Course report 2025

National 5 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: 15,894

Number of resulted entries in 2025: 15,211

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	6,894	45.3	45.3	89
B	3,020	19.9	65.2	75
C	2,203	14.5	79.7	62
D	1,781	11.7	91.4	48
No award	1,313	8.6	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

Marker and centre feedback suggested that the question paper was fair and that the allocated time was appropriate, allowing candidates to answer all questions.

Candidates were able to access the full range of marks and the question paper provided good differentiation and discrimination.

Section 1 performed as intended.

Section 2 was less demanding than intended for stronger candidates. We considered this when setting grade boundaries.

Assignment

The assignment performed as expected. Candidates were able to access the full range of marks and the assignment provided good differentiation.

Assignments covered a range of topics, including rates of reaction, conductivity, electrochemical cells and, to a much lesser degree than in previous years, alcohols as fuels.

Section 2: comments on candidate performance

Areas that candidates performed well in

Question paper

Section 1 (objective test)

Question 1 Most candidates placed an element into a group from its electron arrangement.

Question 2 Most candidates gave the number of protons and electrons from a nuclide notation.

Question 3 Most candidates identified the name of a compound containing three atoms.

Question 5 Many candidates identified a compound that would conduct at a given temperature.

Question 6 Most candidates identified an oxide that would form an alkaline solution in water.

Question 7 Most candidates identified a correct statement to describe the effect of adding water to an acid.

Question 8 Most candidates identified the calculation used to calculate the percentage by mass of an element from a formula given the gram formula mass (GFM).

Question 9 Many candidates identified the charge on an ion from a chemical formula.

Question 10 Most candidates identified a cycloalkane from a description.

Question 11 Most candidates identified the general formula for a homologous series from three structures.

Question 13 Many candidates named a carboxylic acid from a structure.

Question 14 Most candidates identified the structure that matches a shortened structural formula.

Question 15 Many candidates identified the alkene that would not produce two products when reacted with water.

Question 16 Most candidates calculated the energy released by 60 g of fuel given the energy from 5 g of the fuel.

Question 17 Many candidates identified that negative ions are not involved in metallic bonding.

Question 18 Most candidates identified a metal that would produce a voltage greater than zinc and less than magnesium when paired with silver in an electrochemical cell.

Question 20 Most candidates identified that platinum would be recovered unchanged in the Ostwald process.

Question 21 Most candidates identified the nuclide notation for a proton.

Question 22 Most candidates identified a compound that could be prepared by precipitation.

Question 23 Most candidates read the volume from a diagram of a burette.

Question 24 Many candidates calculated the concordant volume from a table of titre values.

Question 25 Many candidates identified the most appropriate piece of apparatus to measure 10 cm^3 of a solution.

Section 2 (restricted-response questions and extended-response questions)

Question 1(a)(i) Many candidates stated the test and result for hydrogen gas.

Question 1(a)(ii) Most candidates described a way in which the student's diagram was incorrect.

Question 1(a)(iii) Many candidates named the technique used to obtain a dry sample of a soluble salt. Some candidates incorrectly gave filtration as the method.

Question 1(b)(i) Most candidates gained 2 marks for correctly calculating the average rate of reaction from a graph of volume of gas produced over time.

Question 1(b)(ii) Many candidates added a curve to the graph to show a change in rate.

Question 2(b) Most candidates named an element with similar chemical properties to oxygen.

Question 2(c) Most candidates stated the relationship between temperature and solubility from a graph.

Question 2(d)(i) Most candidates stated the name used to describe the shape of an oxygen fluoride molecule.

Question 2(d)(ii) Many candidates circled the words to give the charge of the nuclei and the particles shared in a covalent bond.

Question 3(a)(i) Many candidates drew the monomer from a repeating unit.

Question 3(a)(ii) Many candidates stated the term used to describe a molecule containing two atoms. A few candidates incorrectly gave the answer 'diatomic element' or 'diatomic compound'.

Question 3(b)(i) Most candidates gained 2 marks for completing a bar graph given the labels and scale. Some candidates did not accurately plot bars using the scale provided.

Question 3(b)(ii)	Most candidates suggested that PVC was unsuitable for storing boiling water as its melting point is below the boiling point of water.
Question 4(a)	Many candidates named the carboxyl group from a structural formula.
Question 4(b)(i)	Most candidates named the type of addition reaction involving the addition of hydrogen.
Question 4(b)(ii)	Most candidates stated what is meant by the term ‘catalyst’.
Question 4(d)	Most candidates identified the medicine described as an antagonist from a table of information.
Question 5(a)	Many candidates stated what is meant by the term ‘fuel’. Some candidates did not mention burning or combustion in their answer.
Question 5(b)(i)	Many candidates drew a structure for a branched hydrocarbon from a systematic name.
Question 5(d)(ii)	Many candidates gained 2 marks for explaining why ethanol has a higher boiling point than methanol. Some candidates gained 1 mark.
Question 7(a)	Most candidates stated the part of the atom responsible for radioactive decay.
Question 7(b)(i)	Many candidates named the elements present in a compound.
Question 7(c)(i)	Many candidates named the element formed in a nuclear decay equation.
Question 7(c)(ii)	Most candidates gained 2 marks for calculating the length of the half-life for a radioisotope.
Question 7(d)(i)	Most candidates completed the scale on a half-life graph.

Question 8(a)	Many candidates stated the meaning of the Latin term ‘moles’ as given in the passage.
Question 8(b)	Many candidates wrote the nuclide notation given the number of protons and neutrons in the passage.
Question 8(e)	Most candidates completed a table of the number of atoms given a worked example in the passage.
Question 9(a)(i)	Most candidates gave the term ‘isotopes’ to describe two possible structures of a molecule.
Question 9(c)(i)	Most candidates explained why a draught shield improves the accuracy of the results.
Question 9(c)(ii)(A)	Most candidates calculated the average temperature change of the water given three experimental results.
Question 9(c)(ii)(B)	Many candidates gained all 3 marks for calculating the energy absorbed by water. Few candidates gained partial marks because they did not convert the mass of water into kilograms.
Question 10(a)(i)	Many candidates stated the term used to describe liquids in which substances dissolve.
Question 10(a)(ii)(A)	Many candidates named the monomer from a polymer name.
Question 10(b)(i)	Most candidates named a titration from a diagram.
Question 10(b)(ii)	Many candidates suggested why an indicator is used in a titration.
Question 11(a)	Most candidates named the salt produced in a reaction given a formula equation.

Question 11(b) Many candidates calculated the mass of a chemical used to prepare a solution of given volume and concentration. Some candidates gained partial marks for this calculation because they did not convert the volume of water into litres when they calculated the number of moles.

Question 11(d)(i) Most candidates stated the term for a reaction that releases heat energy.

Question 11(d)(ii)(A) Many candidates calculated the enthalpy change on a potential energy diagram given a fully worked example.

Question 11(d)(ii)(B) Most candidates gained 2 marks for circling the words to describe the effect of a catalyst on both the activation energy and enthalpy change from a potential energy diagram, showing the original reaction and the reaction with a catalyst. Few candidates gained 1 mark for only correctly circling the word for one of the effects.

Assignment

Section 1 Most candidates provided an aim for their investigation.

Section 3(b) Most candidates provided sufficient raw data from their experimental procedure.

Section 3(e) Most candidates provided an internet or literature source relevant to their experiment.

Section 3(f) Most candidates provided an appropriate reference for their internet or literature source.

Section 4(a) Most candidates selected an appropriate graph type by plotting either points or bars.

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(a) Most candidates provided an appropriate title for their report.

Section 8(b) Most candidates provided a clear and concise report.

Areas that candidates found demanding

Question paper

Section 1 (objective test)

Question 4 Some candidates identified the bonding and structure never found in elements.

Question 12 Some candidates identified a formula mass that belongs to a different homologous series from the other.

Question 19 Some candidates identified a reaction that was not redox.

Section 2 (restricted-response questions and extended-response questions)

Question 1(b)(iii) Few candidates predicted the volume when using hydrochloric acid in place of sulfuric acid.

Question 2(a) Some candidates answered with a diagram showing all the outer electrons in a molecule of oxygen. Many candidates did not correctly show the presence of two pairs of bonding electrons.

Question 4(c) Some candidates circled the chiral carbon in a molecule given a worked example. Many candidates did not correctly identify a shortened methyl group as being the same as an expanded methyl group.

Question 5(b)(ii)	Some candidates stated the test including the result to distinguish between an alkane and an alkene. Many candidates did not make it clear which chemical would decolourise the bromine or that it is the bromine rather than the hydrocarbon that is decolourised.
Question 5(c)(i)	Some candidates stated the effect that increasing the number of branches in isomeric hydrocarbons has on the flashpoint, from a table of data.
Question 5(c)(ii)	Some candidates predicted the flashpoint of an alkane, given its structure and a table of named alkanes and flashpoints.
Question 5(d)(i)	Some candidates suggested why oxygenates help petrol burn.
Question 6	Few candidates gained 3 marks for demonstrating a good understanding of the chemistry of fertilisers. Some candidates gained 2 marks for demonstrating a reasonable understanding. Many candidates gained 1 mark for demonstrating a limited knowledge.
Question 7(b)(ii)	Some candidates stated that the half-life of a radioisotope is unchanged whether in an element or compound.
Question 7(d)(ii)	Some candidates correctly labelled the axis on the half-life graph. Many candidates gave the label as ‘years’ without including ‘time’.
Question 8(c)	Some candidates calculated the mass of water by using the passage to identify that the number of molecules given was equivalent to one mole.
Question 8(d)	Some candidates suggested why electrons were not considered when calculating the mass of a carbon atom.

Question 9(a)(ii) Some candidates gained 2 marks for drawing and naming one of the structures of propanol. Some candidates gained 1 mark for a name or a structure.

Question 9(b) Some candidates balanced an equation for the combustion of an alcohol. Many candidates balanced both the carbon and the hydrogen atoms but did not balance the oxygen atoms.

Question 10(a)(ii)(B) Some candidates suggested why a molecule could not be used as a monomer in addition to polymerisation.

Question 10(b)(iii) Some candidates gained all 3 marks in a titration calculation. Few candidates gained partial marks for this calculation because they used formula masses, which is the wrong concept for this question.

Question 11(c) Some candidates named the substance missing from a formula equation for a neutralisation reaction.

Question 12 Few candidates gained 3 marks for demonstrating a good understanding of how to place metals into a reactivity series. Some candidates gained 2 marks for demonstrating a reasonable understanding. Some candidates gained 1 mark for demonstrating a limited knowledge.

Assignment

Section 2 Few candidates demonstrated a good understanding of the underlying chemistry related to their chosen topic. Some candidates demonstrated a reasonable understanding. Some candidates demonstrated a limited understanding.

Section 3(a) Some candidates summarised their experimental method. Many candidates did not clearly describe what they were changing and measuring in their experiment.

Section 7 Some candidates gained 2 marks for identifying a factor that had a significant effect on their experimental procedure and what they could have done or did do to minimise this effect. Few candidates identified a significant factor but not the fix for this factor. Many candidates did not gain any marks in this section. Many candidates did not evaluate the experimental procedure. Instead, they simply referred to repeating their experiment.

Section 3: preparing candidates for future assessment

Teachers and lecturers should refer to the National 5 Chemistry Course Specification, which is available on our website.

Question paper

Teachers and lecturers should make sure candidates are familiar with the command words used in the question paper and ensure that they understand the response expected. Candidates should know that when a 2-mark question asks for an explanation, they must demonstrate a deeper understanding of the concept to achieve full marks.

Candidates should learn basic 'routines' for different types of calculations, in particular titration calculations.

In all calculations worth more than 1 mark, candidates should be aware that credit is given for the correct demonstration of chemical concepts or for intermediate results in a multi-step calculation. Teachers and lecturers should encourage candidates to show their working clearly, to maximise their chances of obtaining marks.

Candidates should be prepared to answer questions involving calculations with a mole ratio other than 1:1, 1:2 or 2:1.

Teachers and lecturers should remind candidates that page 3 of the data booklet contains relationships that they can use for National 5 calculations.

Candidates should understand that they must correctly round their answers in all calculations.

Candidates should understand that if a unit is provided in the stem of a question, they do not need to state the unit with their answer. If a candidate does provide a unit, it must be correct, otherwise they will miss out on available marks. The use of incorrect units is only penalised once across the question paper.

Teachers and lecturers should encourage candidates to learn the chemistry definitions provided in the National 5 Chemistry Course Specification.

Teachers and lecturers should encourage candidates to learn chemical tests, processes, and chemical reactions, such as the tests for common gases and the test for unsaturation.

When writing formulae, charges must be superscript, and numbers of atoms and ions must be subscript. Many candidates miss out on marks due to errors in writing chemical symbols, particularly due to incorrectly using uppercase or lowercase letters, and in the position and size of numbers and charges in a formula.

Candidates should know that when drawing organic structures, they must draw the bond connections to familiar functional groups correctly. Some candidates miss out on marks due to errors in the bond connections within organic structures.

Teachers and lecturers should make sure that candidates complete a variety of practical work. This deepens their knowledge and understanding and develops practical laboratory skills. The National 5 Chemistry Course Specification explains the common chemical apparatus, general practical techniques, analytical methods and reporting of experimental work that candidates must be familiar with.

Candidates benefit from opportunities to practise answering open-ended questions. Candidates should be aware that, while there are no definitive answers to open-ended questions, their answer should make statements that are relevant to the situation or problem given. If a candidate is asked to describe how a student could investigate a chemical reaction or carry out an experiment, they should be prepared to mention planning or designing an experimental procedure.

Assignment

Teachers and lecturers should refer to the most up-to-date National 5 Chemistry Assignment Assessment Task on our website. They must apply the conditions of assessment for the assignment fully. Teachers and lecturers must provide candidates with the 'Instructions for candidates' section from the assignment assessment task and encourage them to use the outline structure. Teachers and lecturers must not alter the 'Instructions for candidates' section. Candidates must not use templates in the report writing stage.

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 National 5 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 National 5 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.

Candidates should choose topics that allow them to carry out experiments appropriate to National 5 Chemistry. It is also important that candidates can describe the chemistry of their chosen topic. The reaction between an acid and a metal carbonate lends itself well to investigating rate of reaction, however, variables such as type of metal carbonate do not often yield good results and most candidates do not demonstrate a good understanding of the chemistry involved. Candidates should also know that for this reaction, and the reaction of acids and metals, the term 'dissolving' in place of reacting is not correct. Some candidates miss out on marks in their assignment due to this.

Candidates must carry out an experiment that allows them to make measurements, and they must include these measurements in their report. This includes initial mass and final mass. Change in mass and change in temperature on their own is not raw data and would not be sufficient for the marks in section 3(b). Candidates must understand that their choice of internet or literature source should allow them to make a comparison with their experimental results. They must give their reference for the internet or literature source immediately before, after or alongside their internet or literature source.

Teachers and lecturers should pay particular attention to the instructions relating to supervision and control and redrafting in the 'Report stage' section on pages 7 to 9 of the National 5 Chemistry Assignment Assessment Task. Candidates should take their raw data into the report writing stage (this includes pre-populated tables of raw data). 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 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.

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.