Excel 2019
PivotTable Features

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Welcome to the *Excel 2019 Pivot Tables* course. This manual and the data files are designed to be used for learning, review and reference after the class. The data files can be downloaded any time from *The Computer Workshop* website:

```
http:\www.tcworkshop.com
```

There is no login or password required to access these files. You will also find handouts and supplementary materials on the website in the Download section.

### To Download Data Files

Once on *The Computer Workshop* website, locate and click the *Student Resources* link in the top navigation bar. When on the *Student Resources* page, click the *Data Files* button.

1. *Data Files* page displays a list of general application types.
2. Click once on the *Microsoft Office Courses* link.
3. Click once on the software related to the course.
4. Click once on the version related to the course.
5. If there are multiple folders, click on the *TCW* folder.
6. Click on the course name to download the data files.

You can choose to open or save the zipped folders content to your computer.

While on the *Student Resources* page, you can also access handouts by clicking the *Handouts* button. Handouts are in PDF format and also available to you without login or password. Simply open the PDF and either print or save to your computer.
Conventions Used in this Manual

The hands-on exercises (Actions) are written in a two-column format. The left column (“Instructions”) gives numbered instructions, such as what to type, keys to press, commands to choose from menus, etc. The right column (“Results/Comments”), contains comments describing results of, reasons for, quick keys, etc. for the instructions listed on the left.

◊ Key names and Functions are bold and enclosed in square brackets:

[Enter], [Tab], [F5], [F10]

◊ Keys you press simultaneously are separated by a plus (+) sign, typed in bold and enclosed in square brackets. You do not press the plus.

[Shift + F5]

◊ Keys you press in sequence are separated by a space, bold and enclosed in square brackets.

[Home] [Down Arrow]

◊ Ribbon tab names are in bold and italic: Example: Home

◊ Group names are in bold: Example: Font

◊ Dialog box names are in italic: Example: Save As

◊ Button names are bold and enclosed in square brackets: Example: [Sort]

◊ Information you are to type will be in bold. Example:

This is the first day of the rest of your life.

◊ Information that you need to supply will be indicated with pointed brackets. Example: Type: <your name>.
Lesson Overview

You will cover the following concepts in this chapter:

- PivotTables
- Creating PivotTables
- PivotTable Elements
- Adjusting PivotTable Layouts
- Formatting PivotTables and Fields
- Expanding & Collapsing Fields
- Refreshing PivotTables
PivotTables

A **PivotTable** is a powerful tool for exploring and analyzing information. They can help organize and manipulate the raw data in a spreadsheet, revealing patterns or relationships which may not be obvious at first glance. **PivotTables** also give you the power to view your data in a different context without changing the original content or structure of the source data.

A **PivotTable** can be based on data in your current workbook or drawn from an external data source.

With a **PivotTable**, it is easy to drag and drop fields (columns) of data into different areas of the table, exposing relationships or trends not readily obvious in traditional **Excel** tables or databases.

In short, **PivotTables** allow you to organize data in meaningful ways without doing a lot of tedious work. You could say that a **PivotTable** is like several data tables rolled into one.

Below is a sample of a typical **PivotTable**.

**Guidelines for Data in a PivotTable**

- The data should be in a tabular format.
- The source data should have a row of unique column headings.
- There should be no gaps in the data, no blank columns or rows. **Excel** treats groups of data as a database. Gaps indicate a break in the data and are considered the end of the data.
Creating PivotTables

Creating a PivotTable

◊ Click into the range of data the PivotTable will be based on.

◊ Select the Insert Tab, in the Tables Group click the [PivotTable] button.

◊ The Create PivotTable dialog opens.

◊ Within the Choose the data that you want to analyze group are three choices:

◊ Select a table or range: allowing data from the current workbook to be used as the data source. By setting the cell range in the Select range: field.
  -This field should automatically select all connected cells based on the active cell.
  -If the range that appears is incorrect, you may type it in or select it with your mouse. Make sure that the column headings are included in the selection.

Note

Ideally, source data for a PivotTable should be structured like a traditional Excel table or database. See the guidelines on page 3.
Creating PivotTables, continued

- **Use an external data source**: allows the PivotTable to be based on data outside of the current workbook (such as in another workbook or an external database).
  - Clicking the [Choose Connection] button opens the Existing Connections dialog, which displays a list of existing connections.
  - Typical existing connections may include Microsoft Queries or previously connections to Access databases.
  - Clicking the [Browse for More] button allows new connections to be made.

- **Use this workbook’s Data Model**: can be used when tables of data are related to each other. These tables can be data converted into a table or imported tables.

Once the source of data has been selected and defined, you can set where the PivotTable will be placed in the workbook.

- Select whether to locate your PivotTable in an Existing Worksheet or a New Worksheet.
  - If you choose the New Worksheet option, a new worksheet is added to the workbook with the PivotTable located in cell A1.
  - If you choose Existing Worksheet, you can specify the cell location and on which worksheet the PivotTable will be added. Enter the cell address directly into the Location field, as a cell reference, or by clicking the target cell with your mouse.

- Click the [OK] button to create your PivotTable.
Creating PivotTables, continued

Using Recommended PivotTables

- Select any cell within the data range the PivotTable is to be based on.
- Select the Insert Tab, in the Tables Group and click the [Recommended PivotTable] button.

- The Recommended PivotTables dialog opens.

- Excel offers a series of possibilities based on the data.
  - Scroll through the list of options on the left, when you select one on the left, a large copy is previewed on the right.
  - When one fitting your needs is actively selected, click the [OK] button.
  - A new worksheet is added with the PivotTable in place.
  - If none of the recommendations are suitable, click the [Blank PivotTable] button to start from scratch.
  - A new worksheet is added with a blank PivotTable in place.

Note: Excel automatically extends the selection to include all connected data.
Creating PivotTables, continued

Using the Quick Analysis Tag

When the data is selected, a smart tag is displayed in the lower right corner of the selection. This smart tag offers quick access to Formatting, Charting, Sparkline, Totaling, and Table options.

◊ Select all the data needed in the PivotTable.
◊ Look to the lower right corner of the selection to find the Quick Analysis tag.

◊ Select any cell of connected data and tap the [Ctrl A] key command to select all connected data.

◊ Click the tag to view the available options.
◊ Click the Tables option, hover over the PivotTable options to see recommendations.

◊ Clicking the one which best fits your needs will insert a PivotTable into a new worksheet.
◊ If none seem appropriate then choose the More option to open the Recommended PivotTable dialog.
Adding Fields

After creating a blank PivotTable the PivotTable is located in the worksheet on the left (or where defined) and the PivotTable Fields pane on the right.

In the PivotTables Fields pane is the list of all available fields from the data (column headers). If the data source is a Data Model, then the list will display all related tables which are expandable to show all the fields in the tables.

Note: When using a Recommended PivotTable, the fields are already in place upon creation. It is still possible to edit and rearrange the fields are needed.

PivotTable Fields Pane

In the top half of the pane, all the available fields from the data source or sources are displayed. In the lower half of the pane are four areas. Fields are added to these areas by dragging from above and dropping into the appropriate area.

- Filters: Fields added here are top-level report filters and are shown above the PivotTable.
- Columns: Fields added here are displayed in columns in the PivotTable.
- Rows: Fields added here are displayed in rows in the PivotTable.
- Values: Numeric data fields are added here; these are summarized in the PivotTable.
Lesson 1: Creating and Modifying PivotTables

PivotTable Elements, continued

PivotTable Tools Tabs

When working in a PivotTable, Excel automatically displays the PivotTable Tools Tabs—Analyze and Design.

Analyze Tab

The Analyze Tab offers controls for active fields, filtering, grouping, refreshing or changing data, performing calculations, showing or hiding elements, and PivotTable options.

Design Tab

The Design Tab offers controls for basic layout and formatting of the PivotTable.
**Action 1.1 - Creating a Blank PivotTable**

**Instructions:**

1. Open the workbook named Shipping.xlsx from the lessons folder.

2. Save the file as MyShipping.xlsx.

3. Click anywhere in the data on the Invoices sheet.

4. Select the Insert Tab and click the [PivotTable] button.

5. Verify that the Select a table or range option is chosen and the correct range is entered in the Table/Range field.

6. Make sure that the New Worksheet option button is selected.

7. Click the [OK] button to create the PivotTable.

8. Save the file and leave it open.

**Results/ Comments:**

Notice the first row are the column headings, with one heading for each column. **(The data set does not contain any empty cells.)**

Use the File Tab then Save As or the [F12] key.

The Create PivotTable dialog is displayed. Notice when viewing the Insert Tab you are able to access the [Recommended PivotTables] button from within this group.

The Table/Range field should read Invoices!$A$1:$K$2156.

A new sheet is added to the workbook with a blank PivotTable. You will see a PivotTable Area and a Field List appear in a new worksheet. Notice the column headings (fields) available in the PivotTable Field List which can now be added to the table.

[Ctrl S].
### Instructions:

1. **MyShipping.xlsx** should still be open.
2. Switch back the *Invoices* sheet.
3. Select any cell with a value and use the **[Ctrl A]** keyboard shortcut to select all connected data.
4. Click the *Quick Analysis Tag*.
5. Click the *Tables* heading and hover over the *Recommended PivotTables* icons.
6. Choose the fourth option.
7. Save the file and leave it open.

### Results/ Comments:

- If not, re-open it.
- Click the *Invoice* sheet tab or use the **[Ctrl Page-Down]** keys.
- All the data is highlighted and the *Quick Analysis Tag* is displayed in the lower right corner of the selection.
- The list of Quick Analysis options are displayed.
- The Table and PivotTable options are displayed. As you hover over the icons an example is shown of that option.
- A new sheet is added to the workbook with a populated PivotTable.

[Ctrl S].
### Instructions:

1. **MyShipping.xlsx** should still be open.
2. Switch back the *Sheet1* sheet.
3. Click into any cell in the PivotTable placeholder on the spreadsheet.
4. Drag the **Country** field from the field list to the **Filters** area of the *PivotTable Fields* pane.
5. Drag the **Company Name** field from the field list to the **Rows** area of the *PivotTable Fields* pane.
6. Drag the **Product Name** field from the field list to the **Columns** area of the *PivotTable Fields* pane.
7. Drag the **Sale** field from the field list to the **Values** area of the *PivotTable Fields* panes:
8. Drag the **Company Name** field out of the **Rows** area of the *PivotTable Field* pane.
9. Drag the **Salesperson** field from the field list to the **Rows** area of the *PivotTable Fields* pane.
10. Save the file and leave it open.

### Results/ Comments:

If not, re-open it.

Click the *Sheet1* sheet tab or use the [Ctrl Page-Down] keys.

All PivotTable tools are displayed: *PivotTable Tabs* and *PivotTable Field* pane.

A Country drop-down is added in cell A1.

The list of Clients are added beginning in cell A4. A Row Labels header with a drop-down is added in the cell A3.

The list of Products is added, one product name per column beginning in cell B4. The Column Labels header with a drop-down is added in cell B3. The Row Label header is moved down to cell A4.

The value of each product purchased by each client is displayed on the Pivot Table.

The list of clients are removed from the PivotTable, all the other data remains in place. You now know how much was earned in sales of each product.

The value of each product sold by each salesperson is now displayed on the Pivot Table.

[Ctrl S].
Lesson 1: Creating and Modifying PivotTables

Adjusting PivotTable Layouts

Using the PivotTable Options Dialog

In this dialog you are able to set general options in one place. Users can still modify these choices one by one from the PivotTable tabs.

- Click on any cell in the PivotTable to display the Analyze Tab in the Ribbon.
- On the left side of the Analyze Tab, in the PivotTable group, click the [Options] button to display the PivotTable Options dialog.

- On the Layout and Format tab, make sure the Preserve cell formatting on update box is checked. This will ensure that any formatting you apply will be retained if the table is modified or refreshed.
- On the Totals and Filters tab, specify if grand totals for rows or columns will be shown.
- On the Display tab, select whether filter drop-downs, field captions, expand/collapse buttons, and contextual tool tips will be shown.
- On the Printing tab: determine what optional elements should print.
- On the Data tab, specify PivotTable Data options, such as having the table refreshed when the workbook opens.
- Click [OK] when you are finished with the PivotTable Options dialog.

Note

Remember to always click into the PivotTable to see the related contextual tabs on the Ribbon.

Note

If the PivotTable is large, checking the Set print titles checkbox is a good idea since headers will be repeated on each page of the printout.

2019: PivotTable Features, Rel. 1.0, 02/21/2020
Using the Design Tab

- On the left side of the PivotTable Design Tab is the Layout Group.

- The [Subtotals] drop-down allows you to turn on or off the subtotal information. When they are on, they can be shown at either the top or bottom of each group.

- The [Grand Totals] drop-down allows you to turn on or off grand totals, for both rows and/or columns.

- The [Report Layout] drop-down allows you to change between three layouts: Compact, Outline, or Tabular views. When in Outline or Tabular views, you are able to repeat all item labels or not.

- The [Blank Rows] drop-down allows you to add or remove blank rows after grouped items.

![Item Labels Not Repeating](image1)

![Item Labels Repeating](image2)
Setting the Default Layout.

Excel now offers the ability to modify the default layout of PivotTables. As new PivotTables are created, they will already have basic layout choices in place.

◊ Click the File Tab to access the Backstage.
◊ Select Options from the list of categories on the left of the Backstage.

- OR -
◊ Use the sequential keyboard shortcut, Alt F T.
◊ In the Options, select the Data category.
◊ Click the [Edit Default Layout] button.

◊ The dialog offers controls for Subtotals, Grand Totals, Report Layouts, and Blank Rows. (Similar to using the Design Tab tools)

◊ Use the [Import] button to save changes made in a current or an existing PivotTable as the new default.
### Instructions:

1. **MyShipping.xlsx** should still be open.

2. Activate *Sheet1* and select any cell in the **PivotTable**, scroll all the way over to the right side and select cell **BZ5**.

3. Activate the **Analyze Tab**.

4. In the **PivotTable Group**, click the **[Options]** button.

5. On the **Layout & Format** tab, check the **Preserve cell formatting on update** checkbox is checked.

6. On the **Totals & Filters** tab, uncheck the **Show grand totals for rows** checkbox.

7. Examine the options on each of the other tabs.

8. On the **Alt Text** tab click into the **Title:** field and type: **Sales Data PivotTable**
   
   click into the **Description:** field and enter a description of the table.

9. Click the **[OK]** button.

10. Activate the **Design Tab**.

11. In the **Layout Group**, click the **[Grand Totals]** button drop-down and choose **On for Rows and Columns**.

12. Drag the **Company Name** field into the **Rows** area below the **Salesperson**.

### Results/Comments:

- If not, re-open it.

- The **PivotTable Options** dialog open.

- Examine the available options.

- The Grand Totals will be removed.

- **Alt Text** is text read aloud by screen reading software for the visually impaired community, this helps in making documents accessible.

- The **PivotTable Options** dialog closes and the data in column **CA**, the Grand Totals is removed.

- The Grand Total in column **CA** is added back to the PivotTable.

- The companies each salesperson works with are displayed below the salesperson's name.
### Instructions:

13. Select cell A5.


15. Choose *Show in Tabular Form* from the [Report Layout] button drop-down.

16. Then choose *Do Not The Repeat Item Labels* from the [Report Layout] button drop-down.

17. Save the file and leave it open.

18. Click the **File Tab** and select **Options** from the list of categories.

19. Select the **Data** category and click the [Edit Layout] button.

20. Examine the options available in this dialog.

21. Click the [PivotTable Options...] button.

22. Examine and close the dialog.

23. Click into the **Layout Import** field and select a cell in the PivotTable then click the [Import] button.

24. Click the [OK] button.

25. Click the [OK] button.

26. Save the file and leave it open.

### Results/ Comments:

To see the row and columns labels.

The data structure changes for each. When *Repeat All Item Labels* is active in the outline or tabular views, the salesperson’s name fills all empty cells.

The **PivotTable** changes to the Tabular layout.

[Ctrl S].

The **Excel Options** dialog opens.

The **Edit Default Layout** dialog opens.

The dialog offers the same controls found in the **Layout Group** on the **Design Tab**.

The **PivotTable Options** dialog opens.

It is the same dialog accessed earlier.

By entering any cell address from the current **PivotTable**, you are defining the layout to be imported. Clicking the [Import] button sets the layout Excel uses when creating PivotTables in the future.

The dialog closes.

The **Excel Options** dialog closes.

[Ctrl S].
Lesson 1: Creating and Modifying PivotTables

Formatting PivotTables and Fields

Using the Design Tab

◊ On the Design Tab, you can select one of the preset styles from the PivotTable Styles Gallery, quickly applying a preset format to the table.

◊ There are also checkboxes in the PivotTable Style Options group of the ribbon that will let you turn on or off banded columns or rows, row headers, or column headers.

◊ On the left side of the ribbon, there are controls used to view or hide subtotals and grand totals as well as to specify a PivotTable Report Layout.

General Formatting Options

To format text or cells in a given cell or cell range use the formatting tools found on the Home Tab or right-click in the selected cell or range and use the Mini Toolbar or choose Format Cells... from the menu.

In the Format Cells dialog you can access and set number formats, alignment choices, font styles, borders, fills and protection options.

Note

When right-clicking a selection in a PivotTable, the Format Cells... option is found at the top of the menu.
Formatting PivotTables and Fields, continued

Value Field Settings
As values are added to the PivotTable, you may want to change how those values are summarized or formatted. This is done from within the Value Field Setting dialog. This dialog is accessed in one of three ways: from the ribbon, from within the PivotTable Field pane, or right-clicking.

Opening the Value Field Settings Dialog

- Select a cell containing a value. On the Analyze Tab in the Active Field Group, click the [Field Settings] button.

  - OR -

- Click drop-down arrow on of the field in the Values field in the PivotTables Fields Pane and choose Value Field Settings... from the menu.

  - OR -

- Right-click any cell with a value and choose Value Field Settings... from the menu.

- The Value Field Settings dialog opens.

  - **Summarize Values By** tab: allows you to change how the data is summarized.

  - **Show Values As** tab: allows the data to be displayed as percentages of totals, running totals, or differences. When using the percentage options, formatting is automatically applied.

  - Use the [Number Format] button to open the Format Cells dialog. Applying formatting in this manner will apply it to the entire field and not just an individual cell.
Showing More Than One Value Calculation

If you want to show both the sum and the average of the values in the PivotTable at the same time, do the following:

◊ Add a second instance of the field containing your values to the Values area of the PivotTable.

◊ Open the Value Field Settings using any of the methods mentioned earlier.

◊ From the Value Field Settings dialog, choose the Average function.

◊ Click [OK].

Now you have the values both being summed and averaged simultaneously. This can be revised in the Value Field Settings dialog to any function or combination of functions needed.
### Instructions:

1. **MyPivotTable.xlsx** should still be open.
2. Activate *Sheet1*, if necessary.
3. Right-click any cell with a value and choose *Value Field Settings* from the menu.
4. In the **Custom Name:** field enter *Sales*.
5. Click on the **[Number Format]** button, in the bottom left corner of the dialog.
6. Choose the *Accounting* format option from the list on the left and click the **[OK]** button in each dialog.
7. Drag another two instances of the *Sale* field into the **Values** area of the *PivotTable Fields* pane.
8. Right-click any cell in the second column of values and choose *Value Field Settings* from the menu.
9. Choose *Average* from the **Summarize value field by:** formula list.
10. In the **Custom Name:** field enter *Average Sale*.
11. Click on the **[Number Format]** button, in the bottom left corner of the dialog.
12. Choose the *Accounting* format option from the list on the left and click the **[OK]** button in each dialog.
13. Right-click any cell in the third value column and choose *Value Field Settings* from the menu.

### Results/ Comments:

If not, re-open it.

The **Value Field Settings** dialog opens.

This will now be name for this instance of the data.

The **Format Cells** dialog opens.

The column label in cell A3 is renamed and the values are formatted.

The column label in A3 is moved to C5 and two new columns titled *Sum Of Sales#* are added to the *PivotTable*.

Choose the function before changing the name.

This will now be name for this instance of the data.

The **Format Cells** dialog opens.

The column label in cell D5 is renamed and the values are formatted.

The **Value Field Settings** dialog opens.
Action 1.5 - Formatting PivotTable data, continued

**Instructions:**

14. Activate the *Show Values As* tab in the *Value Field Setting* dialog.

15. Choose *% of Grand Total* from the drop-down list for *Show values as: field*.

16. In the *Custom Name:* field enter *Percent of Sales*.

17. Click [OK].

18. In the *PivotTable Fields* pane, drag the *Products* field from the Columns area below the *Salesperson* field in the Rows area.


**Results/ Comments:**

To name the field header.

The third column of value now shows how much each sale represents from the overall total.

The structure of the *PivotTables* is rearranged, revealing a much more detailed view and greater understanding of the existing data.

[Ctrl+S].
Expanding & Collapsing Fields

As more data is added into a PivotTable it may become necessary to collapse fields to make the big picture is easier to see and understand. When a more granular view of all or a small subset of data is needed, it is possible to expand the entire field or any given collapsed set. As fields are added into the same PivotTable area, data is nested in the field above. Expand and Collapse buttons are displayed next to each field entry;

A Plus when collapsed

A Minus when expanded.

It is also possible to access the Collapse and Expand commands in the Active Field Group on the Analyze Tab. These buttons will expand or collapse the entire field at once.

Right-clicking on the field in the PivotTable, you are able to access the Expand/Collapse submenu. From this menu you can expand or collapse a subset of data or the entire field. Choosing Expand, Collapse, Expand "Field name", or Collapse "Field name" will expand or collapse the selected subset of data only.
### Action 1.6 - Expanding & Collapsing Fields

**Instructions:**

1. **MyPivotTable.xlsx** should still be open.
2. Activate *Sheet1*, if necessary.
3. Select cell **A4**.
4. Click the `[Minus]` button in the cell.
5. Activate the *Analyze Tab*.
6. Click the [Collapse Field] button in the *Active Field Group*.
7. Click the [Expand Field] button in the *Active Field Group*.
8. Right-click cell **A4**, scroll down to the *Expand/Collapse*.
9. Choose *Collapse Entire Field* from the fly-out menu.
10. Click the [Plus] button in cell **A6**.
11. Right-click cell **A4**, scroll down to the *Expand/Collapse*.
12. Choose *Expand Entire Field* from the fly-out menu.
13. Save the File.

**Results/ Comments:**

1. If not, re-open it.

   - The details of that salesperson are collapsed out of view.
   - All the details are collapsed at once.
   - All the details are expanded at once.
   - A fly-out menu is displayed showing options for expanding/collapsing this record or field.
   - All the details are collapsed at once.
   - The salesperson’s record is expanded to show it’s details.
   - All the details are re-displayed.

   - `[Ctrl+S]`
The data in a PivotTable is not linked directly to the source table or range. Instead, PivotTables are based on a hidden copy of the source data that is kept in memory by Excel. This is called the PivotTable Cache. Meaning, changes to the original source or database will not be automatically updated in the PivotTable. If you make changes in the source data, you must Refresh the PivotTable to update it.

### Refreshing a PivotTable

- Select any cell within the PivotTable.
- Activate the Data Tab, then click the [Refresh All] button in the Queries & Connections Group.
- OR -
- Activate the PivotTable Analyze Tab, then click the [Refresh] button in the Data Group.
- OR -
- Right-click a cell in the PivotTable, then choose Refresh from the menu.

### Redefining the PivotTable Data Range

As new records are added to the data set the PivotTable, simply refreshing the data will only pull data from the same range of cells to update the PivotTable. As the data set increases in size, it will become necessary to redefine the cell range being used by the PivotTable.
Activate the **Analyze Tab**, in the **Data Group**, then click the [**Change Data Source**] button.

The **Change PivotTable Data Source** dialog opens and you are taken back to the sheet containing the source data.

If you are adding to the data set on the sheet then click into the **Table/Range** field and edit the range accordingly.

If changing and external source of data, click the **Use an external data source** radio button. Then, click the [**Choose Connection**] button and follow the dialogs to connect to a new source or make other modifications to an existing source.
Action 1.7 - Refreshing the PivotTables

Instructions:

1. MyPivotTable.xlsx should still be open.

2. Activate Invoices.

3. Select cell J2 and change the value to < 50 >.

4. Activate the Sheet1 sheet.

5. Select cell A4 and collapse the entire field to display the sales people's names and their values.

6. Note the values for Nancy Davolio.

7. Activate the Analyze Tab, if necessary.

8. In the Data Group, click the [Refresh] button.

9. Save the file.

Results/ Comments:

If not, re-open it.

Click the Invoices sheet tab.

To correct or modify the data. Changes to the original data will not automatically affect the PivotTable data.

Click the Sheet1 sheet tab.

Use any method from the previous exercise.

The current value for the Sales should be $202,143.71.

The updated value should be $204,068.71.

[Ctrl+S].

2019: PivotTable Features, Rel. 1.0, 02/21/2020
Lesson 1: Creating and Modifying PivotTables, Page 27
Lesson 2: Filtering PivotTables

Lesson Overview

You will cover the following concepts in this chapter:

◊ Filtering Data
◊ Sorting a PivotTable
◊ Basic PivotTable Filtering
◊ Advanced Filtering
◊ Report Filters
◊ Filtering With Search Box
◊ Adding to Filters
◊ Conditional Formatting in a PivotTable
◊ Grouping Data
◊ Using the Slicer
Lesson 2: Filtering PivotTables

Filtering Data

One of the main features of a PivotTable is that you have the ability to present the data in a dynamic format that allows you to show exactly what you need and change it when you need to. For example, if you have a PivotTable that shows Sales by Region for each Salesperson, you may want to show only specific Salespersons or specific Regions. PivotTables allow the flexibility to show each Region and/or Salesperson and to change which Salesperson or which Region shows at any time.

Data in a PivotTable can be filtered based on the Rows, Columns, and the Filters. As fields are added to the PivotTable areas in the PivotTable Fields pane, their labels are shown with drop-down arrows. If the those Field Headers are not being displayed, check that the [Field Header] button is active in the Show Group on the Analysis Tab.

Row and column filtering drop-downs offer a wide variety of options based on the data type. Sorting tools, filtering based on Labels or Values, and the ability to search the field items.

The Filter filtering drop-down simply offers the ability to search, a checkbox list, and the ability to “select multiple items”.

Note

A Value filter allows you to apply a filter to numerical data. A Label filter allows you to apply a filter to textual data referred to in row or column labels.
Basic Sorting

It is possible that the data in a field may not be sorted in the order you need, but this is an easily resolved issue. Clicking the Filter drop-down, you will be able to sort the field ascending, descending, manually, or based on a custom list or conditional format. There are also the standard methods of sorting data from the ribbon on both the Home and Data Tabs, as well as right-clicking a cell to access the sort commands found in the contextual menu.

Applying A Sort

◊ Select the Field Filter drop-down.

◊ The sort options are found at the top of the list.

◊ To sort Ascending or Descending, use the top two options in the menu.

◊ Choosing the [More Sort Options...] button will open the Sort Options (Field Name) dialog.

◊ Choosing either the Ascending or Descending radio buttons allows you to chose any other available fields from the drop-down.

◊ Choosing the Manual radio button allows you to select cells within the field and move them into any desired order.

◊ Click the [OK] button to apply the sort.
Applying An Advanced Sort

- Select the field filter drop-down.
- Choose the [More Sort Options...] button will open the Sort Options (Field Name) dialog.

![Sort Options (Field Name) dialog](image)

- Clicking the [More Options...] button opens the More Sort Options (Field Name) dialog.

![More Sort Options (Field Name) dialog](image)

- Unchecking the Sort automatically every time the report is updated checkbox allows you access to the First key sort order field. Clicking the drop-down allows you to use custom lists to set the sort order.

![More Sort Options (Field Name) dialog](image)

- Click the [OK] button to apply the sort.

Note: The Sort By set of options are active if the field uses the Show Values As instead of the Summarize Values By field setting.
Instructions:

1. **MyShipping.xlsx** should still be open.

2. Click the drop-down arrow in cell A3.

3. Choose Sort Z to A from the menu.

4. Right-click any cell in the first column of values, hover over the Sort option to expand, choose Sort Smallest to Largest.

5. Activate the **Design Tab**, in the Layout Group click the [Report Layout] drop-down button and choose Tabular Layout from the menu.

6. Right-click on a Salesperson’s name, hover over the Expand/Collapse option and choose Expand Entire Field from the menu.

7. Click the Product Name filter drop-down in cell C3 and choose Sort Z to A.

8. Right-click the first name in the Salesperson column, hover over the Expand/Collapse option and choose Collapse Entire Field.

9. Save the file.

Results/ Comments:

If not, reopen it.

The Sorting and Filtering menu is displayed.

The list of salespeople is now sort in a descending order.

The data is now sorted based on the values instead of the names.

If necessary. The **PivotTable** is now displayed in a Tabular mode.

All the data is displayed.

The Product column is sorted. Notice that the overall **PivotTable** is still sorted primarily by the Salespeople.

The data is collapsed back to show the salespeople and three value columns.

[Ctrl S].
Basic PivotTable Filtering

Basic Filtering

Once fields are added to a PivotTable, it is possible to filter that data set down to view only specific individuals or groups from within the field. Excel displays a drop-down on the field labels by default, but if the labels are not visible, then it will be necessary to show the labels by clicking the [Field Headers] button in the Show Group on the Analyze Tab.

Using the drop-downs on the field labels offers access to the filtering tools.

When a field is placed into either the row or column area, it is very quick and easy to see how an individual or subset group is doing by using the filtering drop-downs. When there is only a small data set in the field it can be a simple as unchecking the Select All checkbox checking the desired checkboxes and clicking the [OK] button. Only data pertaining to the selection is displayed.
Basic PivotTable Filtering, continued

Filtering a PivotTable

◊ Click the drop-down arrow next to any row or column field name in the PivotTable.

◊ The menu offering Sorting and Filtering options are displayed.

◊ Uncheck the Select All checkbox

◊ Check only the checkboxes for the desired data.

◊ Click the [OK] button.

◊ The data in the PivotTable reflects the choices made in the Filtering options.

- OR -

◊ In the PivotTable Fields pane, click on the drop-down arrow next to a field name.

◊ Use the Filtering tools as described above.

The PivotTable reflects the filtering choices made. A funnel icon will appear with the drop-down of the filtered column or row header as well as in the PivotTable Field pane.

![Salesperson](filtered-header-drop-down)

Filtered header drop-down

![Salesperson](filtered-field-in-the-pivot-table-field-pane)

Filtered Field in the PivotTable Field Pane

Filtering in the Report Filter

The fields in the Filter area of the PivotTable Field pane do not offer as many filtering options as rows and columns do, you are basically able to filter individual items. In the report filter drop-down is a Select Multiple Items checkbox that when checked places a Select All option and check boxes next to each item. You will also find a search field within the drop-down.
Basic PivotTable Filtering, continued

Clearing a Filter
Clearing applied filters from a PivotTable will return all data which was hidden by the filter. This can be done all at once if multiple filters have been applied or individually as needed.

Clearing Single Filters

◊ Click the Sort & Filter drop-down arrows with the funnel icon.

◊ Check the Select All checkbox.

- OR -

◊ Choose Clear filter for (Field Name) from the menu.

◊ Click the [OK] button.

Clearing All Filters

◊ On the Analyze Tab, in the Actions Group click the [Clear] button drop-down and choose Clear Filters.

- OR -

◊ On the Data Tab in the Sort & Filter Group, click the [Clear] button
**Action 2.2 - Applying a Basic Filter**

**Instructions:**

1. **MyShipping.xlsx** should still be open.

2. On the **Analyze Tab** in the **Show Group**, click the [Field Headers] button.

3. In the **PivotTable Field** pane field list, hover over the **Salesperson** field.

4. Click the drop-down arrow of the highlighted field.

5. Uncheck the **Select All** checkbox. Check the checkboxes for Anne Dodsworth and Margaret Peacock. Click the [OK] button.

6. On the **Analyze Tab** in the **Show Group**, click the [Field Headers] button.

7. Right-click on Anne Dodsworth’s name and Expand Entire Field.

8. Click the drop-down arrow in the **Country** filter header.

9. Click on **Denmark** and then click the [OK] button.

10. Save the file and leave it open.

**Results/ Comments:**

If not, reopen it.

The Row and Column headers are removed from the PivotTable along with the filtering drop-downs.

The Salesperson field is highlighted and a drop-down arrow is displayed.

The **Sorting & Filtering** menu is displayed.

Only data pertaining to the two selected salespeople is displayed in the **PivotTable**.

The Row and Column header are redisplayed.

The list companies each salesperson works with is displayed.

The list of Countries is displayed.

Since Anne Dodsworth had no dealings in Denmark, her information has been removed from the PivotTable.

[Ctrl S].
Advanced Filtering

Label and Value Filters

Rows and columns may contain any of the three data types: Dates, Numbers, or Text. Excel determines the data type offers the appropriate filtering tools. When basic filtering capabilities in the field drop-down are not sufficient to filter data to a more narrow view consider using the Label and Value filtering tools.

Using the Label filters allow you to easily search through a long list of items in the field with a wide variety of options related to the data type. You can choose an option from the menu to open the Label Filter dialog.

From within the dialog, you are able to choose any of the available options in the menu from the Show items for which the label field drop-down. Then enter the desired parameter for the filter in the open field of the dialog.

Applying a Label Filter

◇ Click on the drop-down arrow next to any column or row field name in the PivotTable.

Excel has determined the data type and displays the appropriate filtering tool set.

◇ Select the Filter type you would like to use from the Label Filter drop-down.

◇ Complete the information in the Filter dialog.
Applying a Value Filter

No matter the data type, when choosing the **Value Filter** option, the same set of options are available. Once the choice of Value Filter has been made the **Value Filter** dialog opens. This dialog allows you to specify parameters as needed. The available fields in the **Value Filter** dialog will change in relation to the type of filter being applied.

Accessing the **Value Filter** dialog is done by clicking the row or column filter drop-down and choosing a value filter.

Using the Top or Bottom 10

Sometimes you would like to see the top 10 purchasers of your product or the top 10 salespeople in your organization. You can use the **Top 10** filter in the **Values Filters** to see these results.

**To Filter the Top 10**

- Click on the drop-down arrow next to any field name in the **PivotTable**.
- Click on **Value Filters** to display the drop-down list.
- Select **Top 10...** from the submenu. The **Top 10 Filter** dialog opens.

- In the **Top 10 Filter** dialog, select whether or not you wish to show the **Top or Bottom 10** by clicking on the drop-down arrow.
- If needed, change the number of items being shown by using the arrows of the value field to change the number or by selecting the number and typing it in.
- Finally, select whether you wish to see the **Top/Bottom 10 items**, **Top/Bottom 10 percent**, or **Top/Bottom 10 Sum**.

Select **Sum** to display what contributed to the top number you selected.
Action 2.3 - Label and Value Filtering a PivotTable

Instructions:

1. **MyShipping.xlsx** should still be open.

2. Click the *Country* filter drop-down and choose *(All)* from the menu and click [OK].

3. Click the *Salesperson* drop-down and check the *Select All* checkbox and click the [OK] button.

4. Click the *Salesperson* drop-down, click the *Label Filter* option and choose *Begins With ...* from the list.

5. Click into the blank text field and type in:
   - a
   - click the [OK] button.

6. Expand the entire *Salesperson* field

7. Click the *Product Name field* drop-down, click the *Value Filter* option and choose *Greater Than ...* from the list

8. Choose *Sales* from the first field drop-down, choose *is greater than* from the *operator* field, and in the blank text field and type:  
   - 1000
   - click the [OK] button.

9. Save the file, and leave it open.

Results/ Comments:

If not, reopen it.

- Data from all the countries is re-displayed.

- All the salepeople are re-displayed.

- The *Label Filter* dialog opens.

- The search is for any names which begin with the letter a; the results will show the data from Andrew Fuller and Anne Dodsworth.

- If necessary.

- The *Value Filter* dialog opens.

- Only sales of more than $1000 are displayed.

- [Ctrl S].
Report Filters

Using Multiple Report Filters

The Report Filter will give you a high level summary of the data and can include multiple fields. To filter by more than one field, you add other fields to the Filter area in the PivotTable Field pane.

Adding Multiple Fields to the Filter

◊ In the PivotTable Field pane, drag the desired fields to the Filter area.
◊ Place them in the order you wish them to appear in the PivotTable.

◊ You can now filter by each field independently and combine filters.

Using Multiple Filter

By default, Excel removes a filter on a field when another filter is applied. To maintain your filters while you create additional filters you need to turn on Allow multiple filters per field:

◊ Right-click any cell in your PivotTable.
◊ Select PivotTable Options.
◊ The PivotTable Options dialog opens.
◊ Click the Totals and Filters tab in the dialog.

◊ Click the checkbox for Allow multiple filters per field.
◊ Click the [OK] button.
Filtering With Search Box

Using the Search Box to Apply a Filter

◊ First, from any of the Filter drop-down buttons; (Report Filter, Row, or Column).

◊ If using a Report Filter- select the Multiple Items check box, which will activate the checkbox for each selection.

◊ Click into the Search field located above the field item list.

◊ Type in the search term.

◊ Check the checkboxes that contain or are part of the desired results.

◊ Click the [OK] button.

Using Wildcards

When you can only specify a portion of what you are filtering for, wildcards can be used to replace missing text. For example, if you wish to search for all names that begin with an M and end with a T, you can enter M*T. The asterisk represents any number of characters in that position. The following wildcards may be used in your filter.

<table>
<thead>
<tr>
<th>Character</th>
<th>Definition</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>*</td>
<td>Used to represent any number of characters in that position, including zero characters.</td>
<td>M*T will return Matt, mint, malt, mutt, most.</td>
</tr>
<tr>
<td>?</td>
<td>Represents one character in that position.</td>
<td>M?T will return mat or met.</td>
</tr>
<tr>
<td>~</td>
<td>Searches for wildcard characters.</td>
<td>Computer~Workshop will return Computer*Workshop.</td>
</tr>
</tbody>
</table>
Adding to Filters

Adding Criteria to an Existing Filter

◊ Click on a filtered field button in the PivotTable. (Filtered fields have a Funnel icon with the drop-down arrow)

◊ In the Search Box, type a second search criteria. All matching items list.

◊ Click on the [Add current selection to filter] checkbox to append the existing filtering.

◊ If this checkbox is unchecked when clicking the [OK] button, all previous filtering is replaced not amended.

◊ If working in a report filter field make sure the Select Multiple Items checkbox is checked.

◊ Click [OK].

◊ The additional search results are added to the existing results.

Using Multiple Column and Row Filters

Sometimes, you will want to filter by multiple fields within your rows. By adding multiple fields to the Rows section of your PivotTable Field pane, you will be able to apply multiple filters at the same time.
Instructions:

1. **MyShipping.xlsx** should still be open.

2. On the **Analyze Tab** in the **Actions Group**, click the **[Clear]** button drop down and choose **Clear Filters**.

3. Drag **Company Name** and **Required Date** to the **Filters** area of the **PivotTable Field pane**.

4. Click the **[Filter]** button next to **Country** field and select **Ireland**, then click **[OK]**.

5. Click the **[Filter]** button next to **Company Name** field and in the **Search** field type in: 
   n
do not click the **[OK]** button yet.

6. Add an * to after the N.

7. Place the * before the N.

8. Check the Select Multiple Items checkbox and click the **[OK]** button to apply the filter.

9. Click the **[Filter]** button next to **Country** field and select **All**, then click **[OK]**.

10. Click the **[Filter]** button next to **Company Name** field and in the **Search** field type in: 
    b*
do not click the **[OK]** button yet

Results/ Comments:

If not, reopen it.

All filter have been removed and the PivotTable has been reset.

This will add **Company Name** and **Required Date** to the top of the **PivotTable**.

Only sales made in Ireland are displayed.

Any Company Names with an N anywhere in the name are listed.

Only companies beginning with the letter N are shown.

Only Company Names ending with the letter N are shown.

No results match these filtering criteria, so there is no information in the PivotTable.

Now data matches the filter criteria of the Company Name filter and is displayed in the PivotTable.

Notice the results shown in the **Filter** box.
Instructions:

11. Click the checkbox for *Add to current selection* and click [OK].

12. On the *Analyze Tab* in the *Actions Group*, click the [Clear] button drop down and choose *Clear Filters*.

13. Save the file but leave it open.

Results/ Comments:

Now data which matches both aspects of the searches are displayed.

All filters are removed and all data is redisplayed.

[Ctrl S].

Action 2.4 - Multiple Report Filters, continued
Conditional Formatting in a PivotTable

Automatically applying cell formatting, which is based on the cell contents or values, is referred to as *Conditional Formatting*. This is a great way to emphasize or draw attention to data of particular interest. For example, you can highlight in red any budget items that are greater than 20% over budget. The technique to apply *Conditional Formatting* is similar to the technique used in a spreadsheet.

**Using Conditional Formatting**

◊ Select a value within the field to be formatted.

◊ Click on the [Conditional Formatting] button located on the *Home Tab*. A menu of conditional formatting options will be displayed.

◊ Choose one of the following:

◊ **Highlight Cells Rules** — will highlight cells that are greater than, less than, between or equal to values that you specify.

◊ **Top/Bottom Rules** — will allow you to highlight the highest or lowest numbers or percent in the selected cells.

◊ **Data Bars** — will display colored bars that compare the value in the cell to the other cells in the range.

◊ **Color Scales** — will use different shades of color to represent different values from low to high.

◊ **Icon Sets** — will use sets of similar icons that will visually indicate a cell’s value relative to a set threshold.

There are also options for creating a new rule, for clearing rules, and for managing rules.
Conditional Formatting in a PivotTable, continued

◊ When selecting any of the top five menu options, a submenu appears with additional selections.

◊ For the **Highlight Cells Rules and Top/Bottom Rules** you will get an additional dialog to enter a value and color choice.

◊ As you point to the DataBars, Color Scales, and Icon Sets options the submenus are live preview galleries.

◊ For the **Highlight Cells and Top/Bottom Rules** options, you will not see the preview until you have selected the specific rule or submenu.

◊ To implement the conditional formatting, just click the submenu option of your choice.

◊ Once the Conditional Formatting is applied, it will be applied to the selected cell only. A Smart Tag appears next to the cell; clicking it will allow the formatting to be extended to the entire field.

◊ If the New Rule choice is selected, you are able to apply the formatting to field as the rule is created.

**Note**

Selecting the second option from the **Smart Tag** list will let you switch **Row** labels if needed because the formatting is applied to the values, not the field.
### Conditional Formatting, continued

**Clearing Conditional Formats**

- To clear the formatting, select a cell within the field.
- Click on the [Conditional Formatting] button.
- Select *Clear Rules* from the menu.
- Then, select *Clear Rules from This PivotTable* from the submenu.

---

**Note**

If the PivotTable isn’t active when the *Clear Rule* option is selected, the *Clear from PivotTable* will not be available.
Action 2.5 - Applying Conditional Formatting

Instructions:

1. **MyShipping.xlsx** should still be open.

2. Select cell C6.

3. On the **Home Tab** in the **Styles Group**, click the **[Conditional Formatting]** button drop-down and choose **New Rule**.

4. In the **Select a Rule Type** area of the dialog, choose **Format all cells based on their values**.

5. In the **Edit the Rule Description** area, choose **Icon Set** from the **Format Style** drop-down.

6. Choose the top icon set from the **Icon Style** drop-down.

7. For the Green icon set the fields as:
   - **Operator:** >=
   - **Value:** 4000
   - **Type:** Number

8. For the Yellow icon set the fields as:
   - **Operator:** >=
   - **Value:** 1000
   - **Type:** Number

9. Click the **[OK]** button.

10. On the **Home Tab** in the **Styles Group**, click the **[Conditional Formatting]** button drop-down and choose **Manage Rules**.

11. Select the **Icon Set** rule and click the **[Edit Rule...]** button.

Results/ Comments:

If not, reopen it.

The first cell with a value.

The **New Formatting Rule** dialog opens.

The top choice from the list.

The **Icon Sets** controls are displayed in the **Edit the Rule Description** area.

The **Traffic Light** set.

This sets the upper parameters of the rule.

This sets the mid range parameters of the rule.

Only the selected cell is affected by the rule.

The **Conditional Formatting Rules Manager** dialog opens.

This is the only rule listed and clicking the **[Edit Rule]** button opens the **Edit Formatting Rule** dialog.
12. In the **Apply Rule To:** area select the *All cells showing “Sales” values for “Product Name”* radio button.

13. Click the [OK] button.

14. Click the [Apply] button then the [OK] button.

15. Select an empty cell.

16. On the *Home Tab* in the Styles Group, click the [Conditional Formatting] button drop-down and examine *Clear Rules* options.

17. Select any cell in the *PivotTable*.

18. On the *Home Tab* in the Styles Group, click the [Conditional Formatting] button drop-down and choose *Clear Rules* options and select *Clear Rules From This PivotTable*.

19. Save the file but leave it open.

20. Right-click cell A6 and choose *Collapse Entire Field* from the menu.

21. Select cell C6, on the *Home Tab* in the Styles Group, click the [Conditional Formatting] button drop-down *Greater Than* from the *Highlight Cell Rules* group.

22. Click into the first field of the *Greater Than* dialog and enter 150000.
### Instructions:

23. Click the [OK] button.

24. Click on the **Formatting Options Smart Tag**.

25. Choose the last radio button.

26. On the **Home Tab** in the **Styles Group**, click the **Conditional Formatting** button drop-down and choose **Clear Rules** options and select **Clear Rules From This PivotTable**.

27. Save the file but leave it open.

### Results/ Comments:

The conditional formatting is applied to that cell only. A Smart Tag is shown beside the cell.

A list of options on how to extend the conditional formatting is displayed.

The conditional formatting is applied for the rest of the column.

All conditional formatting is removed.

[Ctrl S].
Grouping Data

When the **PivotTable** data is presented in its smallest value, you frequently end up with detailed information that would be better represented by being grouped. *Excel* will automatically apply grouping when date data is added to the rows or columns area of the **PivotTable**. As data is added, you will see a Month field added along side the days. If data being added to the rows area contains numeric information, it is not automatically grouped, but grouping can be applied. Grouping allows you to see data in larger sets that can be expanded to reveal more granular and detailed views of specific data.

**Grouping Data in a PivotTable**

◊ Drag a date field from the list of **PivotTable** fields into the **Rows** area in the **PivotTable Field** pane.

◊ The data should be displayed in both Month and Date fields.

◊ If the automatic grouping did not occur or you want to modify the grouping:

   - Drag the date field from the **PivotTable Field** pane into the **Rows** area.

   - Right-click a date in the PivotTable and choose **Group** from the menu.

◊ On the **Analyze Tab** in the **Group** Group, click the [Group Selection] button.

- OR -

◊ Right-click a date in the **PivotTable** and choose **Group** from the menu.
Depending on the type of data being grouped (Date or Numeric), the Group dialog offers the appropriate controls.

![Number Grouping](image1)

- **Apply the desired grouping structure and click the [OK] button.**

### Sorting by Fiscal Year

- **In the PivotTable Field pane, add date field in the Rows area.**
- **If Automatic grouping is turned on, the dates should appear in two columns- Months and Date.**
- **Right-click either of these columns and choose Group from the menu.**

- **OR –**
- **On the Analyze Tab in the Group Group, click the [Group Selection] button.**
- **Check the Quarters checkbox and click the [OK] button.**
- **Open the Find & Replace dialog by using the [Ctrl H] shortcut.**

- **OR –**
- **On the Home Tab in the Editing Group, click the [Find & Select] drop-down and choose Replace from the menu.**
Lesson 2: Filtering PivotTables

Grouping Data, continued

◊ In the **Find** field, type in **Qtr3** (to start the fiscal year in July)

◊ In the **Replace** field, type in **Quarter1** (or however you want the name displayed)

◊ Tap the **[Replace All]** button.
  
  ◊ Repeat for each of the remaining quarters accordingly.

◊ Once all the quarters have been renamed:
  
  ◊ Use the Sort options from the field drop-down to sort the quarter automatically.
  
  ◊ Select each quarter cell: hover over the border until the cursor changes to the move cursor and drag into correct position to sort them manually. Repeat to arrange the quarters correctly.
## Instructions:

1. **MyShipping.xlsx** should still be open.

2. In the *PivotTable Field* pane, drag both the **Salesperson** and **Product Name** out of the *Rows* area.

3. Drag the **Quantity** field into the *Rows* area.

4. On the *Analyze Tab* in the **Group** **Group**, click the *[Group Selection]* button.

5. In the *Grouping* dialog:
   - Uncheck the **Ending at:** checkbox and set the value to 250,
   - In the **by:** field set the value to 50,
   - Click the *[OK]* button.

6. In the *PivotTable Field* pane, drag the **Quantity** field out of the *Rows* area.

7. Drag **Order Date** from the field list into the *Rows* area.

8. Click the *[Plus]* button to expand any month.

9. Click the *[Minus]* button to collapse the month.

10. On the *Analyze Tab* in the **Group** **Group**, click the *[Group Selection]* button.

11. Check the **Quarters** checkbox and click the *[OK]* button.

## Results/ Comments:

If not, reopen it.

These fields are removed from the *PivotTable*.

The quantities are added to the *PivotTable*.

The *Grouping* dialog opens.

The **Quantities** field is grouped by 50’s.

The field is removed from the *PivotTable*.

The *Rows* are grouped by month. If the fields are collapsed then you will also see the **Order Date** column.

Any days that month where an order was made are displayed.

The *Grouping* dialog opens. You could also right-click any cell in either the **Month** or **Order Date** field and choose **Group** from the menu.

A **Quarters** column is added to the *PivotTable*. 
Instructions:

12. Expand and collapse the fields in the PivotTable so that the Quarters are expanded but the Months are collapsed.

13. Save the file but leave it open.

14. On the Home Tab in the Editing Group, click the [Find & Select] drop-down and choose Replace from the menu.

15. In the Find field type in:
   - Qtr3,
   - In the Replace field type in:
     - Quarter 1
   - Click the [Replace All] button.

16. Repeat to change each of the remaining quarters accordingly.

17. Click the Quarter field drop-down and choose Sort Oldest to Newest

18. Save the file but leave it open.

Results/ Comments:

- [Ctrl S].
  - The Find & Replace dialog opens.
  - [Ctrl H] is the replace key command.

  - The first quarter of the fiscal year is named.

  - Each of the fiscal year quarters are named.

  - The month are sort in accordance to fiscal year.

  - [Ctrl S].
Using the Slicer

Slicers are used to easily filter of data in the PivotTable or PivotChart. To add slicers to either PivotTable or PivotCharts look in the Filter Group on the Analyze Tab. Excel now also offers Timeline slicers for date data.

A slicer can be used to filter data by fields which are not currently used in the PivotTable. This allows a new level of flexibility. They can also be connected to multiple PivotTables and/or PivotCharts by using the [Filter Connections] button. All connected objects are filtered at once. To display information that pertains only to a specific item or combination of items, click on that option in one of the available slicers.

Generating Slicers

 Gow on the Analyze Tab in the Filter Group, click the [Insert Slicer] button.

 Gow The Insert Slicers dialog is displayed.

 Gow All data fields are lists in the dialog.
 Gow Check the fields which will be used to filter the data.
 Gow Click [OK].

Note

If you use the [Insert Timeline] button, then the field list will only include date fields in the list of options.
When the dialog closes, a slicer for each of the checked fields is added to the worksheet. When one is selected, the bounding box controls and **Slicer Tools Options Tab** are displayed.

This tab will allow you to change the title, format, connections, size and position of the Slicers.

**Using Slicers**

◊ Clicking a button in the Slicer will apply a filter to display only that item. To add to the filter you can hold the

◊ [Shift] key to select consecutively

- OR -

◊ [Ctrl] key for non-consecutive selections

◊ Or click the [Multi-Select] button at the top of the Slicer.

The **PivotTable** automatically shows only the information related to the selected item(s). If you have a **PivotChart** created based on the same **PivotTable**, the **PivotChart** will also display the selection(s).

**Using a Filter Versus Using a Slicer**

Is it better to use a **Filter** or a **Slicer**? Prior to 2010, **Slicers** were not available for use in a **PivotTable**. Slicers make it easier to see the current filtering state when you filter on multiple items. Making it easier to understand what exactly is being shown in a filtered **PivotTable**. Additionally, **Slicers** offer the ability to use one **Slicer** for multiple tables.
Lesson 2: Filtering PivotTables

Using the Slicer continued

Clearing a Slicer Filter
◇ Click on the [Clear Filter] button in the top right corner of the Slicer.

Closing or Deleting a Slicer
◇ Select the Slicer.
◇ Press the [Delete] key.
   - OR -
◇ Right-click on the Slicer and select Remove <Slicer Name> from the shortcut list.

Formatting a Slicer
◇ Select the Slicer you would like to format.
◇ When the Slicer Tools Options Tab appears.
◇ In the Slicer Group you are able to:
   ◇ Change the Slicer Caption to a more descriptive name.
   ◇ Access the Slicer Setting dialog by clicking the [Slicer Settings] button.
   ◇ Modify the connections of the slicer by clicking the [Report Connections] button.
   ◇ Choose a Slicer style from the Slicer Styles Gallery by selecting an option from the gallery.
   ◇ The Buttons group allows you to set number of button columns in the slicer as well as their size.
   ◇ The Size group allows set the size of the Slicer.

Note
Be careful when changing the height and width of the slicer buttons. Use the Height and Width settings in the Button group.
Using the Slicer Settings Dialog

The following options are available in the Slicer Settings dialog which are accessed by clicking the [Slicer Settings] button on the Slicer Tools Options Tab or right-clicking on the Slicer Title Bar and choosing Slicer Settings from the menu.

- **Name:** This is to identify the object on the spreadsheet. The default name is usually displayed, but can be changed to a more appropriate title.

- The **Display Header** checkbox will turn the Header on the Slicer off and on. Consider turning the header off when it is unnecessary or you are trying to fit the slicer into a small area.

- The **Item Sorting and Filtering** section is to determine how the values appear in the slicers.

- **Visually indicate items with no data,** means that even if there is no data, the button for that category/item will still appear in the slicer. You may see this when you connect your slicer to multiple PivotTables. The button will simply be grayed out if there is no data associated with it.

- **Show items with no data last,** will put that button at the bottom of the slicer. The buttons will be re-arranged to show those with data first, going from left-to-right, top-to-bottom.

- **Show items deleted from the data source** will still show a button in the Slicer for items that have been deleted, as long as items deleted from the data source are being retained in the PivotTable Options.
Slicer Connections

When a slicer is created in relation to a **PivotTable**, it is used to filter that **PivotTable**. It is possible to connect multiple **PivotTables** to a single slicer, as long as the data source is the same and on the same worksheet. When multiple **PivotTables** are connected to a single slicer, that slicer is able to filter all connected tables at once. The data source must be exact, if rows or columns are added or removed from the data source, then the source is no longer the same and the connections will not be possible. The Slicers would have to be recreated and re-connected.

Adding Connections

◊ Once the **PivotTables** have been created.

◊ On the **Analyze Tab** in the **Filter Group**, click the **[Insert Slicer]** button.

◊ On the **Slicer Options Tab** in the **Slicer Group**, click the **[Report Connections]** button.

◊ The **Report Connections (Field Name)** dialog opens.

◊ Any **PivotTables** based on the exact same data source will be listed in the dialog.

◊ Check all the PivotTable checkboxes to be controlled by this slicer and click **[OK]**.
**Action 2.7 - Adding Slicers**

**Instructions:**

1. **MyShipping.xlsx** should still be open.
2. Duplicate *Sheet1*.
3. Drag all the fields out of the *Rows* area in the *PivotTable Field* pane.
4. Drag Country and Company name fields into the Rows area.
5. On the *Analyze Tab* in the *PivotTable Group*, type *SecondTable* in the *PivotTable Name* field.
6. Switch back to *Sheet1* and click into the *PivotTable*.
7. On the *Analyze Tab* in the *Filter Group*, click the [*Insert Slicer*] button.
8. From the list of available fields, check the *Salesperson* checkbox and click the [*OK*] button.
9. Examine the *Slicer Options Tab*.
10. Hover over the border of the slicer, the cursor will change to a four sided move cursor. Drag the slicer into column H of the worksheet.

**Results/ Comments:**

If not, reopen it.

On the *Sheet1* tab, hold the [Ctrl] key as you right-click and drag over so that the small black triangle is to the right of the *Sheet1* tab, let go of the mouse to duplicate the entire worksheet.

To name the PivotTable.

The *Insert Slicer* dialog opens, showing a list of all data fields in the data set the *PivotTable* is based on.

While you are able to choose more than one field from the list, we will use only one at this time. The Salesperson Slicer is added.

This is a contextual tab, only available when the slicer is actively selected.

While the slicer is selected the bounding box controls are visible, allowing for easy resizing of the slicer.
Instructions:

11. Using the bounding box controls, resize the Slicer to show only three buttons vertically. Then make the slicer twice as wide.

12. On the Slicer Options Tab in the Buttons Group, change the number of columns in the Columns field from 1 to 2.

13. On the Slicer Options Tab in the Slicer Styles Group, click the more button and choose any style from the gallery.


15. Check the SecondTable checkbox and click [OK].

16. Click the [Andrew Fuller] button in the Slicer.

17. Hold the [Shift] key and click the [Laura Callahan] button.

18. Click the [Clear Filter] button.

19. Click the [Multi-Select] button.

20. Click the [Andrew Fuller] button in the Slicer.

Results/ Comments:

As you hover over the controls (small white circles) the cursor changes to a double headed arrow, allowing you to resize the width, height, or both.

The Slicer now has two columns of buttons.

The Slicer Style gallery is displayed and when you choose one, that style is applied to the Slicer.

The Report Connections (Salesperson) dialog opens, showing a list of all PivotTables that can be connected using this slicer.

The Slicer will now apply filtering to both PivotTables at the same time.

Only data pertaining to Andrew Fuller is displayed.

Using the [Shift] key allows for continuous selection, now all data pertaining the Andrew, Anne, Janet, and Laura is displayed in the PivotTable. Using the [Ctrl] key allows for non-continuous selection.

The filtering is removed and all data is displayed.

Now when a button is clicked, that choice is removed from the PivotTable.

Andrew Fuller’s data is removed from the PivotTable.
### Instructions:

21. Switch to **Sheet1(2)**.

22. Notice that the data here is also not showing information about *Andrew Fuller*.

23. Switch back to **Sheet1** and change the choices in the slicer.

24. Switch to **Sheet1(2)**.

25. Notice that the data here reflects the choice made on the slicer.

26. Save and close the file.

### Results/ Comments:

Consider creating a new Window and tiling the two sheets vertical to better see the changes as they are made.

[Ctrl S] & [Ctrl W].
Lesson 3: Advanced Features of PivotTables

Lesson Overview

You will cover the following concepts in this chapter:

◊ PivotTable and PivotChart Wizard
◊ Installing PivotTable and PivotChart Wizard
◊ Using the Wizard
◊ Consolidating Multiple Workbooks Or Worksheets
◊ Editing A Consolidated PivotTable
◊ Calculated Fields and Calculated Items
◊ Adding A Calculated Item
◊ Adding A Calculated Field
◊ Editing Calculated Items Or Fields
◊ Solve Order and Displaying Formulas
PivotTable and PivotChart Wizard

Frequently, data may be stored in multiple workbooks or worksheets within a single workbook needs to be consolidated into a PivotTable. Excel offers the PivotTable and PivotChart Wizard is the tool to accomplish this type of task although you must add the button to the interface in either the QAT (Quick Access Toolbar) or a customized ribbon tab.

Considerations for Setting Up Your Source Data

◊ Your data ranges should be set up in a cross-tabular format with matching column names for items that you want to summarize together.

◊ The data being consolidated should be numeric data.

◊ Total rows or columns should not be included from within the source data when you are specifying the data range for the report.

◊ Consolidations can use Page Fields that contain items representing one or more of the data source ranges. For example, if combining data from departments to create a company budget the Page Field can define each source as the department.

◊ Consolidations can use Named Ranges which perform better when the Named Ranged are managed in the source files. As rows are added or removed from the named range the consolidated PivotTable will reflect those changes when refreshed.

◊ Consolidations can also use formulas such as a 3D Reference, or the [Consolidate] command located on the Data Tab in the Data Tools group.
Installing PivotTable and PivotChart Wizard

On your Quick Access Toolbar (QAT), located at the upper-left corner of your Excel screen, select the [Customize] button and select the More Commands option.

- OR -

Access the Excel Options window from the File Tab and select the Quick Access Toolbar category.

From the Choose commands from: field drop-down, select All Commands.

Scroll down and select the [PivotTable and PivotChart Wizard] icon, then click the [Add] button to add it to the right-hand column.

Click the [OK] button to apply the change and close the Options.

The PivotTable and PivotChart Wizard icon appears on your QAT and return you back to your Excel worksheet.
Action 3.1 - Adding The PivotTable and PivotChart Wizard

Instructions:

1. On your Quick Access Toolbar at the top left of your Excel workbook, click on the [Customize] button and select More Commands from the list.

2. In the Excel Options dialog, under Choose commands from: field drop-down select All Commands.

3. Scroll down and select the PivotTable and PivotChart Wizard then click the [Add] to add it to the right-hand column.

4. Click the [OK] button and the [PivotTable and PivotChart Wizard] button will appear on your QAT and return you Excel.

Results/ Comments:

- The Excel Options window opens. The [Alt] [F] [T] key sequence will also open the Options window. If using the keys you will need to choose the Quick Access Toolbar from the list of categories on the left.

- This field is above the left column of available commands. Choosing All Commands now lists every command in Excel, including otherwise unavailable commands.

- The list is alphabetical. Once the command you want is selected, doubling clicking the command will add it to the QAT.

- The Options window closes.
Using the Wizard

Now that the [PivotTable and PivotChart Wizard] button has been added to the QAT and the data sources have been opened and prepared, it is ready for use. Clicking the button opens the wizard. This wizard has three steps but the number of sub-steps varies depending on which data source is selected in step one.

**Step 1: What Type of Consolidation do I want?**

In Step 1 of the PivotTable and PivotChart Wizard, there are several selections to determine the type of consolidation you wish to produce. Depending on the choice made here Step 2 will differ.

![PivotTable and PivotChart Wizard - Step 1 of 3](image)

**Step 2: Choosing the Data Source**

1: **Microsoft Excel List or Database**

Choose this option when the source data is on a spreadsheet in an open workbook. Excel recognizes the contiguous data and extends the selection to include all connected data as the source. Choosing this source and clicking the [Next] button opens the Step 2 dialog.

![PivotTable and PivotChart Wizard - Step 2 of 3](image)

Click into the Range field and then select a cell in the data set on the spreadsheet. You can only add one data range when using this option. Once the data range has been defined, click the [Next] button to advance to Step3 dialog.

*Note:* This is very similar to using the [PivotTable] button on the Insert Tab.
Using the Wizard, continued

2: External Data Source

This option is used when the data source is in another workbook or in a database. These would be data sources which are completely external to the currently active workbook. Excel will generate a PivotTable from the database tables or other workbooks. Clicking the [Next] button with this option selected opens the Step 2 dialog.

![PivotTable and PivotChart Wizard - Step 2 of 3](image)

Here you would click the [Get Data...] button to open the Choose Data Source dialog where you could choose from existing connections or create new ones from scratch.

![Choose Data Source](image)

Once the data source connection has been made, the Step 2 dialog is re-displayed with the [Next] button active. Click the [Next] button to advance to Step3 dialog.

3: Multiple Consolidation Ranges

Select this option when source data is stored in other workbooks or other worksheets within the current Excel workbook. Source data from multiple locations will be consolidated into a single PivotTable which can be refreshed as data is updated in each source location. Allowing for broader views of large multi-source data sets. Clicking the [Next] button opens the Step 2a dialog. This dialog allows you to choose whether Excel will generate a Page Field or you will.

![PivotTable and PivotChart Wizard - Step 2a of 3](image)

Note

If using other workbooks, open and tile them before beginning this process. If using data from other worksheets, you can open new windows for each worksheet and tile them before beginning.
Once this choice is made, the next dialog allows you to choose the data sources and/or create page fields.

4: Another PivotTable Report or PivotChart Report
This option is used when you want to create a new PivotTable based on an existing PivotTable in the current workbook. As any source PivotTables or PivotCharts data is refreshed, this generated is also refreshed. Clicking the [Next] button with this option is selected opens this Step 2 dialog. This dialog lists all PivotTable or PivotCharts in the workbook. (only one can be selected.) Once this step is completed the next dialog allows you to set the location of the PivotTable.

Step 3: Where to add PivotTable or PivotChart
After the data sources have been defined, the Step 3 dialog allows you to set where the new PivotTable or PivotChart is placed into the document.
Consolidating Data From Multiple Excel Sources

Excel offers several methods to combine or compile data from across multiple worksheets or workbooks. Linking the files through formulas or using the Consolidation tool allows you to aggregate data, creating data sets which provide clearer insights and understanding of information being gathered or tracked in Excel. When you want to generate a PivotTable from this data but do not need to have all the individual data sets in the file or a single worksheet, using the **PivotTable and PivotChart Wizard** provides the best solution.

Before combining data from different workbooks, consider opening and tiling the source files before using the **PivotTable Wizard** to make this process run as smoothly as possible. In the example above, the **PivotTable** will be placed into the blank workbook. This could also be a blank worksheet in a file with data being drawn from other worksheets.

Choosing **Multiple Consolidation Ranges** in **Step 1 of the PivotTable and PivotChart Wizard** will bring together data from across workbooks or worksheets. **Step 2a** is where you need to consider an over all report filtering, the filter can be generated automatically by the program or you can set the number of and name the page fields manually.
Consolidating Multiple Workbooks Or Worksheets, continued

◊ **Create a single page field for me:** this option generates a single page field based on the source data being combined. As the sources are defined, Excel organizes them alphabetically by name, not in the order added. Each source will be given the name of Item and assigned a number.

◊ **I will create the page fields:** this options allows you to set the number of and name the page fields. The number of page fields can range from 0 to 4. When naming the page field consider the data being named, does the data refer to a region, year or month, or some other commonality that can uniquely be assigned to the specific data being referred to.

**Using The Create A Single Page Field**

On Step 2b of the PivotTable and PivotChart Wizard, you will select and add the data ranges to be consolidated.

◊ Click into the **Range:** field, then select the worksheet and highlight the cell range containing the data.

◊ Click the [Add] button.

◊ With the selected range still highlighted in the **Range:** field, continue to select each workbook or worksheet and highlight the data set clicking the [Add] button after each.

◊ Notice the ranges in the **All ranges:** field are listed in alphabetical order, no matter the order they were added.
Consolidating Multiple Workbooks Or Worksheets, continued

Creating Your Own Page Fields

On Step 2b of the PivotTable and PivotChart Wizard, you will select and add the data ranges to be consolidated, as well as name and determine the number of page field required.

◊ Click into the Range: field, then select the worksheet and highlight the cell range containing the data.
◊ Click the [Add] button.
◊ With the selected range still highlighted in the Range: field, continue to select each worksheet and highlight the data set and click the [Add] button after each.
◊ Once all the ranges have been added:

![Dialog box showing the selection of page fields.]

◊ Select number of page fields in the How many page fields do you want section of the dialog.
◊ Select the first range in the All ranges: field.
◊ Click into the Field one: field and type in a name that helps define the data set.
◊ Continued adding names to each Field name field and giving unique and descriptive names.
◊ Select the next range in the All ranges: field and repeat naming each field. As you do this the existing names are available in the field name drop downs. There will be names that apply to more than one data set, this will act as a mechanism that groups the data in logical ways. (years, regions, etc..)
Instructions:

1. Open the ConsolidatedSales.xlsx workbook.
2. Click the [PivotTable and PivotChart Wizard] on the QAT.
3. In Step 1 of the Wizard, select the [Multiple consolidation ranges] and PivotTable radio buttons, then click [Next].
4. For Step 2a of the Wizard, select the Create a single page field for me radio button, then click [Next].
5. In Step 2b of the wizard, click into the Range: field.
6. Click the Hellmen-Jan worksheet and select the range A3:E8.
7. Click the [Add] button.
8. Repeat the steps 5 to 7 to add the data ranges from the other worksheets in the workbook. The February months cell ranges will be A3:E7.
9. Click [Next] to continue.
10. In Step 3 of the wizard, select the New worksheet radio button, leave the default cell address, and click the [Finish] button.
11. In the PivotTable, click the Page 1 filter drop-down.
12. Save the file.

Results/ Comments:

The PivotTable and PivotChart Wizard opens.

Choosing this option will allow you to pull data from across all the worksheets in this workbook into a new PivotTable.

You will be letting Excel determine a page field for the PivotTable.

You will be selecting the ranges you want to consolidate.

This represent the first range of data to be consolidated.

The range is added into the All ranges: field.

To continue adding all the other data ranges.

Step 3 of the wizard is opened.

The new PivotTable will be placed into it's own worksheet.

The list displays each option as Item#, which may not be very useful.

[Ctrl S].
Lesson 3: Advanced Features of PivotTables

Editing A Consolidated PivotTable

Once you have created a PivotTable and need to modify the Source data or add page fields of your own design, you will use the *PivotTable and PivotChart Wizard* again. If the active cell is outside of the consolidated PivotTable and you click the *[PivotTable and PivotChart Wizard]* button, you will be starting a new consolidation. With a cell actively selected within the consolidated *PivotTable*, you will open the wizard at Step 3 of the dialog, and it is possible to use the *[Back]* button to step back through the process.

Reasons it may become necessary to modify the consolidated *PivotTable* include the addition of or deletion of rows or columns within data sets, or deciding that it is necessary to create page fields.

Modifying a Consolidated PivotTable

- Select any cell within the consolidated PivotTable and click the *[PivotTable and PivotChart Wizard]* button.
- The *PivotTable and PivotChart Wizard* dialog opens to Step 3 of the process.

- Click the *[Back]* button to step back to Step 2b.
- If you need to change the ranges:
  - Select the range to be modified in the *All ranges:* field and click the *[Delete]* button.
  - Click into the *Range:* field, re-define the range and click the *[Add]* button.
  - Once all changes have been made, click the *[Next]* button to proceed to Step 3.
Lesson 3: Advanced Features of PivotTables

Editing A Consolidated PivotTable, continued

If you want to switch from having the single page field created for you to *I will create the page fields*:

- While still in the *Step 2b* dialog, click the [Back] button at go back to *Step 2a*.
- In the *Step 2a* dialog choose the *I will create the page fields* radio button, click the [Next] button.

The *Step 2b* dialog is redisplayed, notice that all your previous selections are still in place, and you can now define the number of fields and assign them names.

- Select the radio button for the number of fields to add.
- Select the first range in the **All ranges**: field.
- Click into the **Field one**: field, and type in a name that helps define the data set.
- Continued adding names to each **Field name** field, giving unique and descriptive names to each data range in the **All ranges**: field.
Lesson 3: Advanced Features of PivotTables

Editing A Consolidated PivotTable, continued

Once all the ranges have had their fields named, click the [Next] button to advance to Step 3 of the dialog.

In the Step 3 dialog, don’t change anything, and click the [Finish] button to update the PivotTable.

Using Find&Replace to Rename Page Field Items

For the times when you simply wish to change the number items in the list to descriptive names without having to go back a create page fields, use the Find and Replace tools.

Drag the Page1 field out of the Filter area in the PivotTable Fields pane to the Rows area.

The Find&Replace tool will not work if the Page1 field is in the Filter area.

On the Home Tab in the Editing Group, click the [Find & Select] button drop-down and choose Replace.

In the Find and Replace dialog:

In the Find what: field, type in the Item# to replace.

In the Replace with: field, type in what it should be replaced with.

Click the [Replace All] button.

Excel notifies you that one replacement has been made.

Repeat the find and replace until all items have been renamed.

Close the Find and Replace dialog.

Drag the Page1 field back into the Filter area of the PivotTable Field pane.
Action 3.3 - Modifying A Consolidated PivotTable

Instructions:

1. The ConsolidatedSales.xlsx file should still be open.
2. Select cell A14 on Sheet1.
3. Click the [PivotTable and PivotChart Wizard] button in the QAT.
4. Click the [Cancel] button to exit the dialog.
5. Select cell A4 on Sheet1.
6. Click the [PivotTable and PivotChart Wizard] button in the QAT.
7. Click the [Back] button twice to return to Step 2a of the dialog.
8. Choose the I will create the page fields radio button and click the [Next] button.
9. Click the 2 radio button in the How many page fields do you want? section of the dialog.
10. In the All ranges: field select the first item in the list.
11. Click into the Field One field and type <Hellmen >.
12. Click into the Field Two field and type <Feb >.

Results/ Comments:

If not, re-open it.

An empty cell on the sheet where the PivotTable is located.

The PivotTable and PivotChart Wizard dialog opens to Step 1. Since you were not in the PivotTable, Excel assumes you want to create a new one.

This cell is within the PivotTable.

The PivotTable and PivotChart Wizard dialog opens to Step 3. Excel now assumes you wish to modify the existing PivotTable created with this tool.

Here you can change how the page fields are added to the PivotTable.

You will now create the number of pages fields.

The Field One and Field Two fields are now active.

The Hellmen-Feb data range is highlighted.

This is the name applied in the first field associated with the data range.

This is the name applied in the second field associated with the data range.
13. In the **All ranges:** field select the second item in the list.

14. Click into the **Field One** field and type `< Hellmen >`.

15. Click into the **Field Two** field and type `< Jan >`.

16. Continued selecting the data ranges from the **All ranges:** field and applying appropriate named to the fields.

17. Once all data ranges have been assigned fields and names, click the [**Next**] button to advance to **Step 3** of the dialog.

18. Click the [**Finish**] button to complete making the modifications.

19. Click the Page 1 field drop-down to examine the available fields to filter by.

20. Select cell A1 and type in; `< Sales Rep >`.

21. Drag the Page2 field into the **Filter** area of the **PivotTable Field** pane. (If Necessary)

22. Select cell A2 and type in; `< Months >`.

23. Select cell A5 and type in; `< Week >`.

24. Rename the Column Label cell with a descriptive name of your own choosing.

25. Save the file.

---

**Results/ Comments:**

The Hellmen-Jan data range is highlighted.

This is the name applied in the first field associated with the data range.

This is the name applied in the second field associated with the data range.

Each data range should get names applied in both field to better help identify them.

Do not change the location since you are currently only updating the active **PivotTable**.

This drop-down offers the list of Sales Reps the **PivotTable** can be filtered by.

Rename the label according to the grouping offer in the drop-down list.

The field and label are added in cells A1 and A2.

Rename the label according to the names offered in the drop-down list.

Since this field contains financial data consider naming it Financial.

[**Ctrl S**].
Calculated Fields and Calculated Items

You can use summary functions in value fields from an underlying data source in PivotTable Reports. If they do not provide the results that you want or need, you can create your own formulas using Calculated Fields and Calculated Items.

The difference between a Calculated Field and a Calculated Item is that a Calculated Field will add an additional row or column to your PivotTable, which then becomes a row or column from which other calculations can be created. A Calculated Item, on the other hand, creates a calculation within a field.

For example, you might use a summary function to add up January, February, and March to return a First Quarter Total. You could then use First Quarter Total as a Calculated Field in a formula.

An example of a Calculated Item would be if you want to sum only those occurrences on certain days of the week.

When you are working with Calculated Fields, it is important to remember the summary functions that are available for source data (with the exception of On Line Analytical Processing or OLAP data).

<table>
<thead>
<tr>
<th>Function</th>
<th>Summarizes</th>
</tr>
</thead>
<tbody>
<tr>
<td>SUM</td>
<td>Sum of the values. Default function for numeric data.</td>
</tr>
<tr>
<td>COUNT</td>
<td>Counts the number of data values.</td>
</tr>
<tr>
<td>AVERAGE</td>
<td>The average of the values.</td>
</tr>
<tr>
<td>MAX</td>
<td>The largest value.</td>
</tr>
<tr>
<td>MIN</td>
<td>The smallest value.</td>
</tr>
<tr>
<td>PRODUCT</td>
<td>The product of the values.</td>
</tr>
<tr>
<td>COUNT NUMBERS</td>
<td>Counts the number of data values that are numerical.</td>
</tr>
<tr>
<td>STDEV</td>
<td>Estimate of the standard deviation of a population, where the sample is a subset of the entire population.</td>
</tr>
<tr>
<td>STDEVP</td>
<td>Standard deviation of a population, where the population is all of the data to be summarized.</td>
</tr>
<tr>
<td>VAR</td>
<td>Estimate of the variance of a population, where the sample is a subset of the entire population.</td>
</tr>
<tr>
<td>VARP</td>
<td>The variance of a population, where the population is all of the data to be summarized.</td>
</tr>
</tbody>
</table>
In addition to these summary functions, there are other functions available for **Custom Calculations** in **Value Fields**. The list below shows some of the available options from the **Show Values As** calculations list.

<table>
<thead>
<tr>
<th>Function</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>Difference From</td>
<td>Displays values as the difference from the value of the Base Item in the Base Field.</td>
</tr>
<tr>
<td>% Of</td>
<td>Displays values as a percentage of the value of the Base Item in the Base Field.</td>
</tr>
<tr>
<td>% Difference From</td>
<td>Displays values as the percentage difference from the value of the Base Item in the Base Field.</td>
</tr>
<tr>
<td>Running Total In</td>
<td>Displays the value for successive items in the Base Field as a running total.</td>
</tr>
<tr>
<td>% of Row</td>
<td>Displays the value in each row or category as a percentage of the total for the row or category.</td>
</tr>
<tr>
<td>% of Column</td>
<td>Displays all of the values in each column or series as a percentage of the total for the column or series.</td>
</tr>
<tr>
<td>% of Total</td>
<td>Displays values as a percentage of the Grand Total of all of the values or data points in the report.</td>
</tr>
<tr>
<td>Index</td>
<td>Calculates values as follows: ( ((\text{Value in Cell}) \times \text{(Grand Total of Grant Totals)}) / ((\text{Grand Row Total}) \times \text{(Grand Column Total)}) )</td>
</tr>
</tbody>
</table>

If **Summary Functions** and **Custom Calculations** do not provide the desired results, you can create your own **Formulas** in **Calculated Fields** and **Calculated Items**.

For data that comes from an **external data source** or from **worksheet data**, Excel uses the **Sum** function to calculate **Value Fields** that contain numeric data, and the **Count** function to calculate **Value Fields** that contain text.

You can choose a different summary function like **Average**, **Max** or **Min** to further analyze or customize the data.
Calculated Fields and Calculated Items, continued

When you use Formulas in a PivotTable Report, you must be aware of syntax rules and formula behaviors.

◊ You can use operators and expressions as you do in other worksheet formulas.

◊ You can use constants and refer to data from the report, however you cannot use cell references or defined names.

◊ Formulas for Calculated Fields operate on the sum of the underlying data for any fields in the formula. Therefore, you cannot sort a Calculated Field.

◊ Formulas cannot refer to totals.

◊ You can include the Field Name in a reference to an Item but the Item Name must be in square [ ] brackets.

◊ If you refer to an Item by its position in your PivotTable Report as it is currently sorted and displayed, the Item referred to can change whenever the position of the Item changes or is displayed or hidden. Hidden Items will not be counted in an index.

◊ You cannot add Calculated Items to PivotTable data that contains Averages.

◊ You cannot add Calculated Items to data that has been Grouped.

Creating a Formula in a PivotTable Report

◊ Decide whether you are creating a Calculated Field or a Calculated Item within a field.

Use a Calculated Field when you want to use the data from another field in your formula.

Use a Calculated Item when you want something calculated within a field.
Lesson 3: Advanced Features of PivotTables

Adding A Calculated Item

Note: A field must be actively selected in order to add a Calculated Item.

Adding a Calculated Item to a Field

◊ If the Items in the Field are grouped, select the Analyze Tab, in the Group Group select [Ungroup].

◊ Select the field where you want to place the Calculated Item.

◊ On the Analysis Tab, in the Calculations Group click the [Fields, Items, & Sets] button drop-down and choose Calculated Item from the menu.

◊ The Insert Calculated Item in “Field Name” dialog opens.

◊ In the Name: field, type a name for the Calculated Item.

◊ In the Formula: field, enter the formula for the item.

◊ The Fields: field list shows all the PivotTable fields. The highlighted field in this list is the one having a Calculated Item added.

◊ The Items: field lists all the items from the selected field.

◊ To use data from an item in the formula, click the Item in the Items: field list, then click [Insert Item] button. The items can only be used in the field that is having the Calculated Item added.

◊ Click [Add] if you are creating more than one Calculated Item.

◊ Click the [OK] button to complete the process and see the results.

◊ Select any of the new cells and examine the Formula Bar.

◊ Regroup the items if necessary.

Note: In Calculated Items, different formulas can be entered cell by cell.
Instructions:

1. The ConsolidatedSales.xlsx file should still be open.

2. In the PivotTable Field pane, drag the Sales Reps and Months fields from the Filter area to the top of the Rows area.

3. On the Design Tab in the Layout Group, click the [Report Layout] button drop-down and choose Show in Tabular Form from the menu.

4. On the Design Tab in the Layout Group, click the [Grand Totals] button drop-down and choose On for Columns Only from the menu.

5. On the Design Tab in the Layout Group, click the [Subtotals] button drop-down and choose Do Not Show Subtotals from the menu.

6. Select the cell with the label Sales, F5.

7. Move the cell over to column D.

8. Select cell F5.

9. On the Analyze Tab in the Calculations Group, click the [Fields, Item, & Sets] button drop-down and choose Calculated Item from the menu.

10. Click into the Name: field and type in Total Expenses.

Results/ Comments:

If not, re-open it.

You are rearranging the structure of the PivotTable.

The layout changes accordingly.

The totals column is removed from the PivotTable.

All subtotals are removed.

A heavy board line is displayed around the cell.

Set the cursor over the border line of the selected cell, the Move Arrow is shown. As you click and drag the cell a thick green I-beam is displayed that show where the content is being moved to.

This cell is in the field you will be adding a Calculated Item to.

The Insert Calculated Item in "Financial" dialog opens.

This will be the name of the new item in the Financial field.
Instructions:

11. Click into the **Formula:** field and type `=sum(` then in the **Items:** field select *Operational Expenses* and click the [Insert Item] button then type a `,` and in the **Items:** field select *Product Cost* and click the [Insert Item] button then type a `)`.  

12. Click the [OK] button.

13. Select cell **H5**.

14. On the **Analyze Tab** in the **Calculations Group**, click the [Fields, Item, & Sets] button drop-down and choose *Calculated Item* from the menu.

15. Click into the **Name:** field and type in **Bonus Earned**.

16. Click into the **Formula:** field and type `=if(` then in the **Items:** field select *Income* and click the [Insert Item] button then type a `>2000`, and in the **Items:** field select *Income* and click the [Insert Item] button then type a `*.05,0)`.

17. Click the [OK] button.

18. Rename the **Income** and **Sales** column headers as **Net Profit** and **Gross Sales**.

19. Save the file.

Results/ Comments:

This formula will add the two expense columns of data.

When completed the formula should read `=sum(Operational Expenses,Product Cost)`

The new item is added into the Financial field. If you select any cell containing a value in the new range, you can see the formula in the **Formula Bar**.

You will be adding another item to this field.

The Insert Calculated Item in “Financial” dialog opens.

This will be the name of the new item in the Financial field.

This formula will determine if a bonus was earned and the value of that bonus.

When completed the formula should read `=if(Income>2000,Income*.05,0)`

The new item is added in the Financial field.

Click into each of the headers cells and type new names.

[Ctrl S].
Adding A Calculated Field

◇ Select any cell in the PivotTable Report.
◇ On the Analyze Tab in the Calculations Group, click on [Fields, Items, & Sets] button drop-down and choose Calculated Field from the menu.
◇ The Insert Calculated Field dialog opens.

◇ In the Name: field, type a name for the field.
◇ In the Formula: field, enter the formula for the field.
◇ To use data from another field in the formula, select the field in the Fields: field list, then click [Insert Field].
◇ If you are creating more than one field click the [Add] button.
◇ Click the [OK] button to complete the process and see the results.
◇ To temporarily remove a Calculated Field from the PivotTable, uncheck the checkbox in the PivotTable Field pane.
**Action 3.5 - Creating a Calculated Field**

**Instructions:**

1. The ConsolidatedSales.xlsx file should still be open.

2. Select any cell in the PivotTable.

3. On the Analyze Tab in the Calculations Group, click the [Fields, Item, & Sets] button drop-down and choose Calculated Field from the menu.

4. Click into the Name: field and type in "Expense Reduction".

5. Click into the Formula: field and type = then in the Fields: field select Value and click the [Insert Field] button then type a -(, and in the Fields: field, select Value and click the [Insert Field] button and type * .03).

6. Click the [OK] button.

7. Notice there is now a Sum of Expense Reduction for each item in the Financial field.

8. Click the Financial field filter drop-down and uncheck every item in the list except Operational Expenses.

9. Right-click any cell with a value in the Sum of Value column and choose Value Field Settings... from the menu.

10. Click into the Custom Name: field and type Current Expenses.

11. Click the [Number Formats] button.

**Results/ Comments:**

If not, re-open it.

To add a Calculated Field you just need to be in the PivotTable.

The Insert Calculated Field dialog opens.

This will be the name of the new field.

This formula will calculate what the desire expense value will be.

When completed the formula should read =Value-(Value*.03)

The new field is added to the PivotTable.

This filed runs the calculation on each item in the field.

Limiting the data being displayed in the PivotTable.

The Value Field Settings dialog opens.

This will be the name given to this column of data.

The Format Cells dialog opens.
12. Choose the Currency category and click the [OK] button twice.

13. Right-click any cell with a value in the Sum of Expense Reduction column and choose Vale Field Settings... from the menu.

14. Click into the Custom Name: field and type Target Expenses.

15. Click the [Number Formats] button.

16. Choose the Currency category and click the [OK] button twice.

17. Examine the PivotTable data.

18. In the PivotTable Field pane, uncheck the Expense Reduction field.

19. Click the Financial field filter drop-down and check the (Select All) checkbox.

20. Save the file.

The currency format and name are applied to the column.

The Value Field Settings dialog opens.

This will be the name given to this column of data.

The Format Cells dialog opens.

The currency format and name are applied to the column.

You are seeing a very specific subset of information based on a mix of original and calculated data.

The Target Expenses field is removed from the PivotTable.

All the items in the Financial field are re-displayed.

[Ctrl S].
Editing Calculated Items or Fields

Calculated Items and Fields may need to be modified or corrected. This is done by opening the Calculated Items or Fields dialog and choosing the calculation to be edited.

Editing Calculated Items

◊ Select the a field, any field will work since you can choose the field in the dialog.

◊ On the Analyze Tab in the Calculations Group, click the [Fields, Items, & Sets] button drop-down and choose Calculated Item... from the menu.

◊ The Insert Calculated Items in "Field Name" dialog opens.

◊ Click the Name: field drop-down and choose the item to be edited.

◊ Click into the Formula: field and edit the formula as needed.

◊ Click the [OK] button to apply the edit.

Deleting Calculated Items

◊ Select a field. Any field will work since you can choose the field in the dialog.

◊ On the Analyze Tab in the Calculations Group, click the [Fields, Items, & Sets] button drop-down and choose Calculated Item... from the menu.

◊ The Insert Calculated Items in "Field Name" dialog opens.

◊ Click the Name: field drop-down and choose the item to be deleted, then click the [Delete] button.

◊ Click the [OK] button to apply.
Lesson 3: Advanced Features of PivotTables

Editing Calculated Items Or Fields, continued

Editing Calculated Fields

◊ With any cell in the PivotTable actively selected.
◊ On the Analyze Tab in the Calculations Group, click the [Fields, Items, & Sets] button drop-down and choose Calculated Field... from the menu.
◊ The Insert Calculated Field dialog opens.

◊ Click the Name: field drop-down and choose the item to be edited.
◊ Click into the Formula: field and edit the formula as needed.
◊ Click the [OK] button to apply the edit.

Deleting Calculated Items

◊ Set the a field. Any field will work since you can choose the field in the dialog.
◊ On the Analyze Tab in the Calculations Group, click the [Fields, Items, & Sets] button drop-down and choose Calculated Item... from the menu.
◊ The Insert Calculated Items in “Field Name” dialog opens.
◊ Click the Name: field drop-down and choose the item to be deleted, then click the [Delete] button.
◊ Click the [OK] button to apply.
Action 3.6 - Editing Calculations

Instructions:

1. The ConsolidatedSales.xlsx file should still be open.

2. Select any column field header cell in the PivotTable.

3. On the Analyze Tab in the Calculations Group, click the [Fields, Item, & Sets] button drop-down and choose Calculated Item... from the menu.

4. Click the drop-down of the Name: field and select Bonus Earned from the list.

5. Click into the Formula: field and change the value of 2000 to 1500.

6. Click the [OK] button.

7. Select any cell in the PivotTable.

8. On the Analyze Tab in the Calculations Group, click the [Fields, Item, & Sets] button drop-down and choose Calculated Field... from the menu.

9. Click the drop-down of the Name: field and select Expense Reduction from the list.

10. Click the [Delete] button.

11. Click the [OK] button.

12. Save the file.

Results/ Comments:

If not, re-open it.

To edit a Calculated Item you must first have a field actively selected; Gross Sales, Net Profit, Operational Expenses, or Product Cost.

The Insert Calculated Item in "Field Name" dialog opens.

The list of all existing field calculations are shown in the list. Choosing one of these will show the name and formula in the appropriate fields of the dialog.

To lower the threshold to earn a bonus.

The edit is applied to the item.

When editing Calculated Fields, any cell in the PivotTable can be selected.

The Insert Calculated Field dialog opens.

The field details area displayed in the dialog. At this point the field can be edited or deleted.

The field is removed.

The field is no longer listed in the PivotTable Field pane.

[Ctrl S].
Changing the Order
If you are not getting the results that you expected, you can change the order in which the calculations are performed for your Multiple Calculated Items.

◊ Click on a cell inside your PivotTable.

◊ On the Analyze Tab in the Calculations Group, click the [Fields, Items, & Sets] button drop-down and choose Solve Order.

◊ Select a formula from the list, click on the [Move Up] or [Move Down] button to change the calculation order.

Displaying Formulas
To display or view all the formulas that you are using in your PivotTable do the following:

◊ On the Analyze Tab in the Calculations Group, click the [Fields, Items, & Sets] button drop-down and choose List Formulas.

◊ A new worksheet listing the Solve Order and Calculations used in the current PivotTable is created.
### Action 3.7 - Solver Order and Viewing The Calculations

**Instructions:**

1. The ConsolidatedSales.xlsx file should still be open.

2. Select any field cell in the PivotTable.

3. On the Analyze Tab in the Calculations Group, click the [Fields, Item, & Sets] button drop-down and choose Solve Order... from the menu.

4. Select the second formula in the Solve Order: field list.

5. Notice that the [Move Up] button is now active.

6. Click the [Close] button without making any changes to the current order.

7. On the Analyze Tab in the Calculations Group, click the [Fields, Item, & Sets] button drop-down and choose List Formulas from the menu.

8. Examine the new worksheet.

9. Save the file.

**Results/ Comments:**

If not, re-open it.

The Calculated Item Solve Order dialog opens. This dialog shows all calculated items used in the PivotTable.

Choosing one of the formulas in the list will activate the [Move Up] or [Move Down] buttons. Rearranging the order of the formulas can change results if the items are used in other formulas.

The dialog closes, there was no need to change anything in this instance.

A new worksheet is added to the workbook with detailed information about the solve order and formulas in use.

[Ctrl S].
Lesson 4: Creating and Modifying PivotCharts

Lesson Overview

You will cover the following concepts in this chapter:

- PivotCharts
- Inserting PivotCharts
- Filtering PivotCharts
- Formatting PivotCharts
Lesson 4: Creating and Modifying PivotCharts

Once you have created the **PivotTable**, you can create a **PivotChart** to help better visualize the data. **PivotCharts** are always based on **PivotTables**, in other words it is possible to have a **PivotTable** without a **PivotChart** but not a **PivotChart** without a **PivotTable**.

Creating a **PivotChart** can be done straight from the source data using the charting tools, *PivotTable and PivotChart Wizard*, or it can be created once the **PivotTable** has been setup. If you filter either of these related objects the changes are reflected in the other.

A **PivotChart** is not unlike a regular chart, in that you have access to the *Chart Design* and *Formatting Tabs*, chart control buttons in the chart (minus the [Filtering] button), as well as the chart elements formatting pane. Although, since it is a **PivotChart** you will also have an *Analyze Tab* and similar filter tools as the **PivotTable**.

---

**Note**

When you create a **PivotChart** from scratch, a corresponding **PivotTable** is automatically created.

---

![Diagram of PivotChart](image-url)
Creating a PivotChart from the Source data

- Select any cell in a structured data set. (Just like the data set used to create a PivotTable)
- On the Insert Tab in the Charts Group click the [PivotChart] button.

The Insert PivotChart dialog opens.

- This dialog is the same as the dialog when inserting PivotTables using the [Insert PivotTable] button.
- You will define the data range the PivotTable and PivotChart will be based on.
- You will also decide where the PivotTable and PivotChart will be placed within the workbook.
- When the [OK] button is clicked a blank PivotTable and PivotChart are placed.

Now you will use the PivotTable Field pane to move the fields into the PivotTable and subsequently the PivotChart also.
Creating a Chart Based on an Existing PivotTable

◊ Select a cell in the PivotTable.
◊ On the Analyze Tab in the Tools Group click the [PivotChart] button.

◊ The Insert Chart dialog opens.

◊ Choose the type of chart most suited to your data and click [OK].

◊ The new PivotChart is placed onto the same worksheet as the PivotTable that it is based on.

---

Inserting PivotCharts, continued

Note

The [F11] key will still create a new chart on its’ own worksheet, since the source is a PivotTable the new chart will be a PivotChart. This will use the default chart type and formatting.

Chart Types Not Support as PivotChart

X Y Scatter
Treemap
Histogram
Funnel
Map
Radar
Box & Whisker
Stock
Sunburst
Waterfall
**Action 4.1 - Creating a PivotChart From Source data**

<table>
<thead>
<tr>
<th>Instructions:</th>
<th>Results/ Comments:</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Open the <em>ShippingPivotChart.xlsx</em> file.</td>
<td>From the data files folder.</td>
</tr>
<tr>
<td>2. Select any cell within the data set.</td>
<td>The <em>Create PivotChart</em> dialog opens.</td>
</tr>
<tr>
<td>3. On the <em>Insert Tab</em> in the <em>Charts Group</em>, click the [<em>PivotChart</em>] button.</td>
<td><em>Excel</em> has expanded the range to include all connected data.</td>
</tr>
<tr>
<td>4. In the <em>Rang/Table</em> field, the range should read <em>Invoices!$A$1:$K$2156</em>.</td>
<td>This ensures the new <em>PivotTable</em> and <em>PivotChart</em> will be on a separate worksheet. (Remember it is not possible to have a PivotChart without a PivotTable.)</td>
</tr>
<tr>
<td>5. The <em>New Worksheet</em> radio button should also be selected.</td>
<td>The new worksheet is added and the are both, a blank <em>PivotTable</em> and <em>PivotChart</em> with all the pivoting tools active.</td>
</tr>
<tr>
<td>6. Click the [<em>OK</em>] button.</td>
<td>Notice the tabs and tools available to manipulate it, a mix of the charting and pivoting tools</td>
</tr>
<tr>
<td>7. Activate the PivotChart by clicking into the chart area.</td>
<td>As the fields are placed into pivot areas both the table and chart reflect the changes.</td>
</tr>
<tr>
<td>8. In the <em>PivotTable Field</em> pane, drag-<em>Country</em> into Filter <em>Salesperson</em> into Axis (Categories) <em>Quantity</em> and <em>Sales</em> into Values</td>
<td>Whatever changes are made to the chart are reflected in the table.</td>
</tr>
<tr>
<td>9. In the <em>PivotChart</em>, click the <em>Country</em> filter drop-down and select any country from the list. Click the [<em>OK</em>] button to apply the filter.</td>
<td>Whatever changes are made to the table are reflected in the chart.</td>
</tr>
<tr>
<td>10. In the <em>PivotTable</em>, click the <em>Country</em> filter drop-down and choose <em>All</em>. Click the [<em>OK</em>] button to apply the filter.</td>
<td></td>
</tr>
<tr>
<td>11. Save and Close the file.</td>
<td><strong>[Ctrl S] and [Ctrl W].</strong></td>
</tr>
</tbody>
</table>
Instructions:

1. The ConsolidatedSales.xlsx file should still be open.

2. Select any cell in the PivotTable on Sheet1.

3. On the Analyze Tab in the Tools Group, click the [PivotChart] button.

4. In the Insert Chart dialog choose the Column category and click the [OK] button.

5. Select the PivotChart and notice the tabs and tools available to manipulate it.

6. On the Analyze Tab in the Actions Group, click the [Move Chart] button.

7. Choose the New sheet: radio button and click the [OK] button.

8. Save the file.

Results/ Comments:

If not, re-open it. Use the ConsolidatedSalesCompleted.xlsx workbook if the other has been closed without saving.

The Insert PivotChart dialog opens.

Take a moment to look at the charts types that can be used. When done the chart is placed on the same worksheet as the source.

The tools are a mix of the charting and pivoting tools. The same relation between the table and chart exists as in the previous exercise.

The Move Chart dialog opens. Notice there are many of the same tools as the Analyze Tab in a PivotTable.

A new worksheet named Chart1 is added with a full size chart. It is also removed from the original location.

[Ctrl S].

Excel 2016: PivotTable Features, Rel. 1.0, 12/21/2020
Lesson 4: Creating and Modifying PivotCharts, Page 105
Once the **PivotChart** has been created, it is time to take advantage of its filtering capabilities to better understand trends in the data. Filtering in a **PivotChart** offers the same functionality as in a **PivotTable**: value and label filters, sorting, and slicers are available.

### Using Field Filter Drop-downs

- Select the **PivotChart**.
- In the **PivotChart Field** pane drag the field into the **PivotChart** areas.

Notice the names of the areas have changed:
- Rows are now referred to as **Axis**
- Columns are now referred to as **Legend**

- The field filter buttons are added to the **PivotChart**.
- If you do not see the buttons added to the chart, they are currently hidden.
- To unhide them, go to the **Analyze Tab** and click the [Field Buttons] drop-down and uncheck **Hide all**.

From this drop-down, you are able to turn on and off specific field filter buttons. This allows you more control over how the data is filtered.
Adding Slicers and Timelines

Both the slicer and timeline slicer work as they do in a PivotTable, so this will be very familiar. These elements offer another way to control what level of access users will have in modifying the PivotChart. It is important to note that slicers can only be added when the PivotChart is on the same worksheet as the PivotTable.

◊ Select the PivotChart on the same sheet as the PivotTable.

◊ On the Analyze Tab in the Filter Group, click the [Insert Slicer] button.

◊ The Insert Slicer dialog opens.

◊ Chose the field you want to add and click the [OK] button.

◊ The slicers are added and the Slicer Tools Options Tab is accessible on the ribbon. Allowing you to apply formatting to the slicer.

When you have added a slicer object to a PivotChart you will be able to see what the they are connected to with the Filter Connections.

◊ On the Analyze Tab in the Filters Group click the [Filter Connections] button.

◊ The Filter Connections dialog opens.

◊ Unchecking a connection disables the slicer object but does not remove it from the worksheet.

Note

If the majority of tools are not active on the PivotChart Analyze Tab, the PivotChart is on its own worksheet.
Action 4.3 - Adding a Slicer

Instructions:

1. The ConsolidatedSales.xlsx file should still be open.
2. Click into the PivotChart on the Chart1 worksheet.
3. Examine the Analyze Tab.
4. Right click the tab and choose Delete from menu.
5. In the Delete Worksheet dialog, click the [Yes] button.
6. Select any cell in the PivotTable on Sheet1.
7. On the Analyze Tab in the Tools Group, click the [PivotChart] button.
8. In the Insert Chart dialog choose the Column category and click the [OK] button.
9. Examine the Filter Group in the Analyze Tab.
10. On the Analyze Tab in the Filter Group, click the [Insert Slicer] button.
11. Choose Sales Reps and click [OK].
12. Choose one to the salespeople buttons in the slicer.
13. Click into the chart.

Results/ Comments:

If not, re-open it.

All of the Filter Group tools are greyed out. The tools are not available since the PivotChart is not on the same worksheet as the PivotTable.

The Delete Worksheet dialog opens.

The Chart1 worksheet is deleted.

The PivotTable Tabs are now active.

The Insert Chart dialog opens.

A chart is added to the existing worksheet with the PivotTable.

Since this chart is on the same worksheet as the PivotTable, the Filter Group tools are available.

The Insert Slicer dialog opens, showing the list of all available fields.

The Sales Rep slicer is added to the worksheet.

Both the chart and table reflect the filtering choice.

The Chart Tabs are now available.
**Action 4.3 - Adding a Slicer, continued**

**Instructions:**

14. On the **Analyze Tab** in the **Actions Group**, click the **[Move Chart]** button.

15. In the **Move Chart** dialog select the **New Worksheet** radio button and name the worksheet; **Chart2** and click the **[OK]** button.

16. On the **View Tab** in the **Windows Group**, click the **[New Window]** button.

17. On the **View Tab** in the **Windows Group**, click the **[Arrange Windows]** button.

18. Choose **Tiled** and click the **[OK]** button.

19. Activate **Sheet 1** and zoom out to make the slicer and table visible.

20. Click a different salesperson button in the slicer.

21. Save the file.

**Results/ Comments:**

The **Move Chart** dialog opens.

The chart is moved to it's own worksheet.

A new window of the workbook is created.

The **Arrange Windows** dialog opens.

There are two windows of the workbook displayed side by side.

Now both worksheets are visible.

As the slicer is modified, both the **PivotTable** and **PivotChart** are still modified. This is because the chart was first created on the same worksheet as the PivotTable.

**[Ctrl S]**.
As with regular charts, when the chart is active the PivotChart Design and Format Tabs are available along with the Analyze Tab.

PivotChart Tools

<table>
<thead>
<tr>
<th>Analyze</th>
<th>Design</th>
<th>Format</th>
</tr>
</thead>
</table>

Both the Design and Format Tabs are consistent with regular chart tools. The Analyze Tab offers the same tools as in the PivotTable.

When the PivotChart is actively selected, you will have access to the [Chart Elements] and [Chart Styles] button at the upper left corner of the chart. Since this is a PivotChart the [Chart Filter] button is not available.
Using the Format Shape Dialog Box

An alternative to using the tools on the Format Tab, is to use the Format Selection pane. Right-clicking a chart element and choosing Format (Element Name) from the menu will open the Format Selection pane on the right side of the interface. The Format pane can also be accessed by clicking on the [Format Selection] button on the Format Tab. The options in the Format Selection pane will change based on the selected element in the PivotChart. You can use the words at the top, or the icons below those, or the index below the icons to select the different elements you wish to affect.

While this Format Selection pane is open, other elements in the PivotChart can be formatted as they are selected. You may keep the Format Selection pane open and simply click on an element to format, make changes, then select the next element to format. When all the elements have been formatted, you can close the pane since all formatting has been completed.
**Instructions:**

1. The ConsolidatedSales.xlsx file should still be open.

2. Activate the Chart2 window and click the [Maximize] button in the upper right corner of the window.

3. Right-click anywhere in the chart on the Chart2 worksheet.

4. Choose Format ... form the menu.

5. Locate the Element Selector drop-down below the Format... title and click on it.

6. From the list of options, choose Plot Area.

7. Click the Fill & Lines icon.

8. Expand the Fill options.

9. Click the Picture or texture fill radio button.

10. Below the [Insert] button is the Texture drop-down. Click it and choose the White Marble image.

11. Once an image or texture is placed, use the Transparency slider to make it semi-opaque.

12. From the Element Selector drop-down, choose Vertical (Value) Axis.

---

**Results/ Comments:**

If not, re-open it.

This window is now full screen.

You may see a wide variety of elements to format, choose any that are available. The Format .... pane opens.

This lists any chart editable elements, this list will vary depending to the chart type.

The Plot Area formatting options are displayed in the Format pane.

It looks like a paint bucket. The Fill & Line formatting options are displayed.

Those controls are now displayed. You can now add logos or other types of imagery.

These basic textures are part of the program. You can choose any of these.

Creating a very nice washed out background image.

The Format pane now offers all controls to related to the selected element.
Action 4.4 - Formatting PivotChart Elements

Instructions:

13. Click the **Axis Options** icon.

14. Expand the **Axis** options.

15. Change the Minor units to **1000**.

16. Change the Major Units to **4000**.

17. Click anywhere in the chart and then click the [Chart Elements] button.

18. In the **Gridlines** fly-out menu, check the **Primary Minor Horizontal** checkbox.

19. Click the [Chart Elements] button again to collapse the options.

20. In the **Format** pane, choose **Vertical (Value) Axis Minor Gridlines**.

21. Click the **Fill & Lines** icon and expand the **Lines** options.

22. Choose **Black** from the **Color Picker** and in the **Width** field, set the value to **1.25**.

23. Try changing the **Vertical (Value) Axis Major Gridlines** to **Black** with a width of **1.5**.

24. Save the file and close all open windows.

Results/ Comments:

It looks like a small three column chart.

Here, you are now able to set the axis scale as well as the major & minor lines as needed.

Nothing changes yet because the Minor Gridlines are not currently displayed.

The major gridlines are now 4000 intervals.

This is the small + located in the upper right corner of the chart.

The minor gridlines are now added to the chart, but are not very easily seen.

This button must be clicked to display the options and then clicked to hide the options.

The formatting controls of the minor gridlines are displayed.

Line formatting controls are displayed.

The minor lines are now more clearly displayed.

Repeat steps 20 to 22 in relation to the Major Gridlines.

You can continue to explore formatting other chart elements to practice further. [**Ctrl S**] and [**Ctrl W**].
Lesson 5: Creating PivotTables from External Data

You will cover the following concepts in this chapter:

◊ Get Data from a CSV File
◊ Power Query
◊ Editing a Query
There are many instances where the required data is stored outside of Excel. Beginning with Excel 2016 you can use the Get & Transform tools to connect to and query data sources. These new tools allow you to use Power Query to bring data into Excel. These tools are accessed from the Data Tab in Excel.

Data source types include:
- CSV or Text file
- Excel tables or cell ranges
- Other Excel files
- Web pages where the data is stored in tables
- SQL servers
- ODBC (Open Database Connectivity)
- Access Databases
- XML files
- Sharepoint
- Azure
- Oracle
- OLE DB (Object Linking and Embedding Database)
- JSON files
- Analysis Services
- Exchange
- Active Directories
- Facebook
- Teradata
Get Data from a CSV File

One common way data is extracted from a database and given to users is with CSV (Comma Separated Value) files. These CSV files are simple plain text documents, as such they can contain vast amounts of data with relatively small file sizes. Power Query automatically detects delimiters and established columns based on those delimiters, first rows are also as headers of the columns.

**Connecting to CSV files**

- Activate the *Data Tab* in the ribbon.
- In the *Get & Transform Group*, click the [From Text/CSV] button.
- The *Import Data* dialog opens, allowing you to search for the necessary files.
- Once the file has been selected and opened, the Navigator window opens.
Get Data from a CSV File, continued

- The Navigator window shows a preview of the data to be imported. If there are multiple sheet, pages, or tables in the source, it also allows you to choose what table or sheet of data to connect to.

- If the data is clean and ready to use, then you can click the [Load] button drop-down.

- Choosing Load will import the data as a table directly into the active cell on the active worksheet.

- Choosing Load To from the drop-down allows you to decide how the data will be imported. You can choose as a Table, PivotTable Report, PivotChart, or simply to Create the Connection.
Power Query

Should the data need further editing in order to pull in only what is required, clicking the [Transform Data] button in the Navigator window will open the Power Query window. This workspace allows users to remove unnecessary columns, split columns into more meaningful data, change data types, and basically further refine the dataset to your specifications.

Using Power Query

◊ While in the Navigator window, click the [Transform Data] button to open the data in Power Query Editor.

◊ This window can be expanded to full screen. It uses the same ribbon navigation system as in Excel and the other Office programs.

◊ The Query Setting pane on the right side shows each step you take, you are able to modify any of those steps as needed. You can undo, redo, modify a step, and even rearrange the steps order.

◊ Once the data has been modifies to suit your needs, on the Home Tab use the [Close & Load] button drop-down to Load or Load To, just as in the Navigator window.
Power Query, continued

Managing Columns

The Power Query Editor allows you to bring in only the necessary columns from a data source. To select columns continuously, select the first column and hold the Shift key as you select the last desired column. For non-continuous selections, select the first columns then hold the Ctrl key as you select each subsequent column. Once the wanted or unwanted columns are selected, use the [Remove Columns] button drop-down in the Manage Columns Group on the Home Tab. You will also find tools that allow you to control rows in a similar fashion as columns.

Split a Column

It is not uncommon to find a single column of data needs to be broken into several. The [Split Column] button offers an easy solution to the problem. You are able to define how or where the data is to be divided: use a set number of characters, a delimiter, case, or digit.

◊ Select the column to be split.

◊ Click the [Split Column] button drop-down.

◊ Choosing By Delimiter opens the Split Column by Delimiter dialog.
Power Query, continued

- In the *Split Column by Delimiter* dialog, you can choose from standard delimiters or use a custom one found in the data.

![Split Column by Delimiter dialog]

- Once the columns have been generated, it is a good idea to rename them accordingly.
- Select the column header cell.
- Right-click the cell; choose *Rename* from the menu.
- Type the appropriate name and tap the *Enter* key.

**Sorting & Filtering Data**

- Select the column containing data to be sorted by or filtered.
- Click the drop-down in the header cell.
- Use the tools in the drop-down as you would in any table filter drop-down.
5.1 - Getting Data from A CSV File

Instructions:

1. Open a blank new workbook.

2. Activate the Data Tab.

3. In the Get & Transfrom Group, click the [From Text/CSV] button.

4. Navigate to the lessons folder and choose the ShippingBase.csv file, click the [Import] button.

5. Examine the options in the Navigator window.

6. Click the [Load] button drop-down and choose Load to.

7. Select the PivotTable Report and Existing worksheet radio buttons, then click the [OK] button.

8. In the Pivottable Fields pane set: Salesperson field in Rows, Country in Filter, Sales in Values.

9. Add a new worksheet.

10. Save the file as MyQuery.xlsx.

Results/ Comments:

Ctrl N.

The Import Data dialog opens.

The Navigator window opens.

The second Import Data dialog opens.

A blank PivotTable is added in cell A1 of Sheet1.

The PivotTable now displays data.

Click the [New Worksheet] button beside the sheet tab.

Ctrl S.
### Instructions:

1. Activate the *Data Tab*.  
2. In the Get & Transform Group, click the [From Text/CSV] button. 
3. Navigate to the lessons folder and choose the `ShippingBase.csv` file, click the [Import] button. 
4. Click the [Transform Data] button. 
5. Examine the interface of the *Power Query Editor*. 
6. On the left side of the interface, click the [Expand] button below the ribbon. 
7. The data is shown in a tabular format. 
8. On the right side of the interface is the *Query Settings* pane. 

### Results/ Comments:

- The *Import Data* dialog opens. 
- The *Navigator* window opens. 
- The *Power Query Editor* window opens. 
- There is a tabbed navigation system in the ribbon. 
- A list of existing queries is displayed. 
- Clicking the [Expand] button will now collapse the *Queries* pane. 
- There is a formula bar above the spreadsheet, as in *Excel*. Each cell in the header row has a *Sorting and Filtering* drop-down. 
- This pane shows which query is active and any steps that have been applied to it.
### 5.2 - Editing the Query

**Instructions:**

<table>
<thead>
<tr>
<th>Step</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Select the <strong>Required Date</strong> and <strong>Shipped Date</strong> columns.</td>
</tr>
<tr>
<td>2.</td>
<td>On the <strong>Home Tab</strong>, click the [Remove Columns] button drop-down and choose <strong>Remove Columns</strong>.</td>
</tr>
<tr>
<td>3.</td>
<td>Select the <strong>Quantity</strong> column.</td>
</tr>
<tr>
<td>4.</td>
<td>On the <strong>Home Tab</strong>, click the [Data Type] button drop-down and choose <strong>Decimal Number</strong> from the list.</td>
</tr>
<tr>
<td>5.</td>
<td>Select the <strong>Unit Price</strong> column.</td>
</tr>
<tr>
<td>6.</td>
<td>On the <strong>Home Tab</strong>, click the [Remove Columns] button drop-down and choose <strong>Remove Columns</strong>.</td>
</tr>
<tr>
<td>7.</td>
<td>In the <strong>Query Setting</strong> pane, set your cursor over the last of the applied steps and click the X.</td>
</tr>
<tr>
<td>8.</td>
<td>Select the <strong>Order Date</strong> column.</td>
</tr>
<tr>
<td>9.</td>
<td>On the <strong>Home Tab</strong>, click the [Split Column] button drop-down and choose <strong>By Delimiter</strong> from the menu.</td>
</tr>
<tr>
<td>10.</td>
<td>Click the <strong>Select or enter delimiter</strong> drop-down and choose <strong>Custom</strong>.</td>
</tr>
<tr>
<td>11.</td>
<td>In the new blank field type in a / set the <strong>Split at</strong> radio button to <strong>Each occurrence of delimiter</strong> and click <strong>[OK]</strong>.</td>
</tr>
</tbody>
</table>

**Results/ Comments:**

Use the Ctrl or Shift keys to select multiple columns.

The columns are removed from the table and a new step has been added in the APPLIED STEPS area of the **Query Settings** pane.

You will change the data type of the column to decimal number.

The data type is now formatted as a decimal number; the formatting will be applied and visible when imported into Excel.

This is a mistake and needs to be corrected.

The last step is removed from the list, and the column is put back in place.

This column needs to split into three.

The **Split by delimiter** dialog opens.

A new blank field is added; you can type in any character to use as the delimiter.

This character separates the day, month, and year in the date. Since we want a column for each, choosing **Each occurrence of delimiter** option allow the column to be broken into three in one pass.
### Instructions:

12. Right-click the first of the new column headers, choose *Rename* from the menu.

13. Type in: **Month** and tap the **Enter** key.

14. Rename the other new columns as **Day** and **Year**.

15. Click the filter drop-down of the **Salesperson** column header.

16. Uncheck the *(Select All)* checkbox, then check the checkboxes for the first three names in the list.

17. On the **Home Tab**, click the [Close & Load] button drop-down and choose **Load to**.

18. Select the **Table** and **New worksheet** radio buttons, then click the **[OK]** button.

19. Save the file.

### Results/ Comments:

The header name is highlighted and ready to be changed.

The column is renamed.

Repeat steps 12 and 13 respectively.

Sorting and filtering controls are displayed in the menu.

Only records for these three reps will be imported.

The second *Import Data* dialog is opened.

A new table is placed on **Sheet3**. Notice the salesperson column only has the three selected names and the order date column is divided into the three desired columns, and the unit cost column is formatted with decimal numbers.

**Ctrl S.**
Editing a Query

After the data has been imported and tables or PivotTables created from the data, it may be necessary to go back and make further changes to the existing query. This is done from the Data Tab in Excel. The Queries & Connections pane lists all existing queries and allows you to jump to the data based on the selected query.

Accessing the Queries

◊ Open a workbook with data based on a query.
◊ Activate the Data Tab.
◊ In the Queries & Connections Group click the [Queries & Connection] button.
◊ The Queries & Connections pane opens.
◊ Clicking one of the connections will jump you to where the data is being used in the workbook.
◊ Hovering over a connection bring up a preview of the query and options related to the query.

Note

Right-click the connection to access options related to the selected connection.
Choosing *Edit* from the bottom of the preview will reopen the query in *Power Query Editor*.

- All the previous APPLIED STEPS are listed and fully editable.
- You have full control to continue making changes to the query.
- Whatever changes are made will be reflected in the table or PivotTable in excel when the [Close & Load] button is clicked.
5.3 - Re-Editing the Query

Instructions:

1. MyQuery.xlsx should still be open.

2. Activate the Data Tab.

3. In the Queries & Connections Group, click the [Queries & Connections] button.

4. Scroll over the two connections.

5. Click the first connection.

6. Click the second connection.

7. Click the [Edit] button at the bottom of the preview window of the second connection.

8. Click the X’s to remove the last several steps to the point the order date column is no longer split.

9. Click the [Close & Load] button.

10. Save and close the file.

Results/ Comments:

If not, re-open it.

The Queries & Connections pane opens or closes on the right side of interface, set it to open.

As you hover over the connection, a large preview window appears. The preview shows a snapshot of the data and connection related tools to edit, load, duplicate, merge, append, access the connection properties, or delete the connection.

You should be taken to the PivotTable on Sheet1.

You should be taken to the table on Sheet3.

The Power Query Editor window opens. Notice that all the step are still listed in the APPLIED STEPS section of the Query Settings pane. Right-click the connection will also allow you to edit the query.

Step back to remove the Split by Delimiter step.

If the drop-down menu appears, choose Load. The data in the table is reloaded and refreshed on the Excel spreadsheet.

Ctrl S and Ctrl W.
Appendix A

Lesson Overview

You will cover the following concepts in this chapter:

- Unlocking a Slicer
- Custom Slicer Styles
- Creating Custom PivotTable Styles
- Using Custom PivotTable Styles
Unlocking a Slicer in a Protected Worksheet

◊ Select the slicer(s) you wish the user to be able to manipulate.

◊ Right-click on a slicer and select Size and Properties... from the shortcut menu.

◊ The Format Slicer pane opens on the right side of the screen.

◊ Expand the Properties section and deselect the check box next to Locked.

◊ Click into the worksheet to deselect the Slicer(s).

◊ Click the Review Tab. In the Changes group, click on the [Protect Sheet] button.

◊ Click on the checkbox to Allow all users of this worksheet to: Use PivotTable & PivotChart.

◊ Click on the checkbox to Allow all users of this worksheet to: Select unlocked cells.
Custom Slicer Styles

There are different ways to format your Slicers so that the user can see what values have been selected and applied. Using the New Slicer Style item from the Slicer Styles Gallery on the Slicer Tools Options Tab, you can change the way a button appears when hovered over or selected.

◊ Select the Slicer you would like to affect, or choose one and press [Ctrl + A] to select all of the Slicers.
◊ Click the Options Tab. Click on the [More] button on the Slicer Styles Gallery.
◊ Select New Slicer Style.
◊ Type in an appropriate name for your Slicer Style in the Name: text box.
◊ In the New Slicer Style dialog, select one of the Slicer Elements in the list.
◊ Click on the [Format] button and select the formatting you would like to apply to that Element.
◊ Repeat the previous steps for all of the Slicer Elements you would like to change.
◊ To reuse the Slicer Style you just created, click on it in the Custom section of the Slicer Style Gallery.
Custom Slicer Styles, continued

Some of the items that can be changed in a Slicer Style are:

◊ **Header** - This is the Field Name at the top of the Slicer.

◊ **Selected Item with Data** - This is a value in the Slicer that is selected and has associated data in the PivotTable, and therefore, the PivotChart.

◊ **Selected Item with no Data** - This is a value in the Slicer that is selected and does not have associated data in the PivotTable and PivotChart. For example, if you filter the PivotTable and PivotChart to show data for a certain month, but there were no sales of the selected Product on the Slicer in that month.

◊ **Unselected Item with Data** - This is a value in the Slicer which has corresponding data within the filter criteria, but has not yet been selected in the Slicer.

◊ **Unselected Item with no Data** - It is helpful to format this element when you wish to see items that do not have corresponding data within the filter criteria. Using the example above, you may format this element if you would like to see which Products do not have sales in that month before you even select them.

◊ **Hovered Selected Item with Data** - This is a value in the Slicer that has already been selected. However, you may wish to also see a format change when you pass your mouse pointer over the value.
Custom Slicer Styles, continued

◊ **Hovered Selected Item with no Data** - This is a value that has been selected in the Slicer that does not have corresponding data in the PivotTable and/or PivotChart. When you pass your mouse pointer over this value, you may want to see a change in format.

◊ **Hovered Unselected Item with Data** - Change this element when you want a different format when you pass your mouse pointer over a value that has not been selected, but *does* have corresponding data in the PivotTable and/or PivotChart.

◊ **Hovered Unselected Item with no Data** - Change the format of this element when you wish to emphasize, on hover, buttons which do not have corresponding data in the PivotTable. This way you can see which items will not produce a result when selected.
Creating Custom PivotTable Styles

Creating a Custom PivotTable Style

◊ Click on any cell in the table to display the Design Tab on the Ribbon.

◊ In the PivotTable Styles Gallery, click on the [More] button.

◊ At the bottom of the Styles gallery, click on New PivotTable Style. This will open the New PivotTable Style dialog box.

◊ In the Name: text box, type an appropriate name for your PivotTable style.

◊ Use the Table Element: list to select an element of the PivotTable, then click on the [Format] button to open the Format Cells dialog box.

◊ In the Format Cells dialog box, click on one of the tabs to change the Font, Border, or Fill for that element.

◊ Click the checkbox to Set as default PivotTable quick style for this document if you wish all PivotTables in the current workbook to have this style.

Notice that your changes will show in the Preview window of the New PivotTable Style dialog box.

◊ Once you have made all of your selections, click [OK] to close the dialog box.
Applying a Custom PivotTable Style

◊ Click on any cell in the PivotTable.
◊ Select your custom PivotTable Style from the Custom section at the top of the PivotTable Styles Gallery.

Modifying a Custom PivotTable Style

◊ Click on any cell in the PivotTable.
◊ Right-click on your custom PivotTable Style in the Custom section of the PivotTable Styles gallery.
◊ Select Modify.

◊ When the Modify PivotTable Style dialog box opens, make the appropriate changes by, once again, selecting the Table Element: and then clicking on the [Format] button.
◊ Click [OK] when you have completed the modifications.

Note

Once created, your custom PivotTable style will not be applied automatically. You must click on it in the gallery to apply it.

Note

You can set any PivotTable quick style from the PivotTable Styles Gallery as the default style by right-clicking on it and selecting Set As Default.
Using Custom PivotTable Styles

Using a PivotTable Style in Another Workbook

◇ Select the PivotTable in the originating workbook with the style you would like to use.
◇ Copy it.
◇ Paste it into the workbook where you would like to use the PivotTable Style.
◇ Click on the PivotTable and create a New PivotTable Style using the New PivotTable Style menu item from the PivotTable Style Gallery.
◇ Click the checkbox at the bottom of the New PivotTable Quick Style dialog box to Set as default PivotTable quick style for this document.
◇ Delete the PivotTable from which you copied the style.
Appendix B

Lesson Overview

You will cover the following concepts in this chapter:

◊ Eliminating Leading and Trailing Spaces
◊ Removing Blank Rows and Columns in Your Data
Troubleshooting Data

**Leading and Trailing Spaces**

Sometimes the data being used for your PivotTable does not summarize correctly. One reason for this is that there may be extra spaces in the data itself. This can happen when the data is imported from another database or application. Excel treats a space as a character, therefore, this data is considered separate pieces of information even though it looks the same in the spreadsheet. This issue can be resolved with the Trim function.

**The TRIM Function**

In the datasheet, click into a blank cell or create a “dummy” column to create the formula.

- Type \(=\text{TRIM(reference cell)}\)
- Fill the formula down to the rest of the cells in the column.
- Copy the cells just created.
- Paste the values back to the original column.
- Refresh the PivotTable.

**Selecting Blank Rows/Columns for Elimination**

- Click on the *Home Tab*, then select the *Find & Select* button in the *Editing* group.
- Click on *Go To Special*... to open the *Go To Special* dialog box
- Select the *Blanks* option button and click [OK].
Troubleshooting Data, continued

◊ Delete the cells using the *Delete* (cells) dialog box from the [Delete] button on the *Home Tab*.

Press [Ctrl + -] to open the *Delete* (cells) dialog box.

![Delete dialog box](image)
Appendix C: Creating PivotTables from External Data - 2016

You will cover the following concepts in this chapter:

✧ Importing Data from External Data Sources
✧ Importing External Data Using the PivotTable Tool
✧ Creating a PivotTable from an Access Object
✧ Importing Data Using Microsoft Query Connection
Importing Data from External Data Sources

It is often the case that the data you need for your Excel PivotTable is stored in a database application or other files. Database applications are great for managing, maintaining, and retrieving large amounts of data. Database programs also provide features for defining relationships between data entities, for developing queries to extract information, and for securing sensitive information. For these reasons and more, organizations often make extensive use of databases.

Excel allows you to import data from a number of external sources. Moreover, the imported data can be linked to the source, so that any changes to the underlying source data tables can be refreshed and updated in your Excel worksheets.

The Microsoft Office suite provides drivers that will allow Excel to connect to a wide array of data sources.

Some of the data sources that you can connect to with Excel are:
- Microsoft SQL Server
- SQL Server Analysis Services Cube
- Microsoft Access and Microsoft FoxPro
- ODBC DSN
- OLAP Services and OLAP cubes
- dBase
- Oracle
- Paradox

In this lesson, we will discuss three different methods of importing external data into a PivotTable.
- Using the Insert PivotTable tool
- Using the From Access Object tool
- Using the Microsoft Query Connection

The advantages of each are discussed in their respective sections.

Connections to external data in the current workbook can be viewed and refreshed with the [Connections] button in the Connections Group on the Data Tab.

In a PivotTable or PivotChart, external connections can be refreshed using the [Refresh] button on the Analyze Tab.
Importing External Data Using the PivotTable Tool

Creating a PivotTable from External Data Using the PivotTable Tool

The advantage of creating the External Data Connection from the PivotTable tool is efficiency. By using the Create PivotTable dialog box, you can create the connection and the PivotTable simultaneously.

- Select the Insert Tab and click the down arrow on the [PivotTable] button.

  The Create PivotTable dialog box will be displayed.

- Click the Use an External Data Source option button.

  Click the [Choose Connection...] button.

  When the Existing Connections dialog box appears, select an item from the list and click [Open].

  - OR -

  Select [Browse for More...] to select a database not yet connected.

- OR -

  Select [Browse for More...] to select a database not yet connected.
Once you have selected the database, click [Open].

Depending on the external data source you have chosen, you may be asked for login credentials (a username and password) or other verifying information. If so, enter the appropriate information in the fields provided and click [OK].

You will be returned to the Create PivotTable dialog box to continue making your selections.

When you click [OK], the PivotTable will be created. You will see the PivotTable area and PivotTable Field List Task Pane as before, but now the field headings in the PivotTable Field List are from the external data source that you have selected.

Once you build a PivotTable using external data, you can refresh the table by clicking the Refresh button on the Data Tab. You may also use the [Refresh] button on the PivotTable Tools Analyze Tab or the PivotChart Analyze Tab. This will update the PivotTable with any changes made to pertinent data in the source database.

The connection you have created will be listed in the Existing Connections dialog box located on the Data Tab in the Connections Group for future use.
Instructions:

1. Open a blank workbook.
2. Select the Insert Tab.
3. From the Tables group, select the PivotTable button.
4. Select the Use an external data source option button.
5. Click [Choose Connection...].
6. Click the [Browse for More...] button.
7. From the exercise files folder, select the MultipleCriteria.accdb file.
8. Click [Open].
9. From the list of available tables in the Select Table dialog box, choose the Products table.
10. Click [OK], then click [OK] again to close the Create PivotTable dialog box.
11. Drag CategoryID to the Rows area.
12. Drag SupplierID to the Columns area.
13. Click on the checkbox for UnitsInStock.
14. Save the file in your Student Folder with the name Products PivotTable and close the file.

Results/ Comments:

This will open an Explorer window to allow you to browse for the database file.

This will open the Select Table dialog box which lists all of the tables and queries available to import.

This will create a PivotTable frame and show a PivotTable Field List with fields from the Products table.
Creating a PivotTable from an Access Object

PivotTables can also be created from Access database objects using the *Data Ribbon*. Just like a linked spreadsheet, the data in the PivotTable is also linked to the data in the Access database.

The advantage to using this method is that Excel only looks for Access data, making it easier to browse for the source file.

The disadvantage to using this method is that this method does not add the connection to the existing connections for future use.

**Using the Data Ribbon**

◊ Display Excel’s *Data Ribbon*.

◊ In the *Get External Data* group, click the *From Access* button.

◊ The *Select Data Source* dialog box will be displayed.

◊ Select the Access database that will serve as the source of the data.

◊ Click the [Open] button.

**Note**

It is a good idea to run advanced queries in the database program and then connect to the resulting query or table.
Creating a PivotTable from an Access Object, continued

- If the Access database being used has multiple tables or queries, the Select Table dialog box will be displayed.

![Select Table dialog box](image)

- Choose the table or query that contains your source data.
- Click the [OK] button.
- The next step is to use the Import Data dialog box to select how you want to view the imported data in Excel.

![Import Data dialog box](image)

- Click the [Properties] button in the Import Data dialog box to see the Connection Properties dialog box.

![Properties button](image)

Note: If the Access database has only one table, the Select Table dialog box will not appear.

Note: If you miss this step, you can also access the [Properties] button from the Connections group on the Data Tab.
In this box you can enable or disable settings for connections to external data sources, and use, reuse or switch connection files.

The **Usage** tab is used to control the way that the connection information is used in the workbook.

- If you put a check by **Refresh data when opening the file**, the table data will be refreshed from the database when you open the Excel workbook.
- You can also specify how much time should pass between refreshes with the **Refresh every** check box.

The **Definition** tab controls how the connection information is defined and the source of the connection information.

- When everything is set the way you want, click **[OK]** to implement the changes and return to the **Import Data** dialog box.
- When you have selected the **PivotTable Report** or **PivotChart option** button in the **Import Data** dialog box, click the **[OK]** button.
Here is the original data from the Access database.

Here is a **PivotTable** report based on imported data from the database.

- If you right click on the table you created in Excel, and click the **Refresh option** from the pop up menu that appears, the data in your Excel table will be updated with any changes made to the source data in the database.
**Action 5.2 - Creating a PivotTable and PivotChart from Access Data**

**Instructions:**

1. Open a blank workbook.
2. Select the **Data Tab**.
3. From the **Get External Data** group, select the **[From Access]** button.
4. Select the **MultipleCriteria.accdb** database from your exercise files folder, click **[Open]**.
5. In the **Select Table** dialog box, select **Orders** and click **[OK]**.
6. In the **Import Data** dialog box, select **[PivotChart]**.
7. In the **Where do you want to put the data?** area, make sure **Existing Worksheet** is selected and the range in the text box is **[$A$1]**.
8. Click **[OK]**.
9. The **PivotChart** and **PivotTable** frames will appear on the worksheet and the **PivotChart Fields** will appear on the right-side of the worksheet.
10. Click on the **PivotChart** frame.
11. In the **PivotChart Fields Task Pane** select **ShipCountry** and drag to **Axis** (Categories).
**Action 5.2 - Creating a PivotTable and PivotChart from Access Data, continued**

**Instructions:**

12. Then drag **ShipRegion** and **ShipPostalCode** from the **PivotChart Fields Task Pane** into the **Axis (Categories)** under **ShipCountry**.

13. Drag **Freight** into the **Values** area.

14. In the **Values** area, click on the drop-down arrow next to **Sum of Freight** and select **Value Field Settings**....

15. Select the **[Number Format]** button.

16. When the **Format Cells** dialog box opens, select **Accounting** to format the field.

17. Click **[OK]** to close the **Format Cells** dialog box, and then click **[OK]** again to close the **Value Field Settings** dialog box.

18. In the **PivotChart Fields Task Pane**, drag the **ShipPostalCode** out of the **Axis fields (Categories)** box.

19. In the **PivotChartTools**, click the **Design Tab**. In the Chart Layouts group, select **[AddChartElment]** and trace to Data Table and then select No Legend Key.

**Results/ Comments:**

This will start to populate the **PivotChart** and the **PivotTable** with the items that you have selected and you will begin to see how the data is going to display.

Notice that the PivotChart which, is displayed, does not display very useful information at this point. We will make changes to display the information we need.

Notice that the **PivotTable** changes to show totals by **Country** and **Region** and a **Grand Total** is at the bottom of the **PivotTable**.
Instructions:

<table>
<thead>
<tr>
<th>A</th>
<th>B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Row Labels</td>
<td>Sum of Freight</td>
</tr>
<tr>
<td>2</td>
<td>Canada  $136.10</td>
</tr>
<tr>
<td>3</td>
<td>BC      $132.60</td>
</tr>
<tr>
<td>4</td>
<td>Quebec $3.50</td>
</tr>
<tr>
<td>5</td>
<td>USA     $875.50</td>
</tr>
<tr>
<td>6</td>
<td>CA      $42.60</td>
</tr>
<tr>
<td>7</td>
<td>ID      $42.40</td>
</tr>
<tr>
<td>8</td>
<td>MA      $13.25</td>
</tr>
<tr>
<td>9</td>
<td>MO      $18.00</td>
</tr>
<tr>
<td>10</td>
<td>MT      $24.50</td>
</tr>
<tr>
<td>11</td>
<td>OR      $38.85</td>
</tr>
<tr>
<td>12</td>
<td>UT      $3.25</td>
</tr>
<tr>
<td>13</td>
<td>WA      $683.70</td>
</tr>
<tr>
<td>14</td>
<td>WV      $8.95</td>
</tr>
<tr>
<td>15</td>
<td>Grand Total $1,011.60</td>
</tr>
</tbody>
</table>

A table containing the amounts for each region appears below the horizontal axis.

Results/ Comments:

The resulting PivotTable and PivotChart should look like this:

20. Save the file as My PivotChart.xlsx and close the file.

A table containing the amounts for each region appears below the horizontal axis.
Importing Data Using Microsoft Query Connection

The Microsoft Query Connection allows you to import data from any Microsoft Application while filtering the data. The advantage of using this method is that the data that is imported fits a specific criteria and you do not end up with data you cannot use or that has to be deleted. In addition, any connection established using this method is added to the Existing Connections list and can be used in future data retrieval.

◊ Select the Data Tab.

◊ From the Get External Data group, click the [From Other Sources] drop-down arrow.

A menu is displayed with a number of options for connecting to an external data source.

The bottom option in this menu, Microsoft Query, is a powerful tool that will allow you to create a connection and build a query. A query is a way to extract specific information from a database.
Once you have selected From Microsoft Query from the [Other Sources] button, you will see the following dialog box. You will be creating an ODBC connection to the database.

The <New data source> option should already be selected.

Click [OK].

The Create New Data Source dialog box displays.

Type a name for your data source.

Click the drop-down to select a driver type for the new data source.

Click the [Connect] button to establish a connection.
Click on the [Select] button.

Browse to the location of the database and select the database you want to connect to. Click [OK].

You may be asked at this point to provide login credentials for the data source. Enter your login credentials and click [OK].

Once this named connection is created, the Query Wizard-Choose Columns dialog box will open to allow you to choose the tables and the columns of information that you can include in your query.
Select the table you want to include in your query by clicking on the [Expand] button, [+] Then, select the column of data you want to include in your query. Press the [>] to move your selection into the Columns in your query box.

When you have selected all the columns you want to include in your query, click [Next]

The Query Wizard - Filter Data dialog box is displayed. You can filter the data to extract specific information.

Select from one of your Column to filter: and in the Only include rows where: drop-down use the search criteria to build your filter.

Once you have made all of your selections, click [Next].

The Query Wizard - Sort Order dialog box will open and offer you the option to sort your selected data. Select the drop-down under Sort by and choose Ascending or Descending.

Once you have completed your selections, click [Next].
The final step is the *Query Wizard - Finish* dialog box which offers you the options to **Return Data to Microsoft Excel** or **View Data** or **Edit Query in Microsoft Query** if you want to make any changes, and **Save Query** if you are going to use the query again.

Name the query if you are going to save it. You will see in the background the information the query is extracting from the table. Click **[Save]**.

If you are selecting the option to **Return Data to Microsoft Excel**, Click **[Finish]**.
Importing Data Using Microsoft Query Connection, continued

You will now see the *Import Data* dialog box offering you the import options for your data, Click [OK].

![Import Data dialog box](image)

Your *Query* data will then appear in an Excel worksheet based on your selections in the dialog box.

![Excel table created from imported data](image)
Action 5.3 - Importing From External Data

Instructions:

1. Open a blank workbook.
2. Select the Data Tab.
3. From the Get External Data group, click the [From Other Sources] button.
4. Select From Microsoft Query.
5. Make sure <New Data Source> is selected and click [OK].
6. In the Create New Data Source dialog box, type Test for the name of the Data Source.
7. From the Select a driver for the type of database you want to access: drop-down list, select [Microsoft Access Driver *.mdb, *.accdb].
8. Under Click Connect and enter any information requested by the driver:, click [Connect].
9. In the ODBC Microsoft Access Setup dialog box, under Database, click on [Select] and browse to select the database ShippingDatabase.accdb.
10. Click [OK] to close the Select Database dialog box.
11. Then, click [OK] in the ODBC Microsoft Access Setup dialog box to return to the Create New Data Source dialog box.
12. Under Select a Default Table for Your Data Source (optional) select the drop-down.
13. Do not make a selection. Click [OK].

Results/ Comments:

Offers options of connecting to a variety of databases to obtain information for analysis.

The Choose Data Source dialog box will open.

This ensures the necessary filter is used for Excel to interpret the data coming from the type of database you are connecting to.

Here, you can see the existing Access objects in this file from which you can extract information.
**Instructions:**

12. You may be prompted with a Login Credentials dialog box. If so, select [OK].

13. Click [OK] to close the Choose Data Source dialog box.

14. Click the [+] to expand the CompanyNames table.

15. Select CompanyName and click the [ > ] arrow to move it into the Columns in your query: box.

16. Repeat steps 14 and 15 to move OrderID, Order Date and Quantity.

17. Click [Next].

18. Select Quantity in the Column to filter: box, then select the drop-down under Quantity to Only include rows where: and choose is greater than or equal to. Select 20.0 from the next drop-down.

19. Click [Next].

20. Select [Next] to skip the Query Wizard-Sort Order step.

**Results/ Comments:**

The Query Wizard – Choose Columns dialog box will open and display the Available Tables and Columns you can select to add to the Columns in Your Query to be imported into your Excel workbook.

The Query Wizard – Filter Data dialog box will open and offer you the ability to filter the data imported by criteria you select.

The Query Wizard-Sort Order dialog box is displayed.

The Query Wizard - Finish dialog box is displayed.
Instructions:

21. At this point, Return Data to Microsoft Excel should be selected in the Query Wizard-Finish dialog box.

22. Click the [Save Query] button and name the query Shipping Quantity Over 20. Then click [Save].

23. Click [Finish] in the Query Wizard-Finish dialog box.

24. Select PivotTable Report in the Select how you want to view this data in your workbook.

25. Click [OK] to place the PivotTable frame in the existing worksheet starting at cell A1.

26. Drag Company Name to the Rows area.

27. Drag Quantity to the Values area.

28. Save file as External Query.xlsx.

Results/ Comments:

We will save the query so that we can re-run it if necessary.

The Import Data dialog box will open.

Your Pivot Report should look similar to this:
### MICROSOFT OFFICE EXCEL ASSOCIATE EXAM MO-200

#### Import data into workbooks
- Import data from .txt file  
  - DA
- Import data from .csv files  
  - DA

#### Navigate within workbooks
- Search for data within a workbook  
  - L-1
- Navigate to named cells, ranges, or workbook elements  
  - L-2
- Insert and remove hyperlinks  
  - L-3

#### Format worksheets and workbooks
- Modify page setup  
  - L-1
- Adjust row height and column width  
  - L-1
- Customize headers and footers  
  - L-1

#### Customize options and views
- Customize the Quick Access toolbar  
  - L-1
- Display and modify workbook content in different views  
  - L-2
- Freeze worksheet rows and columns  
  - L-2
- Change window views  
  - L-2
- Modify basic workbook properties  
  - L-2
- Display formulas  
  - L-1

#### Configure content for collaboration
- Set a print area  
  - L-1
- Save workbooks in alternative file formats  
  - L-1
- Configure print settings  
  - L-1
- Inspect workbooks for issues  
  - L-1
### Manipulate data in worksheets

<table>
<thead>
<tr>
<th>Task</th>
<th>Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Paste data by using special paste options</td>
<td>L-1</td>
</tr>
<tr>
<td>Fill cells by using Auto Fill</td>
<td>L-1</td>
</tr>
<tr>
<td>Insert and delete multiple columns or rows</td>
<td>L-1</td>
</tr>
<tr>
<td>Insert and delete cells</td>
<td>L-1</td>
</tr>
</tbody>
</table>

### Format cells and ranges

<table>
<thead>
<tr>
<th>Task</th>
<th>Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Merge and unmerge cells</td>
<td>L-1</td>
</tr>
<tr>
<td>Modify cell alignment, orientation, and indentation</td>
<td>L-1</td>
</tr>
<tr>
<td>Format cells by using Format Painter</td>
<td>L-1</td>
</tr>
<tr>
<td>Wrap text within cells</td>
<td>L-1</td>
</tr>
<tr>
<td>Apply number formats</td>
<td>L-1</td>
</tr>
<tr>
<td>Apply cell formats from the Format Cells dialog box</td>
<td>L-1</td>
</tr>
<tr>
<td>Apply cell styles</td>
<td>L-1</td>
</tr>
<tr>
<td>Clear cell formatting</td>
<td>L-1</td>
</tr>
</tbody>
</table>

### Define and reference named ranges

<table>
<thead>
<tr>
<th>Task</th>
<th>Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Define a named range</td>
<td>L-2/</td>
</tr>
<tr>
<td>Name a table</td>
<td>FM</td>
</tr>
</tbody>
</table>

### Summarize data visually

<table>
<thead>
<tr>
<th>Task</th>
<th>Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Insert Sparklines</td>
<td>L-2</td>
</tr>
<tr>
<td>Apply built-in conditional formatting</td>
<td>L-2</td>
</tr>
<tr>
<td>Remove conditional formatting</td>
<td>L-2</td>
</tr>
</tbody>
</table>

### Create and format tables

<table>
<thead>
<tr>
<th>Task</th>
<th>Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Create Excel tables from cell ranges</td>
<td>L-2</td>
</tr>
<tr>
<td>Apply table styles</td>
<td>L-2</td>
</tr>
<tr>
<td>Convert tables to cell ranges</td>
<td>L-2</td>
</tr>
</tbody>
</table>

### Modify tables

<table>
<thead>
<tr>
<th>Task</th>
<th>Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Add or remove table rows and columns</td>
<td>L-2</td>
</tr>
<tr>
<td>Configure table style options</td>
<td>L-2</td>
</tr>
<tr>
<td>Insert and configure total rows</td>
<td>L-2</td>
</tr>
<tr>
<td>TCW BOOK CODES</td>
<td></td>
</tr>
<tr>
<td>----------------</td>
<td></td>
</tr>
<tr>
<td>Excel Level 1</td>
<td>L-1</td>
</tr>
<tr>
<td>Excel Level 2</td>
<td>L-2</td>
</tr>
<tr>
<td>Excel Level 3</td>
<td>L-3</td>
</tr>
<tr>
<td>Excel Formulas</td>
<td>FM</td>
</tr>
<tr>
<td>Excel Data Analysis</td>
<td>DA</td>
</tr>
<tr>
<td>Excel Charts</td>
<td>CH</td>
</tr>
<tr>
<td>Excel PivotTables</td>
<td>PT</td>
</tr>
<tr>
<td>Excel Data Analysis with PowerPivot</td>
<td>PPT</td>
</tr>
</tbody>
</table>

### Filter and sort table data
- Filter records: L-2
- Sort data by multiple columns: L-2

### Insert references
- Insert relative, absolute, and mixed references: L-1
- Reference named ranges and named tables in formulas: L-2

### Calculate and transform datas
- Perform calculations by using the AVERAGE(), MAX(), MIN(), and SUM() functions: L-1
- Count cells by using the COUNT(), COUNTA(), and COUNTBLANK() functions: DA
- Perform conditional operations by using the IF() function: FM

### Format and modify text
- Format text by using RIGHT(), LEFT(), and MID() functions: DA
- Format text by using UPPER(), LOWER(), and LEN() functions: DA
- Format text by using the CONCAT() and TEXTJOIN() functions: DA

### Create charts
- Create charts: L-2 / CH
- Create chart sheets: L-2 / CH

### Modify charts
- Add data series to charts: L-2 / CH
- Switch between rows and columns in source data: L-2 / CH
- Add and modify chart elements: L-2 / CH
## MICROSOFT OFFICE EXCEL EXPERT EXAM MO-201

<table>
<thead>
<tr>
<th>Manage workbooks</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Copy macros between workbooks</td>
<td>L-3</td>
</tr>
<tr>
<td>Reference data in other workbooks</td>
<td>L-3</td>
</tr>
<tr>
<td>Enable macros in a workbook</td>
<td>L-3</td>
</tr>
<tr>
<td>Manage workbook versions</td>
<td>L-2</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Prepare workbooks for collaboration</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Restrict editing</td>
<td>L-2</td>
</tr>
<tr>
<td>Protect worksheets and cell ranges</td>
<td>L-2</td>
</tr>
<tr>
<td>Protect workbook structure</td>
<td>L-2</td>
</tr>
<tr>
<td>Configure formula calculation options</td>
<td>FM</td>
</tr>
<tr>
<td>Manage comments</td>
<td>L-2</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Use and configure language options</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Configure editing and display languages</td>
<td>L-1</td>
</tr>
<tr>
<td>Use language-specific features</td>
<td>L-1</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Fill cells based on existing data</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Fill cells by using Flash Fill</td>
<td>L-1</td>
</tr>
<tr>
<td>Fill cells by using advanced Fill Series options</td>
<td>L-2</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Format and validate data</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Create custom number formats</td>
<td>L-1</td>
</tr>
<tr>
<td>Configure data validation</td>
<td>L-3</td>
</tr>
<tr>
<td>Group and ungroup data</td>
<td>L-3</td>
</tr>
<tr>
<td>Calculate data by inserting subtotals and totals</td>
<td>L-3</td>
</tr>
<tr>
<td>Remove duplicate records</td>
<td>DA</td>
</tr>
</tbody>
</table>
## Apply advanced conditional formatting and filtering

<table>
<thead>
<tr>
<th>Activity</th>
<th>Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Create custom conditional formatting rules</td>
<td>L-2</td>
</tr>
<tr>
<td>Create conditional formatting rules that use formulas</td>
<td>L-2</td>
</tr>
<tr>
<td>Manage conditional formatting rules</td>
<td>L-2</td>
</tr>
</tbody>
</table>

## Perform logical operations in formulas

<table>
<thead>
<tr>
<th>Activity</th>
<th>Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Perform logical operations by using nested functions including the IF(), IFS(), SWITCH()</td>
<td>FM</td>
</tr>
<tr>
<td>SUMIF(), AVERAGEIF(), COUNTIF(), SUMIFS(), AVERAGEIFS(), COUNTIFS(), MAXIFS(), MINIFS(), AND(), OR(), and NOT() functions</td>
<td>FM</td>
</tr>
</tbody>
</table>

## Look up data by using functions

<table>
<thead>
<tr>
<th>Activity</th>
<th>Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Look up data by using the VLOOKUP(), HLOOKUP(), MATCH(), and INDEX() functions</td>
<td>FM</td>
</tr>
</tbody>
</table>

## Use advanced date and time functions

<table>
<thead>
<tr>
<th>Activity</th>
<th>Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reference date and time by using the NOW() and TODAY() functions</td>
<td>FM</td>
</tr>
<tr>
<td>Calculate dates by using the WEEKDAY() and WORKDAY() functions</td>
<td>FM</td>
</tr>
</tbody>
</table>

## Perform data analysis

<table>
<thead>
<tr>
<th>Activity</th>
<th>Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Summarize data from multiple ranges by using the Consolidate feature</td>
<td>L-3</td>
</tr>
<tr>
<td>Perform what-if analysis by using Goal Seek and Scenario Manager</td>
<td>L-3</td>
</tr>
<tr>
<td>Forecast data by using the AND(), IF(), and NPER() functions</td>
<td>FM</td>
</tr>
<tr>
<td>Calculate financial data by using the PMT() function</td>
<td>FM</td>
</tr>
</tbody>
</table>
Troubleshoot formulas

<table>
<thead>
<tr>
<th>Task</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trace precedence and dependence</td>
<td>FM</td>
</tr>
<tr>
<td>Monitor cells and formulas by using the Watch Window</td>
<td>FM</td>
</tr>
<tr>
<td>Validate formulas by using error checking rules</td>
<td>FM</td>
</tr>
<tr>
<td>Evaluate formulas</td>
<td>FM</td>
</tr>
</tbody>
</table>

Create and modify simple macros

<table>
<thead>
<tr>
<th>Task</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Record simple macros</td>
<td>L-3</td>
</tr>
<tr>
<td>Name simple macros</td>
<td>L-3</td>
</tr>
<tr>
<td>Edit simple macros</td>
<td>L-3</td>
</tr>
</tbody>
</table>

Create and modify advanced charts

<table>
<thead>
<tr>
<th>Task</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Create and modify dual axis charts</td>
<td>CH</td>
</tr>
<tr>
<td>Create and modify charts including Box &amp; Whisker, Combo, Funnel, Histogram, Map, Sunburst, and Waterfall charts</td>
<td>CH</td>
</tr>
</tbody>
</table>

Create and modify PivotTables

<table>
<thead>
<tr>
<th>Task</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Create PivotTables</td>
<td>PT</td>
</tr>
<tr>
<td>Modify field selections and options</td>
<td>PT</td>
</tr>
<tr>
<td>Create slicers</td>
<td>PT</td>
</tr>
<tr>
<td>Group PivotTable data</td>
<td>PT</td>
</tr>
<tr>
<td>Add calculated fields</td>
<td>PT</td>
</tr>
<tr>
<td>Format data</td>
<td>PT</td>
</tr>
</tbody>
</table>

Create and modify PivotCharts

<table>
<thead>
<tr>
<th>Task</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Create PivotCharts</td>
<td>PT</td>
</tr>
<tr>
<td>Manipulate options in existing PivotCharts</td>
<td>PT</td>
</tr>
<tr>
<td>Apply styles to PivotCharts</td>
<td>PT</td>
</tr>
<tr>
<td>Drill down into PivotChart details</td>
<td>PPT</td>
</tr>
</tbody>
</table>