Goal in video # 24: Learn about how to Visualize Quantitative Data with Excel Charts.

Topics Covered in Video:

1) Charts

1) Charts = Graph = Picture of quantitative (number) data.
2) Charts can be found in Insert Ribbon Tab.
3) Charts Often Come from Summarized Tables, such as this Crosstabulated tables:

WindSport Summer Sales				
Month	In Store Sales	Mail Order Sales	Web Site Sales	Total
May	$6,206	$3,275	$12,016	$21,497
Jun	$17,351	$5,328	$35,371	$58,050
Jul	$11,360	$1,555	$10,822	$23,737
Aug	$28,722	$5,913	$17,243	$51,878
Sep	$7,995	$1,913	$11,764	$21,672
Total	$71,634	$17,984	$87,216	$176,834

2) What do Charts do?

1) Visually portray quantitative data (number data).
2) Give a **quick impression** of the number data.
3) Create a picture that can communicate more quickly than just the numbers alone.
4) Charts allow you to see **patterns or trends** that you may not be able to see if you are looking at just the number data.
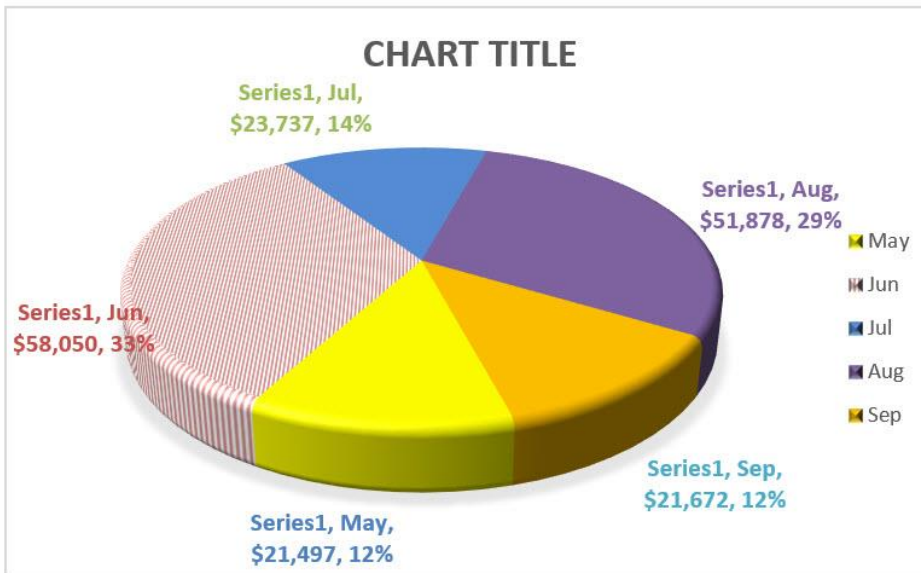5) Allows you to make relative comparisons more quickly than if you are using a table

3) Types of Charts

1) **_Column_**: Use to compare differences across categories. Height of column conveys number.
2) **_Bar_**: Use to compare differences across categories. Length of bar conveys number.
3) **_Stacked Column/Bar_**: Good for displaying crosstabulation, emphasis on horizontal axis categories.
4) **_Clustered Column/Bar_**: Good for displaying crosstabulation, emphasis on legend categories.
5) **_Line_**: Use to show trend for a number variable over a category such as time.
6) **_X-Y Scatter_**: Used to show relationship between two number variables (x and y variables).

4) Effective Charts

1) Include number data AND labels for the number data.
2) No "Chart Junk".
   - Chart Junk means chart elements like:
     1. Unnecessary Repetition.
     2. Chart elements that do not contribute to the message.
     3. Chart elements that make the chart look busy:
        i. Too many different colors
        ii. Patterns that are distracting.
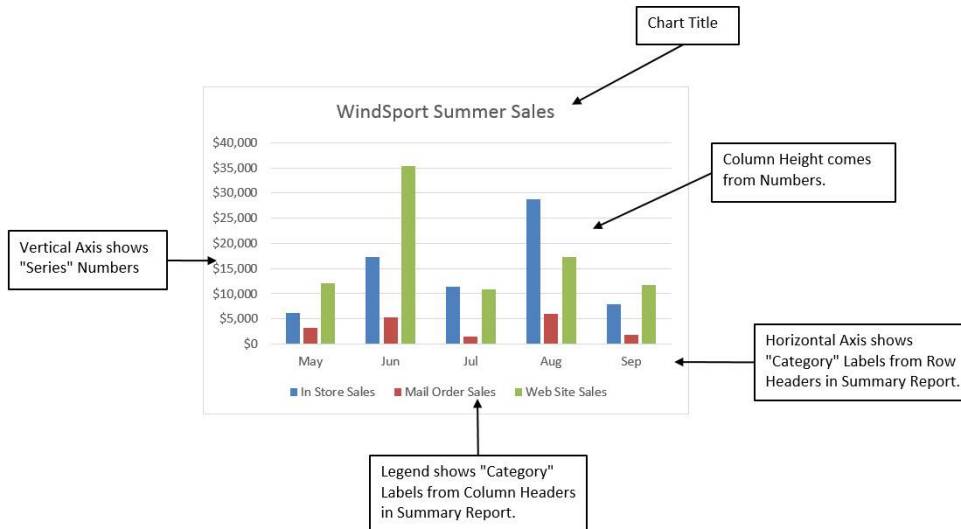   - 3-D effects that are not necessary and can be misleading

5) Example of Chart Junk (Can you find six examples of chart junk?)

CHART TITLE

Series1, Jul, $23,737, 14%

Series1, Aug, $51,878, 29%

Series1, Jun, $58,050, 33%

Series1, Sep, $21,672, 12%

Series1, May, $21,497, 12%

Legend:
- May
- Jun
- Jul
- Aug
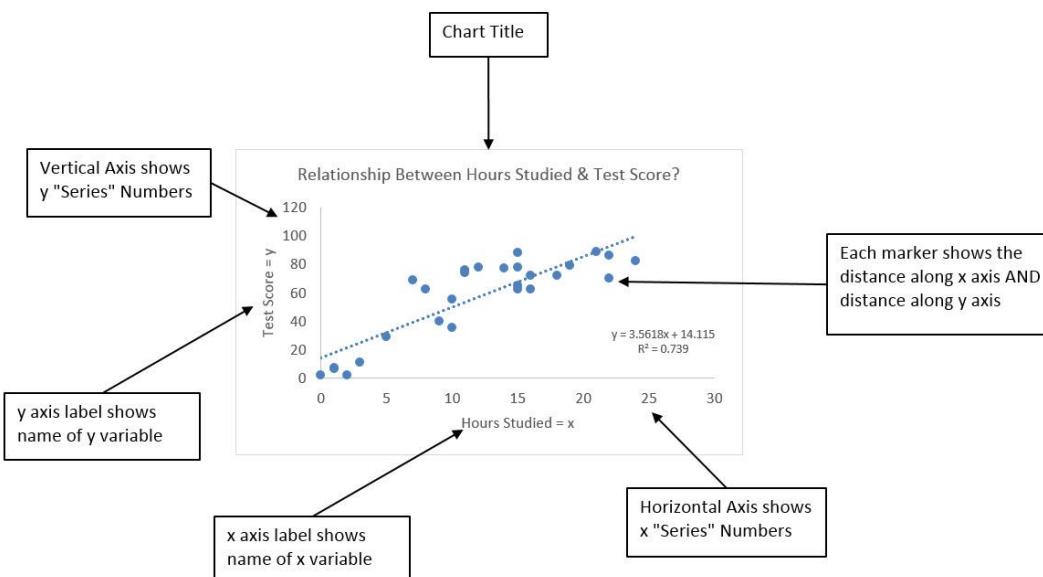- Sep

6) Chart Elements:

1) Chart Elements in Column Chart:

- Chart Title = informative and succinct
- "Series" = ***numbers*** in Chart
- "Category" = categories used such as "July", "Mail Order", or "0 up to 25" for a histogram chart.
- Vertical axis = ***numbers*** in a column chart
- Horizontal axis = categories in a column chart
- Legend = list of categories
- Column height conveys ***number***

Chart Title

WindSport Summer Sales

Column Height comes from Numbers.

Vertical Axis shows "Series" Numbers

Horizontal Axis shows "Category" Labels from Row Headers in Summary Report.

In Store Sales   Mail Order Sales   Web Site Sales

Legend shows "Category" Labels from Column Headers in Summary Report.

2) Chart Elements in X-Y Scatter Chart:

- Chart Title = informative and succinct
- "Series" = ***numbers*** in Chart
- Vertical axis = ***y numbers***
- Horizontal axis = ***x numbers***
- Axis labels = tell you what the number represents
- Markers = tell you the distance along x axis AND distance along y axis.
- Dotted line = estimated regression line.

Chart Title

Vertical Axis shows y "Series" Numbers

Relationship Between Hours Studied & Test Score?

$y = 3.5618x + 14.115$
$R^2 = 0.739$

Each marker shows the distance along x axis AND distance along y axis

y axis label shows name of y variable

x axis label shows name of x variable

Horizontal Axis shows x "Series" Numbers

7) Format Chart Elements with
   1) Chart Elements Icon that shows up to the Right of the Chart.
   2) Chart Styles Icon that shows up to the Right of the Chart.
   3) Chart Filter Icon that shows up to the Right of the Chart (Be sure to click the Apply button).

   4) Format Chart Element with Task Pane (keyboard: Ctrl + 1).
      - Task Pane changes depending on what element in chat you have selected
      - Click the Icons at the top to see different options for chart element
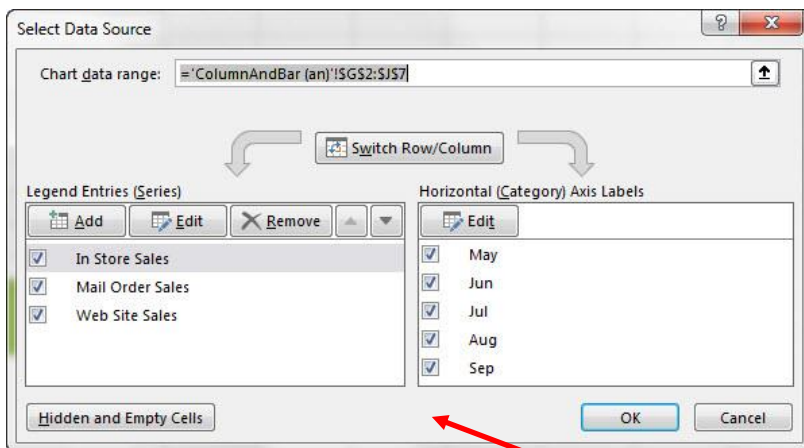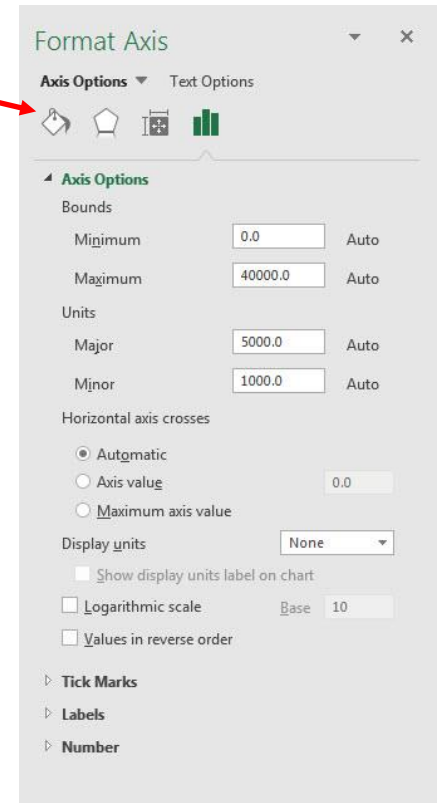
8) BIG KEY: If the chart does not come out right use "Select Data Source" dialog box to edit the ranges that the chart is pointing to
   1) Open "Select Data Source "dialog box:
      - Right-click Chart and click on "Select Data"
      - Chart Tools Design Ribbon Tab, Data Group, Select Data button
   2) Series = Number
   3) Category = Labels.

9) Link Labels to Cells
   1) Click on Chart Title
   2) Type equal sign
   3) Click on cell with label
   4) Hit Enter

10) Chart Keyboards:
   1) F11 = Create Chart on a new sheet
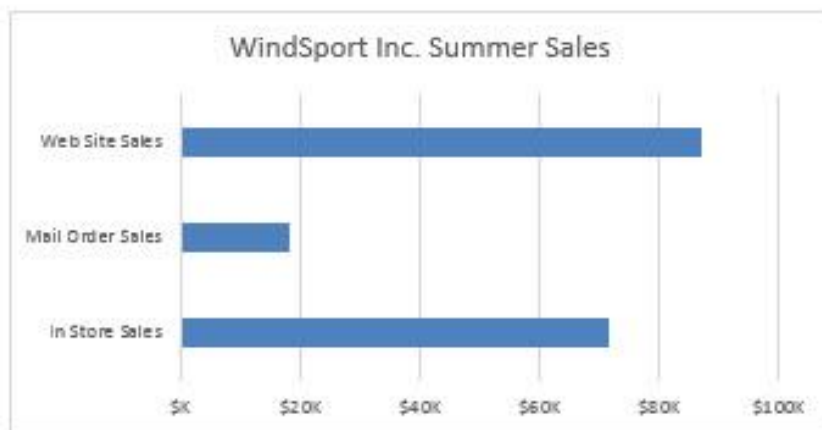   2) Alt + F11 = Create Chart on currently selected sheet.

11) Column Charts:

3) Use to compare differences across categories.
4) Column charts are more effective at conveying differences between categories than pie charts.
5) Height of column conveys number.
6) Categories are listed on Horizontal Axis or in Legend.
7) Gaps in columns:
- Gaps between columns indicate that the data on the horizontal axis are:
    1. "Categorical" or "Qualitative" Variables (like words or names)
    2. Discrete Numbers (like counting 1, 2, 3 when there are gaps between numbers)
- No gap between columns (columns touching) indicate that the data on the horizontal axis are:
    1. Continuous Quantitative data.
    2. There are no gaps between numbers, like with an upper and lower limit used in a Histogram Chart.
8) Column Chart Example:

12) Bar Charts

    1) Same as column charts except:
- Length of bar conveys number
- If page is wider than tall, bars can emphasize differences more forcefully.
- Long category labels are displayed on a single line (not wrapped).

    2) Bar Chart Example:

WindSport Inc. Summer Sales

Month	Sales
Sep	$21,672
Aug	$51,878
Jul	$23,737
Jun	$58,050
May	$21,497

WindSport Inc. Summer Sales

Category	
Web Site Sales	
Mail Order Sales	
In Store Sales	

$K $20K $40K $60K $80K $100K

13) Pie Charts:

    1) Traditionally pie charts are used to compare differences across categories or to compare parts to the whole, usually expressed as percentages.

    2) It is more effective to use Column or Bar Charts than Pie Charts:
- Research shows that column/bar charts convey relative differences more effectively than pie charts.
- People perceive differences across categories more precisely with column/bar charts than with pie charts.
- In recent years data analysts and business intelligence experts prefer to use column or bar charts rather than pie charts.

14) Stacked Column Charts:

1) Good for displaying crosstabulation.
2) **Emphasis is on comparing the categories listed in the horizontal axis**
3) If the number of row headers are equal or greater than to the number of column headers, row headers show up on horizontal axis and column headers in legend. If not, they are reversed. (You can switch this with the Switch button in the Chart Tools Design Ribbon Tab)

15) Clustered Column Charts:

1) Good for displaying crosstabulation.
2) **Emphasis is on comparing the categories listed in the legend**
3) If the number of row headers are equal or greater than to the number of column headers, row headers show up on horizontal axis and column headers in legend. If not, they are reversed. (You can switch this with the Switch button in the Chart Tools Design Ribbon Tab)

| Sum of Revenue	SalesChannel			
Month	In Store Sales	Mail Order Sales	Web Site Sales	Grand Total
May	$6,206	$3,275	$12,016	$21,497
Jun	$17,351	$5,328	$35,371	$58,050
Jul	$11,360	$1,555	$10,822	$23,737
Aug	$28,722	$5,913	$17,243	$51,878
Sep	$7,995	$1,913	$11,764	$21,672
Grand Total	$71,634	$17,984	$87,216	$176,834

Clustered Column: Emphasize items in Legend:

Stacked Column: Emphasize items in Horizontal Axis:

16) Line Charts

1) One number on vertical axis, category on horizontal axis.
2) Great for show trends over time.
   - Chart Time Series: Line Chart with time on horizontal axis and quantitative (number) variable on vertical axis.
3) Examples:
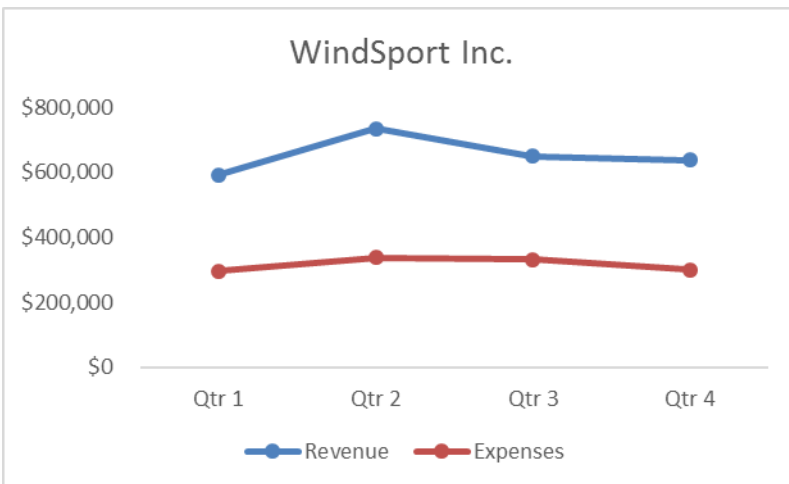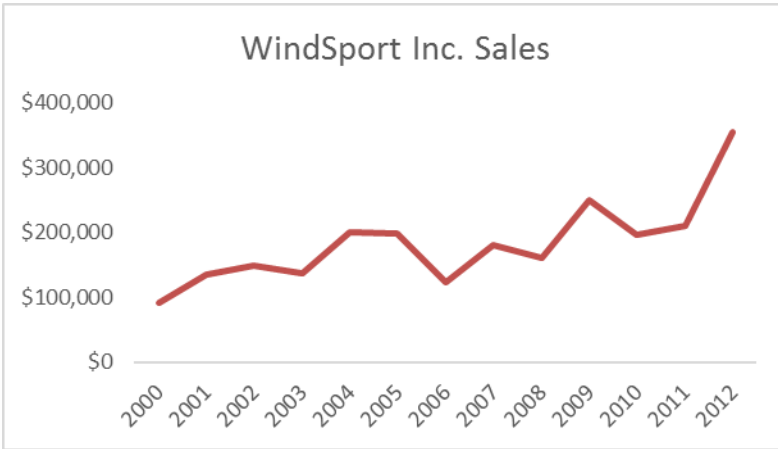
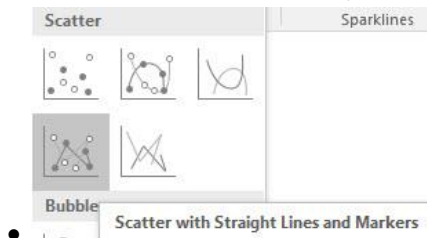## 17) X-Y Scatter

1) Chart that shows the relationship between two quantitative (number) variables
   - Example: Is there a relationship between study time for a test and score on test?
2) One number on vertical axis, one number on horizontal axis:
   - Horizontal Axis = Independent Variable = x.
   - Vertical Axis = Dependent Variable = f(x) = y
3) Always put X values in Left Most Column in the Table of Data
   - This helps the chart understand which variable is x and therefore should be on horizontal axis.
4) Add Regression Line and Equation and R Square:
   - Right-click plotted scatter markers
   - Add Trendline
   - Select Linear
   - Check check box for Show Equation
   - Check check box for R Square
5) Overcome a common mistake by Excel users:
   - Use X-Y Scatter Plot Chart, not Line Chart when plotting X-Y Scatter Data
6) For sample data use the Scatter option:
   -
7) For a model created with formulas, like for a Break-Even Analysis use the
   -
8) Example:
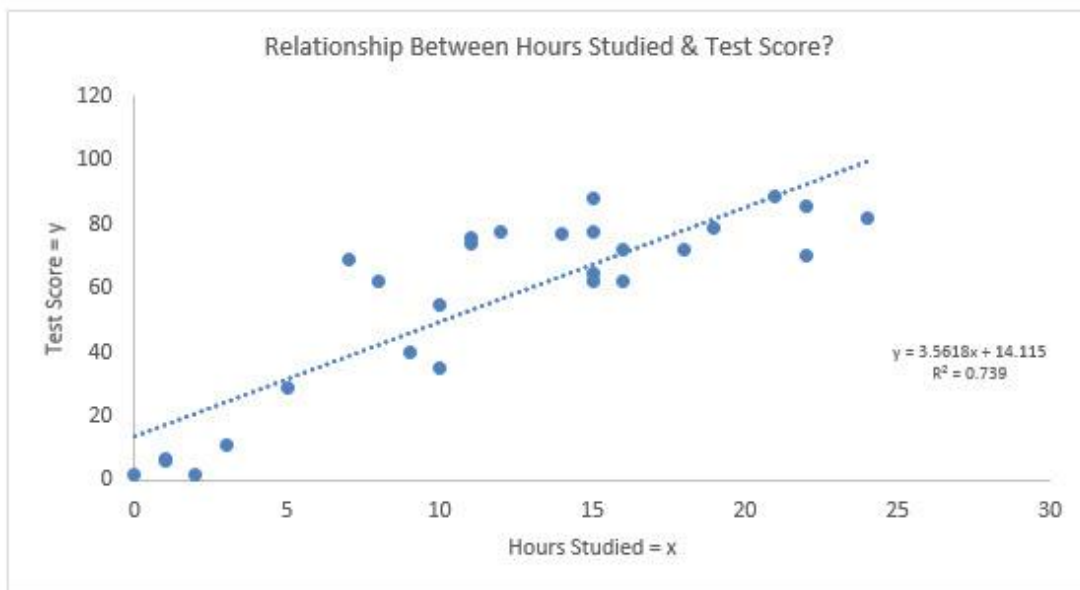
New Keyboard Shortcut:

1) F11 = Create Chart on a new sheet
2) Alt + F11 = Create Chart on currently selected sheet.