



Excel Advanced

Instructor Guide

[Your Company Name]

CustomGuide

EVALUATION
ONLY

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PivotTables

PivotTables are one of the most powerful features in Excel, and they're surprisingly quick to build, too. With properly organized source data, you can create a PivotTable to summarize and analyze data ranges in just a couple of minutes. There are endless possibilities for structuring your data in a PivotTable, so you'll want to have a good idea of what you want to measure or understand before you start.

PivotTables are good for grouping or expanding levels of data, transforming columns into rows and vice versa ("pivoting" data), and filtering and sorting data. They lend themselves particularly well to forming a concise summary from long lists of data. They can be used to build dynamic reports in a fraction of the time it would take to do so manually, helping you make informed decisions.

This module explains how to create PivotTables, modify their structure and formatting, use timelines, and group values. Once you've mastered PivotTables, you'll discover there are a variety of ways you can use them to add value to your projects.

Objectives

- Create PivotTables
- Add Multiple PivotTable Fields
- Change a PivotTable's Calculation
- Add Calculated Fields
- The GETPIVOTDATA Function
- Filter PivotTables
- Timelines
- PivotTable Layout
- Group Values
- Refresh a PivotTable
- Format a PivotTable

Create PivotTables

Commented [IG1]:
Practice File: 01-create-pivottables.xlsx

When faced with a worksheet packed full of data, with many columns and perhaps hundreds or thousands of rows, making sense of it all can be a daunting task. PivotTables help you pull out just the data you need to quickly make informed decisions. They are very flexible, easy to adjust, and can be created and modified with just a few clicks. Don't worry if PivotTables are confusing at first, they will make a lot more sense once you start working with them.

Before you start creating one, it's important to keep a few basic rules in mind:

- Your data should be neatly organized into rows and columns without any blank rows or columns.
- Each column should have the same data type. For example, you shouldn't have a column of prices where some cells have the currency format applied and some have the accounting format applied.
- PivotTables can be created using a cell range or an existing table.

Create a PivotTable

- 1 Select any cell in the data range you want to analyze.
- 2 Click the **Insert** tab on the ribbon.
- 3 Click the **PivotTable** button in the Tables group.

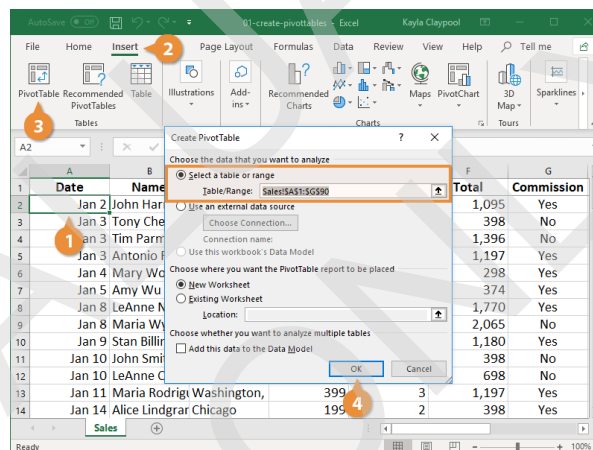
The Create PivotTable dialog box opens. Here, choose which data to analyze and where to place the PivotTable.

If you've already clicked within a data range, the Table/Range field is populated. Verify the correct range is displayed.

Tip: The data range doesn't have to be in the current workbook. Select **Use an external data source** to select data outside the workbook.

- 4 Click **OK**.

An empty PivotTable and task pane appear on a separate worksheet. Next you need to specify the fields you want to appear in your PivotTable.



- Commented [IG2]:
1. Select cell A2.
 2. Click the Insert tab.
 3. Click the PivotTable button in the Tables group.
 4. Click OK.

Add PivotTable Fields

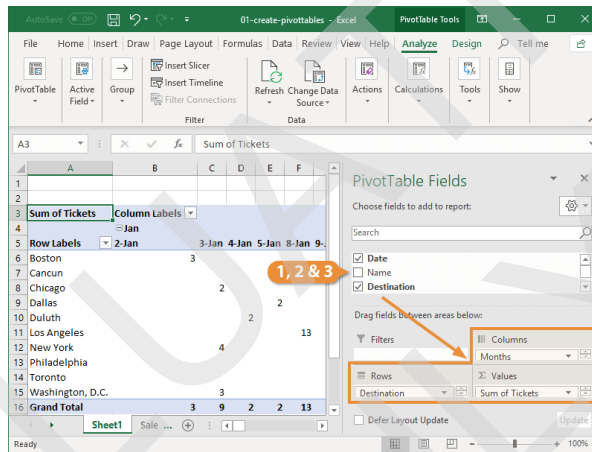
Once you've created your PivotTable, you have to specify the data you want to analyze. The PivotTable Fields pane appears at the right. Under the Search field you see a list of all the possible fields you can use in your PivotTable. These fields are the column headings from the original data source.

To make it a little easier to understand, let's break it down. Say your original data set contains information for ticket sales and includes dates, destinations, prices, the number of sales, sales totals, sales agents, etc., but all you really need to know is how many tickets were sold each month for each destination. You can grab the Destination field and the Date field, add them as rows and columns in the PivotTable, and add a numeric sales field to the values area. The PivotTable will display a subset of the original data, but only include the values you really need to see.

- 1 Click and drag a field to the **Rows** area.
- 2 Click and drag a field to the **Values** area.
- 3 If desired, click and drag a field to the **Columns** area.

Tip: If you want to filter the PivotTable, add an additional field to the Filters area.

The PivotTable updates to display the values for the fields you've added. The great thing about PivotTables is they are extremely flexible. If the table isn't displaying the data like you want, just click and drag fields in and out of the Rows, Values, and Columns areas until the PivotTable represents the data correctly.



Commented [IG3]:

1. Click the Destination field and drag it to the Rows area.
2. Click the Tickets field and drag it to the Values area.
3. Click the Date field to the Columns area.

Show students how easy it is to change the data in a PivotTable. Drag all of the fields out of the Columns and Rows areas. Drag the Destination field in the Columns area and the Name field into the Rows area.

Add Multiple PivotTable Fields

Commented [IG4]:
Practice File: 02-add-multiple-pivottable-fields.xlsx

When adding fields to the Filters, Columns, Rows, and Values areas of a PivotTable, you aren't limited to just adding one field; you can add as many as you like. However, if you make it too complex, the PivotTable will start to become difficult to consume. You may need to experiment with adding multiple fields to certain areas to see what works best for your set of data. Remember, you can always drag fields out of the area you've added them to in the PivotTable Fields pane to remove them.

Let's refer back to our previous example, where we are only interested in seeing the monthly sales for each destination. After creating the PivotTable, your boss may request to see data for which agents made those sales. Instead of creating a separate PivotTable, you can easily add the Name field as an additional row to expand the data that's represented.

Add an Additional Row or Column Field

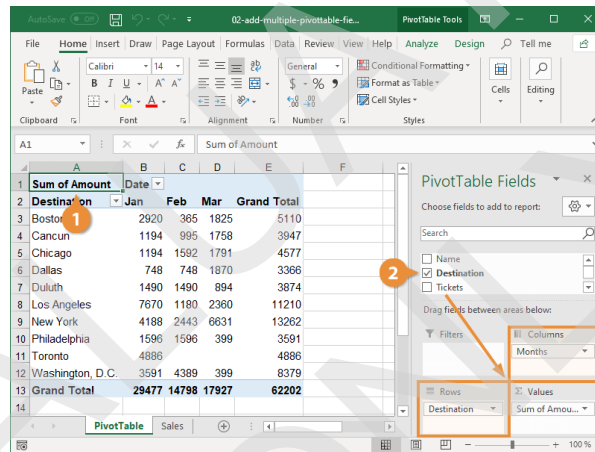
- 1 Click any cell in the PivotTable.
The PivotTable Fields pane appears.

Tip: You can also turn on the PivotTable Fields pane by clicking the **Field List** button on the Analyze tab.

- 2 Click and drag a field to the **Rows** or **Columns** area.

The PivotTable is updated to include the additional values. The order you place the fields in each area in the Fields pane affects the look of the PivotTable. You can drag the field values up or down within an area (the Rows area, for example) to adjust which data appears first.

Note: Some fields, when added to a PivotTable, will automatically be displayed as two fields. For example, when adding a date field to the Columns area, Excel will likely group the dates into months automatically instead of displaying each individual date as a column heading. In the Columns area of the PivotTable Fields pane, you'll see two fields—Date and Months—even though you only added a single field.



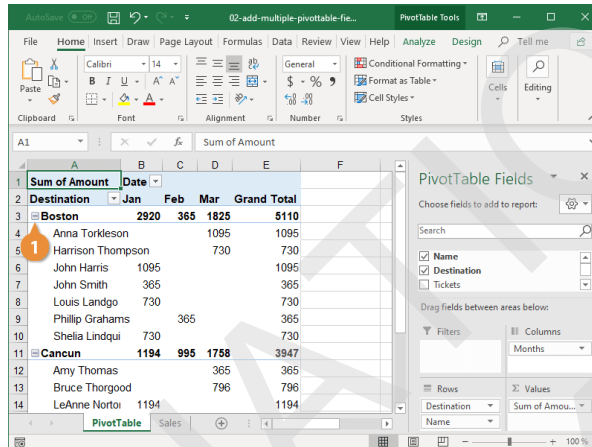
- Commented [IG5]:**
1. Click cell A1 to activate the PivotTable and open the PivotTable Fields pane.
 2. Click the Name field and drag it to the Rows area, below Destination.

The PivotTable now shows who made sales for each destination each month. If you wish, show students that the order the fields are arranged in the Rows area matters. In the Rows area, drag the Name field above the Destination field to see the PivotTable update. Then drag the Name field below Destination once again.

Expand or Collapse a Heading

Once you've added more than one value to an area, expand and collapse buttons appear for the top-level values in the PivotTable. Use these to change how much of the data is visible at once.

- 1 Click the **Expand** or **Collapse** symbol next to a row or column heading.



Commented [IG6]:

1. Click the Collapse button next to Boston.

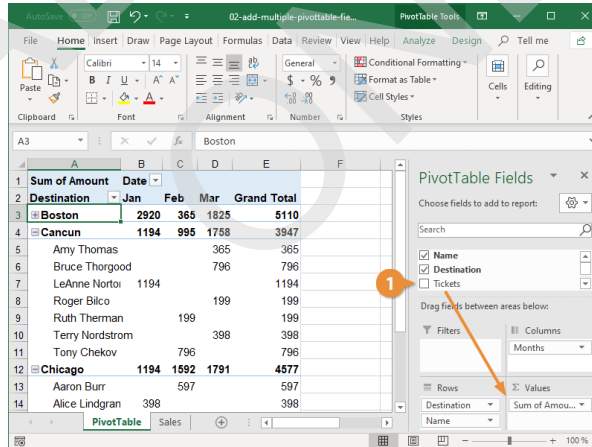
Point out that both the Rows and Columns in the PivotTable have buttons to collapse and expand the data.

Add an Additional Value Field

If your original set of data has multiple columns with numeric values, you may find yourself adding additional fields to the Values area. If this is the case, the PivotTable will display the sum of one set of data followed by the sum of the second set of data in an adjacent column.

- 1 Click and drag a second field to the **Values** area.

The order in which you place the fields in the Values area is very important. If you add a field and the PivotTable doesn't look right, try adjusting the order of the fields until the PivotTable displays useful data.



Commented [IG7]:

1. Click and drag the Tickets field to the Values area, below the existing fields.

The PivotTable now shows the number of tickets sold and the total amount for each destination and each agent.

Change a PivotTable's Calculation

Commented [IG8]:
Practice File: 03-change-a-pivottables-calculation.xlsx

Besides adjusting the layout of your PivotTable data, you can also change how a PivotTable summarizes values. For example, you might want a PivotTable to display averages instead of totals.

Change PivotTable Calculations

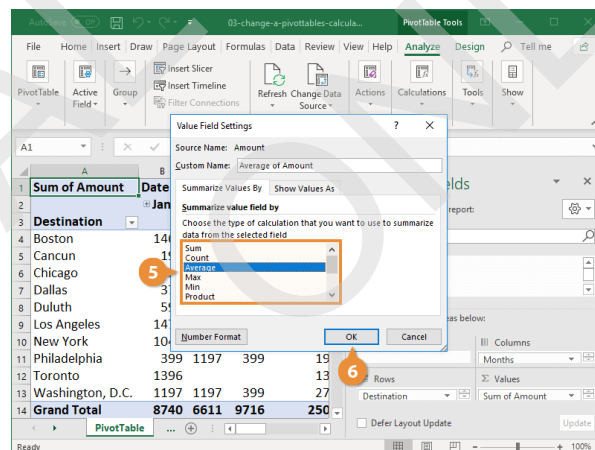
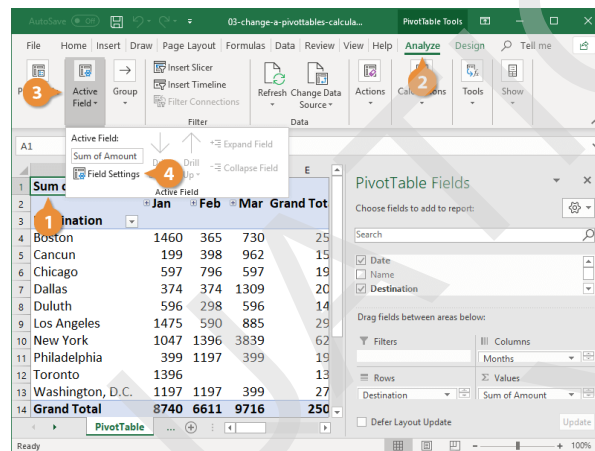
- 1 Click any cell inside the PivotTable.
- 2 Click the **Analyze** tab on the ribbon.
- 3 Click the **Active Field** button on the ribbon.
- 4 Click **Field Settings**.

The Value Field Settings dialog box appears. From here, you can select calculation options including Sum, Count, Average, or Max, among others.

Tip: When a field containing numeric values is added to a PivotTable, Excel automatically calculates the sum.

- 5 Select the type of calculation you want to use.
- 6 Click **OK**.

The summarized data in the PivotTable changes to use the new calculation.



- Commented [IG9]:
1. Click cell A1.
 2. Click the Analyze tab.
 3. Click the Active Field button to expand the ribbon group, if necessary.
 4. Click Field Settings.
 5. Select Average.
 6. Click OK.

Add Calculated Fields

Commented [IG10]:
Practice File: 04-add-calculated-fields.xlsx

A calculated field is a new field that performs calculations based on existing fields in your PivotTable. For example, you could use a calculated field to find the average ticket sales using an existing total sales field and a field containing the number of tickets sold.

Create a Calculated Field

- 1 Click a cell in the PivotTable.
- 2 Click the **Analyze** tab.
- 3 Expand the **Calculations** group, if necessary.
- 4 Click the **Fields, Items, & Sets** button.
- 5 Select **Calculated Field**.

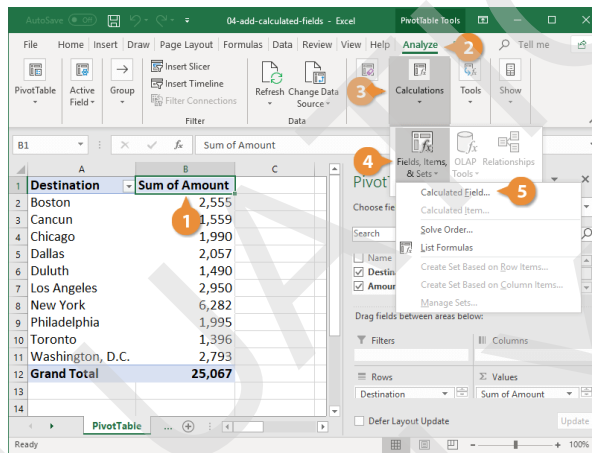
The Insert Calculated Field dialog box displays. This is where you'll create and name the field.

- 6 Type a name for the calculated field in the Name field.
- 7 Click in the **Formula** field.
- 8 Enter a calculation using the fields in the list and/or custom values.

Tip: You can also enter your own values in the formula. For example, you could find a monthly average by adding an existing field and then dividing by 12.

- 9 Click **OK**.

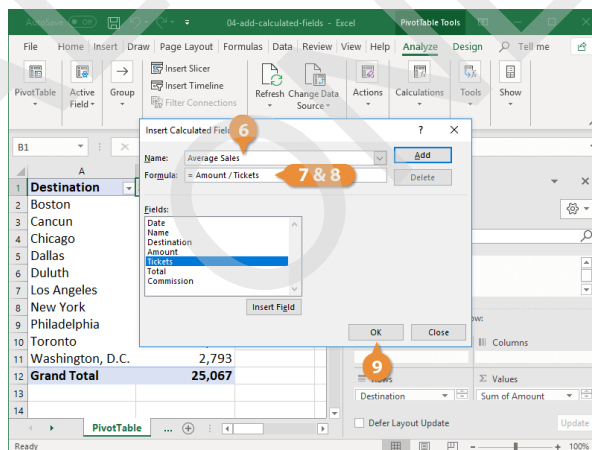
The new calculated field is automatically added to the PivotTable.



Commented [IG11]:

1. Click cell B1.
2. Click the Analyze tab.
3. Expand the Calculations group, if necessary.
4. Click the Fields, Items, & Sets button.
5. Select Calculated Field.
6. Type "Average Sales" in the Name field.
7. Click the Formula field.
8. Delete the 0. Click Amount in the Fields list and click the Insert Field button. Press the / key and double-click Tickets in the Fields list.
9. Click OK.

Point out that Excel automatically labels the row heading "Sum of Average Sales". If you want, show students how to modify the row heading using the formula bar.



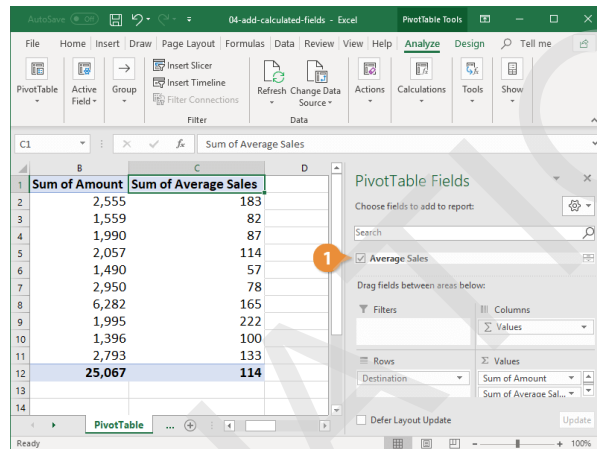
Remove a Calculated Field

If you decide you don't need the calculated field in your PivotTable, it can be removed just like any other PivotTable field.

- 1 Uncheck the calculated field in the PivotTable Fields pane.

The calculated field is removed from the PivotTable; however, it remains in the field list to use again in the future.

Note: If you want to remove the calculated field completely, you need to re-open the Insert Calculated Field dialog box, select the field you created in the Fields list, and click the **Delete** button.



Commented [IG12]:

1. Uncheck Average Sales in the PivotTable Fields pane.

The GETPIVOTDATA Function

Commented [IG13]:
Practice File: 05-the-getpivotdata-function.xlsx

The GETPIVOTDATA function is used to extract data from your PivotTable. You place the function in a cell outside of the PivotTable, and it uses data within the table to perform a calculation. The syntax for the GETPIVOTDATA function looks like this: =GETPIVOTDATA (data_field, pivot_table, [field1, item1], ...). You fill in the function with the following information:

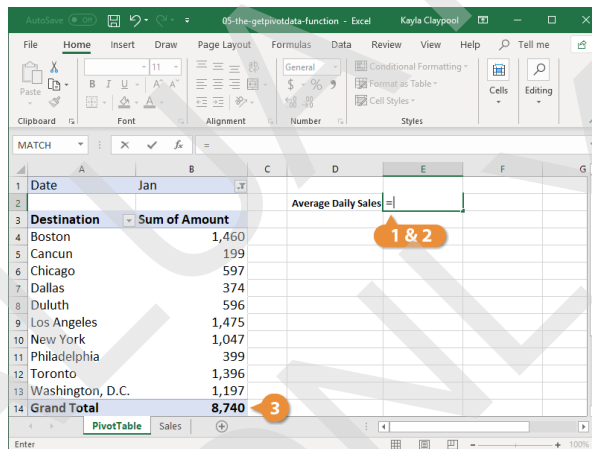
- **data_field:** The name of the field in the PivotTable you want to query.
- **pivot_table:** Any cell located in the PivotTable.
- **field1, item1 (Optional):** The field or item you wish to reference.

Use the GETPIVOTDATA Function

- 1 Click in a cell outside the PivotTable where you want to add the function.
- 2 Type the = sign.
- 3 Click the cell in the PivotTable that contains the data you want to extract.

As soon as you type = and click within the PivotTable, the GETPIVOTDATA function is automatically added.

- 4 (Optional) Expand the function to include additional calculations.



- Commented [IG14]:**
1. Select cell E2.
 2. Type the = sign.
 3. Click cell B14.
 4. Press the / key and then type 22. Click or press Enter.
 5. Click the Filter list arrow in cell B2 and select March. Click OK.

Point out to students that the formula in cell E2 updates to show the new average daily sales for March, even though the referenced value moved from cell B14 to B13.

The advantage of using the GETPIVOTDATA function instead of a cell reference is that it records data to ensure the correct value is returned, even if the location of the referenced cell changes when the data in a PivotTable is updated.

Tip: If you happen to be using cube functions as part of your Excel workbooks, note the GETPIVOTDATA function has almost all of the expressions you'll need for your cube functions. You can paste these GETPIVOTDATA values into your cube functions to save time and simplify the process.

Filter PivotTables

Commented [IG15]:
Practice File: 06-filter-pivottables.xlsx

Much like you can with basic data ranges and tables in Excel, you can filter a PivotTable to focus in on a smaller portion of data.

For example, instead of showing the sales values for every destination, you can add the Commission field as a report filter to show only the sales for which an agent earned a commission.

Add a Filter Field

1 Click any cell in the PivotTable.

2 Drag a field to the **Filters** area in the PivotTable Fields pane.

The filter field appears at the top of the PivotTable. The text (All) is displayed so you know the data is not currently being filtered.

3 Click the list arrow for the field you've added as a filter.

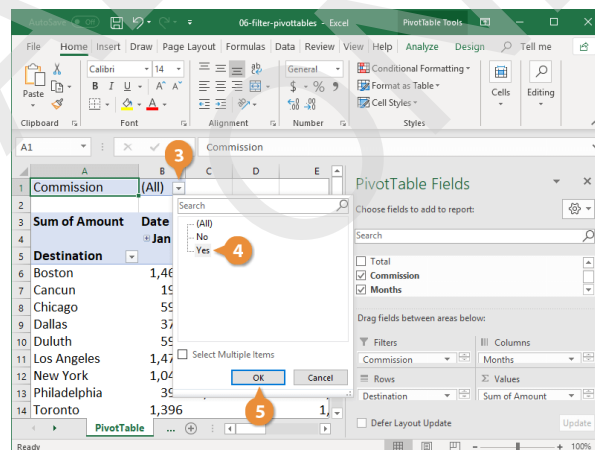
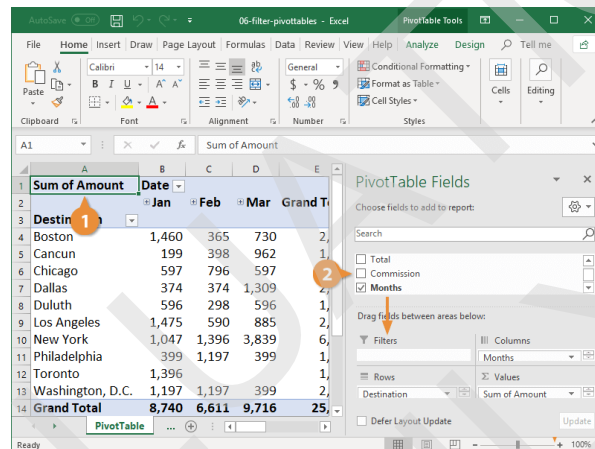
A list of sorting and filtering options appears. The items available in the menu will differ based on the field you've added as a filter. Additionally, a Search field appears at the top of the filter list. If desired, manually type the criteria by which you want to filter.

Tip: You can also filter the row or column headings in a PivotTable by clicking the Row Labels or Column Labels list arrow and selecting only the value(s) you want to display.

4 Select the item(s) you want to use as a filter.

5 Click **OK**.

The PivotTable updates to display only the values that meet the filter criteria.



Commented [IG16]:

1. Click cell A1.
2. Click the Commission field and drag it to the Filters area.
3. Click the filter list arrow in cell B1.
4. Select Yes.
5. Click OK.

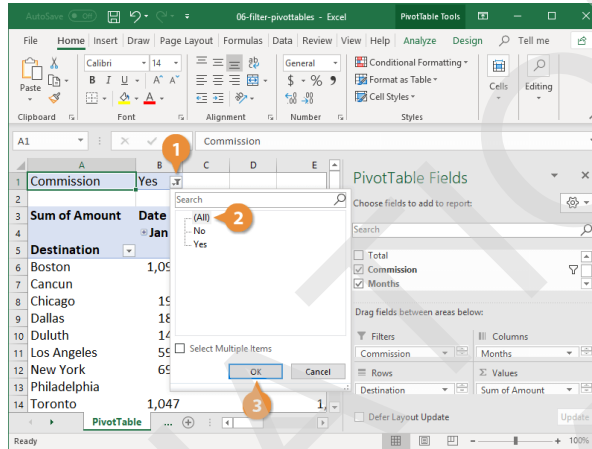
The PivotTable updates to show only the sales where an agent earned a commission.

Clear a Filter

Once you're done analyzing the filtered data, clear the filter to see all the data in your PivotTable again.

- 1 Click the **filter** icon next to the filter field.
- 2 Select **All**.
- 3 Click **OK**.

The filter is cleared from the PivotTable, showing all the data once again.



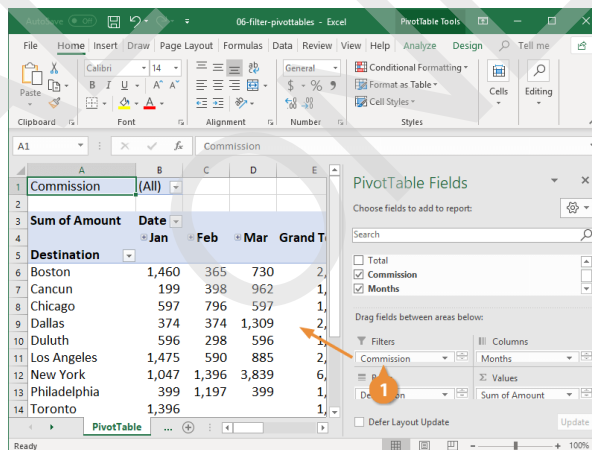
- Commented [IG17]:**
1. Click the filter icon in cell B1.
 2. Select All.
 3. Click OK.

Remove a Filter

When a filter is cleared, all the data is visible; however, the filter remains in the PivotTable to use again. If you want the filter gone completely, you'll need to remove it.

- 1 Click and drag the field out of the Filters area.
- Tip:** You could also uncheck the field in the fields list.

The filter is removed from the PivotTable entirely.



- Commented [IG18]:**
1. Click the Commission field in the Filters area and drag it to the sheet area to remove it.

Timelines

Commented [IG19]:
Practice File: 07-timelines.xlsx

Timelines are interactive filters that let you quickly filter by date. They make it quick and easy to see PivotTable data for only the time period you specify. They are similar to slicers in that you can insert them once and keep them with the PivotTable to update at will.

Insert a Timeline

- 1 Click any cell inside the PivotTable.
- 2 Click the **Analyze** tab on the ribbon.
- 3 Click the **Insert Timeline** button.

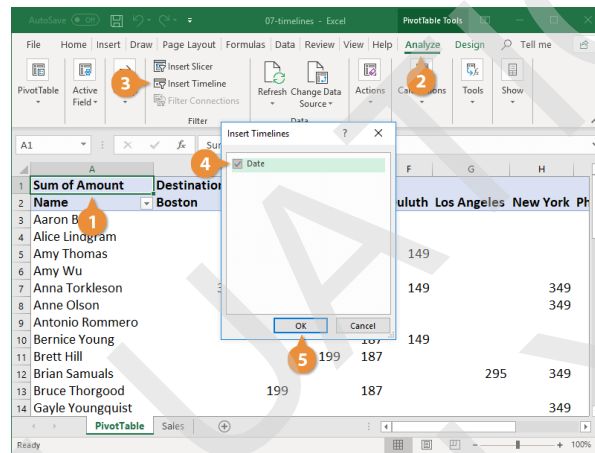
Tip: You can also insert a Timeline for PivotCharts and cube functions.

The Insert Timelines dialog box appears. It automatically detects the date fields used in the PivotTable and has them available for you to select from. Many times, there will only be one available field.

- 4 Select the date field you want to use for the timeline.
- 5 Click **OK**.

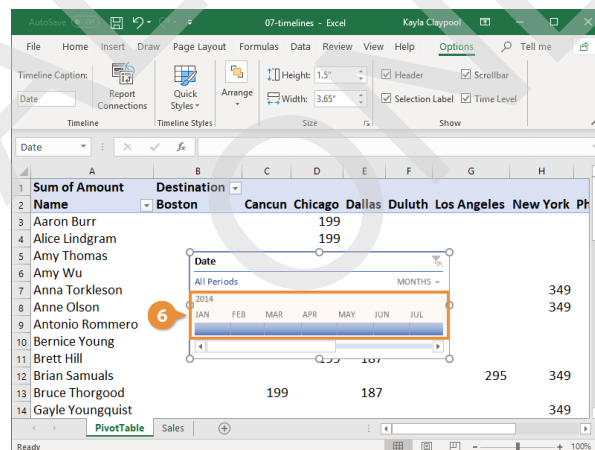
- 6 Select a time span in the Timeline you want the PivotTable to display.

Tip: To select multiple intervals, you can click and drag along the timeline or click the first interval you want to include and hold the Shift key while clicking the last interval in your chosen span.



Commented [IG20]:

1. Click cell A1.
2. Click the Analyze tab.
3. Click the Insert Timeline button.
4. Click the Date check box.
5. Click OK.
6. Select JAN in the Timeline. The PivotTable updates to show only the January data. Then, hold down the Shift key and select June. Once again, the PivotTable updates to show all the selected months.

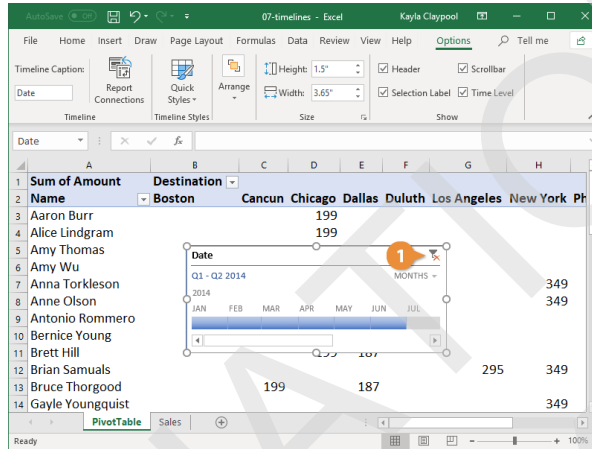


Clear a Timeline

You can clear the Timeline at any point to restore all the data in the PivotTable.

- 1 Click the **Clear Filter** button at the top-right corner of the Timeline.

All the PivotTable data is visible once again.



Commented [IG21]:

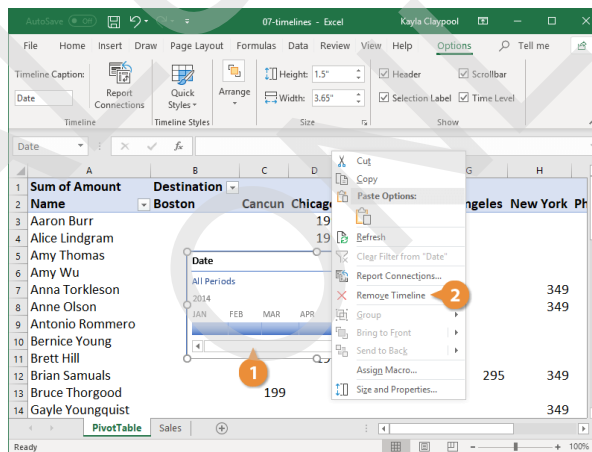
1. Click the Clear Filter button in the Timeline.

Remove a Timeline

If you no longer need to use the Timeline, it can be removed from the sheet entirely.

- 1 Right-click the timeline.
- 2 Select **Remove Timeline**.

The timeline is removed from your PivotTable.



Commented [IG22]:

1. Right-click the Timeline.
2. Select Remove Timeline.

PivotTable Layout

Commented [IG23]:
Practice File: 08-pivottable-layout.xlsx

There are several options for altering the layout of your PivotTable. The Layout group on the Design tab allows you to change what elements appear on the PivotTable.

PivotTable Layout Options

1 Click any cell inside the PivotTable.

The Analyze and Design tabs appear under PivotTable Tools on the ribbon.

2 Click the **Design** tab on the ribbon.

The Layout group has options to change which elements appear in your PivotTable.

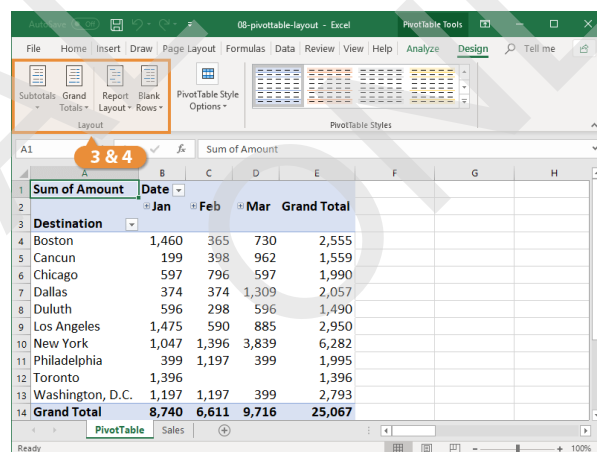
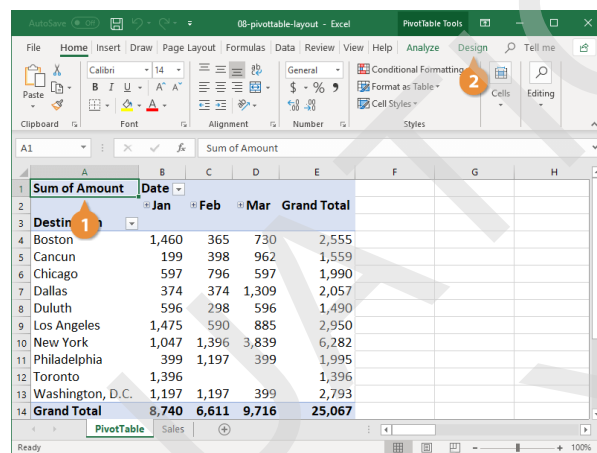
- **Subtotals:** Click to show or hide subtotals, and to specify where to show them.
- **Grand Totals:** Click to show or hide grand totals, and to specify whether they appear for rows, columns, or both.
- **Report Layout:** Show the PivotTable in compact, outline, or tabular form.
- **Blank Rows:** Insert or remove a blank line between each grouped item in the PivotTable.

3 Click the Layout button for the element you want to update.

A list of options appears, depending on the button that was selected.

4 Select an option from the list.

The PivotTable layout is updated based on your selection.



Commented [IG24]:

1. Click cell A1.
2. Click the Design tab.
- Expand each of the options in the Layout group to show students what is available.
3. Click the Grand Totals button.
4. Select Off for Rows and Columns.

Group Values

Commented [IG25]:
Practice File: 09-group-values.xlsx

You can group PivotTable data in order to set it apart from additional subsets of data. You can group most items, but dates are a common item to group. For example, you may want to group the information in the PivotTable by days, months, quarters, or years.

Group PivotTable Values

- 1 Click any cell that has a value you want to group by.
- 2 Click the **Analyze** tab on the ribbon.
- 3 Click the **Group Field** button.

Tip: You can also right-click a cell and select **Group** from the menu.

The Grouping dialog box appears.

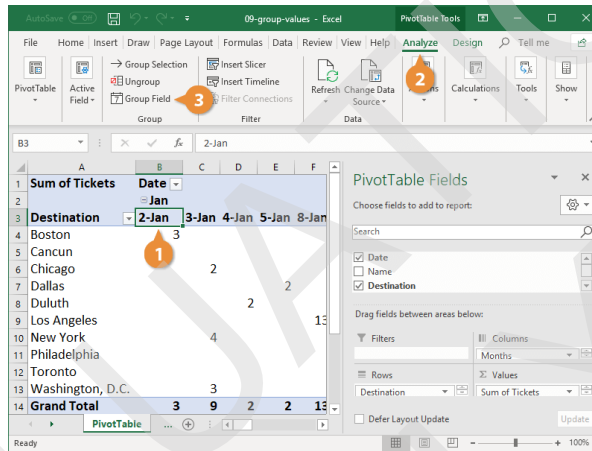
- 4 Specify how you want to group your PivotTable.

When grouping date values, the default starting and ending dates are the first and last dates in the PivotTable.

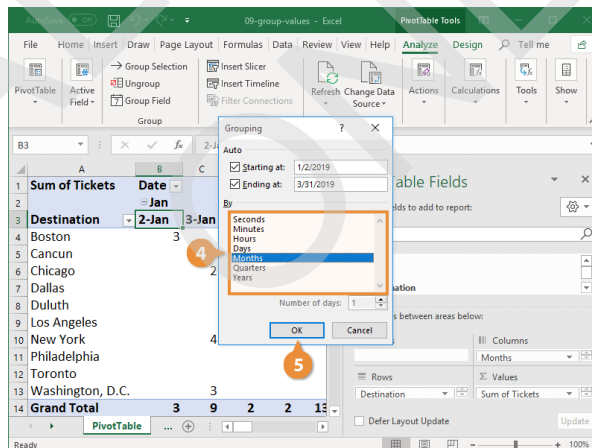
Tip: To group dates by weeks, select **Days** in the **By** area of the Grouping dialog box and enter **7** in the **Number of days** field below the list.

- 5 Click **OK**.

The PivotTable groups together all the data.



- Commented [IG26]:
1. Click on cell B3.
 2. Click the Analyze tab.
 3. Click the Group Field button.
 4. Update the By area so only Months is selected.
 5. Click OK.



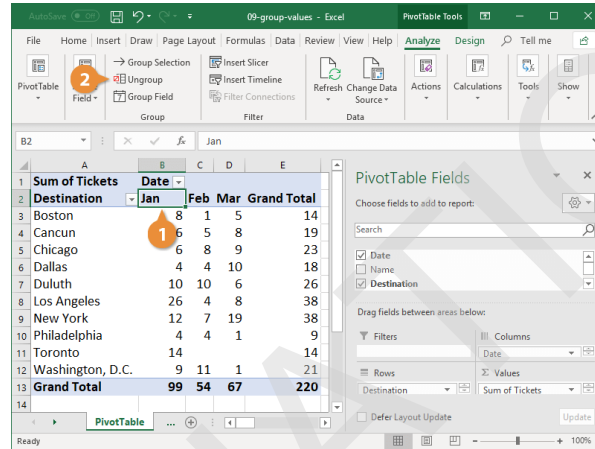
Ungroup PivotTable Values

If you decide you want to see the individual values as column headers again, just ungroup them.

- 1 Click a cell that contains the value you want to ungroup.
- 2 Click the **Ungroup** button on the Analyze tab.

Tip: You can also right-click a cell and select **Ungroup** from the menu.

The grouping is removed from the PivotTable.



Commented [IG27]:

1. Select cell B2.
2. Click the Ungroup button on the Analyze tab.

Refresh a PivotTable

Commented [IG28]:
Practice File: 10-refresh-a-pivottable.xlsx. Begin on the Sales worksheet.

If you make changes to the source data a PivotTable is based on, the PivotTable isn't automatically updated. Instead, you must manually refresh the PivotTable anytime you change its underlying source data.

Manually Update a PivotTable

- 1 Make a change to the PivotTable's source data.
- 2 Navigate to the PivotTable.
- 3 Click any cell inside the PivotTable.

The PivotTable Tools are displayed on the ribbon.

- 4 Click the **Analyze** tab on the ribbon.
- 5 Click the **Refresh** button.

Tip: **Alt + F5** also refreshes the PivotTable.

Commented [IG29]:

1. Select cell E2 in the Sales worksheet and replace the value with 30. Press Enter to see cell F2's value changes to 10,950.
2. Click the PivotTable worksheet tab.
3. Select cell A1.
4. Click the Analyze tab.
5. Click the Refresh button to see the update reflected in the PivotTable.

The PivotTable is refreshed and pulls in any changes made to the source data.

If you have more than one PivotTable in your workbook and you want to update them all at once, instead click the **Refresh** button's list arrow and select **Refresh All** from the menu.

The screenshot shows the Excel interface with a PivotTable. The PivotTable has columns: Date, Name, Destination, Amount, Tickets, Total, and Commission. The 'Tickets' column has a value of 30 in cell E2, which is circled in red. A red arrow points to the 'Analyze' tab on the ribbon.

	A	B	C	D	E	F	G
1	Date	Name	Destination	Amount	Tickets	Total	Commission
2	Jan 2	John Harris	Boston	365	30	10,950	Yes
3	Jan 3	Tony Chekov	Chicago	199	2	398	No
4	Jan 3	Tim Parmont	New York	349	4	1,396	No
5	Jan 3	Antonio Romi	Washington,	399	3	1,197	Yes
6	Jan 4	Mary Worgot	Duluth	149	2	298	Yes
7	Jan 5	Amy Wu	Dallas	187	2	374	Yes
8	Jan 8	LeAnne Noirt	Los Angeles	295	6	1,770	Yes
9	Jan 8	Maria Wyatt	Los Angeles	295	7	2,065	No
10	Jan 9	Stan Billings	Los Angeles	295	4	1,180	Yes
11	Jan 10	John Smith	Chicago	199	2	398	No
12	Jan 10	LeAnne Chanj	Toronto	349	2	698	No
13	Jan 11	Maria Rodrig	Washington,	399	3	1,197	Yes
14	Jan 14	Alice Lindgrar	Chicago	199	2	398	Yes

The screenshot shows the PivotTable Tools ribbon with the 'Analyze' tab selected. The 'Refresh' button is highlighted with a red circle, and a red arrow points to the 'Refresh All' option in the dropdown menu. The PivotTable Fields task pane is also visible.

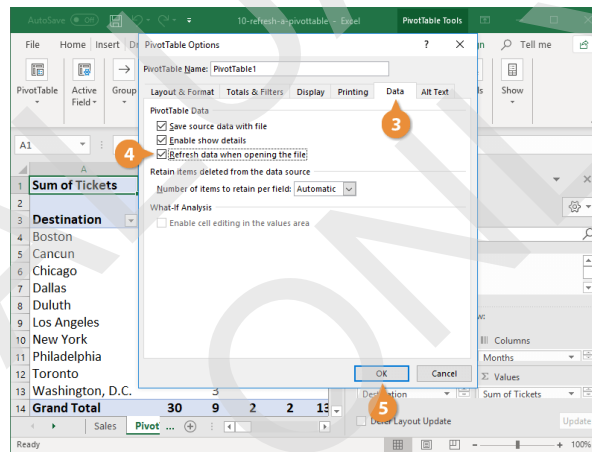
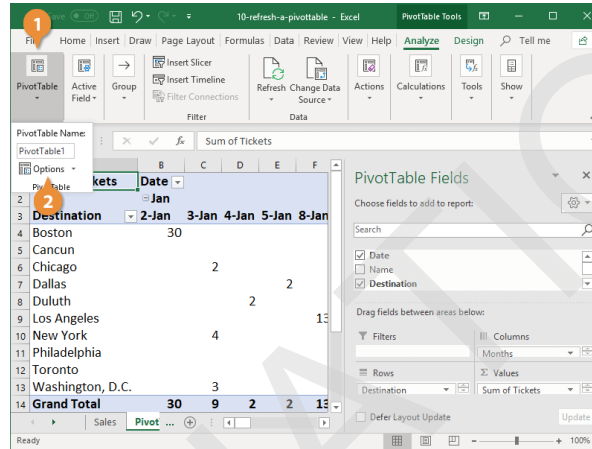
	A	B	C	D	E	F
1	Sum of Tickets	Date				
2		Jan				
3	Destin	2-Jan	3-Jan	4-Jan	5-Jan	8-Jan
4	Boston	3				
5	Cancun					
6	Chicago		2			
7	Dallas			2		
8	Duluth				2	
9	Los Angeles					13
10	New York			4		
11	Philadelphia					
12	Toronto					
13	Washington, D.C.				3	
14	Grand Total	3	9	2	2	13

Automatically Update a PivotTable

You can also have Excel refresh the PivotTables in a workbook when a file opens.

- 1 Click the **PivotTable** button on the **Analyze** tab.
- 2 Click **Options**.
- 3 Click the **Data** tab.
- 4 Check the **Refresh data when opening the file** check box.
- 5 Click **OK**.

Now any PivotTables in the workbook will automatically refresh each time you open the file.



Commented [IG30]:

1. Click the PivotTable button on the Analyze tab.
2. Click Options.
3. Click the Data tab.
4. Check the Refresh data when opening the file check box.
5. Click OK.

Format a PivotTable

Commented [IG31]:
Practice File: 11-format-a-pivottable.xlsx

After creating a PivotTable, you may want to enhance the look of it using styles. By default, the column headings, grand total row, and any filters have a light shading applied to the cells based on the workbook's theme colors. However, if you don't like these, there are a variety of other styles to choose from.

Work with Style Options

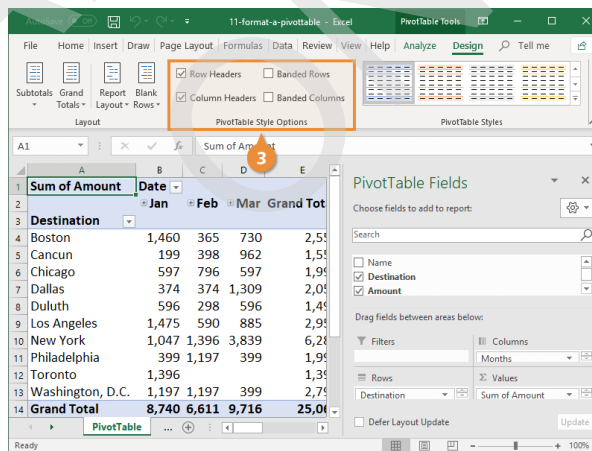
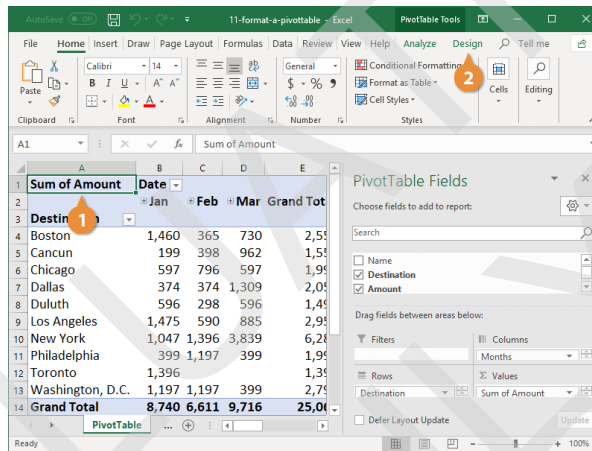
You can select PivotTable style options that allow you to adjust the format for part of a PivotTable. For example, you can apply special formatting to row headers or make the columns banded.

Commented [IG32]:

1. Select cell A1.
2. Click the Design tab.
3. Click the Banded Rows check box to turn on banded rows.

- 1 Click any cell in the PivotTable.
- 2 Click the **Design** tab.
- 3 Select an option from the PivotTable Style Options group.

- **Row/Column Headers:**
Displays special formatting for the first row or column of the PivotTable.
- **Banded Rows/Columns:**
Applies a different format to alternate rows or columns.



Apply a Built-In Style

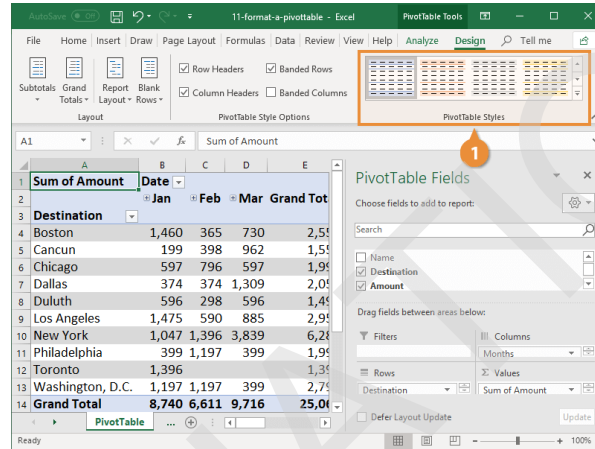
Excel also has a gallery of built-in styles you can choose from to quickly format a PivotTable.

1 On the Design tab, select an option in the Styles gallery.

Tip: The PivotTable Styles group will show a few table styles, but to see the rest, you'll need to expand the gallery.

The style is applied to the table, changing the borders, shading, and colors.

Tip: To remove a Table Style, select **Clear** from the More PivotTable Styles menu.



Commented [IG33]:

1. Select any style from the PivotTable Styles group.

Be sure to point out that you can click the More button to see the entire Styles gallery. Hovering over a style's thumbnail allows you to preview your PivotTable with that style.