Lesson 7
Building Worksheet
Charts

OBJECTIVES  After completing this lesson, you will be able to:

1. Use the Chart Tools Design tab.
2. Use the Chart Tools Layout and Format tabs.
3. Create chart sheets and chart objects.
4. Edit the data source.
5. Format data series with images, gradients, and textures.
6. Create combination charts.
7. Insert sparklines.

Excel is unmatched in its ability to portray worksheet data in a chart. Charts can help you illustrate comparisons, identify patterns, and recognize trends in data. AllAround Vision Care uses many types of charts. It uses charts to compare sales of products, to identify growth in revenue, and to monitor changes in utility expenses. In this lesson, you'll work with a bar chart that compares dollar contributions from the four cities for a particular year. It is easier to determine which city did the best from the chart than it is from looking at the actual values. Your instructor might use a similar type of chart to compare average exam or quiz scores throughout the semester. He or she would be able to quickly determine which exams resulted in the best scores. Utility companies sometimes include a bar or column chart with their bills to show how home energy consumption changes from month to month.

The workbooks you create and use in this course relate to the Case Study about AllAround Vision Care, a fictional eye care company (see frontmatter).
A chart is a visual representation of numerical data. A chart can plot one or more sets of numbers from a worksheet. The number of data sets to be displayed usually determines the type of chart to use. Experience helps you identify which data to use as well as which type of chart to choose.

Using the Chart Tools Design Tab

Charts are clickable elements within a workbook. When a chart is selected or active, the three Chart Tools command tabs in the Ribbon are visible: Design, Layout, and Format. The Chart Tools Design tab includes five command groups: Type, Data, Chart Layout, Chart Styles, and Location.

Charts can be located on the same sheet as the data or on separate sheets in the workbook. In either case, a chart is dynamically linked to the data used to create it and is updated when you edit the data. A chart that appears on the same sheet as the data is a graphic object. An object is a separate, clickable part of a worksheet.

Exercise 7-1 OPEN THE SELECTION AND VISIBILITY PANE

When a workbook has objects such as charts or images, you can use the Selection and Visibility pane to select, view, and rearrange the objects. Remember that, if you access a student data file from a Web site or an e-mail attachment, the workbook opens in Protected View. Click Enable Editing to exit Protected View.

1. Open Excel_Lesson7. The zoom size is set to 80% so that you can see the worksheet and the chart without scrolling.

2. Click in the white chart background area between the two titles above the columns. The Chart Tools command tabs are visible. The chart is surrounded by a light rounded-corner frame, and the data used in the chart are outlined (cells B6:B11 and cells G6:G11).

3. Press [Alt] to see the Key Tips. Key j0 to select the Chart Tools Format tab. The Current Selection group shows that the chart area is the active chart element. If it doesn't show that item name, click the arrow with the entry box and choose Chart Area.

4. In the Arrange group, click the Selection Pane button [§]. The Selection and Visibility pane opens at the right of the window. This worksheet has a chart and a text box, two objects. The Eye button [§] toggles the object's visibility on and off.

Note: In this worksheet, the text box is on top of the chart; otherwise, it would be hidden by the chart's white background.
5. Click the Eye button for TextBox 3. The text box is the campaign name in the top right corner of the chart (WorldWide Campaign, NFP). It’s hidden now.

6. Click the Eye button for TextBox 3 again to display it.

7. Toggle the visibility of Chart 2 on and off. Finish with the chart visible.

**Exercise 7-2  CHANGE THE CHART TYPE AND LAYOUT**

The chart type in this worksheet is clustered column. It plots one series or one column of values, column G. The labels in column A represent the category and are the city names in this case. In column charts, the category is along the bottom, and the values are along the side.

*Chart layout* sets what elements are included on the chart and where they are located. Some layouts include a chart title and a legend; others may include data labels and axes titles. These preset layouts can be changed to suit your plans for the chart.

1. Click the chart background. Click the Chart Tools Design tab.

2. In the Type group, click the Change Chart Type button. The Change Chart Type gallery shows various charts and subtypes.

3. Click Stacked Column in the first row, and click OK. There is no change, because that chart type does not fit the data.

4. Click the Change Chart Type button. Scroll the gallery list and choose Pie. Click OK. This is not a good fit for the data, because you cannot see any distinction.
5. Click the Change Chart Type button. Choose Bar in the pane on the left, and then choose Clustered Bar as the chart subtype. Click OK. This chart type does fit the data and does provide a visual comparison of the data. It is similar to a column chart but shows the categories along the side and the values along the bottom.

6. Click the Change Chart Type button. Choose Clustered Column and click OK. Bar and column charts are good for comparing one or a few sets of values.

7. Click the More button in the Chart Layouts group. The Chart Layout gallery shows 11 preset layouts for this chart type. The thumbnails give an indication of what is included in the layout.

8. Click Layout 2. The chart is redesigned to show values above the columns with no values along the vertical axis. The chart title is centered, and there is a legend ("Series 1" above the columns). A legend clarifies what is shown in the columns.

9. In the Chart Layouts group, click the More button. Choose Layout 3. This is similar to Layout 1 but with a legend at the bottom.

10. Choose Layout 4. This layout does not include a chart title, so the title is removed. There is still a legend.

11. Choose Layout 3. A chart title placeholder is inserted and will need to be rekeyed (later in the lesson).
Exercise 7-3  APPLY A CHART STYLE

A chart style is a preset selection of colors and effects for the chart, its background, and its components. The Chart Styles gallery provides variations based on the current document theme and the chart type. Changing the chart style does not alter the layout of the chart. But it can have unexpected results.

1. In the Chart Styles group, click the More button . The Chart Styles gallery opens. The chart currently uses Style 19, but the column colors were modified separately.
2. Find and click Style 34. The columns show a flat effect in a new color.
3. In the Chart Styles group, find and choose Style 41. This style changes the background color and resets a beveled effect. Notice that the text box (with the campaign name) is no longer visible, because it uses black text.

Exercise 7-4  PREVIEW A CHART OBJECT

By default, a chart object prints with the worksheet. When you open Backstage view for printing, you’ll see a preview of the data and the chart. If you select the chart, however, Backstage view for printing shows only the chart and that is what will print.

1. Click the Close button in the Selection and Visibility pane.
2. Click cell A1 to deselect the chart. The background frame is removed from the chart.
3. Press Ctrl + F2. Backstage view for printing shows the data and chart on a single page.
5. Click the black background chart area to select the chart. Be sure not to select the invisible text box.
6. Click the File command tab and choose Print. In the Settings group, Print Selected Chart is chosen. The chart by itself is previewed in landscape orientation resized to a full page.

Using the Chart Tools Layout and Format Tabs

A chart is composed of many clickable elements or objects. These elements are initially formatted by the chart layout and style, but you can change each object individually. Most changes to a chart element are made from the Chart Tools Layout or Format command tabs.

- The chart area is the background for the chart. It can be filled with a color, gradient, or pattern.
- An axis is the horizontal or vertical boundary that identifies what is plotted.
• The horizontal (category) axis is created from row or column headings in the data. A category describes what is shown in the chart. In a bar chart, the category axis is the vertical axis; it's the horizontal axis in a column chart.

• The vertical (value) axis shows the numbers on the chart. Excel creates a range of values (the scale) based on the data. In a bar chart, the value axis is along the bottom. In a column chart, it is along the side.

• An axis title is an optional title for the categories or values.

• The plot area is the rectangular area bounded by the horizontal and vertical axes.

• The chart title is an optional title or name for the chart.

• A data series is a collection of related values from the worksheet. These values are in the same column or row and translate into the columns, lines, pie slices, and so on.

• A data point is a single value or piece of data from the data series.

• A data marker is the object that represents individual values. The marker can be a bar, a column, a slice, a point on a line, or an image.

• A data label is an optional object that displays the values with the marker.

• A legend is an element that explains the symbols, textures, or colors used to differentiate series in the chart.

• A gridline is a horizontal or vertical line that extends across the plot area to make it easier to read and follow the values.

• A tick mark is a small line or marker on the horizontal (category) and vertical (value) axes to help in reading the values.

• A chart wall is the vertical background or wall for a 3-D chart.

• A chart floor is the base or bottom for a 3-D chart.
Exercise 7-5  EDIT THE CHART TITLE PLACEHOLDER

A chart element shows a ScreenTip when you hover over it. To edit an object, select it. When an object is selected, it shows a bounding frame and selection handles, and its name appears in the Chart Elements box on the Chart Tools Format tab. Selection handles are small circles, rectangles, or dots at the corners and along each border of the bounding frame. They can be used to size the element.

1. Point at the placeholder text Chart Title on the chart and click. The object is selected and shows a bounding border with four selection handles. Its name appears in the Chart Elements box in the Current Selection group.

2. Click the Chart Tools Layout tab. Point at an edge of the chart title object to display a four-pointed arrow. This is the move pointer.

3. Drag the placeholder left to align near the values on the vertical axis.

4. Triple-click Chart Title. This is temporary text.

5. Key Contribution Dollars. The placeholder text is replaced.

6. Triple-click Contribution Dollars to select it. The Mini toolbar appears when data within an element are selected.

7. Point at the Mini toolbar. Click the Italic button. Change the font size to 20.
8. Click the legend below the city names, Series 1. It is selected and shows a bounding border with selection handles. Its name is in the Chart Elements box.
9. Press <Delete> on the keyboard. The columns are resized to fill the space.

Exercise 7-6  SET THE SHAPE STYLE

On the Chart Tools Format tab, there is a group named Shapes Styles. A shape in a chart refers to the bars, the columns, the pie slices, the lines, or whatever element is used in a particular chart type. In the chart you are using, the shape is a column.

There is one data series in this chart, the values from column G. Each value is represented by the height of its column shape. The values are plotted against the value (vertical) axis, the numbers at the left in the chart area. The category for this chart is the city name, shown along the horizontal axis.

1. Make sure the chart is selected. Click the Chart Tools Format tab.
2. Rest the mouse pointer on the Dallas column to see its ScreenTip. It is one data point from the series.
3. Click the Dallas column. The entire data series is selected, and the Chart Elements box shows Series 1. This is the first (and only) series in this chart.
4. In the Shape Styles group on the Chart Tools Format tab, click the More button [▼] for the Shape Styles. The style icons show "abc" in a rounded-corner rectangle. Some shape styles include an outline but no fill, others have both outline and fill, and others have beveled or shadow effects.

Figure 7-5
Changing the shape's style
Excel_Lesson7.xlsx
SContributions sheet
5. Choose Intense Effect, Black, Dark 1 in the bottom row of the gallery. Make sure the data series is selected.
6. In the Shape Styles group, click the Shape Fill button [ ].
7. Choose White, Background 1, Darker 35% in the first column.
8. Click the chart background.

**Exercise 7-7  FORMAT THE PLOT AND CHART AREAS**

The chart area is the solid black chart background. The plot area is the slightly lighter rectangle that appears behind the columns with horizontal gridlines. These are both elements that can be formatted within a chart.

1. Click the Chart Tools Format tab. Click the Chart Elements arrow and choose Plot Area. You can select any chart element from this box.
2. In the Current Selection group, click the Format Selection button [ ]. The Format Plot Area dialog box opens. It has six panes with format options.
3. On the Fill pane, choose No fill. Click Close. The color (light gray) is removed and the area is transparent.
4. Click the Chart Elements arrow and choose Chart Area. The chart’s background is selected; it is black.

   TIP

Choosing no fill color means your chart will print faster than with a white fill color and look the same on white paper.

5. Click the Format Selection button [ ].
6. On the Fill pane, choose No fill. Click Close. The fill color is removed, but now you cannot see the white axes text.
7. In the Shape Styles group, click the Shape Fill button [ ]. Choose Black, Text 1. You can make format choices from the galleries in the command tab or from the dialog box.

**Exercise 7-8  FORMAT THE AXES**

The horizontal (category) axis is the \( x \) axis in this chart, the city names. The vertical axis is the value axis in a column chart.

1. On the Chart Tools Format tab, click the Chart Elements arrow and choose Horizontal (Category) Axis. The labels are selected and show a bounding box and selection handles.
2. On the Home command tab, change the font size to 9 points. Many format choices can be made from the Home tab.
3. Click one of the values along the vertical (value) axis, the \( y \) axis, the sales in dollars. Look for the bounding box to make sure the axis is selected.
4. On the Chart Tools Format tab, click the Format Selection button [ ].
5. On the Number pane, choose Currency. Set Decimal places to 0 and Symbol to $.
6. Click Axis Options. You can specify how the values are scaled. Auto is probably the best choice when you are first learning about charts, because you can distort the data if you choose inappropriate numbers.
7. For **Minimum**, choose **Fixed**. Then key **500** in the entry box. Click **Close**.
   The columns now assume that $500 is the bottom or floor for the values.

**Exercise 7-9 SET A GRADIENT FILL**

Gradient fills are available for most of the elements in a chart. A gradient is a
blend of two or more colors. Each color used in a gradient is a **stop**; it refers
to a position on the color bar. You can define each color stop, add stops, or
remove them.

1. Click the **Chart Elements** arrow and choose **Plot Area**.
2. Right-click inside the plot area and choose **Format Plot Area**.
3. On the **Fill** pane, choose **Gradient fill**. The default gradient has three
   stops, represented by the down-pointing block arrows on the color bar
   below **Gradient stops**.
4. Rest the mouse pointer on the rightmost (third) arrow. The **ScreenTip**
   identifies this color as **Stop 3 of 3**. You will build a two-color gradient
   and can delete this stop.
5. Click **Stop 3 of 3**. Click the **Remove gradient stop button** [x]. The stop is
   removed, but the other two stops have not changed.
6. Click **Stop 2 of 2**, and drag it to the right end of the color bar. This is
   identified as the 100% position.
7. In the Gradient stops group, click Stop 1 of 2.
8. Click the arrow for Color and choose White, Background 1, Darker 5%.
9. Click Stop 2 of 2.
10. Click the arrow for Color and choose White, Background 1, Darker 15%.

11. Click Close.
12. Click a worksheet cell to deselect the chart.

Exercise 7-10  ADD DATA LABELS

A data label is an optional title shown for each value. It is the actual value from column G in this case. Data labels add specificity to the chart, because a reader can only estimate the exact value from most charts.

1. Click the chart to select it. Click the Chart Tools Layout tab.
2. Hover over the Data Labels button and read its ScreenTip.
3. Click the Data Labels button and choose Outside End. The value of each data point appears above its column. The white color does not show well with your current design choices.
4. Rest the mouse pointer on one of the data labels to see the ScreenTip. Click a label to select the object. The data labels are selected and show bounding boxes and selection handles.
5. Click the Home command tab. Click the arrow for the Font Color button \[ \text{A} \] and choose Black, Text 1.

6. Right-click one of the data labels and choose Format Data Labels. Click Number and set currency with no decimals. Click Close. The labels might be better positioned in the middle of the column.

7. Click the Chart Tools Layout tab. Click the Data Labels button \[ \text{E} \] and choose Center.

**Exercise 7-11  CHANGE FONT COLOR IN A TEXT BOX**

There is a text box on the chart that has black as its font color. It is invisible now on the black background. A text box is a drawing object on the Insert command tab.

1. Click the Chart Tools Format tab. In the Arrange group, click the Selection Pane button \[ \text{S} \]. The Eye button \[ \text{E} \] is on for both the chart and the text box, meaning both are shown (not hidden).

2. Click TextBox 3 in the Selection and Visibility pane. The text box is selected in the top right corner of the chart, but you still cannot read the text.

3. Point inside the text box to display an I-beam pointer.

4. Triple-click to select all the text in the text box. You still cannot see it.

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*Figure 7-8  Choosing the invisible text box*  
Excel_Lesson7.xlsx  
$Contributions$  
 sheet

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5. Click the Home command tab. Click the arrow for the Font Color button \[ \text{A} \] and choose White, Background 1. Then click the Bold button \[ \text{B} \].
7. Save the workbook as [your initials]7-11.

Creating Chart Sheets and Chart Objects

With practice and experience, you can develop skill in identifying data and choosing chart types. Keep a few questions in mind as you decide to build a chart:

- Can a chart help analysis of the data?
- What data will be used to build a chart?
- What type of chart is best for that data?

The most popular chart types for business and personal use are column charts, bar charts, pie charts, and line charts. There are also specialized charts such as doughnut, scatter, and radar charts. Table 7-1 describes the chart types available in Excel.

**TABLE 7-1 Chart Types in Excel**

<table>
<thead>
<tr>
<th>Type</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Column</td>
<td>A column chart is the most popular chart type. Column charts make comparisons among items, or they might show how values change over a period of time. They can be prepared with 3-D effects or stacked columns. Categories are on the horizontal axis (x), and values are on the vertical axis (y). The shape can also be a cone, a cylinder, or a pyramid.</td>
</tr>
<tr>
<td>Line</td>
<td>Line charts show trends in data over a period of time. They emphasize the rate of change. 3-D effects are available. Lines can be stacked and can show markers, a character, or symbol on the line that indicates the value at that point.</td>
</tr>
<tr>
<td>Pie</td>
<td>Pie charts show one data series (one set of values) and compare the size of each value to the whole. Pie charts should have fewer than seven data points (slices) to be easy to interpret. A pie chart can use 3-D effects and can show exploded slices.</td>
</tr>
<tr>
<td>Bar</td>
<td>Bar charts illustrate comparisons among items or show individual figures at a specific time. Bar charts can use 3-D effects and stacked bars. Categories are on the vertical axis (y). Values are on the horizontal axis (x). The shape can also be a cone, a cylinder, or a pyramid.</td>
</tr>
<tr>
<td>Area</td>
<td>Area charts look like colored-in line charts. They show the rate of change and emphasize the magnitude of the change. 3-D effects are available.</td>
</tr>
<tr>
<td>Scatter</td>
<td>Scatter charts are used to show relationships between two values, such as additional advertising dollars and increased sales amounts. Scatter charts do not have a category; both axes show numbers or values.</td>
</tr>
<tr>
<td>Stock</td>
<td>Stock charts are often called “high-low-close charts.” They use three series of data (three sets of values) in high, low, close order. They can also use volume as a fourth series.</td>
</tr>
</tbody>
</table>

*continues*
TABLE 7-1 Chart Types in Excel  continued

<table>
<thead>
<tr>
<th>Type</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Surface</td>
<td>Surface charts illustrate optimum combinations of two sets of data. They show two or more series on a surface. Surface charts can use 3-D effects.</td>
</tr>
<tr>
<td>Doughnut</td>
<td>Doughnut charts compare the sizes of parts. A doughnut chart has a hole in the middle. A doughnut chart shows the relative proportion of the whole. A doughnut chart can show more than one data series, with each concentric ring representing a series.</td>
</tr>
<tr>
<td>Bubble</td>
<td>Bubble charts compare sets of three values. They are like scatter charts with the third value displayed as the size of the bubble. Bubble charts can be 3-D.</td>
</tr>
<tr>
<td>Radar</td>
<td>Radar charts show the frequency of data relative to a center point and to other data points. There is a separate axis for each category, and each axis extends from the center. Lines connect the values in a series.</td>
</tr>
</tbody>
</table>

Exercise 7-12  CREATE A CHART SHEET

A chart sheet is a chart that is located on its own sheet in the workbook, separate from its underlying data. A chart sheet does not display any columns or rows, like a regular worksheet. To build a chart sheet, select the values and labels to be plotted and press [F11] to create a default chart, a clustered column chart on its own sheet. You can now build a column chart that graphs and compares unit sales of a particular eyeglass frame from each city and from the company's Web site.

1. In [your initials]7-11, click the FrameSales worksheet tab.
2. Select cells B6:C10. This range includes the city name (the category) and the values (the series).
3. Press [F11]. A default clustered column chart is inserted on its own sheet named Chart1.
4. On the Chart Tools Design tab in the Chart Layouts group, click the More button [2].
5. Choose Layout 3. This layout includes a chart title and a legend (“Series 1” at the bottom).
6. Click the chart title placeholder. Its bounding box and selection handles are visible.
7. Triple-click the placeholder text. Key Number of Jetsetter Frames Sold.
8. Click any column in the chart, and notice that the entire series (all the columns) is selected.
9. While all columns are selected, click the “Chicago” column. It alone is selected. The Chicago column (and value) is a data point (see Figure 7-9 on the next page).
10. Click the Chart Tools Format tab. In the Shape Styles group, click the Shape Fill button [9].
11. Choose Red, Accent 2 in the sixth column (see Figure 7-9 on the next page). Only the selected column is redesigned.
12. Click the legend below the columns and press [Delete]. It is not necessary in this chart, because the horizontal axis includes the city names.

**Exercise 7-13  CREATE A CHART OBJECT**

A **chart object** appears on the same sheet as the data; it may be called an **embedded chart**. There are no design, layout, or format differences between a chart object and a chart sheet. In fact, you can convert one to the other when necessary. You create a chart object by selecting the data and choosing a chart type from the Insert command tab. The data about the JetSetter frame sales can also be illustrated in a pie chart.

1. Click the **FrameSales** worksheet tab. Cells B6:C10 are still selected.
2. Click the Insert command tab.
3. Click the Pie button 🥧. A ScreenTip describes each chart subtype when you hover over its icon.
4. In the 2-D Pie group, choose Pie. The simple pie chart is inserted on the worksheet.

**Exercise 7-14  MOVE AND SIZE A CHART OBJECT**

The selection handles on the corners for a chart object are three dots arranged in a triangle shape. The handles are four dots arranged in a row in the middle of each edge. The move pointer is a four-pointed arrow; the sizing pointer is two-pointed. If you hold down ⌘ while dragging a chart object, its position snaps to the nearest cell.
1. Point at the top edge of the chart object to display a four-pointed arrow. Drag the chart so that its top left corner aligns at cell A14.

2. Point at the bottom-right selection handle. A two-pointed sizing pointer appears.

3. Click and drag the bottom-right selection handle to cover cell E32. As you drag, the chart is made larger.

4. Click the Chart Tools Design tab. In the Chart Layouts group, click the More button \[ \text{More} \].

5. Choose Layout 5. This layout includes a chart title, no legend, and data labels inside the pie slices.

6. In the Chart Styles group, click the More button \[ \text{More} \]. Choose Style 17. The slices are shown in shades of gray with a raised effect.

**Exercise 7-15** **DISTINGUISH AMONG CHART ELEMENTS**

As you prepare a chart, you'll need to select various parts of the chart. Whatever element or part is selected at the time you give a command is what is changed. Some parts or objects in a chart consist of more than one other part or object. For example, the actual pie (the series object) has several slices (data point objects). The Chart Elements box is available on both the Chart Tools Layout or Format tabs. From the list, you can select a specific object in the chart. You can also select an individual object by simply clicking it. Then you can verify its selection in the Chart Elements box.

1. Click the Chart Tools Format tab. Make sure that the chart area is the current selection.

2. In the Shape Styles group, click the More button \[ \text{More} \] for the Shape Styles.

3. Hover over a few different styles. Since the chart area is selected, the entire chart is restyled.

4. Press [Esc] to close the gallery without making a change.

5. Point at any pie slice, away from the label, and click. The pie is selected, and Series 1 is the current selection.

6. For Shape Styles, click the More button \[ \text{More} \].

7. Hover over several styles. Now the slices would be affected, not the background.

8. Press [Esc].

9. While the slices are selected, click only the Chicago slice. You should see selection handles for just this slice (see Figure 7-10 on the next page). Be careful not to select the data label.
10. Click the More button \( \square \) for Shape Styles.

11. Hover over several styles. Now just one slice would be affected.

12. Press Esc.

13. Click the chart title object. Press F. Another chart object is selected, probably the data labels.

14. Press F several times to cycle through selecting the chart objects.

15. Click the Chart Elements arrow and choose Series 1. The pie object is selected; it is the single data series. It does include other objects, the slices.

16. Press F. One of the slices is selected.

17. Press F several times to cycle through selection of the slices.

18. Select the chart title object. Triple-click the placeholder text and key JetSetter Sales.

19. Right-click the pie and choose Format Data Labels. The data labels are the city names within the slices.

20. On the Label Options pane, click to place a checkmark for Percentage. Click Close. The slices now show category names and percentages, which represent which part of the whole pie is illustrated by the slice.
Exercise 7-16  MOVE A CHART OBJECT TO ITS OWN SHEET

A chart object can be relocated to its own sheet. When you do this, the chart is sized to fill the page. You can create a second chart object for the data about the JetSetter frame, a bar chart.

1. Select cells B6:C10 and click the Insert command tab.
2. In the Charts group, click the Bar button.
3. In the 3-D Bar group, choose Clustered Bar in 3-D, the first icon. The chart object appears on the worksheet.
4. In the Location group, click the Move Chart button. The Move Chart dialog box allows you to move the chart to its own new sheet, creating a chart sheet. You could also move the object to another worksheet in this workbook.

5. Choose New sheet and key BarChart in the entry box. Click OK. The chart is placed on a new sheet.
6. Click Series 1, the legend at the right, and press Delete.
7. Click the Chart Tools Layout tab. In the Labels group, click the Chart Title button.
8. Choose Above Chart. A placeholder object is inserted.
9. Triple-click Chart Title, and key Comparison of JetSetter Frame Sales.
10. Click anywhere in the light blue-gray side panel to deselect the chart.
Exercise 7-17  SHOW GRIDLINES AND A DATA TABLE

Gridlines in a chart are horizontal and vertical lines on the plot area that aid in relating numbers to the bars or columns. Major vertical gridlines are shown in the bar chart you just created. They connect to the values along the horizontal axis so that you can make a reasonable assumption of the number represented by the bar. Gridlines can be major and minor, vertical and horizontal.

A data table is a matrix that lists the values and categories illustrated in the chart. It is separate from the chart and appears below the horizontal axis. It is one way to include the actual data used to build the chart and serves as clarification to the reader.

1. Click the white chart background to select the chart area.
2. On the Chart Tools Layout tab, click the Gridlines button.
3. Choose Primary Vertical Gridlines, and then choose Major and Minor Gridlines. More lines help identify the data point.
4. In the Labels group, click the Data Table button.
5. Choose Show Data Table. A matrix (a table) appears below the chart and shows “Series 1” as the name of the data being plotted. The data series are the values from column C on the worksheet; there is only one set of values.
6. Right-click anywhere in the data table, and choose Select Data. The Select Data Source dialog box opens. The focus moves to the worksheet data used to build the chart.
7. Click Series 1 in the Legend Entries (Series) list. On the right, you can see the category names for this data series.
8. Click Edit in the Legend Entries (Series) box. There is no series name at this point; that’s why the data table shows “Series 1.”
9. In the Series name box, key Unit Sales and click OK. Click OK again. The data table shows the new series name.
10. Save the workbook as [your initials]7-17.
Editing a Chart's Data Source

The *data source* for a chart are the worksheet rows and columns used to build the chart. This information can be changed. If you build a chart, do all the formatting, and then realize that you used the wrong set of values, you can simply edit the data source. Many companies use the same chart each month or quarter, with different data for each period. The chart need not be built from scratch each month; it can be copied and the copy's data source updated.

In addition to using different or new data, you can add categories or values to an existing chart. In the charts for this lesson, you might need to add a row for catalog sales for the JetSetter frame. You might also add a second eyeglass frame to the data being plotted. Some changes to the underlying data for a chart are automatically reflected in the chart. Others require that you update the data source with the appropriate command.

**Exercise 7-18  EDIT CHART DATA**

Changes made to the underlying data for a chart are automatically shown in the chart. These include entering new values or changing city names.

1. Click the FrameSales worksheet tab in [your initials]7-17. Notice the pie slice size for Dallas and its corresponding value in the worksheet.
2. Click the BarChart tab. Note the length of the bar for Dallas.
3. Click the Chart1 tab. Note the height of the Dallas column.
4. Click the FrameSales worksheet tab.
5. Click cell C8, key 150, and press Enter. Notice the larger pie slice for Dallas.
6. Click the Chart1 tab. The height of the Dallas column is increased proportionally as the chart is redesigned.
7. Click the BarChart tab. Note the length of the Dallas bar.

**Exercise 7-19  ADD A DATA POINT**

If you add another city location and its total, you add a data point to the data series. If you insert these additional data within the chart's current data range, they appear automatically in all charts linked to the data. If you add new data below or above the chart's original source data range, you need to reset the data range for each chart.

1. On the FrameSales sheet, insert a row at row 10. This row is within the current data range for the chart.
2. Key Catalog Sales in cell B10. Key 125 in cell C10 and press Enter. The pie chart object is redrawn.
3. Click the Chart1 tab. Click the BarChart tab. The charts are automatically redrawn to include the new data.
4. Click the FrameSales worksheet tab. Insert a row at row 12. This row is outside the current data range for the charts.
5. Key **Exhibition Sales** in cell B12. Key **45** in cell C12 and press **Enter**. The pie chart object is not changed.

6. Click the **Chart1** tab. Click the **BarChart** tab. None of the charts has been changed.

7. Click the **FrameSales** worksheet tab. Click the white background area for the pie chart. The data range in the worksheet shows sizing handles at each corner.

8. Position the pointer on the bottom-right handle for cell C11. A two-pointed sizing arrow appears.

9. Drag the sizing arrow to include the Exhibition Sales information. The pie chart is updated when you release the mouse button. You have edited its data source.

10. Click the **Chart1** tab. You must update the data source for each chart separately.

11. Right-click the white chart background. Choose **Select Data**. The Select Data Source dialog box opens on top of the **FrameSales** worksheet with the current data range selected (see Figure 7-14 on the next page).

12. In the **Chart data range** entry box, edit the address to show **$C$12** instead of **$C$11**. Click **OK**. The column chart is updated to include Exhibition Sales.
13. Click the **BarChart** tab. Right-click the white chart background.

14. Choose **Select Data**. Click cell B6 and drag to select cells B6:C12. Click **OK**. There is now an Exhibition Sales bar.

**Exercise 7-20  ADD AND RENAME DATA SERIES**

Your charts currently graph one set of values, one data series. If you add a second eyeglass frame to the worksheet data, another column, you can create a second series for the column and bar charts. A pie chart can have only one data series.

1. On the **FrameSales** worksheet, key **Kallie** in cell D4. Copy the format from cell C4.

2. Key the following values in cells D6:D12:

   D6   60  
   D7   120 
   D8   45  
   D9   15  
   D10  30  
   D11  25  
   D12  10  

3. Format the values and borders to match the rest of the worksheet.

4. Click the **Chart1** tab. Right-click the white chart background and choose **Select Data**.

5. In the **Chart data range** entry box, edit the address to show **$B$5:$D$12**. Click **OK**. The column chart now shows two columns for each city location, one for each frame. The Chicago data have a different color scheme due to your earlier change (see Figure 7-15 on the next page). Your colors may be different from the text figures.
Figure 7-15
Adding a data series 7-17.xlsx
FrameSales sheet

A legend is important when you have more than one data series. Hover over a column to determine which one represents “Series 1.”

7. Click Series 1 in the Legend Entries (Series) list and click Edit.
8. Key JetSetter and click OK.
9. Click Series 2 in the list and click Edit. Key Kallie and click OK.
10. Click OK again. Hover over several columns to view the series’ names.
11. Right-click the JetSetter column for Chicago. Choose Reset to Match Style. The column color resets to its original color.
12. Click the white background. Click the Chart Tools Layout tab. Click the Legend button in the Labels group and choose Show Legend at Bottom.

Formatting Data Series with Images, Gradients, and Textures

Data series are represented by the columns, the slices, and the bars. By default, these elements use a solid fill color, although the preset styles do add effects such as bevels or shadows. There are other possibilities for the fill. They include gradients, textures, or even images. These fill types can better distinguish bars, columns, or slices when the worksheet is output in black
and white. They might also be used to clearly stamp a chart with a company’s identity. Well-known logos such as the Pepsi-Cola circle or the Nike icon can be used inside bars or columns instead of a plain color.

You can insert an image, a gradient, or texture as fill by selecting the data series and doing the following:

- Clicking the Shape Fill button on the Chart Tools Format tab.
- Clicking the Format Selection button on the Chart Tools Format tab or the Chart Tools Layout tab.
- Right-clicking the object and choosing Format Data Series or Format Data Point.

**Exercise 7-21 USE AN IMAGE FOR A DATA SERIES**

Be careful when using images as fill in any chart. It can detract from the purpose if it creates a cluttered look. If you want to use an image as fill in a bar or column chart, it looks best if you use a 2-D chart rather than 3-D. You can convert your 3-D bar chart into a 2-D chart.

The data files for this lesson include a JPEG file named **Eyeglasses**; make sure you know where to find it.

1. Click the **BarChart** tab. Select the chart, and then click the **Chart Tools Design** tab.
2. Click the Change Chart Type button . In the **Bar** group, choose **Clustered Bar** (first icon, first row) to change the chart to a two-dimensional chart. Click **OK**.
3. Click any bar in the chart. All the bars show selection handles.
4. Click the **Chart Tools Format** tab. Click the Format Selection button . The Format Data Series dialog box opens.
5. On the Fill pane, choose **Picture or texture fill**. Additional options appear in the dialog box, and the bars fill with the last-used choice.
6. In the **Insert from** group, click **File** to locate an image on disk.
7. Navigate to the folder with **Eyeglasses** to find the image.
8. Choose **Eyeglasses** and click **Insert**. Do not click **Close**. The picture is inserted and stretched to fit the length of the bar. Move the dialog box if necessary to see the chart.
9. In the dialog box, click to select **Stack**. The image is scaled to fit and repeats across the bars (see Figure 7-16 on the next page).
10. Click Close.

**Exercise 7-22  ADD A BORDER AND A SHADOW**

The bars now display an image with no visible border. This can be effective, or you can choose to add a border to the shapes. You can also add a shadow to give it more of a 3-D look.

1. Click the blue-gray window background to deselect the chart. The bounding box border for a selected object is not the same as a border that prints.

2. Click any bar in the chart.

3. Click the Chart Tools Format tab. Click the Format Selection button 🔍.

4. On the Border Color pane, choose Solid line.

5. For the Color, click the arrow and choose Black, Text 1.

6. On the Border Styles pane, click the down spinner arrow to set the Width at 0.5 pt.

7. On the Shadow pane, click the arrow for Presets. In the Outer group, choose Offset Diagonal Bottom Right (first icon).

8. Click Close.

9. Click the white chart background. On the Chart Tools Layout tab, click the Gridlines button 🔍.

10. Choose Primary Vertical Gridlines and then choose None. The chart looks less busy without the lines.

11. Click the blue-gray window background to deselect the chart.
Exercise 7-23  USE GRADIENTS FOR DATA SERIES FILL

From the Fill pane in the Format Data Series dialog box, you can build color blends (gradients) that use two or more colors. There are also several preset gradients.

1. Click the Chart1 tab.
2. Right-click any column that represents the “Kallie” frame and choose Format Data Series.
3. On the Fill pane, choose Gradient fill. The dialog box updates to show the related options.
4. Click the arrow for Preset colors. A gallery of preset color blends opens.
5. Find and click Calm Water (third tile, second row). The gradient fill is immediately visible. This gradient uses six colors, identified in the Gradient stops group. Do not close the dialog box yet.
6. Click any JetSetter column in the chart. Choose Fill and Gradient fill.
   The most recently used gradient is applied. You can build your own gradient by removing stops and setting new colors.
7. In the Gradient stops group, click Stop 2 of 6. Click the Remove gradient stop button [ ]. The stop is removed.
8. Remove stops 2, 3, and 4 so that you have a two-color bar.
9. Click Stop 1 of 2. Click the arrow for Color and choose White, Background 1.
10. Click Stop 2 of 2. Set its color to Olive Green, Accent 3, Darker 25%.
11. Click the arrow for Direction. Several variations of the way in which the colors blend are shown in a gallery.
12. Find and choose Linear Up. The white shades will be at the bottom of the column.
13. Click Close.

**NOTE**
If your output is black and white, color gradients appear as shades of gray.

**Exercise 7-24 USE TEXTURE AS FILL**

A *texture* is fill that appears as a grainy, nonsmooth surface or background. Use textures carefully, because they can detract from the purpose of a chart if they are too intricate.

1. Click the **FramesSales** worksheet tab.
2. Click the pie (away from a data label) to select it. Click the Web Site slice to select that slice only.
3. Right-click the slice and choose **Format Data Point**.
4. On the Fill pane, choose **Picture or texture fill**. The slice may fill with the last-used image or texture.
5. Click the arrow for **Texture**. A gallery of available textures opens. Textures simulate marble, wood, canvas, and similar surfaces.

**Figure 7-18**
Using a texture as fill
7-17.xlsx
FramesSales sheet
6. Hover over several texture tiles to see each ScreenTip.
7. Choose White marble. Click Close.
8. Select only the Catalog Sales slice. Click the Chart Tools Format tab, and then click the Shape Fill button \[\text{3}\]. Hover at Texture to see the gallery.
9. Choose Granite.
10. Click a cell in the worksheet. Save your workbook as [your initials]7-24.

Creating Combination Charts

A combination chart uses more than one chart type or different number scales for two sets of values. For example, a column chart with a line chart can be used to compare daily phone minutes used (columns) and daily cost (lines). By using different chart types, it is generally easier to distinguish that there are two different sets of values illustrated. Another type of combination chart uses the same chart type for each set of values but includes a second number scale at the right. If a chart were comparing driving speed and miles per gallon for a car fleet, it might be best to show the speed values on one side of the chart and the MPG values on the other side.

Exercise 7-25  CREATE A CHART WITH TWO CHART TYPES

Most chart types cannot be combined. You can combine a column chart with a line or an area chart. Or you might combine a line with an area chart. In fact, if you try to create a combination chart that is not workable, Excel displays a message telling you that.

You'll create a new column chart in this exercise that initially shows the number of units sold and the selling price in two columns. By changing one of the columns to a line, you can better see what happens as the price increases.

1. In [your initials]7-24, click the arrow with the Name Box and choose Frames. This is a named range on the Combo worksheet tab.
2. Select cells J6:L15 and press \[\text{F11}\]. A clustered column chart sheet is inserted. It plots the units sold and the cost per unit.
4. On the Chart Tools Design tab, click the Select Data button \[\text{F4}\].
5. Choose Series 1 in the Legend Entries (Series) list and click Edit. Key Units Sold and click OK.
6. Edit Series 2 to display Unit Cost and click OK.
7. Click OK again. The legend is updated to show the series names.
8. Right-click any Units Sold column and choose Change Series Chart Type.
9. In the Line category, choose Line with Markers. Click OK. The Unit Sold series is now a line chart. The marker is a diamond shape that identifies the data point. Notice that the higher the selling price, the fewer units sold (see Figure 7-19 on the next page). This was not apparent when two columns were used.
10. Right-click the line and choose Format Data Series.
11. On the Line Color pane, choose Solid line. Then choose Black, Text 1 as the Color.
13. Click the white chart background. The markers should be the same color as the line.
14. Right-click the line and choose Format Data Series. On the Marker Fill pane, choose Solid fill. Then set the color to match the line color.
15. On the Marker Line Color pane, choose Solid line and the same color.
16. On the Shadow pane, click the arrow for Presets. Choose Offset Diagonal Bottom Right in the Outer group.
17. Click Close. Click the white chart background.

**Exercise 7-26 BUILD A COMBINATION CHART WITH A SECONDARY AXIS**

The column-line combination chart is one way to demonstrate the difference in values. Another way to accomplish the same thing is to use a second set of values. A secondary axis is a set of axis values that are different from the first (primary) set. It appears at the right side of the chart.

The data for the chart in this exercise list the number of promotional pieces purchased and the cost. The chart compares dollars to units, and you’ll use a column chart combined with an area chart.

1. Click the Combo worksheet tab. Click the arrow with the Name Box and choose Promo.
2. Select cells B6:C11 and cells E6:E11. They represent the number of promotional pieces printed and the costs for the English version.

3. Click the Insert command tab. Choose a Clustered Column 2-D chart.

4. Click the Move Chart button \( \text{[A] \space} \) and place the chart on its own sheet named PromoPieces. There are two series, one for the units and one for the dollars. Both series use the same value axis, and the number printed columns are disproportionately taller.

5. Right-click the legend and choose Select Data.

6. Change the name for Series 1 to display Units Printed. Change the name for Series 2 to Cost, and click OK. Click OK again.

7. On the Chart Tools Layout tab, click the Chart Title button \( \text{[A]} \). Choose Above Chart.

8. Edit the placeholder to show Costs and Units Printed.

9. Right-click any Cost column and choose Change Series Chart Type.

10. Click Area in the left pane, and then choose Area as the chart subtype. Click OK.

11. Right-click somewhere in the Cost data area and choose Format Data Series.

12. On the Fill pane, choose Gradient fill. Click the arrow with Preset colors and choose Moss. Click Close.

13. Right-click a Units Printed column, and choose Format Data Series.

14. On the Series Options pane in the Plot Series On group, choose Secondary Axis. The selected series (Units Printed) will be plotted on a separate value axis. Click Close. The values on the right are units and relate to the Units Printed columns. The currency values on the left axis are the costs associated with the area chart.

Figure 7-20
Using a secondary axis in a chart
7-24.xlsx
PromoPieces sheet
15. Right-click the legend and choose **Format Legend**. On the **Legend Options** pane, choose **Bottom** and click **Close**.

**Exercise 7-27  ADD AXES TITLES**

Since you are using two axes in this chart, you should add axes titles to clarify which set of values pertain to the shapes in the chart. An axis title appears at the left or right, in this case.

1. On the **Chart Tools Layout** tab, click the **Axis Titles** button [ ]. Choose **Primary Vertical Axis Title**. Choose **Rotated Title**. The primary axis is at the left and a title placeholder is inserted.

2. Triple-click the placeholder text and key **Cost**. Click the white chart background.

3. Click the **Axis Titles** button [ ]. Choose **Secondary Vertical Axis Title**. Choose **Rotated Title**. The secondary axis is at the right.

4. Triple-click the placeholder text and key **Units**. Click the white chart background.

5. Point at the secondary axis title and right-click. Choose **Format Axis Title**. Click **Alignment**. This pane includes options for rotating the title.

6. Click the arrow for **Text direction**. Choose **Rotate all text 90°**. Click **Close**.

7. Click the blue window background. Save the workbook as [your initials]7-27.

**Inserting Sparklines**

A **sparkline** is a miniature chart placed in its own cell alongside the data. Sparklines can be used to show trends for data without the need for building a separate chart. If you were to list your monthly expenditures for several categories of items in separate columns for each month (12 columns), you could insert sparklines in the 13th column to illustrate how your expenses progressed from month to month. In your workbook for this lesson, AllAround Vision Care has listed the cash donations per month in each city. Within this worksheet data, it can use sparklines to monitor the general trend in gift giving in each city.

Sparklines are a new feature in Excel 2010, and they are placed on a worksheet from the **Insert** command tab.

**Exercise 7-28  INSERT LINE SPARKLINES**

There are three styles of sparklines: line, column, and win/loss. Line and column sparklines are similar to line and column charts. A win/loss sparkline plots values in a stacked column chart. Sparklines can be inserted all at once.
by selecting the range and giving the command. You can also select the first sparkline in a column and copy it, like a formula. Sparklines are usually placed next to the data to which they refer. In this case, you will insert a column at the left of the data.

1. In [your initials]7-27, click the Sparklines worksheet tab. These are more detailed data about contributions for one year.
2. Insert a column at column C. The sparklines will be inserted in the new column C.
3. Click cell C6 and click the Insert command tab.
4. In the Sparklines group, click the Insert Line Sparkline [ES]. The Create Sparklines dialog box has two entry boxes, one for the data to be plotted and the other for the location of the sparkline.
5. In the Data Range box, select cells D6:O6, the values for each month.
6. In the Location Range box, verify that cell C6 has been assumed. If not, click that cell.

![Figure 7-21](Create Sparklines dialog box 7-27.xlsx Sparklines sheet)

7. Click OK. One sparkline for Boston is displayed. You can see that AllAround Vision Care had some peaks and valleys in its cash collection.
8. Select rows 6:10 and make them 22.50 (30 pixels) tall. The greater height will give the sparkline more visibility and clarity.
Exercise 7-29  FORMAT SPARKLINES

The Sparkline Tools Design command tab becomes available when you choose a cell that includes a sparkline. There are groups on this command tab with options for changing the data range, showing data points, and setting the color:

1. Click cell C6 and click the Sparkline Tools Design tab.
2. In the Style group, click the More button. The colors are from the current document theme.
3. Find and click Sparkline Style Dark #3.
4. In the Show group, click to place a checkmark for Markers. The marker is the symbol that designates the value on the line. It is a tiny diamond on your sparkline.
5. In the Style group, click the Marker Color button. You can change the color for all the markers or only for certain ones.
6. Choose High Point, and choose Tan, Background 2, Darker 90% in the third column. The marker that represents the highest value is recolored.
7. Click the Fill handle for cell C6 and drag to copy the sparkline to cell C10. Each sparkline illustrates the data in its row.

8. Save the workbook as [your initials]7-29. Close the workbook.

Using Online Help

In addition to the popular column, bar, line, and pie charts, there are several charts that are more specialized for certain types of data. Use Help to explore some of these chart types.

Use Help to learn about charts:

1. In a new workbook, press F1.
2. Find and review topics about bubble charts and high-low charts.
3. Close the Help window when finished.