Mount Allison
UNIVERSITY

Microsoft EXCEL Training
Level 3

Introduction

This tutorial covers creating and using a pivot table to extract different information from one data sample. This course will give you the skills to use a Pivot Table to produce meaningful analysis and charts from a simple table of information.

Topics Include

- Creating a Pivot Table
- Analysing Data using Pivots
- Filtering and Slicers
- Creating a Pivot Chart Report
- Working with multiple Values Areas

Prerequisite

Comfortable with Windows 7, or OSX

Platform

Windows, OSX

Software

Microsoft Excel 2013, Microsoft Excel 2010 (Windows)

Microsoft Excel 2011 (MAC)

Instructor

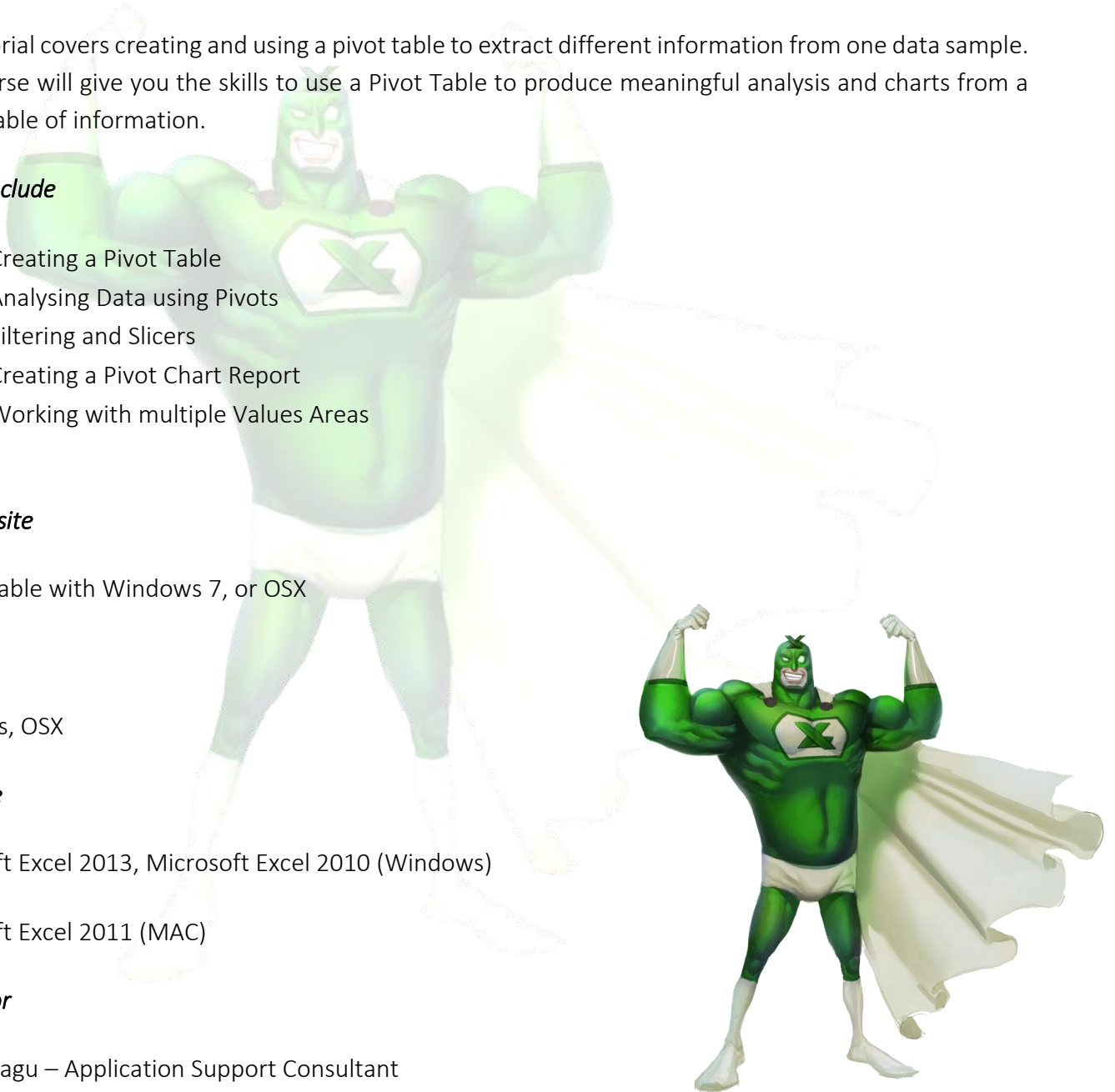Anna Neagu – Application Support Consultant

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1. Pivot Tables

When you have a lot of data, it can sometimes be difficult to analyze all of the information in your worksheet. **PivotTables** can help make your worksheets more manageable by **summarizing** data and allowing you to **manipulate** it in different ways.

Using PivotTables to answer questions

Suppose we wanted to answer the question: **"What is the amount sold by each salesperson?"** for the sales data in the example below. Answering this question could be very time-consuming and difficult—each salesperson appears on multiple rows, and we would need to total all of their different orders individually. We could use the **Subtotal** command to help find the total for each salesperson, but we would still have a lot of data to work with.

	A	B	C	D	E
1	**Salesperson**	**Region**	**Account**	**Order Amount**	**Month**
2	Albertson, Kathy	East	29386	$925.00	January
3	Albertson, Kathy	East	74830	$875.00	February
4	Albertson, Kathy	East	90099	$500.00	February
5	Albertson, Kathy	East	74830	$350.00	March
6	Brennan, Michael	West	82853	$400.00	January
7	Brennan, Michael	West	72949	$850.00	January
8	Brennan, Michael	West	90044	$1,500.00	January
9	Brennan, Michael	West	82853	$550.00	February
10	Brennan, Michael	West	72949	$400.00	March
11	Davis, William	South	55223	$235.00	February
12	Davis, William	South	10354	$850.00	January
13	Davis, William	South	50192	$600.00	March
14	Davis, William	South	27589	$250.00	January
15	Dumlao, Richard	West	67275	$400.00	January
16	Dumlao, Richard	West	41828	$965.00	February
17	Dumlao, Richard	West	87543	$125.00	March
18	Flores, Tia	South	97446	$1,500.00	March
19	Flores, Tia	South	41400	$305.00	January
20	Flores, Tia	South	30974	$1,350.00	January
21	Flores, Tia	South	41400	$435.00	February
22	Flores, Tia	South	30974	$550.00	February

Fortunately, a **PivotTable** can instantly **calculate** and **summarize** the data in a way that's both easy to read and manipulate. When we're done, the PivotTable will look something like this:

Row Labels	▼	Sum of Order Amount
Albertson, Kathy		2650
Brennan, Michael		3700
Davis, William		1935
Dumlao, Richard		1490
Flores, Tia		4565
Post, Melissa		1690
Thompson, Shannon		3160
Walters, Chris		4375
Grand Total		**23565**

Once you've created a PivotTable, you can use it to answer different questions by rearranging, or **pivoting**, the data. For example, if we wanted to answer the question: **"What is the total amount sold in each month?"** we could modify our PivotTable to look like this:

Row Labels	▼	Sum of Order Amount
January		9090
February		9160
March		5315
Grand Total		**23565**

1.1. Create a Pivot Table

Being able to analyse all the data in your worksheet can help you make better business decisions. But sometimes it's hard to know where to start, especially when you have a lot of data. Excel can help you by **recommending** and then automatically creating PivotTables, which are a great way to summarize, analyse, explore, and present your data.

    🖋 <u>TIP</u>: Make sure your data has column headings or table headers, and that there are no blank rows.

1. Select the **table** or **cells** (including column headers) containing the data you want to use.

2. From the **Insert** tab, click the **Recommended Pivot** tables.

> Mac Users (2011) – Data tab / Create Automatic Pivot Table

3. In the Recommended PivotTables dialog box, click any PivotTable layout on the left to get a preview to the right, and then pick the one that shows the data the way you want.

4. Click **OK**.

5. Excel places the PivotTable on a new worksheet and shows the Field List so you can further rearrange the PivotTable data as needed.
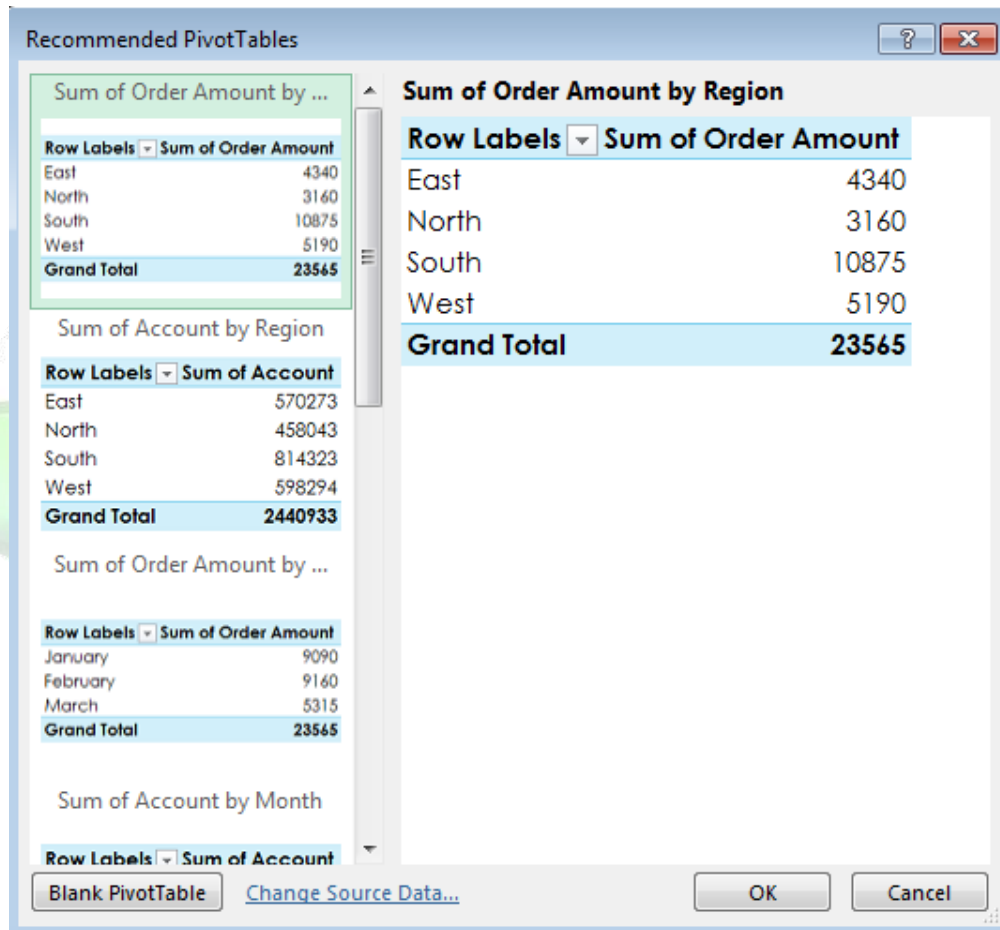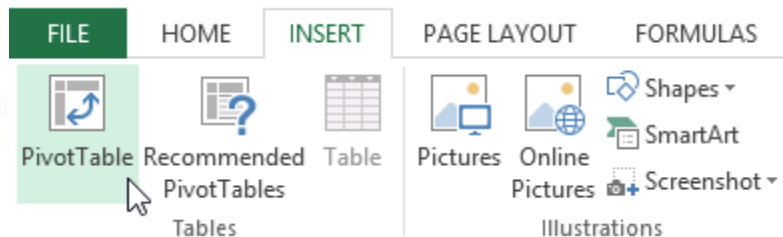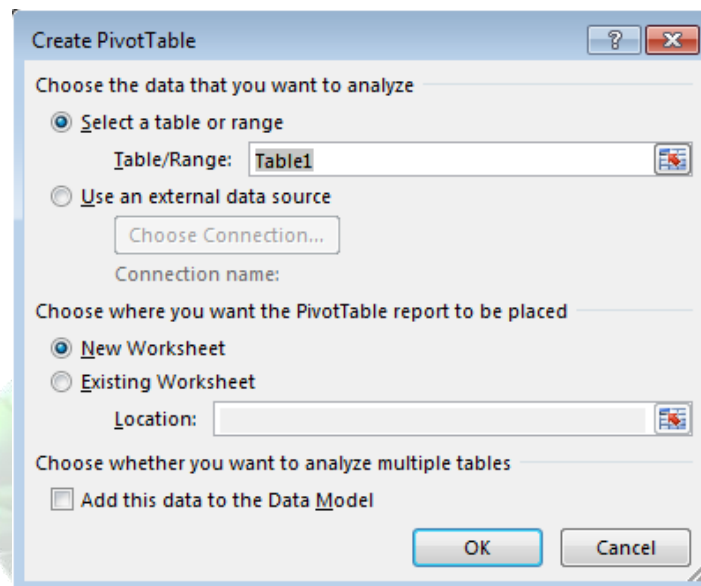
To create a PivotTable

1. Select the table or cells (including column headers) containing the data you want to use.

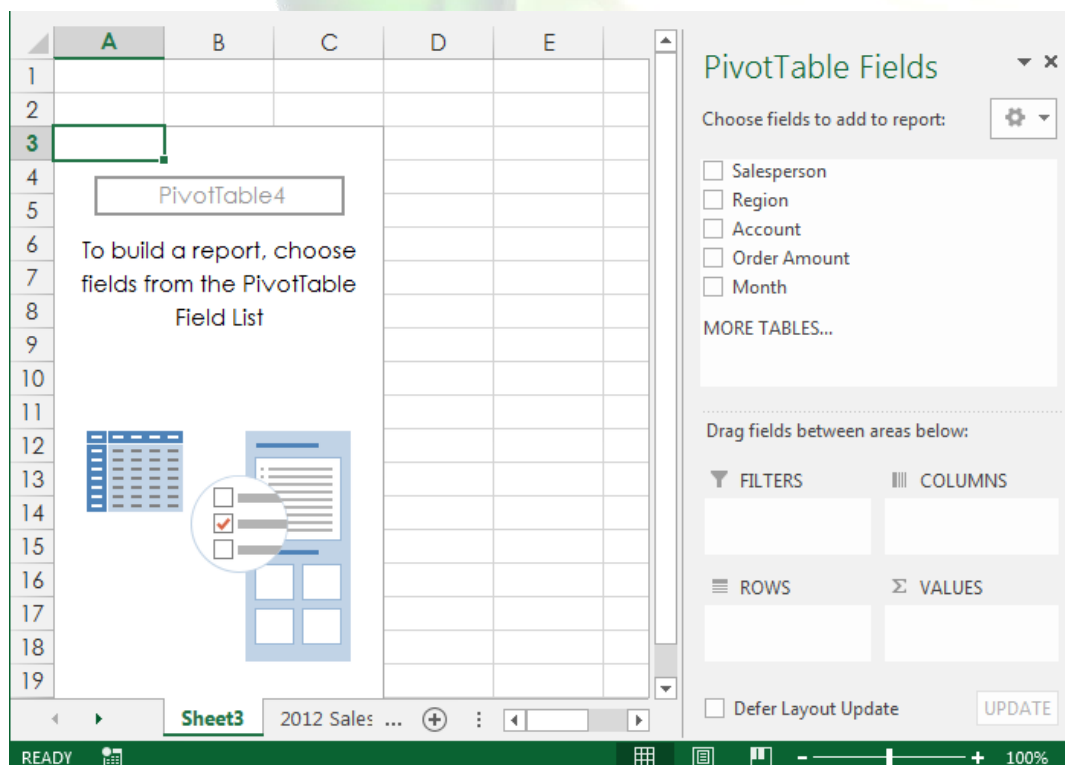2. From the **Insert** tab, click the **PivotTable** command.

Mac Users (2011) – Data tab / Pivot Table

3. The Create PivotTable dialog box will appear. Choose your settings, then click **OK**. In our example, we'll use **Table1** as our source data and place the PivotTable on a **new worksheet**.

4. A blank **PivotTable** and **Field List** will appear on a new worksheet.

5. Once you create a PivotTable, you'll need to decide which **fields** to add. Each field is simply a **column header** from the source data. In the **PivotTable Field List**, check the box for each field you

wish to add. In our example, we want to know the total **amount** sold by each **salesperson**, so we'll check the **Salesperson** and **Order Amount** fields.
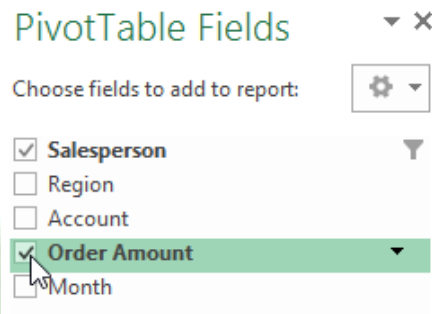
6. The selected fields will be added to one of the four areas below the Field List. In our example, the **Salesperson** field has been added to the **Rows** area, while the **Order Amount** has been added to the **Values** area. Alternatively, you can click, hold, and drag a field to the desired area.
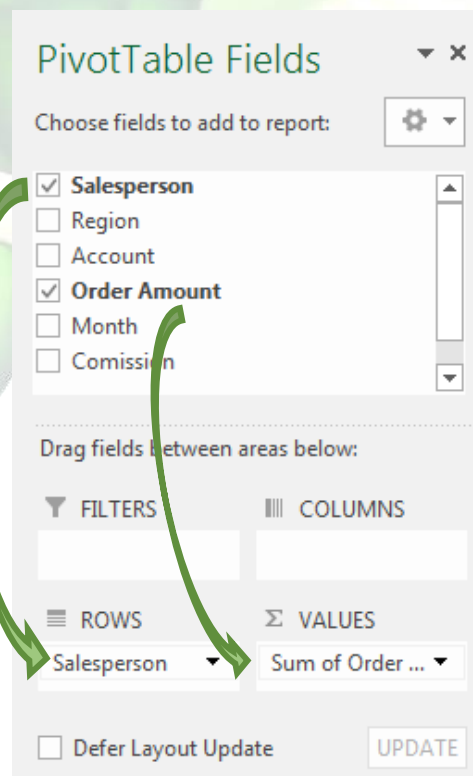
7. The PivotTable will calculate and summarize the selected fields. In our example, the PivotTable shows the amount sold by each salesperson.

✎ <u>TIP</u>: Just like with normal spreadsheet data, you can sort the data in a PivotTable using the **Sort & Filter** command in the Home tab. You can also apply any type of **number formatting** you want. For example, you may want to change the **Number Format** to **Currency**. However, be aware that some types of formatting may disappear when you modify the PivotTable.

Row Labels	Sum of Order Amount
Albertson, Kathy	$2,650.00
Brennan, Michael	$3,700.00
Davis, William	$1,935.00
Dumlao, Richard	$1,490.00
Flores, Tia	$4,565.00
Post, Melissa	$1,690.00
Thompson, Shannon	$3,160.00
Walters, Chris	$4,375.00
Grand Total	$23,565.00

1.2. Refreshing the Data

If you change any of the data in your source worksheet, the PivotTable **will not update automatically**. To manually update it, select the PivotTable and then go to **Analyze → Refresh**.
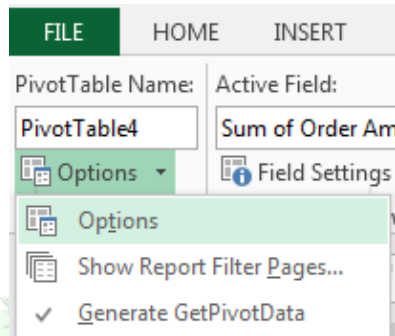
Mac Users (2011) – Same (Pivot Table Analyze Tab)
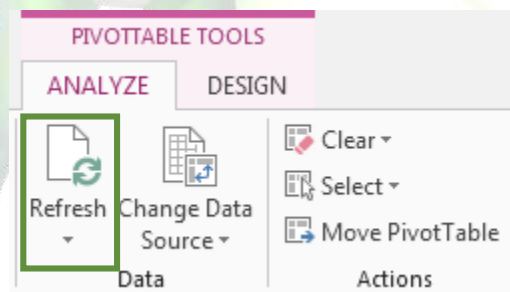
Refresh Data when opening a file

There is an option that can be turned on that will refresh the data when opening the file.
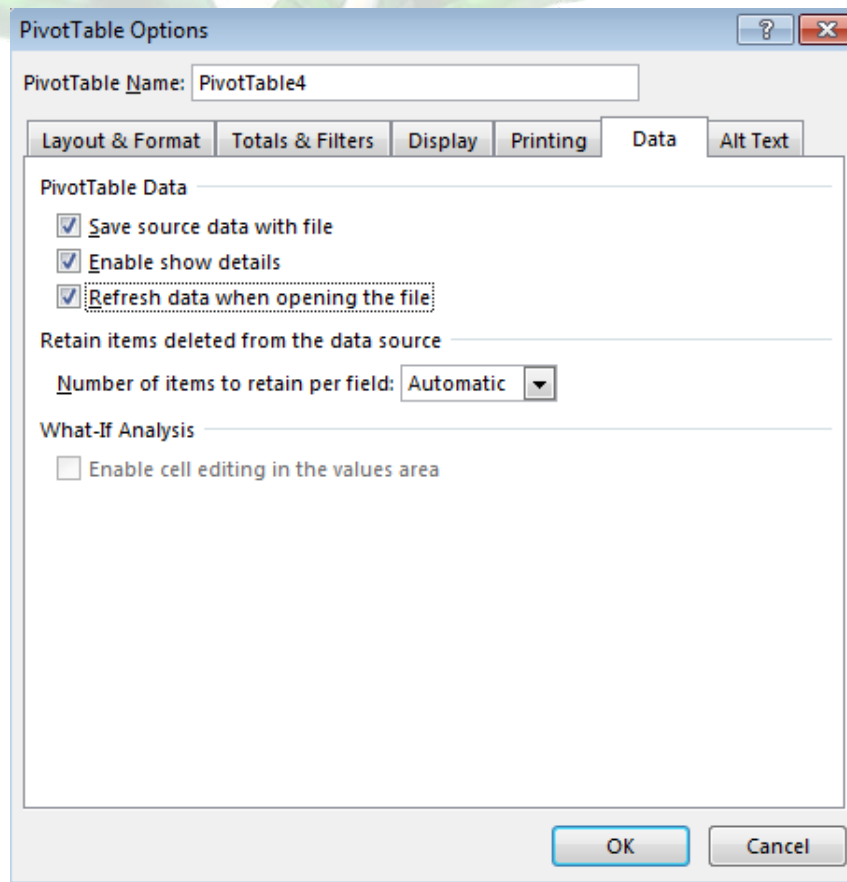
To set an option to automatically refresh PivotTable data when you open your workbook, do the following:

1. From the **PivotTable Tools** click **Options** Tab then within Pivot Table Group, Options command.

Mac Users (2011) – Same
(Pivot Table Analyze Tab)

2. Click on the **Data** Tab and tick **Refresh the data when opening the file**


3. Click on **OK**.

1.3. Pivoting Data

One of the best things about PivotTables is that they can quickly **pivot**, or reorganize, data, allowing you to look at your worksheet data in different ways. Pivoting data can help you answer **different questions** and even **experiment** with the data to discover new trends and patterns.

In our example, we used the PivotTable to answer the question: "**What is the total amount sold by each salesperson**?" But now we'd like to answer a new question: "What is the total amount sold in **each month**?" We can do this by simply changing the field in the **Rows** area.

To change the row

1. Click, hold, and drag any existing **fields** out of the **Rows** area. The field will disappear.

2. Drag a new field from the **Field List** into the **Rows** area. In our example, we'll use the **Month** field.
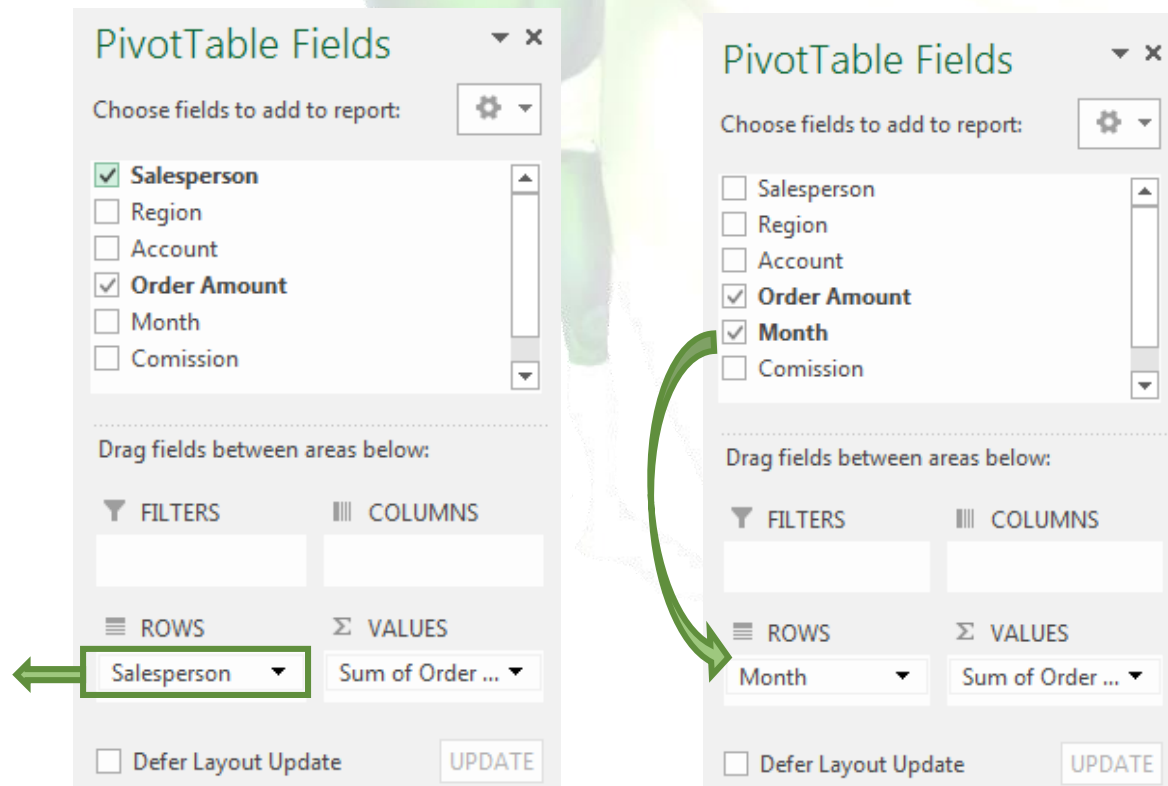
3. The PivotTable will adjust, or pivot, to show the new data. In our example, it now shows the total **Order Amount** for each month.

To add columns

So far, our PivotTable has only shown **one column** of data at a time. In order to show **multiple columns**, you'll need to add a field to the **Columns** area.

1. Drag a field from the **Field List** into the **Columns** area. In our example, we'll use the **Region** field.

2. The PivotTable will include multiple columns. In our example, there is now a column for each region.

| Sum of Order Amount	Column Labels				
Row Labels	East	North	South	West	Grand Total
January	$1,690.00	$1,140.00	$3,110.00	$3,150.00	$9,090.00
February	$1,950.00	$1,720.00	$3,975.00	$1,515.00	$9,160.00
March	$700.00	$300.00	$3,790.00	$525.00	$5,315.00
Grand Total	$4,340.00	$3,160.00	$10,875.00	$5,190.00	$23,565.00

1.4. Filters

Sometimes you may want focus on just a certain section of your data. **Filters** can be used to **narrow down** the data in your PivotTable, allowing you to view only the information you need.

To add a filter

In our example, we'll filter out certain salespeople to determine how they affect the total sales.

1. Drag a field from the **Field List** to the **Filters** area. In this example, we'll use the **Salesperson** field.
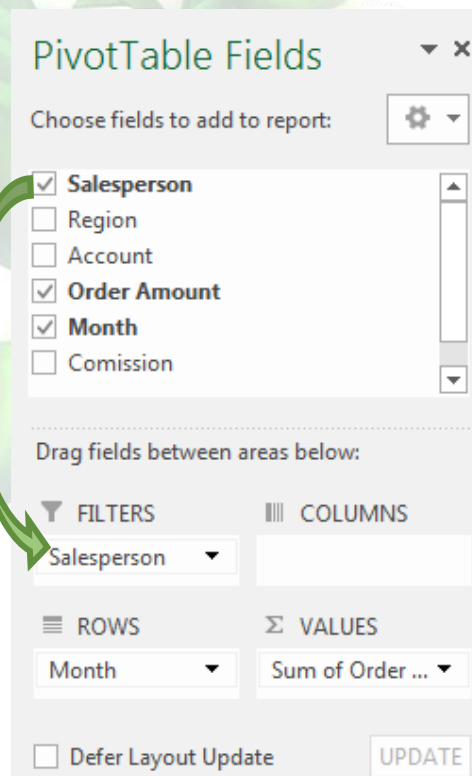
2. The **filter** will appear above the PivotTable. Click the **drop-down arrow**, then check the box next to **Select Multiple Items**.

3. **Uncheck** the box for any items you don't want to include in the PivotTable. In our example, we'll uncheck the boxes for a few different salespeople, then click **OK**.

4. The PivotTable will adjust to reflect the changes.

2. Grouping Data

In the row and column label areas of a PivotTable report, you can group the items in a field in a custom way. Grouping the data can help you to isolate a subset of data that satisfies your specific needs, and that cannot be easily grouped in other ways, such as sorting and filtering. You may wish to group using one of the following:

☑ Group numbers in numeric fields
☑ Group dates or times
☑ Group selected items

To group fields

1. **Select** the data In the PivotTable.

2. **Right-click** on selected data, and click **Group**.
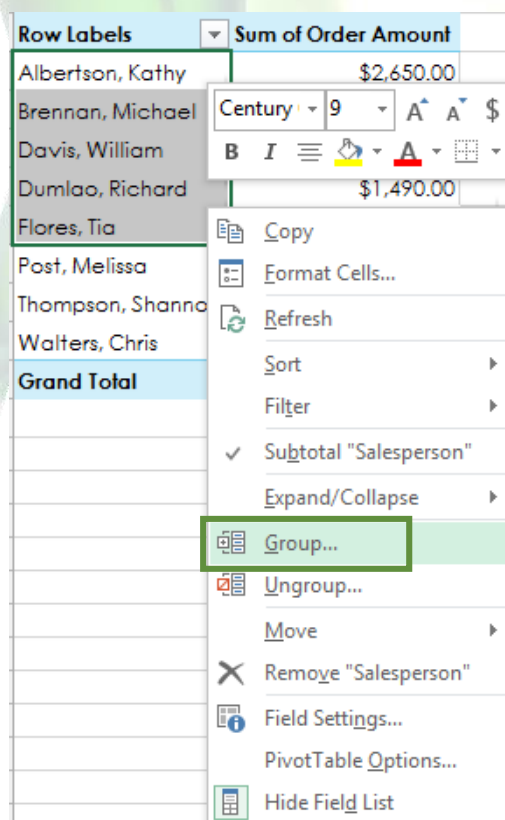
3. Click **OK**.

Row Labels	▼	Sum of Order Amount
⊟ Group1		
Albertson, Kathy		$2,650.00
Brennan, Michael		$3,700.00
Davis, William		$1,935.00
Dumlao, Richard		$1,490.00
Flores, Tia		$4,565.00
⊟ Group2		
Post, Melissa		$1,690.00
Thompson, Shannon		$3,160.00
Walters, Chris		$4,375.00
Grand Total		**$23,565.00**

To group by date

1. **Click** any cell inside the Date column.

2. **Right click** and click on **Group**.

3. Select **Months** and click **OK**.

Grouping	? ✕
Auto	
☑ Starting at:	1/5/2015
☑ Ending at:	10/27/2015
By	
Seconds	
Minutes	
Hours	
Days	
Months	
Quarters	
Years	
Number of days:	1
OK	Cancel

4. The PivotTable will adjust to reflect the changes.

Row Labels ▼	Count of Problem
Jan	35
Feb	22
Apr	1
Aug	1
Sep	2
Oct	4
Grand Total	**65**

3. Pivot Charts

Pivot Charts are like regular charts, except that they display data from a **PivotTable**. Like a PivotTable, a PivotChart is interactive. When you create a PivotChart, PivotChart filters are displayed in the chart area so that you can sort and filter the underlying data of the PivotChart report. Changes that you make to the field layout and data in the associated PivotTable are immediately reflected in the PivotChart.

A PivotChart displays data series, categories, data markers, and axes just as standard charts do. You can also change the chart type and other options such as the titles, the legend placement, the data labels, and the chart location.

Just like regular charts, you'll be able to select a **chart type**, **layout**, and **style** that will best represent the data.

To create a PivotChart

In this example, our PivotTable is showing each person's total sales per month. We'll use a PivotChart so we can see the information more clearly.

1. **Select** any cell in your PivotTable.

Sum of Order Amount	Column Labels			
Row Labels	January	February	March	Grand Total
Albertson, Kathy	$925.00	$1,375.00	$350.00	$2,650.00
Brennan, Michael	$2,750.00	$550.00	$400.00	$3,700.00
Davis, William	$1,100.00	$235.00	$600.00	$1,935.00
Dumlao, Richard	$400.00	$965.00	$125.00	$1,490.00
Flores, Tia	$1,655.00	$985.00	$1,925.00	$4,565.00
Post, Melissa	$765.00	$575.00	$350.00	$1,690.00
Thompson, Shannon	$1,140.00	$1,720.00	$300.00	$3,160.00
Walters, Chris	$355.00	$2,755.00	$1,265.00	$4,375.00
Grand Total	$9,090.00	$9,160.00	$5,315.00	$23,565.00

2. From the **Insert** tab, click the **PivotChart** command.

Mac Users (2011) – Not Applicable
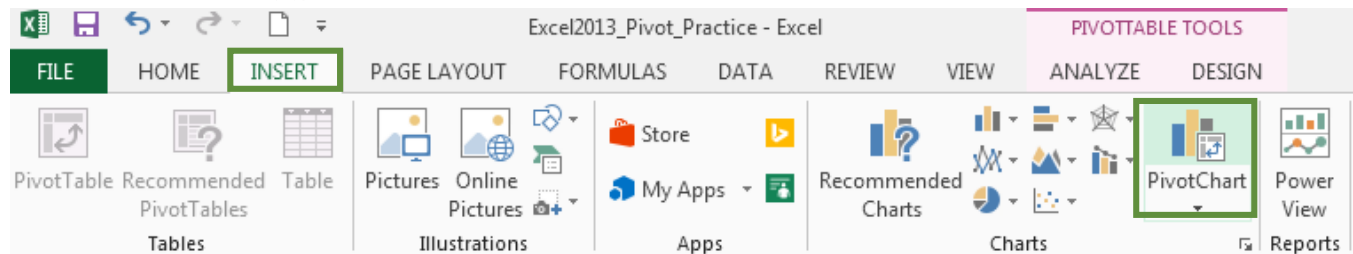
3. The **Insert Chart** dialog box will appear. Select the desired **chart type** and **layout**, then click **OK**.

4. The PivotChart will appear.
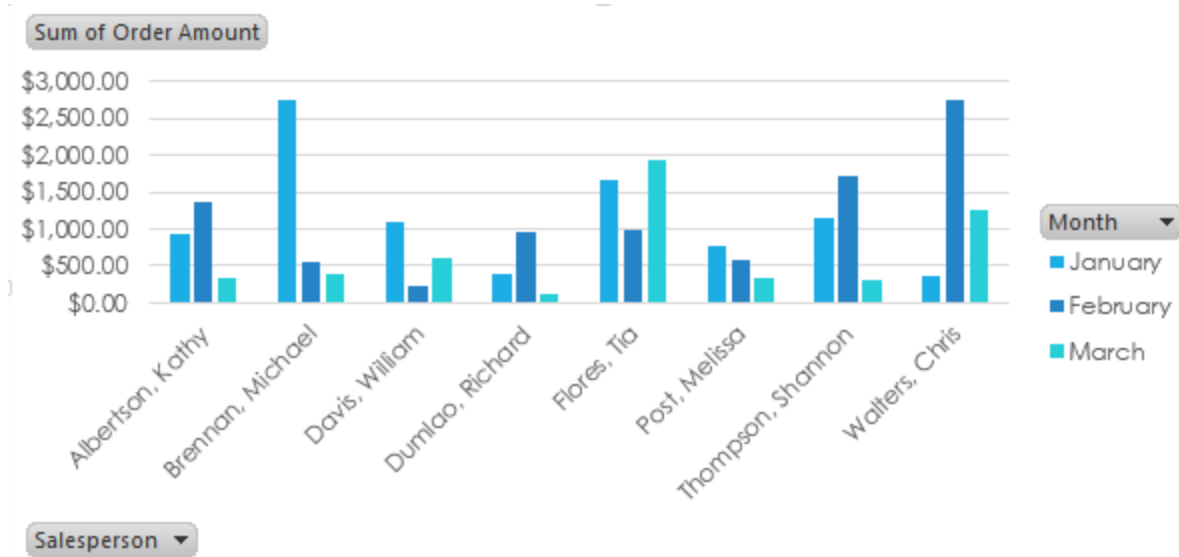
✎ <u>TIP</u>: Try using **slicers** or **filters** to change the data that is displayed. The PivotChart will automatically adjust to show the new data.

4. Slicers

Slicers make filtering data in PivotTables even easier. Slicers are basically just **filters**, but they're easier and faster to use, allowing you to instantly pivot your data. If you frequently filter your PivotTables, you may want to consider using slicers instead of filters.

When you use a regular PivotTable report filter to filter on multiple items, the filter indicates only that multiple items are filtered, and you have to open a drop-down list to find the filtering details. However, a slicer clearly labels the filter that is applied and provides details so that you can easily understand the data that is displayed in the filtered PivotTable report.
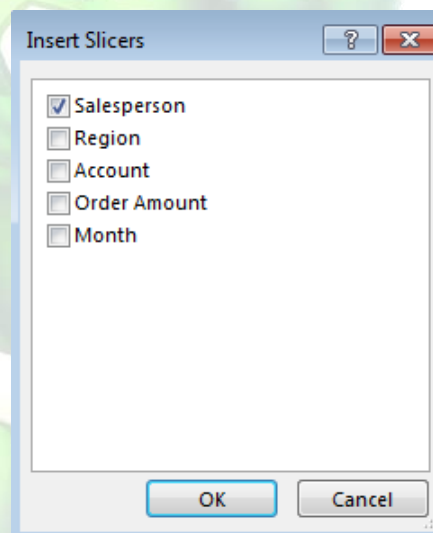
To add a slicer

Mac Users (2011) – Not Applicable

Mac Users (2016) – Same Tab

1. Select any cell in the PivotTable.

2. From the **Analyze** tab, click the **Insert Slicer** command.
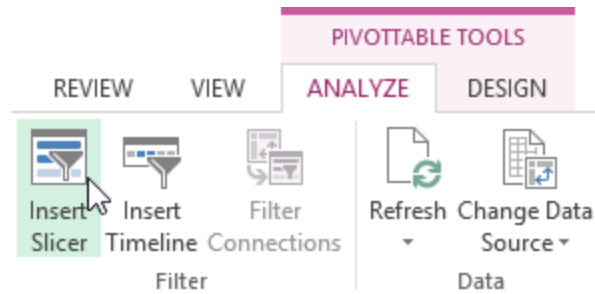
3. A dialog box will appear. Select the desired field. In our example, we'll select Salesperson, then click **OK**.


4. The slicer will appear next to the PivotTable. Each selected item will be highlighted in **blue**. In the example below, the slicer contains a list of all salespeople, and **six** of them are currently selected.

5. Just like **filters**, only **selected** items are used in the PivotTable. When you **select** or **deselect** items, the PivotTable will instantly reflect the changes.

✏ <u>TIP</u>: Try selecting different items to see how they affect the PivotTable. Press and hold the **Ctrl** key on your keyboard to select multiple items from a slicer.

Slicers are typically associated with the PivotTable in which they are created. However, you can also create stand-alone slicers. A slicer typically displays the following elements:
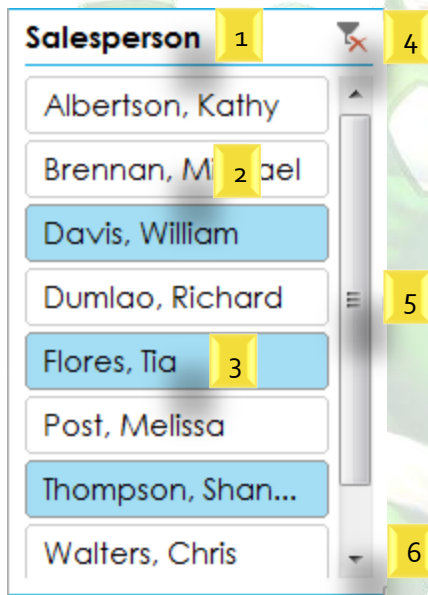
1. A slicer header indicates the category of the items in the slicer.
2. A filtering button that is not selected indicates that the item is not included in the filter.
3. A filtering button that is selected indicates that the item is included in the filter.
4. A **Clear Filter** button removes the filter by selecting all items in the slicer.
5. A scroll bar enables scrolling when there are more items than are currently visible in the slicer.
6. Border moving and resizing controls allow you to change the size and position

Challenge!

1. Open an existing Excel workbook.
2. Create a **PivotTable** using the data in the workbook.
3. Experiment by placing different fields in the **rows** and **columns** areas.
4. Filter the report with a **slicer**.
5. Create a **PivotChart**.

5. Timeline

Mac Users (2011) – Not Applicable

Instead of playing around with filters to show dates, you can now use a PivotTable timeline. It's a box you can add to your PivotTable that lets you filter by time, and zoom in on the period you want.
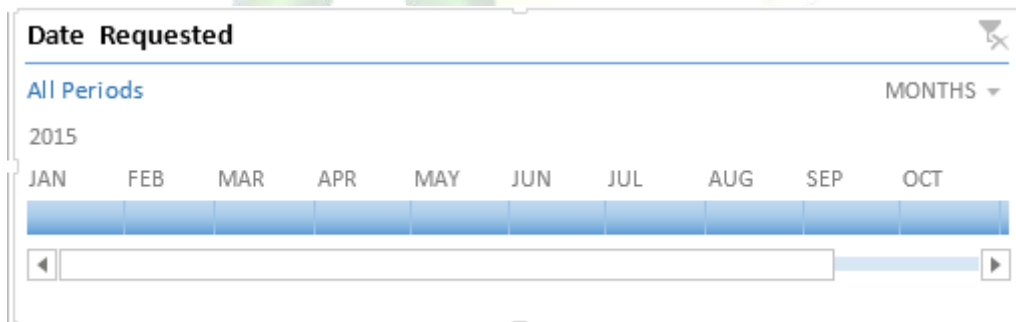
Much like a slicer you create to filter data, you can insert a timeline once and keep it with your PivotTable.

To create a timeline

1. Click anywhere in a PivotTable to show the PivotTable Tools.

2. Click **Analyze** and click on **Insert Timeline**.
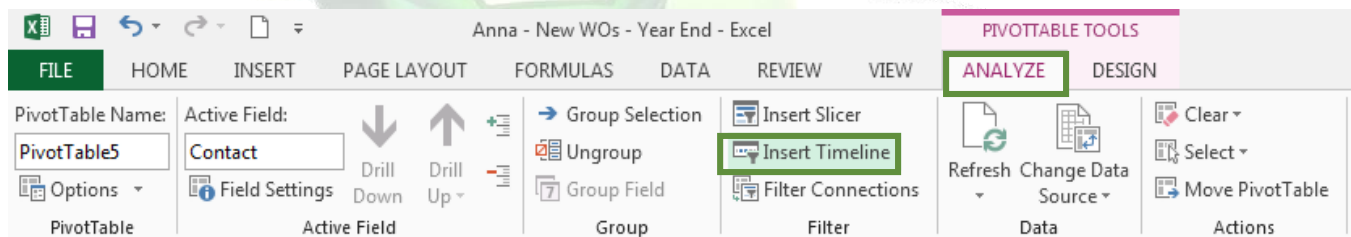
3. In the Insert Timelines dialog box, check the boxes of the date fields you want and click **OK**.


5.1. Use a timeline to filter by time period

With your timeline in place, you're ready to filter by a time period in one of four time levels (years, quarters, months, or days).

1. **Click the arrow** next to the time level shown, and pick the one you want.
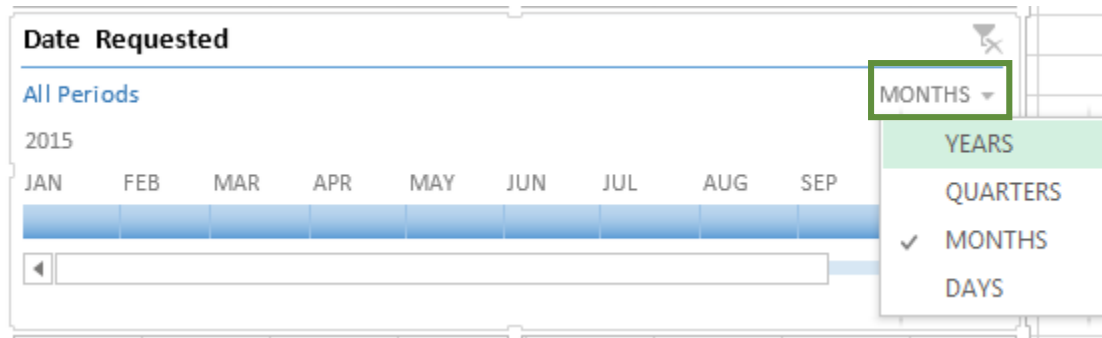
2. Drag the timeline scroll bar to the time period you want to analyse.

3. In the timespan control, click a period tile and drag to include additional tiles to select the date range you want. Use the timespan handles to adjust the date range on either side.
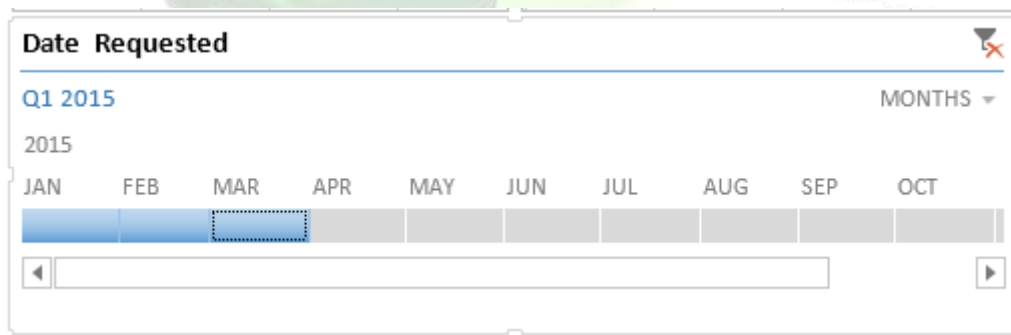

4. To clear a timeline, click the **Clear Filter** button.

✎ TIP: If you want to combine slicers with a timeline to filter the same date field, you can do that by checking the Allow multiple filters per field box in the PivotTable Options dialog box (PivotTable Tools > Analyze > Options > Totals & Filters tab).

5.2. Customize a timeline

When a timeline covers your PivotTable data, you can move it to a better location and change its size. You can also change the timeline style, which may be useful if you have more than one timeline.

1. To move the timeline, simply drag it to the location you want.

2. To change the size of the timeline, click it, and then drag the sizing handles to the size you want.

3. To change the style of the timeline, click it to display the **Timeline Tools**, and then pick the style you want on the **Options** tab.
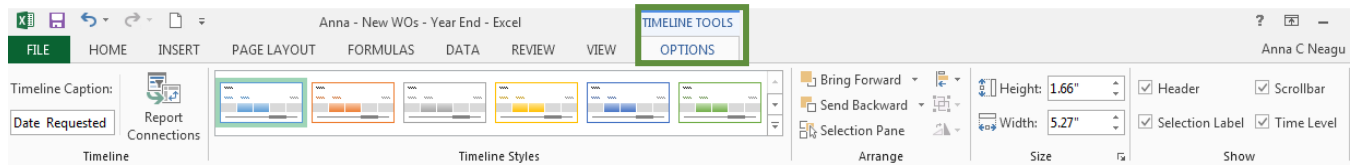
6. Calculate values in a PivotTable report

In PivotTable reports, you can use summary functions in value fields to combine values from the underlying source data. If summary functions and custom calculations do not provide the results that you want, you can create your own formulas in calculated fields and calculated items. For example, you could add a calculated item with the formula for the sales commission, which could be different for each region. The PivotTable report would then automatically include the commission in the subtotals and grand totals.

6.1. Add a calculated field

Mac Users (2011) – Same Tab

1. Click the PivotTable report. This displays the PivotTable Tools, adding the **Analyze** and **Design** tabs.

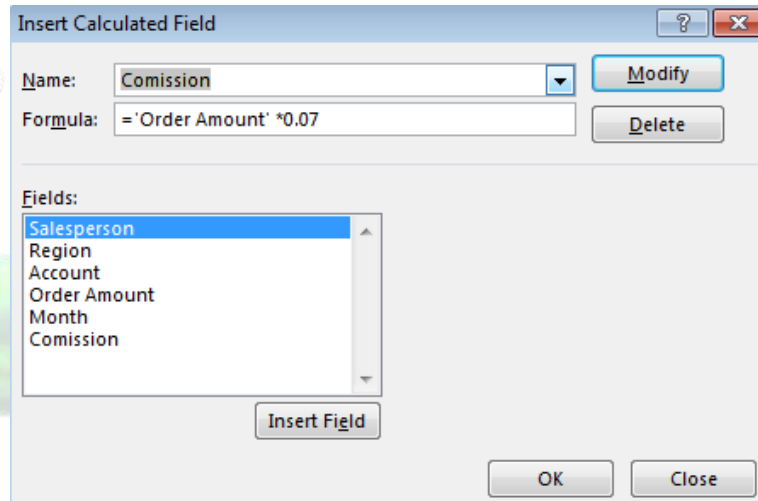2. On the **Analyze** tab, in the **Calculations** group, click **Fields, Items, & Sets**
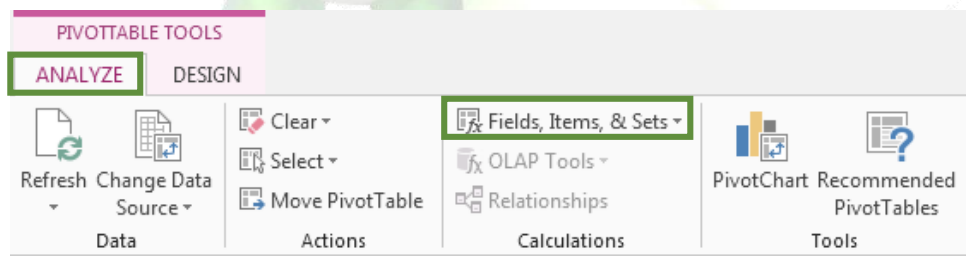
3. Click **Calculated Field**.
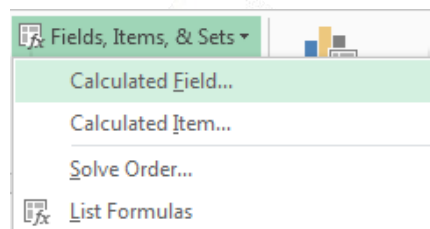
4. In the **Name** box, type a name for the field

5. In the **Formula** box, enter the formula for the field. To use the data from another field in the formula, click the field in the **Fields** box, and then click **Insert Field**.

6. Click **Add**.

7. Then click on **OK**.
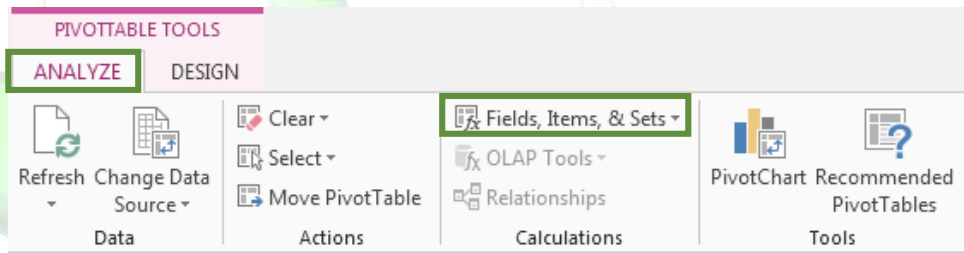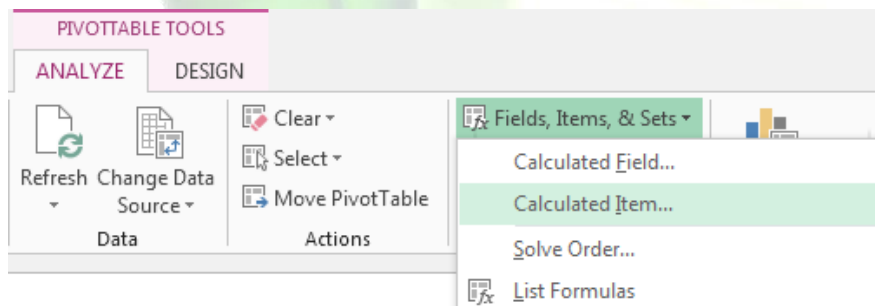
6.2. Add a calculated item to a field

Mac Users (2011) – Same Tab

In addition to the existing items in a pivot table field, you can create one or more calculated items.
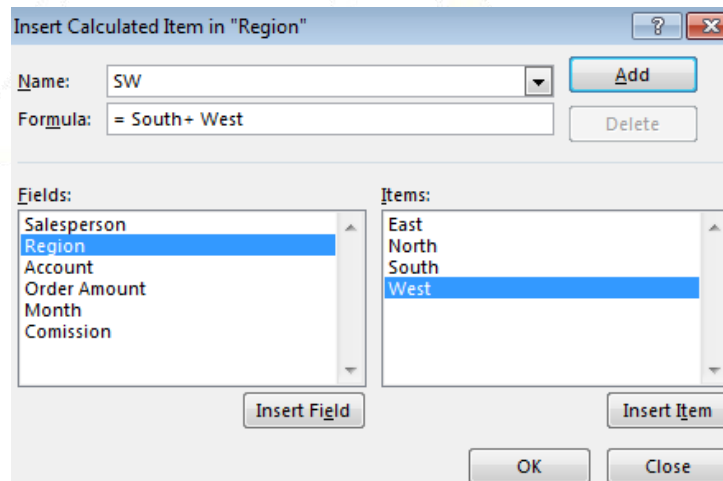
1. Click the PivotTable report. This displays the PivotTable Tools, adding the **Analyze** and **Design** tabs.

2. On the **Analyze** tab, in the **Calculations** group, click **Fields, Items, & Sets**

3. Click **Calculated Item**.

4. In the **Name** box, type a name for the calculated item.

5. In the **Formula** box, enter the formula for the item.

✐ TIP: To use the data from an item in the formula, click the item in the **Items** list, and then click **Insert Item** (the item must be from the same field as the calculated item).
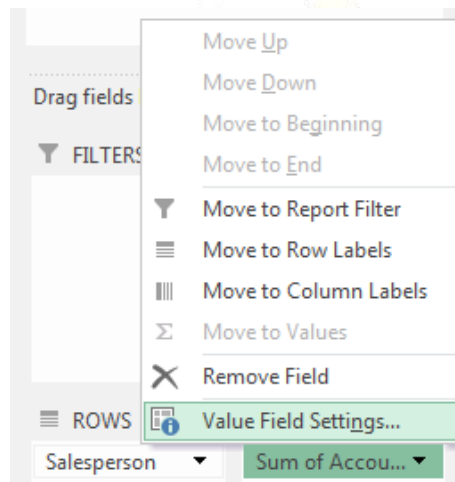
6. Click **Add**.

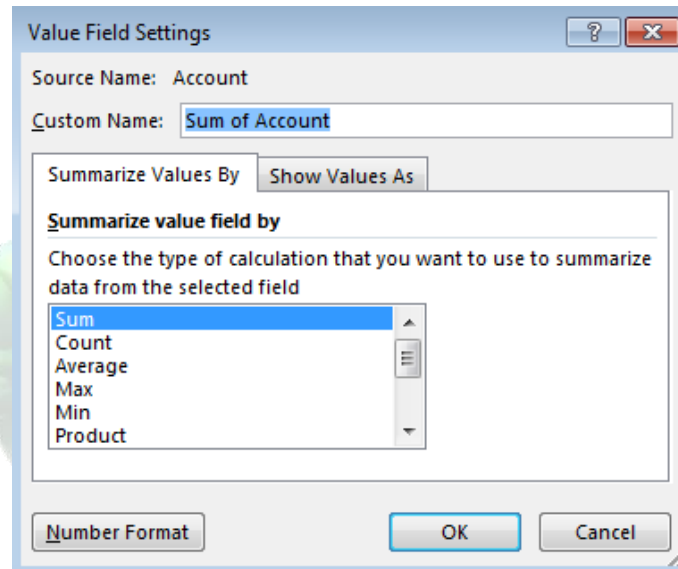| Sum of Order Amount	Column Labels ▼					
Row Labels ▼	**East**	**North**	**South**	**West**	**SW**	**Grand Total**
Albertson, Kathy	$2,650.00				$0.00	$2,650.00
Brennan, Michael				$3,700.00	$3,700.00	$7,400.00
Davis, William			$1,935.00		$1,935.00	$3,870.00
Dumlao, Richard				$1,490.00	$1,490.00	$2,980.00
Flores, Tia			$4,565.00		$4,565.00	$9,130.00
Post, Melissa	$1,690.00				$0.00	$1,690.00
Thompson, Shannon		$3,160.00			$0.00	$3,160.00
Walters, Chris			$4,375.00		$4,375.00	$8,750.00
Grand Total	$4,340.00	$3,160.00	$10,875.00	$5,190.00	$16,065.00	$39,630.00

6.3. Value Field Settings

Mac Users (2011) – Same Options

Data in the Values area summarize the underlying source data (not the value that is showing) in the PivotChart report in the following way: numeric values use the SUM function and text values use the COUNT function. However, you can change the summary function.

1. **Select** any cell in the PivotTable.

2. From the Σ **VALUES** filed, click the **Sum of** option.

3. Select **Value Filed Settings**.

4. Click the **Summarize by** tab.

5. In the **Summarize value field by** box, click the summary function that you want to use.

6. Click **OK**.

7. PivotTable report compatibility issues

Before you continue saving the workbook to an earlier file format, you should address **issues that cause a significant loss of functionality** so that you can prevent permanent loss of data or incorrect functionality.

Issues that cause a minor loss of fidelity might or might not have to be resolved before you continue saving the workbook—data or functionality is not lost, but the workbook might not look or work exactly the same way when you open it in an earlier version of Microsoft Excel.

If you're a data analyst using PowerPivot to create data models in Excel, you might run into the following error if you share workbooks with colleagues who are using earlier versions of Excel. In its entirety, the error reads as: "*This PivotTable was created in a later version of Excel and can't be updated in this version*."

To update it, click OK, and then open the workbook in the version of Excel it was originally created in. In Excel 2013, data models are built into the software. If you upgraded an Excel 2010 PowerPivot workbook to Excel 2013, or created a new Excel 2013 workbook from the ground up that contains a data model, the workbook has limited backwards compatibility. You can open and view the workbook in Excel 2010, but you won't be able to modify or manipulate PivotTables or PivotCharts.

Within an organization, everyone using data models or model-based workbooks should run the same version of Excel, either using Excel 2010 with the PowerPivot add-in for Excel 2010, or upgrade to Excel 2013 to use the embedded data model and data visualization features that are part of that release.