

ACTIVITY 4.2

The following appears in the Teacher's Guide:

In the examination, students will be expected to have experience of working in a laboratory. They should be able to:

- recognise and explain the use of common items of laboratory apparatus
- plan practical procedures
- use the idea of a fair test
- read scales to an appropriate degree of accuracy and perform simple mathematical operations (including finding the mean) on results obtained
- use correct units for values
- record results in tables and use data presented in a variety of formats
- draw and use bar charts
- plot and use graphs and draw straight lines and curves of best fit
- identify relationships from graphs
- comment on the reliability and accuracy of data
- draw conclusions and offer explanations
- identify anomalous results and explain how they may have arisen
- evaluate provided procedures and suggest improvements
- suggest further experimental work that may be required.

Also in the Teacher's Guide:

While there is no requirement for students to conduct a full investigation from planning through to evaluation, all of the skills needed so to do form the basis of the assessment of AO3.

Students would benefit from being introduced to the concept of practical investigative work well before they begin the two-year examination course. Research evidence has shown that students take a considerable time to gain the confidence needed for higher-level investigative skills such as critical evaluation.

Many students will need considerable guidance in order to progress from simply carrying out a set of practical instructions provided by you, to the point where they are able to plan procedures for themselves, obtain and analyse results, and critically evaluate the outcome. However, the effort required will be well rewarded, as the student will more fully understand the principles and parameters upon which scientific method is based.

Students should be encouraged to participate in practical work wherever possible. The scheme is designed to encourage a wide variety of activities, including those based on the collection of first-hand evidence and those that depend on secondary evidence. (The term 'evidence' is used to mean observations, measurements or other data.)

The value of demonstration work must not be overlooked. Demonstrations are important in the teaching of good technique and they enable students to see for themselves experiments they cannot do due to restrictions imposed by resources or safety considerations.

For each of the five sections in the specification there is a list of suggested practicals. This is the list for Section 1:

Principles of Chemistry

- Diffusion of gases and in solutions
- Diffusion of $\text{NH}_3(\text{g})$ and $\text{HCl}(\text{g})$
- Physical properties of substances compared to structure and bonding
- Determination the formula of copper oxide by reduction
- Determination of the volume of one mole of hydrogen
- Acid/alkali titrations
- Electrolysis of molten lead bromide
- Electrolysis of aqueous solutions