CIE Biology International A-level

Collect, Record and Present Data

Practical Notes

Collect, record and present observations, measurements and estimates

Tables

Most questions will require data to be presented in suitable **tables**, whether they are recording observations or numbers. 'Prepare your space' generally indicates that the student should draw a table to record the data.

Tables must have **headings** with **ruled lines**, where the **vertical** column represents the **independent** variable, while the **horizontal** column represents the **dependent** variable. Appropriate **SI units** should be included in the table headings and not next to the recorded data itself.

Data should be presented in a table according to the order in which it is collected. **Processed** results should also be presented in a table, including results of **repetitions**, **means**, and **rates**.

Graphs

Data from a table can then be presented in a graph so that any trends or patterns can be easily visually observed. The x-axis is the independent variable while the y-axis is the dependent variable. The axes should be labelled appropriate with units if necessary, separated from the heading with '/' or '()'. A title for the graph is not required in an exam.

The 3 types of graphs that students may be tested on are **line graphs, bar charts, and histograms**.

Line graphs are used when the relationship cannot be clearly shown in a table alone, and when the **independent** variable is **continuous**. Your axes should go up in multiples of 1,2,5 or 10 (for every 20mm square). Do not use multiples of 3.

Bar charts are used when the **independent** variable is **discontinuous**. The blocks should **not touch** and should be **equidistant** from each other with the same width. The **order** of the blocks should be the **same order as in the table of results**.

Histograms are used when the **independent** variable is **continuous** and **divided into classes**. Before drawing the histogram, the number of classes should be determined, where the **number of classes = 5 x $\log_{10}$ total number of readings**, making sure the classes **do not overlap**. The blocks should be **touching**, and the **area** of the blocks should be **proportional to the frequency**.

Drawings

The two types of diagrams students may be asked to draw are **plan diagrams** and **cell diagrams**. Plan diagrams are drawings of **tissue**, showing their outlines and **relative proportions**, without including cells. Cell diagrams are drawings of a few **cells**, showing any **observable cell features**.

For both types of diagrams, the drawing should fill out **at least half the space provided**. Lines should be **sharp, thin and continuous**, with no shading and colouring. Labels should only be added when necessary, and label lines should be **ruled**, **without crossing each other**.

To find the magnification of the cells/tissues drawn, the **eyepiece graticule** should first be **calibrated** (with a stage micrometer) to measure the actual length of what is drawn. Use the formula: magnification = length of drawing / actual length. Measurements should be taken in mm.