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## Directions for Using Excel

- 1) Collect data from experiment. Open Excel Program and a spreadsheet screen will appear.
- 2) Determine which variable is INDEPENDENT; that is, the variable of the function you are exploring that you vary during the experiment. In many instances, this will be distance or time.
- 3) Place the INDEPENDENT variable in the left-most column in the spreadsheet. Fill down the column. Head the column with the appropriate title and units. Make sure to include all points necessary for each Trial or Series of dependent data taken. NOTE: the independent variable makes up the x-axis of the graph. The dependent variable makes up the y-axis.
- 4) In the second column of the spreadsheet, add data for the First Trial or Series of data. Be sure to match these dependent variables to their corresponding x-value or independent variables. Don't forget column titles and units.
- 5) Fill in the appropriate columns for each trial of data taken. Follow the procedure above.
- 6) Check all data to be sure it was entered correctly and that all points match up as they were recorded.
- 7) Now we are ready to begin making the graph. Click on a cell in the spreadsheet. Click on the "Chart Wizard" icon in the toolbar (upper right corner) or go to Insert and then Chart from the drop down windows menu.
- 8) For our purposes, we will be using the XY Scatter function (found at the left part of chart setup screen). Then choose the top subtype (the one with no lines, just dots) on the right part of the chart screen. Click NEXT.
- 9) Now you should see a Chart Source Data screen. Click on the Series tab at the top. Click on the Remove Series button until nothing appears in the lower left box. Click on Add once.

- 10) Now you are ready to tell the program what data you want to go on which axis and their ranges. Click in the Name textbox and name the trial. Example: Trial 1. Then simply click in the X Values text box. Now move your cursor to the spreadsheet and find the independent variables. Click on the top value and hold down the mouse button while dragging down to the last value in that column. Return to the Chart Wizard and the X-Values will be what you have selected. Click in the Y values text box and delete the {1} symbol. Leave the cursor blinking there and refer to your first Trial of data taken (dependent). Perform the same click and drag on this column of data and it will form your first Series.
- 11) Since you have several series of data, click on Add again. Perform the same operation as in 10. Use the SAME X Values (since these are independent) and then just drag over the data from Trial 2 for the Y Values. Repeat for all trials or series necessary. Click Next.
- 12) Now that the experimental data has been entered, the chart must be labeled and designated properly. Fill in the appropriate chart title and labels for axes (include units!). Click Next.
- 13) For the final step of chart making, decide if you want the chart to appear in the spreadsheet or as a full page. Select desired option and the graph will appear. It is possible to print from both formats.
- 14) If you wish to insert a regression line to find the slopes of the lines formed by data, click on a point from a given series. Then right click (press the right button on the mouse) on the same point and select Add Trendline. Choose upper-left (linear) option (for our purposes). Then click on the Options Tab and place a check beside "Display Equation on Chart." Then Click OK. Repeat for each Series of data. You can click on the equations and drag them to a desired location.
- 15) To differentiate between trend lines of different Series, click on the Line and then right click on it. Select Format Trendline. From this menu you can change the appearance of each line.
- 16) Choose a set of data from the Motion Analysis booklet given to you, but do not choose the Free Fall experiment. Type the data into Excel and produce a graph.