Advanced Charts

Create and Modify Advanced Charts Students will be able to:

Concept: Analyze data with advanced charts

Task: Create and modify advanced charts

Create and modify Advanced Charts, including:

Combo Charts, Map, Treemap, Sunburst, Funnel, Histogram, Waterfall, and Box and Whisker

Change Data Type to Map data

Modify Chart colors

Explain the uses of the advanced chart types

Excel Expert Certification Exam Objectives

Create and modify dual axis charts



VISUALIZING DATA

Unit Check List

Complete the Lesson Advanced Charts: Pages 93-122

Task

Complete the following: Format several spreadsheets as advanced charts: Hierarchy, Statistic, Information, Combo and Map.

Downloads

Advanced Charts Unit Sample.xlsx

Test Yourself: Unit Review Pages 121-122

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Menu Maps

- 1. Insert-> Charts-> See All Charts->Combo
- 2. Insert-> Charts-> Map-> Filled Map
- 3. Insert-> Charts-> Insert Hierarchy Chart-> Treemap Chart
- 4. Insert-> Chart-> Hierarchy Chart-> Sunburst





PUTTING EXCEL TO WORK

Let's Open Excel

In this Unit we will be creating and modifying advanced chart types.

Please download the sample spreadsheet:

Advanced Charts Unit Sample.xlsx

There are a several sheets in the workbook:

- Speed and Crashes Combo
- WHO Traffic Deaths Map
- Potholes Treemap
- MI Divisions Funnel
- Crash Avg Histogram
- Project Cost Waterfall
- Bridge Age Box
- Winter Crash Sunburst
- Crash_PivotTable
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Screen image of the sample workbook

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MO-201: Microsoft Excel Manage Advanced Charts and Tables 4.1 Create and Modify Advanced Charts

4.1.1 Create and Modify Dual Axis Charts

ORGANIZING THE DATA

Excel includes a number of advanced chart types for displaying complex, statistical or hierarchical data visually. These charts go beyond the functions of the standard column, bar, pie and line charts.

Advanced chart types include map, treemap, sunbursts, histogram, combo, box and whisker, and funnel charts.

Often, these charts require data to be in certain format or organized a particular way for the chart to render accurately. As with all charts, using the right chart for the data and the visualization is crucial.

In this Unit we will learn about some advanced Chart types and their uses. We will create and modify advanced charts as well.



REVIEW: THE PARTS OF CHART

All charts show data in a visual format. The type of chart should be suited to the type of data and the meaning that the audience should get from the data.

Different chart types have common elements. Bar, column, Historgram, and other similar types share the same structure: axis, data, wall, title.

Pie charts share similarities with sunburst, treemap, and map charts. They include data as a whole, include a chart area (background), but lack axes.

Understanding the components of a chart can help with chosing and modifying a chart for the best impact.



INSERT A COMBO CHART

A chart can compare the relationship between two types of data. For example, we could chart the relationship between the speed and the number of crashes.

Note that transportation departments usually refer to them as crashes, not accidents.

Task: Create a Combo Chart

- 1. Go to the Speed and Crashes sheet
- 2. Select the data in Columns D and E

3. Go to Insert-> Charts-> See All Charts (the more options arrow in the bottom right of the Charts Group). The Insert Chart dialogue box will open.

Keep going...

MDOT: Michigan Department of Transportation Link: <u>https://www.michigan.gov/mdot/</u>

Insert-> Charts-> See All Charts

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MO-201: Microsoft Excel Manage Advanced Charts and Tables 4.1 Create and Modify Advanced Charts 4.1.1 Create and Modify Dual Axis Charts

COMBO CHART, CONTINUED

A combo chart contains two different types of charts in one chart. The chart will use two data sets. A secondary axis can show a different set of data values.

Task: Set up a Combo Chart

The Insert Chart dialogue box is open. Go to the All Charts tab.

1. Go to the Combo category.

2. Choose Clustered Column and Line chart.

3. Change the SPEED series to Line. Check the box for Secondary Axis

4. Change the YR CRAH AVG Series to Clustered Column.

What Do You See? There is a preview of the chart.

5. Click OK to insert the chart

Insert-> Charts-> See All Charts



MO-201: Microsoft Excel Manage Advanced Charts and Tables 4.1 Create and Modify Advanced Charts 4.1.1 Create and Modify Dual Axis Charts

REVIEW THE COMBO CHART

A new Combo Chart was placed on the spreadsheet next to (or on top of) the data. Let's take a moment to finish the chart.

Task: Review the Combo Chart

1. Move the chart and resize it.

Use the Chart Tools Icons beside the chart to make the following changes:

2. Edit the Title: Speed and Crashes Combo

3. Edit the Chart Elements: Select both Horizontal and Vertical Axis Titles.

- 4. Edit the Vertical Axis Title: Average Speed.
- 5. Edit the Horizontal Axis: Number of Crashes.

What Do You See Now? The chart columns show the number of crashes at each intersection. The line shows the increase in speed.

We can see there is some relationship between an increase of speed and an increase in crashes.

Interesting.

MO-201: Microsoft Excel Manage Advanced Charts and Tables 4.1 Create and Modify Advanced Charts 4.1.1 Create and Modify Dual Axis Charts

Screen image of the Chart Tools



CREATE A MAP CHART

A map chart uses geographical information to color a map based on the values. Excel can work with data for counties, countries, states, and more.

Task: Create a Map Chart

1. Go to the WHO Traffic Deaths sheet

2. Select A2 to A175. Go to Insert-> Charts-> Map-> Filled Map.

3. Excel may prompt for permission to access the internet via Bing to retrieve geography data.

If so, say Yes.

Keep going,,,

WHO: World Health Organization

Link: https://www.who.int/

Insert-> Charts-> Map-> Filled Map

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4.1 Create and Modify Advanced Charts

MAP CHART, CONTINUED

A map chart uses geographical information to color a map based on the values. Excel can work with data for counties, countries, states, and more.

Task: Review the Map Chart

- 1. Move the chart and resize it.
- 2. Edit the Title: Traffic Deaths by Country
- 3. Edit the Chart Elements: Unselect the Legend.

What Do You See? Excel has created a map chart that shows darker shades of blue for areas with higher rates of death.

What Else Do You See? Angola and Greenland are not colored. These countries are not included in the dataset.

The More You Know: To revert data type from Geography back to text, select the cell or cells and right click. Choose Data Type--> Convert to Text.

MO-201: Microsoft Excel Manage Advanced Charts and Tables

4.1 Create and Modify Advanced Charts

4.1.2 Create and Modify Charts including Box & Whisker, Combo, Funnel, Histogram, Map, Sunburst and Waterfall charts

Insert-> Charts-> Map-> Filled Map



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MAP CHART: FORMAT DATA SERIES

Excel often colors with the default blue palette. This does not provide an effective contrast in colors for our map data.

Changing the colors can make the data more meaningful at a quick glance.

Task: Format the Data Series

The WHO Traffic sheet is still open. The Chart is selected.

1. Go to Chart Format-> Chart Area

Note: The Drop down box will display the name of a selected area of the chart. Open the dropdown menu to see the chart elements.

2. In the dropdown menu, choose Series "Estimated road traffic death rate per 100 000 population"

What Do You See? The data series in the map chart were selected. The data in Column A and Column B are selected as well.

Keep going...

Chart Format--> Chart Area

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4.1 Create and Modify Advanced Charts

MAP CHART: FORMAT DATA SERIES OPTIONS

The Data Series for a map can use max, min, and midpoint as the values to show the relationships of the data. Choosing the colors for the three points should highlight the relationship. The colors will be blended for points in between.

Task: Edit the Data Series Options

1. Click Format Selection.

What Do You See? The Format Series Pane will open on the right side of the screen. There are three tabs from left to right: Fil I& Line, Effects and Series Options.

- 2. Click on the Series Options button
- 3. Expand the Series Color options
- 4. In the drop down box, choose Diverging (3 color)

5. Set the colors: Yellow for minimum, Orange for Midpoint, and Dark Red for maximum.

Now the data is more vivid.

Chart Format--> Current Selection->Format Selection



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4.1 Create and Modify Advanced Charts

CREATE A TREEMAP CHART

A Treemap chart displays hierarchical data. The data is shown in categories and subcategories as nested rectangles.

Task: Create a Treemap Chart

- 1. Go to the Potholes Report sheet.
- 2. Select cells B2 to I4.
- 3. Go to Insert-> Charts-> Insert Hierarchy Chart.

Select a Chart: Treemap Chart.

What Do You See? The chart has given each year a color. The rectangles are labeled as Website or Hotline with larger rectangles each year, reflecting the increase in reporting.

Insert-> Charts-> Insert Hierarchy Chart-> Treemap Chart



MO-201: Microsoft Excel Manage Advanced Charts and Tables

4.1 Create and Modify Advanced Charts

CREATE A FUNNEL CHART

A funnel chart is used to show values through stages of a process. It is most often used to represent the sales funnel of potential contacts through to actual sales. It can be used for other comparisons as well.

For our data set we will see a funnel of geopolitical divisions from least to most as a representation of funnel chart data.

Task: Create a Funnel Chart

- 1. Go to the MI Divisions sheet.
- 2. Select the data in A1 to B3
- 3. Go to Insert-> Chart->Waterfall, Funnel, Stock, Surface, or Radar Chart
- 4. Select Funnel.

What Do You See? The Funnel chart shows the relationship between the different geopolitical organizations. There are counties (fewest), charter townships (middle value), and townships.

Insert-> Chart->Waterfall, Funnel, Stock, Surface, or Radar Chart



MO-201: Microsoft Excel Manage Advanced Charts and Tables

4.1 Create and Modify Advanced Charts

CREATE A HISTOGRAM

A Histogram is a chart that displays frequency data. Frequency refers to how often a data point appears in the data set. A histogram is frequently used in statistical analysis.

Task: Create a Histogram

- 1. Go to the Crash Avg Histogram sheet.
- 2. Select column H

3. Go to Insert-> Chart-> Insert Statistic Chart-> Histogram

What Do You See? Excel has distributed the data into 4 bins.

Keep going...

Insert-> Chart-> Insert Statistic Chart-> Histogram



MO-201: Microsoft Excel Manage Advanced Charts and Tables

4.1 Create and Modify Advanced Charts

HISTOGRAM, CONTINUED

To display the frequency data, a Histogram chart sorts the datapoints into bins. The bins have upper and lower bounds. They can be created automatically by Excel. They can also be set up by the user.

Task: Adjust Histogram Bins

1. Select the Histogram Chart.

2. Go to Chart Format->Current Selection. Choose Horizontal Axis from the dropdown list.

3. Go to Chart-> Format-> Current Selection-> Format Selection

The Format Axis pane will open.

4. On the Axis Options tab, the Axis Options category is open. Under bins, select bin width. Enter the value of 10. This means that each bin will hold a range of 10 data values.

What Do You See Now? There are more bins to show the distribution of the data.

Chart Format->Current Selection->Horizontal Axis



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4.1 Create and Modify Advanced Charts

CREATE A WATERFALL CHART

A waterfall chart is designed to show a running total as the initial value is increased or decreased over stages. This type of chart provides a quick visual of the change in value.

Task: Create a Waterfall Chart

1. Go to the Project Cost Waterfall sheet.

2. Select cells A1 through B5

3. Go to Insert-> Chart-> Waterfall, Funnel, Stock, Surface, or Radar Chart

4. Select Waterfall.

What Do You See? The Waterfall chart shows which values are a positive (increase) and which are a negative (decrease).

We can see the available funds goes down and even below zero before ending in the positive.

Insert-> Chart-> Waterfall, Funnel, Stock, Surface, or Radar Chart



MO-201: Microsoft Excel Manage Advanced Charts and Tables

4.1 Create and Modify Advanced Charts

MODIFY A WATERFALL CHART

A waterfall chart displays the information as columns. We can modify the labels to show more. In this example we will display the Category and the Value.

Task: Modify a Waterfall Chart

1. Select the Waterfall Chart.

2. Go to Chart Format->Current Selection, Choose Series 1 Data labels from the dropdown list.

3. Go to Chart-> Format-> Current Selection-> Format Selection. The Format Data Labels pane should be open on the right.

4. On the Text Options tab, the Label Options category is open. Select Category Name and Value.

5. Edit the Separator in the Label Options. Click on the Separator drop down. Choose (New Line) from the list.

What Do You See Now? The columns are now labeled with the Category Name from Column A and the Value from Column B. The Names are stacked. each separated on its own line.

MO-201: Microsoft Excel Manage Advanced Charts and Tables

4.1 Create and Modify Advanced Charts

4.1.2 Create and Modify Charts including Box & Whisker, Combo, Funnel, Histogram, Map, Sunburst and Waterfall charts

Chart 1

3 Labor cost

4 Marketing

6 Total

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15

16

17

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21

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22

Ready 🔯

Chart Format->Current Selection->Series 1 Data Labels



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CREATE A BOX AND WHISKER CHART

A box and whisker chart is used to show the distribution of data, highlighting the mean (average) and outliers. It's commonly used in statistical analysis.

Task: Create a box and whisker chart

- 1. Go to the Bridge Ages sheet.
- 2. Select columns A through G.

3. Go to Insert-> Chart--> Insert Statistic Chart-> Box and Whisker.

What Do You See? We have a chart showing the range of bridge ages. Most fall within a band along about 1960 to 1990.

However, this chart doesn't quite match our data set.

Keep going...

Insert-> Chart--> Insert Statistic Chart-> Box and Whisker



MO-201: Microsoft Excel Manage Advanced Charts and Tables

4.1 Create and Modify Advanced Charts

FORMAT A BOX AND WHISKER CHART

Advanced charts have many of the same elements as more basic chart styles.

Many of the elements can be modified to be appropriate for the data included.

In our data set, we do not have any values below 1860s.

Task: Format the Vertical Axis Labels

1. Select the Vertical Axis on the chart.

2. Go to the Chart Elements Chart Icon tool. Select Axis Options-> More Axis Options. The Format Axis pane will open.

3. Under Axis options, change the minimum value to 1850.

What Do You See? The Chart was modified. The minimum value on the vertical axis is now 1850, not 1750 the default value recommended by Excel.

Keep going ..

Chart Elements-> Axis Options-> More Axis Options



MO-201: Microsoft Excel Manage Advanced Charts and Tables

4.1 Create and Modify Advanced Charts

4.1.2 Create and Modify Charts including Box & Whisker, Combo, Funnel, Histogram, Map, Sunburst and Waterfall charts

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MODIFY THE BOX AND WHISKER CHART ELEMENTS

By adding details, we have clarified the chart and focused the data. Some charts may be ready upon insertion accepting the default formatting. Other charts, such as this Waterfall Chart, benefit from modification.

One last chart modification can be added for clarity: a legend. You can add a Legend with the Chart Elements or the Chart Design Ribbon if you wish.

Task: Modify Chart Elements

The Box and Whisker chart is still selected.

4. Go to Chart Design-> Chart Layouts-> Add Chart Element.

5. Add a Legend to the Bottom of the chart.

6. Edit the Chart title: Michigan Bridge Ages

Chart Design-> Chart Layouts-> Add Chart Element.



MO-201: Microsoft Excel Manage Advanced Charts and Tables

4.1 Create and Modify Advanced Charts

SETTING UP THE DATA FOR THE CHART

Some charts require the data organized in a particular way. A sunburst chart is a dazzling display. However, the data has to be organized in a particular way before you can create the chart.

The data needs to include columns for Year, Month, Weather conditions. These columns will provide the hierarchy.

Where have we seen this pattern before? Yes, it's the same layout as a PivotTable. Let's review it.

Data was downloaded from the MDOT website and included in the sample file. This data can be organized using a PivotTable and then eventually displayed as a Sunburst chart.

Task: Review the Data Set

The Advanced Chart sample file is still open.

1. Go to the Crash_Datasheet.

2. Review the Fields in the Header Row:

ROADNAME, MONTH, DATE, YEAR,...WEATHER

Keep going, please...

Screen image of the completed sunburst chart



The arrangement of data has an impact on the types of charts that can be created. Some charts require the data organized in a particular way.

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ORGANIZE THE DATA WITH A PIVOTTABLE

Our sample file also has a PivotTable report of the Crash_Data. The PivotTable groups crash records by year, month and weather.

This pattern can be displayed as a Sunburst. The inner ring is the YEAR. The middle ring is the MONTH. The outer ring is the WEATHER.

Task: Review the PivotTable

The Advanced Chart sample file is still open.

- 1. Go to the Crash_PivotTable sheet.
- 2. Review the PivotTable Fields:
- Review the Rows: YEAR, MONTH, WEATHER
- Confirm the Value: COUNT of UNITS
- 3. Review the Report Layout

Go to the PivotTable Design Ribbon and confirm:

- The Report Layout is Tabular.
- There are no Subtotals or Grand Totals.
- 4. Review the Filters

Go to the MONTH filter in B3. This will be a winter report, so the following months are selected: Jan, Feb, Mar, only.

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SUNBURST CHART: LINK THE DATA

The data is organized correctly as a PivotTable report; however Microsoft Excel does not support creating Hierarchy, Statistical or Advanced Information Charts, such as Waterfall, Funnel or Sunburst, from a PivotTable

There is another way to achieve our goal. We can create a linked table and then design the Sunburst chart.

Task: Create a Linked Spreadsheet

The Crash_PivotTable sheet is still open.

- 1. Select A3:D36 on the Crash_PivotTable sheet..
- 2. Copy the PivotTable labels and data.
- 3. Go to the Winter Crash Sunburst sheet.
- 4. Click on cell A1 and PASTE Special.

What Do You See? When select cell A1 and PASTE the copied PivotTable, there will be a Clipboard icon.

Click on the Clipboard and choose PASTE LINK.

What Does this Do? The data on the Winter Chart sheet will update when the PivotTable is changed.

Home->Clipboard->Paste->Paste Special

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MO-201: Microsoft Excel Manage Advanced Charts and Tables

4.1 Create and Modify Advanced Charts

CREATE THE SUNBURST CHART

A sunburst chart is another chart for showing hierarchical data. The sunburst chart shows the relationship between the largest categories and the data points. Each level of the data hierarchy forms a ring on the sunburst chart.

Task: Create a Sunburst Chart

- 1. Go to the Winter Crash Sunburst sheet.
- 2. Select column A through D.
- 3. Go to Insert-> Chart-> Hierarchy Chart-> Sunburst

What Do You See? A new chart will be placed on the Winter Crash Sunburst sheet.

- The inner most ring displays the YEARS: 2014, 2015, 2016, 2017 and 2018
- The second ring has the MONTHS: Jan, Feb, Mar.
- The third ring shows the WEATHER.

The sections of this ring are based on the number of crashes. The inner rings size reflects the size of sections in this outermost ring.

Keep going ..

Insert-> Chart-> Hierarchy Chart-> Sunburst



MO-201: Microsoft Excel Manage Advanced Charts and Tables

4.1 Create and Modify Advanced Charts

^{4.1.2} Create and Modify Charts including Box & Whisker, Combo, Funnel, Histogram, Map, Sunburst and Waterfall charts

UPDATE THE PIVOT TABLE DATA

A PivotTable is a dynamic report. The Table can be updated by filtering the Fields.

Task: Filter the PivotTable Report

- 1. Go to the Crash_PivotTable sheet.
- 2. Go to the PivotTable Filed List.
- 3. Filter the YEAR: Select 2016, 2017, 2018.

What Do You See? The PivotTable updated. The data has been filtered to show only the YEAR that were selected.

What happened to the Sunburst chart?

Keep going....really.

Filter the PivotTable Fields

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MO-201: Microsoft Excel Manage Advanced Charts and Tables

4.1 Create and Modify Advanced Charts

MODIFY THE SUNBURST CHART

The Sunburst chart was created with a linked reference table.

When the PivotTable changed, the references and the chart updated automatically.

Task: Review the Updated Sunburst Chart

- 1. The PivotTable was filtered for YEAR.
- 2. Go to the Winter Crash Rate sheet.

What Do You See? The inner most ring now shows the YEARS: 2016, 2017 and 2018.

What Else Do You See? The Sunburst chart does not include the rows where there is no data (0).

This really is good work, isn't it?

Screen image of the updated Sunburst Chart



MO-201: Microsoft Excel Manage Advanced Charts and Tables

4.1 Create and Modify Advanced Charts

UNIT SUMMARY

Superb! In this unit we explored different advanced chart types. We looked at the relationship between the arrangement of data and the chart type. We created different charts from the data set and modified them with chart tools.

We learned about the different chart types and how they display the data visually. We looked at treemap, box and whisker, waterfall, histogram, and combo charts.

We also explored a process to use a PivotTable to transform data to a format conducive to creating a Sunburst chart. We learned about linked charts.

Nice job.

You may save your work.





- 1. Which chart type is used to display geographic data?
- A. Map chart
- B. Treemap Chart
- C. Location Chart
- D. Combo Chart
- 2. Which chart types are used to display Hierarchical
- Data (Give all correct answers)
- A. Box and Whisker chart
- B. Histogram Chart
- C. Treemap Chart
- D. Sunburst Chart
- 3. Which chart type shows frequency data?
- A. Waterfall Chart
- B. Histogram Chart
- C. Funnel Chart
- D. Combo Chart

- 4. Which chart type contains two types of charts on the same chart?
- A. Box and Whisker Chart
- B. Treemap Chart
- C. Combo Chart
- D. Dual Chart
- 5. Which Chart type shows distribution of data?
- A. Waterfall Chart
- B. Funnel Chart
- C. Histogram Chart
- D. Box and Whisker Chart





UNIT REVIEW CONTINUED

Identify the chart type:

- 1. Treemap
- 2. Box and Whisker
- 3. Sunburst
- 4. Waterfall

