

1.2 Assessment

Candidates for Advanced Subsidiary (AS) certification take Papers 1, 2 and 3 (either Advanced Practical Skills 1 or Advanced Practical Skills 2) in a single examination series.

Candidates who, having received AS certification, wish to continue their studies to the full Advanced Level qualification may carry their AS marks forward and take Papers 4 and 5 in the examination series in which they require certification.

Candidates taking the full Advanced Level qualification at the end of the course take all five papers in a single examination series.

Candidates may only enter for the papers in the combinations indicated above.

Candidates may not enter for single papers either on the first occasion or for resit purposes.

All components are externally assessed.

Component	Weighting	
	AS Level	A Level
<p>Paper 1 Multiple Choice 1 hour</p> <p>This paper consists of 40 multiple choice questions, 30 of the direct choice type and 10 of the multiple completion type, all with four options. All questions will be based on the AS Level syllabus content. Candidates will answer all questions. Candidates will answer on an answer sheet. [40 marks]</p>	31%	15.5%
<p>Paper 2 AS Level Structured Questions 1 hour 15 minutes</p> <p>This paper consists of a variable number of questions of variable mark value. All questions will be based on the AS Level syllabus content. Candidates will answer all questions. Candidates will answer on the question paper. [60 marks]</p>	46%	23%
<p>Paper 3 Advanced Practical Skills 2 hours</p> <p>This paper requires candidates to carry out practical work in timed conditions. Candidates will be expected to collect, record and analyse data so that they can answer questions related to the activity. The paper will consist of two or three experiments drawn from different areas of chemistry. Candidates will answer all questions. Candidates will answer on the question paper. [40 marks]</p>	23%	11.5%
<p>Paper 4 A Level Structured Questions 2 hours</p> <p>This paper consists of a variable number of free response style questions of variable mark value. All questions will be based on the A Level syllabus but may require knowledge of material first encountered in the AS Level syllabus. Candidates will answer all questions. Candidates will answer on the question paper. [100 marks]</p>	–	38.5%
<p>Paper 5 Planning, Analysis and Evaluation 1 hour 15 minutes</p> <p>This paper consists of a variable number of questions of variable mark value based on the practical skills of planning, analysis and evaluation. The context of the questions may be outside the syllabus content, but candidates will be assessed on their practical skills of planning, analysis and evaluation rather than their knowledge of theory. Candidates will answer all questions. Candidates will answer on the question paper. [30 marks]</p>	–	11.5%

The overall proportion of marks allocated to physical, inorganic and organic chemistry in Papers 1 and 2, taken together, and in Paper 4 will be in the approximate ratio 3:2:3.

2.2 Assessment objectives

The assessment objectives listed below reflect those parts of the syllabus aims that will be assessed in the examination.

AO1 Knowledge with understanding

Candidates should be able to demonstrate knowledge with understanding in relation to:

- scientific phenomena, facts, laws, definitions, concepts, theories
- scientific vocabulary, terminology, conventions (including symbols, quantities and units)
- scientific instruments and apparatus, including techniques of operation and aspects of safety
- scientific quantities and their determination
- scientific and technological applications with their social, economic and environmental implications
- reasoned explanations for phenomena, patterns and relationships.

The subject content defines the factual knowledge that candidates may be required to recall and explain. Questions testing these assessment objectives will often begin with one of the following words: *define*, *state*, *describe*, *explain* or *outline* (see Glossary of command words on page 69).

AO2 Handling, applying and evaluating information

Candidates should be able (in words or by using symbolic, graphical and numerical forms of presentation) to:

- locate, select, organise and present information from a variety of sources
- handle information, distinguishing the relevant from the extraneous
- manipulate numerical and other data and translate information from one form to another
- analyse and evaluate information so as to identify patterns, report trends and draw inferences
- construct arguments to support hypotheses or to justify a course of action
- apply knowledge, including principles, to new situations
- evaluate information and hypotheses.

These assessment objectives cannot be precisely specified in the subject content because questions testing such skills may be based on information which is unfamiliar to the candidate. In answering such questions, candidates are required to use principles and concepts that are within the syllabus and apply them in a logical, reasoned or deductive manner to a new situation. Questions testing these objectives will often begin with one of the following words: *predict*, *suggest*, *construct*, *calculate* or *determine* (see Glossary of command words on page 69).

AO3 Experimental skills and investigations

Candidates should be able to:

- plan experiments and investigations
- collect, record and present observations, measurements and estimates
- analyse and interpret data to reach conclusions
- evaluate methods and quality of data, and suggest improvements.

2.3 Relationship between assessment objectives and components

The approximate weightings allocated to each of the assessment objectives are summarised below.

The table shows the assessment objectives (AO) as a percentage of each component.

Component	AO1 %	AO2 %	AO3 %
Paper 1	55	45	0
Paper 2	55	45	0
Paper 3	0	0	100
Paper 4	55	45	0
Paper 5	0	0	100

2.4 Relationship between assessment objectives and qualifications

The approximate weightings allocated to each of the assessment objectives are summarised below.

The table shows the assessment objectives (AO) as a percentage of each qualification.

Assessment objective	Weighting in AS Level %	Weighting in A Level %
AO1	42	42
AO2	35	35
AO3	23	23

Teachers should note that there is a greater weighting of 58 per cent for skills (including handling information, solving problems, practical, experimental and investigative skills) compared to the 42 per cent for knowledge and understanding. Teachers' schemes of work and the sequence of learning activities should reflect this balance so that the aims of the syllabus are met and the candidates prepared for the assessment.

4.2 Paper 3

In some examination series, two versions of the Advanced Practical Skills paper will be available, identified as Advanced Practical Skills 1 and Advanced Practical Skills 2. In other series only Advanced Practical Skills 1 will be available. These papers will contain different questions, but will be equivalent in the skills assessed and in the level of demand. Each candidate should take one of these papers.

Where two versions of the paper are offered, some Centres may wish to divide their candidates so that some are entered for Advanced Practical Skills 1 and the others are entered for Advanced Practical Skills 2; other Centres may wish to enter all of their candidates for the same paper. Each of these papers will be timetabled on a different day.

Paper 3 will be a timetabled, laboratory-based practical paper focusing on the following experimental skills:

- manipulation, measurement and observation
- presentation of data and observations
- analysis, conclusions and evaluation.

Each paper will consist of two or three questions, totalling 40 marks.

One question will be an observational problem in which the candidate will be asked to investigate an unknown substance or substances by specified experiments. The substances may be elements, compounds or mixtures. Candidates will be expected to record their observations, analyse their results and draw appropriate conclusions.

The other question or questions will be quantitative: either volumetric analysis or measurement of a quantity, e.g. the enthalpy change of a reaction, mass change on heating, changing the rate of a reaction or measuring a gas volume. Candidates will be expected to draw suitable tables, graphs and other appropriate means of presenting the data. They will analyse the data, perform calculations and draw appropriate conclusions from them.

One or more of the questions may require candidates to comment on the accuracy of the procedure or identify sources of error and make suggestions for change.

The apparatus requirements for Paper 3 will vary from paper to paper. A complete list of apparatus and materials required will be issued in the Confidential Instructions. The Confidential Instructions should be followed very carefully. If there is any doubt about how the practical examination should be set up or if a particular chemical is impossible to obtain or not permitted for use in schools, it is vital that Centres contact Cambridge as soon as possible.

4.2.1 Mark scheme for Paper 3

Paper 3 will be marked using the generic mark scheme below. The expectations for each mark category are listed in the sections that follow.

Skill	Minimum mark allocation*	Breakdown of skills	Minimum mark allocation*
Manipulation, measurement and observation	12 marks	Successful collection of data and observations	8 marks
		Quality of measurements or observations	2 marks
		Decisions relating to measurements or observations	2 marks
Presentation of data and observations	6 marks	Recording data and observations	2 marks
		Display of calculation and reasoning	2 marks
		Data layout	2 marks
Analysis, conclusions and evaluation	10 marks	Interpretation of data or observations and identifying sources of error	4 marks
		Drawing conclusions	5 marks
		Suggesting improvements	1 mark

*The remaining 12 marks will be allocated across the skills in this grid and their allocation may vary from paper to paper.