Power BI - Beyond The Basics

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Section 1 – Course Introduction

Video: Course Introduction

Deb: Hello everyone and welcome to this course on Power BI - Beyond the Basics. My name is Deborah Ashby and I'm a Microsoft IT trainer specializing in the design, delivery, and facilitation of Microsoft courses both online and in the classroom.

Now, I've been using Power BI for quite a few years now to import, transform, and analyze data. And these days, these are really important skills. Gone are the days when only data scientists were required to have top notch data analysis skills. Nowadays, we all need to at least know the basics.

So, if you are a lifelong Excel user, then you are probably familiar with things like Pivot Tables, and Lookups. Or maybe even using Functions and Formulas to clean and tidy data. You might even have unknowingly already been exposed to Power BI as Power Query is used in Excel to import data.

Now, it's worth noting that this course is designed to be a follow on from the Power BI Beginners Course. So ideally, I would recommend that you run through that course first so you have a handle on the basics, and are familiar with the Power BI interface and how it functions. However, if you have come straight to this course, don't worry, we will be doing a recap of the basics in the first section, just not in as much detail.

Now before we dive into the first lesson, let's just run through some housekeeping. So, I will be using Power BI Desktop. So, make sure that you have it downloaded onto your PC. The files I use in this course are available in the ‘Course Files’ folder. So, make sure that you download them to your PC before commencing so that you can follow along with me. And the files I use in this course are similar to the files used in the Beginner course, but the Sales files have more columns.

So really, what I'm trying to say here is that if you've downloaded these files from the Beginners course, you will still need to download the Course Files from this course because they are slightly different. And finally, just a bit of a note about the structure of this course. There aren't any excise files as such, meaning there aren't any exercise files at the end of each section for you to download. And the reason why that is, is because I've built this course so it's more of a follow-along with me.

So, once you download the Course Files from the Course Files folder onto your PC, use those Course Files and go through each video with me so that you get some hands on practice with each of the skills. And the last half of the course is basically one big exercise where you're going to get to practice building Reports and Dashboards.

So, the last half of the course uses different data to the first half of the course. So, with these two combined, you will get plenty of opportunity to practice the skills you've learned in the lessons. So, with all that said, it's time for us to start the first lesson. So, without further ado, grab yourselves a drink and I'll see you over there.

Video: Setting Up for Success

Deb: So, we're going to start this course by ensuring that we set ourselves up for success from the beginning. So, what we're going to do here is we're going to go through the data files, so that you understand the data that you're analyzing, and we're also going to take a look at a couple of settings in Power BI that you should check before you get going.

So, the data that we're going to analyze in this course, is basically Sales Data Transactional Data. And we're going to import 6 files. Now, 4 of them are contained within this Sales Data folder. So, if we double-click to take a look at what we've got in here, these are the 4 main files. These contain our Transactional Data, the Sales Data, for 4 separate years, 2016 to 2019. And this is Sales Data for a coffee shop that has many different chains. And these files are currently in CSV format.

Now, in addition to these 4 files, we're also going to import 2 more, one is an Excel spreadsheet, and one is a text file. So, let's take a quick look at what these transactional files look like. Let's open the first one. So, what we have in here is just Transactional Data showing things like the Order ID number, the Date, the Product, a Country Code, and then we have things like Unit Cost Unit Price, the Quantity that had been sold, the Profit, so on, so forth. And all of these sales files have exactly the same format.

So, all of them have the same Column Headings. The difference between all of them is obviously the data is actually different the amount we've sold for that particular year, the Profit, the Unit Price is going to be different depending on which file we have open. But effectively, they all take on the same layout.

Now, one thing to note here is that I have these 4 sales files contained within their own folder called Sales Data. And there is a reason that I've stored these together in one folder, which I'll speak more about when we get to importing these files.

In addition to those 4 transaction files, we have an Excel file. If I double-click to open this, you can see this is a very small spreadsheet that just contains the Country Code, and then a list of the countries that belong to that particular code. And then finally, we have a text file, which shows me some information relating to the Products essentially what category these Products belong to.

So, we're going to be importing all 6 of these files into Power BI, and then using them throughout this course. So, now is a great time, if you haven't done it already to go into the Course Files folder, and download all of these files, download them into a folder on your PC, you might want to put something on your Desktop, and I would recommend trying to structure them as I've got them structured here. So, create yourself a folder, call it Sales or Sales Data to house the 4 main transactional files. That's gonna make it a lot easier for you to follow along with what I'm doing.

Now, currently, all of these files are individual files, they're not linked to one another at all. So, the first task that we're going to do is we're going to import the files into Power BI, we're going to tidy them up in Power Query, and create relationships between the tables contained in the files, so that we can analyze correctly with Formulas and Visualizations.

So, now that we understand our files, let's take a look at a couple of settings that it's important to review before we get started in Power BI. So, open up Power BI, let's jump across to File and go straight down into Options and Settings, and then select Options. This is very similar to your standard Microsoft Options page that you might come across in any application. We have two groups; Global and Current File, and this basically allows us to define our settings how our Power BI works.

And this Global section, these settings apply to Power BI no matter what file you have open, whereas the Current File section applies to just the file that you're currently working on. Now, most of these are fine to leave on the default. But there are a couple of them that I'd like you to review and make sure that you do have toggled on or toggled off.

So, the first one here, underneath Global, make sure you are clicked on the Data Load page. Because, in this first group here where it says Type Detection, make sure that you do have a check in the second one down; ‘Detect column types and headers for unstructured sources according to each file settings’. So, this is really going to help you out when you import data into Power BI because Power BI will try and detect the type of data that you have in each column, which can be really helpful.

Let's jump across to Power Query Editor and make sure that in the Layout group, you have Display the Formula Bar selected, because we are going to be using the Formula Bar quite a bit when we get on to the DAX section. Let's scroll down because I'm going to select something underneath Current File now. So, let's go to Data Load.

Again, make sure that you're detecting column types and headers for unstructured sources. And this is a really important one. Underneath Relationships, you want to make sure you have a tick in the box next to ‘AutoDetect new relationships after data is loaded’. Now this option is going to take a lot of the hard work out of it for you, when it comes to creating relationships between different tables of data.

If you have this selected, Power BI is going to try and detect those relationships and create them automatically for you, so that you don't have to do them manually. So, make sure that you have a tick in that box as well. And then the final option I'd like to direct you to is Regional Settings for your Current File.

Now, this is one that can cause you problems depending on the type of data that you're importing. So, for example, take a look at what my language is set to English United States. And as you can probably tell from my accent, I'm actually located in the United Kingdom. And there are many differences

between UK English and US English, particularly when it comes to data. A good example would be something like the way that we write the Date.

So, in America, when you're looking at a Date, you're looking at the month, then the day, and then the year. Whereas in the UK, we do the day first, then the month, and then the year. Now the data that I'm going to be importing is actually in UK format. So, the Date column that I have in that Transactional Data is in UK format. But, I have my Power BI set to United States.

Now if I was to try and import my files, currently, I would get an error on that Date column, because I have UK Date format in my source data, but my settings are US state format. So, the first thing I'm going to do here is I'm going to switch this to English United Kingdom.

Now, depending on where you are in the world, when you're running through this course, I don't mind if you want to open up those CSV files and change the format of the Date so it matches your location. But just make sure that the way that you have it written in the spreadsheet matches the locale that you have set in Regional Settings. Let's click on Ok.

Now the final thing we want to do here is we might as well save this new Power BI file. Currently you can see it says Untitled, we're going to change that. Let's go up to File and down to Save As, choose a folder and I don't mind where you save this to, and give it a name. And again, I don't mind what you call it. I'm going to call mine my initials, then Power BI, Practice, and click on Save.

So, we understand our data, we've adjusted our settings, and we've saved our file. It's now time for us to move on to Section 2, where we're going to import our data, and tidy it up in Power Query.

Section 2 – Importing Excel Data Files

Video: Importing Excel Data Files

Deb: So, the first thing we need to do here is we need to get ourselves some data. Otherwise, we can't do any Formulas or any Visualizations. And the first data that we're going to import into Power BI are those 4 Transactional Sales Files that we have stored in a folder.

Now I'm gonna go reasonably quickly through this section, because a lot of this was covered in that Beginners course. So, this really serves as a nice recap to ease you into this session. And also, if you haven't done the Beginners course, then you're going to understand how importing and transforming works as well. So, hopefully, everyone is a winner. So, let's go to the Home tab, and we're going to choose Get Data.

Now because I have these files in a folder, I can import the entire folder. So, I can't see Folder in this list of common data sources. So, I'm going to select More at the bottom. And this opens up the Get Data Pane. And you can see just how many sources we have. You can literally import data from so many different systems and applications.

Now for us, we have ours stored very simply in a folder, I can see Folder just here. So, let's select and click Connect at the bottom, this is going to open up a little window that is going to ask me to provide the folder path.

So, I basically just have to navigate to it by pressing the Browse Button. Now I can make this window a little bit bigger. So now, I just need to navigate to where I have these files stored. So, there we go, there is my folder, it's called Sales Data. I'm going to select it. Now remember, this will be different for you depending on where you've downloaded those files to. You might have them in a folder on your Desktop. If so, navigate to there, select the folder, and click on Ok, and then click on Ok again.

So, what you're going to see now is a window pop up, which is basically going to list out all of the files contained within that folder. And I can see there I have my Sales Files 2016 to 2019, I can see their CSVs. All looks good. So, what is the next step from here? Well, we have some action Buttons down the bottom. I could choose to combine these files, load them directly into Power BI, or I could transform the data first.

Now a good habit to get into is always going into transform data because this is going to open up Power Query where you can then make changes to these files before you import them into Power BI. And you can also make all different kinds of transformations. If you need to add columns, or clean up the data, or remove things, you can do it from here. So, it's always good to click Transform Data when you're importing.

Notice that I am now in the Power Query Editor. So, this is another part of Power BI. And Power Query, as I said, essentially allows you to tidy up and clean your data so it's in a really nice state before you load it into Power BI. And cleaning data is so important when we're going to analyze it. Because, we don't want things like blank rows, or incorrect formatting in our data because, it's going to give us inaccurate analysis results.

Now, the 4 files that you can see in Power Query at the moment are the only 4 files that I had in my Sales Data folder. However, if you've got files that you want to use contained within a folder, and that folder also contains other files that you don't necessarily want to import, if you see these files listed here, because you've chosen to import everything in the folder, you can filter those files out simply by clicking the Extension Dropdown.

For example, if you had some PDFs or Excel files in here, they would all be listed, and you can simply uncheck the box. And then those won't be analyzed in Power Query or imported into Power BI. So, that's a good little tip. So, get yourself to this stage.

In the next lesson, I'm going to show you how we can combine all of these files into one file because these are essentially the same. They all have the same layout as in the same Column Headings, they just contain different data. So, we're gonna put these in one big file and call it Sales. So, get yourself to this stage, and then I'll see you in the next lesson.

Video: Combining Files and Removing Columns

Deb: So, in the last lesson, we imported our 4 sales files, and we're now going to transform them in Power Query. And I mentioned that because these files are all effectively the same with the same columns, we're going to combine all of them together into one big file, so that we don't have 4 separate files to import.

Now, combining files in Power Query is very simple. Take a look at the first column titled Content. Notice that we have these 2 Arrows, this little icon, and as I hover my mouse over those Arrows, it says 'Combine Files'. So, to combine all of these together, all we need to do is click on this Button. The Combine Files window will open, and it's going to show you a preview based on the first 200 rows of that first file.

So, I'm looking at all of the data, the first 200 rows of the 2016 Sales Data file. And this is really just to give you an idea as to what that data is going to look like. And of course, if you want to view the first 200 rows of any of these files, if you click the Dropdown just here, you can switch to any of the sales files to get a preview of what the first 200 rows will look like. Now, I'm happy with this, so let's click on Ok to combine those together. So, it's now combined those files together, and I'm looking at that combined data file.

Take a look on the left-hand side; you can see I have my Queries Pane just here. And most of these queries have been generated for me by Power Query. The only one that I'm interested in is the one that I'm currently working on, which is Sales Data just here. And it's named this query based on the folder name that I imported the files from. And we're going to rename this query in a moment to something a bit more meaningful. Notice over on the right-hand side, this is where we have the Properties.

So, this is in fact where we can rename this query if we need to. And then underneath we have our Applied Steps. And, Applied Steps basically tracks everything that you're doing in Power Query. And this is a really useful little Pane. Because if you make a change to your data in Power Query, and you want to undo that or backtrack to the file in an earlier state, you can simply click on the cross in the Applied Steps Pane to backtrack through the changes that you've made.

So, now that we have our data in one big long file in Power Query, let's start to tidy it up before we import it into Power BI. Now, one of the main things you want to make sure that you're doing when you're dealing with large files like this, is you really want to make your data as efficient as possible so that it's fast to load and also fast to interrogate with things like Formulas. So, you really want to take the time to go through your data, removing any columns, which aren't going to be needed in the final analysis, and generally tidying things up.

So, that's what we're going to do over the next few lessons. But let's just remove any columns from this data that we're not going to need. Now, as I scroll across, I am going to need pretty much all of these columns in my final analysis. However, the first column here where it says Source Name, this is just showing me the file name. Now I don't really need that anymore because we've combined these into one big file, I already have a Date column here, which is showing me the Year as well.

So, I'm going to get rid of this Source Name column. Simple process, right-click on the column and select Remove. Notice that when I've done that, now in the Applied Steps Pane, the last action I took is to remove columns. If I decided that I wanted that column back again, I could click the cross and it reappears. So, just be aware of that. Now looking at this data, I can see that there are some other changes that I'm going to need to make.

For example, if we look at the Product column just here, what I have in here is the Product. So, if we take this first line as an example Chicken Pizza Wrap. But then after that in brackets, we have basically the Location of the store. This isn't the ideal way to have this data; I'm really going to want to break this up. So, that's exactly what we're going to do in the next lesson. I'm going to show you some techniques you can use when you have to split data across columns and also how you can merge data from multiple columns into one.

Video: Splitting and Merging Columns

Deb: In this lesson, we're going to take a look at how we can Split and Merge Column data. And I introduced the example that we're going to use in the last lesson. And that is, we need to make some changes to this Product column, because currently we have both the Product and the Location listed in this column. Now, why is that a problem?

Well, really, it's just going to make your data a lot more difficult to analyze. For example, if I wanted to analyze this data by Location, maybe I was interested in seeing the Total Profit by Location, that's going to be quite difficult for me to do if I have the Location combined with the Product in one cell, it's going to be hard for me to interrogate. It's much better to have separate pieces of information in separate columns. So, really, we want the Product in one column, and the Location in another.

So, what we're going to do is we're going to use a couple of techniques in Power Query to break up this column into 2 separate columns. First thing you need to do, select the column that you want to split up from the Home tab, in the Transform group; we have a Split Column option. And we have a number of different ways that we can split this data. Now, which one you choose really depends on the kind of data that you have in your column.

Now, I can see here that my Product and my Location are separated with a Space. So, I want to separate this by that Space in the middle. And we call things like Spaces, Dashes, Tabs; those are referred to as Delimiters. So, I'm going to split mine by Delimiter. So, what I can now do is go in and select the Delimiter that I want to use. So, for example, if I had the Product and the Location separated with a Comma, I could choose a Comma, or a Colon, or a Space or a Tab.

Now I'm going to choose Custom and define where I want to split them myself. So, I want to split where we have a Space and then an open bracket. And I want to split at each occurrence of this Delimiter. Because I can see that I only have one occurrence of this Delimiter in each item. Let's click on Ok, and let the magic happen. So, take a look at our data now; we have 2 columns, Product1 and currently Product2.

I have my Products in one column; I have my Locations in another, but notice that I still have that closing bracket. So, I'm going to need to get rid of that as well. Now we can get rid of this using a simple Replace. So, let's click this column, again, up to the Transform group and into Replace Values. So, this is very much like your regular standard Find and Replace. I just need to determine what my value to find is, and what I want to replace it with.

So, I want Power BI to find in this column, the closing bracket, and I want to replace it with nothing. So, I'm going to leave this box blank, click on Ok. And like magic, I've got rid of those closing brackets. So, very straightforward. Now what I want to do is just rename these Column Headings so that they make

more sense. So, we can double-click in the heading. And I'm going to change this to Location and hit Enter. And let's double-click in this heading, and I just want this to be called Product, not Product1. And there we go. Very quickly, we've managed to break up that data.

Now, what if I wanted to do the reverse of this? Maybe I have information contained within 2 separate columns that I want to merge together? Well, again, this is very simple. We can select both of the columns, go to the Transform tab, and in the middle here, we have a Merge Columns option. So, the first thing I need to do here is define how I want to separate these columns. So, what is my Separator going to be? So, if I wanted a Comma, or a Colon, or a Space, I could choose it from here.

I can even add again my own Custom Delimiter. So, let's go for that and say that I want the split up with a space dash space (-). I can then choose what I want my new column name to be called. So, let's just say Product and Location as the name, click on Ok, and now, take a look at what I have. I have a new column and I have my Product and my Location separated with a dash. So, super simple to Split and Merge Columns.

Now I don't want these columns merged, I actually do want them split. So, what I can do is go across to my Applied Steps and just backtrack until I get back to those 2 separate columns. So, let's click the cross and that's going to unmerge those columns.

Video: Applying Data Types

Deb: So, now we've split up those 2 columns. If I look across all of the columns in my data, I can see that there aren't really any other transformations that I need to do, everything is looking pretty good.

However, something that you should always be doing when you're working in Power Query with data is checking to make sure the Data Types for each columns are correct. And if you remember, in that first lesson, we went into our settings in Power BI, and made sure that we had the option to AutoDetect Data Types.

Now a Data Type is very similar to something like Number Formatting in Excel. It tells Power BI the type of data that you have in each column. And if we take a look at our Column Headings currently, you can see the Data Type is represented on the left-hand side by a little icon. So, for Order ID, I have a little 123 icon. If I click in, I can see that Data Type, it is a Whole Number. So, basically, there are Whole Numbers in this column, which in this case is correct.

If I go to the next column, I can see that this is a Date. And again, that is correct. The next one, well, this is Text, and again, correct. So, you can see why having that option set to automatically detect Data Types is super useful. It really cuts down the amount of work that you have to do. Of course, sometimes it's not always perfect and you might have to change the Data Type, which you can simply do from this Dropdown. And we actually are going to change a couple of these.

So, if I scroll across to where we start to have our monetary values, so things like Unit Cost, take a look for these 2 here; Unit Cost and Unit Price, I have 1.2, which means this is a Decimal Number. Now it is and that is absolutely fine. But if you take a look at some of these numbers, you can see they're not very consistent when it comes to the number of decimal places. So, you can see here in the first row, it says 1, the next row we have 1.08, so on and so forth.

Now, I am somebody who always likes to make sure that everything is consistent, and that includes the number of decimal places that we have. So, what I'm going to do here is instead of choosing a Decimal Number, I'm going to change it to Fixed Decimal Number. And what that basically means is that all of my numbers are going to have the same number of decimal places.

So, for me, that is a lot easier to read, and it's a lot more consistent. So, I'm going to change that for all of these that contain prices, so, Fixed Decimal Number. Sales Quantity, now that's just a number, it's not currency. So, that's fine. Total Cost, again, we want to change that to Fixed decimal, I'm going to do the same for Total Price, and also for Total Profit as well. So, super important that you go through and review those Data Types.

The final thing we're going to do here is we're going to rename this query. So, currently, the query is called Sales Data. And if you look over on the right-hand side, underneath Properties, you can see there is the current name. So, let's make this a bit more meaningful, and I'm going to call this Sales Prep because we're not quite done with some of the transformations that we're going to do here.

So, effectively, this isn't the final version of this file that I'm going to import into Power BI to analyze. We're going to continue to make some more changes. So, I'm going to start out by calling this the Sales Prep file. Hit Enter to set that name. Notice that the name also changes in the Queries Pane on the left-hand side.

Video: Importing Text and CSV Files

Deb: So, now we have our combined sales files and we've done a little bit of tidying up here, it's time to import the 2 remaining files. If you remember right at the beginning, when I showed you the files that we're going to use in this course, there were 2 other files as well. There was an XML file, and also a text file. So, let's get those into Power Query.

So, all I need to do here is jump across to the Home tab, go to the New Query group, and click the Dropdown underneath New Source. So, let's import the Excel file first of all. I'm going to select Excel workbook. And now we need to navigate and find that file. And there it is, let's select it, and click on Open. So now, the Navigator window opens up. And you can see on the left-hand side, it's showing me that it's the Countries.xlsx file. And then underneath, I have Country and Sheet1.

Now Country is basically the Table that's contained on this worksheet. So, the data in this file is contained within a Table, and that Table is called Country. If I click on it, I'm going to get a preview of that Table in the Pane on the right-hand side. I also have Sheet1, so, it's going to list out any worksheets that you have in here as well. Now normally, what I would do here is I would select the Table, because I can see that looks absolutely perfect, that is the data I want to import.

But in this example, I'm actually going to import the sheet instead, because this is going to allow me to show you an additional cleaning option in Power Query. So, let's select Sheet1. Now because I've chosen to import the sheet as opposed to the actual Table that contains the data, notice that the Column Headings look a little bit strange now that it's been imported into Power Query. I just have Column1 and Column2, and the actual Column Headings are located in the first row.

And this is something you'll find fairly frequently when you're importing data into Power Query; the Column Headings sometimes are not picked up correctly. That might mean because you haven't used a Table in your source data, it might mean that you have blank rows at the top of your Dataset. But whatever the scenario you find yourself in, it is very straightforward just to pull that first row up into the Column Heading.

So, all we need to do here is go to the Home tab, into the Transform group, and we have a little Dropdown just here that says Use First Row as Headers. So, if I select this, it's going to just pull those up into the heading. Now this is a very, very small Dataset. So, there's not really any changes that I want to make here. I really just want to check to make sure I have the correct Data Type set, which I do; I can see that both of these are set to Text.

And then the final thing I want to do is just rename this query to make it more meaningful. Currently, it's simply called Sheet1. But I'm going to rename this to Countries as this is my Countries Table effectively. So, over on the right-hand side in the Properties area, we're going to type Countries and hit

Enter. So, let's now import our final file that we're going to be using, and that is the Text file. So, again, up to New Source, and I'm going to choose Text/CSV. Navigate to the folder that contains your course files, and choose Products.txt, click on Open to pull that into Power Query.

So, you can see here again, I'm getting a preview as to what that file looks like. And I can see that I actually have an extra column on the end here. So, this is going to be something that I want to remove. So, let's click on Ok to load that into Power Query, and there we go. So, I'm going to check these Data Types. What do we have here in the ID column?

Well, we have a Whole Number, which is fine. We then have Text and Text again. So, all of that is good, but it's brought in an additional column, which doesn't contain any information. So, I'm not going to need that column. So, we're going to select it, right-click, and remove it, very straightforward and simple.

The final thing to do here is again, rename this query. Now it's already called products, and I want to call it Products, but I want it to have a capital P. So, let's just change that, over on the right-hand side, and hit Enter. So now, if you take a look in our Queries Pane at the side, I'm just going to collapse up some of these other ones to make this easier to see. We now have our Sales Prep Table, our Countries Table, and our Products Table all currently sitting in Power Query.

Now currently, these 3 different Tables are all independent of one another. So, let me show you an example of what I mean. We're going to load all 3 of these into Power BI. And to do that all we need to do is jump up to the Home tab and the first group here, the Close group, you just want to click Close and Apply, and that is going to import all 3 of those files into Power BI Desktop. And if we take a look over on the right-hand side, where we have our Fields Pane, you can see them all sitting there. I can now expand them and see the different Column Headings.

Now, if you remember also in the beginning, when we were taking a look at Settings, we set our Power BI arm so that it will AutoDetect Relationships between Tables. So, Relationships between Countries, Products, and Sales Prep. So, let's take a look at what Power BI has managed to do for us. What I'm going to do here is jump across to the Model View.

So, currently, we are on Report View, let's switch into Model View, and this is where you get an overview of your different Tables and how they're all linked together. So, let's just move these so they're a bit easier for us to see.

Notice that they're already linked. Now I haven't linked these; I haven't linked the Tables together. But because we've got that AutoDetect set up, Power BI has managed to link these Tables together. So, how has it managed to do that? Well, it's basically done it by the Column Headings. So, it's merged Column Headings across Tables.

If I hover over this Relationship, you can see highlighted in each Table that's linked, the field that it's been linked by. So, it's managed to map Country Code in the Countries Table to Country Code in the Sales Prep Table. If I hover over the other one, you can see that it's mapped Product in the Sales Prep Table to Product in the Products Table. So, it's purely going off of those Column Headings.

Now, it might be that when you review this, it's got it slightly wrong. And I am going to show you a bit later on how you can edit these Relationships. But you might also want to add in more of your own links and Relationships.

So, in the next lesson, I'm going to show you how we can create additional Lookup Tables to link our data together and also make our Dataset a lot faster and easier to interrogate.

Video: Relationships and Lookup Tables

Deb: So, we finished the last lesson by taking a look at how Power BI auto detects Relationships between Tables, basically using common Column Headings. So, currently, all 3 of my Tables are essentially linked together. Now, what does that mean in terms of the types of Formulas that I can do and the types of Visualizations I can use to analyze this data?

Well, what it basically means is that because the Country Code and the Countries Table is linked to the Country Code in the Sales Prep Table, I can use any field in either Table to build a Visualization. And, everything which flows through the Calculations will be correct, and any Visualizations I do will also be accurate. And because I have a link between the Products Table and the Sales Prep Table via the Product field, I can use any field in either Table to perform Calculations.

If I didn't have these Relationships in here, and just to illustrate this, I'm actually going to delete out both of these Relationships. So, let's hover over the line till it goes yellow, right-click and Delete. Are you sure you want to delete this Relationship? Well, yes, why not? Let's delete it. And let's also delete this one. So, now effectively, what I'm left with are 3 Tables, which are independent of one another, none of these fields are linked together. So, effectively, these Tables don't talk to each other.

Now, just to illustrate what effect this has, if we jump across to Report View, I'm going to create a Quick Column Chart. So, let's select this from the Visualizations Pane. I'm going to choose a Clustered Column Chart. Now don't worry too much about what I'm doing here, we are going to go through this in more detail later on. But just to illustrate the point I'm trying to make, I'm going to grab one of these fields.

So, let's go for Product category and add that to the Axis. And maybe I want to see the Total Profit for each Product category. So, I'm gonna grab Total Profit from the Sales Prep Table and drag that into the Values area. Now what do we have in the Visualization? Well, it's showing me my Product categories, Beverages, Food, and Pastries.

When it comes to the Total Profit, you can see that every single bar is the same. And if I hover my Mouse over, you can see the Total Profit for each one is exactly the same number. So, it's quite clear that something isn't calculating correctly.

Now this is because if we go back to our model, I'm using a field from the Products Table, in this case, category, and a field in the Sales Prep Table, in this case, Total Profit. But because these Tables aren't linked together, Power BI doesn't know how to perform that Calculation. And so, that is why we're basically getting something which is not accurate at all. So, let's go back to our model. Let's add back in those Relationships. And to do this, it's fairly straightforward.

Now when you are creating links between 2 Tables, and the first one we're going to do here is we're going to link the Country Code back to the Country Code in the Sales Prep Table. And in general, you always want to link the one in the smaller Table to the one in the larger Table. So, I'm going to grab Country Code, simply click, drag, and drop it onto Country Code in Sales Prep. You can see it sets up a One-to-Many Relationship. I'm going to talk about this more a bit later on.

For the time being, let's also link the Product field in the Products Table, to the Product field in the Sales Prep Table. Same process, click on Product, drag, and drop it to create that Relationship. Now that these Tables are linked together, if we jump back to our Visual, take a look, this looks a little bit better. So, if I now hover over I can see Beverages, we've got almost 90 Million, Food is slightly less just over 80 Million, and then Pastries is less again. So now, this Visualization is working correctly, because we've created those links between our data.

Now something else to consider when you're working with data files, I'm just going to jump back to Data View so we can see all of our files down the side here. Currently, we have Country, Products, and Sales Prep, and I'm currently clicked on Sales Prep. This Sales Prep Table is just about 40,000 rows long. I know that because each of those individual files that we imported in those sales files were roughly 10,000 rows each. So, there were 4 of them, so we have 40,000 rows of data.

Now whilst this isn't the largest Dataset you will ever come across, there are some Datasets that contain one 1 Million 2 Million rows, it is still pretty sizable. If you think of it this way, everything that I want to do with this Sales Prep file in Power BI, it has to run through 40,000 rows of data in order to complete an action. If you have a Dataset that has 2 Million rows, every time you do something, Power BI is basically running through 2 Million rows of data. And that can take a lot of time.

So, what you ideally want to be thinking about when you're working, particularly with large files in Power BI, is how you can set up this main file, this Sales Prep file, so that it is as efficient as possible to work with. So, for example, if I wanted to do a Visualization where I was trying to find the Total Profit by Location, for example, in order to perform that Calculation, Power BI is going to have to run through every single row of data in the Location column. And if you take a look at what we have here, we have the word Boston repeated multiple times throughout this Dataset. And that is the same for other Location names as well. Now how do we do this?

Well, we can do this using something called Lookup Tables. We can create ourselves a little Table that lists out the 48 unique Locations, we can assign a Unique Identifier to each Location, and then we can reference the Unique Identifier in that Table as opposed to using this Location column. Now, if you're not used to Lookup Tables, that might feel like quite a complicated explanation. We're going to walk through it step by step in the next lesson. So, I'm going to head over there now.

Video: Duplicate vs References

Deb: So, we finished the last lesson by briefly talking about the concepts behind Lookup Tables. Now one important thing to get your head around here is that the Table that contains the transaction files, this is basically your main Table. So, for us, that is the Sales Prep Table. And this is referred to as a Fact Table. Now hanging off of that we have Countries and Products.

Now, both Countries and Products are effectively Lookup Tables that I've imported. And these are called Dimension Tables. Now, if we jump back to our data, the reason why these are Lookup Tables is because if we look at the Countries Table, we have our Country Codes and a list of the Countries that these refer to. And this is a very small list. If we take a look at the Sales Prep Table, we have a Country Code column.

And because this Country Code column is linked through to the Country Code column in the smaller Countries Table, it means that Power BI effectively doesn't have to go through and interrogate 40,000 rows of data every time we perform an action, because it's simply going to use that connection between these 2 Tables. So, when it comes across the Country Code, it's going to jump across and look in the much smaller Countries Table to find the information that it needs.

So, it means that your data is going to be a lot quicker and easier to interrogate. We have a similar thing for Products. So, if we click on the Products Table, we have a list of unique Products listed here. And for each of these, I have essentially a unique ID that's been assigned, and this is an Index Column. And we're going to talk more about Index Columns over the next few lessons. But effectively, we have the same process.

If we go to the Sales Prep Table, we have a Product column. Anytime I do anything that relates to Products in this Table, instead of having to run through 40,000 rows of data, Power BI is simply going to use the connection between the Product column in this larger Table and the Product column in the much smaller Table to get the answers that it needs.

So, effectively, having these smaller Lookup Tables makes your data a lot more efficient. And that's what it's all about in Power BI particularly when you are dealing with very large Datasets; we want to make them as quick as possible. So, it really is a good habit to get into looking at your larger Transactional Data and seeing which columns you can perhaps replace with Lookup Tables.

Now currently, here, I have a Country Code column. If we jump across to the Countries Table, instead of Country Code, what I want to add in here is another column with a Unique Identifier to identify each of these Countries. Now if we look back at our Sales Prep Table at the Location column, I don't have a Lookup Table for Location currently. So, if I'm performing any actions, which require Power BI to look in this Location column, again, it's going to have to filter through 40,000 rows of data.

So, basically, I want to create a new Lookup Table that contains just a unique list of values from this column. And I want to use that instead. Now, because I'm going to be making changes to this data, I need to load this data back up into Power Query. So, let's jump across to Home, and all we need to do here is click on the Transform Data Button. I have all of my queries over on this side so Sales Prep, Countries, and Products. So, let's start with this Location.

Now sometimes it's good to not necessarily start to make changes on your main data Table. So, what I'm going to do here is I'm going to go to Sales Prep, I'm going to right-click, and I'm going to make a copy of this query. Now when it comes to making copies, you have two different options, Duplicate and Reference. So, what is the difference between these two?

Well, let's select Duplicate. What you can see now is that I have basically a copy of the Sales Prep Table; it's created a new query and called it Sales Prep2. So, what exactly has it done here? Well, it's made a direct copy. So, we now have another Table contained within my Dataset that basically contains the same information. So, I've effectively added another Table of 40,000 rows to my Dataset.

Now, as I said, most of the time, you want to be keeping your Datasets as small as possible. Also, when you duplicate, it’s going to copy across everything including things like the Applied Steps. So, if you take a look at the Applied Steps for my duplicated Table, I have all of the same Applied Steps as I do with the original Sales Prep Table. But one thing you'll notice is that if you make any changes to the original Table, the Sales Prep Table, they don't reflect in the duplicated version.

So, if I make a small change here, let's double-click in this heading, and let's call this Product1 and hit Enter. If I go to the Sales Prep2 Table, that column is still just called Product. So, any changes you make in the original are not going to update in the duplicated copy. So, in general, if I want to make changes to a query, I don't tend to use the duplicate option.

A much better option that's more efficient and keeps your Dataset smaller is to Reference the Table. So, I'm going to right-click, and just delete out this copy. And this time, I'm going to click on Sales Prep, I'm going to right-click, and instead, I'm going to choose Reference.

Now one important thing to notice here, we still have a Sales Prep2 Table, I can see the same data but take a look in the Formula bar, it says =Sales_Prep. So, effectively, what we've done is we're just linking back to that original Table. So, it's using the same 40,000 rows of data, it hasn't created a copy. Also notice that it hasn't brought across the Applied Steps. So, it's like you're working on a brand new file, but you're still using the original Dataset.

This also means that any changes that you make to the original Table, So, let's double-click in this Column Heading again and just take that back to Product are going to update and reflect in the linked

Table. Because it's just a link, it's essentially the same data. So, that is the difference between referencing and duplicating queries in Power BI. And what we're going to do in the next lesson is we're going to start to do some merges and linking to different Lookup Tables to make this entire Dataset more efficient.

Video: Creating a Lookup Table

Deb: So, now let's take a look at how we can create a Lookup Table for this Location column to make interrogating this data superfast. And it's also worth noting that when you're working in the Reference Table, any changes you make here will not filter back through to the original Table.

So, don't worry, if you start deleting columns in this Reference Table, it's not going to change anything in the original data, it only works the other way round. So, when I'm thinking about putting together this Location Table, I really want to just have included in this Table, any columns that are related to the Location. So, that's going to be this Location column, and also the Country Code column.

So, if I hold down Ctrl, I can select both of those columns. I'm going to right-click, and I'm going to say that I want to remove all the other columns apart from these two in this particular query. So, let's say Remove Other Columns, which is just gonna leave us with Location and Country Code. Now, as I look through this list, I can see that I have a number of Locations repeated multiple times.

So, for example, we have Sydney just here, we then have Sydney there as well, and there, and the same for these other Locations. So, effectively, what I want to do here is create a unique list of all of these Locations so we just have one of each in here. So, this is really straightforward.

I'm gonna select the Location column, and then we have a Remove Rows Button just here. And one of the options we can select is Remove Duplicates. So, if I click this, it's going to go through that list, it's going to remove all the duplicate values and just leave me with a much, much shorter list of 49 unique values. Now with something like this, you can see here one of the Locations is Birmingham, and the Country Code is GBR, so, Great Britain.

Now I know that there is also a Birmingham in America, I think it's in Alabama. There are also other Locations that could be in multiple different Countries. Another example would be something like Newcastle in the UK, there is also a Newcastle in Australia. So, we really want there to not be any confusion when we're working with things like Locations.

Now, the way that you can get around this is by assigning a unique value to each row in your data. And that could be as simple as just numbering them. So, Potsdam would be 1, Odense 2, Stuttgart 3, Graz 4, so on and so forth. And we can then use that code in our main Table. Now we can see an example of this in action by jumping across to the Products Table.

Notice that I already have a column in here called ID. And again, that is simply to make it easier to identify each row each Product in this Table, I've assigned it a unique value. Now the Countries Table doesn't have an ID column.

But again, we can create one if we want to and then use that in the Sales Prep Table instead. So, what we're going to do in the next lesson is create a unique Index Column for the Countries Table and also for our new Locations Table.

Video: Creating Index Columns

Deb: So, it's now time to add some Index Columns into our Datasets. And we're going to start with this Location Lookup Table that we're in the process of creating. If you remember, we removed the duplicate values. So, we now have just a unique list of 49 Locations, which is going to make it so much easier and faster to interrogate.

What we're going to do now is add an Index Column to help us uniquely identify each Location in this list. So, what we're going to do is jump up to the Add Column tab. In the General group, you can see we have an option here for Index Column. Now you have a choice, you can choose to start your Index Column from 0 or from 1 and it's just going to number consecutively. So, 1, 2, 3, 4, 5, or 0, 1, 2, 3, 4, 5; it's up to you which one you choose.

You can also, if you wanted to, create your own Custom Index Column, and specify a value and increment that you want to go up by. Now I'm going to keep things fairly basic, we're just going to insert one that starts from 1, you can see it's added that column and I now just have these index numbers. Let's give this column a brand new name. So, double-click, and I'm going to change this to Location ID and hit Enter.

Now, we'll say that I always tend to like to have my ID columns, my Unique Identifier columns, as the first column in my data. So, I'm going to drag and drop this just to reposition it. So, now I have my Unique Identifier, I then have my Location, and I then have my Country Code. So, by setting this Lookup Table up this way, it really allows for Locations that have the same name, but are possibly located in different Countries, because I have a unique way of identifying each row.

Let's go to our Products Table, I already have an Index Column in here, the only thing I need to do here is possibly change the headings. So, currently, it says ID, I want to keep this fairly consistent. So, I'm going to call this Product ID, and hit Enter. Let's go to our Countries Table, and I'm going to add an Index Column in here. Again, just to have a Unique Identifier.

Let's jump up to Index, go to From 1, and I'm going to double-click to rename this, and we're going to call this Country ID. Hit Enter, and let's drag that so that it's the first column. So now, I basically have three Lookup Tables that are going to be superfast to interrogate. The final thing I want to do here is click back on Sales Prep2, and I'm going to give this a different name. So, this is now my Location Lookup Table.

So, over in Properties, I'm going to change the Query name to Locations, and hit Enter. So, now that we have these 3 separate Lookup Tables; Countries, Products, and Locations, we need to merge them into the Sales Prep Table. Because effectively, what I want to do here is replace the Product Location and

Country Code columns with the ID columns that I've set up so, that there is a quick direct link to these Tables to make this information faster to interrogate.

So, that's what we're going to do in the next lesson. I'm going to show you how you can merge the ID columns from the 3 Dimension Tables into your main Sales Prep Table.

Video: Merging Queries

Deb: So, what we're going to do in this lesson is we're going to take a look at how we can Merge Queries together. Effectively, what we're trying to do is we want to grab the Country ID column from the Countries Table, the Product ID column from the Products Table, and the Location ID column from the Locations Table, and pull them into the Sales Prep Table to effectively replace the Product, Location, and Country Code columns.

Now, as I said, we don't want to start overwriting our original Sales Prep Table. So, we're gonna go to the Home tab, and notice that in the Combine group, we have a Merge Queries option. Now, if I click the Dropdown here, I get the choice to Merge Queries or Merge As New. So, if I was to select Merge Queries, anything that I choose to merge is going to merge into this original Sales Prep file.

So, what I want to do first of all, is I want to merge the queries as a new query so that we're not changing that original data. So, let's say Merge Queries As New, and now I can select what I want to match. So, let's start with Countries. I've got Sales Prep Table selected at the top here; I want to merge the Country Code column in the Sales Prep Table with the Countries Table in the Country Code column just here.

This effectively creates a link between these two Tables, and then I can choose which one of these columns in the Countries Table I want to actually pull into the Sales Prep Table because we want to pull in the Country ID. But the first step is just to create a link between these two Tables. Let's click on Ok. And now if we scroll across, what we should find is that we have an additional column here, and it's called Countries.

Now currently, it just says Table in there, because effectively, we've just linked this column to the entire Countries Table. But what we can do is if we click this little icon in the corner, we can choose which column in that Countries Table, we want to merge into this Table. So, I want to bring across the Country ID column. Let's click on Ok. So, now it's brought that information across.

I'm going to double-click, and I'm going to change this to Country ID, and hit Enter. And just to make this easier to read, I'm going to drag this column all the way across, and place it next to the Country Code column. And what that means is we can now effectively delete the Country Code column. So, let's right-click, and remove. Let's do the same process and bring in the Location ID field and the Product ID field from our other Tables. So, we're gonna do the same thing.

Let's go to the Home tab, across to Merge Queries. Now this time, I can just choose Merge Queries because I don't want to create a new one each time, I just didn't want to overwrite that original file. So, let's say Merge Queries. Let's start with Location. So, I want to choose the Location column up here, and

we want to link that to the Locations Table, and we'll do that via the Location column in the Locations Table, click on Ok.

Again, I get a new column called Locations, I can click and choose the column I want to merge; Location ID. Click on Ok, and it pulls that across. Let's double-click to rename this Location ID, drag this across, and drop it next to Location. And now, I can delete out the Location column. Let's do this one final time for our Product column. So, back up to Merge Queries, this time, we're linking the Tables via the Product column and we're going to choose the Products Table and the Product column, click on Ok.

Let's click our little Button and say that we only want to merge the Product ID column. Double-click to change the heading to Product ID. Let's drag it across, drop that into place, and now we can delete the Product column. So, effectively, I've now created a Sales Prep Table, but instead of having information that Power BI has to scan through 40,000 rows of data, I've made it super-efficient by linking via an ID column to the smaller Lookup Tables. And this is a much more efficient way of working.

The final thing to do here is to give this new Table a meaningful name because currently it's just called Merge1. Now, our original Table was called Sales Prep because we were doing a lot of work on it. We now have our Table in its final state ready for analysis. So, I'm going to call this Table; Sales. So, let's double-click, call it Sales, and hit Enter.

Video: Enable/Disable Load Refresh

Deb: So now, we're pretty much at the stage where we can load all of these Tables, these queries back into Power BI, and we're pretty much ready to start analyzing with Formulas and Visualizations.

Now, one key thing to mention here is if you take a look at my queries, currently I have the Sales Query, which is our final Table, which we're going to be using, I have my Lookup Tables, my Locations, Products, and Countries. But I also have my original Sales Prep Table.

Now, I don't really need to load this Sales Prep Table. Because effectively we have created a copy of it, we've changed it, and we've renamed it to something else. And remember that every time you click the Close and Apply Button to load all of these Tables into Power BI, it does take a little bit of time, depending on how large your files are.

So, really, any Tables that you don't need to load into Power BI, which aren't going to be part of your analysis, don't load them in. So, how can you do that? You might immediately think to yourself, well, I can go in and just delete the Sales Prep Table. Now, I would advise against that. I never like to delete things, what I prefer to do is just disable the load.

So, an easy way to do that is simply right-click on that Sales Prep Table, and you'll notice that Enable Load is ticked by default. So, anything that has Enable Loads next to it with a tick is going to load into Power BI. So, what I can do here is just select this, to remove that tick, it changes to Italics, which is basically telling me that this isn't going to load into Power BI. Now the other option that you have in here is this Include in Report refresh.

Now it's currently grayed out because I'm not loading this Table. But if I click on one that I am loading, and right-click, you can see here it says Include in Report refresh. So, again, once I've loaded these Tables into Power BI, if I start to make any changes, it's going to automatically refresh all of my Tables. Now you might come across a situation where you have a Table that always remains static so it doesn't ever change.

So, once you've loaded it into Power BI once, you don't really need to refresh it because nothing is ever changing. So, if you do have a situation like that, again, just to cut down on the amount of time it takes for refreshes and uploads to run, you could choose not to include it in the Report refresh. So, that is the difference between these two and how you can use them to make load times a lot quicker.

So, now that we're not going to load that Sales Prep Table, we can safely click Close and Apply. And it's going to load all of the other Tables back into Power BI. You can see them located over on the right-hand side. Let's expand that Sales Table and take a look at it just to make sure that we still have our Product ID, Location ID, and Country ID columns, which we do.

Now, I have a couple of other little things to mention before we move on to starting to analyze this data using DAX Functions and Visualizations.

Video: Advanced Editor

Deb: Now another thing that's quite important to know about is the Advanced Editor in Power Query. So, what we're going to do is we're going to jump back into Power Query by clicking the Transform Data Button. And if we click on the Home tab in Power Query, in the Query group, you'll see that here we have an Advanced Editor. And if we take a look at the ScreenTip, it says, 'Open the Advanced Query Editing dialog to view or modify the entire text for this query'.

Now remember, whichever query you're currently clicked on, that's the one that you're effectively reviewing in the Advanced Editor. So, currently, I'm clicked on Sales Prep, which is a Table that we're not loading. So, let's click on Sales, and click on Advanced Editor so we can see what we have in here. And what we have is a whole bunch of code. And this is Power Query code that's written in the M language.

Now, I'm not saying that you need to become an expert in the M language in order to really understand what's going on here. It is fairly straightforward once you know what you're looking at. Now, what you're basically looking at in this Advanced Editor is all of the Applied Steps. So, if you take a look, the first line of code that we have here is related to source.

And if you look over in the Applied Steps Pane, you can see the first item that we have there is also source. And this follows through the next item is Expanded Countries. And you can see in Applied Steps, we have Expanded Countries. So, it's basically a logging of all of your Applied Steps in this Advanced Editor file.

Now you might think, 'Okay, that's great. But why is this useful? And why would I ever need to come into here'? Well, let me show you an example. Now, as we know, this Applied Steps Pane is useful if we need to backtrack through the steps that we've taken. But you can also click on any of these and take a look at your data as it was at that point.

So, for example, if I go to my Applied Steps, and I click on this action, just here, Removed Columns1, if I click that, it's going to take me back to how my spreadsheet looked at that time. And I could see at this stage, I still had my Product column in here, I hadn't yet removed it. Now, what if I'm working back here, and I decide to do something different?

So, maybe I decide I want to keep this Product column, but I want to rename the Column Heading to Product1 and hit Enter. I'm gonna say 'Yes, I want to insert this step'. And then I might think that now I can go back to my last Applied Step. But you can see that I'm going to get an error. It hasn't been able to walk through the preceding steps, because it was all relying on that column being called Product. The last step was to remove the column Product, but I've changed the name.

So, now when I click back on my last step, it's saying, basically, it can't find the Product column in the Table. So, that's a very crude example, I would say. But if you do start doing things like that, you might find that some of your steps break going forward. So, if I go back to this new column that I inserted, I'm just going to remove that so that we get our Product column back. And if I decide that I want to change this Column Heading to Product1, instead of changing it here, it's better to go into the Advanced Editor.

So, if I take a look through my different Applied Steps, I can basically follow through what I did. So, if we get down to here, I can see this is the point where we merged queries, we Expanded Products, and then we renamed the column from Product.Product ID to Product ID. So, if I want this column to be called Product1, instead, I can just change this in the Advanced Editor from Product ID to Product1. And again below, when we reordered the columns, I want to make sure that I change this to Product1 as well. Let's click on Done.

I'm not getting an error. And I can see that this column is now called Product1. So, it's a much better way of doing things if you want to make changes, because if you backtrack through your work, and then make a change to the data, the steps following it are going to produce errors because nothing follows through any more.

Now I actually don't want this field to be called Product1 so, I'm going to switch this back. So, let's do the reverse, I'm going to change that back to Product ID, and also we're going to change that from Product1 to Product ID as well. Click on Done, and we're back to how we were.

Video: Resolving Data Import Errors

Deb: In this lesson, I want to show you an example of Data Import Errors. And if you remember I mentioned at the beginning of this course, that the reason why I was changing my Regional Settings from US to UK, was because the data that I was planning on importing, all of the dates in those files were in UK format. So, let me show you what happens if I don't change my Regional Settings.

So, what I've done here is basically created a new Power BI project. And let's just remind ourselves; if we go into Options and Settings and into Options, currently, my Regional Settings are set to English United States. Now remember, my sales files are in UK date format. So, what I'm going to do is I'm quickly going to import those files again into this file, just to show you what happens and how you can deal with Import Errors.

So, I'm going to jump back down to More, my files are in a Folder, I'm going to connect, and then navigate to my folder. There is my folder; Sales Data. Let's click on Ok, and Ok again. So, now I'm going to transform my data. And I'm going to do the same process; I'm going to combine these 4 files together, and just click on Ok.

Let's remove this Source Name column because we don't need it. But check it out, I have dates in here. And these are currently in UK format. So, take a look at what happens when I load this into Power BI. I'm going to click on Close and Apply. Notice that immediately, I'm getting a Load Error, one of the loaded queries contains errors. Now if I click on View Errors, it's not particularly helpful because it looks like it hasn't done anything.

Well, it has actually done something in the background, but we can't really see that. So, let's open up the Dataset. And if I take a look at my Sales Data Table, take a look at that Date column; there is nothing in there. Now when I clicked on View Errors, it didn't look like it had done anything. And that's because it doesn't do anything in Power BI, but it does highlight the column in Power Query. And because that window is behind Power BI, sometimes it's a bit difficult to see.

Now notice if we jump back to Power Query, I can see a lot clearer that there is an issue with this Date column. Anytime you have a Green line under your Column Heading, that means that you are a okay with the data in that column. If it's Red, it's not good, it means that there's some kind of error. Also notice in the Queries Pane on the left-hand side, I have a new query that's been created called Errors in Sales Data.

So, this makes it a lot easier for me to pinpoint the column that's causing an issue. What I'd probably then do is now that I know that there is an issue with the Date column, I would open up my sales files and take a look at that Date column. And there could be all manner of issues causing whatever problem it is. And it might be at that point that I recognize that I have a conflict when it comes to the format I'm

using for Dates. So, I know that this is because I have U S Date Setting set in Power BI and UK Settings in my files.

So, I could do one of two things. I could open up those sales files and change the format to US format. Or, I could just change my Regional Settings in Power BI. So, what I'm going to do here is let's jump back to Power BI, go to File, down to Options, and into Options again, Regional Settings, I'm going to change this to English United Kingdom, click on Ok, and I'm going to say Apply these changes. And now take a look; now that it's refreshed, it's picking up all of the Dates and putting them in that column. So, I have now resolved that problem.

If I go back to Power Query, and refresh this preview, it's gonna say the Table is empty because I'm still clicked on Errors in Sales Data, and I no longer have any errors. If I click back on my Sales Data file, there is my Dates column, and it's Green, which means this error has been resolved. So, just remember a couple of things there.

If you get an error when you're importing, click on View Errors, but remember, it's going to show those errors in Power Query and the Power Query window might be behind your Power BI window. If you are looking at the Power BI window, it looks like it's done nothing; you just need to switch to Power Query. Find the column that's causing the issue and then take can look at that column in your Source data and resolve any errors at the Source before refreshing everything.

Video: Organizing Queries into Groups

Deb: The final thing I want to talk to you about in this section is more of a Management option. And that is how to organize your queries into different folders. And this can really help with organization, particularly if you have a lot of queries that you're working with.

Now, I mentioned this briefly a bit earlier on, and that is the importance to distinguish between your main file that contains your Transactional Data, and your Lookup Tables and other files. So, our Sales Table is the one that contains our Transactional Data.

Now, the way that we refer to this Table in Power BI is the Fact Table. And the Tables that effectively hang off of this, so in this case the Lookup Tables, these are called Dimension Tables. So, it's always good to organize your queries so that it's very clear which one is the Fact Table and which ones are the Dimension Tables. And we can do this using Folders. And you can already see some other folders in here that have been created automatically by Power BI. So, I'm going to collapse all of these up.

Now all of the queries that we're interested in or that we're working with are listed currently underneath Other Queries. So, what we're going to do is we're going to create a couple of folders, we're going to call one Fact and one Dimension, and we're going to arrange our queries to make them easier to manage.

Now to do this, we want to make sure our Mouse is in the Queries Pane, right-click, and select New Group. So, I'm going to call my first group Fact Table, and I'm going to add a description; 'This group contains the Fact Table for this data set'. Click on Ok, and I now have a new folder. Let's create another one, right-click, and New Group, this one is going to be called Dimension Tables.

Let's add a description. 'This group contains the Dimension Tables for this Dataset', click on Ok, and I can now see that Table in my list. So now, I can move my queries and organize them into these folders. So, my Fact Table, this is my main Transactional Table that is the Sales Table, I can drag and drop it onto the Fact Table to organize that. My Dimension Tables are these three Tables just here.

So, if I hold down the Ctrl key to select them all, I can then drag those into Dimension Tables, and I can now minimize everything else so I can just focus on the Fact Table and the Dimension Tables. And it's really easy to see which one is the main Table, the Transactional Table, and which ones are the Lookup Tables.

Section 3 – Troubleshooting Relationship Issues

Video: Troubleshooting Relationship Issues

Deb: Hello, everyone, and welcome back to the course. In this lesson, we're going to explore in a bit more detail, relationships between tables. And this really all falls under the Data Modeling heading.

And when we're talking about Data Modeling, we really just mean how our tables relate to each other. And if you remember in the last section, we created some unique columns, Product ID, Location ID, and then I've got my Country ID all the way over on the end here to uniquely identify items in each row, and also to keep the Dataset small to interrogate. So, let's now take a closer look at relationships between tables, and I'm going to show you some of the problems that can occur.

Now before we get on to doing that I can see something that I need to change. If I look in this date column, I can see that my dates have changed format, these were all in Short Date. And the reason why they've changed format is because of the last demonstration I was doing with regards to conflicts between UK and US format. So, I'm quickly going to deal with that because it's very straightforward to do in Power BI. So instead of this format, I would like the Short Date format.

So, if we go up to the Formatting area, and click the Formatting Dropdown, all I need to do here is select Short Date, and it's going to change all those back to how they were. So, now that we've done that, let's jump across to our Model view and take a look at our relationships.

Now, because we've added in some more columns, since our last refresh, we added in all of those ID columns, you can see that the model has automatically been updated. Because I have Auto Detect Relationships set, Power BI will do its best to map fields of the same name between tables. So, for example, if I hover over this relationship, I can see it's mapped Country ID in the Countries Table to Country ID in the Sales Table.

It's also mapped Product ID in the Product Table, to and if I scroll down, I should be able to see this Product ID in the Sales Table. And notice that I also have another relationship here that links the Country Code in the Countries Table to the Country Code in the Locations Table. Now notice in the middle, I have a line that doesn't look like the others. And that is this line just here.

Now take a look when I hover over it, this is actually linking or creating a relationship between the Location ID in the Locations Table and the Date Field in the Sales Table. So, something isn't quite right there. And the reason that we have a dotted line here is because this relationship is inactive. So, solid line means that the relationship is active, dotted line is inactive.

If I double-click on this line to take me into the Edit Relationship dialog box, I can see the relationship set up here. But if I take a look at the bottom, where it says Make this relationship active, that box isn't checked. And that's because there is a bit of an anomaly here, because it's linked Date to the Location ID.

Now this is a simple fix, all we would need to do is map the correct fields. So I can just select Location ID and map that to Location ID in Locations. And then, I can say Make this relationship active. But take a look at what I get.

I get a warning message at the bottom that says; 'You can't create a direct active relationship between Sales and Locations because that would introduce ambiguity between tables, Countries and Sales. To make this relationship active, deactivate or delete one of the relationships between Countries and Sales first'. So what does that all mean?

Well, let's click on Cancel. So basically, what this means is that we have too many relationships that are in conflict with each other. So currently, the Locations Table, Location ID column is trying to link to the Location ID in the Sales field. But what do we also have related to this Locations Table? We have another relationship from the Countries Table that is linked via the Country Code. So, if we take a look at the Countries Table, what we have here is the Country Code, the Country and the Country ID.

Now I added a Country ID column in here, but the Country Codes are also unique values. So effectively, I could use either of these columns to link to other tables. I have a Country Code link between Countries and Locations, and then I'm trying to use a Location ID link between Locations and Sales. And if we take a look at the Locations Table, you can see that I also have the Country Code listed here.

So, we basically have too many pieces of conflicting information going on. So, what I'm going to do is with this connection here between the Countries Table and the Locations Table, I'm going to delete out this relationship. Because really, you want your Lookup Tables all linking through to your Fact Table.

And the Fact Table knows what the Country Code is because it's linked to the Location ID in the Locations Table. So, what I'm going to do here is right-click and delete out this relationship. So now, I just have my three Lookup Tables, and all of them are linked to my main Fact Table.

Now that I've done that I can make this relationship active. So, let's double-click, I'm going to select Make this relationship active. Notice that I'm no longer getting that warning message and click on Ok. And I now have a solid line link.

So basically, that additional relationship that was linking Country Code in Countries to Country Code in Locations was unnecessary. And it was proving to be a bit of a conflict for Power BI, because the Sales Table already knows how to pull that Country Code information, because it's linked by the Location ID.

So, just be aware of things like that because they can arise when you're creating relationships. So, just be very aware of things like that when you're working in Power BI. It's always good to switch across to this Model view and make sure that all of your relationships are working correctly. And if you find one that's causing a few problems, jump in there and fix it straight away.

Video: Relationship Type Cardinality

Deb: It's now time to talk about the different types of relationships that can be set up in Power BI. So currently, we have our Fact Table, our Sales Table, and then we have relationships with the 3 Dimension Tables. And what you'll notice is that these lines that connect the Fact Table with the Dimension Tables have either a 1 or an Asterix at either end. So, what exactly does this mean?

Well, it's basically telling me what the relationship type is between these two tables. And this is what we refer to in Power BI as Cardinality. So, let's take a look at this relationship we have between the Countries Table and the Sales Table. So, these two are linked by that Country ID field.

Now I can see that I have a 1 next to the Countries Table and an Asterix next to the Sales Table. And if we double-click to open up the Edit Relationships dialog box, at the bottom here, I can see the Cardinality I have set. So, this is a Many-to-One relationship. And you can see in brackets afterwards, it says Asterix to 1.

So, if we take a look at that, I have an Asterix on the Sales Table and a 1 by the Countries Table. So, the Asterix represents many, and the 1 represents 1. So, between Sales and Countries, we have a Many-to-One relationship. Now if you feel like this reads a bit backwards, because it's more logical to say that, Oh, okay, this is a One-to-Many relationship, then you might want to reorganize the way that you're looking at your tables just to make this a little bit clearer to understand.

So, if I put the Sales Table at the top here and have all of my Dimension Tables underneath, that's a bit easier to understand. Now, it kind of reads Many-to-One. So what exactly does that mean? Well, in general, where you have the number 1, that means that in the Countries Table, there is only one instance of the Country ID.

So, if you're a member in the Countries Table, if we jump across and take a look at it, we set this up so that we don't have any duplicate Country Codes or Country IDs in here. So, there's only ever going to be 1. Whereas when we jump across to the Sales Table, because it's going to use that Country Code column to look up the information, there could be many orders per Country ID. And that is where that Many-to-One relationship comes in; one unique value that could relate to many different orders. So, that is the Many-to-One relationship. And it's by far the most common one that you'll come across.

Now, if we double-click to go back into edit this relationship, again, we can click this Dropdown and see the other relationship types that we have here. We have One-to-One, One-to-Many, and Many-to-Many. And the cool thing about Power BI is that if I was to try and change this relationship from Many-to-One, to One-to-Many, it's going to tell me that the Cardinality you've selected isn't valid for this relationship.

So, that's really good, because it kind of stops me from making a mistake, it's just not going to do it. So, I need to switch this back to Many-to-One. Now if I click the Dropdown, we currently have Many-to-One selected, but, we also have One-to-Many down here. Now if I choose this, it's telling me that this is invalid for my data. Now, for some Datasets, this will be valid, because basically, Many-to-One and One-to-Many aren't really all that different from each other. It just depends on which way you're reading the tables.

For example, I could read this as One-to-Many, or I could read this as Many-to-One. So, it's essentially the same thing, but I have a Many-to-One relationship here because for the type of data that I'm using One-to-Many isn't valid. For example, there can't be multiple countries for one Order ID. Each customer, when they order a product, they get their own unique individual Order ID and that customer is going to be located in one country.

You wouldn't have the same Order ID for customers located in other countries. Hence why we can't create a One-to-Many relationship here. But for some data, One-to-Many is a relationship that is available to you. And you'll be able to select it from here without getting this validity message.

Now, we have a couple of other relationship types in here we have a One-to-One, and Many-to-Many. And I'm going to insert a screenshot just to illustrate One-to-One because I don't have any of those in my data. So, a One-to-One relationship would be created if both of the fields on either side are unique, and a Many-to-Many relationship occurs when multiple records in a table are associated with multiple records in another table.

And I would say that One-to-One and Many-to-Many are the relationships that you're least likely to come across when you're working in Power BI, but they are there in case you have a scenario that needs them. Most of the time when you're creating relationships as we are here between the Fact Table and Dimensions Table, you're either going to see that Many-to-One or One-to-Many relationship.

Video: Cross Filter Direction

Deb: The final thing I'd like to talk to you about in this section related to relationships is the Cross Filter Direction. Now another thing that you might have noticed when you're looking at your tables in Model view is that each of these lines where we have our relationships set up, have an Arrow in the middle. And you can see that I have an Arrow on all of these lines. So, what exactly is this Arrow?

Well, if we double-click on one of these lines to open up the Edit Relationship box, that little Arrow relates to this section, just here, the Cross Filter Direction. And we have two options in here Single and Both. So if you see just 1 Arrow, then the Cross Filter Direction that you have applied is Single. If you send the Cross Filter Direction to Both, then you'll see two Arrows pointing each way in here. So, what is the difference between these two?

Well, the Cross Filter Direction really relates to the way that you filter your data. So, for example, I have the Countries Table linked with the Sales Table, and I have a single Cross Filter Direction. So, what that's basically telling me is that currently, I can filter on the fields in the Countries Table to produce a result in the Sales Table, and that would make a lot of sense. Most of the time, when it comes to your Sales Data, you use other parameters to filter.

So, for example, I might want to find out how many orders we've had for a particular country. So, I could select the Country Code, and it will filter in one direction, the number of orders. However, what about if I wanted to do this in the reverse? So, maybe I wanted to be able to select the Order ID and have it tell me which country submitted that order.

Well, currently, I wouldn't be able to do that, because I only have my filter set to Single. So, the filter can only filter one way. So, let's look at an example of this. Now I'm going to jump across to my Visualizations area, and I've actually added in a couple of Visualizations. And these are just two tables. This one is a Matrix Table, and this one is just a Regular Table.

And in this Matrix Table, I'm basically displaying all of the Locations, the Categories across the top, and then we have the Sales Quantity listed below and the Totals. And then in the other table, I simply have a list of all of the Countries.

Now remember, I have my Cross Filter Direction going from the Country Table to the Sales Table in one direction. So, that means, I can click on something in this Country Table, and this Sales Table is going to update. So, if I click on Austria, the table will update and only show me the locations within Australia. If I click on Canada, the same thing is going to happen. If I click on New Zealand, or maybe if I hold down my Ctrl key and also select Norway, I'm going to see those results.

So, I can see that my Cross Filter Direction when it's set to single is working if I want to filter from Countries to Sales. But, what about if I want to filter in the other direction? Maybe I want to be able to select a location in the Matrix Table and see the country that that location is located in. So, if I select Copenhagen, notice that this Country Table doesn't update because I can't filter in both directions.

So now, if we go back to our relationships, if I double-click on this line, what I could do is change the Cross Filter Direction to Both, click on Ok, and after a couple of seconds, you'll notice that I now have two Arrows as opposed to one. And if I go back to my Visualizations, if I now select something like Berlin, you can see that that is now filtering and letting me know that Berlin is in Germany.

So, those are the two options you have when it comes to cross filtering. Now it's also important to note that when you create your relationships, if you have a Many-to-One or a One-to-Many relationship, which is the most common Cardinality you're going to come across, the Cross Filter Direction is automatically set to Single.

So, if you find that you do you need to filter in both directions. Make sure that you change this to Both and then you shouldn't have any problems.

Section 4 – Measures vs Calculated Columns_4

Video: Measures vs Calculated Columns_4

Deb: It's now time for us to move on to the next section where we're going to explore the wonderful world of DAX Expressions. And DAX, if you've never heard of it before, is the Formula language that you use in Power BI. And the great thing about DAX is that it's not that dissimilar to Excel Functions.

So, if you're used to putting together Formulas in Excel, you're probably not going to find it too difficult to transition to DAX. Now in this first lesson, we're going to kind of set things up and introduce you to some simple DAX Formulas. But I want to start out by explaining the difference between Measures and Calculated Columns.

So, currently, I'm clicked on the Sales Table, this is our Fact Table. And if we take a look at the Table Tools, you can see in the Calculations group, we have a few different options. So, what I could do here is I could add a new column to my data, and use a DAX Formula to populate that column.

For example, if I decided that I wanted another column in here that lists out the location, so the actual city name, I could create a new column, add a DAX Formula, and it will pull that information through. And that type of column we call a Calculated Column because it contains a Formula that's calculating something. And Calculated Columns are Physical Columns that exist in our data.

So, if I add a new Calculated Column, I'm going to be able to physically see the Location Column in this Dataset. The other type of Calculation we can perform is a Measure. And you can see that we have a New Measure option in the Table Tools ribbon. Now the difference between a Measure and a Calculated Column is that a Measure doesn't physically appear in your data.

So, if I was to create a new Measure, to find the city location, I'm not going to see a Physical Column in my Dataset. But the Measure will be available as a Field so that I can use it in Calculations. So, let's start out by walking through an example of a Calculated Column. And we're going to use the example that I just mentioned, I want to add a column which is going to show me the location, so the city.

Now in a real world example, I wouldn't actually need to do this because I already have the Location ID column in here, which is linking through to the Locations Table and giving me access to the name of the city. But just as an example, let me show you how this works. So, we're going to go up to New Column.

Now notice what happens, it gives me a new column on the end here, which is currently blank, but it places my cursor in that Formula bar, you can see my cursor flashing away there. Because, new Calculated Columns require a DAX Formula to populate the information into the column.

Now all I want to do here is basically construct a DAX Formula that says, 'Pull the location from the Locations Table into this column'. Now, when you're working with DAX, the first thing that you specify here is the column name. So, what do you want this column to be called? So, I want this column to be called Location. So, the name of your column always goes in first. We then press equals (=), and we can now start to construct our DAX Formula using DAX Functions.

Now, if you want to pull information in from a different Table, we need to use the DAX Function called RELATED. And you'll see as I start to type this in, much like in Excel, I get that little Dropdown list, that is the IntelliSense, showing me all of the Functions that contain the characters that I've typed. And the first one there is RELATED.

Now, if I want to select that, because it's highlighted, I can just press the Tab key, and it's going to input the rest of that Function. So now, I can see what the arguments for this particular Function are. And the argument is ColumnName. So, it's basically saying to me what column from another Table do you want me to pull through? And you can see underneath, it's basically showing me all of the current Tables that I have, and then the Field in those square brackets.

So, I just need to go through and select the Table and the column that contains the information I want to link to. So, I want to pull through the location. So, I'm going to go down to the Locations Table Location Column, I can press Enter to input that. And remember, we need to close off as many brackets as we open, that is standard across all Formulas in Excel and Power BI. So, that is it.

So, just a quick review, we have the name of our column first, and the particular Function that we're using here is RELATED because we want to pull information through from a related Table, and then we've specified the Table and the column name that we're interested in. Let's hit Enter, and we should see those come through. And there we go, we have a nice new shiny column called Location. And now I have all of those cities in there. And I know currently it looks like they're all Boston. But trust me, if we scroll down, it goes through all of the different cities.

So, that is our first very simple DAX Formula. Not too complicated, right? Let's now take a look at something a little bit different. Maybe I want to add another column to this Dataset, which works out the Sales Tax. So, I have a column in this Table called Total Price, and maybe the Sales Tax is 25%. So, I want to work out what 25% of the Total Price is so that I have a column that contains the Sales Tax amount. So, we can add a new Calculated Column for this.

So, back up to New Column, it's going to do the same thing, it's going to give me a blank column, my cursor is now flashing in that Formula bar ready for me to type my DAX Formula. So, remember, we start with what we want the column to be called. So, I want this column to be called Sales Tax, we need an equal sign, and now, we can perform our Calculation. So, what is my Calculation going to be here? I

basically want to work out what 25% is of the Total Price. So, I'm going to use the Total Price column and multiply it by 0.25.

Now, the Total Price column is contained within the Table that I'm currently in, and I'm currently in the Sales Table. So, if I start to type ‘sales’, you can see it pulls up a list of my Sales Table, and it shows me all of those Column Headings. So now, all I need to do is go down to Total Price, press Tab to select that, multiply, so that's just an Asterix, by 0.25.

Now, I'm hard coding this number into this Formula. You could, if you wanted to, create another column that just lists the Tax Amount, and then use the column name as opposed to hard coding that number in. So, you can do it either way, it's entirely up to you. Let's hit Enter. Like magic, it is calculated 25% of that Total Price. Now, I can see immediately here that this new column is showing in pounds, whereas all of my other columns are in dollar amounts.

Now, I actually do want all of these to be in pounds. Remember, this was a UK Dataset. So, the only formatting I'm going to do on this Sales column, if I go to the Column Tools, you can see that we have a Formatting group here, I'm going to change the number of decimal places so that they're all 2. And that gives me a level of consistency within that column. Now while we're here, let's select these other columns and just change the Formatting.

So, these are all set to dollar amounts. So, I'm going to change these to English United Kingdom. And let's do the Unit Price as well; Total Cost, Total Price, and finally Total Profit. So, those are 2 examples of Calculated Columns, columns that physically exist in our data and are populated using a Formula. So, now that we've got that set in our minds, let's talk about Measures. If we go back to Table Tools, you can see that we have a New Measure Button just here.

Now, a Measure is also, a DAX Calculation, but it doesn't physically exist in the data. So, instead of creating a new column, it's going to basically create a Measure, which is going to look very similar to a Field. And when we have anything as a Field, it means that we can use that Measure in any Visualizations and Calculations that we do, but it's just not a Physical Column in our data. So, let's create ourselves a Measure.

Now there are a few different ways that you can do this. We have a New Measure Button up here, the other way that we can do this is that we can select one of the Tables in that Fields Pane, right-click, and choose New Measure. Now if you take a look in that Fields Pane, you can see that we have a new Field here currently just called Measure. You can also see the 2 Calculated Columns that we've created Sales Tax and Location and check out the different icon.

So, Location, Sales Tax, those are Calculated Columns, and they have a different icon to any Measures that we add. So, we have this Measure, it's not going to show us a Physical Column, my cursor is still

flashing in that Formula bar ready for me to provide a DAX Calculation. So, maybe this time, the Calculation I want to perform is just a sum of the sales quantity. I want to know the total. So, I'm going to give my Measure a name.

So, TotalSalesQuant, we'll say equals and now let's do our Calculation. So, this is just a simple SUM Calculation, and we're summing in this Sales Table. I'm going to use my Arrow Keys to go down this list, I want to sum the Sales Quantity. Press Tab to select and close off that bracket, and hit Enter.

Now notice when it calculates, I don't get a new column, but it has created a new Measure in this Fields area. So, right at the bottom here, I have TotalSalesQuant. And the cool thing about this is that I can now use it in my Visualizations. So, if I jump across to my Report View, and let's just do another Clustered Column Chart, I can now use this Measure, I can drag it and I can drop it into this Values area, and it's going to show me the TotalSalesQuant.

So, in general, Measures are a little bit more flexible than Calculated Columns. They don't create any additional columns in your data, but you can use Measures over and over again in any Calculations and Visualizations that you do.

Video: Creating a Date Table with DAX_2

Deb: So, now we know the difference between Measures and Calculated Columns, and we've seen a couple of basic DAX Calculations, it's now time to put those skills into practice by creating a Dates Table from scratch.

Now, you might be thinking to yourself, 'What is a Dates Table? And why is it important'? Well, if you have data loaded into Power BI, and again, let's use this Sales Data as an example, most of the time in your data, you're going to have a Date Column. And if you have a Date Column in your data, it means that you are able to create Formulas and Visualizations using Time Intelligence features.

For example, if you want to create a Measure or a Formula that shows the year to date totals, that is what we consider to be a Time Intelligence feature. And what a Date Table is, it's basically just a Table like you see in front of you, but it breaks down the dates. So, for example, what I want to have in my Date Table is a column that shows the date that I have in my data, but I then want additional columns, which break it down even further.

So, I might have another column that says, Day Number, I might have another column that says Day Name, another column that says Month Number, another column that says Month Name, Year, so on and so forth. Now, if we don't add a Dates Table into our model, Power BI will use its own based on the Date Fields that you have in your data. And I will say that sometimes this can go a little bit wrong further down the track.

So, I would always advise you to create your own Dates Table so that Power BI uses that instead of its own. So, the first thing I need you to do is change a quick setting in Options. So, let's go to File, down to Options and Settings, and into Options. And we're going to go all the way down to Current File and the Data Load section. And if you have this option here, Time Intelligence ticked, I want you to remove the check from this box.

Now if we hover over the little eye to see more information, it says that, 'This option automatically creates a hidden Date Table for each Field in the model that has a date or a date time data type'. So, when you have this option checked, Power BI is creating its own Dates Table. And we don't want to do that. So, we're going to deselect it, click on Ok, and now we're going to create our own Date Table. This is effectively just a brand new Table.

So, if we go up to Table Tools, in the Calculations group, we have a New Table option. So, let's click it. So, Power BI has now created a new Blank Table, our cursor is flashing in that Formula bar ready for us to type in some DAX Formulas to create each column of this Table. Now if this is the first column of this Table, instead of specifying the column name first, you need to provide what you want the Table to be called. So, this is going to be the Dates Table equals.

Now in this first column, I basically just want to list out every single day that I have in my Dataset. But I also, want to make this a bit more intelligent so that when new dates are added into the Dataset, they're going to be pulled into this Dates Table. So, the first Function that we need here is CALENDAR, I'm going to press Tab to select it. Now take a look at my arguments for CALENDAR; Start Date and End Date.

So, I need to provide the Start Date for my data, so the earliest date that I have in my Sales Table, and then I need to provide the End Date, so the last date that I have in there. But I want to make this dynamic as well. So, here, we're going to use some Time Formulas that you might be more familiar with in Excel, they're pretty much exactly the same in how they work.

So, we're going to type in DATE, first of all, and press the Tab key. We're now into that Function. And you can see the arguments; Year, Month, Day. So, I'm going to type in the YEAR Function as well. And I want it to find the minimum year in that Date Column in my Sales Data Table. So now, I can specify my column name.

So, I'm looking for the Sales Data Table. And I can go down because I want to use that Date Column. Press tab, I'm going to close off the MIN Formula, close off the YEAR Formula, and now I can specify the month and the day. So, we want to find the minimum year in our data, and we want to start on the first day of the first month. So, let's close off DATE.

So now, basically what this Formula is doing at this stage is it's looking at the Date Column in my Sales Data Table, and it's finding the minimum value the minimum year. So, that is going to calculate our Start Date for this Table. But we still need to find the End Date. So, let's press comma, and now we can define how we want to extract the End Date. So, we're going to do exactly the same thing, we're going to say DATE, YEAR.

But this time we're looking for the max year, we're looking for it in the Sales Table, Date Column. Let's close off our MAX Formula, close off our YEAR Formula, and now we can provide the month and the day. So, the month is going to be 12, and the day is going to be the 31st, so the last day of the year. Now all we need to do is close off CALENDAR and hit Enter.

Now notice there that Power BI actually added in another parenthesis or bracket on the end there for me because I didn't quite add enough. So, that's a nice little thing that happens automatically if you don't add enough parentheses. But take a look at what we now have; it's now extracted all of the dates for my data starting from the minimum going to the maximum. And if I add any more dates into that Table, it's going to update correctly.

Now what you'll also, notice is that it's brought through the time as well, and I don't actually want the time, I just want the date. So, we're going to do a little bit of formatting here. Let's click on this New Column, up to the Formatting area, and I just want to see this as a Short Date. And there we go, we have our first column in our Dates Table.

Notice over in the Fields Pane on the right-hand side, there is my new Table. It's called Dates, and currently I have one column contained within this Table. What we're going to do in the next lesson is add additional columns to this Table to really break this date down, and we're going to do that using some other DAX Calculations.

Video: Creating Additional Columns_2

Deb: In the last lesson, we started to build a Date Table using DAX Expressions. So, let's carry on building this and add some additional rows to break down the date that we have in that first column. So, the next column, I would like to be titled Year, I want the Formula to look at this Date Column and simply just extract the year from the date.

So, for this, we can go up to Column Tools and select New Column. This is going to give us a new column, our cursor is going to be in that Formula bar, ready for us to type the column name. And this one is going to be called Year equals, now we can type in our Formula. So, for this, we're going to use the YEAR Formula, press Tab to select from the list, and all we need to do is provide the date.

So, the date that I want to extract the year from is in the Dates Table Date Column. So, if I start to type in 'dates', I can then select the Date Column, which is that first column. And that's all we need to do close off the YEAR Function, hit Enter. And we now have a new column with just the year. We're going to repeat this process, let's add another new column. This time I want to extract the month number from this Date Column.

So, I'm going to give my column the name of MonthNumber =, and for this, we can use the Function called MONTH. Again, we just need to select the Dates Table and the Date Column, press tab, and close off that MONTH Function, hit Enter, and we now have our MonthNumber column. Let's add another new column. Now this time I want to extract the month name. So, this is a slightly different Formula.

Now I'm gonna give my Column Heading the name, MonthName=, and I'm gonna go straight into the FORMAT Function. Let's press Tab to select. The first argument here is Value. Well, I'm still using the Date Column in the Dates Table. So, let's select dates and date, comma, and then I just need to provide the format for this. And this needs to go in quote marks.

And because I want the month name, if I type in 3 M's, and close off the quote marks and then close off the bracket, that's basically going to look in that Dates Date Column, and it's going to extract the name of the month. Let's hit Enter. And like magic, there we go.

Now, most of these at the top here are the same. But if we scroll down, I can assure you, it does work as we go through the Table. Let's add another new column because this time I want to extract the DayNumber. For this, we're going to use the DAY Function, and it's a simple case of selecting the Dates Table and the Date Column. Close the bracket, hit Enter, and there is the DayNumber.

The next column is going to extract the WeekdayNumber. And again, this Formula is slightly different because we can actually specify what day of the week we consider to be Monday. So, for me, I consider Monday to be Day1. Some people consider Sunday to be Day1. But the cool thing about this Formula is

that you get to choose what day Day1 begins on. So, for this, we're going to use the WEEKDAY Function we're extracting from the Dates Table Date Column. And when we press comma, you can now see that it goes on to ReturnType and I have a lot of Dropdown underneath.

So, if I was to type 1 here, it's going to label Sunday as day number 1, Saturday, day number 7. If I go down to 2, Monday is going to be day 1 all the way through to Sunday of day 7. And that is exactly what I want.

So, my final argument here is 2, close the bracket, hit Enter, and I now have my WeekdayNumber. And the final column I want to add here is the weekday name. So, let's give it that title. So, WeekdayName= now for this, we want to use that FORMAT Function again. We're looking in the Dates Table in the Date Column. And again, we need to specify the format that we want this WeekdayName in.

So, this needs to go in quote marks. I'm going to choose my format, close off the quote marks, close off the Formula, and hit Enter. And now I have my WeekdayName. And if we just do a quick visual check here, if I look at Monday, I can see that yes, that is the weekday number of 1. So, everything is working correctly.

Now I could carry on going adding more and more columns to extract different things from this date. But we're going to leave it here for the time being because in the next lesson I want to show you how you can add a Calculated Column to work out if the day is a weekend day or if it's a weekday. So, please join me in the next lesson for that.

Video: Creating Conditional Columns_2

Deb: In the last lesson, I showed you how you can use DAX Formulas to build a really nice Dates Table. And the final thing I'd like to show you in this Table is how you can create a Conditional Column. So, this is a column that uses logic.

And once again, if you are used to using Excel Functions, you're probably familiar with LOGICAL Functions. And one of the first LOGICAL Functions that you'll use is the IF Function. And that is what we're going to use in this Table.

Now the Conditional Column that we want to add here is we want to determine if this is a weekend day or a weekday day. If it is a weekend day, I want the output in the column to be Yes. And if it's not, I want the output to be No. So, let's add a new column. Once again, our cursor is up in the Formula bar. I'm going to call this IsWeekend. And now we can go into our IF statement.

So, I'm going to type in IF, press the Tab key to select, we need to provide our logical test. So, what I want to say here is if the weekday number is greater than 5, then yes, it is a weekend day. If it's not, then no, it is a weekday. So, IF in the Dates Table, the weekday number is greater than 5, comma, if that result is true, I want it to output into the column, Yes. If that result is false, I want it to output No, and close off our IF statement. So, that is our Conditional Column.

If the weekday number in the Dates Table is greater than 5, then yes, it is a weekend day. If it's not greater than 5, then no, it's a weekday. Let's hit Enter and see our results. And there we go. And if we do a quick visual check, I can see here that both Saturday and Sunday are saying Yes and the rest of the days here are saying No. So, that is a very simple example of the type of Conditional Column that you can add into your Tables.

Video: Marking Date Table

Deb: In the last couple of lessons, we've been working on building this Dates Table. We added some new columns using DAX Formulas, and we've also added a Conditional Column. So, now our Dates Table is complete and ready for us to use.

Now, if you remember I said at the beginning of the course that if you don't add a Dates Table into your Dataset, then Power BI is going to use its own Date Table for any Time Intelligence features that you want to use. Now we want Power BI to use our Date Table that we've just created.

So, in order to tell Power BI that that's what we want to do, we need to Mark this as the Date Table. And helpfully, on the Table Tools ribbon, we have a Button in the middle here. And we can just choose Mark as Date Table. And I now have to choose the column that contains my date.

And if I click the Dropdown, you can see that this is basically only showing me one column, and it's this column, the Date Column that basically links through to my Sales Data. So, let's select the Date Column and click on Ok. So, now Power BI knows that when I do anything related to times and dates, this is the data I want it to use.

Let's just jump across to our Model View. Because notice that now that we've created a new Table, we can see it in our diagram. I'm going to do a little bit of rearranging here because what I want to do is make sure that this Dates Table isn't independent of everything else, I need to create a Relationship between the Dates Table and the Sales Table. And we can do that via the Date Field. So, before we do that, if we quickly jump back to our data and go to our Sales Table, notice here that we have a Date Column.

So, this is the column that we're going to use to create the relationship. So, back to the Model View, I'm going to go to the Dates Table, I'm going to grab Date, I'm going to drag and drop it down to Sales. And there we go. If I double-click, I can see what type of Relationship I have, and it is the Many-to-One relationship linked by that Date Column. So, now that I have these 2 linked, any Visualizations that I want to create, should all link through correctly.

For example, if I was to add something like let's add a Year into Values, I can see those Years output in my Visualization. And let's choose something from the Sales Table, let's do the Unit Price for each year. And there we go. That looks pretty good. Everything seems to be flowing through now that I have a connection between those 2 Tables.

Video: Using ROUNDUP to Define Quarters

Deb: So, in the last few lessons, we've been working on this Dates Table. We've added some Calculated Columns and we also added a Conditional Column, and then Marked this Table as the Date Table that Power BI should use.

Now before we leave this Dates Table, there is one more column that I'm going to add. And that's because it relates to something we're going to do in the next lesson. So, what I'd like to be able to do here is add another column and call it Quarter.

And then I want to use a DAX Calculation to work out which quarter these months fall into. And for this, we're going to use the ROUNDUP Function. So, let's add a new column, the column name is going to be Quarter =, and then we're going to go straight into the ROUNDUP Function.

Let's select it from the list and press Tab. And we're splitting this into quarters essentially by 3 via the month. So, we want to go into the MONTH Function and then specify the column that we're interested in, which is the Dates Table Date Column. Let's close off the MONTH Function, and we're then going to divide it by 3 to get the quarters. We're back into the ROUNDUP Function now, and I don't want any digits.

Let's close off everything, hit Enter, and you can see that now I have that quarter output into that column. Now there are numerous different DAX Calculations you can use to calculate the quarter based off of a date, ROUNDUP is just one of them. Another one I would suggest you look at is the CEILING Function.

Now I've used ROUNDUP because it is a Formula in Excel that more people are aware of as opposed to CEILING. Let's just scroll down and make sure that everything is correct. So, we're now into Quarter 2, the month name here is June and yes, June is in fact in Quarter 2. So, that is how you can use the ROUNDUP Function to work out the quarters based off of a Date Field.

Video: Quick Measures

Deb: A few lessons ago, we started to talk about the difference between Calculated Columns and Measures. And I showed you that the main difference between Calculated Columns and Measures is that Calculated Columns physically exist within your Dataset, they are columns that you can see, whereas Measures kind of exist in the background, they are Fields that you can then use in your Visualizations.

Now just to move this on a stage, I'd like to talk about Quick Measures in this particular lesson. And Quick Measures are essentially a bunch of Measure templates in Power BI that you can use to quickly create new Measures. So, I'm going to show you an example of the types of Quick Measures that you can create.

Now we're going to jump across and build a very quick Visualization. For this, I'm going to use the Matrix Table. And what I'm going to do here is I want to summarize by the year. So, let's drag that into Rows. Also, the quarter, I'm going to drag that into Rows. Now notice, in my Visualization, I have my years. But because I've also, added quarters, I now have these collapsible and expandable Buttons.

So, I want to expand all of these out so I can see the quarters underneath. And a quick way to do that is if you take a look underneath the Visualization, we have some Icons. And this one here will basically expand the tree down one level. So, let's click and I can now see those quarters, I'm just going to resize that Visualization. So, now I have my years and quarters, let's say that I want to see the Total Profit for each of these.

Now effectively, what I've created here is what we call an Implicit Measure. And Implicit means that it is only available to this Visualization. So, the current way that I have this data structured summarizing by Year, Quarter, and Total Profit, this Measure effectively isn't available for me to just apply to any data. If I wanted to arrange my data in this way, again, I would need to repeat the same process on a different Visualization.

Now if we actually create a Measure, in this case, a Quick Measure, that is what we call an Explicit Measure. As soon as we create it, it's going to be available in our Fields list. And then we can just drag and drop to apply to whichever Visualization we want to. So, let's now take a look at how Quick Measures can help us.

Now what I'm aiming for here is that now that I have this data in my Table, I want to see the Year to Date Totals. So, I could construct my own new Measure using DAX Formulas. Or I could make this process a lot quicker and easier by going to Quick Measure.

Now notice when I hover over, I get the ScreenTip that says, ‘Choose from a list of common Calculations and add the results to the selected Table’. So, that sounds exactly like what I want. Let's

click on Quick Measure and see what we have. So, the first thing I need to do here is select a Calculation. And you can see that under Quick Measures, we have so many different templates that we can use.

So, if you want to quickly aggregate things by using Average, Variance, Max, Min, Weighted Average, you could choose one of these. We have some Filters in here as well. Time Intelligence, Totals, Mathematical Operations, there really are so many different things you can do with Quick Measures. Now the Measure that we want falls under the Time Intelligence heading, because I want to see a Year to Date Total.

So, I'm going to select this Quick Measure. And the only things that I need to define here are the Base value and the Date. Now if I hover over the eye to get a little bit more information, it says, 'The value whose total you want'. Well, if I look at my Table, I'm currently summarizing by the Total Profit. So, that is the value that I'm interested in, the Profit. So, I need to grab this Field, and that is located in the Sales Table, and it's down here, drag and drop that into Base value.

The next thing I need to define is the Date. Let's hover over the eye, and it says, 'The Date Field over which to calculate the Total'. So, I'm going to use my Dates Table, and I'm going to use the Date Field. Now remember, that's the one that contains the Short Date format, so 01/01/2021, for example. So, let's drag and drop that into Date. And that is pretty much all I need to define for a Quick Measure.

So, I haven't had to build my own DAX Formula, I've selected the template that contains the Calculation that I'm interested in, and then just defined my Base value and my Date. So, let's click on Ok. And I can now see in the Formula bar exactly what this Formula is doing. And if we take a look over in the Fields Pane, I now have a new Measure that's been created. So, if I make this a bit larger, so you can see it TotalProfit YTD.

So, this Measure is now available for me to use in my Visualization. So, all I need to do is grab it, drag it, and drop it onto the Visualization, and now I can see that Year to Date Total. So, the cool thing about this is now I have that Explicit Measure that I can then use in other Visualizations. So, Quick Measures are a really nice quick way of using a template to make it more efficient to create those Measures.

Video: Creating Key Measure Table_2

Deb: So, as we've been working through this section, we've added in a couple of Measures. If you recall, we have the TotalSalesQuant Measure, and also that new Measure that we created via the Quick Measure option, and that is the Total Profit YTD.

Now, I only have 2 Measures in my data model. But you'll find that when you're working in Power BI, in a real world scenario, you'll probably have lots and lots of different Measures listed in that Fields Pane. And the way that they're organized currently isn't particularly efficient. For example, the Total Profit YTD is kind of up here in this Countries area, and then our other Measure is all the way at the bottom in the Sales area, and it's the last Field that we have.

So, if I'm using Measures all the time, having to search through a big long list of different Fields, just to find the Measure that I want isn't particularly efficient. So, we can organize our Measures in a better way by creating a Key Measures Table. So, let me show you how you can do this.

So, from the Home tab, we just want to go to this option here, Enter Data. And this is generally the option you can use if you want to create your own Table and enter in the data manually. Now notice in this Create Table dialog box, we have one column just here. Now, I'm not going to go in and change the column name of this, we'll start adding any data, I simply want a Blank Table. So, I'm just going to rename this to Key Measures, and click on Load.

Now notice over on the right-hand side, in our Fields Pane, we now have that new Table there called Key Measures. And as I said, we do have the column listed underneath, we will delete that out a bit later on. So, now all we need to do is move our Measures into this Measures Table. So, I'm going to go down to the bottom, I'm going to expand Sales, and I'm going to go to my Measure. And it's this one just here TotalSalesQuant.

Now if we go up to the Measure Tools in that first group, you can see there it says the name TotalSalesQuant. And currently, it's showing me the Table that that Measure belongs to. So, it's within the Sales Table. So, all I need to do here is click the Dropdown and choose Key Measures. And now you'll notice on the right-hand side, it's moved that Measure up to this new Table. I'm going to do exactly the same thing for the other Measure that we created the Total Profit Year to Date.

Let's go to Measure Tools and change the Table where this resides to Key Measures. And now I have both of those Measures located in this Table. So, now that I have other columns in this Table, effectively, I can delete Column1. I'm going to select the column, right-click, and delete. Do you want to delete Column1? Well, yes, I do. And there we go.

So, now I have my Key Measures Table that contains both of my Measures. So, in general, I would add all of the Measures that I create to this Key Measures Table. It means that they're all together, they're all organized, and if I need a Key Measure in a Visualization, I can simply expand this Key Measures Table and see them all.

Video: Aggregation Features_2

Deb: When you're working with Measures, a Measure always has to aggregate something. That might be the Sum of something, or the Average, or maybe the Minimum or the Maximum. So, there always has to be some type of Aggregation when you're creating a Measure. So, let's explore some of those other Aggregation Features in this lesson.

Now, currently, I'm clicked on the Data View, I've got my Key Measures Table at the top here. And currently, I just have 2 Measures. So, let's add a new Measure into this Table. Now, the cool thing about this is that because we now have this Key Measures Table, to ensure that any Measures that we create go straight into this Table, we can right-click on the Key Measures Table and select New Measure from here. So now, my Formula bar opens up and I can type in a name for my Key Measure.

So, instead of doing a Sum, let's this time do an Average. So, I want to find out the Average Profit. Let's type in =, and we can now construct our DAX Formula. So, for this, I'm going to use the AVERAGE Function. And again, if you're used to using this in Excel, this is going to look pretty familiar. And now we need to select the column name. So, I'm doing the Average Profit. So, I want to go to the Sales Table, and choose Total Profit from here. Let's press Tab to select it, close off our Formula, and hit Enter.

Now remember, because this is a Measure and not a Calculated Column, it doesn't create anything physically in this Report View. But if you take a look at my Key Measures Table, you can see that I now have a new Measure called Average Profit. And I can now use this and apply it to any Visualizations. So, let's add a Visualization, and I'm going to add one that we haven't used yet, let's go for something like this, the Map Chart.

Now that I have that template in there, I'm going to drag and drop the Average Profit onto this Map Chart. So, let's drag it and drop it. And my Map Chart now loads, but I need a bit more additional data in order to get this to display correctly. And what is that additional data? Well, currently, Power BI doesn't know where to map that additional profit because I haven't given Power BI a list of countries. So, for this, we can go across to our Countries Table, I'm going to grab Country and drop that into the Location Field.

And now it plots the Average Profit by Country on to this very nice looking Map Chart. What about if I wanted to use another Aggregation Feature? So, maybe I'm interested in finding out which product has been the most expensive in terms of costs. So, this time, I'm going to add a Table Visualization, and I'm going to create a new Measure. So, let's right-click, New Measure, I'm going to call my Measure MaxCost.

And for this, we're going to use the MAX Function, we're going to pick up our data from our Sales Table, Unit Cost column. Press Tab, and close off the Function, and hit Enter. Now, I have that new Key Measure in my Key Measures Table, I can drag and drop it onto the Table Visualization. Currently, it's just showing me the maximum cost, but I want this broken down by Product. So, let's grab the Product Field and drag that underneath Values. And there we go, we now get our information.

Now I'm going to delete out this Map Chart just by pressing Delete, and we're going to move this Table a bit further up the page and just expand it out and down. So now, I can see the maximum cost for all of these different products. What about if I wanted to use another Aggregation Feature, so maybe something like Count?

Well, let's delete out this Table so we have a little bit of room. So, maybe I want to find out the Total Quantity that we've sold. And for this, I'm going to use COUNT. So, let's create another new Measure. I'm going to call this CountofQuantity. And for this we're going to use the COUNT Function, press Tab to select and we're counting in the Sales Table, the Sales Quantity, press Tab, close bracket, hit Enter.

Once again, I have another new Measure created in my Key Measures Table. And this time I'm going to display the COUNT on a Card. So, let's grab that Visualization and it's this one just here which has 123 on it. Let's select it, and then let's drag and drop our CountofQuantity onto that Card, and I can now see the result of 40,000. So, don't forget about all of those other different ways that you can aggregate your data when you're creating Measures.

Video: SUMX_2

Deb: In the last lesson of this section, we're going to expand the SUM Function and talk about SUMX. Now, you will notice there is an X variety available for COUNT as well, and it kind of works in a similar way. So, why would we use SUMX over SUM, and what exactly is SUMX?

Well, let me start out by showing you an example of how to do Calculations in the wrong way using the SUM Function. So, I'm currently clicked on my Sales Table. And if you remember, we added a Calculated Column to calculate the Sales Tax. And if I take a look in the Formula bar, I can see exactly what this column is doing. It's using the Total Price column, and then it's multiplying it by 0.25, to get 25% of the value.

So, now maybe what I want to do is add the Sales Tax to the Total Price. Now theoretically, if you were doing this in something like Excel, this will be a fairly straightforward SUM Calculation. We would just add the Total Price to the Sales Tax, and then we would copy that Formula down. But it doesn't work quite like that in Power BI. So, let me show you the wrong way to do this first of all. What I'm going to do is add a new column. And we'll just call this PriceIncTax =.

So, following our logic, what we might do here is enter in SUM, open bracket, and then choose our column names and separate them with a plus. So, I want to use the Sales Table, the Total Price column, press Tab, plus the Sales Table Sales Tax column, and close off my bracket. Looks fairly straightforward, right? Let's hit Enter. And take a look at that, I'm getting an error. And you can see here it says, 'The SUM Function only accepts a column reference as an argument'. I'm looking at my Formula, and I do have Column Headings as both of my arguments.

So, maybe it's the plus that's causing a problem, maybe I need to delete that out and replace it with something like a Comma. Let's hit Enter and see if the result is any better. It isn't. The problem that I'm having here is that the SUM Function, when used in this way in a column, will sum an entire column. So, I could say, SUM the Total Price column.

And if we do that, by removing everything else, and closing off the bracket and hitting Enter, you can see I now get something in here, but that looks nothing like what we want. To get this to work, we need to use the SUMX Formula. So, let's backtrack out of here and delete that out. And this time, we're going to use SUMX, because this lets us define the Table and then the Expression.

So, I'm working with columns in the Sales Table. So, that is our first argument. And you can see here underneath the ScreenTip says that, 'This returns the sum of an Expression evaluated for each row in a Table'. So, we've defined our Table, we now need to tell Power BI what our Expression is. So, that is going to be the Sales Table, Total Price column, plus the Sales Table, Sales Tax column, close the bracket, and hit Enter. What do we get?

Well, again, this isn't working. Because what we're basically saying in this Formula is SUM the entire column Total Price, and the entire column Sales Tax, it's not doing this row by row. So, let me show you a better way of getting this to work. I'm going to right-click, and let's just delete out this column. So, what I'm going to do instead is I'm going to create a new Measure. So, back to our Key Measures Table, let's right-click, New Measure.

My Measure is going to be Price, including Tax, we're going to use SUMX to calculate this, we need to first specify the Table that we're working on, and that is the Sales Table. And now we need our Expressions. So, again, this is Sales Table, Total Price, plus Sales Table, Sales Tax, close the bracket, hit Enter. So, now I have this Measure just here Price, including Tax. So, this is available for me to use in a Visualization.

So, if I jump across to Report View, and let's just delete out this Visualization, and this time, we're going to add a Table and I want to be able to see the Price inclusive of Tax for all of the products. So, from the Products Table, I'm going to grab Product and drop that into Values. And now that I have my Measure I can just drag and drop price including tax onto the Table, and there I get my results and those look a lot better. Now notice here I do have some inconsistent formatting going on, I have inconsistent decimal places. So, let's fix that straightaway.

So, for this, I need to make sure that I select my Measure in the Fields Pane. And then underneath Measure Tools, I can then change my formatting. So, I'm going to take this to 2 decimal places. And now, I can see that all of these values are consistent. So, sometimes it's better to use Measures as opposed to Calculated Columns. And if you want to perform a SUM Calculation on multiple columns, use the SUMX Function.

Section 5 – Calculate the Basics

Video: Calculate the Basics

Deb: In this section, we're going to start exploring the different uses of the CALCULATE Function in DAX. Because, the CALCULATE Function is one of the most important functions to learn in Power BI. And it really does have so many different uses; we're barely going to scratch the surface here. But I want to show you a few examples so you get the hang of this.

Now, what the CALCULATE Function does is it allows us to perform a Calculation based on conditions. So, the function that I would liken it to in Excel would be something like SUMIF. We're summing, but then we're specifying a condition. And that is effectively what CALCULATE does. Now the power of CALCULATE comes from the ability to be able to change the context by using other functions. Now we're gonna get onto that more over the course of the next few lessons. For now, let's look at a basic example of using CALCULATE.

So, for this, I'm going to create another new Measure. And what I want to do here is I want to calculate the quantity of sales, but only for sales that occurred on a weekday. And if you remember, when we were creating that Dates table, we added in a conditional column, which told us if the day was a weekend or a weekday. So, we're going to utilize that in this particular Calculation. Now, as always, the first thing we need to do with Measures is give our Measure a name. So, I'm gonna say let's just say total quantity. And we'll call this let's do a weekday, first of all.

Now we can use the CALCULATE Function. Now note the two arguments that we have underneath, we have Expression, and then we have a Filter. And the Filter part is where you can add in the context for this Calculation. So, in this case, the condition. So, what is my Expression? Well, I'm looking for the Total Sales Quantity. And now, I can set up my Filter. We want to filter the Total Sales Quantity, if the day is a weekday. Now, which table do we find that information in? We find it in our Dates table.

And if you remember, we set up a conditional column called IsWeekend where the result was Yes or No. So, let's use Dates [IsWeekend]. And because we're looking for the weekday, if that IsWeekend column is equal to No, meaning it's not a weekend, and then it's going to perform the Calculation. So, let's close off our bracket, and hit Enter.

So, now I have a new Measure, and it's called Total Quantity Weekday. Let's do the same thing, but this time for the weekend. So, once again, we're going to right-click new Measure, this one is going to be called Total Quantity Weekend, we're going to use CALCULATE. We're still working on that Total Sales Quantity column, but our Filter this time is in the Dates table. And we want IsWeekend to equal Yes. And close off the formula. Let's hit Enter. So, CALCULATE is fairly straightforward.

The first thing you specify is what you want to calculate. So, in this case, the Total Sales Quantity, you then provide your condition. And my condition was listed in my IsWeekend column in the Dates table. So, let's make sure that these are both working. We're going to jump across to our Report, and let's add a Card. And what I'm going to do is just drag and drop one of these Measures onto this Card. So, let's go with the Weekday. And I can see that we have 9 Million. Let's add another Card. And this time we're going to do Weekend. Let's drop that in, and that is 4 Million.

Now, I don't know off the top of my head if these figures are actually correct, but logically, I would expect the Total Quantity to be less for the Weekend than the Weekday because there are only 2 days in the Weekend as opposed to 5 in the Weekday. So, I'm fairly confident that this is working correctly. So, those are the basics of the CALCULATE Function. In the next lesson, I'm going to show you how to expand on that by changing the context of CALCULATE.

Video: Changing Context with Filter

Deb: In the last lesson, we started exploring the CALCULATE Function. And we saw that it basically calculates based on a condition. But one of the most powerful things about this CALCULATE Function is the ability to change the context. So, let's take a look at an example of this.

What we're going to do in this lesson is that we're going to use the CALCULATE Function with the FILTER Function. And these are two functions that you will often see used together. So, maybe this time, I want to create a Visualization that shows me the Average Profit by Country. And then I want to specify the country that I'm interested in. Now I have Average Profit set up as one of my Measures.

So, the first thing I'm going to do here is we're going to create a Visualization, and let's just do a table because this is the easiest Visualization to see data in. And the first thing I want in here is I basically want a list of the countries. So, for this, I can go to my Countries Table, grab country, and drop that into Values. And that's going to give me a big long list of all of the countries that I have in my data.

Now, because I have a key Measure called AverageProfit, I could simply drag and drop this onto the table, and it's going to show me the Average Profit for each of those countries. But what if I'm not interested in all of these countries, I just want to be able to see the information for a specific country? Well, this is where I can combine CALCULATE with FILTER. So, let's create ourselves a brand new Measure. And I'm going to call this AvgProfbyCountry.

We're going to go straight into CALCULATE, our Expression, well, we want to find the AverageProfit. And now we need to provide our Filter, our context, for this CALCULATE formula. So, maybe I'm only interested in seeing the Average Profit for Germany. So, I'm going to go straight into the FILTER Function. And take a look at the arguments that we have for this function. The first one is Table and the next one is FilterExpression.

So, the table that I want to filter on is the Countries Table, because that basically contains Germany, which is what my Filter criteria effectively is going to be. So, we want to select Countries as our table, comma. And now we can specify our FilterExpression. When the Country Column equals Germany, I want to see the Average Profit. So, let's hit Enter. My Measure has now been created, and all I need to do is drag and drop AvgProfbyCountry onto the table. And you'll see that the only one listed is Germany.

Now, in order to really understand what's going on here, one important point you need to know is that the FILTER Function is actually what we consider to be a TABLE Function, which is why the first argument that we have for this FILTER Function is the Table name. So, effectively in the background, FILTER produces the entire list of countries in a table, and then it applies the filter that you've specified, which is why we get this result. So, we're performing a Calculation, but we're performing it in the

context of using a Filter to filter out all the countries we don't want, leaving us with just the country that we do want.

Video: All

Deb: So, we saw in the last lesson, how we can change the context of that CALCULATE Formula by adding in the FILTER Function. So, let's take a look at another example of CALCULATE. And this is the ALL Function. And when you use ALL with CALCULATE, what it's basically going to do is clear any Filters that you have applied to a Visualization.

So, currently, if we take a look at my table, I'm only displaying the AvgProfbyCountry for Germany. Now, maybe I want to clear this Filter and show everything. So, what I can do is edit the Measure. And the Measure I want to edit is the AvgProfbyCountry Measure. So, let's jump over to our Fields and select it. And we can see that CALCULATE formula in there.

Now currently, this CALCULATE formula is filtering for Germany. And that is why that's the only result that I'm getting in this table. But what if I was to delete out this filter and replace it with ALL instead? Now notice the arguments that we have for ALL. It's looking for a TableName, or a ColumnName. Well when I'm using ALL, I basically want to see all of the Average Profit for all of the countries. So, the TableName and ColumnName is the Countries Table, the Country Column, close off the bracket, hit Enter, and let's take a look at what we get.

Now I can see I'm getting something a little bit strange in here, because I have the wrong formatting applied, I currently have Percentage Format applied. So, let's just jump up and change that to English United Kingdom pounds (£). That looks a little bit better.

Now you might be a little bit confused, because all of these numbers in each row are exactly the same. And that is because in this Visualization, we've split up the data into countries. But this Measure that we've applied is removing the Filter context, and is always applying all of the data for the countries. Let's do this again, but using a different example.

Now the first thing I'm going to do here is I'm going to create a quick Measure. And this is a very simple Measure, that's just going to calculate the Total Cost. So, we're going to call this Measure TotalCost, and this is going to be a SUM Calculation. And we're just going to sum in the sales table, the Total Cost column, like so.

Now, what I'm going to do is add a new Table Visualization, we're going to grab the Country Field and drag that into Values. And then I'm going to drag the TotalCost, I can drag that into Values or onto the Visualization. So, now that I have this Visualization, let's filter for a specific country. So, we're going to create a brand new Measure, we're going to call this TotalCostbyCountry, we're going to use CALCULATE, and we're going to set up our Expression.

So, we're calculating the TotalCost. But this time, we're going to filter in the Countries Table in the Country Column, for the Total Cost for Austria. Close the bracket and hit Enter. Now I have that new Measure, let's drag and drop that onto the table. And as you would expect, I'm only seeing the value for Austria. If we changed this Filter context and clear this out by choosing the ALL Function. And once again, we just need to select the Countries Table and the Country Column, we're going to get all of the Total Costs by Country.

Now, as I said, this number that you're seeing in here basically clears up all the Filters and just loads up all the data. So, this figure here is the Total Cost for all countries, and it's just repeated in every single row. Now this can be useful if I want to convert this to a percentage. So, if I want to find out what percentage of the Total Cost each of these countries accounts for, I can perform this type of Calculation, and then I just need to edit this Calculation. And what we're going to do is say Total Cost divided by the Total Costs by Country essentially.

So, because we have the Grand Total in this column, we can just divide the Total Cost by the Grand Total. And that's going to give us our percentage. So, let's hit Enter and see what we get. Well, these are in the wrong format currently. So, we want to change this to Percentage format. And we're going to take those decimal places all the way down. And there we go.

I can now see for example, that Belgium makes up 2% of the Total Costs. And I can see that this is all correct because right at the bottom, it's given me a total of 100%. That's always a good way to tell if your numbers are a little bit off if everything doesn't add up to 100%. So, those are a couple of examples of how you can use the ALL Function with CALCULATE to clear your Filters and also work out percentages.

Section 6 – Visualizations_3

Video: Visualizations_3

Deb: In this section of the course, we're going to explore Visualizations, because really, this is what Power BI is all about. And the way I like to look at this is I kind of split Power BI into 3 sections in my mind; we import and clean our data, we extract meaning from our data using DAX Calculations and Measures, and then we present that data using Visualizations. And the idea behind Visualizations is giving your customers, clients, managers, whoever you're presenting this data to insight into the data, which in turn is going to help them make better business decisions.

So currently, if we were to look at our Table data, and this is the Sales Table, it's pretty difficult for us to analyze this data in its current state. I can easily see things like which Products have sold the most or which Products are selling the best in different Countries. It will be much better if I could create a Chart or some kind of Visualization that easily shows these metrics. And this is a really important point here.

Before you even begin to build Visualizations, it's worth taking a look at your data and working out exactly what's going to be of interest to your audience. What information are they interested in? What do they need to know? What metrics are important to them? And once you have all of that information, it's going to be a lot easier for you to decide what type of Visualization you want to use to display which metric.

So, in this first lesson, I really just want to give you an introduction into Visualizations so you understand what you're looking at. And then over the next few lessons, we'll run through some of the most popular so you can kind of get a feel as to how they work. So, in order to build up your Visualizations, you need to make sure that you are in Report View.

And you'll notice that I currently have One Visualization on this page, and it's a very simple Table Visualization, that's just showing the Countries and the Total Profit, and we have the Grand Total at the bottom. So, a very straightforward Table.

With any of these Visualizations, once you add them, click on them to select, and then you can do things like resizing them to fit them into specific spaces. Or you can just pick them up and drag and drop them to reposition. And there are lots of different types of Visualizations that you can add to your page. And you'll see the entire gallery of them over on the right-hand side in the Visualizations area. And we have dipped in and out of here throughout the course. And now it's really time to focus our attention on these Icons.

Now notice all the different types that we have. When we hover over we can see exactly what that Visualization is. And some of these should look pretty familiar to you if you're used to using Charts in

Excel. So, we have things like Stacked Bar Charts, Stacked Column Charts, Clustered Bar Charts, Clustered Column Charts, Area Charts, Waterfall Charts, Funnel Charts, even things like Pie and Donut Charts, you have access to Map Charts, and Filled Map Charts as well.

And a really cool feature is this little Gauge, and I'll show you how that works a bit later on. We have Card Visualizations which we can add to our page, as well as Tables and Matrix Tables. And these all work in a very similar way with regards to how you add them onto your page. So, if we just delete out this Table that we have, I'm just gonna select it, and press the Delete Key on my Keyboard, let me give you an example of how you add a Visualization and then add data.

So, let's do that Table again, I'm gonna go to my Visualizations Pane, I'm just going to click on Table, you can see that it just adds a Blank Table and it says, 'Select or drag Fields to populate this visual'. So, once you have a Visual added, even if it's blank, if you go across to just underneath where we have our Visualizations, notice we have 3 Icons just here; Fields, Format, and then Analytics.

Now Fields is where you populate the information for the Table. And you can see here we have a Values area and it says Add Data Fields here. So, if I want to display the Countries in the rows, what I would do is go over to my different Tables of data, I'm going to find my Countries Table, I'm going to grab the Country Field, and I'm going to drag and drop it to this Values area. So, this is quite similar to Excel Pivot Tables.

Now, you can see I have all of the Countries listed out and I can then add in my metric. So, maybe I'm interested in seeing the Total Cost or the Average Price or maybe the Total Profit for each country.

Whatever it is that I'm interested in, I just need to grab the correct Field, and that could be one from your Table, or it might be a Measure that you've created. I'm gonna go for Total Profit, and you can either drag it up to that Values area and place it underneath Country. Or if I just click the cross to get rid of it, you can drag it directly on to the Visualization. And that is basically how all of these Visualizations are structured.

Now, you won't necessarily just see values for all of these Visualizations. For example, when you're adding things like Charts, you might have a few different Fields that you need to complete for X Axis, Y Axis, Legend, drag and drop the Fields that you want to show. But in general, you'll always find the Fields under the Fields list just here. Once you have your data in the Visualization, you're then probably going to want to format it maybe make it look a little bit nicer, or match your brand Colors. And that is where we would switch across to the Format area.

Now I'll say you have to make sure that you have the Visualization selected first, click on the Formatting Button, and this opens up a whole load of different ways that we can format this particular Table. And

you can literally expand these and customize everything on this Visualization. And we're gonna get familiar with each of these and the kinds of things they do as we go through this section.

Now, one important thing to note here, which I find is super useful, because there are so many different options in here, sometimes you find yourself scrolling up and down expanding different Categories, desperately searching for whatever it is that you're looking for. So, something I find really useful is this Search bar at the top, if I'm looking for something specific.

Maybe I want to align these Column Headings in this Table to the center. So, instead of expanding all of these trying to find that option, I can click in Search, type in ‘alignment’, and it's going to pull back everything from all of those Categories related to alignment. And I find this a lot easier because I can see here immediately Column Headings. Okay, this is the alignment that deals with these Column Headings.

If I scroll down, maybe I want to align the actual Fields, I've got my options there for that. Or maybe I want to align the Title. So basically, all of my Alignment options are together because I've searched for them. So, I can come into Column Headings, I can say I want them aligned to the center, and you can now see that those have shifted across.

Now I actually don't want them in the center, so let's put that back to Auto, which is going to push them to the left. But just be aware of that. If I double-click and type in format, it's going to pull back all of the options that I have for formatting. So, using that Search can sometimes make it a lot quicker when you're looking for specific items within your Visualization to format.

Now the final thing I want you to note here, before we jump into creating our own Visualizations and formatting them, is if you're not clicked on a Visualization, and you're just clicked on that Page background, when you go to your Visualizations Pane and the Format area, notice what we have in here. We now have our options for formatting the page as opposed to the Visualization.

So, for example, if I wanted to change the background of this page, I would need to go into Wallpaper. And this is a little bit misleading, because we do have a Page background section just here. But the actual Page Color is controlled underneath Wallpaper. I could change that to something like Blue to set that page.

So, the main point I'm trying to make here is that if you want to format the Visualization, make sure that you're clicked on it. If you're not, it's going to be that Page background that you're actually changing.

Video: Tables vs Matrix Tables_3

Deb: So, let's start out by talking about a really popular Visualization, and that is the Matrix Table. Now currently, on this page, I have just a Table. And you'll see that there are 2 Icons in the Visualizations Pane. This one just here is for the Table, and this one next to it is for the Matrix Table. So, what is the difference between these 2 Visualizations?

Well, the main difference is that the Table is kind of a flat structure, and it can display one dimension of data. For example, currently, we are showing the Country and then the Total Profit for each country. I could grab another Field, so let's go for Total Cost, drag and drop that into the Values area. And that's going to give me another column that shows the Total Costs by Country. And I could carry on going adding different columns.

But each time, I'm just summarizing these Totals by the Country. If I wanted to add in a second dimension, so maybe I wanted to summarize the Total Profit and Total Cost by Country and also by Year, I would need to create a Matrix Table. And a Matrix Table is kind of similar to an Excel PivotTable. So, let's click on Matrix, and I'm going to drag this up next to my Table. So now, what I can do here is add a second dimension in.

And notice now that I'm clicked on the Matrix Table, if we take a look at our Fields, I have Rows, Columns, and Values. So, I need to drag in at least 3 Fields to create this Matrix Table. So, what do I want displayed in my Rows? Well, maybe this is where I want the Countries. So, I'm gonna go to my Countries Table, which is up here, grab the Country, and place that in Rows. And there we go, what do I now want in my columns?

Well, maybe I want to see the Years. So, I'm gonna go down to my Dates Table, grab that Year Field, and place that in Columns. And now I can see 2016 to 2019. All that's left is my Values in the middle. So what am I interested in here?

Well, I'm interested in seeing the Total Profit by Country across these Years. So, I'm going to grab the Total Profit Field. And remember, you can drag it into Values, or you can just drop it straight on to the Table. I can drag that out to resize and I can see that I now have the data summarized in a way that's a little bit more meaningful. So, that is the difference between a Table and a Matrix Table. A Matrix Table has 2 dimensions as opposed to 1.

Another cool thing about Matrix Tables is the ability to Drill down through information. So I'm going to reorder my Matrix Table, and we're going to display some different information in here. So currently, I have my Country in Rows, I'm going to get rid of that.

So, let's click on the cross to remove that. I'm also going to remove Years, but I'm going to keep Total Profit in here. And this time, I want to summarize by Category. So, let's drop that into Rows, but also by Product.

So, I'm going to grab Product and drop that underneath Category in that Rows area. And then for the columns, let's do Year again. So, let's scroll up, grab Year, and drop that into Columns. Now notice the difference here, can you see next to each of the Categories, I now have this little plus symbol? So, that is letting me know that there's more information hidden underneath here.

And again, this works very similar to Excel Pivot Tables. If you take a look at my Values, you can see I have Category and then I'm summarizing by Product. So, if I click the plus next to Beverages, it's going to open up all of the Products that belong to the Beverages Category, and then I can see the related information.

Notice also just above, I have 4 Icons here which are going to help me when it comes to Drilling down through my different Categories. Now currently, I have these plus and minus symbols turned on. So, it's reasonably straightforward for people to understand what these are. Most people know that if you click on a plus, it's going to expand something out. But what about if I want people to be able to double-click in order to expand these?

Currently, if I double-click on Beverages, nothing happens. But what I could do is turn on the ability to Drill down. So, let's click this Icon. It’s going to turn Black and that means that if I now double-click on Beverages, it's going to expand that group. If I click on Drill up, that's going to collapse up that Category. Now this is particularly useful if you don't know have these plus and minus symbols turned on. And this is something you'll find under the Format area for this specific type of Table.

And this would probably be where I would use this Search bar at the top, because I don't want to have to go through every single Category, looking for the one that will toggle that's going to turn off these plus Icons. So, in Search, I'm just going to put a plus in there, look what it finds, +/- Icons on or off. If I click this slider to turn them off, they now disappear.

So, the way I can now Drill down through these items is simply by double-clicking on the Category, and it's going to expand that out. So, this is particularly useful if you don't have those plus and minus Icons turned on. Now I'm going to have those turned on because they don't take up a great deal of room, and I just like to make it super obvious for people.

The next Icon is if I have multiple levels to my hierarchy, this is going to take me to the next one. And the final Icon here is going to expand all of these Categories down one level in the hierarchy. So, if I want a quick way to be able to expand all of these, I can click on this Icon, and it's going to expand everything out and I can then resize my Table.

So, don't forget about these little Buttons at the top when it comes to organizing these different Categories of hierarchical information.

Video: Formatting Visualizations- Part 1_3

Deb: Let's take a look at some of the other Formatting options that we have underneath here. And there are so many of them, I'm not going to go through all of them. But let's take a look at some of the main points.

So if we expand General, this is where you can come to define the position of your Table. For example, the exact width and the exact height of this Table. And this is sometimes useful to define if you need to fit your Table into an exact space, you can ensure it's always that size. And if the data breaches that width, for example, you're gonna get Scroll bars come up on your Table, so much like I have a Scroll bar just here for my Dataset. So, let's collapse General back up again.

The next one down is Style. And currently, you can see that the style I have applied is just the Default Style. But we have a few different choices in here. For example, Minimal, that basically turns off those Banded Rows, and adds a little bit of cell padding. So essentially, we have a little bit more room for each of these numbers. And I would say that Minimal is probably the one I use most often, I think it's quite a nice clean look, and it doesn't distract away from the data.

Some of these, as you'll see, are a little bit crazy. So we've got one there Bold Header, quite difficult to see. Alternating Rows, that's adding in your Banded Rows there. We've got Flashy Rows, which is a Blue Color. And remember, these Colors can be customized. You're just really selecting your base template for the Style. So, go through these and see which one you like, I'm going to stick with Minimal.

The next thing we have is the Grid. So, this basically relates to the Gridlines that you can see in this Table. You can choose to have the Vertical Grid off or on. So, currently, mine is off, if I turn that on, you're gonna see I now get Vertical Lines. And, I actually quite like that. I can choose my Vertical Grid Color. So if I want these to be Blue, for example, I can have those Blue lines running down.

I can change the Grid Thickness. So, if I want them a bit wider, I can adjust that just there. And I've got basically the same options for the Horizontal Grid. So, if I want to change that to the same Blue Color, I could do that as well. We've also got things like the Outline Color and the Outline Weight. So, go through some of these options, have a little play around, and see what you like.

We have a Column Headers section. So again, this is where we can come to change things like the Font Color for our headings. And just to show you what this looks like, let's do a Purple Color. You can see here now I have at the top here, my Header Labels have changed to Purple. Now I don't like that, let's do a Darker Blue just to keep in with the Color scheme that we have going on. I can also change the Background Color.

So, if I want them to be maybe a Light-shaded Gray, I could do that also. I can change the Font Family, the Text Size, how they're aligned, so on and so forth. So, all of the options in there to customize the look and feel of those Column Headings. And of course, we have similar options for our Row Headers as well. So, if I want to change the Font Color, Background Color, the Outline, so on and so forth.

Now this option here is something I would direct your attention to where we have Stepped Layout. So, remember, we have a hierarchy system in this Table; we have our Category, and then we have the Products. And currently in the way that this is displaying I have the Category at the top here and then the Products are underneath very slightly indented. But, what about if I wanted these Products in their own separate column? So, this would be similar to Tabular Layout if you were using Excel Pivot Tables.

Well, if I would like them in another column, I can turn off Stepped Layout. And as soon as I do that, take a look at what happens. They now have their own Product column. So, it might be that you prefer this format. If you do, turn off Stepped Layout. Now I feel this takes up a bit of unnecessary space so I'm going to turn my Stepped Layout back on to organize them like that, we can then format our Values. So, now we're dealing with the actual Values within this Table.

And again, all of the options that you would expect; we can change the Color, the Background Color, we can customize our Banded Rows. Now if you look at this, my Banded Rows are turned on but because of the style that I've used, the Minimal Style, my Minimal Style doesn't include Banded Rows. So, even though these are on, I'm not seeing them. So, just be aware of that. We've then got Subtotals. So, with Matrix Tables, by default your Subtotals are going to show at the top.

So, I can see where we have Categories, I can then see the Subtotals for each of the years. Now if you don't want Subtotals on you can simply toggle this slider off and they're going to disappear. You can even change the position of these Subtotal. So again, I'm somebody who prefers to read my Subtotals at the bottom of each group, that's just naturally how my eye goes. So, if I scroll down a little bit, you can see that we have an option here for Row Subtotal position.

Currently, that's set to Top, let's change that to Bottom, and it's going to move those down. What we can also do is if we want to change the Labels. So currently, mine just says Total, I can change the Row Subtotals label here. So, maybe I want to say something like, Category Total. And that makes it just a little bit easier to understand. We've got the same here for Column Subtotals. So, I can turn those off, and it's going to get rid of that column, or I can keep those turned on. So, lots of different customizations in there as well.

We've got similar options in here for Grand Totals, and then we have a Field Formatting section. And this is where I can choose the units that I want to display these Totals in. So, if I switch this to, let's say, Thousands, you can see what that's going to look like it changes all of those values. I could change it to Millions, and I get a more concise version of my Totals. So, if I was trying to save a little bit of space

here, I could switch this to Millions. Now I'm gonna keep mine on None just to stick with my original formatting.

Notice you can also adjust the decimal places in here. I can change the Background Color of my Values if I want to. So, maybe I want to do a Light Blue, and that's going to shade all of those. And I can change things like the Alignment. So, if I want these Center Aligned, I can change that from here also. Now I'm going to switch this back to White to keep everything consistent and easy to read.

Video: Formatting Visualizations-Part 2

Deb: In the last lesson, we were walking through how to format this Matrix Table. So, let's pick up from where we left off. Conditional Formatting, I'm going to skip over for the moment, because we're going to do that in a later lesson. Let's jump to Title. Now currently, I don't have a Title showing on this Matrix Table.

So, if I toggle it on, I can then add some Title Text. So, what is this Table representing? Well, it's Total Profit by Year and Category. And that's going to give me a nice little Title for this Table. I can choose the Font Color. So, I'm going to change this to a Dark Blue.

I can even choose the Background Color. So maybe I want this to stand out a little bit. Let's do a Light Blue Color at the top there. And I can change my Alignment, my Text Size, and even my Font Family. So, let's change this to Cambria.

I then have some options to change the Background of the Table. So I can choose a Color and I can set the Transparency of that Color. So, if I had something like Purple in the Background, I can then drag this Transparency Slider so that that isn't as intense. Now I don't particularly like that, I think it looks a little bit amateurish, and I like to keep things as clean as possible. So, let's go back to White.

I can lock the Aspect Ratio. So, if I turn this on, it means that if I was to resize this Table, it's going to resize this Table evenly. I have some options for the Border. So, if I want a Border around my Table, I can turn that on. And then of course, I can choose the Color and how many pixels I want that Border to be. I can even have a Shadow on my Table if I want to, I'm not going to bother with that. And then finally at the bottom, here we have ToolTips.

Now I currently have this turned off. We're going to talk more about ToolTips in a later lesson, because these can be super useful. So, for now, we're going to skip over that. And then finally, we have Visual Header. And this relates to these Icons running across the top. So, you can even customize the look and feel of these. I can change the Background Color, I can change the Border, I can even change the Icon Color.

So, if I wanted these to match the overall Theme of my Table, maybe I want to make them a Dark Blue Color, and those are going to change Color. And I can choose which Icons I want to show up here as well. So, I don't necessarily have to have all of these showing, I can go through and use the Slider to toggle them off or on. So, that is a very quick run through of all of the Customization options that you have regarding Matrix Tables.

Now you've seen them in Matrix Tables, they take on a similar format for every single Visualization. So, have a good look through these, play around with them, find out what they do, and then you should be pretty much set when it comes to formatting for whichever Visualization you add.

Video: Conditional Formatting_3

Deb: One part of the formatting options that we kind of skipped over in the last lesson was Conditional Formatting. And that's because there is quite a bit to Conditional Formatting. So, I wanted to dedicate an entire lesson to how you can apply it to your Visualizations.

So, we're still formatting this Matrix Table. Let's jump down to Conditional Formatting and expand that out and see what we've got. Now, you might be more familiar with Conditional Formatting in an application like Excel. And if you are, then you're probably going to have no problems using it in Power BI. Because, it is effectively the same thing. Now, if you're not familiar with Conditional Formatting, the main purpose of it is to help you highlight important data in your Tables.

So again, if I look at my data that I have here, remember, I have my Products summarized by the Category that they belong to, and also the Year, and we're summarizing by Total Profit. So, if I want to very quickly be able to pick out of this data, the Highest Values and the Lowest Values, I could use Conditional Formatting to do that. And in Power BI, we have 3 types of Conditional Formatting we can apply.

And again, if we relate this back to something like Excel, we can apply a Color Scale, we can apply Data Bars, or we can apply Icon Sets. So, let's take a look at each of them so that you understand how they work. So, we've expanded that Conditional Formatting Format area, and we can see that we're applying our Conditional Formatting to the Total Profit. So, basically, all of the values that we have within this Table.

Now Conditional Formatting won't include the Totals by default. So you don't need to worry about that, because Totals can throw off the accuracy of your Conditional Formatting. So, fortunately, it doesn't get applied to those Totals. Now, the first little slider we have here is Background Color. And this is basically a bit of a strange name for Color Scales. Again, if you've use those in Excel, you'll know that they're kind of like a heat map.

If we turn this slider on, you'll notice that immediately, the Colors change in my Matrix Table, because currently, Power BI is just applying the default Conditional Formatting. So, the thing I would do straightaway is jump into Advanced Controls, because this is where you can really customize what you're seeing in here.

So, the format that we're using is a Color Scale, we're applying it to only the Values, and it's based on our Total Profit. We're summarizing by the Sum of the Total Profit. And where it has default formatting as 0, what this basically means is that if you have a blank value in your data, the formatting will be applied as if there was a 0 value in there. We can then choose how we want this formatting to apply. And you can see we have Minimum and Maximum.

So, it's going to highlight or shade the background of the Lowest Value in our data in this Light Blue Color. And the Highest Value in a Dark Blue Color. And this is the default that's already been applied to my data. So, if we just cancel out of here a second, you can see that these values in this Dark Blue Color are the Highest Values, and then we kind of work our way down in shading towards the Lighter Blue. And the Lightest Color Blue is going to be our Lowest Values. So, that's kind of how Conditional Formatting works.

Also, note that for the blank cells that we have here, those have been highlighted in the Lightest Blue Color. So, if we jump back into Advanced Controls, I can change the Colors. So, if I don't want this to be Light Blue and Dark Blue, I can simply click the Dropdown and choose my own Colors. Also, by default, it's going to apply this Color Scale based on the Lowest Value that it finds in your data. And the same with this one, the Highest Value that it finds in the data.

Now you could even in here, change this and set your own custom values for the Minimum/Maximum, and the shading will be applied according to the values that you've set in here. So, this is a way of customizing this Conditional Formatting to suit your needs. Now, most of the time, you're going to want to choose Lowest Value and Highest Value to see where those values fall within that range. Now if you click on Diverging, that gives you a Center Value as well.

Once again, this Color can be customized and you could choose Custom from in here also. So, if we add in that Middle Value and click on Ok, let's see what we get. So, with that Diverging Middle Value turned on, this is actually a little bit easier for me to read. So, I can see quite clearly here where my Lowest Values are because they're all in Light Blue going through that Color Gradient up to my Highest Values, which are showing in the Darker Blue.

And remember, you can always jump in here and change these Colors if you're finding them a bit difficult to understand. So, that is how you can use the Background Color the Color Scale. If you want to get rid of it, we can simply toggle this slider off.

Now you can do a similar thing, but this time using the Font Color as opposed to the Background Color. So, if you would rather that the font for the Values changes, as opposed to the Background Color, you could toggle this on, go to your Advanced Controls, and you have similar options just here.

So, I could set this to and you probably going to want to do slightly Darker Colors for this so that it shows up as a Dark Red and a Dark Green. So, I'm gonna go to More Colors for this. Let's drag our slider down to the Green, and we'll go for quite a Dark Green. And let's click on Ok. Now still, you see that is quite difficult to see.

So, you have to be careful with your Colors here if you really want those values to stand out. And this is why in general, I prefer to use the Background Color because I just find it a little bit easier to read. But that option is there if you prefer it.

The next thing you have here is Data Bars. So, if we turn these on, these are little representations of the value within that cell. And you can choose to show these bars with the value displaying or you can choose to show just the bar only.

So, let's jump into Advanced Controls for our Data Bars. And you can see right at the top, the first option is Show bar only. So, if I select that and click on Ok, it's actually going to remove the values and just leave a representation of the values in the form of that bar.

Now you might be thinking to yourself, well, when an earth would that be useful? And the scenario that I tend to think of is if maybe you work in HR, and you're presenting data that's quite sensitive, maybe it relates to employees' salaries, you might want to give people a general idea of where that salary falls within a range without showing them the employees' actual salary.

So, when information is sensitive, sometimes this is a really good way of getting around that. Now, we are going to show the values, let's jump into Advanced Controls again, and just take a tick out of that box. And the same principle applies here. Power BI is looking for the Lowest Value it finds in our range of data, and also the Highest Value and the length of the bar is defined by where the value in the cell falls within that range.

And this is a really important point to note when it comes to Data Bars; people tend to think that this bar kind of represents almost like 100%, but it doesn't. The bar is very much in relation to the lowest and highest numbers. So, the Highest Value in this Table, and I think that might possibly be this one at the top here, this one is essentially 100%. And everything else is kind of defined by that. So, this one just here is kind of like a percentage of the Highest Value.

Now you could get these Data Bars to display as a representation of the percentage of the Grand Total, as opposed to how they relate to the Highest and Lowest Values in this data. And if you wanted to do something like that, you would need to create a Measure first of all, to work out what the Total is as a percentage, and what the Total Profit for each Product is as a percentage as well. So, it is possible to do something like that, but just be very aware as to what that bar is actually representing.

And then the final option that we have down here is Icon Sets. So, let's turn these on. And let's immediately jump straight into Advanced Controls. Now this allows you to display an Icon again, depending on what the value is within the cells. So, we can see that we're applying our Icons to the values only. It's based on the Total Profit Field or the Sum of Total Profit, our Icon is going to show to the left of the data, and we could change that if we wanted to.

And our Icon alignment is going to be to the top. We can then choose the Icon Sets that we'd like to use in our data. And we have Icon Sets that have 3 Icons, sets that have 4 Icons, and also sets that have 5 Icons. And currently the one that I have selected is a 3-Icon Icon Set. And this makes an important difference when it comes to understanding what these Icons are representing.

If you take a look underneath where we have Rules, this is how Power BI is assigning an Icon to a value. And you'll see that because I've chosen a 3-Icon Icon Set, it's essentially looking at all of the values in my data and dividing them up into thirds. And you can see here we have them set to percentages 33%, 67, and 100. So, this represents thirds in our data.

Now we have quite large numbers in our Dataset. So, the best way to explain this would be, imagine a number like 12, 1 - 4 would be the bottom third, 4 - 8 would be the middle third, and 8 - 12 would be the top third. And it will assign Icons based on that. So, this is effectively what it's calculating here, it's looking at my data with my large numbers, and dividing it into thirds, and it's using that to assign the Icons.

Now again, I can jump in here and get a little bit more specific about how I want Power BI to divide up this data. So, for this first line, I don't have percentages in my data, I have numbers. So, I'm going to change this top line to Numbers. And I'm going to say if the value is greater than or equal to 0, but is less than, and I'm going to change this to 400,000, if that is true, then it's going to assign that Red Icon. Let's go to the next line, change these to Numbers.

If the value is greater than or equal to, and this time, we're going to say 400,000, but is less than 600,000, then the value will be assigned this Yellow triangle. And then the final row, let's change these to Numbers, and we'll say if the value is greater than or equal to 600,000, but is less than 2 Million, then we want a Green Icon. So, you can customize all of these. And then when we click on Ok, this makes it a lot easier for me to read.

So, I know that anything that has a Green circle next to it is greater than 600,000 but less than 2 Million. Anything that has a Yellow triangle is greater than 400,000, but less than 600,000. And then anything with Red is somewhere between 0 and 400,000. So, don't be afraid to go in there and customize those Icons. Now if we jump back in here one last time, that was all based on a 3-Icon Icon Set.

Now, if we were to choose something like a 4-Icon Icon Set, you can see that it now divides it into quarters essentially, and with a 5 Icon Set, it's going to divide it into fifths. So, just bear that in mind. The number of Icons that you choose has an effect on how your data is going to be broken up. So, Conditional Formatting is a great way of making your data more readable and easily highlighting values that are important to you.

Video: Column and Line Chart_4

Deb: Now let's take a look at some other popular Visualizations in Power BI. So, if you remember in the last lesson, we created a Matrix Table, and we've been through and applied different types of formatting to this Table. But now, what if I decide that I want to change this from a Matrix Table to something like a Bar Chart or a Clustered Column Chart? Well, it's pretty simple.

All you need to do here is click on your current Visualization, and then over in the Visualizations Pane, you just need to select the new Visualization that you want to apply. Now, this first row up here, are all different kinds of Bar Chart. So, we have a Stacked Bar Chart, a Stacked Column Chart, a Clustered Bar Chart, a Clustered Column Charts, a 100% Stacked Bar Chart and a 100% Stacked Column Chart.

So, for this one, I'm gonna go for a very simple Clustered Column Chart. So, all I need to do is click, and it's going to swap that Visualization. So now, I have my Years running across the bottom, and my Total Profit down the side. But notice that when I had my Table, it was showing me the Product and the Category. But because of the type of Chart I've replaced it with, I'm now just seeing my Profits summarized by the Year. So, let's jump in and take a look at our Fields.

Now you can see here what it's done. In the Axis, we have Category, Product, and Year. But I can't display all of these on one Axis. So, it's just given me the Year. I have Total Profit as my Values, which is absolutely fine, but I also have a Legend just here. And currently, this is empty. So, what I'd probably want to do is grab one of these items from the Axis and move it into Legend. So again, this is going to depend on what you want to summarize by. Do I want to summarize by Category or by Product?

So, I'm going to do Category, I'm just going to drag that down to the Legend. And then I could just click the cross to get rid of Product from the Axis. Because currently, it's not showing me any information. If I drag that back out of Legend and back up to Axis and drag Product down here, instead, I get a completely different Visualization.

Now for me, this is a little bit too much data to be displaying in a Visual. I like to keep things fairly small and easy to understand. So, I'm going to get rid of Product, and we're just going to use the Category in the Legend. Now that I have my Dataset like this, I could choose any of these other Chart Visualizations, and everything should work nicely.

So, if I choose Stacked Bar Chart, that's what we're gonna get. Stacked Column Chart, Clustered Bar Chart, we've seen the Clustered Column, then we have a 100% Stacked Bar Charts, and a 100% Stacked Column Chart. And if we set this back to a Clustered Column Chart, we can then go into our Formatting area, and start to make some changes to customize this Chart.

So, let's expand General. And again, I'm not going to go through all of these, because many of these are kind of similar to the ones that we looked at in the Matrix Table. So, we have all of our positioning options, I'm not going to change anything there. When it comes to the Legend I have this turned on, but I can choose the position.

So, currently, I have at the top, I could choose to have it at the bottom, over on the left, or on the right. And I also have some other options here. So, top center. And I quite like that one, I think I'm going to leave it in the center just there.

I can choose if I want the Title of the Legend to show, so where it says Category. If I don't want that there, I can turn that off, which is going to save me a little bit of space. I can even change the name of the Legend just here if I wanted to do that. And I can customize the Color, the Font, and the Text Size that I'm using. We then have some options for our x Axis. For example, we can define the Start and End points.

And again, we can customize the Color, the Text Size. So if I take this up, you can see that those Titles, the Year Titles are getting bigger. So, I'm going to take those down to let's set those to 12 points. And I can also do things like adjust the Inner padding. So currently, this is set to 20%. If I take this all the way up to 43%, you can see that that increases the space between the bars.

So, I can essentially control this Gap Width. And I think I'm going to set it to that. I can choose if I want to display the Axis Title in this case year by turning that off or on, I can change the Title Color, and also what that Axis Title says. So mine is set to Auto, which means it's just going to use the Field name and in this case, I'm fine with that. I can choose to turn Gridlines off or on. Currently, mine are off. If I toggle those on, I don't know if you can see, because they're very faint in the background, I do have some Gridlines.

So, let me make those Gridlines a bit Darker, so that you can see exactly what those look like. And there we go, you might want to leave those on, or you might not. I can then make the same changes to the Y Axis. So I'm going to change the Text Size from 9 to 12, just to match the other Axis. And I can change my Display Units. So I have mine currently displaying as Millions. If I wanted to, I could choose to display as Thousands instead, Billions, Trillions, or I could say None, which is going to give me the actual values just here.

Now just to save a bit of space, I am going to set these back to Millions. Let's move down. Again, I've got my Gridlines on. But I want to make those the same Color as the Vertical Gridlines so that I can see those Horizontal Gridlines.

The next option I have is the Zoom Slider. Now currently, I have this turned off, if I turn this on, it's going to put these bars underneath, and I can choose to show my Zoom Slider on the x Axis or the Y Axis. So, if I turn off the x Axis, I just have one on the Y.

I can then use this Zoom Slider to kind of zoom in on my data. And you'll see as I do that, it's adjusting the granularity of the information that I can see. So, if you have quite a lot of complex data, and you really want to get into exactly where this bar lies, you can use this Zoom Slider. Now I don't want to have that turned on, so let's just turn that off.

We then have Data Colors. And this is where we can define the Color of these bars. So, I'm going to change these and I think I'm going to have a bit of a Purple Theme here. So, let's go for this Aubergine Color, I'm going to change Food to this Pink Color, and then finally Pastries is going to be let's go for a Lighter Purple Color. I can then choose if I want to display Data Labels. Now let's turn this on and see what we get.

Well, this is really cool, because it shows us exactly what each of these values are. Again, I can choose the Color, I can choose the Display Units, I'm going to keep these on Millions, I can choose the Orientation. So maybe I want to have those going vertically instead. And I can also choose the Position.

So currently, these are showing on the outside end of the bar. But if I wanted to, I could put those on the inside end of the bar. And I think that looks a lot nicer. And I'm going to take this Text Size up, let's make this slightly bigger, I'm going to take it up to 10 points. And I could also customize the font that I'm using. Now Plot area refers to this blank space behind where we have our bars.

Now in general, I like to keep this clean, so that the data really stands out. But if you wanted to, you could add an image. So, let's click Add Image. And as this is coffee shop data, I'm going to choose this image just here. I'm going to choose the Image Fit because I can only see a little part of it here. So let's go for Fill. And then what I can do is adjust the Transparency. So, I can take this all the way down and make it a lot lighter, and I'm probably going to go even more transparent.

And this in general is the only way that I would use a Background Image. You really don't want it to distract from your data, but it can look really effective. So, my advice is to make that image as transparent as possible, so that it doesn't detract from the information that you're trying to convey.

Again, we have our Title, which we currently have turned on, and we've got our Title Text in here, obviously, you can modify that. I'm going to change the Colors so that it matches my Chart. So let's change the Background Color first of all.

I'm going to go for this Dark Purple, and the Font Color, we're just going to change that to White. And of course I can change that Alignment if I want to, let's put it in the middle. And let's make it a little bit

bigger. Background will allow us to change the Background Color of the Chart. And just to show you what that looks like if I was to change this to Gray, we get a completely different look and feel. And again, we can adjust the Transparency of this Color overlay.

Now I think that Gray is a bit too Dark, let's go for something like a very pale Gray Color. And I might even make that a little bit more transparent. A couple of other options I might want to change in here I could choose to add a Border to my entire Chart. So, let's toggle that on. And if we click away, we can see what that Border currently looks like.

We can change the Color and the Radius. Now I'm going to turn the Border off because the final option I want to show you in here is this ToolTip area. And again, this is something that we skipped over in the last lesson.

Now, ToolTips are very useful. If I hover my Mouse over one of these bars, I'm gonna get this little ToolTip pop up, which is showing me the figures, the information in this Chart. So, I can see the Year, the Category of this bar, and the Total Profit as an exact value. So in general, I always like to have these ToolTips enabled. Now you can customize what you're seeing in those ToolTips. But you don't do it from this Formatting area, you do it over in the Fields area.

So, maybe if I scroll down, you'll see that you have a ToolTips area at the bottom here. You can drag and drop Fields, and then that information will then appear in the ToolTip when you hover over the bar. So maybe, I want to be able to see what the Total Costs are as well as the Total Profit. So, what I'm going to do here is grab the Total Cost Field from the Sales area and drag that into ToolTips. And because I have my ToolTips turned on in formatting, now, when I hover over, I can also see that Total Cost.

So, ToolTips are a great way of seeing additional information. So, that is pretty much all the customization I want to do here. And all of these Formatting options pretty much apply to all of these Charts on the top row. I also have other Charts that I could switch to, I have a Line Chart in here. I think we're all reasonably familiar with a Line Chart, we have Area Charts, Stacked Area Charts, and also things like Line and Stacked Column Charts.

So, if I want to display 2 series of data, I could switch to a Line and Clustered Column Charts. But then I would need to go in and modify some of these options. For example, I can see that my Data Labels are now showing in Gray, and they don't really stand out. So, let's expand Data Label, and I'm going to make those White. And if we go back to Fields, currently, I can only see the columns, but I've selected to display a Line Chart as well.

So, if we take a look at my Fields, I can see here in Line Values, I don't currently have anything. So again, if I also wanted to see how the Total Costs relate to the Total Profit, I could grab that Total Cost

Field and drag it into Line Values, and that's going to display on my Chart as well. Now that I've done that, when I go back into Formatting, I'm going to have some additional options in here related to that Line Chart.

For example, if I go down to Data Colors, you'll see that now I have an additional Legend item in here for Total Cost, which is this Blue line. You'll also notice I have an additional Formatting option in here as well called Shapes.

So if I wanted to, I could turn on the Shaded area. And that's basically going to shade everything below this line. I can also choose if I want to show Markers. So, if I click this, it's going to show me those Markers at the end. I can choose my Marker Shape, so let's change that to a diamond.

My Marker Color, so maybe I want these to stand out a little bit more. So, let's do a nice bright Yellow. So I'm going to move to the Yellow section, and let's do something like that. And this is pretty cool. Where we have Stepped, if I turn this on, take a look at what happens to this line. Instead of it being a linear line like we're used to seeing in most Charts, we can have this Stepped effect instead.

So, just remember that if you do change the Chart type and you add something else in like a Line Chart, then you're going to need to go back in and review your Formatting options because there's going to be some extra things in there that you're going to need to change.

Video: Card Visualization_3

Deb: Another cool Visual that you can use to display data is the Card Visualization. And I usually see Cards being used in Power BI Dashboards to show an overview of the information on the Dashboard. So, a high level overview. And these might be the key metrics that you really just want people to be able to see really easily.

And you normally find these Cards will be at the top of the Dashboard showing your important key metrics. So, for example, I'm going to use some Measures and add them to Cards. So let's add on some Cards, because they're super simple and really effective. So let's go across to our Visualizations. And when you're looking for Cards, it's this one just here, which has the 123 on it.

Now, if I click on the Card, when I'm still clicked on my Column Chart, take a look at what happens. And this is something you have to be really careful of. I find myself doing this all the time. Let's click back to undo that, make sure that you're clicked on the page and not on any existing Visuals. Let's now add our Card. There it is at the top. And by default, it's going to resize itself so that it's the same width as the visual below.

So in this first Card, I'm going to use one of my key Measures, because I want people to easily be able to see what our Total Costs have been. So, I'm going to drag Total Costs, I can drag it to this Fields area or directly onto the Card, let go, and it's as simple as that. Now I'm going to resize this Card, so I can easily fit some more on. Let's click away, click our Card again, this time, I'm going to display the Total Profit on this Card. Let's drag and drop that Measure. And again, I'm going to drag this in.

Now when it comes to the sizing of these Cards, if accuracy is very important to you here, and you want to make them all exactly the same size, we can do this through Formatting. If we expand General, this is where we can define the Width and the Height. So, if I want to make this one exactly the same Width and Height as this one, I could click on it, make a note of this, and then just copy those settings across. So, 264 and 244, let's change that to 264 and 244, and they're exactly the same.

A different way that I could go about this is I could select this first one Ctrl + C to copy, Ctrl + V to paste. So now, they're exactly the same size, and all I need to do now is replace the Total Cost with the Total Profit Field. So, 2 different ways that you can ensure that these Cards are exactly the same size as each other.

Now, notice when I drag this over, I'm also getting those Alignment guides, which is really going to help me when it comes to aligning these on the page. Let's add another Card, I'm going to copy and paste the last one, drag it across. And this time, we're going to replace Total Profits with Total Sales Quantity, drag and drop onto the Card.

So, these are a very effective way of displaying summary information at a glance. And of course, all of these can be formatted in a very similar way; make sure you have the Card selected, click on Format, and then we can go through our different options. So, some of the things I'm going to change here, let's take a look. Now with this Data Label, I can choose my units.

So currently, I'm displaying in Millions, I could say None, that's not going to work too well. I'm going to change that back to Millions. The Category, well, if I turn the Category off, it's going to remove that label underneath. Now, it's actually quite useful being able to see what exactly that number represents. So, we're going to leave that on. But I can make some modifications. So I might want to make this a lot bigger than it currently is.

So I'm going to take this up to 18 points, I could add an additional Title, if I wanted to, I can change the Background Colors. So, maybe I want to change this Background Color to let's do that Dark Aubergine Color. And because I've done that, I want to go back and just change some of this Text.

So, we're going to change this Text here to White, and we're going to go up and we're also going to change the Data Label Color to White as well, just so that stands out a little bit more. And I can give it a Border, a Shadow, I can add more into that ToolTip as well. So currently, when I hover over this Card, I don't get a ToolTip come up. So I need to turn on ToolTip and then when I hover over I can now see that information the Total Cost.

Now what if I want to copy this formatting quickly across to these other 2 Cards so they all look exactly the same? Well, fortunately, I don't have to go through each one applying those settings, what I can do is click on the first Card, up on the Home ribbon, use my Format Painter, click it once, and click to apply that formatting. Let's do it again, Format Painter, click to apply.

Now that I've done that, I can see this one isn't quite in alignment. So, let's change that and put those together at the top. If I want to resize these all in one go, I can select them all by holding down the Shift key, right-click, and group. That makes them one object and then I can use this handle to resize them all in one go.

Just remember that once they're grouped, you need to right-click, and ungroup them again if you want them to be individual Cards, which you can then move around independently.

Video: Map Charts_2

Deb: The next type of Chart I'd like to show you is a Map Chart. And in Power BI, we have 2 different kinds of Map Chart that we can use; the Regular Map, or the Filled Map. So, let me show you the difference between these 2.

Now for this just to give ourselves a bit more room, I'm going to create another blank page. So, at the bottom, where we have Page1, I'm going to click the plus symbol to give me Page2. And remember, you can rename these pages simply by right-clicking, selecting Rename. And I'm just going to call this Map Charts, and let's give Page1 a rename as well, we'll call this Summary.

Now, Map Charts are great for displaying geographical data. And it just so happens that in our Dataset, we do have a Countries Table for our stores. So, this type of data is going to be perfect for a Map Chart. So, let's see how this works. From the Visualizations Pane, I'm going to click on this Globe Icon. And you can see as I hover over it says Map, and the one next to it is the Filled Map. And there is a bit of a difference between these 2. So, let's go for the map first of all. Let's click to add.

It's going to be blank until we add in some Fields. So, let's now take a look at what we need to add. The first Field here is Location. So, this is where you're going to want to grab your Field that contains your geographical information and drop it into here. So, for me, I think I'm going to go for Country, let's drag and drop that in. Notice straight away what is happening.

Now if I make this Map Chart a bit bigger, so it's easier to see, it's basically picked up all of the Locations in my Dataset, and it's plotted these little Bubbles on those Locations. Now, at the moment, all of these Bubbles are the same size. And the idea behind this Chart is that you can represent values such as Total Cost, Total Profit by the size of the Bubble. And you'll notice here, as we go through these Fields, there's one at the bottom that represents Size.

So, this is where we can drop the Field that is going to define the size of our Bubble. So, maybe I am interested in it, let's go for Total Profit again, I'm going to drop that into Size. And now those Bubbles have resized depending on the Profit per Location.

Now one of the drawbacks of this Map Chart is, particularly if you have Locations that are fairly close together, sometimes these Bubbles can start to overlap and things can look a little bit confusing. So just bear that in mind.

We are going to make some adjustments, which is going to make this a bit easier to read. But in some cases, particularly if you have lots of Bubbles plotted, it's going to be a little bit too chaotic to display your data effectively. Now, I do have some other Fields that I could fill in here and one of them is the

Legend. So, let me just show you what happens if I add a Field to this Legend area. Let me grab Category and drag it into Legend.

And now you can see each of these Bubbles divided up by the different Categories; Beverages, Food, and Pastries. I could get rid of that and choose something else. So, what about Year? Let's drag that into Legend. And now I can see those figures divided up 2016 to 2019. So, you really can display some nice information on this type of Chart.

Now for me, I find this level of detail a little bit confusing. I prefer to use this type of Chart when I just want to represent the Total Profit for each of the Locations. So, I'm going to remove Year and just leave it as a plain Bubble.

Remember, when you hover over these Bubbles, again, you're going to get that ToolTip information. And we can always add more information into these ToolTips by dragging more Fields to this ToolTip section at the bottom.

So, maybe I want to grab one of my Measures here and also display the Average Profit. So, let's drop that into ToolTips. Now when I hover over, I've got my Total Profit and my Average Profit. Now let's take a look at some of the Formatting options we have for this type of Chart. So, let's click on Format and expand General.

Once again, we have some Positioning options in here. I don't think I'm going to change anything in there, let's go straight down to Data Colors. This is where you can change the Color of that Bubble to match maybe the Theme that you're using. So, I'm gonna go for this Dark Red Color again.

Now if you want to have each Countries Bubble represented with a different Color, you can definitely do that as well. All you need to do is toggle on Show All, and then you can go through and you can define a Color for the Bubble for each of these Locations.

Now I'm going to leave mine all on Purple just to save a little bit of time. If we go to Category, this is where I can add some Data Labels effectively. So, if I toggle this on, it's going to show me those Countries Data Labels. And again, this can get a little bit chaotic if you have lots of Locations very close to each other. Let's go down to Bubbles.

Well, this is where we can change the size of the Bubbles. So if I want to make those a little bit smaller, I can do that, which sometimes makes them a little bit more manageable. Now I'm going to take those up to about 17. Let's expand Map Controls. Well, I currently have Auto Zoom on.

But if I turn this off, and then choose to display Zoom Buttons, instead, you can see that I can then control the zoom much like you would something like Google Maps. I can click the plus to zoom in, the plus again. And then I can just drag that Map around if I want to take a closer look at a particular region.

So, this sometimes works a little bit better if you have lots of overlapping Bubbles, because you do still have the ability to zoom in and see those a little bit clearer. I then have access to different Map Styles. So currently, this Theme is the Road Theme.

But in this Dropdown, we have Aerial, which looks pretty cool, I must say. And then we have a Dark Theme, can't really see too much there, a Light Theme, which is quite nice, and then we have a Grayscale Theme as well. So, choose whichever one you like the best, and showcase your data in the best way.

Now I think I'm gonna go for Aerial because I quite like that one. And now that I've done that, I think I'm going to make my Bubbles a little bit bigger. So, let's just increase those, like so, perfect. And then most of these other options we've already covered in other Chart types. We can customize things like the Title, the Background, the Aspect Ratio, we can add a Border, a Shadow, and you've seen how we can change those ToolTips.

Now for this Title, I think I am actually going to change this, I'm going to change the Font Color to White. And we're going to have the Background Color, just so it suits the style of the Map a little bit more. So, lots of cool things we can do here with this Map Chart. And of course, remember you can drag around. So, if you want to go over and see a different area, then you can definitely do that as well.

Now, the difference between this Map Chart and a Filled Map Chart is that the Filled Map Chart doesn't display Bubbles. Instead, the entire country will be shaded if there's values for it in your data. So, let me just make this Chart a bit smaller. I'm just going to drag that in, like so. And let's click on Filled Map Chart. Now once again, we need to go in and add in our different Locations.

Now I will say that my data doesn't really suit this Filled Map Chart, and I'll show you why. In the Location, I'm going to add my Countries in again. So it's going to find those Countries and notice that it's shading them in as opposed to showing me a Bubble representation. And if we go to our Formatting, let's go to Data Colors, Default Color there is a Blue. So, let's do this in a Dark Purple Color as well. And I'm going to say Show All. Because this time, I actually do want to shade the Countries in different Colors.

So we'll keep Australia as Purple, let's do Austria as a Lighter Purple, and let's just do some crazy Colors so they really stand out. So, we'll have Blue here, and I'm just going to go through and change all of the Colors for these different Countries. And there we go. So, that now makes it a little bit easier to see.

Once again, I can use my Map Control. So, I'm going to turn off Auto Zoom and turn on my Zoom Buttons. And once again, this is going to allow me to zoom in to a specific region. So, let's zoom back in on Europe, because this is the easiest one to see, and there we go. Let's take a look at our Map Styles. Well again, we have the same Map Style, so I'm going to make this one Aerial as well. And then we have similar options below to add things like a Title, Background, Border, Shadow, ToolTip.

So, that is the main difference between these 2 different Charts. One shows as Bubbles for a representation of the values, whereas the other one just shades the country. But both of them are really effective and really nice ways of displaying geographical data.

Video: Gauge_2

Deb: The next Visualization that can look really effective in your Dashboards is the Gauge. And it's this little Icon here. Now, if you're not sure what the Gauge is, you might be able to tell from that very small Icon.

It's basically an arc with an Arrow, which shows us KPI information. For example, we might have a target to meet, and we want to be able to see in a Visualization, how close we are to that target. And for this, we're going to do this in a slightly different way. And this is also going to show us how to utilize another skill, and that is how to enter data manually.

Now, we briefly touched on this much earlier on in the course, but we're going to do it again so you can see one of the other options you have when it comes to getting data into these Visualizations. So, the first thing to do here is add the Gauge Visualization. So let's click it. As always, we're gonna get a blank Visualization.

Now normally, at this stage, I would grab my Field codes and start adding them into these Value areas. But this time, I'm going to use some data that I have stored off in an Excel spreadsheet. So, let's jump across to Excel and look at the data that we're going to use. So, here I have a very small Dataset, and you'll find this Dataset in the Course Files folder to download. It's just displaying some Year information 2016 to 2019.

We then have a Minimum and a Maximum Value showing as a percentage. We have our Target KPI, our Actual KPI and what that represents in terms of Sales Revenue. Now in order to display our data in a Gauge, we need to have all of this information. Because what this Gauge is going to do if I move my Excel spreadsheet to the side, you can see here we have this arc. And effectively I want 4 of these Gauges running across the top of my Dashboard, and each one is going to represent one of these 4 years.

So, if we start with 2016, the Minimum Value needs to be specified. So basically, what is the value going to be at the bottom on the left-hand side of this Gauge? Well, it's going to be 0. And then we need to specify a Maximum Value, which is effectively going to be on the right-hand side of this Gauge.

So, I'm going to set that to 200%. And you can set that to whatever you want. And then we have our Target KPI. So, I'm going to set that at 100%, which is basically going to be somewhere in the middle of this Gauge. And then we have the Actual KPI.

So this first one, for example, 65%, I would expect this Gauge to show that at about this level on the Gauge. Because, we have 0 over here, 200 over here, and our target, 100, is going to be in the middle. So, straight away, we're going to be able to see how close to our target we actually are. And the reason

why I set this Maximum Value to 200%, as opposed to 100 is because sometimes we've exceeded our KPI, so our target is 100%, but in 2018, and 2019, we exceeded that KPI, 110%, and 140%.

So, I'm still going to be able to plot these nicely on this Gauge Visual. So, now that we have this small Dataset, it's time to get this into this Visualization. And what we're going to do here is we're going to enter the data manually. So, we don't have to always import our data in. If it's a very small Dataset, we could create our own Table and then use that in the Visualization.

So, what we're going to do here is we're going to select all of this data Ctrl + A, and Ctrl + C to copy, we're gonna go back to our Visualization, and we're going to enter this data manually. So, up on the Home tab, into Enter Data. And we were in here before but if you remember last time, we didn't actually enter anything into the Table, we just wanted to create a Blank Table. This time we are going to add our data.

So, make sure that you're clicked in that first cell, Ctrl + V to copy that data in. I'm getting a warning message, Power BI is telling me that the first row of data that I've pasted has been promoted to Column Headers. And that's actually perfect, that is exactly what I want. The last thing to do here is to rename this Table. So, I'm going to call this 2016 to 2019 KPIs, and I'm going to load that in.

So, once it's loaded, we should be able to see that new Table over on the right-hand side, and there it is. If I expand this out, I can then see all of my different Column Headings. Now I always like to jump across to Data and just check to make sure this data looks as I want it to look. And I can immediately see here that I need to do some work on this formatting. So, these should be percentages.

So, let's select this first column just here, change that to percentage, I'm also going to change the Data Type, because it's saying it's a Decimal Number, I'm going to change that to Whole Number. And let's take these decimal places down, I'm going to do exactly the same for these other columns, let's change to Whole Number and change that Data Type. Let's change it to a percentage and take those decimal places down. And I'm going to do the same for the other 2 columns.

And then the final column here, for Sales Revenue, let's just select that, and we're going to change that to a currency, we're going to use pounds. And yep, I think that looks good. So, let's jump back to our Visualization. So, now that we have this information, we can use it to build our Gauge. Now, I want this first Gauge to show the KPIs for 2016 only.

And if I just start adding Fields in, it's basically going to use all of the data, so 2016 to 2019. So, in order for this to work, we need to apply some filtering first, so that we're just using the 2016 data. So for this, we're going to use this Filters Pane just here. We haven't really used this much so far in this course. So, this is going to give you a nice little introduction. So, let's expand it out.

This is where we can apply Filters to our Visualization. So, the first thing I need to tell this Filters area is which Field I want to filter on. Well, I want to filter on the Year. So I'm going to go to my KPIs Table, grab the Year Field and drop that into Filters on this Visual. I'm then going to go into Basic Filtering, and then I can select the Year I'm interested in. So, I want to see information only for 2016 in this Visual.

Now that I've done that, I can collapse that Pane back up again, and I can go through and start adding my Fields to these areas. So, my Value is going to be my Actual KPI, let's drop that in. My Minimum Value is 0%. And you should see that now displayed on the left-hand side of this Gauge. I'm going to grab Max and drop that into Maximum Value. And now you can see 200% displayed on the right-hand side of the Gauge. Our Target Value, we're gonna grab our Target KPI and drop that in, and there is our 100% target line, and then we have our ToolTips at the bottom.

So, remember, if we hover over, this is going to show us the Actual KPI and the Target. But maybe I want to see what that represents in Sales Revenue. So, I'm going to grab the Sales Revenue Field, drop that into ToolTips. Now when I hover over, I can see what the monetary value is relating to that KPI. And that is pretty much it, we can then go through and start formatting. So, if we go to Data Colors, I can change the Fill to match my Theme.

So, let's go for Dark Purple. I'm going to keep my Target on Dark Blue, and I've already got my Data Labels turned on here. So, I can choose the units that I want to display those in and change things like the Text Size and the Font. I maybe want to add a Background. So, I could come in here and make that Background Gray or maybe a completely different Color so that everything stands out. I can go in and modify the Title, so on and so forth.

So, you would format this the same way that you would any other Visualization. And I think I'm actually going to change that Background because I really don't like that Purple. So let's change that back to White. So, what I could do then is maybe resize this Visualization just a little bit, and then I could copy and paste it, and then change the Filter that I'm using.

So, this one needs to show the information for 2017, I'm going to expand out my Filters, let's click on Year, and this time, we're going to swap this from 2016 to 2017. And it is as simple as that. So, very quick just to copy and paste these across and display the data for all of the different years. And what you might find is if you have the 4 of these running across the top, you don't want a Title for each of them.

You can turn off the Title and use the Text Box on your Home tab just to give it a Universal Title. But, we'll talk more about that when we go into designing Dashboards. But that is it; that is how you create Gauge Visualizations.

Video: Slicers and Filters_2

Deb: Since the last lesson, I've done a little bit of arranging on this page. So, I've copied over the Map Chart and also the Gauge Chart from the Map Charts page and just simply copied them on to the Summary page. I resized them and move them around a little bit, just so they fit on the page a little bit better. But I've left a gap down the side because this is what we're going to be working with in this lesson.

It's now time for us to add some interactivity into our Power BI Report. And we're going to do this using Slicers and Filters. And again, Slicers might be something that you're familiar with in an application like Excel. We often use them to filter Charts and Pivot Charts. And they're a really nice visual way to help users extract from your Report exactly the information that they're interested in. So, let me show you how we can add some Slicers to our Report page.

Now, once again, we're going to use a Visualization for this. And the Slicer Visualization is this one just here, the one with a little Funnel Icon on it. So, let's click to add a Slicer. And as usual, it is blank until we add some data to it. So, what we can basically do here is we can use any of the Fields that exist in our data, as a Filter or a Slicer for this data. And you can have multiple Slicers in your Report. So, I'm going to add a few of them, just so you can see how these work.

Now the first Slicer that I'm going to add, if I go over to my Fields, I think I'm going to add a Slicer or a Filter for the Products. So, from the Products Table, let's grab the Product Field and drag and drop that into the Field area. And now, you can see what I get. So in this Slicer, I now have all of the Products in a big long list. And this list is pretty long. In fact, it goes off the edge of the page.

Now the idea behind this is that users can simply click to select the information that they're interested in, and the Charts on this page will update. Now bear in mind, these Gauges at the top, I don't really want those to update because those are KPIs based on if we've met a target or not. So, I don't particularly want those changing, which is quite handy because they're not actually linked to the Slicers because I entered the data manually.

However, if I was to select a Product from this list, when I select it, if you look at all of the other Charts on this page, you'll see that they will change. So, let's select BLT Sandwich., and you can see everything is changing as I select. If I want to select multiple options, I can hold down my Ctrl key, and I can select multiple Products. And that will reflect in the Charts on this Report page. To clear your Slicers and set everything back to the default, just click the Eraser Icon to clear your selections.

Now, as I mentioned, this list of Products that I have in here is pretty long. And I don't really want to have to be scrolling up and down looking for the particular Product that I want. This also makes this

Slicer not particularly space efficient. If I want to add more Slicers underneath, this is going to get cumbersome very quickly.

So, what you can do here is change this from a List to a Dropdown menu. And we do that simply by clicking this little Dropdown Arrow, and then we can select the type of Slicer that we want. So, I'm going to change this to Dropdown. And now, I have something which is a lot neater and cleaner to look at. I can then click the Dropdown and then go in and select what I want to filter by.

Now I'm going to do a bit of resizing here because that is a bit wide, and it's going off the page. Let's move that in to about there. Perfect. Let's now do some formatting just to make this feel like it's part of this Report. I'm going to jump over to my Formatting tools, and I'm not going to do much formatting here.

But one thing I am going to do is I'm going to expand the Slicer header. And I'm going to say that I want a Bottom only Outline. That's gonna give me this line underneath the heading. And what I tend to like to do on Reports and Dashboards is use Color to group together the Slicers.

So, if I have Slicers that are all from the Products Table, I might give the underline the same Color. So, to change the Color of the underline, you have to do that from a different area. Let's go to General, I'm actually going to change the weight of that to 2, and we're going to change the Outline Color to Purple. And then we have our first Slicer. I'm going to add another one for the Category.

Now as with anything in Power BI I don't have to go back in and add a Slicer Visualization from scratch, I can simply copy and paste the existing Slicer. So select it, Ctrl + C, Ctrl V, and that's going to give you a copy. And we're going to place that directly under the Product Slicer. Now, all I need to do is go over to my Fields Pane, click the cross to remove Product, and I'm going to replace it with Category. So now, when I click the Dropdown, I can filter by Category as well.

Now this is also part of the Products Table, so I'm going to leave that underline as Purple because these are both from the same Table. Let's do the same process, I'm going to copy Ctrl + C, Ctrl + V to paste, let's drag this one underneath. And this time, we're going to use a Field from the Locations Table. So, I'm going to grab Location, and drag and drop that into Field. And now, I have a big long list of Locations that I can select from.

Now this is from a different Table, so let's change that Line Color to separate it from the other 2. So, into Formatting, all I need to do here is go to General and change the Outline Color. And let's do a nice Blue Color, like so.

Now one other thing that's worth pointing out here is if you have a Dropdown menu that has a very long list of data like this one just here, you can help your users out a little bit by adding the ability to search through this list so they can easily find what they're looking for.

So, what we can do here is click on the Slicer, click the 3 dots, and you can see the first option we have in the menu is Search. So, if we click that, now when they go to the Dropdown, they get this little Search bar at the top here, so they can then type in exactly what it is that they're looking for. So, that can be a super helpful thing.

Now the final Slicer that I'm going to add to this page is a Date Slicer, because there is a slight difference with Slicers that deal with dates. So, let's copy our Slicer Ctrl + C, Ctrl + V, let's position it, let's go to our Field Pane, Remove Location. I'm going to go to the Dates Table, and I'm going to grab Year, drag and drop that into Field. Let's go to the Format tab, and let's just change the Outline Color because that is coming from a different Table. And we're going to change this one to Pink.

So, when I click this, you'll see that I can filter on my dates 2016 to 2019. Now, because Power BI recognizes that these are dates, if I click the little Dropdown, you'll see that aside from List and Dropdown, I now get between, less than or equal to, greater than or equal to. So, if I'm looking for something specifically between 2 dates, I can then use this Slider.

So, if I'm only interested in things that are between 2017 and 2019, I can just use that Slider. And you won't see those options on any of these other Slicers. They are very specific to Date Slicers. So, just be aware of that. Now I'm going to switch this one back to Dropdown. But that is pretty much it. We can now go in and we can select all of the options that we're interested in.

So, we can select a few different Products. I can then go to Location and select a few different Locations. And I can then go to the Year that I'm interested in, so let's say 2018. And there we go. My Cards, my Column Chart, and my Map Chart have all updated to reflect my Slicer selections.

Video: Applying Design Elements_2

Deb: So, I just want to end this section by just briefly showing you some of the other Design Elements that you can change in your Report. Because so far, when we've been applying formatting, it's very much been Visualization-based.

We've selected a particular Visualization on the Report, and then we've used our Format area to apply different formatting settings. But you do have other options on the Ribbons that allow you to make more universal changes to the look and feel of your Report. So, let's look at some of them now.

If we jump up to the View tab, you'll see in the first group, we can change the Overall Theme. And Themes are a great way to very quickly apply formatting, different Colors, different Font Styles with the click of one Button. So, if we click the Dropdown here, we have access to quite a few Themes in this gallery. And I'll leave it to you to go through some of these and experiment with the different Colors.

Now for example, I'm going to apply this one just here Tidal. Now when I click this, you can see what that looks like. Instantly, a little bit more interesting, and I haven't had to format every single Element individually. So, Themes are a great way to quickly change the look and feel of your Report. If we go across to the Insert Ribbon, we also have some other options in here.

So, for example, if we want to add a new page, we can add a blank page or a duplicate page from here. Remember, you can also do that by clicking the plus at the bottom where we have our Tabs. We can add new Visuals from here, as opposed to clicking on the Visualization in the Visualizations Pane. And then we can also add different AI visuals.

Now I'm not really going to go into these in this particular lesson. But one that I will point out to you is this one just here the Smart Narrative. Because, this is quite a nice way of auto generating a summary of the data that you have on your Report. So, if you kind of want a couple of paragraphs of text, which gives an overview of the data you're displaying, this is what Smart Narrative does. Now, I don't have a great deal of blank space on this page, so it might be a little bit difficult to see.

But if I click Smart Narrative, it opens up this little Text Box, and take a look at what we have in here. So it's given me a summary of my Report. It's telling me that Beverages had the highest Total Profit. And then it's given me the value, followed by Food and Pastries. Total Profit and Total Cost are positively correlated with each other, so on and so forth.

So, this is something that's quite nice that you can add to your Report page, if you just want a quick written summary of what your Report is showing. So I quite like that little option. And then in the group on the end, we have different Elements that we can add. So, if you want to add a Text Box to the page, then you have that option just here.

So it might be that I want to add a Title for this Report at the top here, I would do that using a Text Box. And this brings me on to my other little tip here. And that is grouping your objects together in order to be able to move them as a whole.

So currently, if I wanted to add a Title to this Report, I don't really have any room, I haven't allowed any space at the top. So, I might want to resize these visuals and move them down a little bit, and I don't really want to be selecting them all individually, moving them down and resizing them, that's not going to be very time efficient. I want a way of doing this all together.

So, what we can do here is we can go to the View menu. And in the Show Panes area, we have a Selection Pane. And this allows us to do things like change the Layer Order, but it also allows us to select all of the Elements on our page. So, if I select the top one, go down to the last one hold down Shift, it's going to select everything on the page. What I can then do is right-click my Mouse, and group all of these Elements together in one big element.

I can then use my Resize handles to resize everything as a whole. And if I want to maintain the Aspect Ratio, I just need to make sure I hold down Shift as I resize. So, let's make this quite a bit smaller. And I'm then going to move the group as a whole a bit further down the page so that I have a bit of space at the top for a Title. And I think I'm going to drag that out a little bit as well. So, there we go.

Now if you want to go back to editing these Elements individually, you must make sure that you right-click and ungroup them before you continue. So, now that I have some space, let's go back to Insert and we can add a Text Box and I'm just going to give my Report a Title. And we'll call this Mega Coffee Sales Analysis 2016 to 2019. And this is just a regular Text Box, which we can then format. So, let's select the text, I'm going to leave it on Segoe UI quite like that. But let's make this font a little bit bigger, I'm going to change that to 24. And let's move that up to the top of the page.

Now, if I want to make any other changes to this Text Box, such as maybe removing that Background Fill, notice that now over on the right-hand side, I have a Format Text Box Pane, which gives me access to a lot of the similar options that we have when we're formatting a Visualization. So, let's turn the Background off, and then I'm going to change this Font Color to White. And let's also make it Bold, why not? Click away, and there we go.

Some other things that I can add here are different types of Buttons. Now if we click the Dropdown, I can add things like a Left Arrow, a Right Arrow, a Reset, Back, Information, Help, Q&A, so many different things that we can add. So, for example, if I click on Back, this is going to give me this little Back Arrow just here. Now I'm going to place this over at the side of my Report. And once again, we have the Format Button Pane open on the right-hand side to allow us to customize this Button.

So, what I'm going to do here is I'm going to turn the Background off, and then we're going to change the Icon to White. And I'm going to turn on Text as well and make that Font Color White. And the Text that I'm going to add here is the word, Back. Let's make that Text a little bit bigger. And yeah, that is it. And the idea behind Buttons like this is that you can press Ctrl and click them. And this one, for example is going to jump you back to the previous page in this Report.

So, if I now click Back, it's going to take me to the other page that I have, which is essentially the Map Charts page. So, things like Buttons can really help you with navigation, and giving users information and help.

And then the final two options we have we can add some Shapes to our Report. This is probably fairly self-explanatory. If we want to add something like a Block Arrow, we can do that. We can add Rectangles, Circles to add to the design, and we can also add our own Images to our Report.

So, definitely some additional really cool features in there which are going to help you elevate the overall look and feel of your Report, and make it super visual and easy for people to understand.

Section 7 – Creating a Shared Workspace

Video: Creating a Shared Workspace

Deb: It is time now for us to move on to the Dashboards section of this course. And before we get going with creating different types of Dashboards, there are a few key things that you need to know.

Now, predominantly throughout this course so far, we've been working solely in Power BI Desktop. And I did mention right at the beginning of this course, that there is another part to Power BI, and that is the Power BI Service. And the way you need to look at this is it's really the Online version of Power BI. And the idea is that you build your Reports in Power BI Desktop, and then you can publish them to the Power BI Service.

Now why on earth would you want to do that? Let's jump across the Power BI Service and take a look. So currently, I'm on the office.com homepage logged in as myself. So, anybody who has access to a Microsoft 365 account should be fairly familiar with this start page. This is where you go to access all of your Online applications. If you click the app launcher in the corner, you can see right at the bottom, we have Power BI. And if we launch that, it’s going to jump us into the Power BI Service.

Now the first thing I'm going to do here is expand this Navigation Pane on the left-hand side just by clicking these 3 lines at the top. And what you'll see right at the bottom is we have Workspaces and My Workspace. Now if I click the Dropdown Arrow, just here, you can see that this is an area where I can store any Dashboards I create Reports, Workbooks, and also Datasets that I use as well.

So, this is really an online storage area for all of my work in Power BI. Aside from the My Workspace area, we also have something called Workspaces. And if I click the Arrow, you can see that currently I don't have any Workspaces in here. Now this area is for Shared Workspaces.

So, effectively, I can publish any Reports to the Shared Workspace, and then assign access to any of my colleagues, which means that they can jump into my Report, they can take a look at it, and depending on their level of access, they can interact with the Report as well.

So My Workspaces is just for you, whereas Workspaces is a shared area. So, what we're going to do here is we're going to create a Shared Workspace, and then we're going to publish our Report to that Shared Workspace.

So, the first thing I'm going to do is select Create Workspace. I can choose to upload an image for my Workspace if I want to, I'm not going to right now, I can then give my Workspace a name. So, I'm going to call this Power BI Training. You can give it a description if you want to, again, I'm not going to bother at this stage, let's click on Save to create that Workspace.

So now, when I click this Arrow to expand, there is My Workspace. So, let's jump back to Power BI Desktop and publish our Report. And this is super straightforward. On the Home tab, notice right at the end here, we have a Publish Button. And as I hover over it says, ‘Publish this Report online in the Power BI Service’. So, let's click on Publish.

I'm gonna say Yes, I want to save my changes. And now I need to select a destination. And underneath, it’s showing me My Workspace or Power BI Training. So, I have a choice here; I could just publish it to my own Workspace, or I'm going to have a choice of any of the Shared Workspaces that I've created.

So, I'm gonna save this to the Shared Workspace, click on Select, and it's now publishing that Report. And there we go, I have the success message. Let's click on, ‘Got it’. And I'm going to jump back to Power BI Service to make sure that that's uploaded correctly. And there we go.

So now, I have 2 files sitting in here; the actual Power BI file the Report, but also the Dataset, take a look in that type column Report and Dataset. So, I can access both of them from here. Also, if I take a look underneath Workspaces, I now have Power BI Training, which is My Workspace. It’s telling me I don't have any Dashboards, which is correct.

But now underneath Reports, we've got Power BI Practice, and then we also have the Dataset in its own group down here as well. So, it makes it super easy to organize and manage all of your shared Reports.

So, now that we understand how to publish our Reports, and we understand the concept behind Workspaces, and Shared Workspaces, it's time for us to build a Dashboard because Dashboards are actually built in the Power BI Service and not Power BI Desktop.

Video: Inviting Others to a Shared Workspace

Deb: Before we get on to creating our Dashboard, I just want to run through with you how you can invite other people to any Workspaces. If you remember, in the last lesson, I showed you how to publish your Power BI Reports to the Power BI Service, and we created a Workspace at the bottom here called Power BI Training.

So, if I want other people to have access to any Dashboards, Reports, Workbooks, and Datasets that I've created, I'm going to need to invite them to the Workspace. So, what we need to do here is hover our mouse over Workspaces and click, you will see any Workspaces that you've created listed underneath here. And currently, I only have one; Power BI Training. And we need to click these 3 dots.

From there, let's jump into Workspace Access. And this is where you can add admins, members, or contributors. And these access levels basically define what other people can do with your Reports and Dashboards. So, an admin basically has full access to everything. They can interact with the Report, and they can even do things like Schedule Refreshes.

Members have read-only access. So, they can't edit or interact with the Reports. And, contributors can publish Reports and edit Dashboards. So assign access accordingly. And all you need to do to do that is just simply type in their email address. So, I'm just gonna choose Adam’s email address, and I'm gonna give him member access and I'm going to add him to My Workspace.

As soon as I do that, you can see his name pop up below, and it's showing me his permission level. And that is pretty much it, very straightforward to add somebody to a Workspace.

Video: Reports vs Dashboard

Deb: It's very important to understand the difference between Reports and Dashboards. So far, we've seen how to set up a Workspace, and this Workspace can contain multiple Reports from different people.

Now, your manager or a stakeholder might want a single location to look at key data from different Reports. So, what we can do is select any of the Visuals from any of the Reports and pin them onto one Consolidation Report, and this is what we call a Dashboard. So, effectively, a Dashboard is a way to combine data in a single location without having to build a huge data model.

Now, one important thing to note here is that there is no filtering on the actual Dashboard. If you pin Visualizations from different Reports and Data models, then the user applies a Report-specific Filter, some tables will get filtered, but others wouldn't. And you can pin Visuals from Reports using the Pin icon in the corner, which is what we're going to look at in the following lessons.

The final point worth noting here is that Visuals on a Dashboard do refresh when any of the underlying data is updated. So, effectively, the data does stay linked to its original data source. So, the overarching goal of a Dashboard is to provide quick insights for the user.

If a user wants to interact with any metric on the Dashboard, they can use the drill through features to click through to the original Report, and it's on the original Report where they can start to use things like Filters.

So, a Report is what you build first, and it's how you interact with your data. Whereas a Dashboard is a high level collection of data from multiple Reports with drill down capabilities when the user wants to do a deep dive.

Video: Pinning Visualizations to the Dashboard

Deb: So, let's now take a look at how we can pin Visualizations from our Reports and create ourselves a Dashboard. So, I'm back in the Power BI Service. And if I take a look at the bottom, where I have my Power BI Training Workspace, this is where I have my Report; DA Power BI Practice. And I've simply clicked on that to load the Report up in the window.

Now your Reports in the Power BI Service should look exactly like they do in Power BI Desktop. And what you'll notice is that if you hover over any of these Visualizations, so currently, I'm hovering over that Map Visualization, we get some icons appear at the top, and one of them is the Pin icon, and this is how you pin Visualizations to a Dashboard. And you'll see this Pin icon when you hover over any of these Visualizations.

The only time you won't see it is if you hover over a Filter. Because remember, we can't pin Filters to the Dashboard. If we want to use a Filter, we need to drill down when we're on the Dashboard, which will take us through to this Report, and we can then use our Filters. Another thing to bear in mind when you're pinning Visuals, if you have applied a Filter on the Report page, so for example, if I have applied the product Filter and selected BLT Sandwich, for example, if I then choose to pin this Bar and Line Chart, it's going to pin it as it's currently filtered. So again, just be aware of that.

Now when it comes to this Report, if you take a look, we have a Pages Column just here. And I have 2 pages to this Report; I have that Summary Page, and then I have that Map Charts page. And that was really where we kind of started to build our Map Charts and our Gauges. If I had more pages, I could see all of those down here as well. And I can choose to pin any Visual from any page.

Even if I had multiple Reports, so I only have one in this particular Workspace, but if I've created a few others, I can basically grab and pin Visualizations from any of my Reports and place them on a Dashboard. So it's pretty cool in that way. So let's go back to the Summary Page. And I'm going to hover over this Map Chart and I'm going to select Pin. I get this box pop up that says, 'Pin to Dashboard. Select an existing Dashboard or create a new one'.

So currently, I don't have any Dashboards at all, so we're going to need to create a new one. So let's call this Sales Analysis Dashboard. And I'm going to choose Pin. And now if I go back over to My Workspaces area, if we take a look under the Dashboard's heading, you can see there it is, Sales Analysis Dashboard. So, if I click on it, I should be able to see that Visualization that I've pinned.

Now, there isn't a great deal of editing that you can do when you're on your Dashboard. Effectively, all of the editing and the pretty stuff, I should say, occurs at the Report level. But a couple of things that you can do on this Dashboard, we can pick up this Visual and move it to a different location. And you need to pick it up by the Title up here.

So, if I click, I can then drag it around and place it wherever I want to place it on this Dashboard. So, let's put it down there. Again, if I hover over the Visual, I have these 3 dots at the side. And if I click it, it's going to open up more options. So, I can do things like add a comment, I can go directly to the Report that this Visual came from, I can open in Focus Mode, which is basically going to allow me to see that Visual in full screen size.

I can export to a CSV, I can edit the details. So let's click on Edit Details. I can do things here, like change the Title. So, maybe I want to change this to Total Profit by Country, something like that, and click on Apply. I can also delete the Tile from here as well.

Now when it comes to the look and feel of your Dashboard, if we take a look at this horizontal menu that runs across the top, if we click the Edit Dropdown, we can add Tiles, I can change my Dashboard Theme from up here. So, currently, I have the Light Theme selected, and we do have a few little options.

So, I could go for a Dark Theme, or I could change it to a Color-blind friendly Theme. Or I can choose a Custom Theme where I can define the Background Color, the Tile Background, the Tile Font Color and the Tile Opacity. So, you do have minimal controls when it comes to the design the look and feel of your Dashboard.

Now I think I'm going to leave mine on a Dark Theme and click on Save. And that is basically it. Let's go back to our Report, and let's pin a couple of other things. So, let's pin some of these Gauges. So again, I'm going to click on the Pin icon. This time, I'm going to pin it to an existing Dashboard, the Sales Analysis Dashboard and select Pin. I'm going to do the same for these other ones, and Pin. And let's do the last 2. And each time you do this, you're going to get this message pop up, which allows you to create a Mobile Layout or go directly to your Dashboard.

Let's pin the final one, and click on Pin. This time, I am gonna go to my Dashboard, and there are my Visualizations. And these are quite large. Now if you take a look in the bottom corner, when I hover over, I can drag those in and make them a bit smaller, and I can then move those into position. And the cool thing with this is that Power BI does try to help you when it comes to resizing. If you take a look that shaded area, once it's at the correct size, I can just let go and it will resize the Visual.

Let's do the final one, we're going to drag this up here and put it next to this one. We can drag in and there we go. So, now I think I need to move this one up very slightly. And you can see that we're starting to construct a really nice looking Dashboard. So, once you start to build your Dashboard, and you're adding Visualizations to it, what about if you want to filter these or see the underlying data? What can you do here?

Remember, you can add Filters to your Dashboard. The Dashboard is here to give you a high level insight. If I did want to change the Filters, I can drill down using these Visualizations. So, if I take this Map Chart, for example, if I click on it, it's basically going to take me to the Report where this Visualization came from. And I have my Filters just here which I can then apply to take a look at that particular data. So, that is pretty much it, fairly straightforward to pin Visualizations and drill through to the original Report.

Video: Setting up Scheduled Refreshes

Deb: Any Report or Dashboard we create connects to any number of data sources in the model. And all of these sit on the Power BI Service.

Now it might be that the data in your data model gets updated every month. For example, in the terms of sales figures for a coffee shop, each month, new sales figures will be added to the underlying Dataset. So, we want to make sure that the new data being imported into Power BI and the Reports and Dashboards are updated accordingly.

Now, many Reports are not set up as live connections so they don't refresh automatically, we need to trigger a refresh on a regular basis to get everything to update. So, in this video, we're going to set up a Scheduled Refresh to refresh the Dataset automatically at the times and intervals specified. Now an important thing to note here, our data in our Model came from an Excel, CSV, and text files that are stored on my computer.

So, because the files are stored locally, we need to install a Data Gateway to act as a bridge from the Power BI Service and any machine where the data is sitting locally. Remember, a Data Gateway is only needed if you are connecting to a local file or database. Once we've set up that Gateway, our Report will be able to access the data files. So, let's take a look at how we do this.

I'm going to jump back to the Power BI Service. I'm going to scroll all the way down in this left-hand Pane until I get to Datasets. There is my Dataset for this particular Report. Let's click the 3 dots. And from this menu, we need to select Schedule Refresh. Now if we scroll down and expand Scheduled Refresh, everything currently is grayed out. And that's because it doesn't have the ability to set a Scheduled Refresh until we set up this Gateway. So, just above we have a Gateway Connection.

So, let's expand that. It’s telling me I don't have any Data Gateways, which is correct, I haven't installed any. But I do want to create one now so I can set up this Refresh. So, underneath we have an Install Now Button. So, let's click it. And that is going to download a little exe file onto your computer. Now, in a moment, when this has finished downloading, we're going to open it and we're going to run the setup.

But I will say that this works best on a computer that is always on. So, if in general most of the time when you're using Power BI you're using a work computer, you'll probably find that this Gateway will be installed on the server by your IT team. So, it might be unnecessary for you to do this step, you might just be able to schedule that refresh when you come into this area.

Now I can see that their little exe file is downloaded. So, let's click to run through the setup. So, I can see here where it's going to install that to and that is fine, I'm going to accept the terms and conditions and click on Install. So now, I can see that installation was successful, I need to type in my email

address to use with this Gateway. So, in general, you want to use the same one that you're signed into Power BI with. And let's click on Sign In. I'm going to choose my Microsoft account, and there we go. It's now telling me that the Gateway is online and ready to be used.

So I can simply click Close on this window. And sometimes, this doesn't always update right away. So I'm just going to click Refresh on my browser to reload this page. Because, I should find that I now have a Data Gateway sitting there set up. So, let's expand again, and there we go, there it is. So now, if I expand Gateway Connection, I should see that Gateway is set up, which it is. So now, when I go down to Scheduled Refresh, I can choose to turn this on. And this is where I can choose my Refresh Frequency.

So, maybe I want it to check for updates 3 times a day, maybe at 9am, 1pm, and 4pm. And in here I have a choice between Daily or Weekly. So, let's go for Daily. Check to make sure your Time zone is correct in there. I'm going to say Add another time. And the first time we're going to choose is 9am. I'm going to choose another Refresh at, let's go for 1pm, and then another Refresh at 4pm.

If there are any failures or problems with this Refresh, the Dataset owner, in this case me, is going to receive a notification. And all I need to do here is click on Apply. And that is it. So again, just check to see if you can set up your Scheduled Refresh without having to install a Gateway. You might find that it's already installed on the server where you work. If not, it's a fairly straightforward process to get that up and running.

Section 8 – Orders Dashboard Example

Video: Orders Dashboard Example

Deb: So, now that we have all of the key skills when it comes to using Power BI under our belt, it's time now to combine them all together and build ourselves a Dashboard from scratch. So, we're going to run through the same process again, but in a more joined-up way.

Now you've seen everything done once, we're going to use a different Dataset, different examples, and we're going to go right from the beginning from importing the data into Power BI, through to cleaning it and creating DAX Measures, building multiple Reports, and then we're going to publish them to Power BI, and pin our visuals to create a Dashboard.

So, this is going to give you a really good opportunity to see those skills again, learn new skills as we go through, and see how everything fits together. So, let's start out by taking a look at the Dataset that we're going to be using for the rest of this course. And this is basically again, a sales spreadsheet, but it's different from the one we were using last time. This one is a little bit bigger. You can see that we have numerous different columns.

So, if we scroll all the way across, we have an Order ID column. And each Order ID represents a different order for a customer. We have the Order Date. And if I check out the Filter, I can see that my orders basically run from 2021, all the way back to 2000. So, this is essentially a log that's tracked every single sale. I can see the Order Types so whether the order was placed Offline or Online. And then I can see the Customer Name, Gender, and their Age in years.

We then have that email address, and then the total amount that they spent in that order. We then have a column for Total Costs. So, with every purchase, there are always some associated costs. And we can see those listed in Column K. We've then got the Payment Type. So, whether they used Card, Cash, or Voucher to pay for their order. The Order Status, whether it's been Shipped, Returned, or if the order is Pending.

We then have Location Information. So, I can see the Town, the City, the State, and the Region. So, quite a lot of information in here. And this is the data that we're going to be using to build our Reports. So, before we begin, let's start out by taking a look at the finished product, just so you can get an idea as to what we're aiming for. And this is the Report that we're going to build.

It’s displaying lots of key metrics, and some of these have been built using DAX Calculations. And we've used quite a lot of different design elements on this page as well. Something that I've also used that we haven't actually covered so far, is I've added in a Navigation menu down the left-hand side,

which uses bookmarks to allow us to quickly jump between these different pages of the Report. So, if I click on 2018, it's going to jump me across to that Report page.

So, this is a real cool little feature that can really assist your users when it comes to interacting with your Reports. So, this is basically what we're going to build throughout the rest of this course. The original data file, The Order Log, is available for you to download in the Course Files folder. So, make sure you have that downloaded and then we'll begin.

Video: Report Requirements

Deb: Before you dive into creating your Reports and your Dashboards, it's always important to take a moment and think about your Report Requirements. Now, Report Requirements might be something that you receive from a client. So, if you are building a Dashboard for a client, they might have a whole list of requirements that you need to incorporate into the Report.

For example, they might have specific metrics that they want you to display, they may be have specific Chart types that they want you to use, they might have very specific requirements about the way the Report is laid out, or even the types of Visualizations that you use. Even if you're not doing a Report for a client, and it's something you're putting together maybe for your manager, it's always good to ascertain before you get started, exactly what it is they're looking to get from this Report.

And I always find it's quite useful to write down the metrics that I want to display in my Report, and also give some thought to the types of Measures I'm going to need to create, and also what Visualizations I might use to represent that data. So, bearing in mind the data that we're going to be using, that Sales Data, these are our Report Requirements. So, our Report needs to have separate pages for the 2017, 2018, 2019, and 2020 Sales Data.

So, I want 4 different pages that shows different KPIs for those years. We then need to add a fifth page that gives an overview of all of the years. So, effectively, we're going to build a 5-page Report. Now, what are we going to display on each of these pages? Well, we're going to have quite a few Charts in here.

So, the first Chart I want is going to show me the Number of Orders, Male vs Female, and another Chart to show the Total Number of Orders by Year. We want to be able to see the Total Revenue broken down by Region, and also the Age Distribution of our Customers. So, which age group essentially purchases products from us the most? And then finally, I want to do a Count of the Customers by Payment Type, Order Type, and Order Status.

So, Payment Type will tell me if they're paying by Card, Cash, or Voucher. Order Type will tell me if the transaction is Online or Offline. And Order Status will tell me if that order is Pending, Shipped, or cancelled. So, I need to think about the types of Charts that are best gonna represent this data. The next thing I want to think about other types of Measures I might need to create in this Report.

So, I'm probably going to need a Measure which counts the Number of Female Customers, and a similar Measure that counts the Male Customers, I'm going to create another one that counts the Total Number of Orders. And then, 3 Measures that sum the Total Costs, the Total Profit, and the Total Revenue.

Finally, we're going to have a Measure that calculates the Total Profit as a Running Total by Date. And we can use all of these Measures to build up Charts. And then finally, what am I requirements with regards to filtering and Navigation? Well, each Report page should be filtered to display the data relevant for only that year.

And the final requirement here, which is a very important one, is that the Reports need to be simple to navigate. So, this might be something similar to what you receive from a client. And you need to make sure that you're incorporating all of the Report Requirements into your final Reports and Dashboard. So, we're going to consider all of these when we start to build, which is exactly what we're going to start doing in the next lesson.

Video: Importing Order Data

Deb: So, the first step in Power BI is always to import our data. And we've already seen the Excel file that we're going to import. So, all we need to do here is go across to the Home tab, into the Data group, and because this is an Excel workbook, we can simply click this Button.

And from here, I'm going to choose this worksheet, Order_Log. Let's select it, and click on Open. It's going to create a connection between Power BI and that Excel file, and then it's going to open that Navigator window. Remember, this is going to show any tables of data that you have on your worksheets.

So, if I select Order_Log, it's going to show me the first 200 rows. This all looks good so far to me, but I do want to check to see if there's anything that I need to change in Power Query. So, we're going to click on the Transform Data Button at the bottom. This is going to load up my spreadsheet into Power Query. And we just have one file here so we haven't had to combine anything together.

If we take a look over on the right-hand side, I can see the properties; the name of the file, and I'm going to quickly change the name of this to Order Prep, and hit Enter. So, now that we've imported it and renamed it, it’s time to go through and tidy up the data.

Section 9 – Transforming Order Data in Power Query

Video: Transforming Order Data in Power Query

Deb: So, now that we have this data loaded into Power Query, it's time to go through and check to see if there's anything that we need to tidy up. And the first thing I want to check, I just want to make sure that all of these data types are correct.

So, in the first column, we have Order ID, and I can see that here, I have a Whole Number applied. And that's fine in this instance. The next one is a Date Column. That's all correct. We then have Text, more Text, and the next 2 columns are also Text. And so far, these all look to be pretty much correct.

Now when it comes to Total Revenue, just here, I think I'm going to want to change that to a Fixed Decimal Number. So, let's say Yes, we want to replace current. And the same for Total Cost, I'm going to change that as well to Fixed Decimal Number. Payment Type is Text as is Order Status. And I think the rest of these columns are also, Text, which they are. So, we haven't really had to do a great deal of tidying up for this particular Dataset.

But one thing I do want to do is make my Dataset as efficient as possible by creating some Lookup Tables. So, if we just take a look through our columns, I can see here we have Order ID, and Order ID contains unique values. So, effectively, here we have a unique identifier column. If I scroll across, what else might I want to create a Lookup Table for? Well, I could probably create some Lookup Tables for these locations just here.

So, where we have Town, City, State, and Region, I'm probably going to want to create a Location Lookup Table, remove the duplicates, so that this Lookup is as fast as possible. So, that is exactly what we're going to do in the next lesson.

Video: Creating Lookup Tables

Deb: So, now let's create Some Lookup Tables to make this Dataset as easy and fast to interrogate as possible. So, currently, I just have my Order Prep table, my query. Now if I scroll across, I think I'm going to create a Lookup Table for these Locations. And I'm actually going to create 2 Lookup Tables. I'm going to create one for the Town and City and another for the State and Region.

So, the first thing I need to do here, because I want to make changes to this, and I don't want to overwrite this copy, I need to right-click on my query, and I'm going to choose Reference, which will create a copy. Remember, when you reference you're linking to the original Dataset, you're not creating another Dataset.

So now, if we go across, I'm going to do Town and City first of all. So, let's select both columns, right-click and Remove Other Columns just to leave these 2. So, what I've probably got in this Town column is a lot of duplicates. So, I want to just have a list of unique Towns and the Cities that they relate to. So, let's select the Town column, up to Remove Rows, and Remove Duplicates. And there we go. And just in case, we have 2 Cities with the same name, I'm going to add an Index Column to uniquely identify each row in the table.

So, up to Add Column, into Index Column, and from 1. I'm going to give this Index Column a name, and let's just call this Town/City Key, and hit Enter. And I'm going to move this column to the start of the table. The final thing to do here is just rename this table. So, over in the Properties area, let's call this Town/City, and hit Enter. Now we're gonna go back to Order Prep, because I want to do the same thing, but this time for the State and Region columns.

So, once again, we need to right-click and reference this table. Let's scroll across, select State and Region, right-click and Remove Other Columns. Once again, I don't want any duplicates I just want a list of all of the States. So, back to Home, Remove Rows, Remove Duplicates, and you can see that that has left me with 51 rows. And I probably don't really need to add an Index Column here, because the State codes are all unique.

But if you want a little bit of extra insurance that there's going to be no conflicts, you can simply add an Index Column, why not, it only takes a few moments. So, let's double-click and call this State/Region Key and hit Enter. And let's move that column. Final step is to rename this query. So, we're going to call this State/Region Key and hit Enter. Let's jump back to our Order Prep table. Now, I think I'm also going to create a table for the Order Type.

Now we only have 2 different Order Types in here; Online and Offline. But any Calculations that I do currently will have to run through every single row in this table. So, instead of running through a 1000+ rows, I want it just to run through 2 rows. So, I'm going to create a Lookup Table for this. Let's right-

click on Order Prep, Reference, let's choose Order Type, right-click, and remove all of the other columns. And once again, I want to get rid of any duplicate entries. So, when I remove these duplicates, I should be left with just 2 rows; Online and Offline. So, let's remove, there we go. Once again, I'm going to add an Index Column just to be on the safe side. Let's call this Order Type Key and hit Enter, and move that to the beginning.

And of course, we want to rename this query Order Type and hit Enter. I could go to Town and create Lookup Tables for all of these but I think I'm just going to do one more. Let's do another one for Payment Type. We have 3 different Payment Types here; Cash, Voucher, or Card. So, once again, right-click, Reference the table, we're gonna go across to Payment Type, select, right-click and remove the other columns. Let's go to Home and Remove Duplicates, which is going to leave us with 3 unique entries.

I'm going to add an Index Column starting from 1, I'm going to call this Payment Type Key, hit Enter, and drag to the beginning. And finally, rename that query. Hopefully, you're getting the idea here. Now if you want to go in and add more Lookup Tables for things like the Gender, or maybe the Order Status, because we have Shipped, Returned, and Pending in there, then please feel free and go ahead and do that. I'm going to leave it like this. Because, the next stage is we want to merge these queries into our Order Prep table, so that we just have the Key as opposed to the actual column.

Video: Merging Queries

Deb: So, now that we've created our Lookup Tables, it's time to merge these into our Orders Table, and then remove some of these other columns. So, for this, we're going to jump up to that Home tab. In the Combine group, we have a Merge Queries option. Now, if this is the first query, again, we don't want to overwrite this Order Prep table by merging everything into this one. So, we're going to Merge Queries as a new query. So, let's deal with this Town City Lookup Table first of all.

I have my Order Prep table in the top part of this window, and I'm going to select Town and City to load that into the lower half. So, remember, what we need to do here is effectively link these 2 tables together by a common Field. So, I'm going to scroll across, and I'm going to use the Town column in the Order Prep table, and the corresponding Town column in the Town City Table. If I take a look at the bottom, I can see I have a green tick. So, I know that this is all good, and let's click on Ok.

I have a new query, it's called Merge1, we will rename that at the end. But if I now scroll across to the last column, there is my Town/City Column. And remember, the only field we want to import into here is that Town/City Key that we created. So, let's click on the 2 Arrows. And then I can choose the field or the column that I want to import. So, I'm going to deselect everything and just use Town/City Key and click on Ok. Let's double-click that Column Heading because I just want this to be called Town/City Key. So, let's remove that first bit, and hit Enter.

So, now that I have the Town and the City Key in here referring to that table, I no longer need the Town and City Column in this particular table. So, let's move this over. And then we can select Town and City, right-click, and remove those columns. Let's merge the next one, the State and Region Key. Now because we're in our New Merge, we can this time just select Merge Queries, we're going to go through the same process. So, we're doing the State and Region Key. So, let's select that table and load it up.

Let's scroll across. And this time, I'm going to use the State Column to link these 2 tables. I've got my green tick, let's click on Ok. And we do exactly the same thing. Let's click the 2 Arrows. The Field we want to merge is the State/Region Key and click on Ok. Let's double-click and just remove that first part, and hit Enter. And now, I can remove the State and the Region columns.

The next one we need to do is the Order Type. So, back to Merge Queries, let's select Order Type, and load that up. Let's link these 2 tables together. So, where is my Order Type? There it is. Let's select and select it in the Order Type table. Click on Ok, it's loaded up. And this time, all we want is the Order Type Key and click on Ok. Double-click to rename this column, and then I'm going to drag this across to where we have the Order Type which was towards the beginning of this particular table. So, let's drop that in. And now, I can get rid of the Order Type Column.

The final one we need to do is the Payment Type. So, again, up to Merge Queries, let's select Payment Type and load that up. Let's scroll across and find our Payment Type Column and link it to the Payment Type Column in the Payment Type Table. Click on Ok, let's click our Arrows, we only want the Payment Type Key. Let's load it up, double-click to rename this column, and then we can drag that across to where we have Payment Type. And I'm going to remove the Payment Type Column.

So now, I have a number of different columns linking through to much smaller Lookup Tables, which is going to make this overall Dataset a lot faster to interrogate. So, now my data is pretty much ready to import into Power BI. I'm not really going to make any further changes on this particular Dataset. So, at this point, I can now rename this query from Merge1, to Orders, and hit Enter. And we're now going to load all of these into Power BI.

Now remember, if you want to disable load for any of these tables, you just need to right-click. So, I don't really need to load the Order Prep Table because we have a newer updated version of that and it's called Orders. So, let's right-click on Order Prep, and just Disable Load. Now, I can click Close and Apply and it's going to load up all of those tables. So, now I can see those tables loaded over on the right-hand side. The next stage is to check the Relationships and then create a Date Table for this Report to use.

Video: Creating a Date Table

Deb: So, now that we have our tables loaded into Power BI, it's time to jump across to Model View and check to make sure those relationships have auto detected correctly. So, let's switch across and see what we have. So, quite a lot going on here, I'm going to want to do some reorganizing.

Now I'm going to put my main table at the top here, which is my Orders Table, I'm just going to make that a little bit smaller. And then I have all of my Lookup Tables around the outside, this AutoDetect feature really does take out of this a lot of the hard work, because it's created all of the relationships for me based on those Key Fields. So, if I hover over this one, I can see it's linking from the Town and City Key in the Town and City Table, to the Town and City Key in the Orders Table. And that is a Many-to-One relationship.

Because there could be many Towns and Cities in the Orders Table, but it links through to one Town and City in the Town and City Table. And pretty much that applies to all of the rest of these. I'm linking by Order Type just here, by Payment Type just here, and by the State and Region just here. Remember, if you do need to make any additional changes, or you need to link tables together, it's a simple case of dragging and dropping the relevant fields. So, we're all looking good so far.

Now one thing I always advise you to do is create yourself a Date Table. If you don't create a Date Table, then Power BI is going to use its own internal Date Table to work out your dates. Now if I take a look at my data just here, I can see that the one column that I have that contains dates is this Order Date Column. Now currently, this is showing in Long Date format. And I don't really want that I would prefer a Short Date format. So, let's select it, up to this Formatting area, and a very simple case of changing it to Short Date.

Now this is the only Date Column that we have in this data. So, basically, I want to create a Date Table which breaks down this date, but I want that Date Table to be dynamic. I want it to pick out the first date that I have in this column, and the last date. And I want to construct my DAX formula so that when new data is added, I don't have to change that formula. So, it's going to be a dynamic formula. So, let's create ourselves a Date Table and then mark it as a Date Table so Power BI knows I want to use that one, and not its own internal Date Table.

So, for this, we jump up to Table Tools and click the New Table Button. So, now effectively, we have a blank table, a blank column just here and our cursor is flashing in that formula bar. So, we now need to use DAX to populate our Date Table. So, the first thing we need to do here is give our Date Table a name, and I'm going to call it Dates.

Now in this first column, I just want a big long list of all of the dates that I have in my Dataset. I want it to start at the minimum date, and end at the maximum date. And I want these to be dynamic so that if

anything new is added, I don't have to change anything. So, for this, we're going to use the CALENDAR Function. Remember, hit tab to select. And now we need to pick out the start date from our Dataset. So, we're gonna say Dates, we want to go for the year, and I want it to find the minimum date in my data.

Now I need to specify the column name that I'm referring to. So, my table is called Orders, and I can then use my Arrow Keys to select Order Date, Tab Key, to select. I'm going to close off Min, close off Year, press comma, I now specify the month and day. So, I want it to start looking January, the first, and the first day of the year effectively, and close off Date.

Now when I press comma, I now need to specify the end date. So, we're going to do exactly the same thing. We want to start with Date, we then want Year, but this time we're looking for the maximum year in our Dataset. We're looking in the Orders Table, Order Date Column, let's close off Max, close off Year, comma, and this time we're going to choose the last day of the year. So, the month will be 12 and the day will be the 31st and close off that CALENDAR Function.

So, now when I hit Enter, that column is going to populate with the first date that it finds in my Orders Table all the way through to the last day it finds. Now one thing I need to do here is just change this formatting, and we need to make sure that that is the Short Date.

So, now I have that first column, I basically want to break this day down into lots of different columns. So, let's start by pulling the year from this Date Column. So, let's create a new column. Remember, you always need to start with the name of the column, I want this one to be called Year, I'm then going to go straight into the YEAR Function, hit Tab. And the only argument required for this particular function is the date where we want to extract the year.

So, I'm going to find that in the Dates Table, which is the one that we've just created in the Date Column. Let's close that off, hit Enter, and it's going to pull out the year from this first column just here. Let's add another new column. This time I want to pull out the month number. So, for this, we're going to use the MONTH Function. Again, we just need to select the table and the column. So, again, we're using the Dates Table, the Date Column, close bracket, hit Enter. And now I have my month number. Let's add another new column because now I want to extract the month name.

Now for this, we need to do it in a slightly different way, we need to use the FORMAT Function. We need to specify our value, well we're going to find that in the Dates Column, comma, what format do we want? Well, we want this to be the month name, So, Jan, Feb, Mar. So, the format I want here is basically 3 characters for the month, and hit Enter.

Let's add a new column. And this time I want to extract the weekday number. And for this, we're going to use the WEEKDAY Function. Once again, we're going to use the Dates Table, the Date Column, but now we need to specify a return type. So, remember, you select this based on how you like your days to

be numbered. So, if Sunday is day number 1 for you, then you would select this first option. For me, I'm going to choose number 2, because Monday to me equals 1, Tuesday 2, Wednesday, 3, so on and so forth. So, let's go for 2, close the bracket, hit Enter, and now I'm going to get those weekday numbers.

Let's do another column, because this time I want the weekday name. This one we need to use FORMAT again. We want to use the Date Column in the Dates Table. And the format we want is DDD, which is going to extract the short day, and hit Enter. And there we go. And I can see that these tie together nicely. So, Saturday is weekday number 6, Sunday is 7, Monday is 1, so that is perfect.

Now this is pretty much good enough for a Dates Table, I could go through and add a conditional column like something like is this a weekend, Yes or No, like we did previously. But really, it is quite unnecessary if you're not going to use that Calculation in your Report.

So, if I was doing a Report where knowing whether it was a weekday or a weekend day is quite important, then I would add a Calculated Column in here. Now I'm not sure if I'm going to use that information just yet. So, we might as well add one because this gives us a good chance to practice a different type of column. So, let's add a new column. And basically, I want this column to let me know if this day is a weekend or a weekday.

So, we're going to call the column IsWeekend. And for this we need to use an IF Statement because it's a logical or conditional formula. So, we're going to say if our first argument is the logical test, so, if the weekday number in the Dates Table is greater than 5, if that is true, then it is a weekend. Remember, our weekend days are numbered 6, and 7.

So, if that's true, we want it to produce a result of Yes, it is the weekend. If that's false, we want it to produce a result of No, it's not. Close off the bracket, hit Enter, and that's going to populate and we can do a quick visual check here Saturday and Sunday is weekend, Yes. And the next 5 days are all No. So, now we have a pretty good Dates Table.

A couple of final things we need to do, we need to mark this as the Date Table that we want Power BI to use. So, for this, we need to go across to Table Tools, select Mark as Date Table, and then choose the Date Column. So, it's this column that we want to use, and click on Ok. So now, whenever we perform Calculations using dates, Power BI is going to refer to this table.

The final thing I want to do is jump across to Model View, because you can see here is our Dates Table. Currently, it's not linked to anything. So, we want to change that. Otherwise, we're going to come across some problems.

So, what I'm going to do here is link it to my Orders Table. And the field that I'm going to link it to is the Order Date field. This is the only Date Column that we have in this table, and it's basically what we

used to build this Dates Table. So, I'm going to grab Date, drag and drop it onto Order Date to create that Many-to-One, Link. Perfect. Now we have all our data. It's all linked and we have a Dates Table, it's time to start performing some DAX Calculations.

Video: Creating DAX Measures

Deb: So, before we start creating our DAX Measures and Calculations, let's create a quick Measures Table to keep them all organized. So, the first thing we're going to do here is jump up to Home and select Enter Data.

We're going to leave this table blank, but we are going to give it a name, and let's call this KPI Measures Table and click on Load. That's going to load that up in the right-hand Pane. If I expand, we have Column1 here, which is just a blank column. We'll get rid of that once we start adding in some KPIs.

So, the first Measure that I want to create here is just a Measure that does a count of all of the Orders. So, I'm going to right-click on my Measures Table and select New Measure, I'm going to call this Order Count. And now I'm into my DAX formula.

So, in order to get the Order Count, I basically just need to do a count of the Order IDs, because each order has a unique ID. So, let's go for COUNTA just here, which will count everything regardless of if it's a number or text in the column. And then I just need to select my table. So, my Order ID column is in my Orders Table.

So, if I type in Orders, I can then use my mouse to go down to Order ID, hit the Tab Key, close off the bracket, and hit Enter. And remember, you can always check to see if these are actually working by jumping across to your Visualizations page. And I always like to test this by using a Card. We can then drag the Measure onto the Card. And yes, I can see that that is about right. I know I have just under nine and a half thousand orders. So, that would be correct. Perfect. So, now that I have one Measure in this table, I can right-click on Column1 and just delete from the model.

The next Measure I want to create is just the Total Revenue. So, once again, I'm going to right-click select New Measure, we're going to call this one Total Rev, and this is going to be a straightforward SUM Calculation. And we're going to sum that Total Revenue column in the Orders Table. So, let's select Orders.

Now, incidentally, a point to note here, you don't have to start by typing in the table name each time and then using your Arrow Keys to find the correct column. If I know I'm looking for Revenue, I can type in Revenue. And that is sometimes a bit of a quicker way to get to that particular column. So, Orders Table Total Revenue, close the bracket, hit Enter. If I want to do a quick check, I'm going to use this Card again. Let's deselect Order Count and select Total Rev. And there we go, that looks about right.

The next Measure I want is a Sum of the Total Costs. So, maybe in this Report that I'm going to create, I want to compare the Costs to the Revenue. So, I'm going to right-click, create a New Measure. This one is going to be Total Cost. And this is basically the same thing. So, SUM, but this time, we're summing

the Total Cost Column in the Orders Table, close the bracket, hit Enter. Let's go back to our Visualizations page. Let's add another Card, I'm just going to copy and paste this one, and we're going to remove Total Revenue and add Total Cost. And there we go.

So, now that I have Total Cost and Total Revenue, maybe I want to create a Measure that's going to tell me what my profit is. So, effectively, the Revenue minus the Cost. So, let's right-click, New Measure, this one is going to be called Total Profit. So, what I can do here is I can actually use the Measures that I've already created within this Measure, because I have a Measure for Total Revenue, and I have a Measure for Total Cost. And I just want to minus one from the other. So, this is using a Measure inside another Measure.

So, for this if I type in Rev, you can see at the bottom here, there is my Measure the icon is slightly different from when we're selecting a column. So, Total Revenue minus this time I'm going to type in Cost, there is Total Cost, hit Enter, and there we go. Let's jump back to our Visualizations. I'm going to Ctrl + C and then CTRL + V to create another Card. And this time we're going to use the Total Profit. So, this figure effectively should be the Total Revenue minus the Total Cost.

Now the actual value if you were to work this out on a calculator is 1.183240. But because we have this rounding up to Millions, that's why we're getting 1.19. But effectively, this Calculation is correct.

The next Measure that I want to create is I want to find out how many orders we've had from Males versus Females because this could be valuable information to me or my managers when it comes to determining the type of products that we're going to be selling next year. So, I'm going to right-click and create a New Measure. And this time, I'm going to call this Measure Male Customers.

Now for this, I need to use the CALCULATE Function. And the first thing I need to tell this function is what I want to calculate. So, I want to calculate the total number of orders effectively the Order Count. We're then going to add a Filter to say only count the orders if it was submitted by someone who was male.

Now again, in our Measures, we already have an Order Count Measure. So, I can use this as my Expression. So, if I type in Order, you can see it comes up at the bottom there, Order Count. And now I want to tell this formula, what my Filter is. So, my Filter is going to be where I have an M for Male in the Gender Column in the Orders Table.

So, I'm going to type in Gender, there we go, Gender Column in Orders Table, and that needs to equal an M, in order for this formula to count it. So, that is our first formula. Let's hit Enter. Now I'm going to do another one for Female Customers. And the formula is basically going to be exactly the same, we just need to change the name of the Measure, and also, change the M to an F. So, a quick way to do this would simply be to copy this formula, Ctrl + C.

I'm then going to create a New Measure, we're going to do Ctrl + V to paste that in, and we're just going to make a couple of changes. So, this needs to be Female Customers. And this time, our Filter is where the gender equals F for Female, and hit Enter. If I go back to my Visualizations now, and let's add a couple more so Ctrl + C, Ctrl + V. And let's do another one Ctrl + C, Ctrl + V. And this time, I want this one to show the Male Customers, and this one the Female Customers. And there we go, I can see that breakdown.

And because we know that the Order Count is equal to 9356, if I add both of these up, it should equal the total. So, these are little checks you can do as you go through to make sure that your Calculations are working correctly.

Now, the final Measure that I'm going to create at this stage is one that's going to show me the Running Total for the Profits year on year. And for this, I'm going to use a Quick Measure. So, let's click on the Quick Measure Button.

And remember, this is basically like a set of templates for common Calculations that you might want to perform. So, I'm going to go straight down to the Totals section. Because this is the one I want to use, I want to see the Running Total for each year. So, let's select Running Total, I now need to define my Base Values and my Fields. So, my Base Value is basically the information I'm interested in. So, I'm interested in the Total Profit here.

Now if I expand my KPI Measures Table, I have a Measure created which calculates the Total Profit. So, let's drag and drop that into Base Value. Now I want to see the Running Total of the Profit over the Years. And remember, these years are going to relate back to the dates that I have in my Orders Table.

So, the Field that I kind of want to base this on is the Dates Field. So, I'm gonna expand my Dates Table, grab the Date Column, and drop that into Field. And I'm happy to have this in ascending direction. So now, when I click on Ok, it's going to create that New Measure for me. So, if I scroll all the way down, it's kind of put it down here haphazardly in the middle; Total Profit Running Total in Date. So, really, I want to move this up to my Key Measures Table.

So, let's select it, and let's jump up to our Measure Tools and where we have Home Table, and currently it's in the Orders Table, I'm going to select the Dropdown and we're going to move that to the KPI Measures Table. And that's just going to pop that up to the top with all of the others. So now, let's test this. Let's jump across to our Visualization, this time, I'm going to add a table, and let's grab the Year Field and put that in Values. And then I'm going to grab my new Quick Measure. Let's drag that into Values as well.

So, now I get this little table and I can see the Running Total from the year 2000 to 2021. And basically, a Running Total would just add on to the Current Total, the previous year's Total. So, effectively 169644.80 is the total for the year 2001 and 2000 added together. So, I think we are done with Measures for the time being. It might be when I start to build my Report that I find that I need other Measures to represent the data that I want. But for the time being, these are enough to get us started.

Section 10 – Adding a Report Title

Video: Adding a Report Title

Deb: So, now it's time for us to move into the Design section of this course. And really, when it comes to designing Reports, you're pretty much free to do whatever you want.

So, the way that I'm designing my Report isn't necessarily how you have to do yours, it's really down to personal preference. But I'm going to show you some very quick techniques that are going to enable you to build a really nice looking Report. And we're going to do this step by step. And in this first lesson, I just want to show you how to add a Report Title.

So, you can see up on the screen now exactly what we're going to recreate. And this is just a very simple Report Title. It just says Overview Sales Analysis Report, we have some Shapes in here, we have a little Icon, and if you also notice at the bottom, I've added a few different pages. So, currently, I'm clicked on the page labeled ALL, but then I have 4 other pages, which are going to display the data for those specific years. So, let me show you how I created this.

So we're starting back at the beginning, we're on our Report page. And as you can see, at the bottom, I've already renamed this page to ALL. So, what we're going to do now is just add 4 more pages. So, I just need to click the plus, click the plus again, and carry on clicking until I have all of the pages that I need.

Now it's a simple case of right-clicking and renaming the page. So, this first one will be for 2017. The next one for 2018, the next one for 2019, final one is going to be for 2020, and let's jump back to the ALL page. So, on this page, this is where we're going to display all of the data for all of the years. So, I'm going to add a Report Title.

Now the first thing I'm going to do here is I'm actually going to change the Wallpaper or the Page background. So, for this, just make sure that you click somewhere on the background across to Formatting, and remember, it's this Wallpaper section that you want to change not Page background. So currently, it's set to White, let's change this to a Light Gray Color. And I'm going to do exactly the same on all of these pages. So, let's go through and change that Color. Right, brilliant.

So, let's go back to the ALL page and build our Report heading our Report Title. So, for this, we're going to jump up to Insert, and we're going to be using the Elements section just here. So, the first thing I'm going to do is select the Rectangle tool. By default, that Shape is going to be Blue, and I'm going to drag it all the way out to the edge of the Report. And let's drag it up. And I think that's about the right size. Now if I go over to my Format Shape Pane, I'm going to change that Fill Color from Blue to White.

Now notice when I click away, this Shape actually has an Outline. So, I want to remove that as well. And all I need to do here is toggle the Outline off. Next, I'm going to go back to my Shapes, let's add another Rectangle. And this time, I'm just going to make a Square Shape that kind of fits into this area up here. So, you can always use those Alignment guides to get this exact, and I think that is about right. Let's now change the Fill Color. So, click on the Blue Shape, over to Fill, I'm going to click the Dropdown, I'm going to make this a Dark Green.

And what I want to do here is basically add a little Icon. Now Icon Sets aren't included in Power BI, but you can download Icons from websites like The Noun Project, you can even use PowerPoint Icons. So, if you open up PowerPoint and insert an Icon, you can right-click and save that Icon off to your local drives, and then use it in your Power BI Report.

So, I already have one saved off, so I'm going to use my Elements group again and jump across to Image. There is the image that I'm going to use. Let's select it and click Open. There is my image, let's resize this using the handles and make it a little bit smaller. I'm going to hold down Shift as I drag this in, and then I can place that on top of this Green Square.

If you need to make very minor adjustments and you're struggling to do that using your Mouse, remember you can use your Arrow Keys. Now I'm going to make this very slightly smaller so it fits nicely in the center. The final thing I want to do here is add some Text. So, for this we're going to use the Text Box.

Now I want two Text Boxes here. The first one is just going to say Overview. And I'm going to apply some formatting to this. So I'm going to keep it on this font, but I'm going to take that up to 16 points and make it Bold. I'm going to click the Font Dropdown, and let's change it to this Teal Color. Now, all I need to do is resize this Text Box. I'm going to drag that in, and I don't really want this White background.

So again, over to the Format Text Box, and we're going to turn off the Background, and then drag that up into position. So now, I want to add another Text Box. And again, the easiest thing to do here is simply Ctrl + C, Ctrl + V to make a copy of your Text Box. And then I can just modify the Text in here. This is going to be a bit longer. I want this to say, Sales Analysis Report. Now I want to make this a little bit smaller. So, let's take this down to 14, and I'm going to turn off Bold as well.

Once I've done that, I can then move that into position. And remember, if you want to make minor adjustments, you can just use your Arrow Keys. Now I'm going to select both of these Text Boxes, and I'm going to group them together. So now, they're effectively one object, which means I can move them around in one big block. Perfect. So, now we have our Report Title. So, I'm basically going to do this on all of the pages. And to differentiate the different pages, I might decide to maybe change the Icon or maybe change the Color of the Background Square or Font. Again, these decisions are really up to you.

But a quick way to get this across all of the pages is to group everything together using the Selection Pane. So, if we go to the View tab, and open up the Selection Pane, this is going to show us all of the objects essentially that we have on this Report page. And because I have them grouped, I can see here they're called Group1.

Now, what I can do here is make this a bit more meaningful by giving them better names. So, I'm going to call this Title, this image here is that Chart Icon. So, I'm going to double-click and call this Chart Icon. This Shape just here is that Green Square, so let's call it Green Square, so we know what we're dealing with.

And then the final Shape, just here is the Title Background. So double-click, and I'm going to call this Title Background. And what I can also use this Selection Pane for is moving Elements around changing the layer order effectively, or I can use it to group everything together.

So, if I hold down Shift and select everything in this Selection Pane, it's going to select all of the Elements that I have on my page. And now effectively, I can right-click, go to Group, group everything together, and now I can copy and paste these across the other pages in one big block.

So, Ctrl + C, let's jump across to the 2017 page, Ctrl + V to paste. And I can just do exactly the same on all of these pages. Now if I go back to 2017, I might want to change this Title, or maybe the Colors of this Green Square. Now remember, if you want to go back to editing individual Elements, you're going to have to ungroup everything first.

So, I'll just show you this first example, and then I'll leave you to do the rest. So, I'm going to change the Text here, and I'm going to change this to 2017. I'm going to leave it on Sales Analysis Report, but I am going to change the Background Color of this square. Now when I'm clicked on this Green Square, it looks like I am actually clicked on it. But if I take a look in the Selection Pane, I can see that I'm actually clicked on the Chart Icon.

So, this is why I like to have this Pane open because sometimes what you're actually clicked on isn't what it looks like on the page. So, let's select Green Square. Now I'm going to change the Fill Color from a Green to let's do a Blue Color, and there we go. And then I might decide that I want to change the Color of the Text to match that new Icon. So, let's do a Dark Blue. And the same for the subheading as well, and there we go.

So, I'm gonna go through the rest of these off camera and just change the Background Color of the Square and also the Text. So, join me back here in a few moments. And there we go, we now have some really nice looking Report Titles. Join me in the next lesson where we'll continue building this Report.

Video: Add Navigation with Buttons and Bookmarks

Deb: So, what we're going to do next is we're going to add some Navigation to our Reports, so the user can interact with the Report easily and efficiently. And the way that we're going to add Navigation is by using Buttons, and also Bookmarks.

So, effectively, what I want to be able to do here is I want to add some Buttons to this Overview page for each of the years. So, I want one Button to say 2017, 2018, 2019, and 2020. And when the user clicks on this Button, it's going to jump them to the relevant page in this Report. So, a really nice way of adding interaction.

Now, the way that we do this is by using Bookmarks, and you might be familiar with Bookmarks in an application like Word, it's kind of similar in many ways. Effectively, what we need to do here is go to all the pages that we're going to link to, for example, this 2017 page, add a Bookmark, and then we can create a link from the Button to the Bookmark, which will effectively jump us across to that page. So, the first thing we want to do here is we want to add a Bookmark to each page in our Report.

So, currently, I'm clicked on ALL and for this, we need to go up to the View menu and into Bookmarks. And that's going to open this Bookmarks Pane on the right-hand side. Currently, we don't have any Bookmarks. So, let's add one. And this is going to be a Bookmark on the page ALL. Now I'm going to rename this Bookmark by double-clicking and just changing it to ALL. Let's move across to the 2017 page.

Let's Add another Bookmark, double-click, and call this one 2017. Let's move across to 2018, Add a Bookmark, double-click, 2018. You can see where we're going with this. Let's move across to the 2019 page, Add a Bookmark, double-click, 2019. And the final one, let's go to 2020, Add a Bookmark, double-click, and 2020. Now one important thing to note here about these Bookmarks, if you click the 3 dots, notice that you have Data, Display, and Current Page selected.

And that is because Bookmarks do a lot more than just assist you with Navigation. And if you have Data and Display selected for your Bookmark, when you click on that Bookmark, it can start to mess with things like Filters in your Report. The only thing we want to use these Bookmarks for in this particular instance is Navigation.

So, we need to make sure we go through and deselect Data and Display. And this is a really important step or you're going to find that you do run into a few different problems. So, let's just quickly go through and deselect Data and Display from all of these. And the final one here, for 2020, like so. Okay, so we have our Bookmarks assigned to each page. Let's go back to ALL. Now, what I want to do is I want to add some Navigation Buttons.

So, for this, we're going to go up to Insert, into Buttons, and I'm going to choose this Blank Button at the bottom. And the reason why I like Blank Buttons is that I can just fully customize them to suit my needs. So, let's go for Blank. It inserts a little Blank Button just here. I'm going to move it down. And let's resize it so it is a similar size to that Green Square above. So, I think right there will do. Let's apply some formatting to this Button. So, let's add a Shape Fill. Let's turn this on.

And the cool thing about this is that you can change the Shape Fill depending on the state of the Button. So, Default state, which is what you see on the Report, the Fill is White. But I could choose to change the Fill Color when the user hovers the Mouse over the Button, when they press, or when it's disabled. So, my Default state is going to be White, but on the hover, I want the Button to change to a Dark Gray Color, and I want the Text to change to White.

So, I want to make sure I select On Hover here as well, and the Font Color is going to be White. So, let's just test that out. If I hover over, it changes to that Dark Gray. I currently don't have any Text in here. So, let's add some. Let's click the Button again, go down to Text and the Text is going to say ALL. And once again, you can come in here, and you can modify the Font Color, whatever you want to change.

Now notice that when I hover over because I selected White Text for the Hover state, it's changing to White. So, a really nice little effect there, which helps users see what they're clicking on. Now, I might want to add in another state here. So, maybe once they've clicked on it, I want the Button to change Color again. So, let's go back up to Fill, and change this to On press. And this time, I want the fill to be that Dark Green Color, and the Text is going to be White. Perfect.

So, I think I also want this Text to be a little bit bigger. And the cool thing here is that you don't have to change it for each state. If you just change it for one of them, so in this case the Default state, let's take it up to 14, that's going to change it for the On Hover state, and also the On Press state as well. So, that's looking pretty good. Not a big fan of that thick Border around the outside. So, let's change that as well.

Let's see what it looks like with the Outline off, not too bad, but I think I do actually want an Outline. I just don't want it to be quite as thick. So, we'll leave it on Dark Gray. And I'm going to take the Outline Weight down to 1. And there we go, we have a nice clickable Button. So, now that I have this, I want one for all of the other years as well. So, again, instead of creating these Buttons from scratch each time, we're just going to copy; Ctrl + C, and paste, and then we can drag that into place underneath.

All I need to do now is basically change the Text label. So, let's click on the Button, let's go to Text, and we want this one to say 2017. And we're going to repeat this process Ctrl + C, Ctrl + V, drag it down. Let's go to Text and change that to 2018. I'm going to do two more, Ctrl + C, Ctrl + V, drag down 2019. And then finally, Ctrl + C, Ctrl + V. Let's drag that down, and change the label to 2020. Perfect. Those are my Report Buttons. So, now we have these looking as we want them to look, we need to link them to the Bookmarks on the various different pages.

So, let's click on this first one, which is essentially just going to stay on this page. So, over in the Format area, all the way at the bottom, we have an Actions menu. So, we want to add an Action to this Button. And this is where you go to link your Button to the different pages. But remember, we're linking to a Bookmark. The Bookmark we're going to link this one to is on the ALL page, and I could add a ToolTip here as well. So, maybe; 'Click to jump to ALL'.

So, now when I hover over this Button, you're going to see that ToolTip. So, all of these little things really help the users, it guides them through your Report Navigation. Let's go to the next Button. Let's turn on Actions, we're going to link this to a Bookmark again. And the Bookmark we're going to link to is 2017; 'Click to jump to 2017', and hit Enter. And what I'm actually going to do here is I'm just going to copy this Text so I don't have to keep typing it each time. Go to the next one, turn on Actions, link it to a Bookmark, we're going to link it to 2018. Ctrl + V to paste in our ToolTip, and just change that to 2018.

Let's do the final two, turn on our Actions, link it to a Bookmark, the Bookmark this time is 2019. Add ToolTip, let's change that to 2019. And then the final one just here, let's link it through to our Bookmark, this time 2020, and our ToolTip will be for 2020, and hit Enter. So, now it's time to test these Buttons out. Now when you're clicking Buttons, you have to hold down the Ctrl key to get them to work.

So, if I want to jump across to the 2019 page, notice at the bottom, we're currently on ALL because we have the Yellow line underneath it. If I hold down Ctrl and click on 2019, it's going to jump me across to that page. And what I'm probably going to want to do is add these Buttons to all of these pages.

So, again, we can group these together. So, I'm going to hold down my Shift key this time and just select all of the Buttons, right-click, Group, and now I can do Ctrl + C. Go across to 2017 and paste them in, 2018 paste, 2019 paste, and I'm just pressing Ctrl + V here as I do this, and paste them in. And just test to make sure that those all work. So, that is how you can add Navigation Buttons using Bookmarks.

Video: Adding Card Visualizations

Deb: So, now it's time to start adding some Visualizations to our Report. And since the last lesson, I have made a couple of tiny changes to those Navigation Buttons. I decided I didn't actually like the border around the outside, the Outline. So, I've just remove the Outline, and I've also moved all of the Buttons a little bit further up the page so that they're directly under this Icon.

So now, I'm ready to add in my high level Overview statistics. So, these are the statistics that I want on every single page, which basically gives me an overview of some of the key metrics that we're interested in. And I'm going to do this using Cards. And you've seen how we can use Cards in previous lessons. So, this should be reasonably straightforward.

Now if I go across to my Fields, I'm going to be using the Measures that I've created to create a few Cards. And I'm going to place them at the top here where we have Overview and Sales Analysis Report. Now these Cards are going to differ on each page. Because on this first page, I want them to show all of the years, on this page, I want them to show just the information for 2017, 2018, 2019, so on and so forth. So, we need to do a little bit of filtering on these other Report pages.

But let's deal with ALL first of all, because this one is going to be the most straightforward. So, the metrics that I want to display at the top here are going to be the Order Count, the Total Cost, the Total Profit, and the Total Revenue. And so, let's add our first Card Visualization, and it's this one just here with the 123 Icon. Let's click to add.

Now your Visualization will always resize itself to the width or the length of the longest item on your page. So, for me, that is this White bar at the top. So, let's resize this because we definitely don't want the Card to be that big. I'm just going to drag that to there. Now this is a very simple case of dragging and dropping the Measure onto the Card or into this Fields area.

So, the first thing I want to display here is the Total Order Count how many orders we've had. So, I'm going to drag and drop that to Fields, and that's going to display my Order Count. Now of course, we can do some formatting here. But what I'm going to do is add all my Cards first, and then we're going to format them. So, that's the first Card.

Again, a nice quick way of adding another one is to just copy and paste Ctrl + C, Ctrl + V, and then we can just switch out the KPI that we're using. So, let's deselect Order Count. And this time, we're going to show Total Revenue. Let's do exactly the same Ctrl + C, Ctrl + V. For this Card, I want to show the Total Cost; Ctrl + C, Ctrl + V. And for this Card, I want to show the Total Profit.

So, now that we have these metrics, we can now start to format them. Because currently, these are way too big, I want these to go up here in this Title area. So, let's first start by resizing. And you can see as I

do that, I kind of lose some of the Text. So, we need to resize the Text within this Card. So, let's go across to Formatting, and let's expand Data Label. Now the Data Label basically refers to the number that you see here.

So, what I'm going to do is I'm going to change the Color of this number to a Green to match the Theme, I can then choose how I want to display the unit. So, this is just a simple count. So, what I might want to do here is change this to Thousands, which gives me 9k, Millions, Billions, or Trillions. So, it depends how granular you want to be here. Do you want people to see the exact figure or kind of what it's nearest to?

Now I'm going to just go with None to display the entire amount. The Text size, now we need to take this down a little bit, because currently it is quite large. So, I'm going to take this down to 24 and see what that looks like. I think possibly we could go slightly bigger with this. Yeah, I think I'm gonna take that up to 30 for the time being, I may decide to change that at a later date. Let's scroll down and deal with the Category.

So, the Category is Order Count that you can see underneath. So, this name is going to be whatever the name of the Measure is. Now I'm happy to leave this Color on that Gray. But again, I do want to take this down and make it a little bit smaller. So, I'm going to take that down to 11 points. Now if you want to format this Category may be move it above the number, then there isn't actually an option in Formatting to do that.

So, what you would need to do here if you wanted to have a little bit more control is turn off the Category, and then you could use a Text Box to add your own Title. Now just for this demonstration, I'm going to turn Order Count on. So now, I want to resize this entire thing. And again, I can see that it's still not quite fitting correctly. So, I'm probably going to want to adjust my Text size. So, let's take this all the way down, and there we go. I think that will do for the time being.

So, once you have your formatting set for one of the Cards, instead of having to do the same for all of the others, we can simply use our Format Painter to apply the same formatting to the other Cards. So, let's select the Text Box, up to Home, and select Format Painter. Now all I need to do is click on the next one, and it's going to make it look exactly the same, which is perfect. Format Painter click, Format Painter, click. And then all I need to do is resize these boxes.

So, let's resize this, let's drag it up and make that a little bit smaller like that. Let's do the same thing here for the Total Cost. Let's drag it up, and also drag it in. And the same one just here, let's do that, drag it up, and drag it in. And of course, remember for some of these other numbers, if you want to change these to Thousands, Millions, Billions, then just jump back into Formatting and underneath Data Label, you can change the Display Units here. So, I could choose to display this as Millions.

In fact, I think that does look a little bit better. Let's go for that. And for this one, I think I'm going to display this as Thousands. This one, I think this needs to go to Millions as well, yes, it does. So, change the formatting accordingly. Now another little tip here, if you want to make sure these are spread out nice and evenly across the width of your Report, what you can do is just arrange them roughly to where you want them to be. So, I want this one to be more towards the end.

And then you can select all of them and use your Alignment tools. So, if we go to Format, and Align, if I choose Distribute Horizontally, it's gonna space these nice and evenly across the top of your Report. And then if I want to go a bit further here, I might want to add some nice little Design Elements. So, for example, I might decide I want to add a Shape, and I'm gonna go for a Rectangle just here.

Once again, I'm gonna get this big Blue block, let's make this a lot smaller, and I might decide just to have one of these separating each of those different Cards. So, once again, let's go across, I want to change the Fill Color, and let's change this to that Teal-y Blue Color again. So, let's go for something like that. And I don't want an Outline on this either. So, let's turn the Outline off. Now I'm simply going to Ctrl + C, Ctrl + V, and add one of these next to each of these Card values.

And again, you don't necessarily have to do this, but these little things do make your Report look a lot nicer and a lot easier for people to read. So, these Cards are currently referring to all of the data. So, that is the Total Order Count across all years, and the same for Rev, Cost, and Profit. What I'm going to do here is I'm going to copy these Cards, and also these lines.

Now for this because we have quite a few things, I'm going to use the Selection Pane. And I'm going to select all of the Shapes just by holding down my Shift key and all of those Cards. And we're going to group them together. So, now that one big block, Ctrl + C to copy, let's go across to 2017, Ctrl + V to paste. Let's paste it on all of these different pages. And then we can go in and we can change our Filters. Perfect. So, let's go back to 2017, let's deal with the formatting changes we need to make first of all.

So, we're going to ungroup the Elements because I want this to match my Theme. So, here I have Blue. So, I'm going to select these bars first of all, and we want to change that Fill Color to a nice Blue. And then we're going to go through and we're going to change the Font Color to Blue as well. So, into Formatting, we want to format the Data Label, we want this to be Blue, and also we want the Category, let's make that a slightly Darker Blue, like so.

So, once we have this, we can then copy that formatting across to the others. Now remember, if you are copying and pasting Formatting, then sometimes that can change the Number Formatting that you've applied. And you can see that that's happening just there. So, I'm gonna go back through and just change the Data Labels to reflect the correct Display Units. And there we go. So, I'm going to go through and I'm going to change the Formatting on each of these pages. So, join me back here in a couple of moments.

So, the first thing we want to do here is we want to apply some Filters so that we're just seeing the relevant information for the page. So, on this ALL page, we don't need to do anything here because we want to see all of the data summarized.

However, if we jump across to 2017, we only want the Cards to show the relevant data for the year 2017. So, this is where we need to apply some Filters. So, let's expand out our Filters Pane. And I'm going to use the Year Filter from my Dates Table. So, let's grab Year, and drag it into Filters on this page.

And the first thing we want to do here is change the Filter Type to Basic Filtering, and we can then go through and select the year we're interested in. So, in this case, 2017. And you'll notice that all of those figures now update. Now it might be that once you change these, you want to then change the Number Formatting because Total Revenues, 0.07 Million, not particularly useful.

So, let's click, let's go into Formatting, we're going to expand Data Label, and we're going to change the Display Units to Thousands. And I'm going to do the same here for Total Profit. Let me show you that once again for 2018, and then I'll leave you to do the others yourself. So, for this one, we're going to expand the Filters Pane. Again, we're going to drag Year onto the Filters on this page, change it to Basic Filtering, and this time, we're only interested in data that relates to 2018.

And once again, I'm going to change some of these. So, let's change this Data Label to Thousands, and also the Total Profit needs to go to Thousands as well. So, that is it, pretty straightforward. I'm going to go and apply this same setting to 2019 and 2020, and then I'll see you in the next lesson.

Video: Creating a Line Chart

Deb: So, the next thing that we want to add to our Report is a Line Chart. And Line Charts are great for displaying time-based data. So, if you want to see how a metric has changed over time, or if you want to compare two different metrics together over years, months, weeks, then Line Charts are great for that.

So, we're going to add a Line Chart that shows us how many Female Customer and how many Male Customers we've had over the year. Because this type of metric can help us make better business decisions. Maybe I'm trying to decide what type of product I want to stock next year. And if I notice that we're getting an increasing number of Female Customer Customers, maybe I want to stock more products that are aimed at Female Customers.

Now, the way that we do this is going to be slightly different on the ALL page, as opposed to the different year pages. On the ALL page, I'm happy to see a Line Chart that compares Female Customer to Male Customers year on year. Whereas on the other pages, I want to specifically look at that year. And it's going to be more beneficial for me to see the trend over the months of that year. So, let's start out with our first Line Chart on the ALL page.

I'm going to go to Visualizations and select Line Chart. Again, it's a little bit too wide so let's make this smaller. I'm going to move it up to here, and kind of position it where I want it to be. So, let's do something like that for the time being. Now I need to add in my Fields. So, the first thing I'm going to do here is I'm going to grab the Year Field from my Dates Table, and I want this to run across the horizontal Axis at the bottom. So, let's drop it into Axis. What values do I want to display on this Chart?

Well, I want to display Female Customer vs Male Customers. And I have Measures for this setup already. So, let's grab Male Customers and drop that into Values. And then let's grab Female Customer Customers and drop that into Values as well. And you'll see as soon as I do that, it automatically adds a Legend for me. So, what can I see here? I can see we have a sharp drop off around 2020, and I'm going to say that that is because of the pandemic, sales in general have been down.

So now, I can do a little bit of formatting on this Chart. So, let's jump across to Formatting, and you can see here that I have some warning symbols next to the Legend, the X and the Y Axis. And if you see this, if you hover over, it says; ‘The visual is responsive. To return the Legend font to its original size, enlarge the visual’. So, it's basically telling me that my Visual isn't quite large enough. So, as soon as I take that up a little bit more, those warning symbols disappear.

Now for this, I do want to keep the Legend so we know what each of those series mean. Let's go to X Axis. Now I don't think there are too many changes I want to make to the X Axis. What about the Y Axis? Now I'm fairly happy there as well, I don't want to change any of the Font Sizes. So, let's just leave that one be.

Data Colors, now this is something I do want to change so that it matches with my Theme. So, Male Customers are going to be the Dark Green, and then Female Customer Customers, let's do a contrasting Color. Let's do a Yellow. Now, Data Labels, what happens if I turn these on? Well, it's going to give me the values at each of the points on that Line Chart.

Now that looks a bit chaotic to me, so, I'm going to turn that off. Let's go down to Shapes, because this is where I can define if I want to show any Markers. And if I turn those on, I'm going to get those Markers on my Line Chart. I actually quite like those, because they pinpoint the years quite nicely. I can also define my Marker Shapes. So, if I don't like those Circles, I could change it to something else. I can change the Marker Size and even the Marker Color.

Now I'm not going to change the Color, I'm quite happy with how those look. And one cool thing I could do is if I turn on Stepped, instead of Lines, it's going to show me that kind of Stepped Layout for those values. Now I'm going to turn that off, but just be aware that that is in there. Now what else do I want to do in here? What about these Titles? We can see currently I have Male Customers and Female Customer Customers by Year at the top just here.

Now if you want to leave that, that's absolutely fine. I'm going to turn mine off because I'm going to add a Text Box for this instead because I have a bit more control over the format. Now one thing I do want to change is I do want to change this Y Axis Title because it's a little bit long and it's going off of the page. So, instead of trying to find this option throughout these Categories, I'm simply going to use my Search and type in Axis title. And there we go.

So, now I can change the Y Axis Title. So, I'm going to call this Male vs Female Customers so that that fits on a little bit better. And there we go. I'm pretty happy with how this Line Chart looks. So, now that we've done this one, I'm going to copy it. Let's jump across to 2017, Ctrl + V to paste it in. Now we need to make some changes just here. Because remember, this whole Report page is filtered to show information just for the year 2017.

So, currently, look at my Line Chart, it has 2017 and then we just have two points, so, it's not really displaying correctly. So, what I would rather have here is to show the trend over the months of 2017. So, what we're going to do is we're going to remove the Year Field from the Axis, and we're going to replace it with the MonthName Field. And now I can see that trend over the different months.

Now, one point here, that's really important to know, notice that my MonthNames are not in order, they don't start at January, they're currently starting at March. So, what we're going to do here is we're going to click on the Visual, we're going to click the 3 dots, and we're going to say Sort Ascending. We're then going to go back into those 3 dots and say Sort by MonthName. And that's going to order those months correctly.

So, now that we've done that, we can go through and we can apply some formatting. And there's not a great deal that I need to change here, but I am going to change those Data Colors just so that they match this particular page. And Male Customers are going to be a Dark Blue, and our Female Customer Customers are going to be a Lighter Blue Color. Let's do it one more time, Ctrl + C, jump across to 2018, Ctrl + V to paste. And simply, all we need to do here is just change those Data Colors.

So, we're going to do a Dark Orange for our Male Customers and a Lighter Orange for our Female Customers, and that's pretty much it. So, I'm gonna go through and I'm going to do exactly the same for 2019 and 2020.

Video: Stacked Column Chart

Deb: So, in the last lesson, we added some Line Charts into our Reports to show the count of Male vs Female Customers. And since then I've done a small change. If you recall, I turned off the Titles for all of these Charts because I wanted to add my own using a Text Box. And the reason why I like to do this is just because it gives me a little bit more formatting control over that Title.

So, what I've done here is I've added my own Title, and I've just added this simply using a Text Box and changing the Background Fill. So, we have one for all years. And if we go across to 2017, and then 2018, you can see how they differ. So, now that we have these Line Charts, it's time to add our next Visualization. And the next one we're going to add is going to be a Stacked Column Chart.

And this Stacked Column Chart is going to show me the Total Revenue per Region. So, over to the Visualizations Panel, and it is this one here that we're going to use, the 100% Stacked Column Charts. So, let's click to add. So, this is fairly straightforward, we want to display the Total Revenue by Region. So, I'm gonna go to my KPI Measures Table, there's my Total Revenue Measure, let's drag and drop that into Values. And then what I want to do is break this down by Region.

So, let's go down to our State/Region Table, and I'm going to grab the Region and drag that into Legend. And there we go, we can now see we have Midwest, Northeast, South, and West. So, really nice and simple. Now, I'm going to want to do some formatting on this, as always, let's jump across to Formatting. I can see here I've got those warning symbols again, so I do need to make this a little bit bigger. There we go.

And the first thing I'm going to do here is turn off that Title, because we're going to create our own. Let's go to our Data Colors and change these because currently, they don't really match my Theme. So, for Midwest, let's go for that Green Color, for North East, let's go for Yellow, and then I think I'm going to do a Blue Color for South, and then finally, an Orange for West. And another thing I'm going to do here is I'm going to display the Data Labels on the Stacked Column because this makes it super clear what the breakdown of those percentages are.

Now another little effect you can add to these Data Labels is you can choose to show a background. And you'll see if I do that, I kind of get this little shaded transparency. And you can change that Color if you want to. And you can even make them less transparent by dragging that slider. And sometimes that can look quite effective. So, I think I'm going to leave those on and set the transparency to 64. And the final thing I'm going to do here is just resize this so it's a bit smaller.

Now that I've resized this, this column has actually got a lot thinner. And I would like that to be a little bit wider. So, what we can do here is go to X Axis, and if we scroll down, we have a little setting here for Inner Padding. So, what I'm going to do here is I'm going to take this all the way down, and just

make that column a little bit wider. And the final little change is I'm going to remove the Region label on the Legend.

So, for this, we want to expand Legend and I can just say Title Off. And I think that looks pretty good. So, now I can do exactly the same, I can grab this Chart, Ctrl + C, go to the next page, Ctrl + V to paste that in. And remember, we don't need to do anything to tell this Chart that we only want to see the data for 2017, because we have our Filters automatically applied to this page. Again, the only things I might want to do here are change the Colors so that they match the Theme of this page.

So, let's quickly do that and then I'll leave you to do the others yourself. So, let's jump into Data Colors. And for this one, we've kind of got a Blue Theme going on here. So, let's do a Dark Blue, let's do a Lighter Blue. In fact, we're going to make all of these a Blue Color, and there we go. It's as simple as that. So, I'll leave you to copy these across to the other pages.

But one thing I will show you before we leave is I'm just going to add another one of these Titles. So, let's go back to the ALL page and I'm just going to move this down and get it out the way. I'm going to grab this Text Box, Ctrl + C, Ctrl + V to copy, and I'm going to move this and make it a little bit smaller. We basically want to make it the same width as the Chart underneath.

Now I'm going to drag this Chart up very slightly so that everything matches nicely. And you might want to change the Color of the heading, I'm not going to in this case. So, this one is showing Total Revenue by Region, and we'll just put all in brackets. Let's apply some Formatting.

So, we're going to change this to White, we're going to make it Bold, and we're going to make that slightly bigger. Let's take that up to 11. So, really straightforward to add in those Text Boxes. That's pretty much it. I'm going to go away and I'm going to copy this Chart across to the other years and make the same customizations.

Video: Treemap Chart

Deb: The next Visualization that we're going to add is a Treemap Chart. And what a Treemap Chart does is it shows some Tiles and the size of each Tile is dependent on the value. So, for example, maybe I want to create a Treemap Chart which shows the number of sales, the Order Count effectively, by Year. So, the size of each year's Tile will be determined by the number of orders. So, let's take a look at how we might do that.

So, I'm currently clicked on the ALL page, I'm gonna go to my Visualizations, and it's this one that we want just here, the Treemap, let's drag this down so, we can see it a bit better. I'm going to make this a little bit wider. So, now we just need to add our Fields. And the first Field we need to add is basically what we want to group by.

So, I want to see the number of orders by year. So, my group is going to be the year. So, across to my Dates Table, let's grab Year and drag that into group. Now I need to provide some values. So, I want one of my Measures, which is the Order Count, and let's drag and drop that into Values, and now you can see what we get. So, each Tile is a different size based on the value contained within.

Now we'll say with my data, a lot of these values are very close together, which is why we have a lot of Tiles which look like they're pretty much the same size. But if we hover over we can see in the ToolTip, for example, 2020 has 450 orders, whereas 2019 has 471. So, the difference between some of these isn't large enough to make a real impact on the size of the Tile. So, just bear that in mind.

This can work really well with certain types of data. However, with the data that we're using, it still gives a pretty good representation, and it's a really eye catching way to display data as well. Now, I think that I want this Treemap to be up here at the top. So, I'm going to do a little bit of rearranging. I'm going to select my Chart, and it's Title, and I think I'm going to group these together to make them a bit easier to move.

So, let's drag this down. And I'm going to replace it with this up here. Because I think that fits into that gap quite nicely. Now you could go through and start customizing all the Colors of all the different Tiles, I'm not going to do that I'm quite happy with how these look as they are. However, I am going to remove the Title or turn the Title off, because we're going to create our own Title.

So, once again, let's just grab one of these Titles, Ctrl + C, Ctrl + V, to copy it, and I'm gonna give this a different name. So, this time, we're showing the Count of Orders by Year. And again, I'm just going to put all in brackets. Let's make some changes to this. So, we're going to make that 11 and also Bold. And we want to make sure that that font is White.

Remember, you could use the Format Painter here to apply all of those formatting properties. So, now that we have that, let's move everything nicely into place. So, let's drag this one up to the top and drag our Treemap up just there. And we want to make sure that it's the same size, and there we go.

Now I'm going to copy this Visualization across to the other pages, because again, we have to do something slightly different here. So, much like with this Line Chart, if I'm looking at the 2017 page, I would rather see a breakdown of orders by month, as opposed to year. So, Ctrl + C, let's jump across to 2017, Ctrl + V to paste in. And you can see by default, because this whole page is filtered just to show 2017 data, that's all I'm currently getting in this Treemap.

So, we want to replace how we're grouping this data. So, instead of year, we're going to remove that I want to do MonthName instead. And what I should find getting here are all of those different months. So, let's do some rearranging once again. Going to group both of these together and move this little Stacked Column Chart out the way. Let's Ctrl + C, Ctrl + V to copy this heading and drag that across, and we want to change this Title.

So, once again, this is going to be Count of Orders by Month. Let's drag our Treemap up and position that underneath that heading. So, again, it's super straightforward. Now actually, come to think of it, one thing I might want to add on to here are some Data Labels so, I can see the actual Order Count on the Tile as opposed to just in that ToolTip. So, let's go back ALL, I probably should have done this first, but I forgot. So, let's try that again. I'm going to click on the Treemap, let's go into Formatting, and I'm going to display Data Labels.

Now let's format these a little bit, I'm going to keep them on White. I'm happy with the Display Units, but I think I'm going to make them a little bit bigger. So, we're going to make these quite nice and big, I'm going to take them up to 17 points. So, again, very straightforward. Let's do the same for 2017. Whilst we're here, let's jump into Data Labels, let's turn those on, and we're going to take that Text size up to 17.

And remember, you can just type it in. And these Data Labels are particularly good if you have data that's similar to mine where all of the values are very close together, and it's not as easy to see what that value is based on the Tile size. So, I'm going to go through and add this Treemap to the other pages, I will leave you to do the same.

Video: Funnel Chart

Deb: The next Visualization that we're going to add to this Report is a Funnel Chart. And a Funnel Chart is a great way of determining the distribution of values across specified criteria. So, maybe I want to see the distribution of Customer Age, because this in turn could help me make better business decisions for next year.

If the majority of my customers are within the age range of 20 to 30, then I might want to start stocking products that are more relevant for that age group. So, let's take a look at how we can add one of these Funnel Charts. So, we're gonna go across to our Visualizations Pane, and the Funnel Chart is this one just here. So, let's click it to add it in. So now, we need to define our Fields. And the first thing I need to specify here is what I want to group these distributions by.

Well, I'm interested in grouping together all of our orders by the age of the customer that submitted the order. So, if I go across to my Fields, and to my Orders Table, I have a Field here called Age in Years. So, I'm going to drag and drop that into group. And then in the Values area, well, I want to find out how many customers we have within each age group.

So, for this, I can use the Count of Orders or the Order Count Field. So, let's grab this from the KPI Measures Table and drop it into Values. Now currently, you can see that my Funnel Chart is rather busy looking, it's quite hard to tell from this exactly what we're looking at. So, instead of this very detailed breakdown, I might want to split the ages into different age buckets. So, maybe 20 to 30, 30 to 40, 40 to 50, 60 and above.

So, what we can do here is we can jump across to where we have the group Age in Years, click the Dropdown, and select New Group. And this will allow us to divide this data into different buckets or Bins, as they're termed here. Now you can see here, it's going to use the Age in Years, which is perfect. The group type is going to be a Bin I also have a List just here. And you can see it's picked up the minimum value and the maximum value in my Dataset.

So, all of my customers are between 21 years and 60 years of age. I can then choose the Bin type. So, how do I want to define this Bin size? I can choose the size of the Bins or the number of the Bins. Now I want to separate out my Bins into 10-year groups. So, I'm going to choose Size of Bins, and my Bin size is going to be 10 years.

The other option in here, Number of Bins, if I wanted a specific Number of Bins, so maybe 5, I could choose that, and then Power BI will distribute my customers based on the Number of Bins I've selected. But I'm going to do Size of Bins, click on Ok, and check out what has happened. So, running down the side here I have my different ages. And once again, you can see that these aren't ordered correctly, we have 40, then 30, then 50, then 20. So, I'm going to want to sort that out.

So, let's click More Options. We're going to keep the Sort in Descending order, but we're going to Sort by the Age in Years. And now, that looks a little bit better although I do want to swap this around. So, let's say Sort Ascending. So, there we go. Now these are ordered correctly. So, now I can see that I have 2,152 customers that are between 20 and 30. 2,330 customers that are between 30 and 40. And my largest group, so, this is really going to be my target audience is the age group of 40 to 50 with 2,559 customers.

So, now that we have our Funnel Chart, let's do some tidying up and some formatting. So, let's go across to our Formatting area, and the first thing I'm going to do here is turn off that Title. Now another thing I want to do is I'm going to change the Data Colors. So, let's click the dropdown, and I'm going to select this Green. And as for these Data Labels, well I want those to be a little bit more specific. So, let's expand this one, and we're going to change the Display Units to None. And that's gonna give me the exact value.

I want them positioned on the Inside Center, the other option I have here is Outside End, which for this I don't think looks too great. So, let's put those back into the Center. Another thing I want to get rid of is this 100% bar at the top and this 0.1% at the bottom, and that is this little Conversion toggle.

So, if we turn that off, it's going to get rid of both of those. So, this now looks a lot cleaner. And actually I think I'm going to change these bars to a different Color because our Title is going to be Green. So, I think we might have too much Green going on if we have the same Color bars.

So, let's change the Data Colors, and let's go for that Yellow Color in there. And I think that looks a little bit better. So, now that we've done that, we can add our title. So, let's Ctrl + C, and Ctrl + V to add another one of those. I'm going to drag this down and let's just position it just there. And then we can do a little bit of rearranging.

So, I'm going to make that the same size and possibly move that down very slightly, and there we go. So, now all I need to do is change this heading. So, this is Age Distribution of Customers. And that looks perfect.

Now I think I am going to move this in because this doesn't really need quite as much room. And there we go. So, now all I need to do is exactly the same as we've done before and copy and paste this across to the other pages.

Video: Matrix Table

Deb: The final Visualization we're going to add to our Report is a Matrix Table. And a Matrix Table just allows you to show multiple dimensions of data in a table.

So, let's jump straight into our Visualizations Pane, and we're going to choose Matrix. And I'm going to drag this over and just position it in the spare bit of space that we have just here. So, we're gonna put it about there, and let's drag the bottom of this down, and drag this in, and that fits perfectly.

So, basically, what I want to display in this table is I want to see how many orders we've had broken down by Order Type, Payment Type, and Order Status. So, in the rows, I'm going to grab the Payment Type Field, and I'm going to drag and drop that into rows. And you can see now we have Card, Cash, and Voucher. Then, I want to break that down further by Order Type. So, let's grab the Order Type Field, and I'm going to drop that down into rows as well.

And as soon as I do that, I get my plus symbols next to each, which means I can drill down into each of these items. I now want to add some columns. And for this, I want to see the breakdown by Order Status. So, I can see if that is Pending, Returned, or Shipped. And then finally, in the middle, I want to use my Count of Orders Measure, and I'm going to drag that into Values. And take a look at that.

Remember, if you want to expand all of these in one go, if we use our little Icons just above this one just here will expand it down one level in the hierarchy. So, now it's very clear for me to see this breakdown. Let's jump across to Formatting. Because one of the things I'm going to do here is I'm going to change the Matrix Table Style from Default to my preferred Table Style, which is Minimal.

And if I expand Grid, I'm going to turn on the Vertical Grid, I'm going to leave those Vertical Gridlines as that Light Gray Color. And I think I'm going to leave all of the Gridlines the Color they are, I quite like just that very faint Light Gray Color.

Let's go down to Column Headers. Well here, I can do things like change the Font Color, the Background Color. And I think for this, we're going to change the Font Color, let's make those a Darker Blue. And I'm going to do the same for the Row Headers. So, we're going to make those a Darker Blue as well. And I think that's all I'm going to do here. I don't really need to do too much fussing around with this one.

Now, whilst this table fits in perfectly into this allotted space, we do still need to add our Title. And because we're adding a Title, it means that we're going to get a scrollbar on this data, which I don't mind too much. So, let's copy Ctrl + C, Ctrl + V, and I'm going to drag this over. And we want to change this Title because this is now showing us Count of Customers by we'll just say Type and Status. So, let's just resize our Table down. I'm going to resize this little header, and move that into position.

Then we can move our Table up a little bit and also drag it down. And actually, you know what, that still fits pretty perfectly. I do have a scrollbar, but it's just a very small scrollbar on the side there. So, look at that, that looks beautiful.

So now, I'm going to copy this across to my other pages. So, let's click on the Table, let's click on that heading, we're going to right-click, we're going to group them together, Ctrl + C to copy, let's jump across to 2017.

Once we've pasted it in, we can ungroup the items, and then we can make the Formatting changes. So, for this, I'm simply going to change the Background Fill of this title. So, select any of the Titles, click on Format Painter, and that's just a quick way of applying that formatting.

And remember because this entire page has a Filter on it, I don't need to apply any additional Filters to see just the results for 2017. So, I'm going to go away, and we're going to copy this Matrix Table and that little heading across to all of the other pages.

Video: Adding Conditional Formatting

Deb: So, the final thing I'm going to do to this Matrix Table is I'm going to add some Conditional Formatting, so that my highest and lowest numbers really stand out from one another.

So, for this, we're going to open up the Visualizations Pane, jump into Formatting, and we want to expand Conditional Formatting towards the bottom. So, I'm going to apply two pieces of Conditional Formatting to this Matrix Table.

The first thing I'm going to apply is a Background Color. And this is going to shade the background of the cells according to the values contained within them. Now I'm gonna jump straight into Advanced Controls, because I do want to make some changes here. Now I want to format it lowest value to highest value. So, for my lowest value, let's change this Color.

So, I'm gonna go to More Colors, because I want to keep in with this Theme. So, we're gonna go into the kind of Teal-y Blue range. And let's go for quite a light Color, I'm gonna choose something like that. And then for my highest value, we're going to do a Darker Teal. Let's click on Ok. And now you can see what that looks like in the table. So, the Darker the Teal-y Color, the higher the value.

What I'm also going to add in here is some Icon Sets. So, let's scroll down and turn on our Icons. I'm going to jump into Advanced Controls, and let's change this to a different Icon Set. I think I'm going to go for these ones just here. Now remember, by default, because I've selected 3 Icons, Power BI is going to look at the data in that table and divide it into thirds and assign an Icon accordingly.

So, the lowest values, the ones within the lowest third are going to have a Red Icon, the ones in the middle third, a Yellow, and the ones in the top third, a Green. So, if I now click on Ok, it's very obvious for me to see where I've had my highest orders.

And again, this is just a really nice visual way of highlighting certain pieces of data. So, I'm going to go through and I'm going to add the same Conditional Formatting to my other Matrix Tables.

Section 11 – Publishing Reports to Power BI Service

Video: Publishing Reports to Power BI Service

Deb: So, those are my Reports pretty much finished. We've seen how to add quite a few different things, and we've got our Page Navigation at the side. Remember; hold down Ctrl to jump to whichever Report you're interested in.

Now, you'll notice that I haven't applied any Filters to these Report pages. And the reason why I haven't applied those is because we already have Filters applied to each of these Report pages. So, the ALL page is showing all the data. But then when we go to something like the 2016 page, we have a Filter set just here on the year to only display the information for 2017.

Now, I could still add some Filters on to this page. And if you want to do that just to practice, then, please feel free. However, I have my Reports Filtered pretty much how I want them to be Filtered. So, the only thing left to do now is to jump across to the Power BI Service, create ourselves a Workspace, and then publish these Reports to that Workspace. So, let's open up Power BI Service.

So, from the Power BI Service, if we click on Workspaces at the bottom, if you recall, we created our own Power BI training Workspace. Now I want to create another Workspace. So, let's go down and click the Button at the bottom. My Workspace, well, this is going to be the sales team, and let's add a quick description. Sales Reports 2017 to 2019, and click on Save. So now, when I click on Workspaces, I should see that Workspace underneath there, which I do.

If I then wanted to invite the sales team members to this Workspace, I just need to click on the ellipses, go to Workspace access, and then enter in their email addresses. So, now we have the Workspace set up, it's time for us to publish our Power BI Report. So let's go back to Power BI Desktop, let's click on the Home tab, and click Publish. I'm going to say Yes, I want to save my changes. And then I'm going to choose the Sales Team Workspace, and click on Select.

So, Power BI is now going away, and it's publishing my Orders Report to that Workspace. And we should see in a couple of seconds, we get the Success message. So, I'm going to jump across there quickly by using this link underneath, and there we go. There is our published Report. And it looks exactly as it does in Power BI Desktop. And the cool thing about this is that we can still use our little Navigation bookmarks down the side here.

So, if I want to jump across to 2018, I can simply click and view that Report. We also have our different pages listed down here. So, I can click and move around that way as well. So, now that we have our 5 different Reports, we could, if we want to, create a Dashboard and pin different Visualizations from different Reports onto that Dashboard.

Remember, the Dashboard is a Summary Report effectively, that gives you some insight and a high level overview of your data. So, in the next lesson, let's create a Dashboard and pin some Visualizations to it.

Video: Pinning Media Tiles to Dashboard

Deb: So, now that we've published all of our Reports to the Power BI Service, it's time to pin some of these Visualizations on a Dashboard. So, I'm going to start with the ALL page, first of all. And maybe I want to pin all of the Line Charts from each of these different Reports onto a Dashboard.

Because this particular manager, maybe he works in Diversity and Inclusion, is really interested in the breakdown of male versus female employees. Because, that is going to inform his strategy for next year. So I'm going to click on this first Line Chart, and I'm going to select the Pin icon. And this is going to pin the visual to a Dashboard. Now currently, I don't have a Dashboard set up, so I want to create a new one. So, I'm going to call this Dashboard Male vs Female Customer Analysis, and click on Pin.

Now notice, I get this little pop up in the top corner, which is going to allow me to go directly to the Dashboard. But just to show you, if we expand Sales Team, you can now see underneath Dashboards, we have Male vs Female Customer Dashboard, which is what we just created. I can also see my Reports, which is my Order Reports. And then I also have attached to this my Datasets as well. And those are the Datasets that we used to build these Reports. So, let's click and take a look at the Dashboard, and take a look at what we have on here.

So, that looks pretty good. I'm going to jump back to My Workspace, we're going to go to 2017, and we're going to do the same with this Line Chart. We're going to pin it this time to an existing Dashboard, the Male vs Female Customer Analysis, and Pin. Let's go across to the next one, select it, and Pin. The next one, select and Pin, and the final one for 2020, select and Pin. So now, if I jump across to this Dashboard, you can see that I have all of those pinned just here.

Now, as I mentioned before, the type of editing that you can do on this Dashboard is reasonably minimal. If I click the Edit Dropdown, I can add Tiles, I can change the Dashboard Theme if I want to. So, let's take a look at this Theme. The Dark one is pretty nice, I might come back to that. Let's take a look at Color-blind friendly, that's not too bad. And then finally, we could choose our own Custom Theme.

Now, I quite like this Dark Theme. So, I think I'm going to leave it on that. Don't forget, you can pick up these Tiles and move them around. You can also resize them by dragging in the bottom corner if you need to make those a little bit smaller. I'm going to actually have this one across the entire top of the Reports because this is showing all of the information for the different years.

And remember, if you want to actually make any changes or maybe apply some Filters, if you click on any of the Charts, it's going to take you through to the Report that the Chart came from. And from here, you can start applying Filters and interacting with the data. So, don't get confused between Dashboards and Reports. This is a common mistake that particularly Excel users make because the way they build

Dashboards in Excel does work in a slightly different way. Dashboards in Excel are more interactive, you can filter the data, whereas in Power BI, it's the Report that you build that provides the interaction, and the Dashboard is simply here to display different Visualizations.

Now one thing that I can do here is I can add things like Titles and Images to this Dashboard. So if we jump up to the Edit Dropdown and go to Add a Tile, this will allow us to add a title of a specific media type. So, I'm going to add a Title here. So Male vs Female Customers, Subtitle is going to be 2017 to 2019 Sales Analysis. And then I'm going to add a little bit of content down here. So, this might be a bit of a description about the type of metrics that you're showing on this Dashboard. So, let's click on Apply, and this is going to add a new Tile at the bottom.

So, I can resize that Title and there maybe I can drag that towards the top of the Dashboard to give people a bit of an idea as to what this Dashboard is all about. Now I'm going to jump back to my Orders Report because I do want to pin a couple of other items. So, let's go back to ALL, and I'm going to pin the Order Count to the Dashboard. Let's go to 2017 and pin the same thing. I'm going to pin for all of these Order Counts. So, you can see how simple is just a pin items from different Reports.

So, now I have those pins, let's jump back to our Dashboard and we can now see those numbers running down the side. Now, of course, again, we can do some reorganizing over here. So, I could move this Tile, and you'll see that they kind of snap into position. So, let's put all of these up here. And obviously, you can arrange these a little bit nicer than I am currently. This is really just to show you an example. But everything is nicely lined up, and we can really start creating some effective looking Dashboards.

And remember, if at any point you decide you don't particularly like this Theme, you can go into Edit, and Dashboard Theme. And we could go for a Custom Theme here if we wanted to. So, if I decided that I wanted the background to be a Dark Green, I can change that. Maybe I want my Tile Font Color to be something completely different. So, we could go for a Pinky Color just there, or maybe even a brighter Red to really make that standout.

And then, we have our Tile Opacity. So, I can take that Opacity all the way down or bring it all the way back up again. So, lots of different customizations that you can make here. Now I think I'm going to switch this back to Light for the time being, and click on Save.

Section 12 – Course Close and Next Steps

Video: Course Close and Next Steps

Deb: Congratulations, everyone, we've made it all the way through to the end of this Power BI Beyond the Basics course. We've covered so much over the last 12 sections of this course. So, let's do a quick recap.

We've learned how to import and combine data from multiple sources into Power BI Desktop, and transform it using Power Query, including creating Lookup Tables to make our data faster to interrogate. We've seen how to create some powerful DAX formulas and Measures to analyze our data and build a Report using a multitude of different Visualizations.

From Line Charts to Stacked Column Charts, Cards, Funnel Charts, Treemap Charts, and let's not forget about adding Navigation to our Reports using Buttons and Bookmarks. We've seen how we can easily publish our Reports to a shared Workspace in the Power BI service, and invite our colleagues.

And finally, we've seen how we can pin Visualizations from different Reports to a Dashboard to give high level insight into our data. The only thing that's left to do now is practice, practice, practice. I hope this course has given you a good level of understanding when it comes to working with Power BI.

Now remember, the skills you've learned in this course are just the tip of the iceberg. There is so much more to learn in Power BI when it comes to DAX Calculations, Report building, and Dashboard design. But for now, that is all from me. Once again, we hope you enjoyed this course and we look forward to seeing you again at some point in the future. My name is Deb. Bye for now.