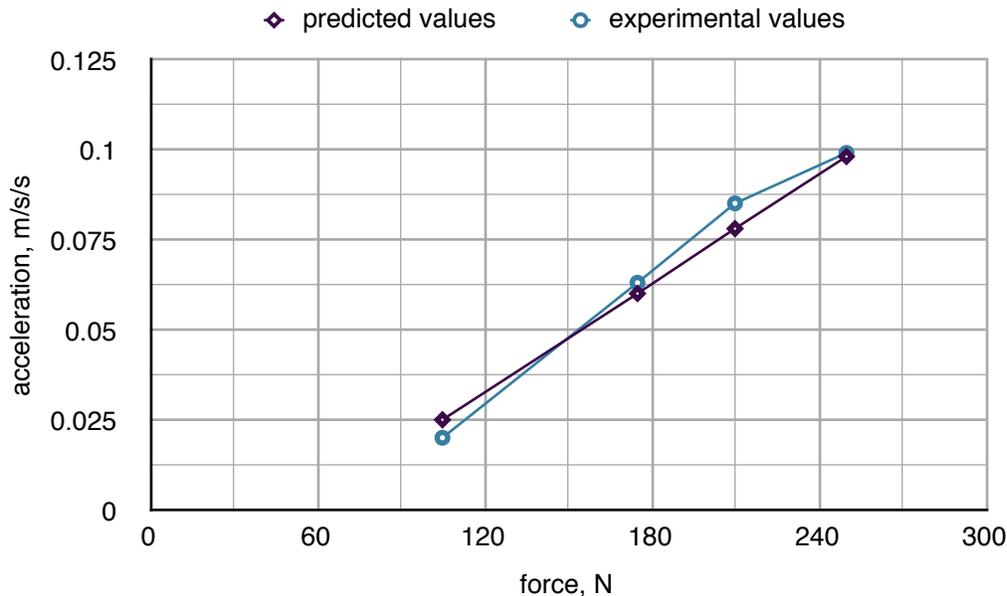


Preparing Scientific Graphs on a Mac in Pages

For students who have Macs without Microsoft Excel, you can prepare your graphs in Pages with the built-in Charts tool. Pages can make a great looking graph, and the specific features of the graph are easier to set than they are in Excel.

This tutorial, which was written in Pages, will run through the basics of how to do this. The example shown in Graph 1 below was prepared right in this document using these guidelines.

Graph 1. Example graph made in Pages.



To Start

1. Click on the Charts icon at the top of the page and click the third choice up from the bottom (the one that looks like data points on a graph). Two tool panels will open up: The Inspector, with the charts icon selected, and the Chart Data Editor. You enter your data in the Chart Data Editor, and set up everything else in the Inspector panel.

Entering Data in the Chart Data Editor

2. If the Chart Data Editor has any default or sample data in it when you open it, delete the data values. At the tops of the columns there are headers with colored squares next to them. Under each of the headers is a pair of columns for the data values for one curve. Under each header you enter the values for the independent variable (horizontal axis) in the left column and the dependent variable (vertical axis) in the right column. For each curve on your graph you need one header with a pair of columns below. If there are other unneeded headers the Chart Data Editor just click on the unwanted header and delete it.
3. If you have two or more curves to plot on the same graph, the headers in the Chart Data Editor are a place where you can label the data columns with the labels you want to appear in

the legend for the different curves on the graph. (You can also edit these labels right in the legend that appears above the graph.) If you only have one curve on your graph you will not need a legend. If no legend is needed, click on the *Chart* tab in the Inspector and uncheck the *Legend* field.

Settings in the Inspector Panel

4. Under the *Axis* tab,
 - a. Use the *Choose Axis Options* menu to turn on the features you need on the graph. For most graphs in high school physics, you will need to activate the following selections:
 - i. Show axis
 - ii. Show title
 - iii. Show value labels
 - iv. Show minimum value
 - v. Linear scale
 - vi. No tick marks
 - vii. Show major gridlines
 - viii. Show minor gridlines
 - b. Set the following for each axis:
 - i. Appropriate minimum and maximum values to cover the range of your data.
 - ii. Use the *Steps* and *Minor* fields to set the number of gridlines you want for the axis.
5. Do this separately for each curve on your graph:

Click on one of the data points in your graph, then use the *Series* tab to select the following:

 - i. The symbol for the data points on that curve (Different symbols should be used for each curve when there is more than one curve on the graph.)
 - ii. The font size for the symbol (The default value of 10 is too large; try using 6.)
 - iii. Connect data points with straight lines (usually, unless a trendline is to be shown).

Final Clean Up

6. A default font size of 12 is used in Pages for all the titles and axis values. To me, this is too large. To change it, click on one of the title fields in the graph and set the font size. I prefer 10-point fonts. The font sizes are set separately for the five individual fields for the axis scales, axis labels and graph title (if used, see below), and the separate field for the legend.
7. As you write your report, you can click and drag the graph to place it where you want in the document. The legend is a separate object in the document and has to be moved separately. In the example graph shown in Graph 1, I typed the title of the graph in the Pages text. If you wish, you can instead create the graph title by clicking on the *Chart* tab in the Inspector and checking the *Title* field. However, the position of the title defaults to the center and cannot be moved. I prefer graph titles to be justified at the left margin, so I made the title in the document text rather than in the Inspector.

Adding Trendlines and Error Bars

8. These features can be added by first clicking on the *Series* tab in the Inspector, and then activating the *Advanced* drop-down menu.

9. You must select the type of trendline. (Linear is the choice when you expect your data to vary linearly.) You can check the *Show Equation* field to see the equation for the trendline (to see the slope or y-intercept). Once you know the equation you may or may not want it to be displayed on the graph.
10. For upper-level students who wish to show error bars to indicate measurement uncertainty, the error bars can be configured from the same *Advanced* menu.