



Course report 2022

Subject	Environmental Science
Level	National 5

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. It would be helpful to read this report in conjunction with the published assessment documents and marking instructions.

The statistics used in this report have been compiled before the completion of any appeals.

Grade boundary and statistical information

Statistical information: update on courses

Number of resulted entries in 2022	350
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Statistical information: performance of candidates

Distribution of course awards including grade boundaries

A	Percentage	17.7	Cumulative percentage	17.7	Number of candidates	60	Minimum mark required	65
B	Percentage	22.6	Cumulative percentage	40.3	Number of candidates	80	Minimum mark required	53
C	Percentage	23.4	Cumulative percentage	63.7	Number of candidates	85	Minimum mark required	42
D	Percentage	22.6	Cumulative percentage	86.3	Number of candidates	75	Minimum mark required	30
No award	Percentage	13.7	Cumulative percentage	N/A	Number of candidates	50	Minimum mark required	N/A

You can read the general commentary on grade boundaries in appendix 1 of this report.

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 page of [SQA's website](#).

Section 1: comments on the assessment

Question paper

The majority of the question paper performed as expected. Feedback from the marking team and teachers and lecturers indicated it was received positively by centres and was fair and accessible for candidates. Most candidates understood what was required and completed the question paper in the allocated time.

There were some candidates who appeared to have been presented at an inappropriate level as they struggled to access many of the questions.

A number of questions were more demanding than expected. These included questions 3(a)(ii), 5(c)(i), 5(c)(ii), and 7(b)(i).

Assignment

The assignment component was removed for session 2021–22.

Section 2: comments on candidate performance

Question paper

Question 1(a)(i)	Many candidates could suggest a human activity that may have led to the extinction of the beaver population in Scotland 400 years ago. A few candidates did not take account of the time period given in the question and suggested modern issues such as cars.
Question 1(a)(ii)	Few candidates could name the national organisation responsible for advising the Scottish Government about the beaver trial.
Question 1(b)(i)	Many candidates could give an example of an invasive non-native species (INNS) found in Scotland.
Question 1(b)(ii)	Some candidates could explain how the introduction of an INNS can lead to a reduction in biodiversity.
Question 2(a)	Most candidates were able to identify the correct type of weathering shown in each photograph.
Question 2(b)	Most candidates were unable to provide a full and correct description of the differences between weathering and erosion. It was evident that most candidates did not know how the two differ.
Question 3(a)(i)	Many candidates were able to define the term 'non-renewable' correctly.
Question 3(a)(ii)	Most candidates calculated the percentage difference incorrectly. Where working was shown in some of the incorrect answers there was an indication that candidates had included nuclear as a fossil fuel.
Question 3(b)(i)	Some candidates were able to give the energy change involved in a hydro-electric power scheme.
Question 3(b)(ii)	Most candidates were able to give one environmental impact of hydro-electric power schemes but only some could then give a second impact.
Question 3(b)(iii)	Most candidates could name two other types of renewable energy.
Question 3(c)(i)	Few candidates were able to give an accurate description of how crude oil is formed.
Question 3(c)(ii)	Some candidates were able to name the process used to obtain products such as fuel oil from crude oil.
Question 3(c)(iii)	Most candidates were unable to describe the role of temperature in the separation of products. A lack of appropriate scientific language and terminology was an issue in many responses to this question.

Question 4(a)(i)	Most candidates could select the best type of plastic for making laboratory safety glasses, using the information given in the table.
Question 4(a)(ii)	Some candidates were able to give a full explanation of their selection. However, some merely restated the headings given in the table and made no attempt to explain why being transparent or being resistant to chemicals were important.
Question 4(a)(iii)	Many candidates were able to use information from the table to explain why LDPE plastics may be easier to remove from oceans than PE plastics.
Question 4(b)(i)	Most candidates produced a high-quality bar graph. However, as indicated by the use of the spare grid, it was common to see that many graphs were completed successfully only on the second attempt.
Question 4(b)(ii)	Many candidates were able to calculate how much money would be raised from selling the LDPE plastic.
Question 4(c)	Many candidates made appropriate suggestions for encouraging recycling, from their knowledge of environmental science.
Question 5(a)	Few candidates were able to define the term 'groundwater'. A quite common incorrect response was 'puddles'.
Question 5(b)(i)	Many candidates were able to suggest one reason why some areas have less time when water is available for abstraction, but few could suggest two reasons.
Question 5(b)(ii)	Most candidates were able to state one use for abstracted water in agriculture and many were able to state two uses.
Question 5(b)(iii)	Some candidates were able to calculate the volume of water abstracted for 'other uses'. A common incorrect response was to calculate the volume abstracted for public water supply.
Question 5(c)(i)	Most candidates were unable to suggest why the impact of drought is likely to be more severe in the summer after a dry winter.
Question 5(c)(ii)	Many candidates were unable to suggest an appropriate impact on humans of summer drought in England. Responses suggested that candidates had not focused on 'in England', and instead gave responses that related to drought in parts of Africa, perhaps based on adverts or television programmes they had seen.
Question 5(c)(iii)	Most candidates were able to suggest a method of water conservation in the home.

Question 5(d)(i)	Most candidates were unable to provide a full and correct definition for indicator species.
Question 5(d)(ii)	Somewhat surprisingly, most candidates were unable to suggest a waste product that may enter a river resulting in a low oxygen concentration in the water.
Question 5(d)(iii)	Many candidates were able to state another role of SEPA.
Question 6(a)(i)	Many candidates were able to identify correctly the two terms that applied to barley as a resource.
Question 6(a)(ii)	Many candidates were able to use the information in the diagram to identify two other resources used in making whisky.
Question 6(b)	Some candidates were able to calculate the simplest whole number ratio. Common errors included not expressing the numbers in their simplest form.
Question 6(c)(i)	Most candidates were unable to describe, using appropriate scientific language and terminology, the technique for using the equipment for their chosen abiotic factor. Only a few candidates scored full marks for this question. Responses suggested that many candidates were unfamiliar with the practical work or fieldwork associated with the appropriate techniques.
Question 6(c)(ii)	Many candidates were unable to suggest a method that the distillery could use to reduce its water usage in the manufacturing process. Instead, many focused on general methods such as 'low-flush toilets' and 'use toilet hippos', rather than the manufacturing process.
Question 6(c)(iii)	Many candidates were able to give either an advantage or a disadvantage of using biomass. However, many were unable to give both.
Question 7(a)	Although many candidates identified gas X as oxygen, the number that did so was disappointing given that nitrogen and other gases including carbon dioxide had been identified for them.
Question 7(b)(i), (ii)	Most candidates were unable to describe fully the role of greenhouse gases in the natural greenhouse effect, using appropriate scientific language and terminology. Only a few high-attaining candidates scored full marks for these questions. Responses often focused on the anthropogenic greenhouse effect rather than the natural greenhouse effect, despite natural being emboldened in the question.
Question 7(c)(i), (ii)	Many candidates were unable to name processes involved in the carbon cycle.

Question 8(a)	Most candidates were unable name substance Y involved in the nitrogen cycle.
Question 8(b)(i), (ii)	Most candidates were unable to recall the details of the involvement of root nodules in the nitrogen cycle.
Question 8(c)	Many candidates were able to describe either an advantage or a disadvantage of using fertilisers. However, many were unable to describe both.
Question 8(d)(i)	Many candidates were able to describe the overall trend in the number of farmers using fertiliser. A few candidates did not focus on the overall trend.
Question 8(d)(ii)	While there has been an improvement in the number of candidates calculating percentage change correctly compared to previous exams, most are unable to do so.
Question 9(a)(i)	Many candidates made appropriate suggestions from their knowledge of environmental science and the information in Source 1.
Question 9(a)(ii)	Most candidates were able to give a suitable reason to support their prediction for what might happen to the number of hospital admissions.
Question 9(b)(i)	Most candidates were able to support their prediction, at least partially, with a suitable explanation.
Question 9(b)(ii)	Most candidates were able to use Source 1 to suggest the impact of rising sea level on the abandoned quarry.
Question 9(b)(iii)	Few candidates were able to explain whether the town could be protected by sea walls.
Question 9(c)(i)	Most candidates could state the meaning of the term habitat.
Question 9(c)(ii)	Some candidates could state a reason, other than birdlife, why an area may be designated as an SSSI.
Question 9(d)	Most candidates were able to suggest why changing plumage colour may help the bird to be better adapted to its environment.
Question 9(e)(i)	Many candidates demonstrated competence in using a paired statement key to identify the bird pictured in Source 4.
Question 9(e)(ii)	Most candidates were able to use the information in the key to describe the difference between the two named birds.
Question 9(e)(iii)(A)	Most candidates could match the bird species to the food source.

- Question 9(e)(iii)(B) Most candidates could select the bird that would be able to feed on all three burrowing animals.
- Question 9(e)(iii)(C) Many candidates were able to suggest why it is an advantage for the birds to have different diets.
- Question 9(e)(iii)(D) Many candidates were able to predict one effect of the cockles dying out.
- Question 9(f) Many candidates made a good attempt at explaining their choice of whether permission should be granted for the maritime container terminal. Candidates that didn't, often just listed points rather than expanding them and explaining the reasons for their decision.
- Essay questions Despite having advance notice of the essay topics in the exam, there was no noticeable improvement in the overall marks for the essays, other than a small improvement on the number of candidates attaining three or four marks.
- Questions 10A, 10B Some candidates produced detailed descriptions of appropriate sampling techniques, indicating that they had practical experience of using them in the field. However, some candidates included additional techniques that were inappropriate to the scenarios provided.
- Questions 11A, 11B Some candidates produced high-quality, detailed, and well-structured, extended responses that included explanations for their suggestions. However, it was common to see responses that comprised a simple list of suggestions with no accompanying explanation. Where a candidate provides only a list and does not attempt to explain their suggestions, they cannot be awarded any marks.

Section 3: preparing candidates for future assessment

Question paper

Teachers and lecturers are encouraged to incorporate the command words used in exam questions into teaching at an early stage, especially the difference between 'describe' and 'explain'.

Definitions and terminology

It is important that candidates learn definitions and have the ability to express them accurately using scientifically appropriate terminology. Acceptable definitions are listed in the National 5 Environmental Science Course Specification.

Centres should ensure that candidates are provided with a copy of the mandatory content tables and glossary available in the National 5 Environmental Science Course Specification. These will enable candidates to familiarise themselves with phrasing and terminology used at National 5.

Practical skills

Candidates **must** be given the opportunity to take an active part in a wide range of practical work and fieldwork, to develop the necessary knowledge and skills. This will help candidates with questions that ask about practical or fieldwork contexts. While demonstration of experiments, videos, and computer simulations may be useful additional tools, they cannot replace active practical or fieldwork and do not develop the knowledge and skills associated with them.

Candidates should experience the use of a variety of apparatus and techniques and be aware of the purpose and methodology of each. A list of apparatus and techniques is detailed in the National 5 Environmental Science Course Specification.

Extended responses

Candidates should consider how to structure their responses where there is an allocation of multiple marks. This will help them respond effectively. Teachers and lecturers should support candidates with practise in exam technique throughout the course for this purpose.

Past papers and marking instructions are a useful resource to show candidates the expected level and depth of response required. Centres should encourage candidates to practise past paper questions.

Centres should ensure that candidates are presented at an appropriate level.

Appendix 1: 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 including assessment modifications and revision support, was introduced to support candidates as they returned to formal national exams and other forms of external assessment. This was designed to address the ongoing disruption to learning and teaching that young people have experienced as a result of the COVID-19 pandemic. In addition, SQA adopted a more generous approach to grading for National 5, Higher and Advanced Higher courses than it would do in a normal exam year, to help ensure fairness for candidates while maintaining standards. This is in recognition of the fact that those preparing for and sitting exams have done so in very different circumstances from those who sat exams in 2019.

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 2022. 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 revision support.

The grade boundaries used in 2022 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 2022 Awarding — Methodology Report](#).