Instructor’s Manual Materials to Accompany

EXPLORING MICROSOFT® OFFICE 2013, VOLUME 1

## EXCEL CHAPTER 3: Charts: Depicting Data Visually

### Available Instructor Resources

|  |  |  |
| --- | --- | --- |
| **Resource** | **File Name** | **Found** |
| **Student Data Files** | various | Online Instructor Resource Center |
| **Solution Files** | various | Online Instructor Resource Center |
| **Answer Keys** |  | Online Instructor Resource Center |
| Matching | e03\_answerkey\_match |
| Multiple Choice | e03\_answerkey\_mc |  |
| Concepts Checks | e03\_answerkey\_concepts |  |
| **Scorecards** | e03b1Tips\_scorecard | Online Instructor Resource Center |
| **Scoring Rubrics** | e03b1Tips\_rubric | Online Instructor Resource Center |
| **Annotated Solution File** | e03b1Tips\_annsolution | Online Instructor Resource Center |
| Scripted Lecture (Script) | e03\_script | Online Instructor Resource Center |
| Scripted Lecture Solution | e03\_script\_solution |
| Scripted Lecture Data | e03\_script\_data |  |
| **PowerPoint Presentation** | e03\_powerpoints | Online Instructor Resource Center |
| **Testbank** | e03\_testbank | Online Instructor Resource Center |
| **Instructor's Manual (lesson plans incl.)** | e03\_instructormanual | Online Instructor Resource Center |
| **Assignment Sheet** | e03\_assignsheet | Online Instructor Resource Center |
| **Prepared Exam (Chapter & App)** |  | Online Instructor Resource Center |
| Prepared Exam-Chap instruction | e03\_exam\_chap\_instruction |
| Prepared Exam-Chap solution | e03\_exam\_chap\_solution |
| Prepared Exam-Chap Data | e03\_exam\_chap\_data |
| Prepared Exam-Chap Annotated Sol. | e03\_exam\_chap\_annsolution |
| Prepared Exam-Chap Scorecard | e03\_exam\_chap\_scorecard |
| Prepared Exam-App instruction | e03\_cumexam\_instruction |  |
| Prepared Exam-App solution | e03\_cumexam\_solution |  |
| Prepared Exam-App Data | e03\_cumexam\_data |  |
| Prepared Exam-App Annotated Sol. | e03\_cumexam\_annsolution |  |
| Prepared Exam-App scorecard | e03\_cumexam\_scorecard |  |
| **File Guide** | e03\_file\_guide | Online Instructor Resource Center |
| **Instructor Resource Card** | e03\_ircard | Online Instructor Resource Center |
| **Objective Map** | e03\_objectivesmap | Online Instructor Resource Center |
| **Online Chapter Review** | e03\_chapt\_checklist | Companion Website for Students |
| **Grader Project** |  |  |
| Grader-instruction | e03\_grader\_instruction | Online Instructor Resource Center |
| Grader-solution | e03\_grader\_solution |
| Grader-data | e03\_grader\_data |
| Grader-annoted. Solution | e03\_grader\_annsolution |  |
| Grader-scorecard | e03\_grader\_scorecard |  |
| **Additional Projects (Practice & Mid Level)** |  | Online Instructor Resource Center |
| Additional Proj-Practice instruction | e03\_p\_addproject\_instruction |
| Additional Proj- Practice solutions | e03\_p\_addproject\_solution |
| Additional Proj-Practice Data | e03\_p\_addproject\_data |
| Additional Proj-Practice Ann Sol. | e03\_p\_addproject\_annsolution |
| Additional Proj-Practice Scorecard | e03\_p\_addproject\_scorecard |
| Additional Proj-Mid Level instruction | e03\_ml\_addproject\_instruction |  |
| Additional Proj-Mid Level solutions | e03\_ml\_addproject\_solution |
| Additional Proj-Mid Level Data | e03\_ml\_addproject\_data |
| Additional Proj-Mid Level Ann Sol. | e03\_ml\_addproject\_annsolution |  |
| Additional Proj-Mid Level Scorecard | e03\_ml\_addproject\_scorecard |  |

### CHAPTER OBJECTIVES

#### When students have finished reading this chapter, they will be able to:

* Select the data source
* Choose a chart type
* Move, size, and print a chart
* Add chart elements
* Format chart elements
* Apply a chart style and colors
* Modify the data source
* Create and customize sparklines

### CHAPTER OVERVIEW

*The students will be asked to create and modify accurate and effective charts. The student will learn that the chart is a visual representation of numerical data that compares data and helps reveal trends or patterns to help people make informed decisions. Students will create effective charts that depict data in a clear, easy-to-interpret manner. Student will learn that a chart needs to contain enough data to be useful without overwhelming the audience.*

#### The major sections in this chapter are

1. **Chart Creation Basics.** In this section, the student will learn how to select data and create a meaningful chart using the data.
2. **Chart Elements.** In this section students will learn how to add and format chart elements.

**3. Chart Design and Sparklines.** Students will learn that after they add and format chart elements, that they might want to experiment with other features to enhance a chart. In this section, students will learn how to apply chart styles and colors, filter chart data, and insert and customize miniature charts (sparklines) within individual cells.

### CLASS RUN-DOWN

1. Have students turn in Homework assignments.
2. Talk about chapter using discussion questions listed below.
3. Use PowerPoint Presentation to help students understand chapter content.
4. Demonstrate Excel 2013 chart possibilities and processes.
5. Run through Scripted Lectures for chapter. Give special attention to areas where students might be challenged.
6. Have students complete Capstone Exercise for Excel Chapter 3.
7. Use myitlab for in-class work or to go over homework.
8. Give students Homework Handout for next class period.

### LEARNING OBJECTIVES

#### At the end of this lesson students should be able to

* Decide the appropriate chart type for the data and the message
* Create a chart
* Change the chart type
* Change the data source and structure
* Apply a chart layout and a chart style
* Move a chart
* Print charts
* Insert and customize a sparkline
* Select and format chart elements
* Customize chart labels
* Format the axes and gridlines
* Add a trendline

### KEY TERMS

**100% stacked column chart–**Places (stacks) data in one column per category, with each column having the same height of 100%. This type of chart depicts contributions to the whole.

**3-D chart–**Adds a third dimension to each data series, creating a distorted perspective of the data.

**Area chart**–Emphasizes magnitude of changes over time by filling in the space between lines with a color.

**Axis title–**Label that describes either the category axis or the value axis.

**Bar chart**–Displays values across categories using horizontal bars where the width represents the value.

**Bubble chart–**Shows relationships among three values by using bubbles.

**Category axis**–Provides descriptive group names or labels, such as college names or cities, to identify data.

**Category label**–Text that describes a collection of data points in a chart.

**Chart–**Visual representation of numerical data that compares data and assists to reveal trends or patterns to help people make informed decisions.

**Chart area**–Contains the entire chart and all of its elements.

**Chart element**–A component that completes or helps clarify the chart. Some chart elements, such as chart titles, should be included in every chart.

**Chart Filter*–***Controls which data series and categories are visible in a chart. By default, all the data you selected to create the chart are used to construct the data series and categories. However, you can apply a chart filter to hide extraneous data.

**Chart sheet**–Contains a single chart and no spreadsheet data and no spreadsheet cells.

**Chart style*–***A collection of formatting that controls the color of the chart area, plot area, and data series. Styles also affect the look of the data series, such as flat, 3-D, or beveled.

**Chart Styles group**–Contains predefined styles that control the color of the chart area, plot area, and data series.

**Chart title**–Label that describes the entire chart; should reflect the purpose of the chart.

**Clustered column chart**–Groups or clusters of similar data in columns to compare values across categories.

**Column cha**rt–Displays data vertically in columns where the height represents the value.

**Data labels**–Descriptive labels that show the exact value of the data points on the value axis.

**Data point**–Numeric value that describes a single value on a chart.

**Data series–**Group of related data points.

**Doughnut chart**–Displays values as percentages of the whole but may contain more than one data series.

**Error Bars*–***Visuals that indicate the standard error amount, a percentage, or a standard deviation for a data point or marker.

**Exploded pie chart–**Separates one or more pie slices from the rest of the pie chart to give focus on a particular slice or data point.

**Format Selection button**–In the Current Selection group, opens the appropriate Format element dialog box.

**Gridline–**Horizontal or vertical line that extends from the horizontal or vertical axis through the plot area.

**Legend*–***Key that identifies the color, gradient, picture, texture, or pattern assigned to each data series. The legend is displayed by default for particular charts.

**Line chart–**Displays category data on the horizontal axis and value data on the vertical axis by using a line to connect data points in order to show trends over equal time periods.

**Multiple data series**–Compares two or more sets of data in one chart.

**Pie chart**–Shows each data point in proportion to the whole data series as a slice in a circular pie.

**Plot area**–Contains graphical representation of values in a data series.

**Radar chart**–Compares aggregate values of three or more variables represented on axes starting from the same point.

**Select Data Source dialog box**–To modify the data source range in the worksheet, or adjust the legend and horizontal axis.

**Single data series**–Compares values for one set of data.

**Sizing handles–**Enables you to adjust the size of the chart; indicated by eight small white-filled squares.

**Sparkline*–***Small line, column, or win/loss chart contained in a single cell. The purpose of a sparkline is to present a condensed, simple, succinct visual illustration of data. Unlike a regular chart, a sparkline does not include a chart title or axis labels.

**Stacked column chart–**Places stacks of data in segments on top of each other in one column, with each category in the data series represented by a different color.

**Stock chart–**Shows the volume high, low, open, and close prices for individual stocks over time.

**Surface chart–**Displays trends using two dimensions on a continuous curve.

**Switch Row/Column button**–In Data group; reverse/switch the category axis and the row labels as data series and in the legend.

**Trendline–**Line used to depict trends and forecast future data.

**Value axis**–Displays incremental values to identify the approximate values of the data series.

**X Y (scatter) chart**–Shows a relationship between two variables.

**X-axis**–Horizontal border of plot area which provides a frame of reference for measurement.

**Y-axis–**Vertical border of plot area which provides a frame of reference for measurement.

### DISCUSSION QUESTIONS

* What is a data point? A data series? A category label?
* What are some of the possible types of charts that Excel can create and examples of situations when each type would be used?
* What are the typical steps in creating a chart?
* What is the Chart Tools contextual tab used for?
* What is a sparkline and what is a sparkline’s purpose?
* What are some elements of a chart?
* What is a trendline and why would you add it to a chart?
* What do you feel are the most common errors that can be made in chart creation?

### WHEN USING SCRIPTED LECTURE IN CLASS, DEMONSTRATE HOW TO:

* Create a Clustered Column Chart
* Change the Chart Position and Size
* Create a Pie Chart
* Explode a Pie Slice
* Change Worksheet Data
* Move a Chart
* Apply a Chart Style and Chart Layout
* Change the Data
* Change the Chart Type
* Insert a Sparkline
* Add a Chart Title
* Add and Format Axis Titles
* Add Data Labels
* Apply Fill Colors
* Insert a Trendline
* Print a Chart

### CONNECTIONS PRACTICAL PROJECTS AND APPLICATIONS

* Complete an Excel worksheet with your monthly budget (total output). When it is complete, turn that data into a pie chart.
* Complete an Excel data source sheet with the x-axis as number of miles driven per day and the y-axis as days of the month. Create a chart and add a trendline.
* Keep track of wins/losses of any team and the competitors of the team and compare them against each other.
* Track the stock prices of a publicly traded stocks of companies that interest you.

### TEACHING NOTES

#### Chart Creation Basics

In this section, the student will learn how to select data and create a meaningful chart using the data.

A. Selecting the Data Source

* Before creating a chart, organize the worksheet data so that the values in columns and rows are on the same value system (such as dollars or units), make sure labels are descriptive, and delete any blank rows or columns that exist in the primary data set.
* Each cell containing a value is a data point.
* **Teaching Tips**: Demonstrate the importance of ensuring that each data series uses the same scale. For example, do not include data aggregates (such as totals or averages) with individual values.
* **Teaching Tips:** After you create a chart, you may need to change the worksheet data. When you change the worksheet data, Excel updates any charts that you created based on the data. Demonstrate an example of this.

B. Choosing a Chart Type

* When you select a range of cells and position the mouse pointer over that selected range, Excel displays the Quick Analysis button in the bottom-right corner of the selected area. The Excel 2013 Quick Analysis tool enables you to use analytical tools such as charts to quickly examine data.
* **Teaching Tips:** Stress the importance of determining your message before selecting chart type.
* **Teaching Tips:** Demonstrate how a column chart displays data vertically in columns where the height represents the value.
* **Teaching Tips:** Show the clustered column chart where groups or clusters similar data in columns to compare values across categories for easy comparison.
* **Teaching Tips:** Demonstrate the bar char which displays values across categories using horizontal bars where the width represents the value.
* **Teaching Tips:** A bar chart is preferable when category names are long, such as Database Administrators. A bar chart enables category names to appear in an easy-to-read format, whereas a column chart might display category names at an awkward angle or in a smaller font size.
* **Teaching Tips:** Show how a line chart displays category data on the horizontal axis and value data on the vertical axis by using a line to connect data points in order to show trends over equal time periods.
* **Teaching Tips:** Demonstrate the creation of a pie chart which shows each data point in proportion to the whole data series as a slice in a circular pie.
* An exploded pie chart separates one or more pie slices from the rest of the pie chart to give focus on a particular slice or data point.
* **Teaching Tips:** Avoid separating too many pie slices because it will diminish the impact of the emphasis.
* **Teaching Tips:** Demonstrate a stacked column chart which places stacks of data in segments on top of each other in one column, with each category in the data series represented by a different color.
* **Teaching Tips:** Use a stacked column chart to compare total values across categories, as well as to display the individual category values.
* **Teaching Tips:** When you create a stacked column chart, make sure data are additive: each column represents a sum of the data for each segment.
* **Teaching Tips:** Create a 100% stacked column chart which places (stacks) data in one column per category, with each column having the same height of 100%. This type of chart depicts contributions to the whole.
* **Teaching Tips:** When a 100% stacked column chart type is selected, you cannot change the y-axis labels from percentages to values.
* **Teaching Tips:** Demonstrate how a 3-D chart adds a third dimension to each data series, creating a distorted perspective of the data.
* **Teaching Tips:** Some columns might appear taller or shorter than they actually are because of the angle of the 3-D effect.
* **Teaching Tips:** Some columns may be hidden by taller columns in front of them.
* **Teaching Tips:** 3-D charts might hide smaller data values behind data series with larger values; be cautious.
* **Teaching Tips:** Discuss other chart types as follows:
* Area chart–Emphasizes magnitude of changes over time by filling in the space between lines with a color.
* X Y (scatter) chart–Shows a relationship between two variables.
* Stock chart–Shows the volume high, low, open, and close prices for individual stocks over time.
* Surface chart–Displays trends using two dimensions on a continuous curve.
* **Teaching Tips:** The surface chart is not as common as other chart types because they require more data points and often confuse people.
* Doughnut chart–Displays values as percentages of the whole but may contain more than one data series.
* Bubble chart–Shows relationships among three values by using bubbles.
* Radar chart–Compares aggregate values of three or more variables represented on axes starting from the same point.

C. Moving, Sizing, and Printing a Chart

* Excel inserts the chart as an embedded object in the current worksheet, often to the right side of, but sometimes on top of and covering up, the data area. After you insert a chart, you usually need to move it to a different location, adjust its size, and prepare to print it.

***Chart Elements***

After you create a chart, you usually need to add components to describe the chart. Adding descriptive text for labels provides information for the reader to comprehend the chart**.**

A. Adding Chart Elements

* A chart element is a component that complete or helps clarify the chart. Chart elements include the following:
* A chart title is a label that describes the entire chart; should reflect the purpose of the chart.
* **Teaching Tips:** All charts should have chart title.
* An axis title is important because it is the label that describes either the category axis or the value axis.
* Data labels–Descriptive labels that show the exact value of the data points on the value axis.
* **Teaching Tips:** Format Labels dialog box enables you to specify what to display as the label.
* **Teaching Tips:** When you first create a pie chart, Excel generates a legend to identify the category labels for the different slice colors, but it does not display data labels. You can display values, percentages, and even category labels on or next to each slice. Pie charts often include percentage data labels. If you also include category labels, remove the legend to avoid duplicating elements.
* **Teaching Tips:** Show how gridlines can be effective as horizontal or vertical lines that extend from the horizontal or vertical axis through the plot area.
* **Teaching Tips:** Excel displays horizontal gridlines for column, line, scatter, stock, surface, and bubble charts and vertical gridlines for bar charts. Gridlines may display by default, depending on the chart type.
* Error Bars are the visuals that indicate the standard error amount, a percentage, or a standard deviation for a data point or marker.
* **Teaching Tips:** Error bars are not displayed by default.
* A trendline is a line used to depict trends and forecast future data.
* The legend is the key that identifies the color, gradient, picture, texture, or pattern assigned to each data series. The legend is displayed by default for particular charts.
* **Teaching Tips:** To remove an element, click Chart Elements and deselect a check box. Alternatively, click Add Chart Element in the Chart Layouts group on the Chart Tools Design tab, position the mouse pointer over the element name, and then select None.

B. Formatting Chart Elements

* When you position the mouse pointer over the chart, Excel displays a ScreenTip with the name of that chart element. To select a chart element, click it when you see the ScreenTip, or click the Format tab, click the Chart Elements arrow in the Current Selection group, and then select the element from the list.
* You can apply multiple settings, such as fill colors and borders, at once using a Format task pane.
* Based on the data source values and structure, Excel determines the starting, incremental, and stopping values that display on the value axis when you create the chart. You might want to adjust the value axis.
* When you select a data label, Excel selects all data labels in that data series. To format the labels, double-click a data label to open the Format Data Labels task pane.

***Chart Design and Sparklines***

After you add and format chart elements, you might want to experiment with other features to enhance a chart.

* **Teaching Tips:** The Chart Tools Design tab contains two other groups: Chart Styles and Data. These groups enable you to apply a different style or color scheme to a chart or manipulate the data that are used to build a chart. You can also click the Chart Styles and Chart Filters buttons to the right of a chart to change the design of a chart.

A. Applying a Chart Style and Colors

* A chart style is a collection of formatting that controls the color of the chart area, plot area, and data series. Styles also affect the look of the data series, such as flat, 3-D, or beveled.
* **Teaching Tips:** When choosing a chart style, make sure the style complements the chart data and is easy to read. Also, consider whether you will display the chart onscreen in a presentation or print the chart. If you will display the chart in a presentation, consider selecting a style with a black background.

B. Modifying the Data Source

* A chart filter controls which data series and categories are visible in a chart. By default, all the data you selected to create the chart are used to construct the data series and categories. However, you can apply a chart filter to hide extraneous data.

C. Creating and Customizing Sparklines

* A sparkline is a small line, column, or win/loss chart contained in a single cell. The purpose of a sparkline is to present a condensed, simple, succinct visual illustration of data. Unlike a regular chart, a sparkline does not include a chart title or axis labels.
* **Teaching Tips:** Inserting sparklines next to data helps your audience understand data quickly without having to look at a full-scale chart.

### ONLINE CHAPTER REVIEW

To find an online chapter review to help your students practice for tests, visit the Companion Web site at <http://www.pearsonhighered.com/exploring/>.

### ADDITIONAL WEB RESOURCES

1. Recommended Charts Command in Excel 2013: http://office.microsoft.com/en-us/excel-help/create-a-chart-HA102809309.aspx?CTT=5&origin=HA102809308
2. Charting Overview for the New Microsoft Office (Microsoft's Excel Blog): http://blogs.office.com/b/microsoft-excel/archive/2012/09/06/charting-overview-for-office-2013.aspx/
3. Format and customize Excel 2013 charts quickly with the new Formatting Task pane: http://blogs.office.com/b/microsoft-excel/archive/2013/03/27/format-and-customize-excel-charts-quickly-with-the-new-formatting-task-pane-.aspx
4. How to use the Chart Wizard in Excel: http://support.microsoft.com/kb/304421
5. Microsoft Excel Chart Templates: http://office.microsoft.com/en-us/templates/results.aspx?qu=Charts&av=zxl

### PROJECTS AND EXERCISES

|  |  |  |
| --- | --- | --- |
|  | **Data file** | **Save As** |
| Hands-On Exercise 1 | e03h1Jobs | e03h1Jobs\_LastFirst |
| Hands-On Exercise 2 | e03h1Jobs\_LastFirst | e03h2Jobs\_LastFirst |
| Hands-On Exercise 3 | e03h2Jobs\_LastFirst | e04h3Jobs\_LastFirst |
| Practice Exercise 1 | e03p1Utilities | e03p1Utilities\_LastFirst |
| Practice Exercise 2 | e03p2Pine | e03p2Pine\_LastFirst |
| Mid-Level Exercise 1 | e03m1Airports | e03m1Airports\_LastFirst |
| Mid-Level Exercise 2 | e03m2Psych | e03m2Psych\_LastFirst |
| Mid-Level Exercise 3 (collaboration) | Blank workbook | e03t1CurrentMovies\_GroupName |
| BYC Research | Blank workbook | e03b2StockData\_LastFirst |
| BYC Disaster Recovery | e03b3Houses | e03b3Houses\_LastFirst |
| BYC Soft Skills | Blank workbook | e03b4Time\_LastFirst |
| Capstone | e03c1Movies | e03c1Movies\_LastFirst |

### CHAPTER REVIEW/ANSWERS TO END OF CHAPTER MATERIAL

**Key Terms Matching Answer Key**

1. A **Clustered column chart (F)** is the chart type to compare multiple categories of data vertically. p. 510

2. A **Sparkline (P)** is a miniature chart contained in a single cell. p. 539

3. A **Line Chart (L)** is a chart type that shows trends over time in which the value axis indicates quantities and the horizontal axis indicates time. p. 508

4. A **Chart title (E)** is the label that describes the chart. p. 525

5. An **Axis title (A)** is a label that describes either the category axis or the value axis. p. 525

6. The **Legend (K)** is the key that identifies the color, gradient, picture, texture, or pattern fill assigned to each data series in a chart. p. 506

7. A **Bar chart (B)** is the chart type that compares categories of data horizontally. p. 508

8. A **Pie chart (M)** is a chart that shows each data point in proportion to the whole data series. p. 508

9. A **Data Point (H)** is the numeric value that describes a single value on a chart. p. 506

10. A **Stock chart (Q)** is a chart that shows the high, low, and close prices for individual stocks over time. p. 515

11. The **Sizing handles (O)** are the indicators that enable you to adjust the height and width of a selected chart. p. 518

12. A **Gridline (J)** is the horizontal or vertical line that extends from the horizontal or vertical axis through the plot area. p. 525

13. The **X Y (scatter) chart (T)** is a chart type that shows the relationship between two variables. p. 515

14. A **data series (I)** is the group of related data points that display in row(s) or column(s) in a worksheet. p. 506

15. The **Task pane (R)** is the window of options to format and customize chart elements. p. 529

16. The **Category axis (C)** provides descriptive group names for subdividing a data series. p. 506

17. **Plot area (N)** is the section of a chart that contains graphical representation of the values in a data series. p. 506

18. **Chart area (D)** is the boundary that contains the entire chart and all of its elements, including the plot area, titles, legends, and labels. p. 506

19. A **Data label (G)** is the descriptive label that shows the exact value of the data points on the value axis. p. 525

20. The **Value axis (S)** displays incremental numbers to identify approximate values, such as dollars or units, of data points in a chart. p. 506

**Multiple Choice Answer Key**

1. Which type of chart is the *least* appropriate for depicting yearly rainfall totals for five cities for four years?

**(a) Pie chart**

2. What is the typical sequence for creating a chart?

**(c) Select the data source, select the chart type, and then size and position the chart.**

3. Which of the following applies to a sparkline?

**(b) Single-cell chart**

4. If you want to show exact values for a data series in a bar chart, which chart element should you display?

**(d) Data labels**

5. The value axis currently shows increments such as 50,000 and 100,000. What do you select to display increments of 50 and 100?

**(b) Show Axis in Thousands**

6. You want to create a single chart that shows each of five divisions’ proportion of yearly sales for each year for five years. Which type of chart can accommodate your needs?

**(d) 100% stacked column chart**

7. Currently, a column chart shows values on the value axis, years on the category axis, and state names in the legend. What should you do if you want to organize data with the states on the category axis and the years shown in the legend?

**(b) Click Switch Row/Column in the Data group on the Design tab.**

8. Which tab contains commands to apply a predefined chart layout that controls which elements are included, where, and their color scheme?

**(a) Design**

9. Which icon does *not* display to the right of a selected chart?

**(d) Chart Quick Analysis**

10. What indicates that the closing price was higher than the opening price in a stock chart?

**(c) A rectangle with a white fill color**

**.**