



Course report 2023

National 5 Biology

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 in conjunction with the published assessment documents and marking instructions.

The statistics in the report were compiled before any appeals were completed.

Grade boundary and statistical information

Statistical information: update on courses

Number of resulted entries in 2022: 22,576

Number of resulted entries in 2023: 22,937

Statistical information: performance of candidates

Distribution of course awards including minimum mark to achieve each grade

A	Number of candidates	7,848	Percentage	34.2	Cumulative percentage	34.2	Minimum mark required	77
B	Number of candidates	4,704	Percentage	20.5	Cumulative percentage	54.7	Minimum mark required	65
C	Number of candidates	4,170	Percentage	18.2	Cumulative percentage	72.9	Minimum mark required	53
D	Number of candidates	3,292	Percentage	14.4	Cumulative percentage	87.3	Minimum mark required	41
No award	Number of candidates	2,923	Percentage	12.7	Cumulative percentage	100	Minimum mark required	N/A

Please note that rounding has not been applied to these statistics.

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

In this report:

- ◆ 'most' means greater than 70%
- ◆ 'many' means 50% to 69%
- ◆ 'some' means 25% to 49%
- ◆ 'a few' means less than 25%

You can find more statistical reports on the [statistics and information](#) page of SQA's website.

Section 1: comments on the assessment

Question paper

Overall, the question paper proved to be slightly less demanding than intended especially in section 1. This was taken into account when setting grade boundaries.

Markers commented that the question paper was fair and balanced. Most candidates made a good attempt at answering most of the questions; however, the number of unanswered questions was similar to previous years.

The question paper was designed to provide a spread of marks across the course and to give candidates the opportunity to display a range of skills, as well as demonstrating and applying their knowledge and understanding.

Literary skills and knowledge of practical apparatus and experimental set up continues to be a problem area for candidates. However, there was an improvement in numerical skills.

Assignment

The requirement to complete the assignment was removed from the course for session 2022–23.

Section 2: comments on candidate performance

Areas that candidates performed well in

Question paper

Section 1 (objective test)

- Question 1 Most candidates were able to identify the structures common to both plant and animal cells.
- Question 3 Most candidates were able to identify the complementary base sequence for a strand of DNA.
- Question 7 Most candidates were able to calculate the volume of oxygen used by an earthworm in 1 minute.
- Question 8 Most candidates were able to identify a role of stem cells in the human body.
- Question 9 Most candidates were able to correctly identify the functions controlled by each part of the brain.
- Question 14 Most candidates were able to correctly identify the experimental set up that would allow a valid comparison of two plant species.
- Question 18 Most candidates were able to define a niche.
- Question 22 Most candidates were able to use a formula to calculate the highest accumulation factor.
- Question 23 Most candidates were able to identify the correct conclusion using data in a graph.

Section 2 (structured and extended response)

- Question 1(a)(i) Most candidates were able to name a structure found in both bacterial and fungal cells.
- Question 1(a)(ii) Most candidates were able to name the material cellulose.
- Question 2(b)(iii) Most candidates were able to identify the term turgid when describing a plant cell.
- Question 3(a) Most candidates were able to identify the names of the DNA bases adenine and cytosine.
- Question 5(a) Most candidates were able to name the process of genetic engineering.
- Question 5(b) Most candidates were able to name a plasmid.

- Question 8(c)(i) Most candidates were able to correctly select data from a line graph.
- Question 9(a)(i) Most candidates were able to correctly select data from a bar graph.
- Question 10(a)(ii) Most candidates were able to name the organ where the male gametes are produced.
- Question 11(c) Most candidates were able to correctly calculate the percentage of patients.
- Question 12(a)(ii) Most candidates were able to describe a relationship using data from a table and a graph.
- Question 12(a)(iii) Most candidates were able to use data to correctly predict the average red blood cell count of an athlete.
- Question 13(a) Most candidates were able to give an ecological term to describe an organism in a food web.
- Question 14(a) Most candidates were able to use information in a table to correctly complete a paired statement key.

Areas that candidates found demanding

Question paper

Section 1

- Question 2 Many candidates had difficulty identifying the solution with the highest sugar solution when given the mass of potato after one hour.
- Question 4 Many candidates were unable to identify statements that were true for proteins.
- Question 15 Some candidates were unable identify statements describing features of veins.
- Question 16 Some candidates struggled to identify the nutrients that are absorbed into the lacteal.
- Question 20 Some candidates were unable to identify limiting factors on the rate of photosynthesis when presented as a graph.

Section 2

- Question 2(a) Most candidates did not mention that membrane proteins were involved in active transport.
- Question 2(b)(ii) Many candidates were unable to name the vessels involved in water transport in plants.
- Question 3(a)(ii) Many candidates were unable to calculate the total number of bases in a DNA strand.
- Question 4(a)(ii) Many candidates did not mention 'active site' when describing a feature of pepsin that allows it to bind with only one substrate.
- Question 4(c) Most candidates were unable to identify the optimum pH as 2.4 from a graph showing results of an enzyme experiment when the y axis label was 'protein remaining after 24 hours (%)'. Most candidates interpreted this as enzyme activity identifying the incorrect pH.
- Question 5(c) Many candidates incorrectly stated that the modified plasmid would be placed 'back' into the bacterial cell.
- Question 6(b)(i) Few candidates were able to correctly identify the variable altered in the investigation.
- Question 6(b)(ii) Many candidates were unable to suggest a variable that would have to be controlled to ensure validity.
- Question 6(c) Many candidates were unable to give a reason for using a control in the investigation.
- Question 8(d) Many candidates were unable to name another type of stem cell.
- Question 9(b)(i) Most candidates were unable to explain why insulin did not affect cells in other organs.
- Question 11(b) Most candidates were unable to suggest that the same number of capsules would improve the validity of the study.
- Question 12(b)(i) Many candidates were unable to name oxyhaemoglobin.
- Question 14(b)(i) Most candidates were unable to state the reliability of the results would be improved.
- Question 14(b)(ii) Many candidates found difficulty in describing how to minimise error when using a moisture meter.
- Question 16(b)(i) Many candidates were unable to name the process by which oxygen moves out of the leaf.
- Question 16(c)(i) Many candidates were unable to describe how sugar was produced in the second stage of photosynthesis.

Section 3: preparing candidates for future assessment

The National 5 Biology Course Specification explains the overall structure of the course, including its purpose and aims as well as information on the skills, knowledge and understanding required. Course support notes are provided as an appendix to the document. Both the key areas and the depth of knowledge can be assessed in the question paper.

Centres must ensure that they are using the most up-to-date versions of all documents, which are available on SQA's website.

Question paper

Candidates need to spend time consolidating the mandatory knowledge and understanding of the course. Centres should build revision exercises into their delivery of the course to ensure that candidates are spending enough time learning terminology and definitions.

As well as demonstrating their knowledge and understanding, candidates must be able to apply their knowledge, which allows them to show greater understanding. Many candidates find this difficult and do not cope well with questions of this nature. Centres should provide opportunities for candidates to practise questions set in new and unfamiliar situations.

Teachers and lecturers should remind candidates to take time to read all parts of each question, not just the introduction, with care and attention so they do not miss important pieces of information. Too often candidates incorrectly interpret what they have to do and, therefore, their responses are not appropriate to the question asked.

As in previous years, candidates had difficulty distinguishing between questions that ask them to 'describe' and those that ask them to 'explain'. Many candidates gave an inadequate answer to these types of questions. Teachers and lecturers should practise both types of questions with candidates. Information on valid responses to command words can be found in the general marking principles within the marking instructions.

Candidates coped well with the extended response question (question 15). In a change from last year, candidates had not been given prior information regarding the key area that would be assessed in this question, and many were able to access marks.

Candidates coped well with the scientific literacy question (question 11). This type of question mirrors the research skills used in the assignment and aims to help develop scientific and critical thinking in candidates. Candidates struggled with the idea of validity but coped well with the rest of the question. Candidates should be encouraged to be critical of the research they encounter.

Centres are reminded that the table of apparatus and techniques included in the course specification is an assessable part of the course.

Candidates' responses to questions involving calculations were stronger than previous years with fewer candidates failing to attempt these questions than seen in previous years.

Candidates should continue to review their responses to calculations, checking to see if they are feasible, as some answers were unrealistic.

Some candidates' literacy and spelling continue to be weak when naming and stating biological terms.

Candidates can use pencils to draw graphs and diagrams. Candidates should not use pencils for their other responses as markers can find these responses difficult to read.

Candidates' responses to experimental set up questions showed a lack of understanding, particularly when referring to validity, reliability, and controls. Teachers and lecturers should incorporate practical work into the course wherever possible to reinforce learning and provide opportunities for data analysis and evaluation. Candidates should be given opportunities to evaluate experimental design and results. The reintroduction of the assignment for session 2023-24 should provide opportunities for candidates to do this.

Assignment

We removed the assignment from the National 5 Biology course for session 2021-22 and session 2022-23. From session 2023-24 the National 5 Biology course will return to full assessment requirements.

The National 5 Biology Assignment Assessment Task outlines the assessment conditions for the assignment. It is important to note that the assessment requirements have not changed. The information below, from section 3 of the 2019 course report may support centres preparing candidates for the assignment.

The choice of topic for the assignment needs to be carefully considered to ensure candidates have the opportunity to access all of the marks. Centres should consider a variety of topics that lend themselves to carrying out experimental work. This not only gives more experience at engaging in practical work to increase skills but could allow candidates a choice of topic for their assignment.

An appropriate title should be provided for the report. This should provide information about the content of the report, but not be a reiteration of the aim. Teachers and lecturers must discuss the aim with each candidate and advise them on the suitability of the aim before the candidate proceeds.

Teachers and lecturers should not assist candidates in relation to the wording of the aim, but they can check to ensure that it is a feasible investigation. Centres should discourage candidates from providing multiple aims as they rarely manage to address all of them in the conclusion section.

All candidates are required to take an active part in experimental work or fieldwork. The nature of this must allow candidates to gather data that they can use in the report stage. In previous years, candidates often failed to gain marks in the analysis and conclusion. These involve skills that can be developed through practical work carried out during the course. Evaluation skills can also be developed in this way.

Candidates must ensure that in the analysis and conclusion sections they are not just restating results but discussing trends and patterns and highlighting similarities and differences. Conclusions must relate to the aim and be supported by all of the evidence in the report. There is no word count for the assignment, however, candidates are permitted 1 hour and 30 minutes to complete their report. The report stage must be conducted under a high degree of supervision and control. It may be completed in one session or over more sessions. Candidates' work must be retained and stored securely between sessions. Giving feedback to candidates, marking by centre staff, or redrafting by candidates is not permitted.

Centres must ensure that they are adhering to the conditions of assessment in the Assignment Assessment Task and are applying them fully. The issuing of pre-prepared tables for candidates is not permitted. Candidates must prepare their own tables, individually, to record the data they collect.

The instructions for candidates must not be altered and template answer sheets for candidates are not allowed. SQA takes very seriously its obligation to ensure fairness and equity for all candidates in all qualifications through consistent application of assessment conditions and investigates all cases alerted to us where conditions may not have been applied.

Appendix: general commentary on grade boundaries

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

For most National Courses, SQA aims 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, SQA holds 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 SQA's 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. SQA 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.

Grade boundaries from question papers in the same subject at the same level tend to be marginally different year on year. This is because the specific questions, and the mix of questions, are different and this has an impact on candidate performance.

This year, a package of support measures was developed to support learners and centres. This included modifications to course assessment, retained from the 2021–22 session. This support was designed to address the ongoing disruption to learning and teaching that young people have experienced as a result of the COVID-19 pandemic while recognising a lessening of the impact of disruption to learning and teaching as a result of the pandemic. The revision support that was available for the 2021–22 session was not offered to learners in 2022–23.

In addition, SQA adopted a sensitive approach to grading for National 5, Higher and Advanced Higher courses, to help ensure fairness for candidates while maintaining

standards. This is in recognition of the fact that those preparing for and sitting exams continue to do so in different circumstances from those who sat exams in 2019 and 2022.

The key difference this year is that decisions about where the grade boundaries have been set have also been influenced, where necessary and where appropriate, by the unique circumstances in 2023 and the ongoing impact the disruption from the pandemic has had on learners. On a course-by-course basis, SQA has determined grade boundaries in a way that is fair to candidates, taking into account how the assessment (exams and coursework) has functioned and the impact of assessment modifications and the removal of revision support.

The grade boundaries used in 2023 relate to the specific experience of this year's cohort and should not be used by centres if these assessments are used in the future for exam preparation.

For full details of the approach please refer to the [National Qualifications 2023 Awarding — Methodology Report](#).