

CHARTS

CHART CREATION

A **chart** is a visual representation of numerical data. Creating a chart involves a three-step process:

STEP 1. PREPARE THE WORKSHEET DATA

- Before you create the chart, you need to make sure that the worksheet data is organized as follows:
 - Make sure all **values** in the **columns and rows** of the worksheet have the **same value system** (e.g., units, dollars).
 - Make sure the **labels** are **descriptive**.
 - **Delete blank rows or columns** in the dataset.
 - Determine what information you want to convey to the audience through your chart by answering the following questions:
 - Does the worksheet contain a **single set of data** (e.g., average gas sales at one convenience store location) or **multiple sets of data** (e.g., average gas sales at several convenience stores in a region)?
 - “Do you want to depict data for one specific time period or over several time periods”? (Mulbery et al 2017, p. 534)

	A	B	C
1	Utility and Insurance Costs		
2	Site Name	Utilities	Insurance
3	Altoona #1	\$ 1,456.00	\$ 1,245.00
4	Altoona #2	\$ 1,725.00	\$ 1,349.00
5	Claysburg	\$ 2,456.00	\$ 256.00
6	Bedford	\$ 1,457.00	\$ 989.00
7	Bellwood	\$ 2,654.00	\$ 1,356.00
8	Roaring Spring	\$ 5,021.00	\$ 1,820.00
9	Tyrone	\$ 2,512.00	\$ 589.00
10	Total	\$ 17,281.00	\$ 7,604.00

STEP 2. SELECT THE DATA SOURCE

- Select **values and labels** that you want to include in the chart.
 - Hold down the **Ctrl** key to select **nonadjacent ranges**.

TIPS FOR SELECTING DATA

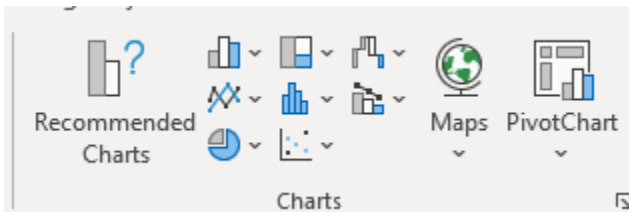
- **Do not** select **worksheet titles or subtitles**.
- Make sure to select **parallel ranges** (i.e., ranges that consist of the same starting and ending point as another similar range).

- **Do not** include totals or averages in the data range.
- **Do not** include individual values

In the Utility and Insurance Costs example above, you should select the **range A2:C9** as your data source.

STEP 3. SELECT A CHART TYPE

- Click the **Insert** tab.
 - **Note:** “You **must** use the **Insert tab** to create a chart when you select **nonadjacent ranges**” (Mulbery et al 2017, p. 537).
- Click the desired chart type in the **Charts** group.



- Click the desired **chart subtype** from the chart gallery.

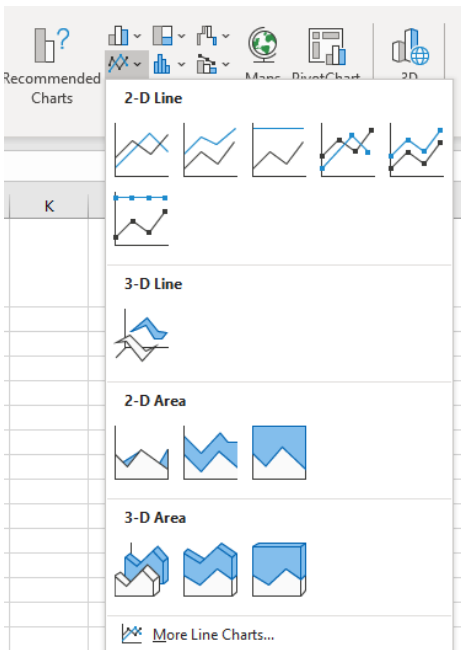


Chart gallery

- If you are unsure about which chart type to select:
 - Click **Recommended Charts** in the **Charts** group.
 - Click a thumbnail of your desired chart. If the displayed thumbnails still do not suit your needs, click the **All Charts** tab to see more choices. When you find a suitable chart thumbnail, click **OK**.

The following section describes all available chart types.

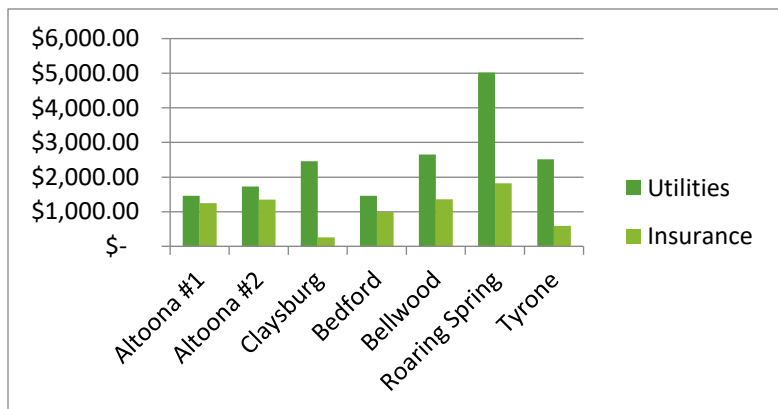
CHART TYPES

COLUMN CHART

- A **column chart** displays “values in vertical columns where the height represents the value” (Mulbery et al., 2017, p. 536).
 - The categories appear along the **category** (aka the **horizontal** or **x**) axis.
 - The values appear along the **value** (aka **vertical** or **y**) axis.
- It is recommended to limit a single column chart to **seven or fewer** categories (Mulbery et al., 2017, p. 538).

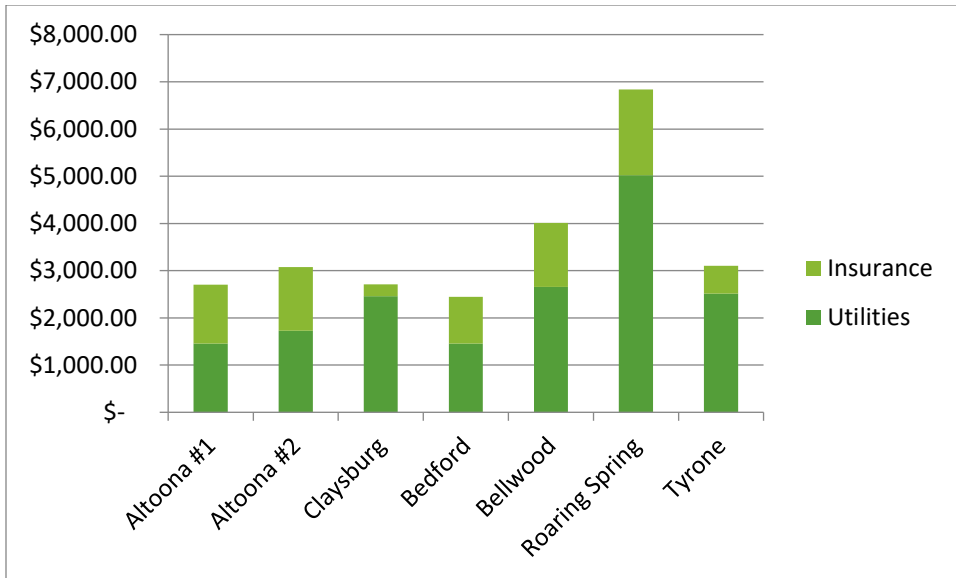
CLUSTERED COLUMN CHART*

- A **clustered column chart** compares **groups** (i.e., **clusters**) of side-by-side columns where the height of the column indicates its value.
- The taller the column, the larger the value.



STACKED COLUMN CHART

- A **stacked column chart** shows the relationship of individual data points to the category as a whole.
 - One column displays for each category in the chart.
- “A **100% stacked column chart** converts individual data points (values) into percentages of the total value” (Mulbery et al., 2017, p. 542).
- **Caution:** “A disadvantage of the stacked column chart is that the segments within each column do not start at the same point, making it more difficult to compare individual segment values across categories” (Mulbery et al., 2017, p. 540).

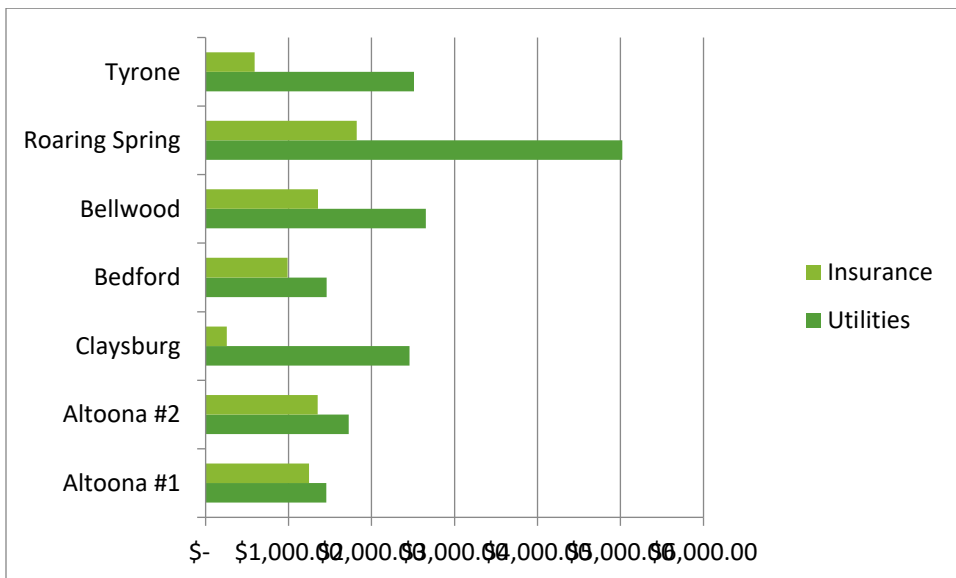


BAR CHART

- A **bar chart** compares values across categories using horizontal bars.
 - The wider the bar, the larger the value.
- **Values** display along the **horizontal** (aka the **category** or **x**) **axis** and **categories** display along the **vertical** (aka the **value** or **y**) **axis**.

STACKED BAR CHART

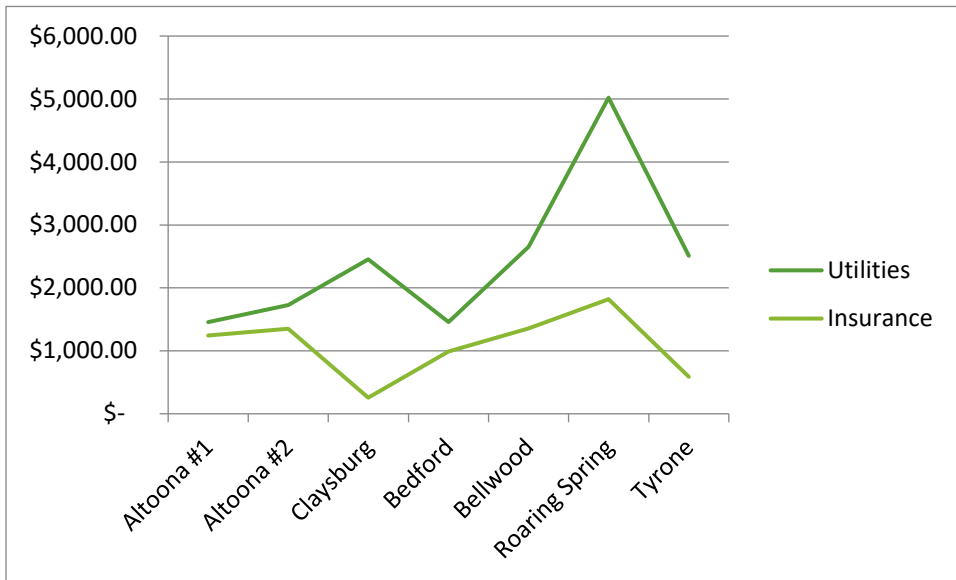
- A **stacked bar chart** shows relationships of individual data points to the whole.



LINE CHART

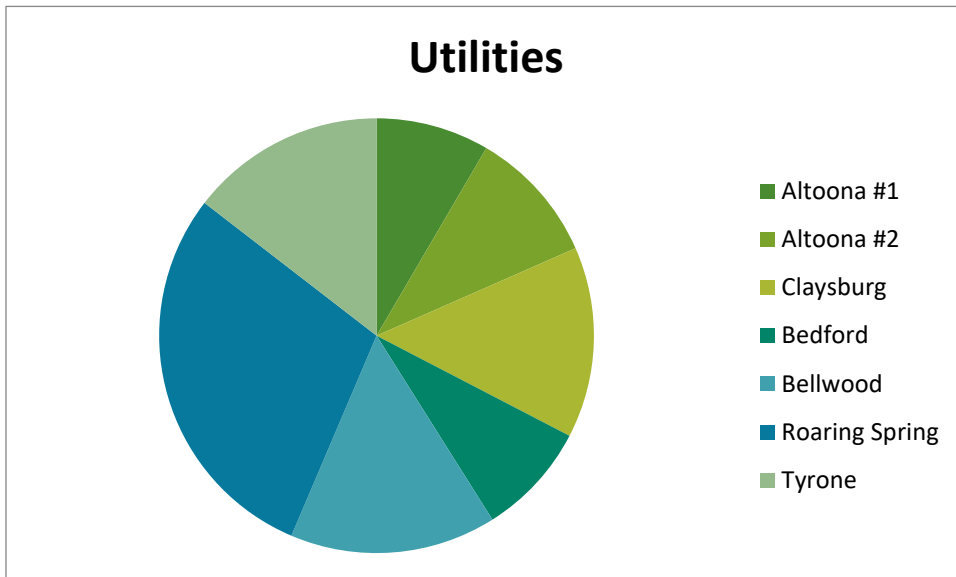
1. A **line chart** compares trends over time.

2. **Values** are displayed on the **value** (aka **vertical** or **y**) **axis**, and **time periods** are displayed on the **category** (aka **horizontal** or **x**) **axis**.



PIE CHART

- A **pie chart** indicates the proportion to the whole for one data series.
- The size of the slice indicates the size of the value.
 - The larger the pie slice, the larger the value.



COMBO CHART

- A **combo chart** combines elements of two chart types, such as column and line, to depict different data, such as individual data points compared to averages or percentages.
 - The **primary axis** displays on the **left side** of the chart.
 - The **secondary axis** displays on the **right side** of the chart.

XY (SCATTER) CHART

- An **XY (scatter) chart** shows a relationship between two numerical variables.

STOCK CHART

- A **stock chart** shows fluctuations in prices of stock, such as between the opening and closing prices on a particular day.
- Excel offers four stock subtypes:
 - **High-Low-Close**
 - **Open-High-Low-Close**
 - **Volume-High-Low-Close**
 - **Volume-Open-High-Low Close**

AREA CHART

- An **area chart** displays trends over time.
- Colors appear between the lines to help illustrate the magnitude of the changes.

SURFACE CHART

- A **surface chart** displays trends using two dimensions on a continuous curve.

RADAR CHART

- A **radar chart** compares aggregate values for several data series.
- Each **category** displays as a spoke extending from the center point of the chart to the outer edges.
 - Each **spoke** represents an **individual data series**.
 - **Lines** connect the data points between spokes.

HISTOGRAM

- A **histogram** is a chart in which the **category (horizontal or x)** axis displays intervals in which data is aggregated into **bins** and the **vertical (value or y-axis)** displays **frequencies**.

CHANGE THE CHART TYPE

To change the type of an existing chart:

1. Select the chart.
2. Click the **Chart Tools Design** tab.
3. Click **Change Chart Type** in the **Type** group to open the **Change Chart Type** dialog box.
4. Click the **All Charts** tab within the dialog box.
5. Click a chart type on the left side of the dialog box.
6. Click a chart subtype on the right side of the dialog box.
7. Click **OK**.

CHART ELEMENTS

- A **chart element** is a component of a chart that helps complete or clarify the chart. Chart elements include the following: chart title, axis titles, data labels, legend, gridlines, chart area, plot area, data point, data series, and sparklines.
- When you select a chart, three icons appear to the right of the selected chart: **Chart Elements**, **Chart Styles**, and **Chart Filters**.
- In addition, the **Chart Layouts** group on the **Design** tab provides tools to add and customize chart elements and to change the chart layout.
- The section below describes the individual chart elements.

CHART AREA

- The **chart area** is a container for the entire chart and all its elements, including the plot area, titles, legends, and labels.

CHART TITLE

- The **chart title** is a label that describes the entire chart. The label should be brief yet as descriptive as possible.
- The default chart title is **Chart Title**.
- To edit and format the chart title:
 - Select the chart title.
 - Type the text you want to display in the chart title.
 - Press **Enter**.
 - Click the **Home** tab.
 - Apply the desired font formatting.
 - Click the chart to deselect the chart title.
- To change the position of the chart title:
 - Select the chart title.

- Click **Chart Elements**.
- Point to the Chart Title and click the triangle on the right side of the menu option, **Chart Title**.
- Select one of the following options:
 - **Above Chart**
 - **Centered Overlay** (“[c]enters the chart title horizontally without resizing the plot area; the title displays over the top of the plot area”) (Mulbery et al. 2017, p. 560).
 - **More Options**
- Click **Chart Elements** to close the menu.
- To link a chart title or an axis title to a cell:
 - Click the Chart Title or Axis Title placeholder.
 - Type = in the Formula Bar.
 - Click the cell containing the label you want for the title.
 - Press **Enter**.

AXIS TITLES

- An **axis title** is a label that describes either the **category axis** or the **value axis**.
- Display titles for the value and category axes to help describe the axes better.
- To add an axis title:
 - Select the chart.
 - Click **Chart Elements**.
 - Point to Axis Titles and click the right triangle on the right side.
 - Select one or more of the following options:
 - **Primary Horizontal**—Displays a title for the primary horizontal (x or category) axis.
 - **Primary Vertical**—Displays a title for the primary vertical (y or value) axis.
 - **Secondary Horizontal**—Displays a title for the secondary horizontal (x or category) axis.
 - **Secondary Vertical**—Displays a title for the secondary vertical (y or value) axis.
 - **More Options**—Opens the Format Axis Title task pane to apply fill, border, and alignment settings.
 - Click **Chart Elements** to close the menu.
- To position and format the axis title:
 - Double-click the axis title to open the Format Axis Title task pane.
 - Click **Title Options**.
 - Click the **Size & Properties icon**.

- Change the **Vertical alignment** or **Horizontal alignment** option to the desired position.
- Click other icons and select your desired options.
- Close the **Format Axis Title task pane**.

DATA LABEL

- A **data label** is an identifier that shows the exact values of a data point in a chart. It appears above or on a data point in a chart.
- By default, Excel adds data labels to all data series.
 - To display data labels for only one series:
 - Select the data labels for the other data series.
 - Press **Delete**.
- To add and position a data label:
 - Select the chart.
 - Click **Chart Elements**.
 - Click the **Data Labels** check box to display data labels.
 - Click the arrow to the right of the Data Labels item to select the position.
 - Click **Chart Elements** to close the menu.

LEGEND

- The **legend** is the key that identifies the color, gradient, picture, texture, or pattern fill assigned to each data series in a chart.
- The legend can be positioned to the right, top, bottom, or left of the plot area.

PLOT AREA

- The **plot area** is the region of a chart containing the graphical representation of the values in one or more data series. The **category axis** (also known as the **x-axis**) and **value axis** (also known as the **y-axis**) form a border around the plot area.

DATA TABLE

- The **data table** is a grid that contains the data source values and labels.

CATEGORY AXIS (X AXIS)

- The **category axis (x-axis)** is the **horizontal** border “that displays descriptive labels for the data points plotted in a chart” (Mulbery et al 2017, p. 535).

VALUE AXIS (Y AXIS)

- The **value axis (y-axis)** is the vertical border that “displays incremental numbers to identify the approximate values ... of data points in a chart” (Mulbery et al 2017, p. 535).
- To format the category or value axis:

1. Double-click the axis to open the **Format Axis** task pane.
2. Click the **Axis Options** icon, and complete one or more of the following:
 - Change the bounds, units, and display units.
 - The **Minimum Bound** sets the starting value.
 - The **Maximum Bound** sets the ending value on the value (y or vertical) axis.
 - The **Major Units** specifies the intervals of values on the value axis.
 - The **Display units** converts the values.
 - Click **Tick Marks** to change the major and minor tick marks.
 - Click **Labels** to change the label position.
 - Click **Number** to change the category, specify the number of decimal places, and select how negative numbers display.
3. Close the **Format Axis** task pane.

DATA POINT

- The **data point** is a numeric value that describes a single value on a chart.
 - “Each data point in the worksheet creates an individual data point in the chart” (Mulbery 2017, p. 534).
- Use the **Chart Tools Format** tab to select a chart element and insert and format shapes.

DATA SERIES

- A **data series** is a group of related data points that display in row(s) or column(s) in a worksheet.

GRIDLINE

- A **gridline** is a horizontal or vertical line that extends from the horizontal or vertical axis through the plot area to guide the reader’s eyes across the chart to identify values.

TRENDLINE

- A **trendline** is “[a] line that depicts trends or helps forecast future data” (Mulbery et al. 2017, p. 558).

SPARKLINE

- A **sparkline** is a small line, column, or win/loss chart contained in a single cell to provide a simple visual illustrating one data series.

ERROR BARS

- **Error bars** are “[v]isuals that indicate the standard error amount, a percentage, or a standard deviation for a data point or marker” (Mulbery et al. 2017, p. 558).

REMOVE A CHART ELEMENT

- To remove a chart element:
 - Click **Chart Elements**.
 - Click a check box to deselect the check box.
- You can alternately:
 - In the **Chart Tools Design tab**, click **Add Chart Element**.
 - Point to the element name.
 - Select **None**.

Note: You can also select a chart element and press **Delete** to remove it.

MOVE, SIZE, AND PRINT A CHART

Excel inserts the chart as an embedded object in the current worksheet. After a chart is inserted, it frequently needs to be moved or resized.

MOVE A CHART

- The **Move Chart** dialog box enables you to select a new sheet and name the new chart sheet.
- To move a chart within an active worksheet:
 - Point to the chart area to display the Chart Area ScreenTip and a pointer with a white arrowhead and four-headed arrow.
 - Drag the chart to the new desired area of the worksheet.
- To place a chart on a separate worksheet known as a **chart sheet**:
 - Select the chart.
 - Click the Design tab.
 - Click Move Chart in the Location group to open the Move Chart dialog box.
 - Alternate method: Right-click the chart and select Move Chart.
 - Select one of the following options:
 - Click **New sheet** to move the chart to its own sheet.
 - Click **Object in** followed by the *Object in* arrow, and select the worksheet where you want to move the chart.
 - Click **OK**.

Note: You cannot enter data and formulas on a chart sheet.

SIZE A CHART

- Adjust the chart size by dragging a **sizing handle** (a sizing handle consists of eight circles that display around the four corners and outside middle sections of a chart when you select it).
- You can also specify exact measurements for a chart in the **Size group** on the **Format tab**.

PRINT A CHART

- To print the data only:
 - Select the data
 - Click the **File** tab.
 - Click **Print**.
 - Click the first arrow in the **Settings** section.
 - Select **Print Selection**.
 - Click **Print**.
- If you insert a chart onto a worksheet and leave it there, you will be able to print the data source and the chart on the same page.
 - To ensure both the data and the chart print, make sure neither the chart nor the data is selected before you select the Print options.
- If the chart is on its own sheet or if you select the chart on a worksheet containing other data, the chart will print as a full-sized chart. **To print only the chart as a full page:**
 - Select the chart if it is on a worksheet that also contains data.
 - Click the **File** tab.
 - Click **Print**.
 - Make sure the default setting is **Print Selected Chart**.
 - Click **Print**.

SOURCES

McFedries, Paul. *The Unofficial Guide to Microsoft Office 2007*. Hoboken, NJ: Wiley, 2007, 142–143.

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Perry, Greg. *Microsoft® Office 2007 All in One*. Indianapolis, IN: SAMS, 2007.

Poatsy, Mary Anne, Keith Mulbery, Cynthia Krebs, Lynn Hogan, Eric Cameron, Jason Davidson, Linda K. Lau, Rebecca Lawson, and Jerri Williams. *Microsoft Office 2016 Volume 1*. Exploring Series, series editor Mary Anne Poatsy. Boston, MA: Pearson, 2017.

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