## Microsoft Excel 2010 <br> Presenting Data Using Charts For

## University of California



Haas School of Business

# Microsoft Excel 2010 Presenting Data Using Charts For <br> The Haas School of Business, University of California 

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## Excel 2010 Presenting Data With Charts

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Reference Workbook: UC Excel 2010—Charting Tools Workbook.xls

## Microsoft Excel 2010

 Presenting Data Using Charts
## FOR

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## Charting Guidelines

## Reference Worksheet: Sales Analysis

## What is a Chart?

Simply stated, a chart is a graphic representation of selected numeric data in your Excel worksheet. Charts make it easy for users to see comparisons, patterns, and trends in data. Rather than having to scroll through cells of worksheet data, a chart can instantly give the viewer a "picture" of that data.

## XY Scatter Chart



## Components of a Chart

| Data Point / Marker | A single value from the worksheet that is plotted on the <br> chart. They can be displayed in a variety of different <br> formats such as columns, bars, lines, pie slices, etc. |
| :--- | :--- |
| Data Series | All the Data Points (values) in the same row or column in <br> a worksheet plotted on a chart. They will be graphically <br> displayed the same (i.e., All the blue columns). <br> A box on the chart that identifies each series with their <br> name and the color or marker that represents that series. |
| Legend | Usually the vertical axis is on the left hand side of the <br> chart. It is generally known as the Y-Axis (Z axis if the <br> chart is 3-dimensional). Values from the worksheet are <br> plotted against the Value Axis. By default, the Value Axis <br> increments from 0 to some value slightly higher than the <br> highest actual value plotted on the worksheet. |
| Value Axis | Usually the horizontal axis is on the bottom of the <br> chart. It is generally known as the X-Axis. The labels <br> that appear on the Category Axis are generally taken <br> from the top row of cells selected in the worksheet when <br> the chart is created. Data Points/Markers are grouped <br> into the categories on this axis. |
| Gridlines | Horizontal lines that make comparing Data Points/ <br> Markers to the Value Axis easier. They can be turned on <br> and off on the chart. By default, they appear ta major <br> increments on the chart but can also be made to appear <br> at minor increments on the Value Axis. Gridlines can be <br> turned on for the Category Axis as well. |
| Chart Wall | The back of the chart area. Color can be added or <br> removed. |

## Guidelines for Creating Charts

－Worksheet data must be a contiguous range of cells．No blank rows or columns can be included within the selected range of cells to chart．Blank rows or columns can be plotted as empty gaps in your chart．
－Labels for the chart（Category labels and Series Names）must be located in the top row and left column．In addition，they must reside in one cell only（i．e．，can not have a label span two cells）．
－Selection of cells must be a contiguous and symmetrical （rectangular）selection（i．e．，selecting the same number of cells across and down）
－Normally，you only want to select cells with＂like＂data．That is， we usually don＇t include the totals along with the values in our chart．That would skew the comparison of the data．The totals can be plotted in a separate chart such as a pie chart．


## Charting Non-Contiguous Data

Although the worksheet data must be placed in a contiguous layout (no blank rows or columns), data can be charted that is not in a contiguous layout. To chart non-contiguous cell ranges you can hold the <CtrI> key when selecting data to chart. The selection of the non-contiguous cell ranges must be made in a symmetrical fashion. That is, selecting the same amount of cells in each range.

You can use the <F11> key or the Insert Tab: Chart command to complete the chart.


## Locations for Charts

There are two locations in which you can place a chart.

- Chart Sheets-Separate sheets in the workbook.
- Embedded Charts - Charts placed on the same worksheet as data.



## Creating A Basic Chart

There are two ways you can create a chart. One method is the Chart Wizard. Another method is by using the F11 (function) key. When you use the F11 key, Excel creates a chart automatically from the selected cell range using the default chart type. In Excel, the default chart type is the 2D Column chart.

## Steps:

$\Rightarrow$ Select the cell range from the worksheet
$\Rightarrow$ Press the F11 key
$\Rightarrow$ Click on the new Chart sheet and view your chart

## Creating an Embedded Chart

To create an Embedded Chart (on the worksheet) you can use the Insert Tab: Chart command.

## Steps:

$\Rightarrow$ Select the cell range from the worksheet
$\Rightarrow$ Click the Insert Tab
$\Rightarrow$ Select the Chart Type
$\Rightarrow$ Format the chart as preferred

## Moving and Sizing Embedded Charts

An embedded chart is considered a picture on the worksheet. That is, the chart is not "attached" to a cell and can be moved or sized just as any free-floating inserted picture. To move an embedded chart, you point over it and drag it to another location on the worksheet.
To size an embedded chart, click on the chart and drag one of the sizing handles.


- Hold the Alt key down when you size the chart, if you want to size the chart so that it "snaps" into and aligns with the worksheet gridlines.
- Hold the Shift key down when you size the chart, if you want to size the chart so that it is proportional.
- Hold the Control key down when you size the chart, if you want to size the chart so that it sizes in the opposite direction. This helps keep the chart more proportional.


## Charting Tools - Contextual Tabs

Excel 2010 displays "contextual" tabs of commands when working with particular graphic objects. When a chart is created 3 additional tabs display at the end of the Ribbon bar. They are the Chart, Layout, and Format Tabs. Each contains commands that effect how the chart displays its data.

Chart Tools - Design Tab


Chart Tools - Layout Tab


Chart Tools - Format Tab


## Setting Chart Types / Chart Options

## Changing Chart Types

Excel provides $\mathbf{1 1}$ different chart types and $\mathbf{7 3}$ sub-types including 2-dimensional and 3-dimensional charts. Which chart you choose will depend on the type of data and the amount of data you want to chart. The default chart in Excel is the 2-dimensional column chart.

The Chart Type dialog box displays each chart type as well as several sub-types within that category.

## Steps:

$\Rightarrow$ Click on the chart
Change
$\Rightarrow$ In Chart Tools, click the Design Tab: Change Chart Type
$\Rightarrow$ Select the chart type you prefer (left side)
$\Rightarrow$ Select the Sub-Type of the chart you prefer (right side)
$\Rightarrow$ Click OK


## Microsoft Excel Chart Types

| Column <br> 3-D Column, <br> (includes 3-D Cone, 3-D Cylinder, and <br> 3-D Pyramid) | Vertical bars that display individual values that can be compared to each other. Can show multiple series of data. |
| :---: | :---: |
| $\begin{aligned} & \text { Bar } \\ & \text { 3-D Bar } \end{aligned}$ | Horizontal bars that display individual values that can be compared to each other. Can show multiple series of data. |
| Line 3-D Line | Multiple series of data displayed in a line format with data markers representing each value in that series. Data markers can be displayed in a variety of formats including triangles, squares, diamonds, etc. |
| Area 3-D Area | Displays data as an overall trend as opposed to emphasizing individual values. Series are displayed as "filled-in" areas. Can be used to display a large amount of data. |
| Pie 3-D Pie | Displays only 1 data series as a group. Each value in that series is displayed as a slice of that pie. The size of the slice is displayed as a percentage that the value contributes to the whole series. |
| Doughnut | Similar to a pie but displays more than one series. Displays series as rings and each ring is divided into slices like a pie chart. |
| XY Scatter | Displays data for both the Value and Category Axes as numbers and plots the data against both axes. Generally used for scientific or statistical data. |
| Bubble | Compares sets of 3 values. Similar to an XY Scatter. The third value is used as the basis for the size of the bubble marker. |
| Radar | Plots data relative to a central data point. |
| Stock | Requires 3 values. Plots High, Low, Open, and Close points. |



Column, Bar, Line, and Area, charts plot data identically.

They can be used interchangeably!

## Applying Chart Options

Within the Chart Tools Group, the Design Tab and the Layout Tab contain commands to add, change, remove options from the chart.

These include Chart Layouts, Chart Styles on the Design Tab, as well as, specific options on the Layout Tab for Chart Title, Axis Title, Legend, Data Label, Data Table, Axis, and Gridlines.

## Steps:

$\Rightarrow$ Click on the Chart
$\Rightarrow$ Within Chart group, click Design Tab or the Layout tab
$\Rightarrow$ Click the appropriate command and make preferred changes

## Chart Options - Layouts

On the Design tab is a command group for Chart Layouts. These are preset format options for the chart. For example, the legend placed below the chart, adding chart titles, and data labels. All performed with one click.


## Chart Options - Axes

On the Layout Tab, Axis command, the chart's axis can be formatted



## Chart Options - Gridlines

In the Layout Tab, you can hide or display the chart's gridlines with the Gridlines button. For each axis there are major and minor gridlines. Major gridlines on the Value Axis display on the chart at the major increments of the values. That is, where you see values on the axis. Minor gridlines display in between the major increments.



## Chart Options - Legend

On the Layout Tab, with the Legend button, you can hide or display the chart's legend. In addition, you can set the placement of the legend on the chart. Although you can manually move and size the legend, this option allows the chart to re-shape itself around the legend as well as re-shaping the legend depending on where you place it.


## Chart Options - Data Labels

On the Layout Tab, with the Data Labels button, the chart can display information about the data on the chart automatically. This can include the Series Name, Category Name, and (what we usually apply) the Value that is represented by the Data Point or Series.


## Formatting Charts Automatically

Excel 2010 provides professional quality formatting that can be quickly applied to the chart type being displayed. The Design Tab contains the Chart Styles Gallery. With these options, color and 3-dimensional formatting can be applied to a chart automatically.

| ig Tools Workbookixisx - Mi... |  |  | Chart Tools |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Data | Review | View | Design | Layout | Format |  |
|  |  |  |  |  |  |  |
| Chart Styles |  |  |  |  |  |  |



## Formatting Charts Automatically

Chart Styles Gallery-Scatter/Line Chart Styles



## Adding Text To A Chart

There are a couple of additional methods to add text to a chart besides the Chart Options (Titles tab) box. Text can be added by writing a formula that references a specific cell in the worksheet. Text can also be added as an independent graphic object.

## Using Text From the Worksheet

Text in the chart can be linked to the worksheet by referencing that cell in a formula. Subsequently, if the worksheet text changes, the chart will update as well. The text can be attached as a Title or as stand-alone text.

## Steps:

$\Rightarrow$ Click on the Title placeholder
$\Rightarrow$ Type an equal (=) sign
$\Rightarrow$ Activate the worksheet (if necessary) by clicking on it
$\Rightarrow$ Select the cell that contains the text you want
$\Rightarrow$ Press Enter (or click the check ( $\checkmark$ ) mark in the formula bar )
$\Rightarrow$ Click and drag the text by its border to the location on the chart that you prefer


## Adding an Independent Text Graphic

Text can be added to the chart as a "stand-alone" graphic object using the Text Box tool. This method can be used for titles as well as informational text on the chart.

## Steps:

$\Rightarrow$ Click on the Insert Tab, Text Box command button
$\Rightarrow$ Draw out a rectangular boundary on the chart
$\Rightarrow$ Type the text you require
$\Rightarrow$ Click away from the Text Box when finished
$\Rightarrow$ Click and drag the text box by its border to the location on the chart that you prefer


Global Cycling Inc.


## Formatting The Chart Axis

In an XY type of chart (i.e., Column, Bar, Line, Area) there are two axes. The category ( $\mathbf{X}$ ) axis and the value ( $\mathbf{Y}$ ) - ( $\mathbf{Z}$ if it is a 2-dimensional chart) axis. Each axis can be customized according to their respective types. The available formatting options include text formatting, number formatting, alignment, range of values, and the placement of tick marks.
Text formatting includes the font, style, color, and size. Number formatting can be set to match the type of values they represent (i.e., Currency, Standard, Percent, Date, etc.). By default, the number formatting is set to match the way they are displayed in the worksheet.
Alignment formatting affects the orientation of the values on the axis. You can set the alignment to vertical, horizontal, and diagonal.
The Scale tab in the Format: Axis dialog box allows you to set the major and minor increment measurements. By default, the Value Axis is set so that the minimum value is zero (0) and the maximum value is set at some value slightly higher than the largest value plotted on that chart. You can customize the scale of the axis with regard to the minimum, maximum, major increment, and minor increment.
Tick marks are small lines of measurement that divide the axis into more readable divisions. There are major and minor tick marks. They can be displayed on the outside, inside, or both sides of the axis line. Major tick marks display on the axis at what is called the major increments, that is, where the values or categories display. Minor tick marks generally display in between the values that display on the axis.


## Formatting The Chart Axis

## Steps:

$\Rightarrow$ Click on the appropriate axis
$\Rightarrow$ Click the Layout Tab: Axis command

## $\Rightarrow$ Click More Primary Axis... Options command

$\Rightarrow$ Click the appropriate category on the left and make preferred changes
$\Rightarrow$ Click Close button


## Forecasting With Regression Analysis

Reference Worksheet: Sales Analysis

## Forecasting With Regression Analysis

Trendlines can help you make better business decisions, better understand your marketplace, and improve your budgeting and planning with better forecasting.

Trendlines are graphical lines that show trends in data that you can use to better predict business in the future. This process is also called regression analysis. With regression analysis, you can extend a trendline beyond the actual data to predict future values. For example, Global Cycling wants to predict whether or not to put more of its resources into the international market or divide them evenly between the domestic and international market. They have actual data for the past 5 years. From that 5 year history and by using Trendlines, they can more correctly see where international sales will be in 5 years.

There are 6 different trendline types:

- Linear
- Logarithmic
- Power
- Polynomial
- Exponential
- Moving Average

How do you know which type of trendline fits your data set? Trendlines use a calculation known as the R-Squared Value. This calculation is the relationship between the trendline and the data to which it is attached. This calculation can be displayed on the chart with the trendline. The R -squared value is a number between 0 and 1 . What is important to know is that the closer the $\boldsymbol{R}$-Squared Value is to 1 , the more accurate the portrayal of that trend.

The legend displays the type of trendline and to which data series it is attached.
Note: Trendlines can only be placed on 2-dimensional charts.

## Forecasting With Regression Analysis

## Steps:

$\Rightarrow$ Select the preferred Data Series
$\Rightarrow$ Click the Layout Tab: Trendlines button
$\Rightarrow$ Select the type of Trendline you prefer

## To Format A Trendline

$\Rightarrow$ Select the Trendline
$\Rightarrow$ Click Format Tab: Format Selection command (you can change trendline type, color, and display equation)

## To Delete A Trendline

$\Rightarrow$ Select the Trendline
$\Rightarrow$ Press the <Del> (delete) key


## Forecasting With Regression Analysis

Scatter Chart With Trendline and $\mathrm{R}^{2}$ Value


## Forecasting With Regression Analysis

Trendline Options Box


Forecasting The Market With Rearession Analvsis
Regression Analysis with Trendline for 10 years actual data


Regression Analysis with Trendline for 5 years actual data with Forecasting


## Types of Chart Trendlines (Regression)

Linear best-fit straight line that is used with simple linear data sets. Show data trends where the data increases or decreases at a steady rate.

Logarithmic best-fit curved line that is most useful when the rate of change in the data increases or decreases quickly and then levels out. A logarithmic trendline can use both negative and positive values.

Polynomial curved line that is used when data fluctuates. It is useful, for example, for analyzing gains and losses over a large data set.

Power curved line that is used with data sets that compare measurements that increase at a specific rate - for example, the acceleration of a race car at 1 -second intervals. You cannot create a power trendline if your data contains zero or negative values.

Exponential curved line that is used when data values rise or fall at increasingly higher rates. You cannot create an exponential trendline if your data contains zero or negative values.

Moving Average works well for data that fluctuates higher and lower.

Remember: the closer the $\boldsymbol{R}$-Squared Value is to 1, the more accurate the portrayal of that trend.

## Combining Contrasting Data In Charts

Reference Worksheet: Combination Chart

## Displaying Data In A Combination Chart

Combination charts display chart data in two visual ways such as a column and a line chart. This can be a great way to display data together on a chart that isn't on the same level or when the values of one data series is much larger than the other series in the chart. For example, if you wanted to chart sales data from different regions but you also wanted to display the average sales for the quarter on the same chart you can plot the regional sales data as a column and the average quarterly sales as a line plotted against a second Y -Axis.

## Steps:

$\Rightarrow$ Select data from worksheet and create a simple column chart
$\Rightarrow$ Select the preferred series
$\Rightarrow$ Click Layout Tab: Format Selection

Chart Area
2 Format Selection ब1 Reset to Match Style

Current Selection
$\Rightarrow$ With the series still selected, click Design Tab:

## Change Chart Type

$\Rightarrow$ Select Line chart type and click OK
U.S. Series will be plotted against a second $Y$ Axis and displayed as a line chart!


## Displaying Data In A Combination Chart



## Customizing 3-Dimensional Charts

Reference Worksheet: 3-D View

## Customizing A Chart With 3-D View

Everyone makes charts today. What can make your chart stand out from your competition is the addition of some "special effects". One of those processes is 3-D View.

Using the 3-D View command, you can customize the elevation, rotation, height, and perspective of the chart.

When working with 3-dimensional charts, you give the chart a professional and exciting look and depth.

## Steps:

$\Rightarrow$ Click anywhere on your chart
$\Rightarrow$ Click Layout Tab: 3-D Rotation
$\Rightarrow$ Click on the $\mathbf{X}$ or $\mathbf{Y}$ options to change Elevation and Rotation
$\Rightarrow$ In a Pie Chart, change the Height box to alter the depth of the Pie
$\Rightarrow$ Click Close when finished


## Customizing A Chart With 3-D View




## Printing Charts

## Reference Worksheet: Sales Analysis

## Printing Embedded Charts

As previously mentioned, if the chart is embedded in the worksheet, you have the option to print the chart with the worksheet data or separately.
If you selected a worksheet cell prior to printing, the chart will print with the worksheet data. To print the chart separately, just click on the embedded chart before you print.

## Steps:

## To Print Embedded Chart With Worksheet Data

$\Rightarrow$ Click anywhere on the worksheet
$\Rightarrow$ Click the File tab: Print command (data and chart will appear)
$\Rightarrow$ Click the Setup button (add any options you prefer)
$\Rightarrow$ Click OK button
$\Rightarrow$ Click Print button when you are ready to print

## To Print Embedded Chart Separately

$\Rightarrow$ Click anywhere on the chart
$\Rightarrow$ Click the File tab: Print command (chart will appear alone)
$\Rightarrow$ Click the Setup button (add any options you prefer)
$\Rightarrow$ Click OK button
$\Rightarrow$ Click Print button when you are ready to print
To Print Worksheet Data Without Chart
$\Rightarrow$ Select the worksheet cells you want to print
$\Rightarrow$ Click the File tab: Print command
$\Rightarrow$ Under the Settings button, choose Print Selection option
$\Rightarrow$ Click Print button when you are ready to print

## Printing Embedded Charts

Print Window With Data and Embedded Chart


Printer
Brother MFC-5890CN Printer
Ready
Printer Properties
Settings

Global Cycling
Ten Year Sales Analysis
Domestic Sales vs. International Sales
Year $1=2000$

| Year | Domestic | International |
| :---: | :---: | :---: |
| 1 | 106.7 | 80.5 |
| 2 | 107.3 | 86.3 |
| 3 | 108.0 | 92.4 |
| 4 | 108.6 | 99.0 |
| 5 | 109.3 | 106.0 |
| 6 | 109.9 | 113.6 |
| 7 | 110.6 | 121.6 |
| 8 | 111.3 | 130.3 |
| 9 | 111.9 | 139.6 |
| 10 | 112.6 | 149.5 |
| Total | 1,096.3 | 1,118.7 |
| Years 1-5 Adual Revenue Years i-10: Estimated Growth Trend |  |  |

## Printing Embedded Charts

## Print Window With Embedded Chart Only



## Printing Data Without Chart

## Print Window With Selected Data Only



