



## Course Report 2018

Subject	Environmental Science
Level	National 5

This report provides information on the performance of candidates. 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**

## **Summary of the course assessment**

### **Component 1: question paper**

Candidate responses have shown an improvement compared to previous years. There was evidence that the course content has been thoroughly covered by most centres and well received by candidates.

Candidates achieved a wide range of marks, with the highest achieving gaining 65 or more marks.

A minority of candidates would have been better suited to National 4 level.

The new structure of the paper did not appear to disadvantage any candidates; rather it gave them more opportunity to demonstrate their skills and knowledge.

Sentence construction and use of English has also improved overall compared to previous years. Candidates demonstrated more transferable skills, such as evaluation and using evidence.

Candidates, who achieved marks in one numeracy question, generally performed well in all numeracy questions. Graph question responses were better than in previous years.

The vast majority of candidates were able to access all of the paper, omitting very few questions.

The new section 2 performed well suggesting that candidates had been well prepared by centres. Most candidates were able to access many marks in this section.

As in previous years, section 3 (extended-response questions) proved to be a major differentiating factor. Although candidate responses were generally slightly better than in previous years, many responses were incomplete. Despite this, more candidates were able to provide more considered responses rather than a list of points.

Candidates appear to have been better prepared for Earth's resources questions than in previous years.

The paper contained a good balance of challenging and less challenging questions, and as it performed as expected, there was no need to alter the grade boundaries.

### **Component 2: assignment**

The quality of response was variable, but the majority of candidates performed well.

Overall, most candidates had a clear understanding of what was required, particularly in terms of layout and organisation of their reports. Most candidates presented their report using headings and structured their report in a logical manner.

In a number of centres, candidates had studied identical topics, which is acceptable as long as each candidate has clearly produced work that is unique. However, a small minority of candidates had been over-directed in the guidance that they had received.

Some centres had conducted good practical experiments on rock porosity and others on lichen as an indicator species. The related assignments were generally of a high standard. The candidates were clear about the concept and met the assignment requirements due to their greater understanding.

Candidates' literacy skills were often a barrier to accessing marks, particularly where an extended explanation was required. Candidates must be able to express their ideas in writing to gain available marks.

## Section 2: comments on candidate performance

### Areas in which candidates performed well

#### Component 1: question paper

Candidates performed well in the following questions:

Question 1(a)(ii) and (b)	naming renewable energy types
Question 2(c)(d)	prediction and competition questions in a food web
Question 3(a)	bar graph construction
Question 5	PHEV car question, including calculations
Question 7(c)(ii)	uses of limestone
Question 9(b)(i)(ii)(iii)	mink raft
Question 10(a)(iii)	wind speed and shelter belt
Question 10(b)(iii)	leaf fall during winter
Question 10(c)(i)	ground invertebrate investigation

#### Component 2: assignment

Most candidates:

- ◆ stated an appropriate aim, an informative title and produced reports that were clear and concise
- ◆ demonstrated knowledge of underlying environmental science, although for some it did not meet the depth of detail required for National 5
- ◆ found suitable sources to compare with their own data
- ◆ could present their selected data in alternative and appropriate formats
- ◆ provided references in sufficient detail

The majority of candidates were awarded marks for sections 2, 3(e) and (f), 8(a) and (b).

### Areas which candidates found demanding

#### Component 1: question paper

Although there are certain areas of geology included within the mandatory content, questions about geology are generally not well answered.

Challenging calculation questions requiring two steps and/or extracting specific data performed as expected, discriminating between candidates.

Some candidates are still having difficulty in distinguishing between the command words 'suggest' and 'explain', but 'state' and 'name' appear to be better understood.

Candidates found the following questions more demanding:

- Question 1(a)(i) This question was designed to help candidates settle into the question paper. The vast majority of candidates answered the question. However, many candidates did not appear to know what a physical resource was.
- Question 2(a) The source of energy in all terrestrial food webs is the sun. However, the most popular response was 'fruit and seeds'.
- Question 2(d) A significant number of candidates thought that a pitfall trap was an appropriate method to estimate dormouse populations.
- Question 3(b) As in past years, a percentage calculation proved to be a major challenge for candidates.
- Question 4(b) Many candidates were unable to identify bacteria as the organism that converts nitrates into nitrogen gas.
- Question 4(e) Most candidates failed to achieve the mark as most were unable to explain why the method was unsustainable.
- Question 6(a) Many candidates did not have the necessary literacy skills to explain how the groups are in conflict with each other. This item format has been used in previous papers.
- Question 7(a)(i) Candidates are still confusing weathering with erosion, or merging both definitions into one.
- Question 7(a)(ii) Candidates rarely achieved the full three marks for describing how sediments form sedimentary rocks.
- Question 7(b) Only the highest achieving candidates were able to describe the specific differences between the formation of limestone and sedimentary rock as a whole.
- Question 8(a) Few candidates were able to define the term 'ecosystem'.
- Question 8(b)(i) The table was rarely completed well.
- Question 8(b)(iii) Candidates failed to explain how the aquatic plant carries out photosynthesis with the resources available. Most candidates stated what photosynthesis requires and the equation. Candidates appeared not to use the photograph to help them answer this question.
- Question 9(a) Most candidates missed out the fact that the mink were invasive.

- Question 11(a) Candidates were unable to fully answer the final section questions well, most either partially answered the question or missed the question entirely, and wrote about a topic. Most candidates were unable to state the natural greenhouse effect and nearly all failed to mention radiation (short waves/long waves).
- Question 11(b) Most candidates were able to discuss a limited number of requirements for siting a hydroelectric power station, but most were unable to discuss the energy change from kinetic to electrical. Most candidates also struggled to discuss the turbines and the electromagnetic generators.
- Question 12(a) Most candidates were very poor at giving impacts on the environment due to higher food demands, but instead simply stated the demands and why there was a greater demand, essentially rewriting the question.
- Question 12(b) Most candidates stated issues with world waste management, but were less successful in discussing solutions to these problems.

## **Component 2: assignment**

Many candidates:

- ◆ did not produce tabulated data with appropriate headings or scientific units
- ◆ were unable to gain marks because they failed to calculate mean values within their tables
- ◆ lost marks in section 4(c) for not transferring the labels from the tables to the labels on the graph

The choice of fieldwork really influenced the attainment of candidates. Some of the fieldwork was over complicated and made it very difficult for candidates to properly analyse the data. It also meant that candidates were doing a lot more in terms of data presentation and processing, thus making it more likely to lose marks, for example when plotting data.

There appeared to be particular difficulty with the concept of evaluation. However, the main area where marks were lost was summarising the experimental procedures.

Some candidates did not specify on the graph that they had used averages, whilst other candidates calculated their average values, but instead of graphing this information, they graphed their raw data.

## **Section 3: advice for the preparation of future candidates**

### **Component 1: question paper**

Candidates need to spend more time learning the mandatory knowledge, especially the definitions, as they are likely to be covered at some point in the question paper.

Calculations, especially involving percentages, need to be practised on a more regular basis. These will always be part of the question paper. Candidates should also be encouraged to show working for their calculation, especially if the question has two marks.

Candidates need to read questions properly and ensure their answer is complete.

Candidates need to be given the opportunity to practise past paper questions, or exam style questions to allow them to develop essential exam skills, such as reading questions carefully. They also need to be able to respond in an appropriate manner to commands such as 'describe', 'state' and 'explain'.

Candidates need to be clear what evaluation means and practise this skill instead of listing.

### **Component 2: assignment**

Candidates should ensure that the environmental science within the assignment is relevant to the aim.

Candidates should not be referring to equipment that has not been involved in the measurement of the dependent variable, for example additional measuring cylinders. Teachers and lecturers should remind candidates that this section of the assignment should be a brief description and not a full method.

Candidates' tables could be improved by taking care over headings. Candidates should be reminded that the average/mean should be included in the table along with their raw data.

Pie charts are not an appropriate format for presenting data in many topics.

Candidates should be provided with graph paper of an appropriate scale to allow markers to check the accuracy of plots.

In the analysis section, candidates should be encouraged to include data in their internet source, as this would allow them to better access the mark.

Overall, candidates performed well in assignments where the aim was narrow and involved changing a single independent variable, to generate a single dependent variable. For example investigating the effect of light intensity on the rate of photosynthesis, is likely to be more successful than identifying the relationship between air pollution and various lichen species.

Most candidates displayed a good knowledge of what was expected of them in the assignment. Where candidates did not do as well, this was typically due to a harder practical or mostly fieldwork, and lack of clarity about what was actually being investigated.

Candidates who followed the instructions for candidates did much better than those who did not, or who had followed the previous year's guidance.

Teachers and lecturers must refer to the current *National 5 Environmental Science Assignment Assessment task* to ensure the correct instructions are used.

Candidates who had followed the 'Instructions for candidates' section of the coursework assessment task, and carried out a simple experiment were generally awarded a higher mark. Candidates who had carried out more complicated fieldwork generally scored lower marks.

If candidates submit reports that have been electronically produced, centres must ensure that internet access is disabled during the report writing phase.

Candidates should use information gathered in the research phase to produce their report. The report should be expressed in their own words. Candidates will not earn marks for information copied directly from their research materials.

Conclusions must relate to the aim and must be backed up by evidence in the report. If multiple aims are stated, the conclusion must address all of them.

References should be given in sufficient detail to allow them to be retrieved and checked by a third party.

Candidates should not be over-directed in the guidance that they receive from teachers and lecturers.

Although topic choice may be limited by availability of apparatus or other factors, there should be some element of candidate choice. Advice from the teacher or lecturer should ensure that candidates are able to access all of the available marks with their choice of topic.



## Grade boundary and statistical information:

### Statistical information: update on courses

Number of resulted entries in 2017	290
------------------------------------	-----

Number of resulted entries in 2018	272
------------------------------------	-----

### 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	8.5%	8.5%	23	87
B	20.6%	29.0%	56	74
C	22.8%	51.8%	62	62
D	24.6%	76.5%	67	49
No award	23.5%	-	64	-

## **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 which allow a competent candidate to score a minimum of 50% of the available marks (the notional C boundary) and 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 Business Manager and Statistician to discuss the evidence and make decisions. The meetings are chaired by members of the management team at SQA.

- ◆ The grade boundaries can be adjusted downwards if there is evidence that the exam is more challenging than usual, allowing the pass rate to be unaffected by this circumstance.
- ◆ The grade boundaries can be adjusted upwards if there is evidence that the exam is less challenging than usual, allowing the pass rate to be unaffected by this circumstance.
- ◆ Where standards are comparable to previous years, similar grade boundaries are maintained.

Grade boundaries from exam 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 exams set by centres. If SQA alters a boundary, this does not mean that centres should necessarily alter their boundary in the corresponding practise exam paper.