

## ANALYTICAL LAB ACTIVITY

NAMES \_\_\_\_\_

We will be performing two experiments that will require data collection. We will then use Microsoft Excel to graph the data and to generate trend lines that will be used to derive the equation of the linear relationships.

The first experiment involves timing a bowling ball as it travels 80 feet down a hallway. Students will be positioned at 10 feet intervals to time the bowling ball as it passes by. Three rolls will be made.

Distance (ft)	Time 1 (sec)	Time 2 (sec)	Time 3 (sec)
10			
20			
30			
40			
50			
60			
70			
80			

The second experiment involves recording the stretch of a spring as more mass is hung from the end of it. A meter stick will need to be held vertically so that the spring can hang freely from the top. Measure the original length of the spring and then record 5 additional lengths using various amounts of mass.

Mass (Grams)	Length (cm)
0	

Now we are ready to graph the data:

- 1) Open up a new spreadsheet in Microsoft Excel.
- 2) Type in the all the data from the bowling ball experiment. Title the columns the same as they are in the table.
- 3) Hilite just the data cells in the first two columns. (Do not hilite the titles) This is the first set of data to be graphed.

NOTE: Excel will read the data as a set of ordered pairs. The values in the column to the left will be calculated as the x coordinates. Since the distance of the bowling ball was the value we controlled or the input (the independent variable) it is to be to the left of the time, the dependent variable, or y.

- 4) Click on the Chart Wizard icon on the tool bar. (It is shown circled on page 3)
- 5) Select the XY scatter plot. The graph option we want to use, which is just to plot the points, will already be selected. Click the 'next' button at the bottom of the display.
- 6) The data we are graphing is in column form so click 'next' again.
- 7) In the next display format your chart to have titles (with units), major gridlines and value labels for the points.
- 8) When you finish, place the chart as a new sheet.
- 9) Looking at the chart, select the "Chart" menu and select "Add Trendline". Excel will draw the line of best fit for your data.
- 10) Now, looking at the chart, select "Chart" and "Add Data". Excel already knows the x values will not change and it will only prompt you for the new *range* or the new set of y-values, in our case Time 2.
- 11) To select the new y-values, change your panel back to the spreadsheet by selecting 'Sheet1' at the bottom of the chart and highlight the column of Time 2.
- 12) Excel will automatically update the chart, and will label the new data in the chart as "Series 2". Draw in a trend line for "Series 2".
- 13) Graph and draw in a trend line for Time 3.
- 14) Question: Using two data points that the trend line most closely passes through, what are the equations of the three lines?  
  
What does the slope represent in all three cases?
- 15) Following the same steps, graph and generate a trend line for the data from the "Springs" experiment.
- 16) What is the equation of this line?