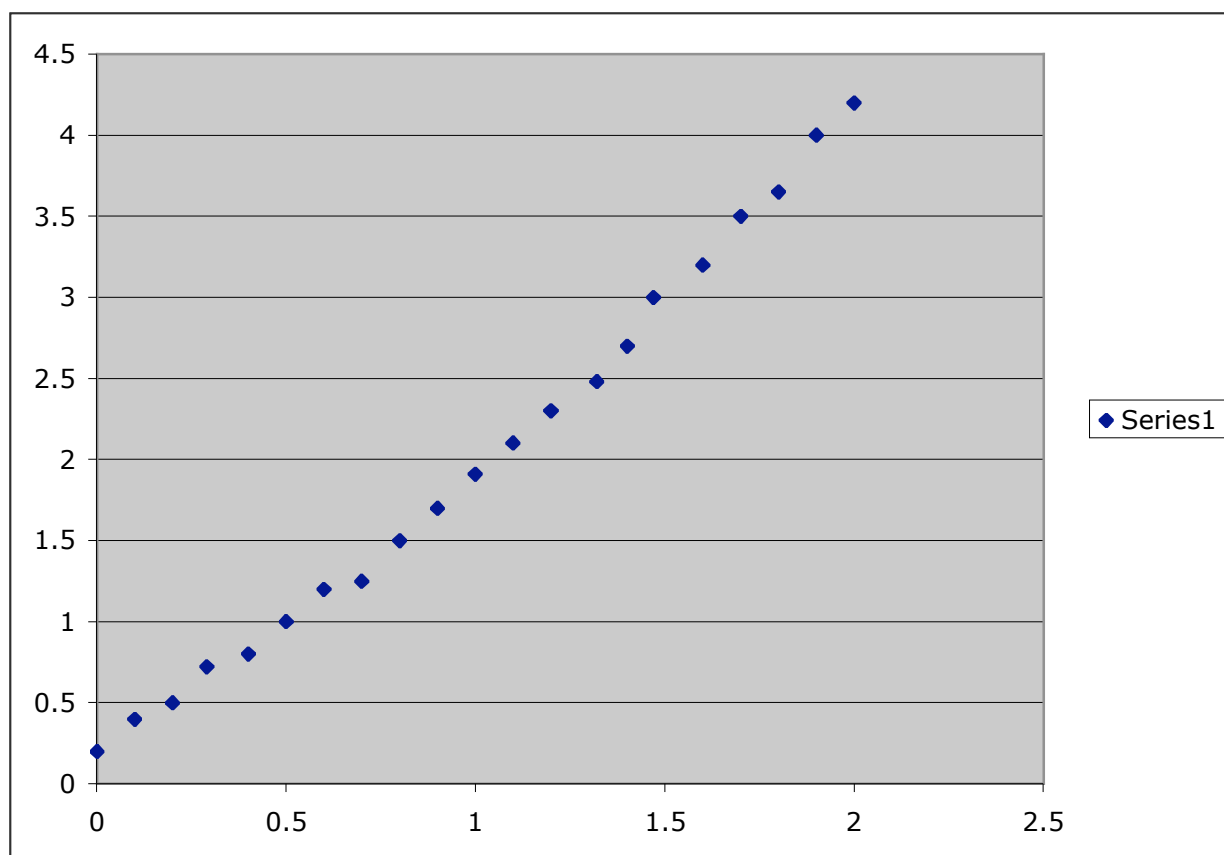


How to make a good graph for a science class

Suppose you do a laboratory exercise in which you measure the position with time of a ball as it rolls along in front of you. The positions were measured using a metre stick and the times were found using photogates and CBLs. You and your lab partner have the following data from which you are to make a graph:

Position (m)	Time (s)	Position (m)	Time (s)
0	0.2	1	1.91
0.1	0.4	1.1	2.1
0.2	0.5	1.2	2.3
0.29	0.72	1.32	2.48
0.4	0.8	1.4	2.7
0.5	1	1.47	3
0.6	1.2	1.6	3.2
0.7	1.25	1.7	3.5
0.8	1.5	1.8	3.65
0.9	1.7	1.9	4
		2	4.2

Q1) What is wrong with the way this data is reported?

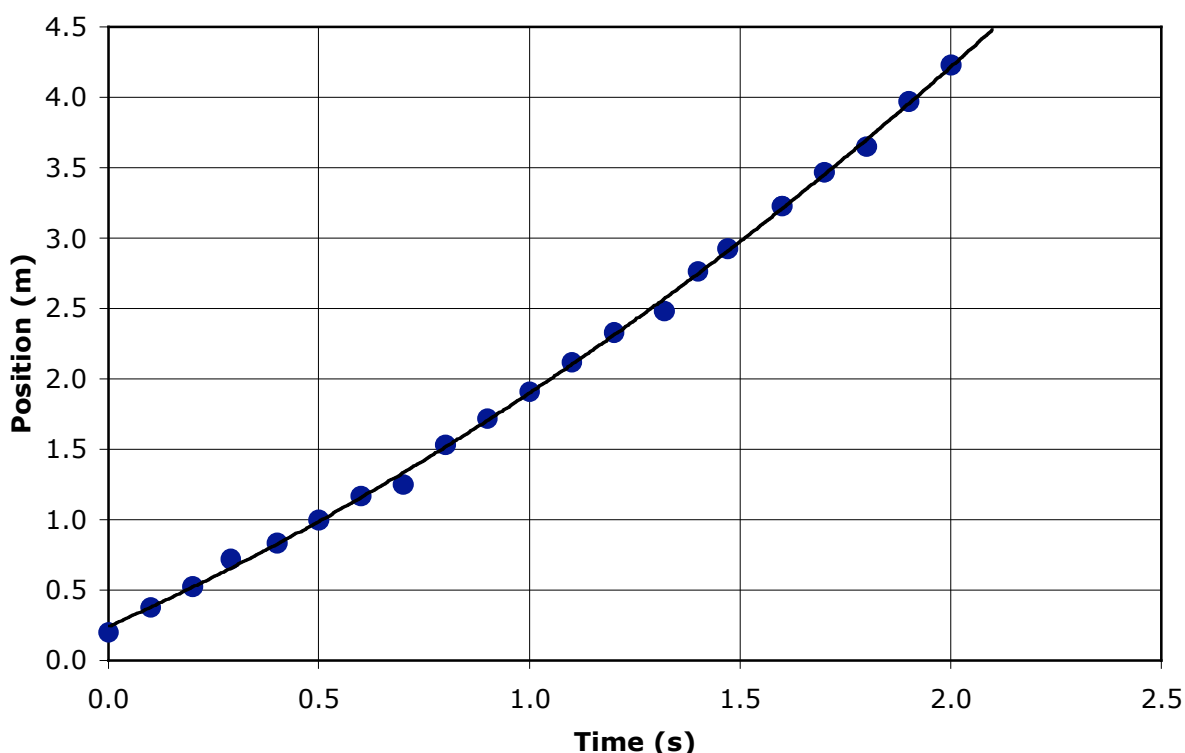


Q2) How would you score this graph? How many points would you take off and why?

Comments

- 1) Series1? Delete the legend and label the axes. No, do not call one “x-axis” and the other “y-axis”, call them what they are; “time” and “position” and remember to include the units!
- 2) This graph needs a title. The words “Title” or “Graph” are not acceptable; choose terms that are more descriptive; try to match the terminology used in the directions for your lab.
- 3) Remember significant digits and line up those decimal points!
- 4) Why only horizontal grid lines? Please add vertical grid lines, or use none at all.
- 5) You can waste lots of ink if you wish, but there is no real need for a shaded background.
- 6) There is no real need for a border around the graph.
- 7) Make the graph big; for example, use an entire page.

Position vs Time



Best fit curve: $x(t) = (0.33 \text{ m/s}^2)t^2 + (1.3 \text{ m/s})t + 0.24 \text{ m}$

Comments:

- 1) Notice how all of the problems mentioned above have been corrected.
 - a) both axes are correctly labeled and the units are included.
 - b) there is a descriptive title.
 - c) decimal points line up and there are even zeros after the decimal points.
 - d) there are now vertical gridlines in addition to the horizontal ones.
- 2) In addition, a best fit curve has been added and the data markers have been made more visible.
- 3) If you (or your calculator/computer) determine a best fit curve, please include the equation for this curve in your report and use the appropriate variables (see above example).

Here are the things I look for when I grade a graph. I will take off one (or more) points for each item that is missing or incorrect.

Type of graph is appropriate (pie charts and bar graphs are not common.)
Size of graph is adequate; full page preferred in most cases.
Title; sometimes a subtitle is appropriate as well to distinguish problems or trials.
Labels
Units
Good scales
Data points are visible and plotted accurately
Best fit line or curve (when appropriate)
Esthetics

So how would I score that first graph?

No title: -1
No labels or units -2
No best fit curve -1
Esthetics -3 (Series1, only horizontal grid, zig-zag scale is ugly)