

## Graphs

In many courses in your degree you will need to construct graphs or tables, insert them correctly into assignments and refer to them in your written material. Graphs should be self-explanatory, which means that the reader should be able to understand them without detailed reference to the text. Here are a few guidelines for creating graphs.

1. All graphs in a given text must be sequentially labeled: that is, the first graph in a document should be labeled as Figure 1, the second graph as Figure 2 etc. Figures should also be introduced in the text prior to appearing.
2. The title should be informative and to-the-point, usually including information relating to the horizontal and vertical variables.
3. The horizontal and vertical axes must be labeled, including any units of measure.
4. Before plotting a graph, you must decide which variable is the *independent* variable. This variable is usually assigned to the horizontal axis. Table 1 shows examples of different relationships and their independent variables.

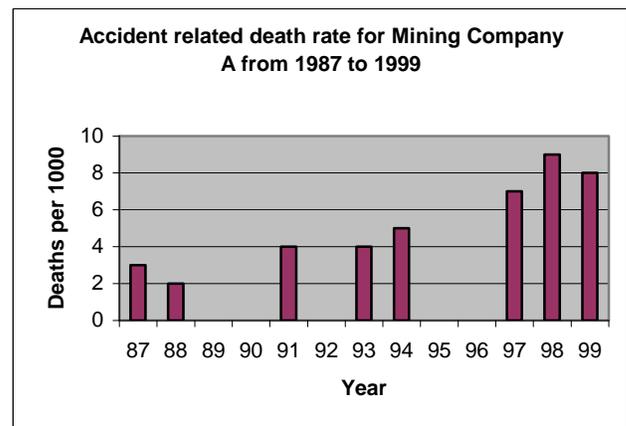
**Table 1: relationships and the independent variable**

<i>Relationship</i>	<i>Independent variable</i>
$y = x^2 + 2x + 3$	$x$
Cost = \$100 + \$30 per person × Number of people	Number of people
Change in salaries with time	Time
Affect of hours spent studying on final grade	Hours spent studying

5. Keep a fixed scale on the axes. Compare Figures 1(a) and 1(b): Figure 1(a) shows an incorrect graph, as the scale on the horizontal axis is not uniform, unlike the correct graph in Figure 1(b).

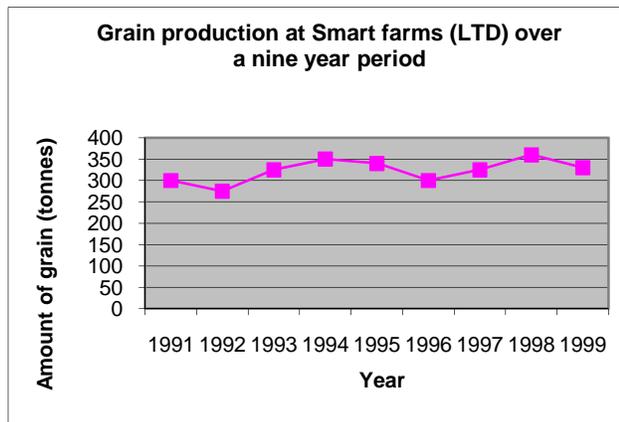


**Figure 1(a): Incorrect graph as the years with zero death-rate have been ignored**

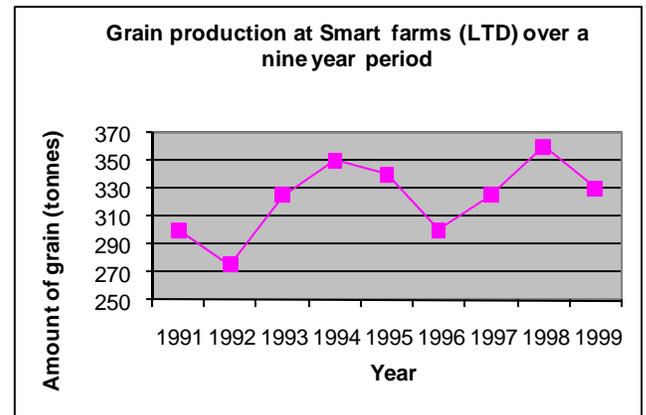


**Figure 1(b): Correct graph as this graph reflects the years where there is zero death-rate.**

6. Scales used should not distort the data. Compare Figures 2(a) and 2(b) which show both an incorrect vertical scale and a scale which clearly shows the relationship of grain production over the nine year period.



**Figure 2(a): Incorrect graph as the scale is too small on the vertical axis. There is a lot of wasted graph space between the horizontal axis and the line graph.**



**Figure 2(b): Correct graph as the values from 0 to 250 are not shown on the vertical axis. The difference in the amount of grain production is clearer.**

7. Graphs should be accompanied by a few descriptive sentences that highlight key points. This also means that if the graph does not warrant discussion, it is probably not worth using. The descriptions should include:
- an introductory sentence with a general statement about both variables
  - one or two sentences that pick out specific points in the graph that you consider to be important and
  - a final sentence that is more general, emphasizing one of the main points of the graph.

For example, Figure 2(b) shows the variation in the production of grain at Smart Farms over a period of nine years from 1991 to 1999. Grain production shows a cyclical variation of approximately four years over this period, with high tonnages in 1994 and 1998 and low tonnages in 1992 and 1996. Although production does not show consistent yearly growth, there is a general upward trend in grain production over this period.

## RESOURCES

- Other Quick Tips Flyers  
<http://www.usq.edu.au/learningcentre/tips.htm>
- Online resources on ALSOnline  
<http://www.usq.edu.au/learnteach/learnsupp/alsonline/mathsci/topics.htm>
- Further examples on how to describe graphs  
<http://www.usq.edu.au/learningcentre/alsonline/mathsci/mathsscitopic/graph.htm>
- Talk with a tutor at The Learning Centre ([tlc@usq.edu.au](mailto:tlc@usq.edu.au))