**Graphs**

The following general guidelines should be followed when presenting data in graphs.

• The type of graph used (e.g. bar chart, histogram, line graph, pie chart or scattergram)

should be appropriate to the data collected.

• The graph should be of an **appropriate** **size** to make good use of the paper.

• There should be an **informative** **title, and axes should be fully labelled with units**.

**Bar charts and histograms**

These are used when the dependent variable on the y-axis is **discrete**, i.e. whole numbers,

fractions are impossible and the data under consideration deal with frequencies.

**Bar charts**

Bar charts are used when the independent variable is **non-numerical**, e.g. the number of different insect species found on trees. These data are discontinuous.

• They can be made up of lines, or blocks of equal width, which do not touch.

• The lines or blocks can be arranged in any order, but it can aid comparison if they are arranged in descending order of size.

• Each axis should be labelled clearly with an appropriate scale.

**Histograms**

These are used when the independent variable is **numerical** and the data are **continuous**. They are sometimes referred to as frequency diagrams.

• One axis, usually the x-axis, represents the independent variable and is continuous. It should be labelled clearly with an appropriate scale.

• The number of classes needs to be established. This will largely depend on the type and nature of the data. However, five times the log of the number of observations is one approach.

• The blocks should be drawn touching.

• The edges of the blocks should be labelled, so a block might be labelled ‘7’ at the left and ‘8’at the right; this is expressed as a class range 7 - 8 units but it is implied that 7.0 is included in this range but 8.0 is not. 8.0 will be included in the next class range, 8 - 9.

• The other axis, conventionally the y-axis, represents the number or frequency, and should

be labelled with an appropriate scale.

**Pie charts**

These can be used when displaying data that are proportions or percentages.

• Sector angles are calculated by dividing their percentage by 100 and multiplying the answer by 360° (if figures are proportions then just multiply by 360°).

• When comparing two or more pie charts, the sequence of segments should be the same.

• The size of the pie circle can be made proportional to the size of the sample.

• Pie charts should not contain more than 6 to 7 sectors, otherwise they become confusing.

• There should be segment labels or a key.

**Line graphs**

• Straight lines should join points. A smooth curve is only drawn if there is reason to believe

that intermediate values fall on the curve.

• The independent variable should be plotted on the horizontal axis (x) and the dependent

variable plotted on the vertical axis (y).

• Axis labels should be stated horizontally and in lower case, using SI units or in full.

• Axes should have an arrow end when there is no scale. If the origin (0,0) is not included in a printed graph, the axis should be broken.

• Points should be plotted with encircled dots (**o**) or saltire crosses ( **x** ). When multiple

curves are being plotted, vertical crosses ( **+** ) can be employed.

• If a graph shows more than one curve, then each curve should be labelled to show what it

represents.

**Scattergrams**

These are used when investigating the **relationship between two variables** of a sample or

replicate and observations are in pairs. The data can then be used to establish if there is a

relationship between the variables. The relationship can be a positive correlation, a negative

correlation or no correlation at all.

• The two axes of the graph are marked out with appropriate scales.

• The two variables are plotted for each sample as a point so that each point on the graph

represents an individual.