

Create Charts



Charts

Charts are graphical representations of the numeric values and relationships in a dataset. Charts help worksheet viewers to quickly and easily interpret the data in a worksheet. Excel charts update automatically when you update the data feeding them. And, some chart types contain animation functionality that helps worksheet viewers more easily discern overall patterns in the changing data as you update it.

In this figure, while you can tell from the values in the **Total Sales (in millions)** column what the sales are for each market, the pie chart to the right of the data is much easier to interpret. With just a glance, you can tell that sales in the West region are greater than the sales in the other three regions, and that they account for more than a third of all sales. Getting this information from the raw data would require a bit of analysis and some calculating.

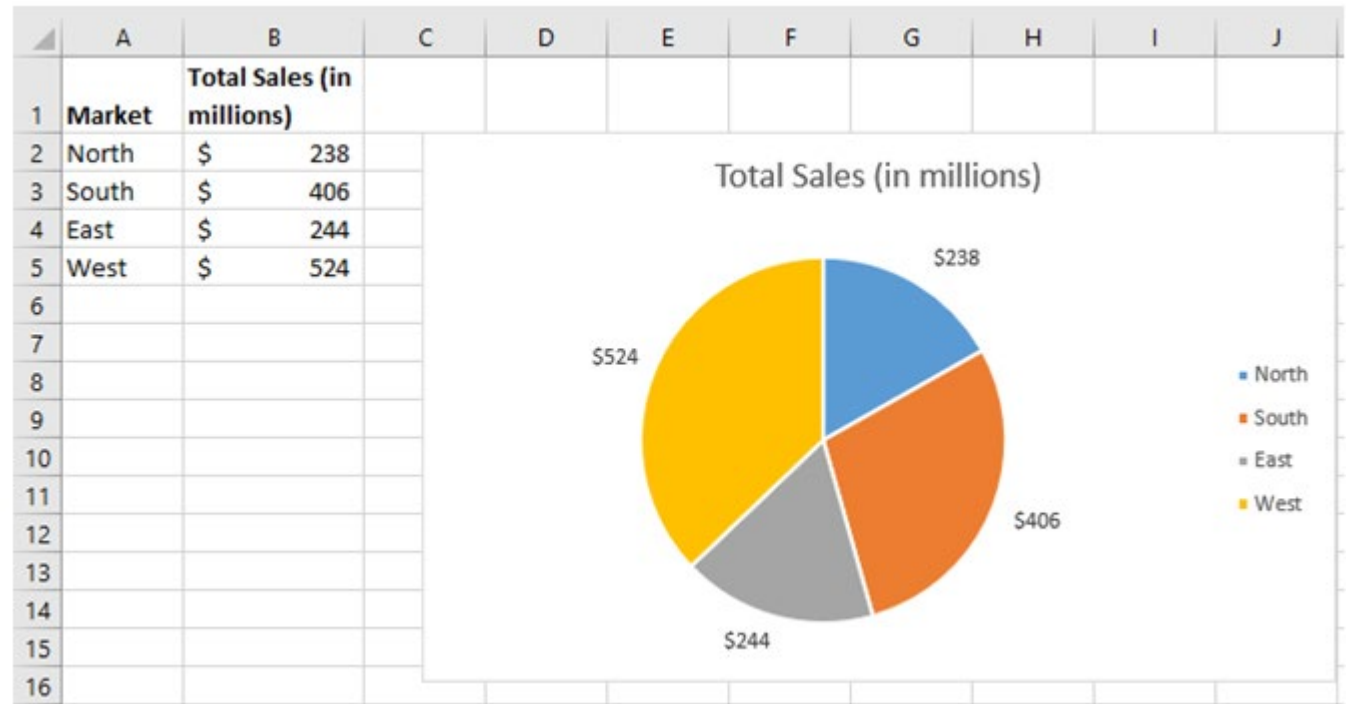


Chart Basics

Excel 2021 offers many chart types, but most follow the same conventions. Charts typically use two axes:

- **X axis (horizontal):** Represents categories, such as time periods or departments.
- **Y axis (vertical):** Represents values, such as sales totals or quantities.

The chart objects (bars, columns, lines, etc.) represent data series, like regions or sales reps. Excel builds charts directly from worksheet data:

- **Column labels → categories (X axis)**
- **Row labels → data series**
- **Cell values → plotted values (Y axis)**

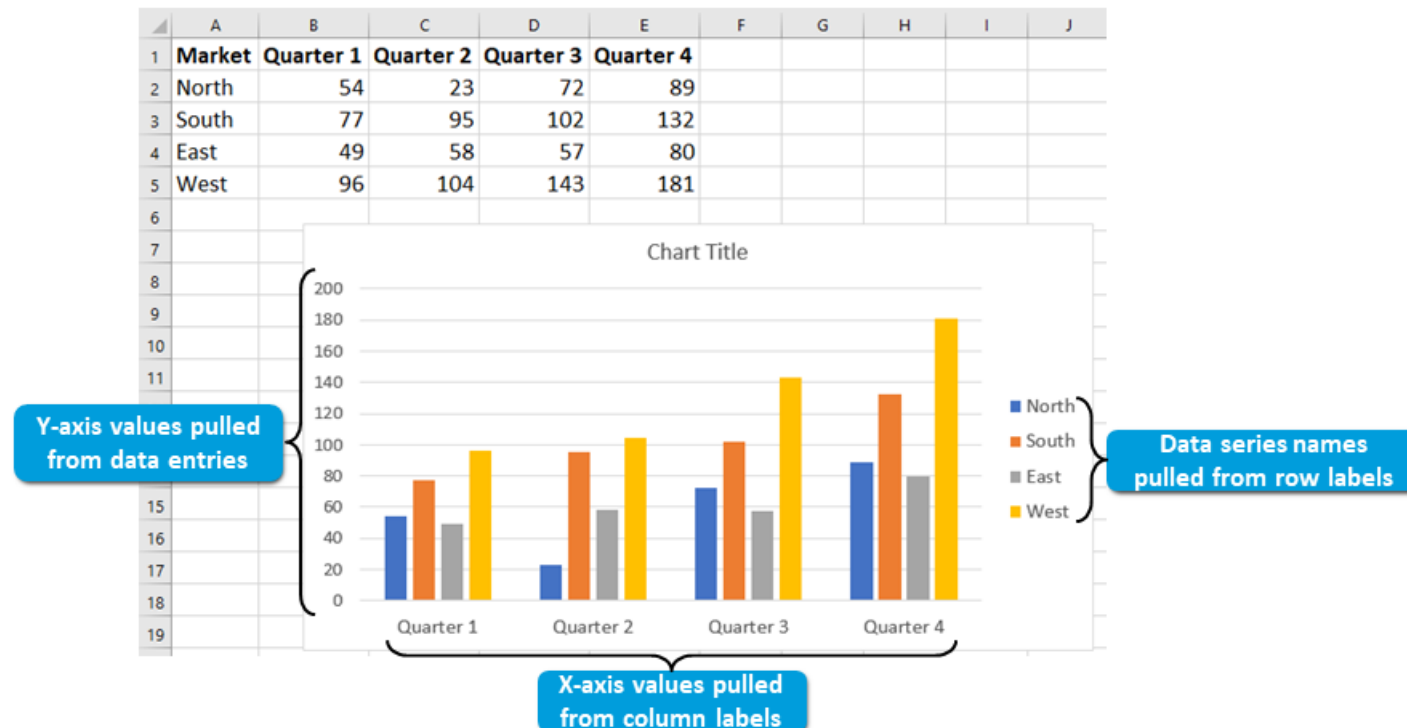


Chart Insertion Methods

Before creating a chart, it's best to **manually select the dataset**, including both row and column labels, to ensure Excel interprets the data correctly.

- **Column labels → categories (X axis)**
- **Row labels → data series**
- **Cell values → plotted values (Y axis)**

Once the dataset is selected, you can insert a chart using four main methods:

- **Quick Analysis tools**
- **Ribbon commands (Insert tab)**
- **Insert Chart dialog box**
- **Default chart type**

If you frequently use the same chart type, you can set it as the **default chart type**. Then use these shortcuts:

- **Alt+F1** → Inserts the default chart on the same worksheet.
- **F11** → Inserts the default chart on a new worksheet.

➤ You set the default chart type for Excel by right-clicking the desired chart subtype from the **Insert Chart** dialog box and selecting **Set as Default Chart**. This is an application-level setting, so what you set here will be the default chart type for any workbook file until you change the default chart type.

The Insert Chart Dialog Box

The dialog box has **two tabs**:

- **Recommended Charts tab** → Displays chart subtypes Excel suggests based on your selected dataset. You can preview how each recommendation would look before inserting.

- **All Charts tab** → Lets you browse all available chart types and subtypes. Each option includes a live preview, often with formatting variations, so you can choose the exact style that fits your data.

- In short: *Recommended Charts helps you quickly pick from Excel's suggestions, while All Charts gives you full control to explore every chart type and formatting variation.*

Chart Types

Excel 2021 includes 17 different chart types, each of which is ideal for displaying a particular type of data or set of relationships. Each type of chart contains a variety of specific subtypes that you can use to tailor the presentation of your data. You can access the chart types and subtypes in the **Insert Chart** dialog box, which you can use to insert charts into your worksheets. You can access the **Insert Chart** dialog box by selecting the dialog box launcher on the **Charts** group on the **Insert** tab, or by selecting the **More** option from any of the chart type drop-down menus in the **Charts** group on the **Insert** tab.

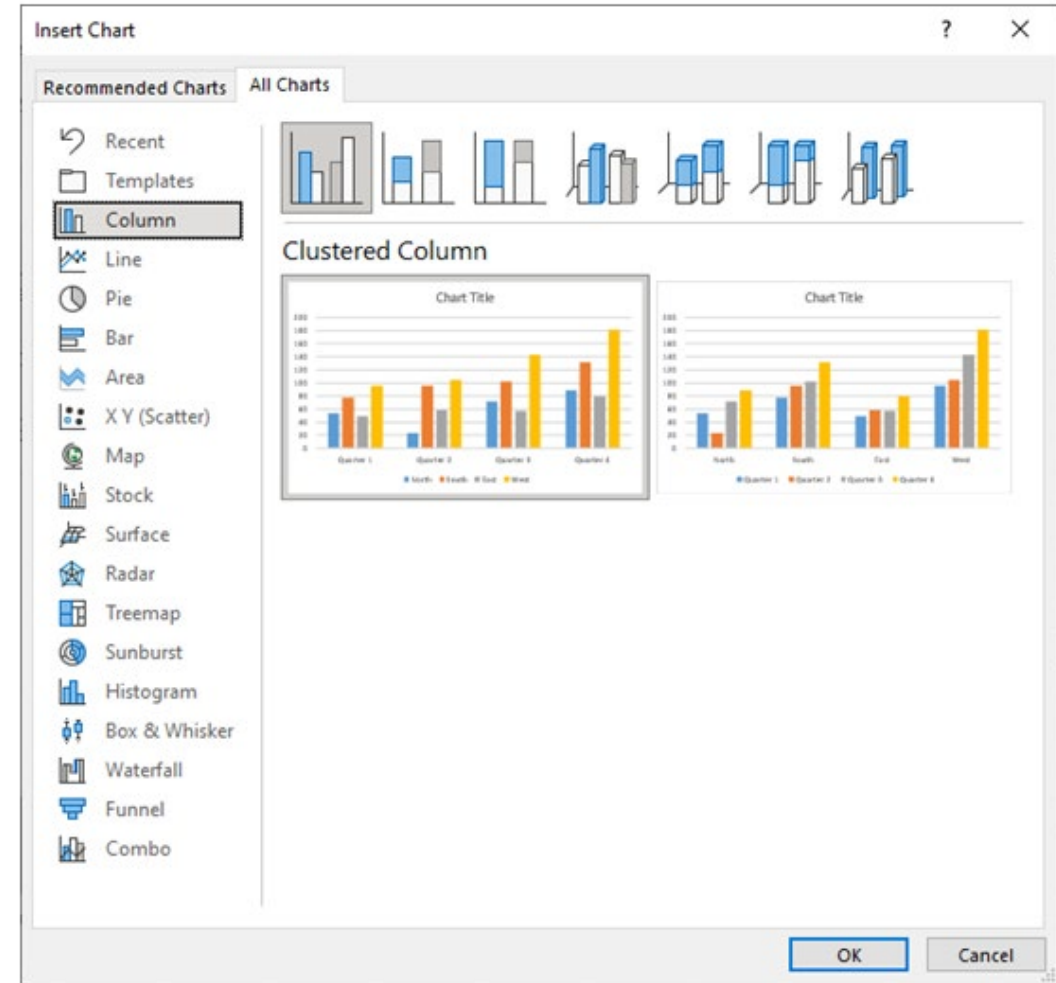


Chart Types

Chart Type	Is Best Used to Display
Column	Relationships among values in a number of categories or changes in values over time.
Line	Trends in data over a period of time at consistent intervals (for example, quarterly or annually).
Pie	The relative size of values, compared to the whole and to other parts of the whole. This is the best chart to use when you are charting only a single column or row of data.
Bar	Relationships among values in a number of categories.
Area	Relationships among values in a number of categories over time with visual emphasis on the magnitude of each data category.
X Y (Scatter)	The relationship between two categories of measured data, as opposed to one category of measured data across evenly spaced periods of time. Use this chart type to determine if there is a trend in the relationship between two sets of variables.
Map	Data comparisons across geographic regions.
Stock	The change in stock prices over time or other similar fluctuating sets of values, such as daily or annual temperatures.
Surface	Three-dimensional representations of data. Typically, you would use a surface chart when working with three sets of data. An example of this would be charting the relative change in density of several materials, at a variety of temperatures, over a period of time.
Treemap	A hierarchical chart; it shows a hierarchical view of your data and how the parts of the hierarchy compare in size to each other.

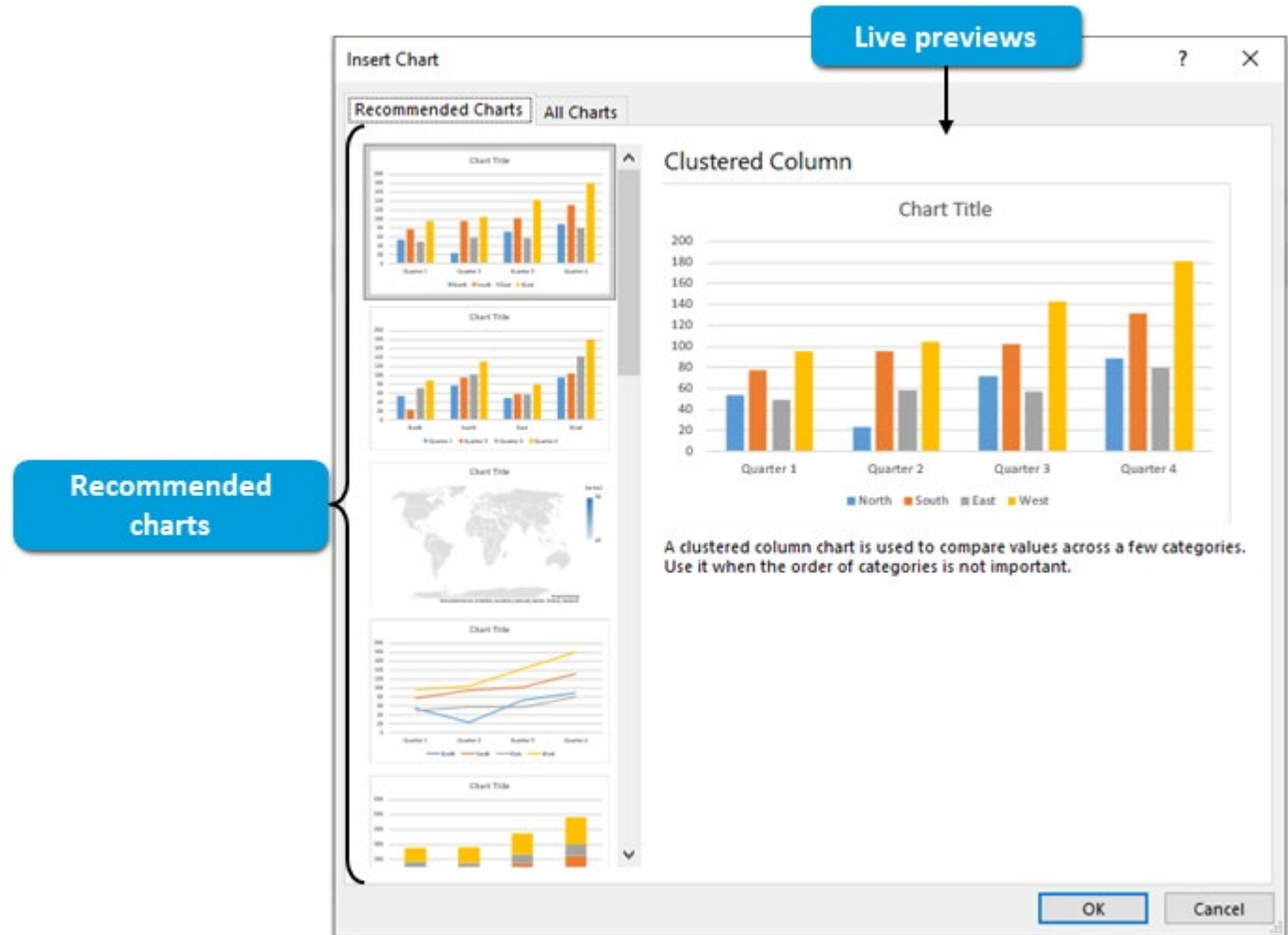
Chart Types

Chart Type	Is Best Used to Display
Radar	The aggregate relational sizes of multiple data categories in terms of multiple criteria. For example, you could use a radar chart to track the popularity of a particular item in multiple countries for each year in a decade.
Sunburst	Visual comparisons of relative sizes, similar to Treemap. The difference with Sunburst is showing the links between groups and sub-groups.
Histogram	A column chart that shows frequency data. The difference is that each column represents a range of values (called a bin) instead of a single value.
Box & Whisker	Statistical information about a set of data; the distribution of data into quartiles, highlighting the mean and outliers.
Waterfall	A running total as values are added or subtracted. It's useful for understanding how an initial value (for example, net income) is affected by a series of positive and negative values.
Funnel	Values across a process with multiple stages. Typically, the values decrease as the data moves through the process (for example, prospects in a sales pipeline).
Combo	Relationships among values of widely differing ranges of data. For example, if you want to chart unit sales measured in thousands of units on the same chart as sales in billions of dollars, you could use a combo chart so that both sets of values, which are on vastly different scales, can be displayed simultaneously. Combo charts are also referred to as dual-axis charts.

Recommended Charts

Excel 2021 includes a handy feature to assist you with selecting the most appropriate chart subtype for the selected data: recommended charts.

Based on the dataset you select, Excel 2021 uses an algorithm to determine which of the chart subtypes would best suit your needs. You have access to recommended charts in two places: from the **Quick Analysis** tools and from the **Recommended Charts** tab in the **Insert Chart** dialog box.



Activity 21. Creating Charts

Modify and Format Charts

 Microsoft



Excel 2021

Modification vs. Formatting

Modifying a Chart

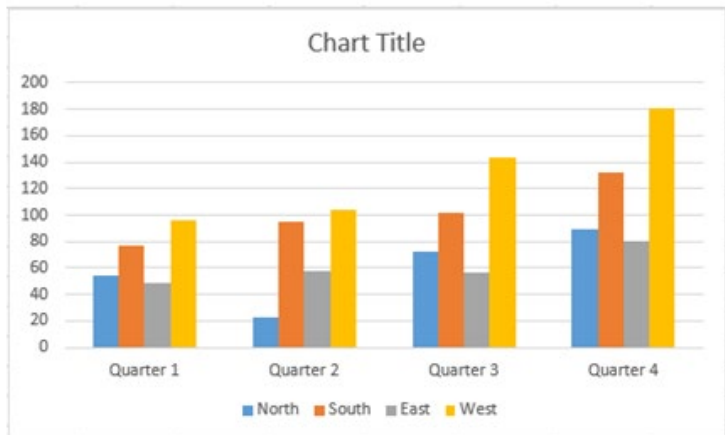
- Focus: Adjusting how the **data is displayed**.
- Examples:
 - Moving chart elements (titles, legends, labels).
 - Adding/removing chart elements.
 - Turning specific data series on/off.
 - Changing the chart type (e.g., column → line).
- Purpose: To improve how the audience interprets the information.
- Think of it as: *Changing the structure of the chart to clarify the story the data tells.*

Formatting a Chart

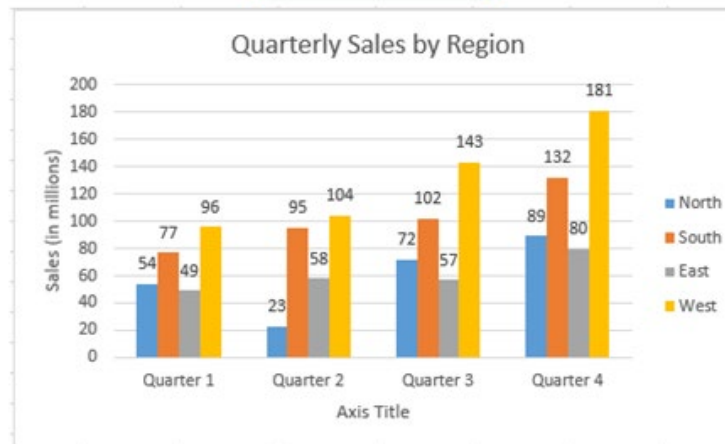
- Focus: Adjusting the **visual style and appearance**.
- Examples:
 - Changing colors, fonts, or themes.
 - Resizing the chart.
 - Applying branding guidelines.
- Purpose: To align with design standards or convey a particular mood.
- Think of it as: *Styling the chart so it looks polished and consistent.*

Modification vs. Formatting

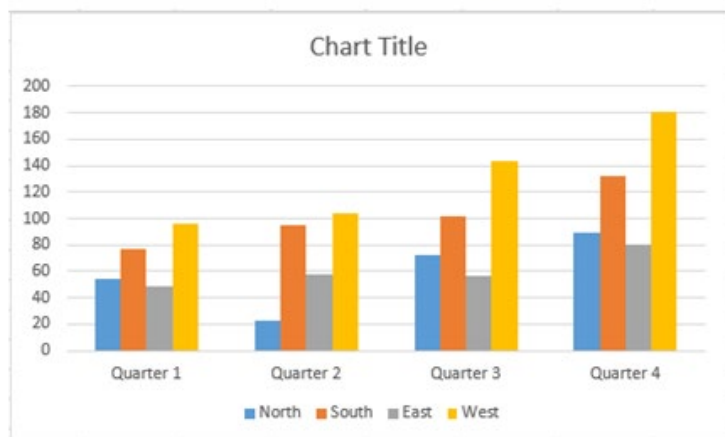
Original chart



Modified chart



Original chart



Formatted chart

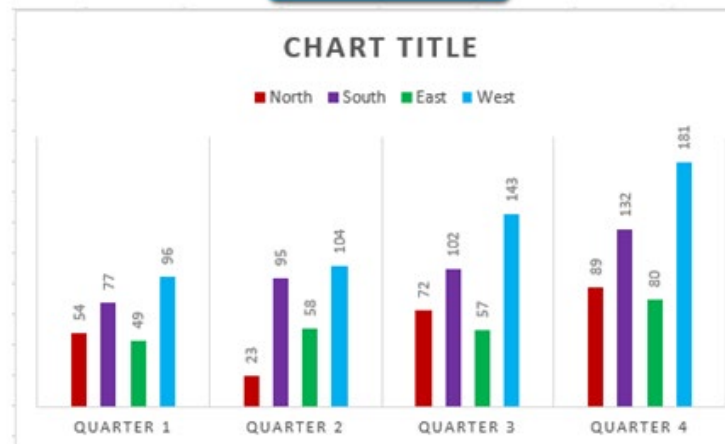


Chart Elements

Chart elements are the individual objects that can appear on charts and that convey some level of information to a viewer about the chart's data. While all Excel charts contain at least one chart element by default, the various chart types display different chart elements. Each chart element serves a different role in visually communicating information about data and trends.



Guidelines for Modifying Chart Elements

Formatting charts has relatively little impact on an audience's ability to interpret your data. Modifying chart elements, on the other hand, can have a significant impact. As a general rule, it's best to include only those chart elements that are absolutely necessary for conveying meaning. Cluttered charts can muddy your main point and make your charts confusing to view, and avoiding confusion is exactly why you created them in the first place.

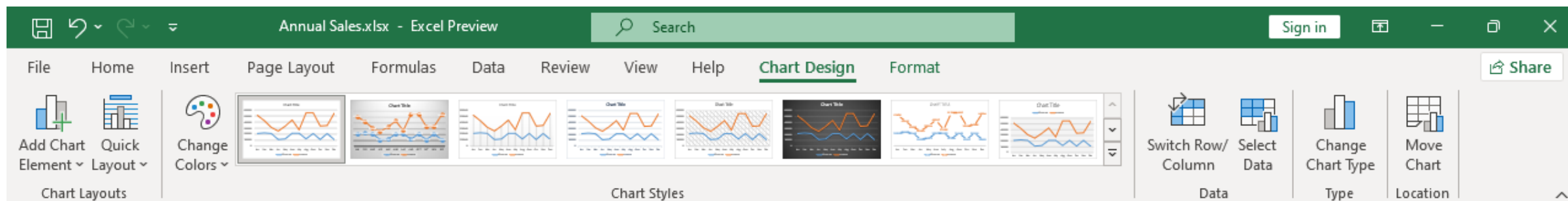
However, some chart elements do actually help add meaning. Until you gain an intuitive sense of what chart elements to include for various purposes, you may want to consider adding chart elements that you feel will help your target audience interpret your data, analyzing your chart, and then removing anything that doesn't directly contribute to the message you intend to deliver.

When analyzing your charts, ask yourself questions such as:

- If I remove the gridlines, will the chart still convey meaning?
- Do I need a legend? Can I remove the legend and use data labels instead?
- How much precision do I need for axis labels?
- Do the axes really need titles?
- Will using a three-dimensional layout enhance visual appeal or distort proportions?
- Does including the data table aid understanding?
- Do I really need major and minor tick marks on the axes?

The Chart Contextual Tabs

You can access many of the commands you will use to modify and format your charts on the two chart contextual tabs, which appear whenever you select a chart or a chart element and disappear when you select a worksheet element outside the chart. Each of these two tabs contain task-related groups and commands for working with your charts. Let's take a look at the various command groups on both of these tabs.



The Chart Contextual Tabs

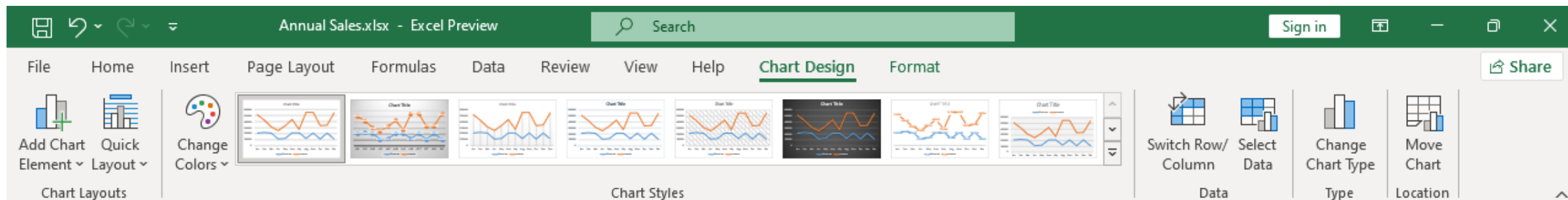
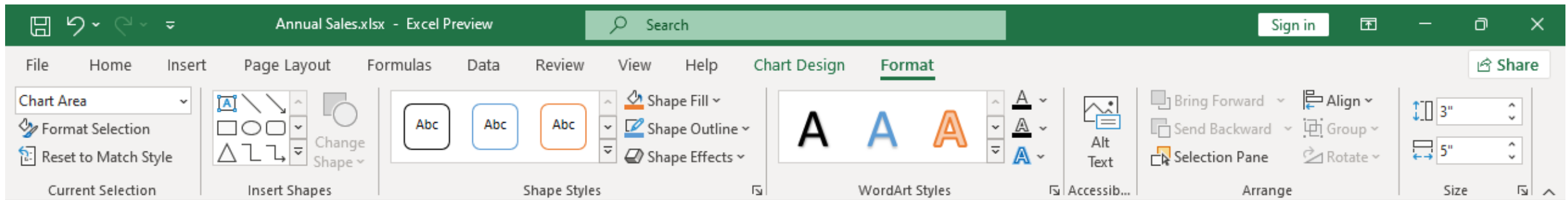


Chart Design Tab Command Group	Contains Commands For
Chart Layouts	Adding or removing individual chart elements, and quickly configuring the display of all chart elements according to predefined configurations.
Chart Styles	Quickly formatting a chart by using predefined sets of formatting options.
Data	Changing the chart's dataset range and switching the row and column data. Keep in mind that this does not switch the data that is displayed on the X axis with the data that is displayed on the Y axis. This switches the categories with the data series.
Type	Changing the chart type.
Location	Moving charts to different worksheets within a workbook.

The Chart Contextual Tabs

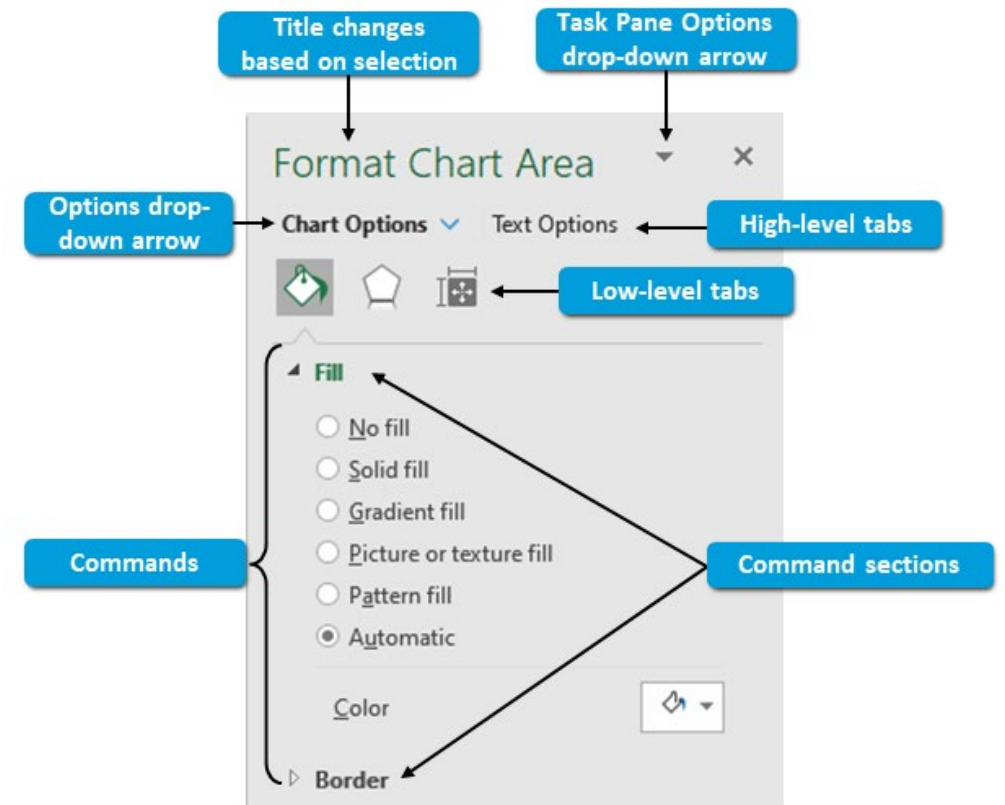


Format Tab Command Group	Contains Commands For
Current Selection	Selecting particular chart elements and accessing the Format task pane.
Insert Shapes	Inserting or changing shapes on worksheets.
Shape Styles	Configuring formatting options for chart elements.
WordArt Styles	Configuring formatting options for chart text.
Accessibility	Configuring alternative text for use by screen readers meant for visually challenged people or people suffering from vision impairment.
Arrange	Changing the front-to-back placement of chart elements and configuring the orientation of chart elements.
Size	Changing the size of charts and chart elements.

The Format Task Pane

The **Format task pane** in Excel 2021 is a context-sensitive tool that lets you fine-tune chart appearance.

It opens when you choose **Format** → **Format Selection** from the chart contextual tab, and its name changes depending on the element selected, for example, **Format Axis** or **Format Chart Title**. The pane adapts to the chosen element, showing different tabs and commands. At the top level, it often separates options into text formatting and object formatting. Within these, lower-level tabs group related functions, and expandable sections provide specific commands for adjustments such as fonts, fills, borders, and effects. In short, the Format task pane gives precise control over both text and visual elements, ensuring charts are polished and tailored to your needs.

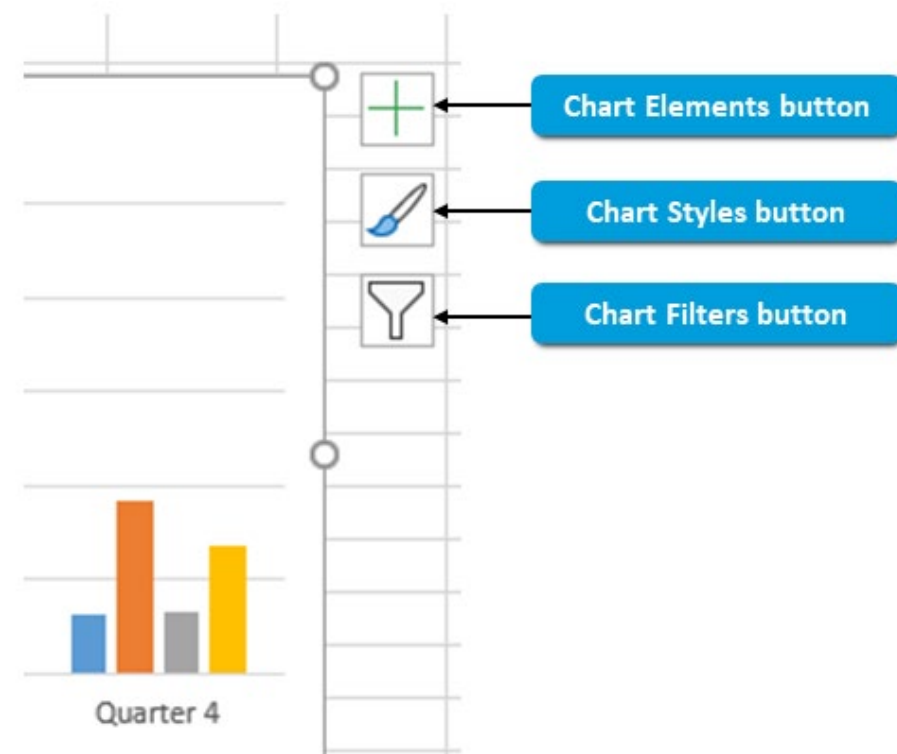


The Format Task Pane

Format Task Pane Element	Description
Title	Displays variations of the Format task pane's title, depending on the chart element that is currently selected.
Task Pane Options drop-down arrow	Provides you with access to options for moving, resizing, or closing the Format task pane.
Options drop-down arrow	Opens a drop-down menu that enables you to select different chart elements for formatting purposes. This is essentially the same menu you can access by selecting the desired chart element from the Chart Elements drop-down list on the Format contextual tab. Changing the selection changes the task pane's title and the displayed tabs and commands.
High-level tabs	Divide the formatting commands into functional groups at the highest level. Essentially, these divide the formatting commands and options between object formatting tasks and text formatting tasks. If a chart element doesn't contain text, the Format task pane displays only a single option at this level of the hierarchy.
Low-level tabs	Divide the formatting commands and options at a more granular level than the high-level tabs. The low-level tabs available are dependent upon your current selection.
Command sections	You can expand or collapse these task-specific sections to access or hide the specific commands and options you will use to format chart elements.
Commands and options	Enable you to apply formatting options to the selected chart element.

The Chart Tools Buttons

Chart Tools Button	Selecting This Button
Chart Elements button	Opens a menu that enables you to toggle on or off, as well as modify, various chart elements.
Chart Styles button	Opens a gallery providing you with quick access to various chart styles and color schemes.
Chart Filters button	Opens a menu that enables you to quickly toggle on or off the display of chart series, chart categories, or individual elements within either of these. From this menu, you can also toggle on or off the display of series labels and category labels.



The Select Data Source Dialog Box

You will use the **Select Data Source** dialog box to manage Excel chart data. From here, you can edit the entire dataset feeding the chart or you can edit the data feeding any of the individual data series. You can also remove from or add back to the chart any of the individual data series, reorder how the data series appear on the chart, or switch the chart's X and Y axes. You can access the **Select Data Source** dialog box from the chart contextual tabs by selecting **Chart Design** → **Select Data**.

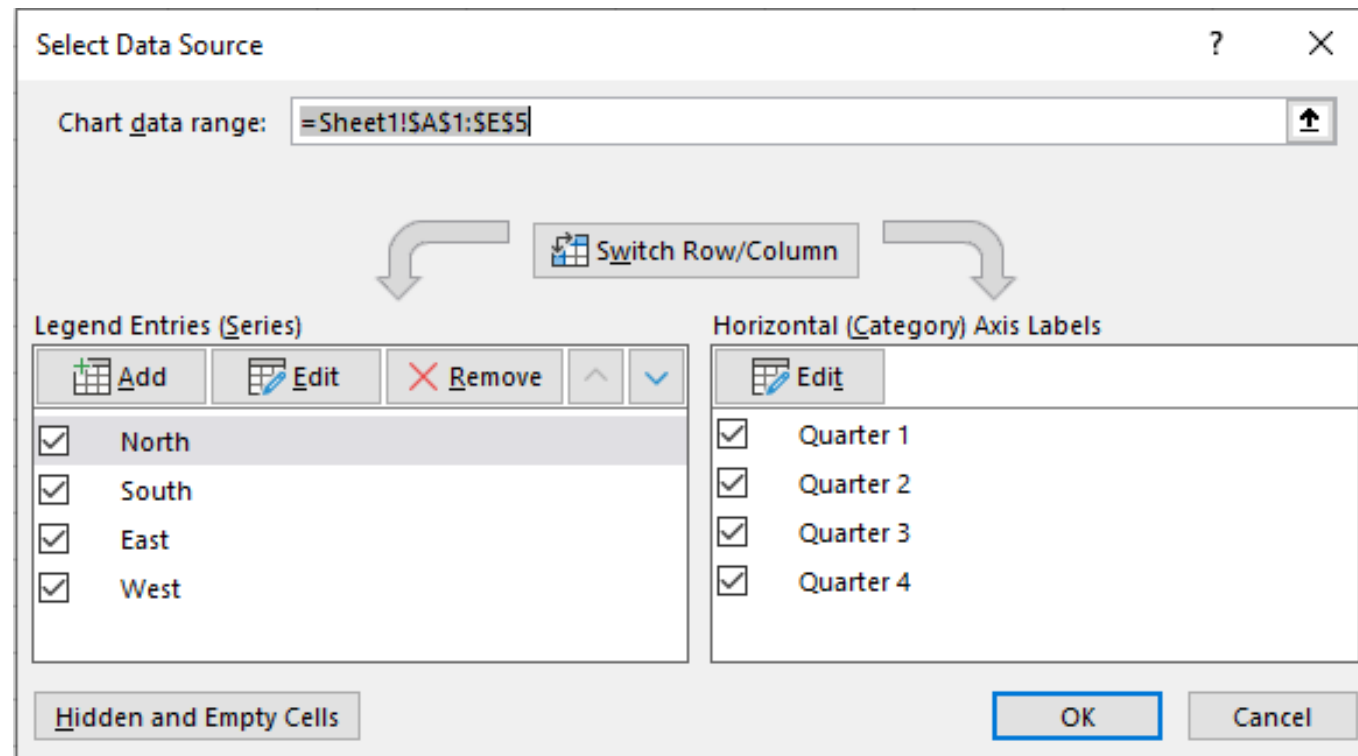


Chart Animations

As previously mentioned, when you update the data associated with a chart, the chart itself also updates. In Excel 2021, these changes are animated to help worksheet developers and viewers get a clearer sense of how the changes affect the overall values and relationships in the chart. This functionality can also enable you to create dynamic, animated charts by using some of the add-ins available for Excel 2021.

Activity 22. Modifying and Formatting Charts

Use Advanced Chart Features

 Microsoft



Excel 2021

Dual-Axis Charts

A dual-axis chart is, simply, a chart that displays two sets of information on the same chart. This can be in the form of a dual-Y-axis chart, which displays two data series simultaneously, or a dual-X-axis chart, which displays two sets of categories simultaneously. By far, dual-Y-axis charts are used more frequently than dual-X-axis charts. But dual-X-axis charts can be useful for particular types of charts, such as bubble charts or XY (scatter) charts.



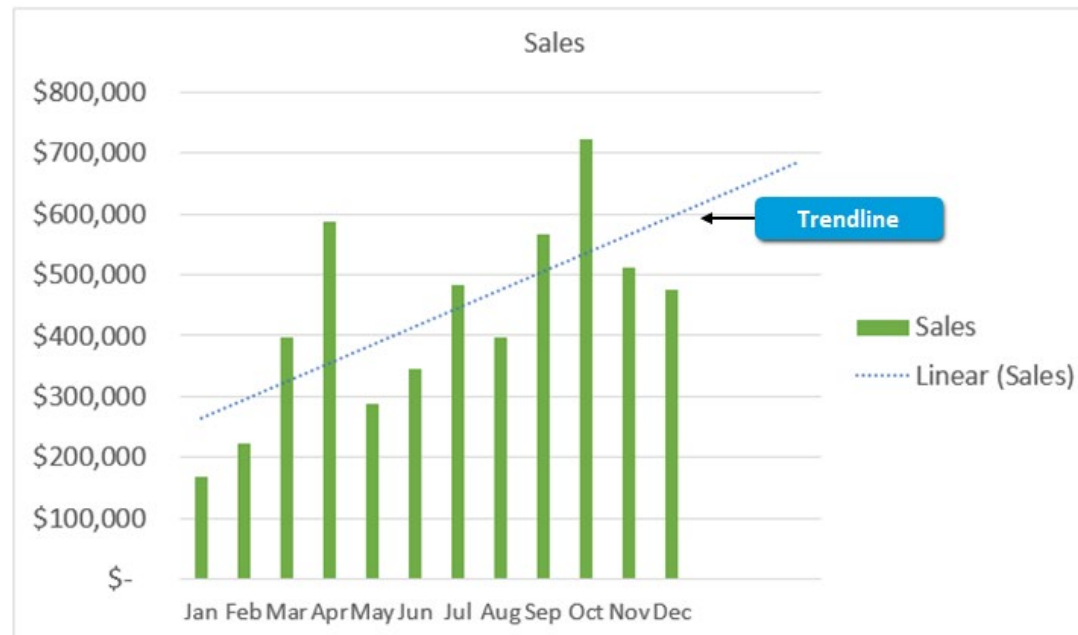
The main advantage to dual-axis charts is the ability to not only display two different sets of data simultaneously, but also to format the different sets of data independently of each other. This means you can make the various data series easily visually distinguishable from each other and display them within the same amount of space using different scales. 26

Forecasting

In addition to creating secondary axes to display various data series or categories simultaneously, Excel includes a chart feature that can help you forecast trends in your data. Forecasting is the process of using the trends that exist within past data to predict future outcomes. By its nature, forecasting can never be entirely accurate, as one can never precisely predict all possible future outcomes. As a general rule, the farther you forecast out into the future, the less accurate your forecasts become.

Trendlines

In Excel, trendlines are chart elements that can graphically represent both the current trends that exist within your data and future forecasts of those trends. You can add trendlines to any of the following non-stacked, 2-D chart types: column, line, bar, area, stock, XY (scatter), and bubble. You can name and format trendlines to make them easier to view on charts or to adhere to organizational branding standards. To access the options for adding trendlines to your charts, select the desired chart to display the chart tools buttons, select the **Chart Elements** button, point the cursor at the **Trendlines** check box, and then select the arrow that appears to the right of it.



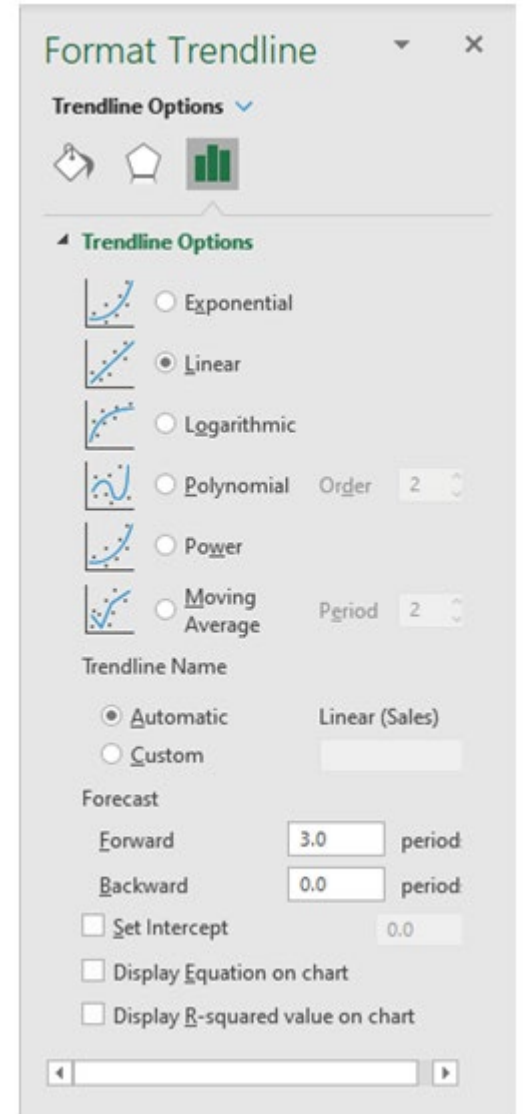
Trendline Types

You can use different types of trendlines to display and forecast data trends depending on the type of data you wish to analyze. Excel provides you with six options for adding trendlines to your charts.

Trendline Type	Use This to Display or Forecast Data That
Exponential	Increases in rate of change at an ever-faster rate over time.
Linear	Has a proportional relationship. When you graph linear relationships, the resulting graph is a straight line that represents a trend that holds steady or that increases or decreases by a steady rate.
Logarithmic	Has a rapidly increasing or decreasing rate of change that eventually levels out.
Polynomial	Fluctuates over time.
Power	Increases in rate of change at a steady rate over time.
Moving average	Fluctuates randomly over time. Use this type of trendline to smooth out random patterns of values to give viewers a sense of the overall average change in values over time.

The Format Trendline Task Pane

You will use the **Format Trendline** task pane to apply formatting and effects to your chart trendlines and to change the type of trendlines in your charts. You can access the task pane by selecting the desired trendline; then, on the chart contextual tabs, select **Format** → **Format Selection**.

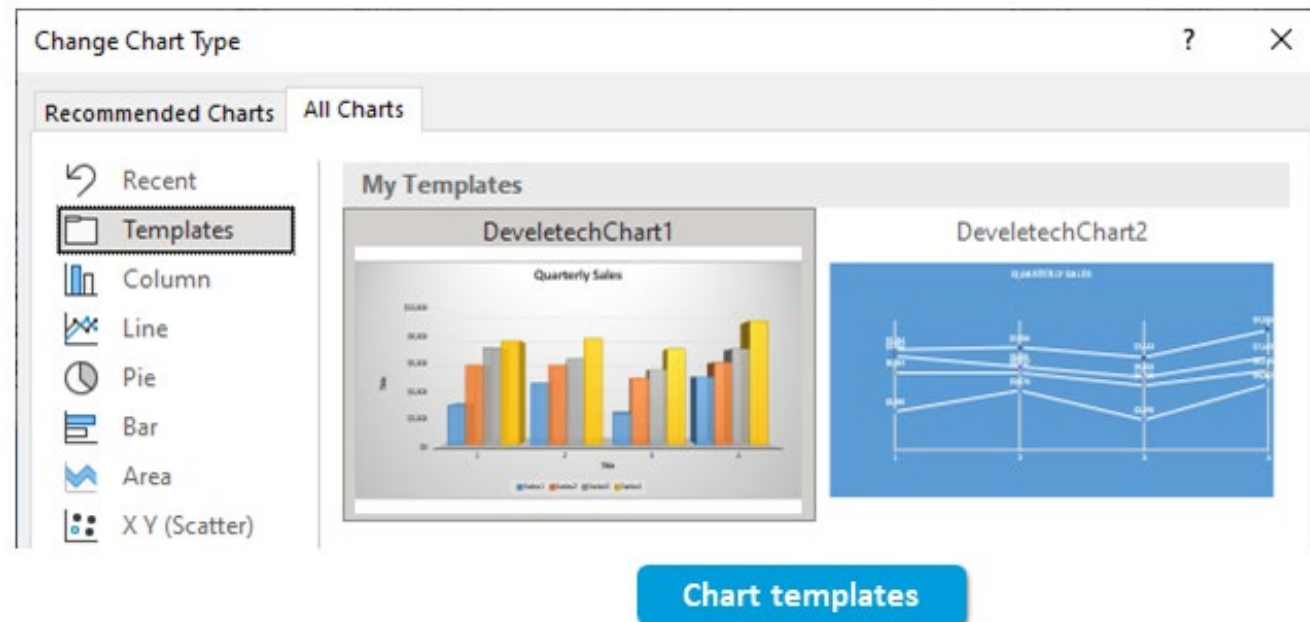


Activity 23. Creating a Dual-Axis Chart with a Trendline

Chart Templates

A **chart template** in Excel 2021 lets you save all the formatting and modifications you've applied to a chart so you can reuse them in future workbooks. This is especially useful if you've customized charts to meet organizational branding guidelines or need to create consistent visuals across multiple projects.

Chart templates are stored as **.crtx files** in the *Charts* subfolder of the Microsoft Templates folder. Once saved there, they can be accessed from the **Templates tab** in either the *Insert Chart* dialog box or the *Change Chart Type* dialog box. If you save the template outside the Charts folder, it won't appear in those dialog boxes.



Activity 24. Creating a Chart Template