# Course report 2025

## Higher Chemistry

This report provides information on candidates' performance. Teachers, lecturers and assessors may find it useful when preparing candidates for future assessment. The report is intended to be constructive and informative, and to promote better understanding. You should read the report with the published assessment documents and marking instructions.

We compiled the statistics in this report before we completed the 2025 appeals process.



 

# Grade boundary and statistical information

## Statistical information: update on courses

Number of resulted entries in 2024: 9,902

Number of resulted entries in 2025: 10,120

## Statistical information: performance of candidates

### Distribution of course awards including minimum mark to achieve each grade

| Course award | Number of candidates | Percentage | Cumulative percentage | Minimum mark required |
|---|---|---|---|---|
| A | 3,237 | 32.0 | 32.0 | 108 |
| B | 2,625 | 25.9 | 57.9 | 92 |
| C | 1,843 | 18.2 | 76.1 | 77 |
| D | 1,347 | 13.3 | 89.4 | 61 |
| No award | 1,068 | 10.6 | 100% | Not applicable |

We have not applied rounding to these statistics.

You can read the general commentary on grade boundaries in the appendix.



 

In this report:

- ‘most’ means greater than or equal to 70%
- ‘many’ means 50% to 69%
- ‘some’ means 25% to 49%
- ‘a few’ means less than 25%

You can find statistical reports on the statistics and information page of our website.

# Section 1: comments on the assessment

## Question paper 1: multiple choice

The multiple-choice paper performed as intended.

Statistical evidence shows that there was a range of questions in terms of difficulty, and that questions showed good discrimination.

## Question paper 2

The question paper proved slightly less demanding than intended. We adjusted the grade boundaries to account for this.

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## Assignment

The assignment performed as intended.

# Section 2: comments on candidate performance

## Areas that candidates performed well in

### Question paper 1: multiple choice

| | |
|---|---|
| Question 1 | Most candidates identified a pure covalent bond. |
| Question 2 | Most candidates linked strong reducing agents to low electronegativity values. |
| Question 3 | Most candidates calculated the number of moles of $Fe^{2+}$. |
| Question 5 | Most candidates identified a tertiary alcohol. |
| Question 6 | Most candidates identified the structure of 3-ethylhexanoic acid. |
| Question 9 | Most candidates identified the correct formula for 6-methylhept-5-ene-2-one. |
| Question 10 | Most candidates identified the reaction as hydrolysis. |
| Question 11 | Most candidates identified that fatty acid chains are hydrophobic and dissolve in vegetable oil droplets. |
| Question 12 | Most candidates identified the formula of a terpene. |
| Question 13 | Most candidates determined the temperature rise required to double the rate of the reaction. |
| Question 14 | Most candidates correctly identified the diagram that showed the distribution of kinetic energies for molecules of a reaction when the temperature of the reaction is increased from $T_1$ to $T_2$. |
| Question 17 | Most candidates applied Hess's law to a reaction pathway. |

| | |
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| Question 18 | Most candidates applied Hess's law to a set of equations. |
| Question 19 | Most candidates identified a correct statement about a catalyst. |

## Question paper 2

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| Question 1(a)(i) | Most candidates wrote the equation for the first ionisation energy of sodium. |
| Question 1(a)(ii) | Most candidates calculated the energy required for the given reaction. |
| Question 2(b)(i) | Most candidates stated the trend in covalent radius. |
| Question 2(c) | Many candidates fully explained the trend in boiling points in group 0. |
| Question 4(a)(iv) | Most candidates gave a reason for lower experimental enthalpy values. |
| Question 4(b)(i) | Most candidates determined the oxygen to hydrogen ratio. |
| Question 4(c)(ii)C | Many candidates gained 3 marks for calculating the concentration of ethanoic acid. Few candidates gained partial marks because they did not apply $n = cV$ correctly. |
| Question 4(c)(iii)B | Most candidates calculated the mass of ethanoic acid in 200 $cm^3$ of solution. |
| Question 5(b)(ii) | Most candidates stated the term for an amino acid that the human body cannot make. |
| Question 5(c)(ii)A | Most candidates named the other compound produced on hydrolysis. |
| Question 5(c)(ii)B | Most candidates named the saturated fatty acid obtained on hydrolysis of palm oil. |
| Question 5(d)(ii) | Most candidates named the circled functional group. |



 

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| Question 5(d)(iii)A | Most candidates named the class of terpenoids to which cafestol belongs. |
| Question 5(e) | Most candidates calculated the number of cups of the latte coffee drink. |
| Question 6(b) | Most candidates combined two ion-electron equations to give the overall redox equation. |
| Question 6(c)(i) | Most candidates completed the table to show the volume of water needed for experiment 3. |
| Question 7(c)(ii) | Most candidates calculated the atom economy for the production of carbon monoxide. |
| Question 8(a)(iii) | Most candidates calculated the mass of tin(iv) oxide that reacted. |
| Question 9(a)(i) | Most candidates completed the table to show the name of the missing step. |
| Question 9(b) | Most candidates stated the term used to describe the change in shape. |
| Question 9(c) | Most candidates gave an example of a type of consumer product that has free radical scavengers added. |
| Question 10(a)(i) | Most candidates circled the amide link in the CAP structure. |

## Assignment

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| Section 1 | Most candidates stated an aim, or aims, that they could investigate. |
| Section 3(b) | Most candidates supplied sufficient data from their own experiments. |
| Section 3(e) | Most candidates supplied information from an internet source. |



 

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| Section 4(a) | Most candidates selected an appropriate graphical format. |
| Section 4(b) | Most candidates selected suitable scales on their axis or axes. |
| Section 4(c) | Most candidates added suitable labels and units to their axes. |
| Section 8 | Most candidates gave a clear and concise report, with an informative title. |

## Areas that candidates found demanding

### Question paper 1: multiple choice

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|---|---|
| Question 20 | Some candidates gave the yield for step 2. |
| Question 21 | Some candidates gave the number of moles of sulfate ions present. |
| Question 23 | Some candidates identified that adding a solution of $AgNO_3$ would cause the red colour to fade. |

### Question paper 2

| | |
|---|---|
| Question 1(a)(iii) | Few candidates gained 2 marks for explaining fully why sodium has a higher second ionisation energy than magnesium. |
| Question 1(b)(i) | Few candidates stated what was meant by the term ionic bond. |
| Question 4(b)(ii)A | Some candidates suggested a suitable oxidising agent. |
| Question 4(c)(i) | Some candidates named the piece of glassware. |
| Question 4(c)(iii)A | Some candidates wrote the ionic formula for potassium ethanoate. |
| Question 5(b)(i) | Some candidates wrote the correct amino acid sequence. |
| Question 6(c)(ii) | Some candidates suggested why a dry beaker should be used. |



 

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| Question 7(c)(i) | Few candidates gained 2 marks for completing the labelled diagram of apparatus suitable for preparing and separating carbon monoxide. Some candidates did not add labels, and some candidates drew systems that would not work. |
| Question 8(a)(i) | Few candidates gained 2 marks for calculating the mass of tin oxide required. |
| Question 8(b)(ii) | Some candidates suggested another way that profit is maximised. |
| Question 9(d)(iii) | Few candidates described the effect of changing pH. |
| Question 10(a)(ii) | Some candidates described a chemical test and the expected result to distinguish between CAP and DHC. |
| Question 10(b) | Some candidates suggested why the burning sensation produced by capsaicinoids is not affected by drinking water. |
| Question 12(c) | Few candidates drew the skeletal formula for pentanoic acid. |

## Assignment

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| Section 3(a) | Some candidates summarised their experimental method and included a statement identifying additional safety measures or a statement indicating that additional safety measures were not required. |
| Section 5 | Some candidates provided a valid comparison of their experimental data with data from their internet or literature source. |
| Section 7 | Some candidates provided an appropriate justification for their evaluative statements, based on their own experimental results. |

# Section 3: preparing candidates for future assessment

## Question paper 1: multiple choice

### Calculations

Candidates generally perform well in questions about calculations, but they would benefit from practising questions involving the use of chemical formulae (for example, question 21).

### Questions relating to practical work

Candidates tend to perform less well in some of the questions relating to practical work. Teachers and lecturers should make sure that all candidates experience practical techniques such as titration (for example, questions 24 and 25).

Candidates must have time during the course to develop practical skills associated with Higher Chemistry. Teachers and lecturers must specifically teach candidates how to properly use the equipment and the techniques listed in the Higher Chemistry Course Specification to ensure they gain a full understanding.

### Questions relating to equilibrium

Candidates would benefit from practising questions about the consequences of altering reaction conditions on equilibrium reactions (for example, question 23).



 

## Question paper 2

### Questions linked to statements in the course specification

Candidates must be able to accurately recall and use statements from the course specification (for example, question 1(b)(i), ‘State what is meant by the term ionic bond’).

Questions can also ask candidates about the compound names, structures and functional groups mentioned in the course specification (for example, question 4(b)(ii)A, ‘Suggest a suitable oxidising agent’, and question 5(d)(ii), ‘Name the functional group’).

### Calculations

Candidates generally perform well in questions about calculations that are taught as part of the course, for example, question 7(a) on bond enthalpy, question 7(c)(ii) on atom economy, question 4(c)(ii)C on titration, and question 8(a)(ii) on excess calculations.

Teachers and lecturers should encourage candidates to set out their working clearly, as they can still gain partial marks if their final answer is incorrect. For example, in question 4(c)(ii)C, candidates could gain partial marks for applying $n = cV$ and the stoichiometry of the equation correctly.

Generally, candidates perform well in general numeracy calculations set in a chemical context. However, they must give answers appropriate to the units used, for example, answers in pence need to be rounded to whole pence. Teachers and lecturers need to give candidates practice in scaling up answers. Candidates should be able to give quantities per mole and convert answers to other units.

## Questions requiring more detailed answers

Candidates should understand that questions that require more detailed answers contain the words ‘explain fully’ or ‘explain clearly’ and are worth a minimum of 2 marks. Teachers and lecturers should make sure candidates understand that, to gain full marks for these questions, they must give a detailed explanation.

For questions worth 3 marks, candidates should understand that they have to make at least three correct points in their answer. For example, in question 2(c), the first mark is for stating that intermolecular forces increase down group 0, the second mark is for correctly identify London dispersion forces, and the third mark is for an explanation linking the strength of London dispersion forces to the number of electrons.

## Questions relating to equilibrium

Candidates would benefit from further practice on the consequences of altering reaction conditions on equilibrium reactions, in particular, changes in temperature leading to changes of state of reactants or products (for example, question 7(b)).

## Open-ended questions

Some candidates do not attempt the open-ended questions. Candidates would benefit from more opportunities to answer this type of question.

Candidates need to know that, while there are no definitive answers to open-ended questions, their answer should make statements relevant to the situation or problem given. For example, answers to question 3 should include mention of how different kinds of bonding arise and the link to properties.

Candidates can give broad answers covering a number of aspects of a question or focus on one aspect and give a detailed explanation.

Candidates do not need to give a perfect answer to gain full marks for the question. Markers judge open-ended questions holistically, rather than on a number-of-points basis (for example, 1 point, 1 mark; 2 points, 2 marks). Markers assign marks according to whether a candidate's answer displays no understanding (0 marks); limited understanding (1 mark); reasonable understanding (2 marks); or good understanding (3 marks).

### Questions relating to practical work

Candidates should be familiar with the apparatus and techniques listed in the Higher Chemistry Course Specification. Teachers and lecturers should make sure candidates are aware that approximately 10 marks are available for questions relating to practical work.

Candidates tend to perform less well in questions relating to practical work, particularly questions that ask them to suggest variables that should be kept constant (like question 9(d)(ii) and question 6(c)(ii)). Candidates would benefit from practising questions about drawing and labelling diagrams of assembled apparatus (for example, question 7(c)(i)).

Teachers and lecturers must allow candidates time during the course to develop the practical skills associated with Higher-level Chemistry so that they understand the proper use of the equipment and techniques listed in the course specification.

## Assignment

Teachers and lecturers should refer to the most up-to-date Higher Chemistry Assignment Assessment Task on our website, which we updated for session 2024–25. They must apply the conditions of assessment for the assignment fully. Teachers and lecturers must provide candidates with the 'Instructions for candidates' section, during the write-up phase. Teachers and lecturers must not alter the 'Instructions for candidates' section.

Teachers and lecturers should pay particular attention to the information about conducting the assignment and supervision and control in the 'Conditions of assessment' section on pages 3 and 4 of the Higher Chemistry Assignment Assessment Task. The 'Instructions for candidates' section lists the permitted resources for the report stage.



 

Teachers and lecturers should pay particular attention to the instructions relating to whole-class experiments in the 'Choosing the topic' section on page 5 of the Higher Chemistry Assignment Assessment Task. Teachers and/or lecturers must ensure that their candidates have a range of topics to choose from. Candidates within a class and across classes can investigate the same general topic as long as they are investigating a variety of independent variables or carrying out a variety of experiments, or both. This ensures that centres do not use a whole-class experiment.

Centres must choose experiments that allow candidates to access all 20 marks for the assignment. Candidates' experiments should allow them to complete appropriate chemical calculations. For a viscosity experiment, a calculation using the formula $\frac{1}{t}$ is **not** an appropriate calculation, as relative rate is not a measure of viscosity. Experiments must have measurable outcomes, appropriate for a centre laboratory and the equipment available in each centre, which can provide candidates with a range of values for the independent and dependent variables. For example, measuring the enthalpy of combustion of different brands of the same alcoholic drink would not yield data that a candidate could easily process.

A candidate's aim must be specific to the experiment they conduct, and they must not bring a copy of it into the write-up stage.

Teachers and lecturers should pay particular attention to the instructions relating to experimental research and internet or literature research on pages 6 and 7 of the Higher Chemistry Assignment Assessment Task. Underlying chemistry must be relevant to the experiment the candidate conducts. For example, an experiment investigating the effect of temperature on rate of reaction would not link to other factors affecting rate, such as concentration and particle size. Candidates must collect their own data for underlying chemistry and for a comparative source. Centres cannot provide packs of possible sources or allow candidates to make copies of each other's sources. Extracts from internet sources should be unedited. Candidates cannot take a pre-prepared set of notes into the write-up stage.

Teachers and lecturers must not give candidates full experimental instructions, for example, previous versions of the Higher Chemistry prescribed practical activity or instruction sheets. Experimental instructions must not contain information on the number of repeats and sample calculations.

Teachers and lecturers should advise candidates to graph calculated experimental values to allow for comprehensive analysis and evaluation. Best-fit straight lines and smooth curves must fit the data collected. Candidates should avoid including points not collected, for example, the origin. Correct graphing allows candidates to make better-informed comparisons between experimental and internet data and provides evidence for evaluative comments.

Teachers and lecturers should pay particular attention to the instructions relating to supervision and control and redrafting in the 'Report stage' section on pages 4 and 7 to 9 of the Higher Chemistry Assignment Assessment Task. Candidates should take their raw experimental data into the report writing stage. This may be tabulated, however, must not include additional blank or pre-populated columns for mean or derived values. Candidates should not input mean and/or derived data into a pre-populated table. However, if candidates bring in a pre-populated table, then they should either extend their table of raw data or produce a new table during the write-up stage. Candidates must ensure that they complete labels and units for both raw and mean and/or derived data in the report writing stage.

Teachers and lecturers should ensure that candidates understand that their analysis needs to include comments about the relationship between their experimental data and their internet data. Candidates must also understand that they need to compare and discuss data values within and between the two data sets.

Teachers and lecturers should make sure candidates understand that their conclusion must cover all the data in their report. If there is no agreement between their internet data and their experimental data, then they must state that there is no agreement and that they cannot draw a conclusion.

Teachers and lecturers must not scrutinise candidate reports, provide candidates with feedback, or allow them to redraft. Teachers and lecturers must ensure the assignments are kept securely until they are submitted to SQA.



 

Teachers, lecturers and candidates should use all the materials on our Understanding Standards website. Last session, we added more examples on the brief summary, analysis and evaluation.

# Appendix: general commentary on grade boundaries

Our main aim when setting grade boundaries is to be fair to candidates across all subjects and levels and to maintain comparable standards across the years, even as arrangements evolve and change.

For most National Courses, we aim to set examinations and other external assessments and create marking instructions that allow:

- a competent candidate to score a minimum of 50% of the available marks (the notional grade C boundary)
- a well-prepared, very competent candidate to score at least 70% of the available marks (the notional grade A boundary)

It is very challenging to get the standard on target every year, in every subject, at every level. Therefore, we hold a grade boundary meeting for each course to bring together all the information available (statistical and qualitative) and to make final decisions on grade boundaries based on this information. Members of our Executive Management Team normally chair these meetings.

Principal assessors utilise their subject expertise to evaluate the performance of the assessment and propose suitable grade boundaries based on the full range of evidence. We can adjust the grade boundaries as a result of the discussion at these meetings. This allows the pass rate to be unaffected in circumstances where there is evidence that the question paper or other assessment has been more, or less, difficult than usual.

- The grade boundaries can be adjusted downwards if there is evidence that the question paper or other assessment has been more difficult than usual.
- The grade boundaries can be adjusted upwards if there is evidence that the question paper or other assessment has been less difficult than usual.
- Where levels of difficulty are comparable to previous years, similar grade boundaries are maintained.

Every year, we evaluate the performance of our assessments in a fair way, while ensuring standards are maintained so that our qualifications remain credible. To do this, we measure evidence of candidates' knowledge and skills against the national standard.

For full details of the approach, please refer to the Awarding and Grading for National Courses Policy.



 