	36
	<i>Diagram Layouts</i>	36
	<i>Collapsing and Expanding Tables</i>	37
	<i>Controlling Expand/Collapse Field Visibility</i>	37
	<i>Seeing Table Information</i>	37
3.3	Hiding Objects	38
	<i>Why you might Want to Hide Tables and Fields</i>	38
	<i>Hiding Tables</i>	39
	<i>Hiding Fields/Columns</i>	39
3.4	Model Properties	40
	<i>Table Properties</i>	40
	<i>Display Folders</i>	40
	<i>Default Number and Date Formatting</i>	41
	<i>Changing the Default Aggregation for a Field</i>	41
3.5	Relationships	42
	<i>The Need for Relationships</i>	42
	<i>Parent-Child Relationships</i>	42
	<i>Creating a Relationship</i>	43
	<i>Editing Relationships</i>	43
	<i>The Effect of Relationships</i>	44
	<i>Cross-Filter Direction</i>	44

## TABLE OF CONTENTS (2 of 10)

4	VISUALS	Page
4.1	Overview of Visuals	45
4.2	Adding and Changing Visuals	46
	<i>Adding a Visual then Selecting its Data</i>	46
	<i>Data-First Visual Creation</i>	47
	<i>Changing Visual Types</i>	47
4.3	Working with Visuals	48
	<i>The Visual Header</i>	48
	<i>Focus Mode</i>	48
	<i>Spotlight Mode</i>	48
	<i>Resizing a Visual</i>	49
	<i>Selecting Visuals</i>	49
	<i>Moving, Copying and Deleting Visuals</i>	49
	<i>Locking Visuals</i>	50
	<i>Aligning and Distributing Visualisations</i>	50
	<i>Grouping Visualisations</i>	51
	<i>Showing a Visual's Underlying Data</i>	52
4.4	The Selection Pane	53
	<i>Viewing the Selection Pane</i>	53
	<i>Changing the Visual Layer Order</i>	54
	<i>Changing the Tab Order</i>	54
	<i>Hiding Visuals</i>	54

5	VISUAL INTERACTIONS	Page
5.1	Overview	55
5.2	Editing Visual Interactions	56
	<i>What the 3 Symbols Mean</i>	57

6	TABLES	Page
6.1	Basic Tables	58
6.2	Working with Table Columns	58
	<i>Sorting Tables by Columns</i>	59
	<i>Re-ordering Columns</i>	59
	<i>Changing Column Widths Automatically</i>	59
	<i>Changing Column Widths Manually</i>	60
	<i>Changing Word Wrap Options</i>	60
	<i>Renaming Columns</i>	61
6.3	Aggregating Data	62
6.4	Formatting Numbers	63
	<i>Formatting Numbers within a Single Table</i>	63
	<i>Formatting Numbers for all Visuals</i>	64
	<i>Setting Custom Number Formats</i>	64
6.5	Working with Dates in Tables	65
	<i>Displaying Dates as Dates</i>	65
	<i>Changing the Default Format for a Date</i>	65
	<i>Setting a Custom Date Format</i>	66
6.6	Specific to Formatting Tables	67
	<i>Column Headers</i>	67
	<i>Totals</i>	67
	<i>Font Size and Typeface</i>	68
	<i>Table Padding and Gridlines</i>	68
	<i>Table Styles</i>	69
	<i>Formatting Columns Individually</i>	69

7	CONDITIONAL FORMATTING	Page
7.1	Conditional Formatting	70
7.2	Applying Conditional Formatting	71
	<i>Setting Conditional Formatting</i>	71
	<i>Changing Conditional Formatting</i>	71
7.3	Gradient Effects	72
	<i>Adding a Middle Colour</i>	72
7.4	Rules-Based Conditional Formatting	73
7.5	Formatting Using Field Values	74
7.6	Data Bars	75
7.7	Displaying Icons	76

## TABLE OF CONTENTS (3 of 10)

8	MATRICES	Page
8.1	Overview of Matrices	77
8.2	Creating a Matrix	78
	<i>The Sections of a Matrix</i>	78
	<i>Sorting in a Matrix</i>	78
8.3	Multiple Rows, Columns and Values	79
	<i>Multiple Row Fields</i>	79
	<i>Multiple Values Fields</i>	80
	<i>Multiple Column Fields</i>	80

9	TEXT BOXES, IMAGES AND SHAPES	Page
9.1	Overview	81
	<i>Drawing Text Boxes, Images or Shapes</i>	81
9.2	Images	82
	<i>Scaling Images</i>	82
	<i>Adding a Hyperlink to an Image</i>	82
9.3	Text Boxes	83
	<i>Inserting Values</i>	83
9.4	Shapes	83
	<i>Adding a Shape</i>	84

10	CHART BASICS	Page
10.1	The Parts of a Chart	85
10.2	Types of Chart Available	86
10.3	Working with Charts	87
	<i>Creating a Chart</i>	87
	<i>Suggesting Chart Types</i>	87
	<i>Sorting Charts</i>	88
	<i>Zoom Sliders</i>	89
	<i>Excluding and Including Data</i>	90
10.4	Quick Ways to Format Charts	91
10.5	Chart Legends	92
10.6	Detail Labels	93
	<i>Leader Lines for Data Labels</i>	94
	<i>Total Labels</i>	94
10.7	Background and Gridlines	95
	<i>Plot Area and Background</i>	95
	<i>Gridlines</i>	95
10.8	Axes	96
	<i>Categorical versus Continuous Formatting</i>	96
	<i>Formatting Axes</i>	97
	<i>Scaling Ranges</i>	97
	<i>Spacing Categories</i>	97
10.9	Conditional Formatting	98

11	SMALL MULTIPLES	Page
11.1	Overview of Small Multiples	99
11.2	Creating and Formatting Small Multiples	100
	<i>Setting Grid Width and Height</i>	100
	<i>Formatting Small Multiple Titles</i>	101
	<i>Other Formatting Options</i>	101
	<i>Suppressing Axis Titles</i>	102
	<i>Using Different Axes for Different Charts</i>	102
11.3	Making the Background Colour Dynamic	103

## TABLE OF CONTENTS (4 of 10)

12	MORE ON CHARTS	Page
12.1	Line, Combination and Area Charts	104
	<i>Multiple Fields in Line Charts</i>	104
	<i>Line Formatting</i>	105
	<i>Secondary Axes</i>	106
	<i>Combination Charts</i>	106
	<i>Area Charts</i>	107
12.2	Pie, Donut and Treemap Charts	108
	<i>Formatting Pie and Donut Charts</i>	108
12.3	Scatter and Bubble Charts	109
	<i>Creating Scatter Charts</i>	109
	<i>Making Bubble Charts</i>	109
	<i>Formatting Scatter and Bubble Charts</i>	110
	<i>Animating Bubble Charts</i>	111

13	GROUPING AND BINNING	Page
13.1	Grouping	112
	<i>Starting a Group</i>	112
	<i>Editing Groups</i>	113
	<i>Using Group Fields</i>	113
13.2	Binning	113

14	DRILL-DOWN	Page
14.1	Drill-Down for Charts	115
	<i>What is Drill-Down?</i>	115
	<i>Enabling Drill Down</i>	115
	<i>Drilling Down</i>	116
	<i>Drilling Up</i>	116
	<i>What Happens when you Drill Down</i>	117
	<i>Drill Down and Visual Interactions</i>	117
	<i>Viewing the Next Hierarchy Level</i>	118
	<i>Expanding All Levels in a Hierarchy</i>	118
14.2	Drill-Down in a Matrix	119
	<i>Choosing Row or Column Fields</i>	119

15	CARDS	Page
15.1	New Cards	120
15.2	Working with Cards	121
	<i>Creating a New Card</i>	121
	<i>Formatting Card Values and Labels</i>	121
	<i>Formatting the Numbers in Cards</i>	122
	<i>Card Shapes</i>	122
	<i>Formatting the Cards Themselves</i>	123
	<i>Adding Images to Cards</i>	123
15.3	Reference Labels	124
15.4	Multi-row Cards	125

16	GAUGES	Page
16.1	Gauges	126
	<i>Adding a Gauge</i>	126
	<i>Minimum, Maximum and Target Values</i>	127
	<i>Formatting Gauges</i>	127

17	KEY PERFORMANCE INDICATORS (KPIs)	Page
17.1	Overview of KPIs	128
	<i>Creating a KPI</i>	128
17.2	Creating Targets	129
	<i>Formatting KPIs</i>	130

18	SLICERS	Page
18.1	Introducing Slicers	131
18.2	Working with Slicers	132
	<i>Creating a Slicer</i>	132
	<i>Selecting and Clearing Items</i>	132
	<i>Changing Selection Behaviour</i>	133
	<i>Searching in Slicers</i>	133
	<i>Dropdown Slicers</i>	133
	<i>Tile Slicers</i>	134
	<i>Customising your Slicer Header</i>	135
18.3	Hierarchical Slicers	136
18.4	Number and Date Slicers	137
	<i>Sliders</i>	137
	<i>Choosing Dates</i>	137
	<i>Picking Relative Dates</i>	138
	<i>Changing the Anchor Date</i>	138

19	NEW SLICERS	Page
19.1	Overview of the New Slicer Visual	139
	<i>Benefits of the New Slicer Visual</i>	139
	<i>Enabling the Visual</i>	139
19.2	Working with the New Slicer	140
	<i>Adding a New Slicer Visual</i>	140
	<i>Basic Configuration</i>	140
	<i>Adding Images and Text</i>	141
	<i>Adding Hover and Selection Effects</i>	142

## TABLE OF CONTENTS (5 of 10)

20	FILTERING REPORTS	Page
20.1	How Filters Work	143
20.2	Working with Filters	144
	<i>Showing the Filters Pane</i>	144
	<i>Applying a Basic Filter</i>	144
	<i>Adding Fields to the Filters Pane</i>	145
	<i>Removing a Filter</i>	145
	<i>Advanced Text Filters</i>	145
	<i>Advanced Number Filters</i>	146
	<i>Relative Date Filtering</i>	146
	<i>Top and Bottom Filters</i>	147
	<i>Sorting Filters</i>	147
20.3	Formatting Filters	148
20.4	Controlling Filters for End Users	149
	<i>Locking and Hiding Filters</i>	149
	<i>Report Filter Settings</i>	149

21	DRILL-THROUGH FILTERS	Page
21.1	What are Drill-Through Filters?	150
21.2	Creating a Drill-through Filter	151
	<i>Step 1 – Create the Main Report Page</i>	151
	<i>Step 2 – Create the Drill-Through Target Page</i>	151
	<i>Step 3 – Name and Hide your Drill-Through Page</i>	152
	<i>Step 4 – Configuring your Drill-Through Page</i>	152
	<i>Step 5 – Testing your Drill-Through Page</i>	152
21.3	Three Ways to Drill Through	153
	<i>Modern Tooltips (Left Clicking)</i>	153
	<i>Right-Clicking</i>	153
	<i>Using a Drill-Through Button</i>	153
21.4	Adding a Context-Sensitive Title	154
21.5	Extra Drill-through Options	155
	<i>Keeping All Filters</i>	155
	<i>Drill-through from Summarised Fields</i>	155

22	BUTTONS AND SHAPES	Page
22.1	Overview	156
	<i>Types of Clickable Objects</i>	156
	<i>Types of Action</i>	156
22.2	Adding Clickable Shapes	157
22.3	Adding Clickable Images	157
22.4	Adding Clickable Buttons	159
	<i>Adding the Button</i>	159
	<i>Setting Default, Hover, Selection and Disabled Effects</i>	159
	<i>Formatting Buttons</i>	160

23	PAGE NAVIGATION	Page
23.1	Overview	161
23.2	Page Navigators	162
	<i>Creating Page Navigators</i>	162
	<i>Formatting Page Navigators</i>	163
	<i>Displaying Page Navigators as Grids</i>	163
23.3	Simple Custom Page Navigators	164
23.4	Dynamic Page Navigation	165
	<i>Step 1 – Creating (and Editing) the Table</i>	165
	<i>Step 2 – Creating the Slicer</i>	166
	<i>Step 3 – Creating the Button</i>	166
	<i>Step 4 – Setting the Button's Action and Tooltip</i>	166
	<i>Step 5 – Showing your Menu on All Pages</i>	167

24	CUSTOM VISUALS	Page
24.1	What are Custom Visuals?	168
24.2	Adding Custom Visuals	169
	<i>Pinning Custom Visuals</i>	169
24.3	Working with Custom Visuals	170
	<i>Applying a Custom Visual</i>	170
	<i>Removing Custom Visuals</i>	170

## TABLE OF CONTENTS (6 of 10)

25	QUERYING DATA	Page
25.1	What are Queries?	171
25.2	Working with Queries	172
	<i>Opening the Query Editor</i>	172
	<i>The Query Editor</i>	172
	<i>Default Query Steps</i>	173
	<i>Viewing Data at Different Steps</i>	173
	<i>Editing a Query Step</i>	173
	<i>Renaming Steps</i>	174
	<i>Deleting a Query Step</i>	175
	<i>Deleting Multiple Query Steps</i>	175
	<i>Adding a New Step</i>	175
	<i>Viewing M Formulae</i>	176
	<i>Applying Query Changes</i>	176
25.3	Common Transforms	177
	<i>Changing Data Types</i>	177
	<i>Renaming Columns</i>	177
	<i>Removing Columns</i>	178
	<i>Removing Rows</i>	178
	<i>Sorting Rows</i>	179
	<i>Filtering Rows</i>	179
	<i>Splitting Columns by Delimiter</i>	180
	<i>Splitting Columns by Number of Characters</i>	180
	<i>Extracting Values</i>	181
	<i>Replacing Values</i>	181
	<i>Duplicating Columns</i>	181
25.4	Creating New Columns	182
	<i>Creating a Column by Example</i>	182
	<i>Creating a Formula</i>	182
	<i>Creating Conditional Columns</i>	184

26	PUBLISHING	Page
26.1	Overview of Publishing	185
26.2	An Infinite Number of Variables	186
	<i>Your Power BI Licence</i>	186
	<i>Linking to Data</i>	186
	<i>Data Sources</i>	187
26.3	Workspaces	188
	<i>Choosing a Workspace</i>	188
26.4	Creating Workspaces	189
26.5	Publishing Reports	190
26.6	Viewing and Editing Reports	191
	<i>Reports and Datasets</i>	191
	<i>Viewing Individual Reports</i>	191
	<i>Editing a Report</i>	192
26.7	Dashboards and Tiles	193
	<i>Adding Tiles to Dashboards</i>	193
	<i>Using Tiles</i>	193
26.8	Lineage View	194
26.9	Refreshing Data	194
	<i>Types of Connection</i>	195
	<i>Types of Refresh</i>	196
	<i>Web Connections: a Warning</i>	196
	<i>Viewing and Managing Connections</i>	197
	<i>Viewing Individual Connections</i>	197
	<i>Scheduling Refreshes</i>	198
26.10	Sharing and Exporting Reports	199
	<i>Creating a PowerPoint Presentation</i>	199
	<i>Exporting to PDF</i>	200
	<i>Generating a Public URL for your Report</i>	200
	<i>Embedding your Report in a Website</i>	201
	<i>Creating a Power BI Report File</i>	201
	<i>Sharing a Report</i>	201

27	INTRODUCTION TO DAX IN POWER BI	Page
27.1	DAX in Power BI	202
	<i>How DAX is Used 1 – Calculated Columns</i>	202
	<i>How DAX is Used 2 – Measures</i>	202
	<i>How DAX is Used 3 – Calculated Tables</i>	203
	<i>Choosing the Type of Calculation</i>	203
	<i>Where Else is DAX Used?</i>	203
27.2	The Construct-a-Creature Database	204
	<i>The Tables and Relationships</i>	204
27.3	Getting Help with DAX	205
	<i>Getting Help within Power BI</i>	205
	<i>Other Sources of Help</i>	205

## TABLE OF CONTENTS (7 of 10)

28	BASIC CALCULATED COLUMNS	Page
28.1	Calculated Columns	206
	<i>Key Features of Calculated Columns</i>	206
	<i>Creating a Calculated Column</i>	206
	<i>Entering a Formula</i>	207
	<i>Calculated Column Properties</i>	208
	<i>Using Calculated Columns in Visuals</i>	208
28.2	Referencing Columns and Tables	209
	<i>Qualifying Column Names</i>	209
	<i>Table Names</i>	209
	<i>Referencing Columns in Other Tables</i>	210
	<i>The Related Function</i>	210
28.3	Editing DAX Code	211
	<i>Multiple Lines and Indenting</i>	211
	<i>Comments</i>	212
	<i>Keyboard Shortcuts</i>	212

29	WORKING WITH DATA TYPES	Page
29.1	DAX Data Types	213
	<i>Viewing a Column's Data Type</i>	213
29.2	Working with Numbers	214
	<i>Basic Arithmetic</i>	214
	<i>Controlling the Calculation Order</i>	214
	<i>Safely Dividing Numbers</i>	215
	<i>Numeric Functions</i>	216
29.3	Working with Text	217
	<i>Writing Text in Calculations</i>	217
	<i>Concatenating Text</i>	217
29.4	Text Functions	218
	<i>Finding and Extracting Text</i>	218
	<i>Replacing Text</i>	218
	<i>Generating Text</i>	219
	<i>Converting and Formatting Text</i>	219
29.5	Working with Dates	220
	<i>Entering Date and Time Values</i>	220
	<i>Returning the Current Date and Time</i>	220
	<i>Calculating Date and Time Values</i>	221
	<i>Calculating the Difference Between Dates</i>	221
	<i>Extracting Date Parts</i>	222
	<i>Formatting Dates</i>	222

30	CONDITIONAL FUNCTIONS	Page
30.1	The IF Function	223
	<i>Testing a Single Condition</i>	223
	<i>Comparison Operators</i>	223
	<i>The IN Operator</i>	223
	<i>Nesting IF Functions</i>	224
	<i>Combining Logical Tests</i>	224
	<i>The NOT Operator</i>	224
30.2	Working with Blanks	225
	<i>Producing a Blank</i>	225
	<i>Blank Arithmetic</i>	225
	<i>Testing for Blanks</i>	225
	<i>The COALESCE Function</i>	226
30.3	Testing for Errors	227
	<i>The ISERROR and IFERROR Functions</i>	227
	<i>Avoiding Error Functions</i>	227
30.4	The SWITCH Function	228
	<i>A Simple SWITCH Function</i>	228
	<i>Logical Tests in a SWITCH Function</i>	228

31	BASIC MEASURES	Page
31.1	Introduction to Measures	229
	<i>Measures vs. Calculated Columns</i>	229
	<i>Implicit Measures</i>	229
31.2	Creating a Measure	230
	<i>Adding a Measure to a Table</i>	230
	<i>Formatting Measures</i>	231
	<i>Displaying a Measure in a Visual</i>	231
	<i>Referencing Measures</i>	232
31.3	Filter Context	233
	<i>What is Filter Context?</i>	233
	<i>How DAX Applies Filter Context</i>	234
31.4	Measures Tables	235
	<i>Creating a Separate Measures Table</i>	235
	<i>Moving Measures</i>	236
31.5	Quick Measures	237
	<i>Creating a Quick Measure</i>	237
	<i>Editing a Quick Measure</i>	238
	<i>Using a Quick Measure</i>	238



## TABLE OF CONTENTS (8 of 10)

32	AGGREGATION FUNCTIONS	Page
32.1	Aggregating Column Values	239
	<i>Basic Aggregation Functions</i>	239
	<i>Functions for Counting</i>	240
	<i>Dealing with Boolean Values</i>	240
32.2	Aggregating Expressions	241
	<i>The AggregateX Functions</i>	241
32.3	Iterators and Row Context	242
	<i>A Reminder of Filter Context</i>	242
	<i>Row Context in Iterator Functions</i>	243
	<i>The Final Result</i>	243
	<i>How to Spot Iterators</i>	243

34	VARIABLES	Page
34.1	Introduction to Variables	258
	<i>Using Variables in Measures</i>	258
34.2	How Variables are Evaluated	259
	<i>Lazy Evaluation</i>	259
	<i>DAX Variables are Constants</i>	259
34.3	Debugging with Variables	260
	<i>Returning Different Variables</i>	260
34.4	Nesting Variables	261
	<i>Variables in Functions</i>	261
	<i>Variable Scope</i>	262

33	THE CALCULATE FUNCTION	Page
33.1	Introducing the CALCULATE Function	244
	<i>Expressions in the CALCULATE Function</i>	244
33.2	Adding New Filters	245
	<i>Basic Filter Expressions</i>	245
	<i>Adding Multiple Filters</i>	246
	<i>Filter Arguments and Filter Context</i>	246
	<i>Multiple Columns in Filter Arguments</i>	247
33.3	Replacing Filters	248
	<i>Replacing an Existing Filter</i>	248
	<i>Comparing Differently Filtered Measures</i>	249
	<i>Dealing with Blank Values</i>	249
33.4	Keeping Filters	250
	<i>The Problem with the Default Behaviour</i>	250
	<i>The KEEPFILTERS Function</i>	251
	<i>Using the VALUES Function</i>	251
33.5	Removing Filters	252
	<i>Removing Every Filter</i>	252
	<i>Using the ALL Function</i>	253
	<i>Comparing Filtered and Unfiltered Values</i>	253
	<i>Removing Filters from Specific Fields</i>	254
	<i>An Issue with Sort-By Fields</i>	255
	<i>Removing Filters from a Specific Table</i>	255
33.6	Special Filter Removal Functions	256
	<i>The ALLEXCEPT Function</i>	256
	<i>The ALLSELECTED Function</i>	257

35	THE FILTER FUNCTION	Page
35.1	Introduction to the FILTER Function	263
	<i>A Basic FILTER Example</i>	263
	<i>Using the CALCULATE Function</i>	263
	<i>How CALCULATE and FILTER are Related</i>	264
	<i>Using Multiple Filters</i>	264
	<i>Using Variables</i>	264
35.2	FILTER vs. CALCULATE	265
	<i>Referencing Multiple Fields</i>	265
	<i>Using Fields from Different Tables</i>	265
	<i>Referring to Measures</i>	266
	<i>Replacing Filters</i>	267
35.3	The CALCULATETABLE Function	268
	<i>Using CALCULATETABLE</i>	268

36	FILTERS AND RELATIONSHIPS	Page
36.1	Relationships and Filter Direction	269
	<i>The Problem with Relationships</i>	269
	<i>Changing the Cross Filter Direction</i>	270
	<i>Solving the Problem using Filters</i>	271
36.2	Cross Filter Direction in Measures	272
	<i>The CROSSFILTER Function</i>	272
	<i>Using Single and Both Filter Directions Simultaneously</i>	273
	<i>Multiple CROSSFILTER Functions</i>	273

## TABLE OF CONTENTS (9 of 10)

37	CONTEXT TRANSITION	Page
37.1	What is Context Transition?	274
	<i>Row and Filter Context</i>	274
37.2	Context Transition in Calculated Columns	275
	<i>Row Context in Calculated Columns</i>	275
	<i>Performing Context Transition</i>	275
	<i>Implicit Context Transition</i>	276
	<i>The RELATEDTABLE Function</i>	276
37.3	Context Transition in Measures	277
	<i>Row Context in Measures</i>	277
	<i>Context Transition in Measures</i>	278
	<i>The Effect of Filter Context</i>	278
	<i>Removing Filters</i>	279
37.4	Ranking Values	280
	<i>The RANKX Function</i>	280
	<i>Ranking in Calculated Columns</i>	280
	<i>Context Transition in Calculated Columns</i>	281
	<i>Ranking in Measures</i>	281

38	TIME INTELLIGENCE	Page
38.1	Introduction to Time Intelligence	282
	<i>Calendar Tables</i>	282
	<i>The Date Column</i>	283
	<i>Referring to Calendar Tables</i>	283
38.2	Time Intelligence Functions	284
	<i>General Time Intelligence Functions</i>	284
	<i>Using the DATEADD Function</i>	284
	<i>How DATEADD Works</i>	285
	<i>Using the DATESINPERIOD Function</i>	285
	<i>Using the Current Date</i>	286
	<i>Using Specific Dates</i>	286
38.3	To Date Calculations	287
	<i>Returning Date Ranges</i>	287
	<i>Calculating Running Totals</i>	287
	<i>Total To Date Functions</i>	288
	<i>Easier Running Total Calculations</i>	288
	<i>Specifying Year End Dates</i>	289
	<i>Calculating Life to Date Values</i>	289
38.4	Next and Previous Periods	290
	<i>Next and Previous Period Functions</i>	290
	<i>Comparing Entire Previous Years</i>	291
	<i>Comparing Parts of Previous Years</i>	292
38.5	Period Start and End Dates	293
	<i>Period Start and End Functions</i>	293
	<i>Start and End Dates</i>	294
	<i>Opening and Closing Balances</i>	295
	<i>First and Last Non-Blank Dates</i>	295
	<i>First and Last Non-Blank Values</i>	296
	<i>Non-Blank Opening Balances</i>	296
38.6	Moving Averages	297
	<i>Calculating a Moving Average</i>	297

## TABLE OF CONTENTS (10 of 10)

39	CUSTOM CALENDARS	Page	40	DYNAMIC MEASURES	Page
39.1	Why use Custom Calendars?	298	40.1	Dynamic Labels	310
	<i>Disabling Automatic Calendars</i>	298		<i>Why use Dynamic Labels?</i>	310
39.2	Creating a Custom Calendar	299	40.2	Returning a Single Value	311
	<i>The CALENDARAUTO and CALENDAR Functions</i>	299		<i>The VALUES Function</i>	311
	<i>Adding Extra Columns</i>	300		<i>Testing for a Single Value</i>	312
	<i>Financial Years</i>	301		<i>The SELECTEDVALUE Function</i>	312
39.3	Finishing the Calendar	302	40.3	Concatenating Values	313
	<i>Marking as a Date Table</i>	302		<i>The CONCATENATEX Function</i>	313
	<i>Changing Default Aggregations</i>	302		<i>More Complex Expressions</i>	313
	<i>Setting Sort-By Columns</i>	303	40.4	Filtered Values	314
	<i>Creating Hierarchies</i>	303		<i>Testing for Filtered Values</i>	314
	<i>Hiding Fields</i>	304		<i>Testing for Cross Filtered Values</i>	314
	<i>Creating a Relationship</i>	304		<i>Selecting the Top N Rows</i>	315
39.4	Using a Custom Calendar	305	40.5	Disconnected Slicers	316
	<i>Creating Visuals</i>	305		<i>Creating a Disconnected Table</i>	316
	<i>Time Intelligence Functions</i>	305		<i>Creating a Disconnected Slicer</i>	317
39.5	Multiple Date Fields	306		<i>Referencing the Selected Value</i>	317
	<i>Using Multiple Calendars</i>	306	40.6	Formatting with Measures	318
	<i>Using a Single Calendar</i>	307		<i>Calculating Colours with Measures</i>	318
	<i>Changing the Active Relationship</i>	307		<i>Using Measures in Conditional Formatting</i>	319
	<i>The USERRELATIONSHIP Function</i>	308		<i>Choosing Colours with Slicers</i>	319
39.6	Special Dates	309			

# CHAPTER 1 - GETTING STARTED

## 1.1 Getting Started in Power BI Desktop

This chapter describes the basic workflow you'll use to build a report in Power BI Desktop:

Stage	Details
<i>Loading and transforming data</i>	Loading one or more tables from various data sources, cleansing the data and linking the tables together if necessary.
<i>Creating a report</i>	Using the data that you've loaded to create a report, including visuals like charts.
<i>Publishing this</i>	Publishing the results to your report server (usually Microsoft's Power BI Service) so that other people can view your reports.

You'll find much more detail on the ideas mentioned in this chapter in later parts of this courseware.

### Example for this Chapter

To demonstrate the basic process of building a report, we'll import a table of data from a webpage and create and publish a report based upon this:

**AT A GLANCE SNOW REPORTS**

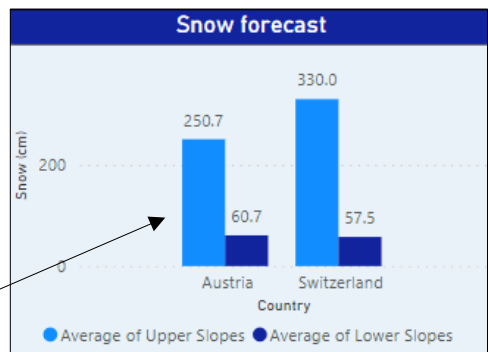
Sort By: Most Popular Resorts | [Uppers Slopes](#) | [Lower Slopes](#) | [Last Snowfall](#) | [A-Z](#) | [Country](#)

Resort	Country	Upper Slopes	Lower Slopes	Last Snowfall
St Anton snow reports	Austria	335cm	70cm	12cm
Ischgl snow reports	Austria	160cm	80cm	4cm
Obergurgl snow reports	Austria	159cm	85cm	1cm
Lech snow reports	Austria	335cm	70cm	12cm

At the time of writing these are the snow conditions at selected resorts courtesy of <https://www.igluski.com/snow-reports>. We'll *transform* the data to tidy it up (for example, we can remove columns we don't need).

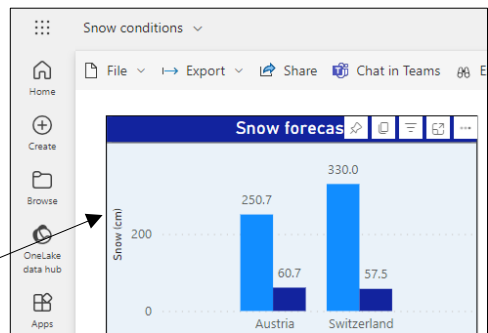
We'll then present this data using *visuals* such as this chart:

We can use the imported, cleaned data to create a variety of visuals, such as this chart.



Finally we will publish this report to the Power BI Service, so that anyone in your organisation can see it:

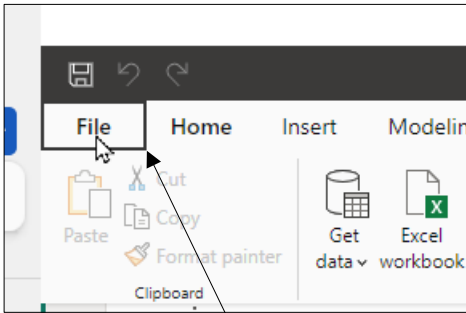
The final report published to Power BI Service, and viewed through your browser.



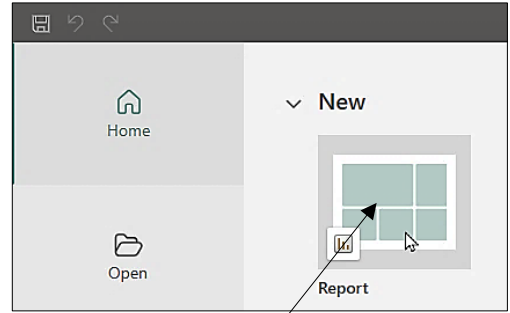
## 1.2 Working with Files

### Creating New Files

You can create a new report in Power BI Desktop in the following ways:



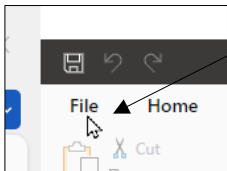
a) If you already have Power BI Desktop open, select the **File** menu.



b) Click on this icon to create a new report.

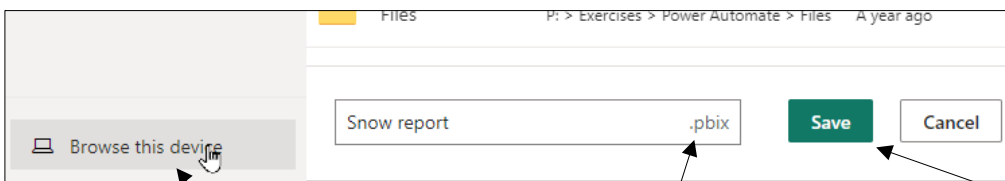
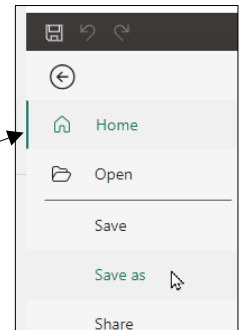
### Opening and Saving Files

You can open and save files using options in the **File** menu:



a) From the Power BI Desktop menu choose the **File** menu.

b) Choose one of these menu items to open or save a report (the dialog box which appears is similar whichever you choose).



c) Click on this button to find the folder which contains (or will contain) your report.

d) Files that you save in Power BI Desktop will have a **pbix** extension.

e) Click on this button to open the report you've chosen or to save this report



*Every time you open a Power BI Desktop report a new instance of the application will launch, leaving the current report you're working on unaffected. To close a report you must close down the Power BI Desktop application containing it (there is no option to close a report but still leave Power BI Desktop running).*

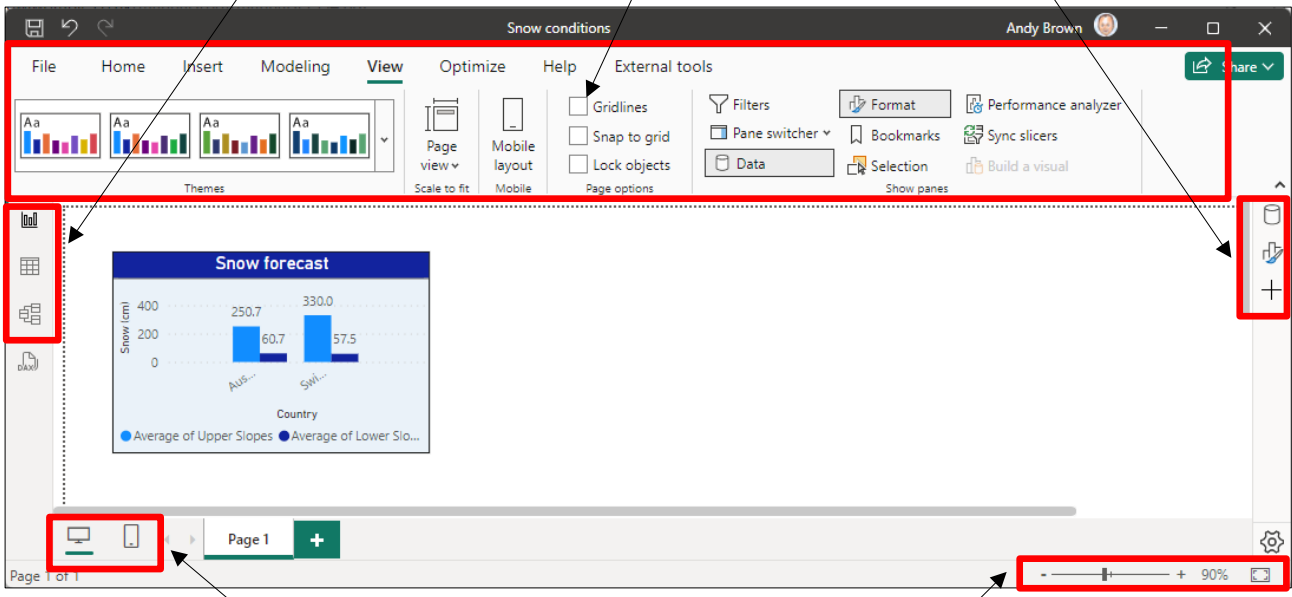
### 1.3 Views in Power BI Desktop

The most important components of the *Power BI Desktop* screen are as follows:

These tools allow you to switch between the 3 main views in Power BI Desktop: **Report view**, **Table view** and **Model view**.

This is the Power BI Desktop menu and ribbon.

You can use the *Pane Switcher* to change what to look at. The two main views are **Data** and **Format**, as explained below.



These tools allow you to switch between designing reports for viewing on desktop computers or mobile phones.

You can use the slider to zoom in and out, although you may find it easier to hold down the **Ctrl** key and use your mouse wheel instead.

### Switching Panes

You can use the icons on the right-hand side of your Power BI screen to choose what to show:

**Data**

Search

- Country
- Σ Last Snowfall
- Σ Lower Slopes
- Resort
- Σ Upper Slopes

Click on this icon to see the data tables in your model ...

... or this icon to see the format properties of the thing you currently have selected (in this case a chart visual).

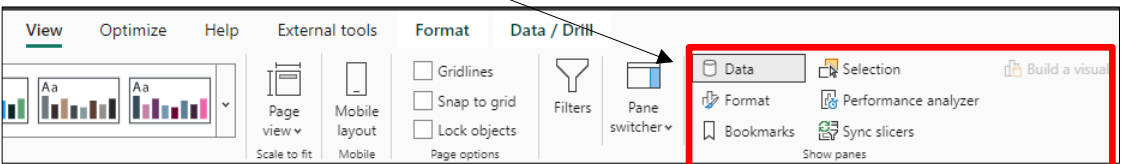
**Format**

Search

Visual Properties

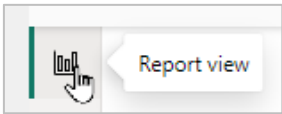
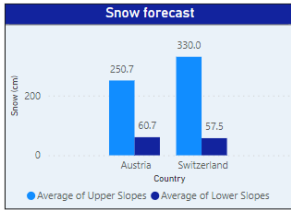

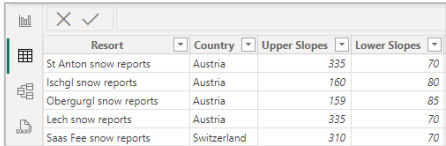
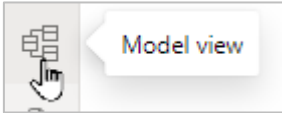
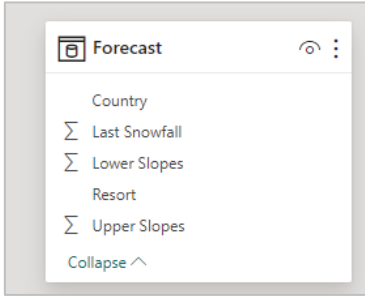
- > Size and style
- > Title On

You can also use these tools on the **View** tab of the Power BI Desktop ribbon to choose what you want to view.



## Report, Table and Model View

You can switch between the three views of a report using the tools on the left of the screen:

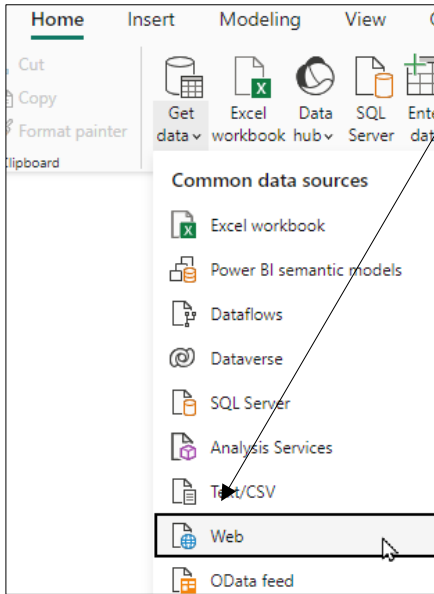
View	Icon	What it shows	Example view
Report		The report that you're creating, consisting of visuals and shapes.	
Table		The tables of data that you've loaded into your model (you can see one table at a time in this view).	
Model		The links between the tables in your model, called <i>relationships</i> in Power BI Desktop.	



The 4<sup>th</sup> icon – if present – allows you to create queries in DAX to interrogate the data upon which your report is based, but this is definitely not something to consider in this courseware chapter!

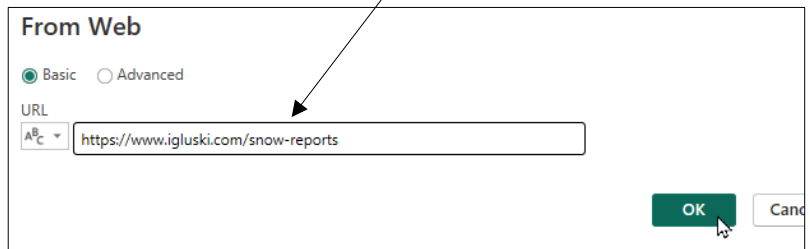
## 1.4 Getting Data

The first stage in building a report is to find some data!

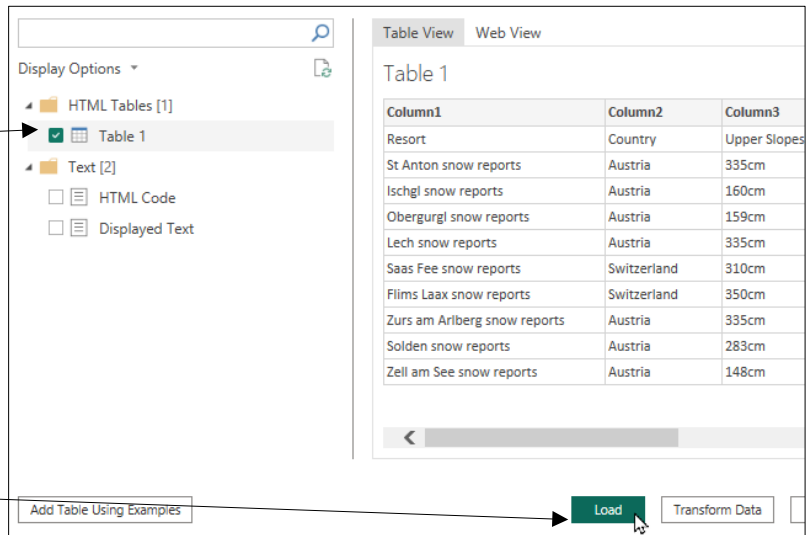


a) From the ribbon, choose **Home | Get Data** then choose a type of data source. Here we're choosing a **Web** source.

b) Each type of data source requires different information to allow your report to connect to it. For a web source you need to enter the URL of the page and then click **OK**. You may also be asked to enter credentials if the website requires some.



c) Tick which table you want to import from this page (the best way to see what each looks like is to click on it).



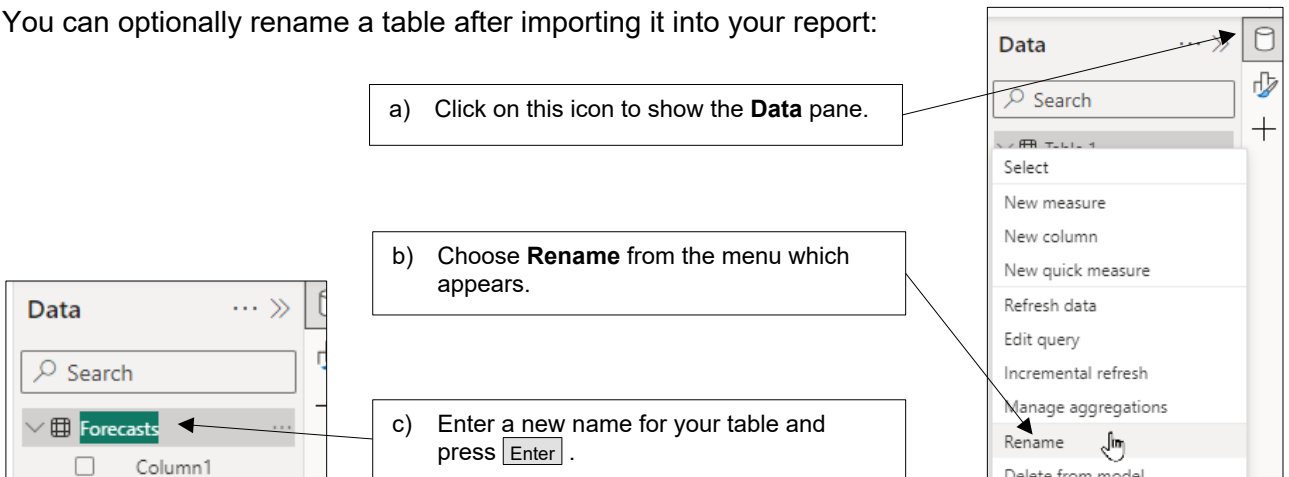
d) Click on this button to load the data into your model.

You can optionally rename a table after importing it into your report:

a) Click on this icon to show the **Data** pane.

b) Choose **Rename** from the menu which appears.

c) Enter a new name for your table and press **Enter**.





## 1.5 Transforming Data

You'll often need to make changes to the data you have imported so that it can be presented easily in visuals. This process is known as *transforming* data.

Column1	Column2	Column3	Column4	Column5
Resort	Country	Upper Slopes	Lower Slopes	Last Snowfall
St Anton snow reports	Austria	335cm	70cm	12cm
Ischgl snow reports	Austria	160cm	80cm	4cm
Obergurgl snow reports	Austria	159cm	85cm	1cm
Lech snow reports	Austria	335cm	70cm	12cm
Saas Fee snow reports	Switzerland	310cm	70cm	1cm
Films Laax snow reports	Switzerland	350cm	45cm	1cm
Zurs am Arlberg snow reports	Austria	335cm	70cm	12cm
Sölden snow reports	Austria	283cm	30cm	1cm
Zell am See snow reports	Austria	148cm	20cm	1cm



We will change the column headings, turn some column into numbers and remove the final column.

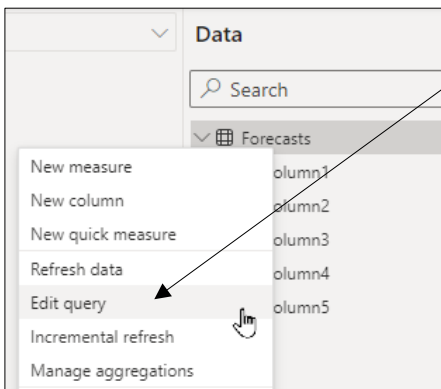
1	Resort	Country	Upper Slopes	Lower Slopes
1	St Anton snow reports	Austria	335	70
2	Ischgl snow reports	Austria	160	80
3	Obergurgl snow reports	Austria	159	85
4	Lech snow reports	Austria	335	70
5	Saas Fee snow reports	Switzerland	310	70
6	Films Laax snow reports	Switzerland	350	45
7	Zurs am Arlberg snow reports	Austria	335	70
8	Sölden snow reports	Austria	283	30
9	Zell am See snow reports	Austria	148	20



As with everything else in this chapter, we will go into this topic in much more detail later in this courseware.

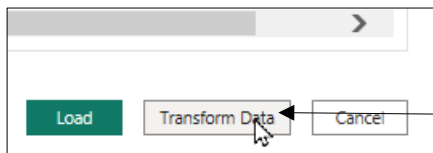
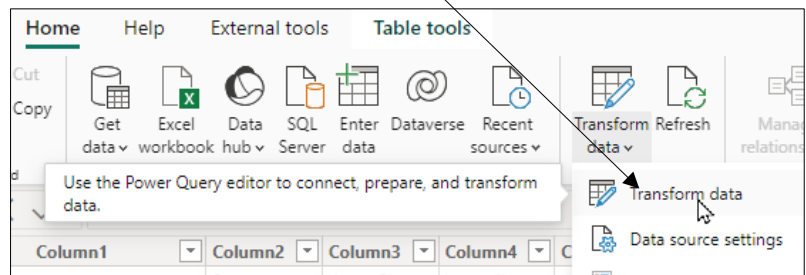
### Editing Queries / Transforming Data

Each table that you import into a report generates a *query* which tells Power BI Desktop which data to get (and how to get it). You can edit these queries in (at least) 3 different ways:



You can right-click on a table in the **Fields** pane and choose **Edit query...**

...or you can choose this option from the **Home** tab of the ribbon (although it says it's doing something different, transforming data and editing a query are actually the same thing!).



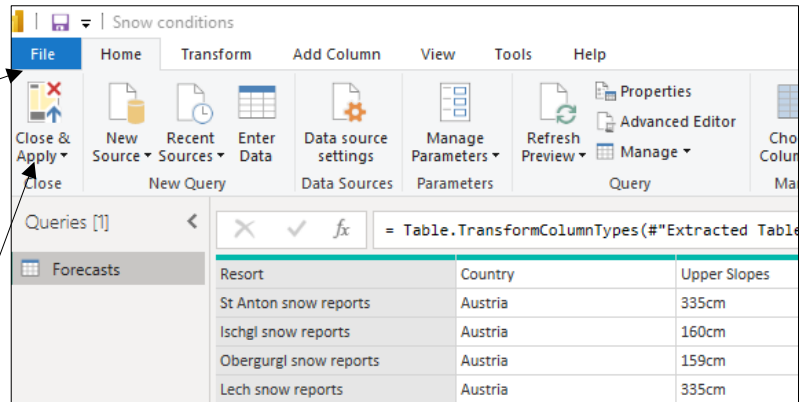
Alternatively, you could click on this button at the point at which you're first loading data to go directly into the Power BI Query Editor.

## The Power BI Query Editor

Choosing to edit a query as described above opens the *Power Query Editor* tool within Power BI Desktop.

Although you're still working in the same Power BI Desktop file, the Power Query Editor has a different ribbon with options related to modifying data.

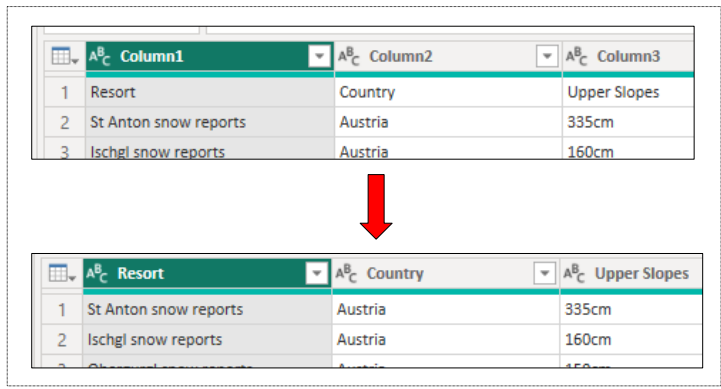
When you have finished cleaning your data click **Close & Apply** to close the Power Query Editor.



*This program to edit Power BI queries has gone by many names in the past! This courseware will call it **Query Editor**, although this name seems to have been abandoned by Microsoft. Little known fact: everything that you can do using Query Editor in Power BI Desktop you can also do when getting data in Excel.*

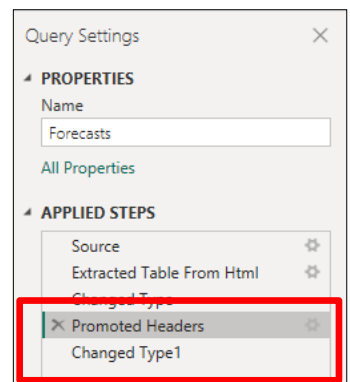
## Promoting Row Headers

For our example the first thing you need to do is to make the first row your table headers:



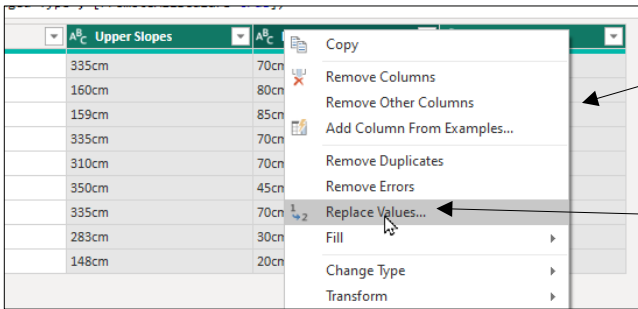
a) To tell Power BI Desktop to use the first row of the table as column headers, click on this tool on the **Home** tab of the Query Editor ribbon:

b) Query Editor will add two steps: one to promote your row headers (as requested), and then another to change the data types of the columns following this step. Query Editor will often insert silent additional steps like this to second-guess your intentions, and (to be fair) nearly always gets these right.



## Replacing Values

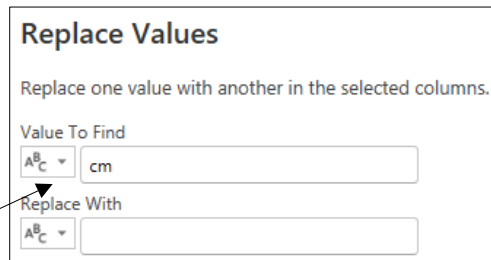
To allow us to average snowfalls for our data we need to remove the **cm** suffices then convert the resulting data to integer numbers:



a) Select the first column whose **cm** suffices you want to remove, then hold down the **Shift** key and select the last one (this is the easiest way to select multiple columns in Query Editor).

b) Right-click on the selected columns and choose to replace values.

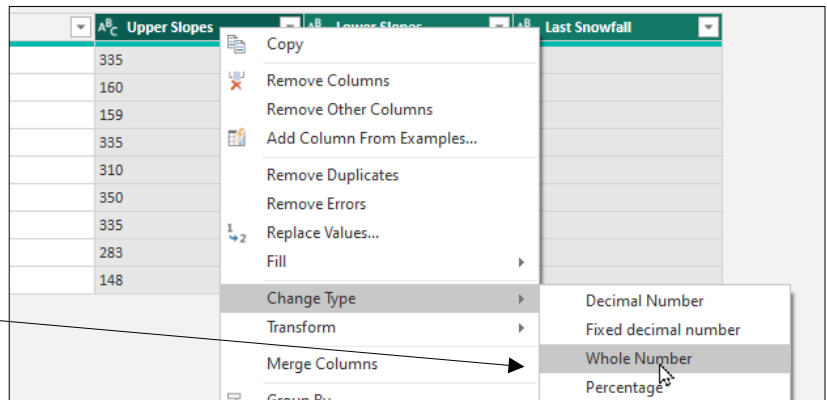
c) Choose to replace the text **cm** with nothing, then select **OK**.



## Changing Data Types

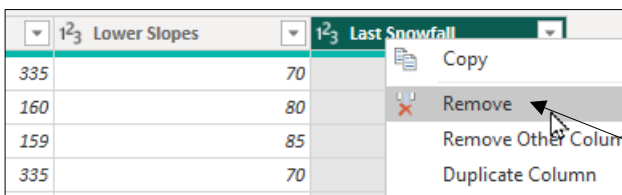
You can now change the data types of the 3 columns you have selected:

Right-click on the 3 columns and choose to change their data types to **Whole Number** (note that this would have generated errors if we had done this earlier).



## Removing Columns

Finally, we're not interested in the last snowfall depth, so we'll remove this column.



Right-click on the **Last Snowfall** column and remove it from your query.

## 1.6 Creating Visuals

*Visuals* are the tables, charts or other gizmos which display the data in your report. There are many types of visual ( you'll learn a lot more about them in later chapters of this courseware).

### Inserting a Visual

Probably the easiest way to add a visual to a report is as follows:

a) Make sure that you're in **Report** view, otherwise you won't be able to add visuals!

b) Click on the side bar to the right of the visuals pane (this appears on both the **Home** tab and the **Insert** tab of the ribbon).

b) Choose which visual you want to create. If you get this wrong, you can always change it after creating your visual by clicking here:

### Assigning Grouping Fields to a Visual

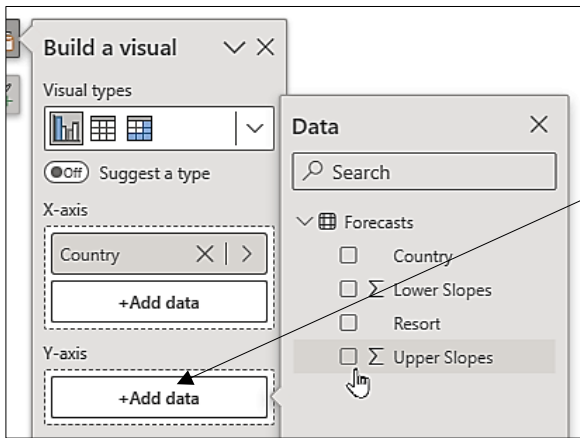
Once you have inserted a visual you can begin assigning fields to it:

The easiest way to assign fields to a visual is to click on this tool.

You can then click on each part of a chart (here we're saying what will appear on the horizontal axis of this column chart) then tick the field you want to include.

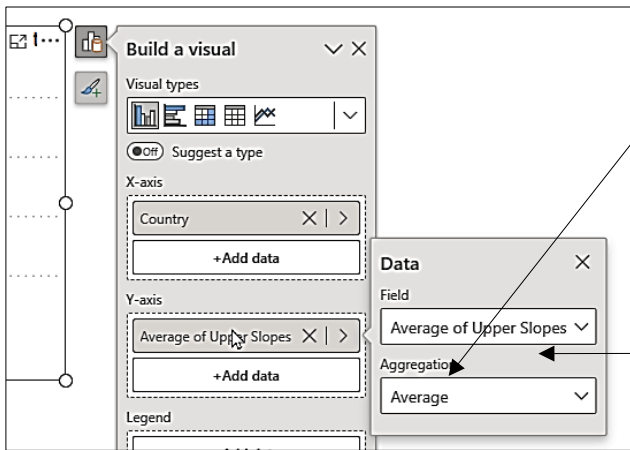
## Assigning Numerical Fields

You can assign numerical fields in the same way, then change how you want to aggregate them:



a) Click on the **Y axis** box the field well and choose to show the **Upper Slopess** snow depth to get this:

The 'Y-axis' field well now contains 'Sum of Upper Slopess'. The 'Data' pane is still open, showing the 'Upper Slopess' field selected.



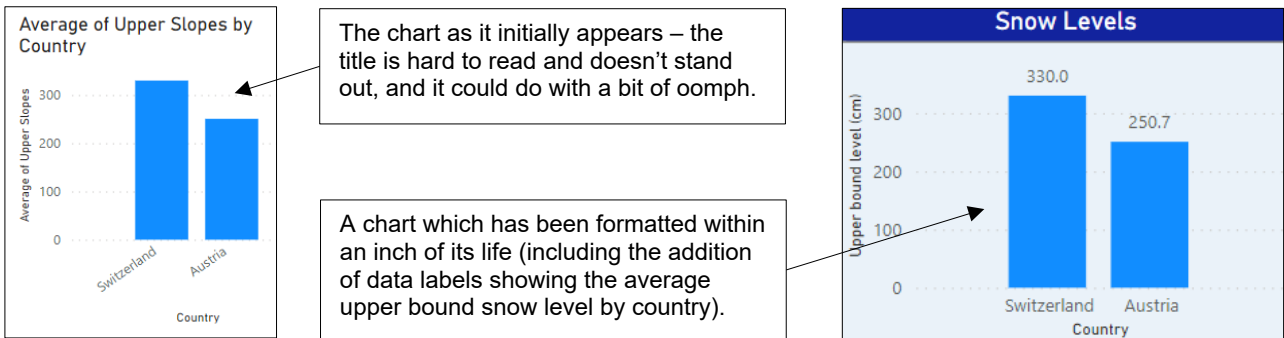
b) Click on the field you've added and change it:

The 'Y-axis' field well now contains 'Sum of Upper Slopess'. The 'Data' pane is open, showing the 'Aggregation' dropdown set to 'Average'.

c) Once you've assigned a numerical field to a chart you can click on it to say how you want to aggregate it (here we've changed from summing the upper slopes' snow depth for each country – which would be fairly meaningless – to averaging it).

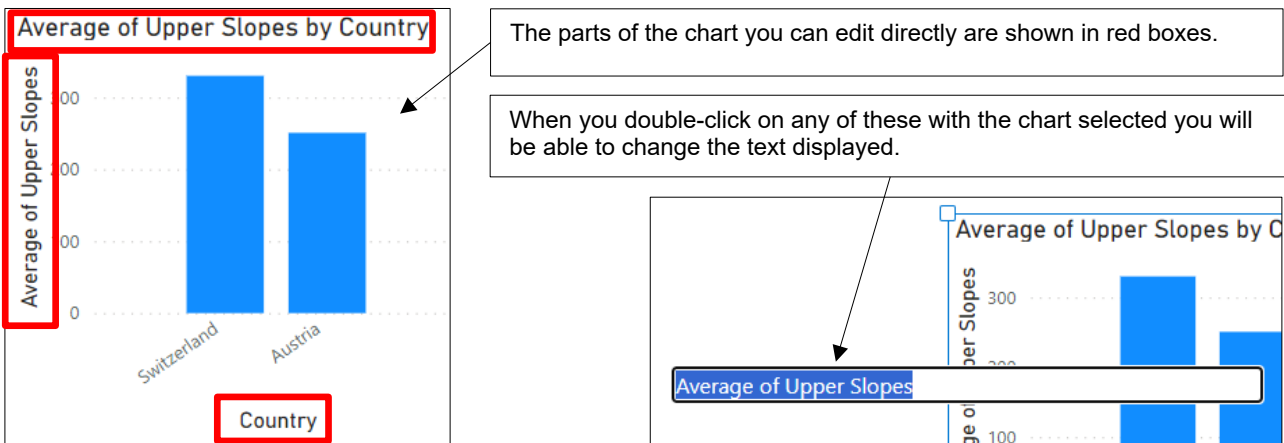
## 1.7 Three Ways to Format Visuals

Much of your time in Power BI Desktop will probably be spent applying formatting like this:



### In Situ Selection

There are a few parts of a chart that you can edit on the chart itself:



### Changing what's on your Chart

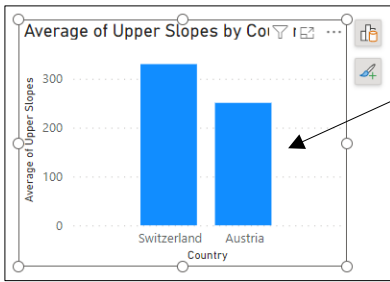
You can choose to add or remove some parts of your chart using the following icon:



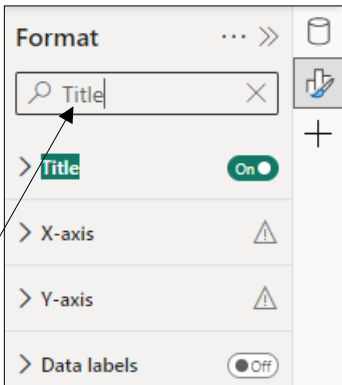
The **More options** button is less useful than you might think: it just takes you to the **Format** pane on the right-hand side of Power BI Desktop.

## The Format Pane

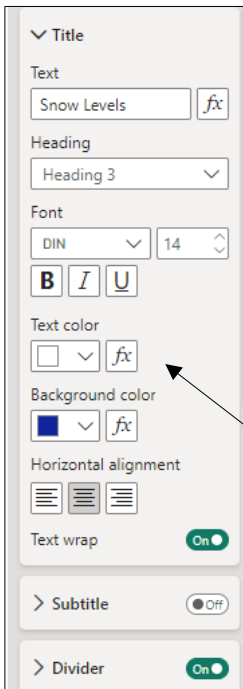
You'll spend much of your time in Power BI Desktop using the **Format** pane:



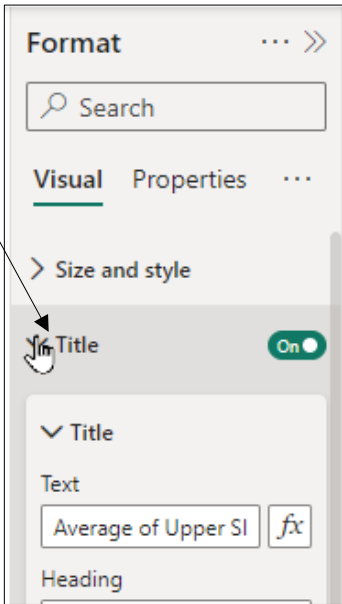
a) Select the visual you want to format (otherwise you'll see the formatting properties of the page to which it belongs instead).



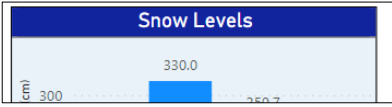
b) Optionally, reduce the number of properties displayed by typing in part of the name of the one you want to change (here we've typed **Title** in the search box).



c) Expand a card to show its range of formatting options, and make changes.



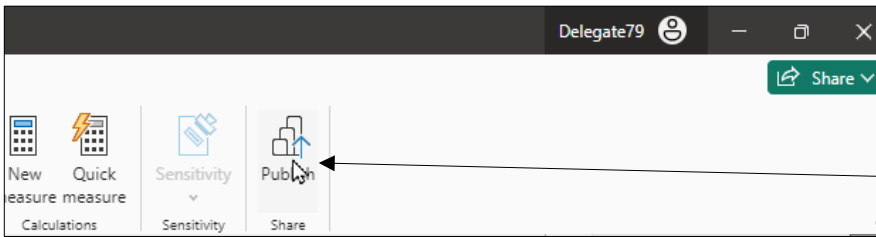
d) Some of the changes made to change the title to this:



*As a short-cut, double-click on a visual to select any part of it that you want to format; the relevant card will automatically then be selected in the **Format** pane.*

## 1.8 Publishing your Report

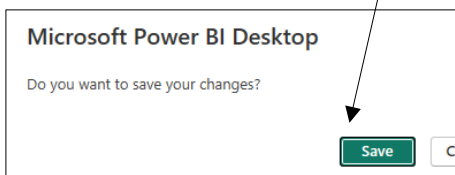
When you've finished your report you will probably want to share it!



a) Check that you're signed in to a Power BI account.

b) Click on this **Publish** button on the **Home** tab of the Power BI ribbon.

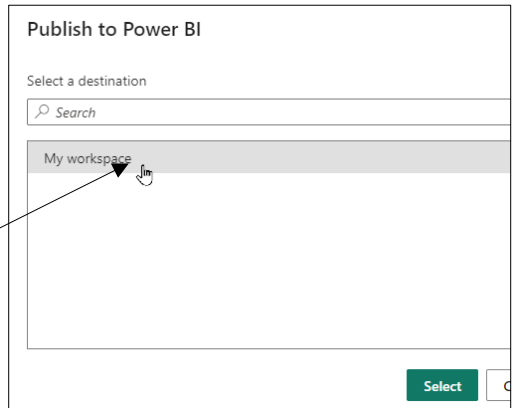
c) If you have unsaved changes you will be asked at this point to save them (you can't publish a report which contains unsaved changes).



Microsoft Power BI Desktop  
Do you want to save your changes?

Save

d) Choose to publish to the default **My workspace** (see hint below for more on this).



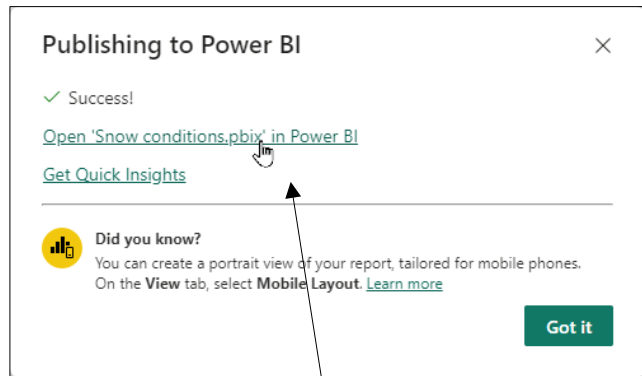
Publish to Power BI

Select a destination

Search

My workspace

Select



Publishing to Power BI

✓ Success!

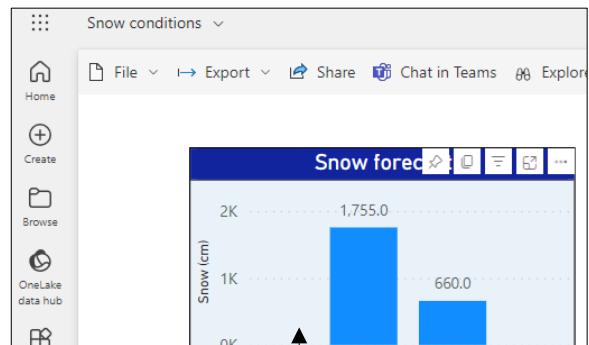
[Open 'Snow conditions.pbix' in Power BI](#)

[Get Quick Insights](#)


Did you know?  
You can create a portrait view of your report, tailored for mobile phones. On the **View** tab, select **Mobile Layout**. [Learn more](#)

Got it

e) Click on this link to see your report in Power BI Service on the Internet (you may be asked to log in to your account again at this point).



f) Your report as it will appear to the world (provided of course that they have the right security level and licence ...).



**Wise Owl's Hint**

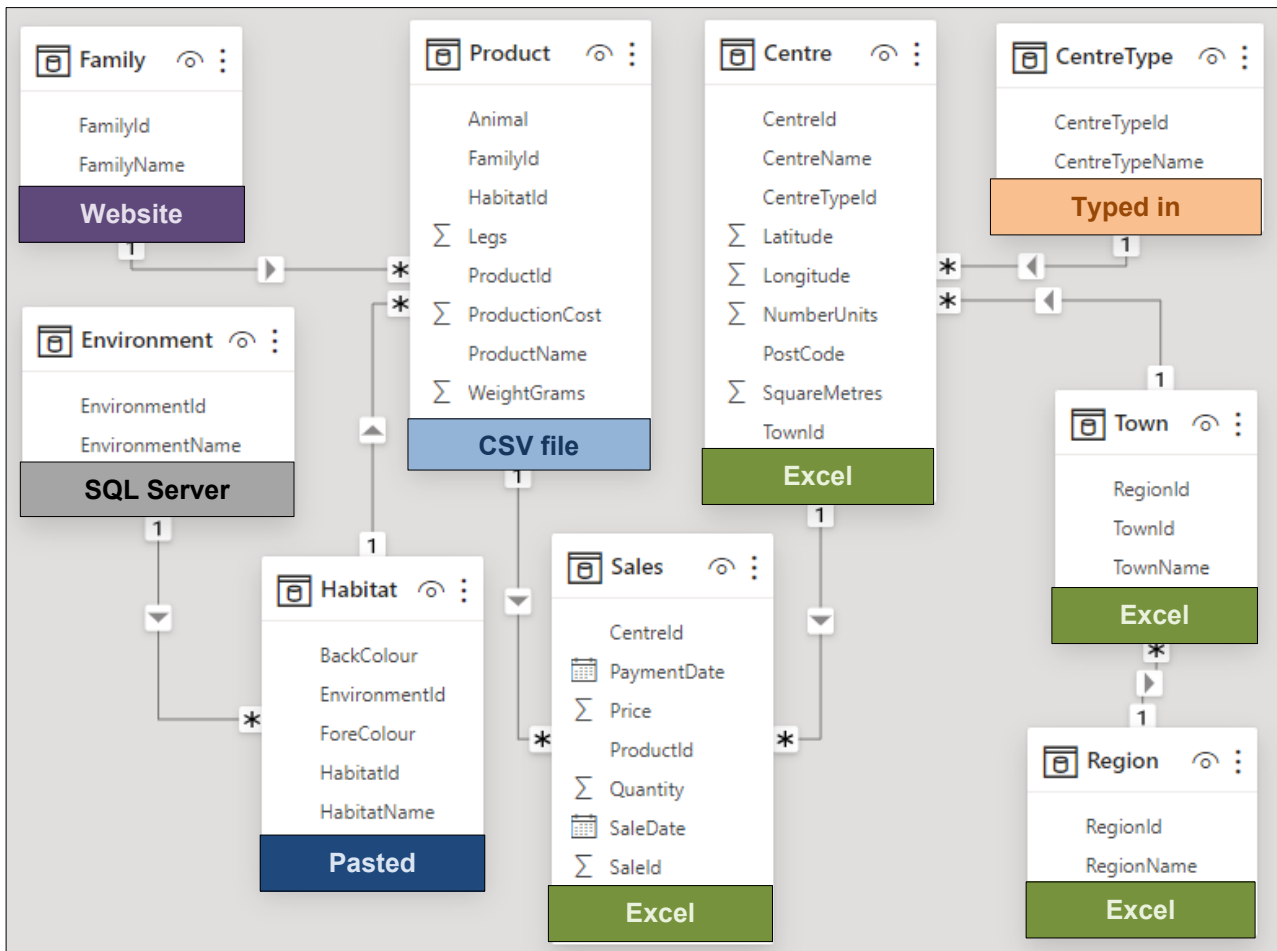
A (much) later chapter in this courseware will cover publishing in more detail, including an explanation of workspaces (and why you might want to create them), how to create dashboards and much more besides.



## CHAPTER 2 - IMPORTING DATA

### 2.1 Our Example

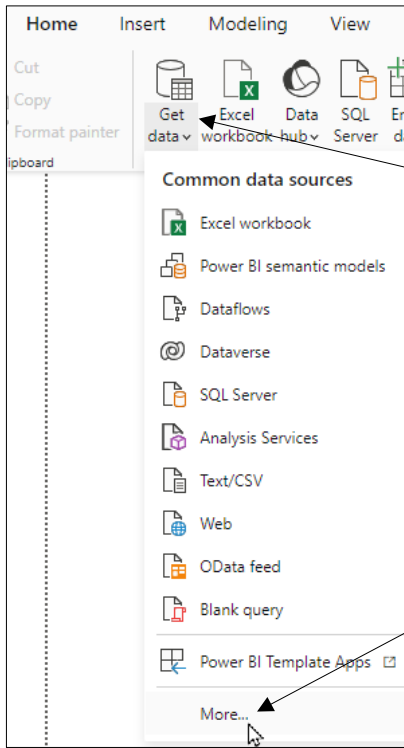
Our example is based on a relational database which keeps track of sales of soft toys. The diagram below shows which type of data source we'll use to import each table:



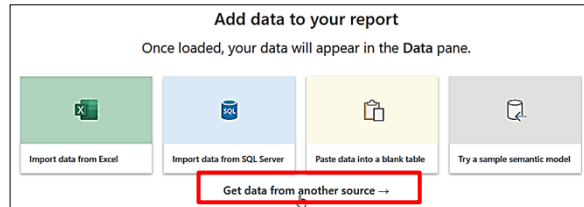
Once you've loaded your data into Power BI from disparate data sources all tables will be treated equally (so for example you can join a table imported from Excel with one imported from a website without any problem).

## 2.2 Importing from Different Sources

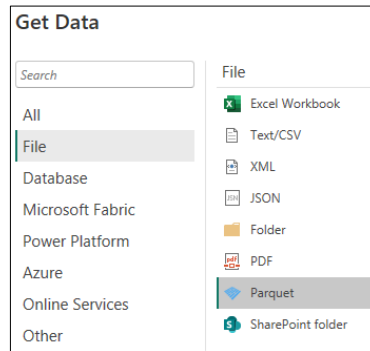
This section shows how to import data into a report from a variety of common data source types. Regardless of which data source type you're using, you can begin the import process as follows:



a) From the ribbon choose **Home | Get Data**. You can also click the top half of the **Get Data** tool to open the dialog box shown below, or click on this link in a new report:



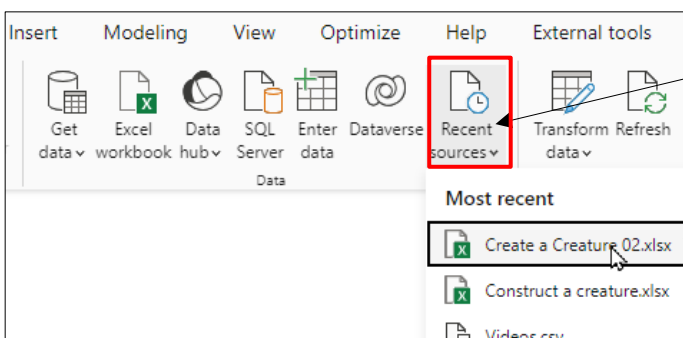
b) Pick a data source type from the **Common data sources** list, or click **More...** to see more choices.



*What happens next depends on which data source type you've chosen, but it inevitably involves launching some type of wizard which will help you import your data.*

### Re-Using a Data Source

You can quickly re-use a recent data source as shown below:

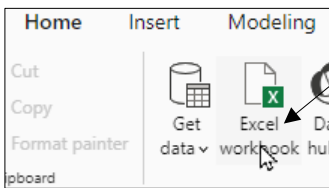


a) From the ribbon choose **Home | Recent Sources**.

b) Pick from the list of databases, workbooks, websites, etc from which you've already imported data.

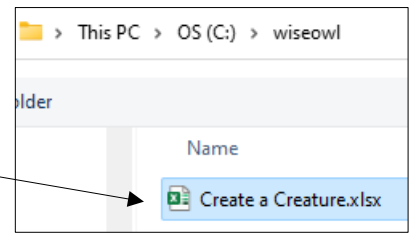
## 2.3 Importing from Excel

To start importing from an Excel workbook, use this short-cut:



Power BI gives you a special Excel tool because it's such a popular choice.

Double-click on a workbook containing one or more worksheets or named ranges that you want to import.



The dialog box which appears lists the contents of the workbook you have selected. You can choose which parts of the workbook you want to import as shown below:

Tick the box next to the name of any item you want to import. Here we've chosen to import the **Centre, Region, Sales and Town** worksheets.

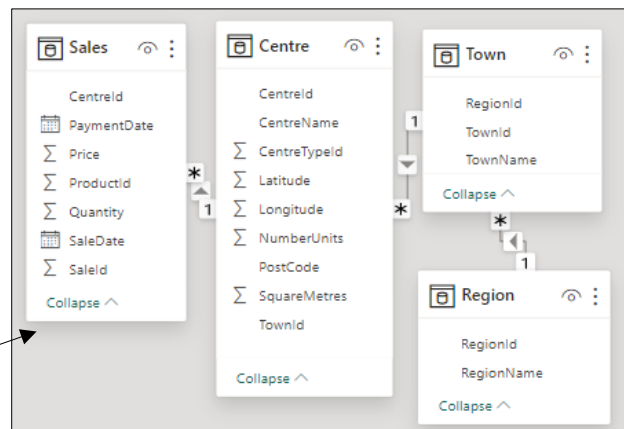
The dialog box will list worksheets in your workbook, but also named ranges in the file such as **RegionList** here. These names ranges have a different icon next to them and appear at the bottom of the list of options.

When you've chosen which worksheets or named ranges you want to import choose either to load them into your model or to go to Query Editor for further processing.

CentreId	CentreName	TownId	CentreType
1	Pavilion Shopping Centre	180	
2	Times Square Shopping Centre	170	
3	North Quay Retail Park	111	
4	Norman Park	9	
5	Crownhill Retail Park	132	
6	Whiteley Village Outlet Mall	68	
7	Cannon Park Shopping Centre	48	
8	Snipe Retail Park	6	
9	Abbey Wood Retail Park	29	
10	Mayflower Retail Park	13	
11	Ocean Park	134	
12	Kingsmead Shopping Centre	69	
13	Market Quay	68	
14	Banbury Cross Retail Park	8	
15	Sundorne Retail Park	152	
16	Wellington Retail Park	183	
17	Morton Park	54	

Note that Power BI Desktop will where possible build relationships between the worksheets you've imported:

Power BI Desktop creates these relationships for this example (we've tidied the diagram up a bit). You'll learn how and why Power BI Desktop creates relationships between pairs of loaded tables in another chapter in this courseware.



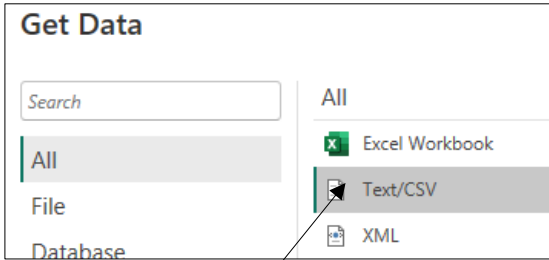
## 2.4 Importing CSV or Text Files

You can import from CSV files as well as a variety of other text file types.

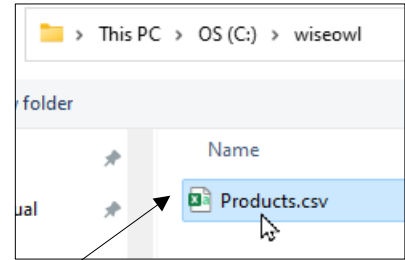
**CSV** stands for **Comma Separated Values**. The value in one column is separated from the next by a comma. Our example file also includes a row of column headers.

```
ProductId,ProductName,Animal,HabitatId,Legs,FamilyId,WeightGrams,ProductionCost
1, Sammy, Snake, 1, 0, 1, 950, 7.19
2, Pokyo, Penguin, 4, 2, 3, 850, 4.5
3, Fenella, Frog, 3, 4, 4, 400, 10.79
4, Layla, Lemur, 2, 2, 5, 550, 4.28
```

To begin importing from a text file like this:



Choose to get data from a **Text/CSV** file ...



... then browse for and double-click the file you want to import.

You can then choose exactly how the text file is configured using the dialog box which appears:

The preview of your data is a good way to check if you've selected the correct options.

If Power BI Desktop hasn't picked the correct delimiter, you can choose a new one.

Power BI Desktop attempts to work out the data type of each column using a sample of rows. You can set the sample size here.

**Products.csv**

File Origin: 65001: Unicode (UTF-8) | Delimiter: Comma | Data Type Detection: Based on first 200 rows

ProductId	ProductName	Animal	HabitatId	Legs	FamilyId	WeightGrams	ProductionCost
1	Sammy	Snake	1	0	1	950	7.19
2	Pokyo	Penguin	4	2	3	850	4.5
3	Fenella	Frog	3	4	4	400	10.79
4	Layla	Lemur	2	2	5	550	4.28
5	Dave	Dachsund	1	4	5	775	5.85
6	Kylie	Camel	5	4	5	1200	3.15
7	Jeremy	Jackdaw	7	2	3	295	7.65
8	Faye	Fox	6	4	5	420	4.95
9	Oliver	Owl	7	2	3	380	6.75
10	Cleopatra	Clownfish	4	0	2	290	2.69
11	Oscar	Otter	3	4	5	340	13.72
12	Bob	Butterfly	7	6	6	450	5.85
13	Englebert	Elephant	1	4	5	1450	3.15
14	Petronella	Parakeet	2	2	3	520	4.05

Buttons: Extract Table Using Examples, Load, Transform Data, Cancel

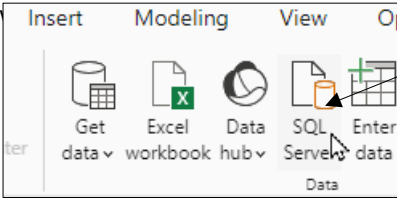
Optionally you can click on this button to train Power BI on which columns you want to import, although it's usually easier to import everything then remove from the query the columns you don't want.

When you've finished configuring the text file, click the **Load** button to import it into your Power BI report.

## 2.5 Importing from SQL Server

You can import data from a SQL Server database as shown in the diagram below:

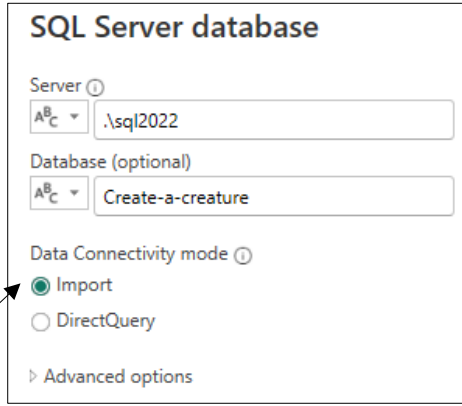
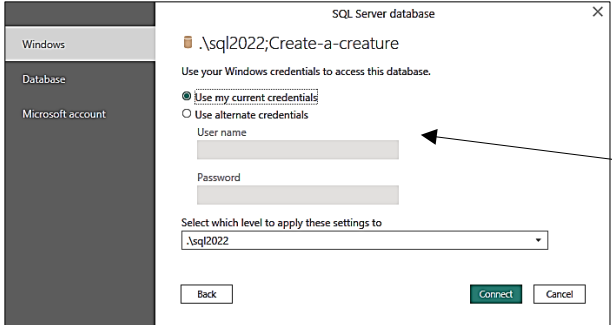
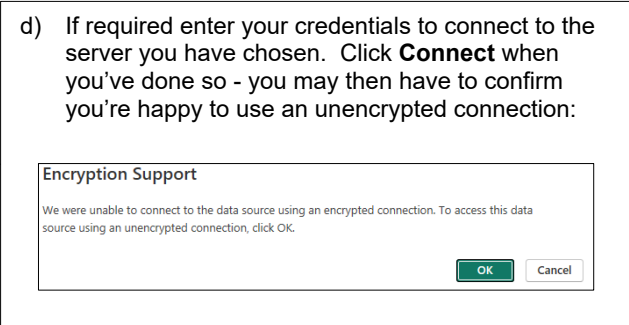
a) Like Excel, SQL Server has a dedicated import tool!



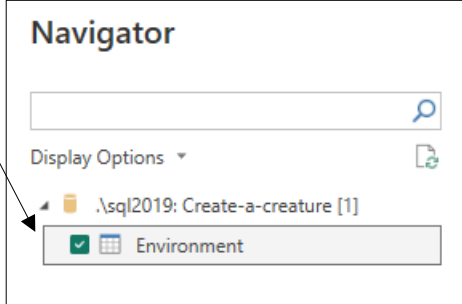
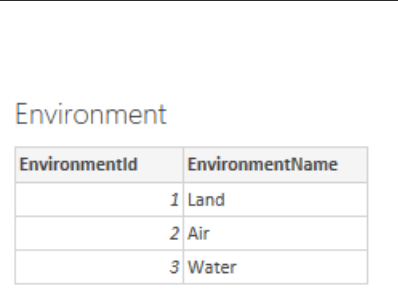
b) Enter a server name and, optionally, the name of a database.

c) Choose to **Import** the data and then click **OK** (see the hint below for more on what **DirectQuery** means).

d) If required enter your credentials to connect to the server you have chosen. Click **Connect** when you've done so - you may then have to confirm you're happy to use an unencrypted connection:

e) In the next dialog box you can pick from a list of tables to import. Here we've chosen to import the **Environment** table.

EnvironmentId	EnvironmentName
1	Land
2	Air
3	Water



*If you're wondering, DirectQuery means you don't import the data into your model: you just link to it. On the plus side this means that the data in your visuals is always up to date, but on the downside reports may run more slowly, and there are numerous limitations (for example, you can only use a few types of data source and you can't use something called calculated columns).*

## Using Queries and Stored Procedures

Rather than choosing to import from a list of tables, you can write a *query* to return your data. This is more complicated but provides much more control over which data you get.

```
USE [Create-a-creature]
GO

CREATE PROC splistNorthWestTowns
AS
-- list the towns in the North-West
SELECT
    t.TownName AS Town,
    t.TownId
FROM
    Town AS t
JOIN Region AS r ON t.RegionId = r.RegionId
WHERE
    r.RegionName = 'North West'
```

a) It's much easier to test your query in SQL Server Management Studio than it is to type it into Power BI! When your query or stored procedure is working, copy the query text or the name of the stored procedure to the clipboard.

**SQL Server database**

Server

Database (optional)

Data Connectivity mode  Import  DirectQuery

b) While loading SQL Server data, choose to show advanced options.

**SQL Server database**

Server

Database (optional)

Data Connectivity mode  Import  DirectQuery

Advanced options

Command timeout in minutes (optional)

SQL statement (optional, requires database)

EXEC splistNorthWestTowns

Include relationship columns

Navigate using full hierarchy

Enable SQL Server Failover support

**SQL Server database**

Server

Database (optional)

Data Connectivity mode  Import  DirectQuery

Advanced options

Command timeout in minutes (optional)

SQL statement (optional, requires database)

```
SELECT
    t.TownName AS Town,
    t.TownId
FROM
    Town AS t
JOIN Region AS r ON t.RegionId = r.RegionId
```

Include relationship columns

Navigate using full hierarchy

c) Choose either to execute a stored procedure (left) or run a query (right). Either option will then let you load your data:

**.\sql2022: Create-a-creature**

Town	TownId
Aintree	1
Altrincham	3
Ashton Under Lyne	6
Birkenhead	18
Blackburn	20
Bolton	21
Bootle	22

Be careful: Power BI Desktop seems to have a preference for choosing **Direct Query** when you load data from SQL Server like this; be sure to set this back to **Import**.

## Passing Arguments to Stored Procedures

Note that you can now pass arguments to a stored procedure using these advanced options:

Here we have a stored procedure listing out all the towns for any given region. We could load this as follows:

Advanced options

Command timeout in minutes (optional)

SQL statement (optional, requires database)

EXEC splistTowns 'East Anglia'

```
CREATE PROC splistTowns(
    @region varchar(100)
)
AS
-- list the towns in any given region
SELECT
    t.TownName AS Town,
    t.TownId
FROM
    Town AS t
JOIN Region AS r ON t.RegionId = r.RegionId
WHERE
    r.RegionName = @region
```

## 2.6 Importing from a Website

Power BI Desktop makes it easy to grab data from a website, as shown below:

**Table of families**  
Here are the families that you probably want to import!

FamilyId	FamilyName
1	Reptile
2	Fish
3	Bird
4	Amphibian
5	Mammal
6	Insect

a) Find a website which contains a table of data that you want to import (this one is at [wiseowl.co.uk/sundry/pbd1/](https://wiseowl.co.uk/sundry/pbd1/) ).

b) Choose to get data from a **Web** source in the **Other** category.

**Get Data**

Search

Other

- Web
- SharePoint
- OData Feed
- Active Directory
- Microsoft Exchange
- Hadoop File System
- Spark
- Hive LLAP
- Recent

**From Web**

Basic  Advanced

URL

c) Enter the URL of the page containing the table you want to import and click **OK**.

Anonymous

Windows

Basic

Web API

Organizational account

https://wiseowl.co.uk/sundry/pbd1

Use anonymous access for this Web content.

Select which level to apply these settings to

d) If this is the first time you've connected to this page you'll be asked if you want to use any credentials. Here we're opting to connect to the site anonymously.

**Navigator**

Display Options

- HTML Tables [4]
  - Table 1
  - Table 2
  - Table 3
  - Table 4
- Suggested Tables [2]
  - Table 5
  - Table 6
- Text [2]

Table View Web View

Table 1

FamilyId	FamilyName
1	Reptile
2	Fish
3	Bird
4	Amphibian
5	Mammal
6	Insect

e) Tick the box next to any table you want to import.

f) Choose one of these buttons to load the data directly or to further process it before loading:

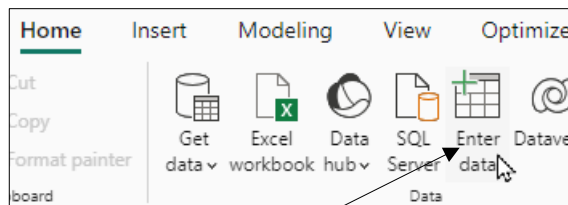
## 2.7 Entering Data Manually

As well as importing existing data, Power BI Desktop allows you to enter data into a model manually.

### Pasting Data

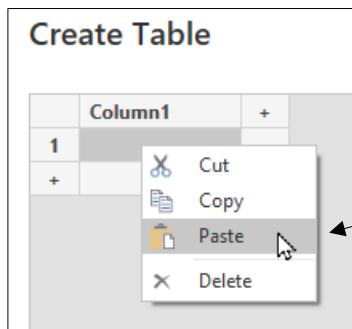
Although you can't import directly from Word, you can copy and paste:

HabitatId	HabitatName	EnvironmentId	BackColour	ForeColour
1	Grasslands	1	Light green	Black
2	Forest	1	Dark green	White
3	Fresh water	3	LightBlue	Dark blue
4	Salt water	3	#78aaf5	White
5	Desert	1	#d6a740	Black



a) In Word, select the table you want to import and copy it.

b) Click on this button to enter data into a new table.



c) Right-click on the empty grid and choose to paste in your data.

d) Power BI Desktop will decide whether the first row of your table should become the header columns.

e) Give your table a better name.

**Create Table**

*The first row of data that you pasted has been promoted to column headers.* Undo Headers

	HabitatId	HabitatName	EnvironmentId	BackColour	ForeColour	
1	1	Grasslands	1	Light green	Black	
2	2	Forest	1	Dark green	White	
3	3	Fresh water	3	LightBlue	Dark blue	
4	4	Salt water	3	#78aaf5	White	
5	5	Desert	1	#d6a740	Black	
6	6	Urban	1	#222	White	
7	7	Sky	2	#0a66f0	White	
+						

Name:

f) Choose to **Load** it into your data model.

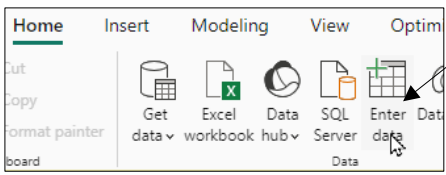


*If you copy and paste data, you obviously won't be able to refresh the resulting table to bring in updates.*

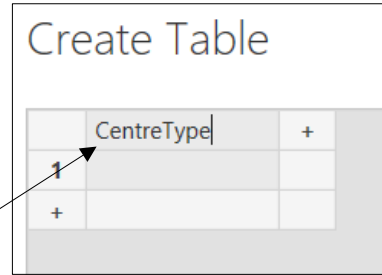


## Typing in Data

The final option for loading data into a model in *Power BI Desktop* is to type it in!



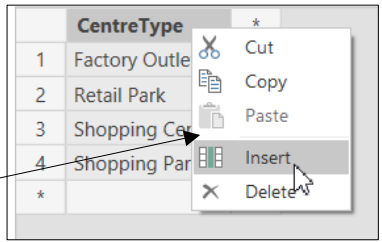
a) From the ribbon select this icon to enter data.



b) You can overwrite any column name to rename it.

	CentreType	*
1	Factory Outlet	
2	Retail Park	
3	Shopping Centre	
4	Shopping Park	
*		

c) Type in the data that you want to store in the table.



d) Right-click to insert any additional columns that you need.

	CentreTypeID	CentreType	*
1	1	Factory Outlet	
2	2	Retail Park	
3	3	Shopping Centre	
4	4	Shopping Park	
*			





e) Type in any data for new columns that you've added.

	CentreTypeID	CentreType
1	1	Factory Outlet
2	2	Retail Park
3	3	Shopping Centre
4	4	Retail Park
*		

Name: CentreType

f) Give the table a name and click **Load** to add it to the report.

## WHAT WE DO

					
	<b>ONLINE TRAINING</b>	<b>MANCHESTER OR LONDON</b>	<b>AT YOUR OFFICE</b>	<b>BESPOKE CONSULTANCY</b>	
<b>OFFICE 365</b>	Microsoft Excel	✓	✓	✓	✓
	VBA macros	✓	✓	✓	✓
	Office Scripts	✓		✓	
	Microsoft Access				✓
<b>POWER PLATFORM</b>	Power BI and DAX	✓	✓	✓	✓
	Power Apps	✓		✓	
	Power Automate	✓	✓	✓	✓
<b>SQL SERVER</b>	Reporting Services	✓	✓	✓	✓
	Report Builder	✓		✓	✓
	Integration Services	✓	✓	✓	✓
	Analysis Services	✓		✓	
<b>CODING LANGUAGES</b>	SQL	✓	✓	✓	✓
	Visual C#	✓	✓	✓	✓
	Python	✓	✓	✓	✓



