



Course report 2019

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| 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 post-results services.

Section 1: comments on the assessment

Question paper

Overall performance in the question paper was very similar to that in 2018. Candidates appear to be more confident overall in section 3, extended-response questions, than in previous years. Despite this sign of progress, few candidates gained more than three marks for each extended-response question. This is an area of the question paper that remains very challenging for the majority of candidates.

Assignment

Overall performance in the assignment showed some improvement on the previous year. Candidates attained a wide range of marks and the general quality of candidates' responses was slightly higher this year, particularly regarding numeracy and literacy.

Section 2: comments on candidate performance

Areas that candidates performed well in

Question paper

Overall, candidates performed particularly well in two questions: question 4, which was based on the waste part of the sustainability topic, and question 5, which was based on food webs from the living environment topic. This is with the exception of question 5(b)(iii) and question 5(c).

Candidates also performed well in the following questions:

Question 1(a) Almost all candidates were able to identify the diagram that was labelled correctly.

Question 2(a)(i), (ii) Most candidates were able to suggest an advantage of operating very large aircraft on longer routes. They were also able to calculate how much aviation fuel would be used on a flight between London and Sydney.

Question 2(e) Candidates coped well with this question. Although this was not anticipated to be a challenging question, the use of 'keys' was set in an unusual context.

Question 3(a)(ii) Almost all candidates could name a source of non-renewable energy.

Question 4(a) The bar graph was well done. The y -axis was labelled properly and bars were plotted accurately in most cases.

Question 4(b) The numbers did not factorise down to small numbers in this simple whole number ratio. However, most candidates attained this mark.

Question 4(c)(i) Most candidates were able to suggest a reason why internet shopping is responsible for much of the waste produced in the retail industry.

Question 8(d)(iii) Most candidates were able to name the organisation responsible for monitoring water quality in Scotland.

Question 8(e)(i) Most candidates were able to suggest a potential use for the disused quarry.

Question 10(c)(iv) The vast majority of candidates were able to justify their choice of whether the cat was a Scottish wildcat or a domestic cat.

Question 10(c)(v) Most candidates could explain why there may be some doubt about the type of cat they had identified.

**Question
10(c)(vii)**

Most candidates could suggest a step that could be taken to reduce the threat to the wildcat population for one of the three factors listed.

Assignment

There appeared to be some link between the topics candidates chose for investigation and the marks attained. For example, candidates investigating wind turbines and permeability tended to score highly, but candidate investigations involving complex fieldwork that generated a lot of data, for example, lichen surveys and beach transects, tended to score less well. Candidates tackling complex fieldwork often appeared overwhelmed by the amount of data generated and struggled to construct tables and/or graphs, and correctly calculate multiple averages.

Almost all candidates were able to formulate a suitable aim for their assignment.

Most candidates were able to give a reasonable or good description of the science underlying their chosen topic.

Almost all candidates included sufficient raw data from their experiment/fieldwork.

Most candidates included a suitable reference for their secondary source of data taken from either the internet or literature.

Almost all candidates were able to choose the correct graphical format for their experimental data.

Almost all candidates included suitable scales on their graphs.

Most candidates were able to come up with an informative title, although a very small number are still writing titles such as 'National 5 Assignment'.

Most candidates were able to produce a well-structured report that was clear and concise.

Areas that candidates found demanding

Question paper

Section 1

As in previous years, questions that focused on knowledge based on the Earth's resources topic tended to be the least well answered.

Candidates found the following questions demanding:

- Question 1(b)** Few candidates were able to access this mark. Candidates will be asked to provide definitions directly from the course specification document. Candidates are not expected to quote word for word, but should prepare for definition questions by attempting to provide explanations that are similar.
- Question 2(b)(ii)** Most candidates were unable to state the term 'fractional distillation'.
- Question 2(d) (i), (ii)** Both parts of this question were answered poorly. 'Carbon offsetting' is a key piece of knowledge in the sustainability topic.
- Question 3(b)** This was a percentage increase question. As in previous years, only a small number of candidates were able to complete this calculation satisfactorily.
- Question 5(b)(iii)** Most candidates did not provide information about a shoreline transect using a quadrat, and discussed how to conduct random sampling using a quadrat instead.
- Question 6(b)** Only a minority of candidates were successful with this calculation. The context was unusual as it related to weathering and erosion. It was set as a more challenging question.
- Question 7(a)** Many candidates did not use the rock types provided in the stem of the question to complete the table. Candidates appeared to have misunderstood this question.
- Question 8(a)** Most candidates were able to obtain some marks here, but not many were able to provide acceptable explanations. Some missed the point that the question focused on aspects of air quality.
- Question 8(b)(i)** Another definition question where few candidates were able to provide a suitable answer.
- Question 9(b)** The majority of candidates were unable to attain this mark. The most common mistake was where candidates made statements about these crops requiring large inputs of pesticides or herbicides.
- Question 9(c)** Most candidates gained marks here. However, some made correct statements, but for the wrong impact. It would appear that these

candidates are not secure in identifying social, economic and environmental factors.

Section 2

Overall, most candidates were able to gain reasonable marks here, but markers noticed that many did not use the sources adequately, or there was little evidence of them doing so. This cost candidates marks, as this question is designed to assess the candidate's ability to analyse and then utilise the sources provided in the additional booklet or in the main question paper.

Question 10(b)(ii) Few candidates were successful here. They either did not recognise the term biodiversity, or were unable to deduce that mixed woodland and open grass would give a larger variety of environments. The maps and photograph source 'F' provided the information for them to work this out.

Question 10(c)(ii) A large number of candidates wrote 'National' rather than 'Natural'. As this is a key governmental organisation involved with Scotland's environment, it is likely to appear frequently. Candidates will not be awarded a mark if they do not get this correct.

Question 10(d) The average mark here was low, and candidates struggled to provide four well-justified arguments for their choice. Some candidates made no choice. As this type of decision-making question will appear in all subsequent exam papers in section 2, it is worth exposing candidates to these, and helping them prepare for this style of question.

Section 3

As in previous years, many candidates found this the most challenging part of the question paper.

Questions 11A (water cycle) and 12A (sustainable methods of energy production) were the better-answered questions.

A common problem with 11B (natural greenhouse effect) was that a significant number of candidates discussed the enhanced greenhouse effect rather than the natural greenhouse effect.

Many candidates who answered 12B (sustainable water supply) gave answers that suggested they were unclear about the distinction between developed and developing countries.

Assignment

The underlying environmental science was generally well done, but candidates appeared to have issues when linking it to their aim and conclusion in a way that made it all work together.

Analysis and conclusion appeared to cause issues when relating the experimental data, the research data, and the aim with the underlying environmental science.

Candidates found labelling tables and graphs difficult marks to achieve.

Many candidates only managed to achieve one mark for the evaluation section.

Assignments with specific aims were able to gain the conclusion mark. However, in most fieldwork investigations, the mark for the conclusion was not gained as often.

Some other notable issues include:

- ◆ difficulty in summarising the experimental method. The skill being assessed is the candidate's ability to summarise so they must not give a full or detailed method
- ◆ calculating mean values and rounding answers. Many candidates clearly demonstrated the ability to do some of these calculations but then lost the overall mark by making errors in at least one of them
- ◆ creation of tables with acceptable units. This was a problem area, particularly with complex investigations as mentioned previously
- ◆ labelling of tables, which was poorly done
- ◆ conclusions that did not always link to the aim, and over complex data that again, added to the difficulty
- ◆ graph skills, which were a bit better but had to be marked with care to ensure that errors in the mean calculations and/or the table were not double penalised
- ◆ analysis and conclusion, which were very mixed and seemed to be dependent on the type of investigation chosen and the data candidates had accessed
- ◆ evaluation responses, which showed there is still a lot of confusion between the terms accuracy and reliability

Section 3: preparing candidates for future assessment

Question paper

As the course covers many disciplines such as biology, geography and geology, teachers and lecturers can consult with colleagues in the same centre for advice about less familiar areas of the course. Alternatively, SQA's Subject Implementation Manager can help teachers and lecturers make contact with professionals who are currently delivering the course.

The National 5 Environmental Science course specification should be used as a guide to structuring the delivery of the course. As previously mentioned, most candidates appeared unable to describe how to conduct a transect study — 'appendix: course support notes, approaches to learning and teaching, section 1c' of the course specification outlines the various applications of such a technique.

Candidates should be encouraged to develop their own dictionary of key words and definitions as they progress through the three topics. Many candidates are still unable to give accurate definitions as outlined in the course specification document.

It was surprising that most candidates, compared to the previous year, did not answer section 2 as well, considering it was introduced in session 2017–18. The most obvious issue was that candidates were not using the sources provided to reach conclusions or decisions. The key reason for this section of the paper is to enable candidates to deal with a particular issue using the sources provided.

Assignment

Some candidates did not follow the 'instructions for candidates' within the coursework assessment task for National 5 Environmental Science. Time should be spent with candidates going through these instructions prior to them undertaking the assignment.

In general, candidates tended to attain higher marks if the amount of data generated was kept to a manageable volume. This gave candidates time to analyse the data without too many complications.

Centres need to look at how secondary source data is retrieved and used, as many candidates from the same centre use the same data. Google search pages do not give results that point directly at a source. Some websites are date or location specific, and having a reference that ends 'uk/search-by-location' just gives a front page. A printed page showing a date and the full page URL would be more appropriate.

Grade boundary and statistical information:

Statistical information: update on courses

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|------------------------------------|-----|
| Number of resulted entries in 2018 | 272 |
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| Number of resulted entries in 2019 | 207 |
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Statistical information: performance of candidates

Distribution of course awards including grade boundaries

| Distribution of course awards | Percentage | Cumulative % | Number of candidates | Lowest mark |
|-------------------------------|------------|--------------|----------------------|-------------|
| Maximum mark | | | | |
| A | 12.1% | 12.1% | 25 | 87 |
| B | 17.9% | 30.0% | 37 | 74 |
| C | 18.4% | 48.3% | 38 | 62 |
| D | 27.5% | 75.8% | 57 | 49 |
| No award | 24.2% | - | 50 | - |

General commentary on grade boundaries

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

SQA aims to set examinations and create marking instructions that allow:

- ◆ a competent candidate to score a minimum of 50% of the available marks (the notional C boundary)
- ◆ a well-prepared, very competent candidate to score at least 70% of the available marks (the notional 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 every year for each subject at each level to bring together all the information available (statistical and judgemental). The principal assessor and SQA qualifications manager meet with the relevant SQA head of service and statistician to discuss the evidence and make decisions. Members of the SQA management team chair these meetings. SQA can adjust the grade boundaries as a result of the meetings. This allows the pass rate to be unaffected in circumstances where there is evidence that the question paper has been more, or less, challenging than usual.

- ◆ The grade boundaries can be adjusted downwards if there is evidence that the question paper is more challenging than usual.
- ◆ The grade boundaries can be adjusted upwards if there is evidence that the exam is less challenging than usual.
- ◆ Where standards 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 to year. This is because the particular questions, and the mix of questions, are different. This is also the case for question papers set by centres. If SQA alters a boundary, this does not mean that centres should necessarily alter their boundary in the question papers that they set themselves.