Purpose: To review the types of graphs, and use MS Excel 2010 to create them from a dataset.
Outline: You will be provided with several datasets and will use MS Excel 2010 to create graphs.
Materials Needed: Data file, MS Excel 2010.
Topical Objectives: Bar, line, circle graphs, scatter plot and measures of central tendency.
Instructions: Go through the questions to create graphs of each type.

You will need to use MS Excel 2007-2010 to complete this lab. Locate and open the file on the course website. Then follow the instructions below for each graph type. For the first graph you will be provided with a great deal of detail. However, since the procedure is quite repetitive, you will be given less detail as we proceed.

Line Graph:
NOTE: A line graph is typically made up of data points and connected lines.
1. Be sure to click on the tab that says **Line Graph**
2. Click on an empty cell
3. Click on the **Insert** tab, then click on the **Line** button.
4. After the menu pops up, click on the type which is called **Line with Markers**
5. Sometimes Excel tries to guess what you want, so you may see a graph. But many times you will see a blank ‘canvas.’ So we will likely need to indicate some details of the data set. Right click on the blank chart, and then click on **Select Data**.

6. Click on the **Add** button
7. In the **Series** box, type in the name of the independent variable (in this case, Mean CO2). Then in the **Series Values** box, erase the “={1}” and highlight the column of data under “mean.” Then click **OK**.

8. Now click the **Edit** button under **Horizontal (category) Axis Labels**

9. With the cursor in the **Axis Label Range** box, highlight the data under “year”

10. Play around with the **Chart Tools**, particularly be sure to title your graph by using the **Chart Title** button, and label the horizontal axis and vertical axis by using the **Axis Titles** button.
Bar Graph:
1. Be sure to be on the tab that says Bar Graph
2. Click on an empty cell.
3. Click on the Insert tab, then click on the Column button.

4. After the menu pops up, click on the first type, which is called Clustered Column. NOTE: Here you only have one dataset, even though the picture looks like it is two.

5. Again, sometimes Excel tries to guess what you want, so you may see a graph. But many times you will see a blank ‘canvas.’ So we will need to indicate some details of the data set. Right click on the blank chart, and then click on Select Data.
6. Click on the **Add** button. Label the series name whichever variable you chose (e.g. “SAT”). Then click inside the box that says **Series Values** and delete the “={1}”. Then click on the top most value of the number in your variable row, and drag to the bottom most data value. Then click **Ok**. Then click on the **Edit** button (underneath the “Horizontal Category) Axis Labels”) and with the cursor in the box click on the top most value for school and drag to the bottom most value. Then click **Ok**. At this point, your screen should look like the one below.

![Select Data Source](https://example.com/select_data_source.png)

Then click **Ok** again.

7. Play around with the **Chart Tools**, particularly be sure to title your by using the **Chart Title** button, and label the horizontal and vertical axis by using the **Axis Titles** button.

![Chart Tools](https://example.com/chart_tools.png)

8. You can also modify just about any feature, including lines, background, colors, size of bars… Play around with it, and make your graph look different than your neighbors.
Circle Graph:
1. Be sure to click on the tab that says **Circle Graph**
2. Click on an empty cell.
3. Click on the **Insert** tab, then click on the **Pie** button.
4. After the menu pops up, click on the first type, which is called **Pie**.
5. Again, right click on the blank chart, and then click on **Select Data**.
6. Click on the top most value of your data, and drag the mouse down to highlight to the bottom most data value. Include the column heading. Then click **OK**.
7. Again, play around with the **Chart Tools**, particularly be sure to title your graph.
8. By right clicking on the pie, you can **Add Data Labels**. Once they are on the pie, you can right click on them to format exactly what you see by clicking on **Format Data Labels**.
Scatterplot:
NOTE: Typically with a scatter plot you do NOT want to connect the data points with a line.
   1. Be sure to click on the tab that says Scatterplot
   2. Click on an empty cell.
   3. Click on the Insert tab, then click on the Scatter button.
   4. After the menu pops up, click on the first type, which is called Scatter with only Markers.

      ![Scatterplot Image]

   5. Again, right click on the blank chart, and then click on Select Data.
   6. You are only using the Height and Weight columns. Click on the top most value of your data, and drag the mouse down to highlight to the bottom most data value. Include the column heading. Then click OK.
   7. Again, play around with the Chart Tools, particularly be sure to title your graph.

Adding a trendline:
   1. You can fit a linear equation to any scatterplot.
   2. Once you have the data in a plot, right click on any data point, and click on Add Trendline.
   3. Under Trendline Options, make sure Linear is checked.

      ![Trendline Image]
4. Also be sure to check the boxes indicating Display Equation on Chart and Display R squared Value on Chart.
5. Click Close.
6. The linear regression line will be added to your chart, along with the equation for that line and correlation coefficient.

Measures of Central Tendency and Box and Whisker Plot
1. Click on the tab for “Box Whisker”
2. You can use excel to find various measures of central tendency
3. Below, the text called “DataRange” indicates the range of values where your data is. In our example, DataRange is A4:A18
4. To find the minimum value, click on the yellow cell next to it and type in 
   =Min(A4:A18)
5. For the rest of the questions, you will type in (or click and drag with the mouse) your particular data range instead of typing “DataRange”
6. To find the maximum value, click on the yellow cell next to it and type in 
   =Max(DataRange)
7. To find the median value, click on the yellow cell next to it and type in 
   =Median(DataRange)
8. To find the average value, click on the yellow cell next to it and type in 
   =Average(DataRange)
9. To find the 25th percentile, click on the yellow cell next to it and type in 
   =Percentile(DataRange, 0.25)
10. To find the 75th percentile, click on the yellow cell next to it and type in 
    =Percentile(DataRange, 0.75)"
11. Excel doesn’t actually have a Box and Whisker Plot type, so we will have to fudge it a little bit. That is why there is already a plot there. Once your data in the yellow cells is filled in, the points will automatically show up on the plot.
12. A box and whisker plot connects the Min and Max values with a straight horizontal line.
13. You then put a “box” with the left and right ends at the two percentiles
14. You then draw a vertical line through the median
15. When finished, it should look something like what is below (note the horizontal scale)
Double Bar Graph

1. Click on the tab for “Double Bar Graph”
2. First we need to find the average calories and sodium for each type of hot dog
   - Click on cell F5 and type in “=Average(B5:B24)” to get average calories for beef
   - Click on cell G5 and type in “=Average(C5:C24)” to get average sodium for beef
   - Repeat a similar procedure for all other cells (F6, F7, F8 and G8)
3. Click on an empty cell.
4. Click on the **Insert** tab, then click on the **Column** button.

![Insert Column](image)

5. After the menu pops up, click on the first type, which is called **Clustered Column**.
6. Again, sometimes Excel tries to guess what you want, so you may see a graph. But many times you will see a blank ‘canvas.’ So we will need to indicate some details of the data set. Right click on the blank chart, and then click on **Select Data**.
7. With the cursor in the **Chart Data Range Box** select the entire table of data including the headings. Then click **Ok**.