



External Assessment Report 2012

Subject(s)	Managing Environmental Resources
Level(s)	Higher

The statistics used in this report are pre-appeal.

This report provides information on the performance of candidates which it is hoped will be useful to teachers/lecturers in their preparation of candidates for future examinations. It 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 question papers and marking instructions for the examination.

Comments on candidate performance

General comments

The paper covered all three units of the topics outlined in the specification in an interesting and challenging way. It included environmental issues relating to the impact of using oil-based products and waste management, pollution and the role of SEPA, energy sourcing, energy use and impacts on the environment, conservation and food webs, re-introductions and alien species in an ecosystem, a coastal transect investigation, changing land use in agriculture, forestry and industries, as well as the impact of windfarms. The paper reflected both national and international environmental issues.

All questions in the paper were similar in standard to previous years and accessible to candidates. A balance was maintained in the marks awarded in each question in Section A, and across the paper, between those testing Knowledge and Understanding and Problem Solving/Practical Abilities. The quality of answers throughout the paper was generally good, with candidates indicating a very positive attitude to, and understanding of, current environmental issues.

The vast majority of candidates coped well with Section A of the paper — ie the structured questions and discriminating questions in this section of the paper functioned appropriately.

Performance in problem-solving and data-handling questions continues to improve, indicating that perhaps more attention is being given to these areas of the course as a result of PA feedback to centres.

Questions requiring discrete factual information, particularly biological information as detailed in the subject specification, still prove difficult, indicating that candidates may require more structured revision of terminology throughout the course. Likewise, examples of legislation are not known by many candidates.

Published marking schemes can be useful to centres in this respect, in that they provide concise definitions/examples of eg biological terms or legislation.

In Section B, the essays proved very discriminating this year and, while centres have clearly discouraged use of bullet points in responses, the presentation and standard of English was lower than in previous years. Candidates, in the main, formulated essays containing relevant factual information. Good candidates did well in both essays, often with marks in double figures. The majority of candidates attempted both essays.

Unusually, the structured essay Questions 8A and 8B were not done as well as 9A and 9B as they required sound knowledge and understanding of basic biological concepts.

The overall marks for the paper ranged from 24 to 99 out of 110.

Areas in which candidates performed well

Candidates performed well particularly in questions 1, 2, 4 and 6 in Section A of the paper. These questions ranged across the three topic areas of the MER specification.

Most candidates showed good knowledge and/or gave sound explanations in the following questions:

- ◆ Question 1 (a) (i) – plastic as a finite non-renewable resource
- Question 1 (a) (iii) – reasons for fuel oils demand increasing
- Question 1 (b) (ii) – life cycle analysis
- Question 1 (c) (ii) – local authority recycling
- Question 1 (c) (iii) – sustainable use of organic waste
- ◆ Question 2 (b) (i) – level at which SEPA operates
- Question 2 (c) (i) – monitoring role of SEPA
- Question 3 (e) – ways of reducing energy consumption
- Question 4 (b) (i) and (ii) – understanding of the terms autotroph and niche
- Question 4 (b) (iii) – giving an example of an interspecific relationship
- Question 4 (b) (iv) – pyramid of biomass
- Question 4 (c) (ii) – distinguishing between herbivore and carnivore
- Question 5 (a) (iv) – abiotic factors
- Question 6 (a) (ii) – cereal crops grown in Scotland
- Question 6 (c) (i) – examples of edaphic (soil related) factors
- Question 7 (d) – conflict and resolution

Some of the problem solving and data handling aspects of questions were also well done particularly in the following questions:

- ◆ Question 1 (a) (i) - calculation
- ◆ Question 3(b) (ii) – trend from data
- ◆ Question 4 (a) (iii) – select and explain
- ◆ Question 6 (b) (i) – calculation
- ◆ Question 6 (b) (iii) – select and compare data

Areas which candidates found demanding

In Section A the following knowledge and understanding based questions in questions 1, 3, 5 and 6 proved difficult for a number of candidates:

- ◆ Question 1(c) (iv) – many candidates still do not have a sound knowledge of legislation.
- ◆ Question 3 (a) (ii) – comparing use of biomass as an energy source in ELDCs and EMDCs was challenging for the majority of candidates.
- ◆ Question 5 (a) (ii) – accounting for bare ground — many candidates responded with ‘footpath’, despite being given two lines in which to answer. Trampling had to be mentioned in the response.

- ◆ Question 5 (a) (iii) – many candidates mentioned ‘repeat’ but not ‘averaging’ in their response and so lost a mark.
- ◆ Question 5 (a) (v) – intended as a challenging question; even very able candidates were unable to respond fully, especially in relating geology and stability in the ecosystem.
- ◆ Question 5 (b) – frequency and distribution continue to pose problems for candidates.
- ◆ Question 5 (c) – poor responses on biotic factors included food and predators which needed to be quantified to achieve the mark.
- ◆ Question 6 (a) (iii) – explaining diversification in agriculture was not done well.
- ◆ Question 6 (c) (ii) – precipitation was required as an example of a climatic factor, rainfall was not accepted.
- ◆ Question 7 (c) (i) – once again legislation relating to planning permission was poorly done.
- ◆ Question 7 (c) (iii) – many candidates still confuse statutory and non-statutory organisations.

In relation to problem-solving, data-handling and practical abilities, candidates found difficulty with the following questions:

- ◆ Question 3 (c) – explaining why HEP is unlikely to increase in significance was challenging.
- ◆ Question 4 (a) (i) – on selecting habitats within the LNR was surprisingly poorly done. Candidates did not comply with the stem of the question.
- ◆ Question 6 (b) (ii) – very few candidates were able to give both a description and explanation of trend relating to dairy cows.
- ◆ Questions 7 (c) (vi) (why educate the public on renewable) and 7 (e) (ii) (windfarms contributing to a low carbon economy) were asking candidates to suggest an appropriate response in the context of an unfamiliar situation. This type of question proves challenging for the average and poor candidates.

Section B — Essays

In Section B, once again some candidates could not provide enough detail in essays. A significant number of candidates did not attempt or wrote very little in their essays this year. Attempting both essays is essential to meeting the pass mark. This should be emphasised when training candidates in essay writing. In all essays it was important to relate factual knowledge to the stem of the question

In the essays, performance was not as good on average for the structured questions on biological based topics (8A, 5.45; 8B, 5.5) compared to the average for questions 9A and 9B (9A, 7.6; 9B, 7.1). This is significantly different from previous years, but reflects a continuing trend for questions requiring thorough knowledge and understanding of biological concepts to be more challenging for the poor and average candidate.

Question 8A

- ◆ Relating energy conversion and transfer processes proved to be more difficult than expected, with many candidates not even able to give a full word equation of photosynthesis. Energy conversion such as light capture, chemical storage as carbohydrate often went unmentioned.
- ◆ Relating energy efficiency in food chains was more accessible to candidates.
- ◆ Relating energy efficiency to decomposition revealed a lack of understanding of the basic process of respiration in decomposition, and knowledge distinguishing decomposition by bacteria and fungi from action by detritivores in breaking up organic matter to form humus.

Question 8B

- ◆ While density-dependant factors were known, their impact on population dynamics was often overlooked and/or not explained concisely.
- ◆ Many candidates could not exemplify and/or describe natural environmental regulation and its effects on populations.
- ◆ Unexpectedly, succession was not well done, with key terms (pioneer community/climax community), examples of plant communities, and impact on the development of soils omitted from the essay. Very few candidates attempted to relate succession to its impact on populations.

Question 9A

- ◆ Many candidates attempting this question showed a basic knowledge of FCS and other methods of supporting Scotland's forests and woodlands.
- ◆ Current sustainable practices were well illustrated or exemplified.

Question 9B

- ◆ Most candidates were able to comment on historical aspects of industry in Scotland.
- ◆ Many gave good exemplification of present industries, often focusing on energy industries and in some cases clearly benefitting from locally-acquired knowledge gained from 'field trips'/visits.
- ◆ Some candidates chose to provide more detail on a limited number (2–3) of industries found in their local community rather than illustrating a wider range.
- ◆ Sustainable practices were generally well covered, many emphasising links to global warming and climate change.

Advice to centres for preparation of future candidates

Centres' maintenance of interest in presentation, and increased numbers of candidates presented at Higher, are welcomed. All presenting centres should be congratulated on the support given to candidates in preparing for this examination.

Very few questions were not attempted, and many were answered with extended responses that indicated the wide scope of the candidates' knowledge and interest in environmental issues.

Clearly, centres have picked up on previous advice regarding the preparation of candidates for data-handling questions — the graph, averaging, and % change questions are showing improvements.

In addition, centres appear to be preparing candidates better for the challenging definitions and knowledge that are subject specific eg 'life cycle analysis', SEPA and its roles, some basic biological terms relating to food webs, and historical impacts on Scotland's environment.

However, more in-depth knowledge of biological concepts in the context of investigations and the essays 8A and 8B of the 2012 paper is required and could be supported by colleagues presenting in comparative examinations such as Higher Biology.

Fieldwork should be encouraged as one method of teaching some of the coursework, especially in relation to techniques and terminology such as transect studies involving frequency and distribution of organisms, repeating and averaging, and the impacts of abiotic and biotic factors. Soil as an ecosystem is included in the MER specification for study in a practical way, while land use studies allow for field excursions to enrich candidates' knowledge. Candidates who have been involved in such studies demonstrate their understanding clearly in responses to questions in biological and land based studies.

The following points may help with the preparation for future candidates.

- ◆ The most recent SQA Arrangements Document for MER includes the specification of areas of knowledge and detailed facts, including suitable exemplification, which the candidate must know for the external examination. However, the nature of this subject is such that many alternative examples can be used and are acceptable as answers in the examination, eg local initiatives.
- ◆ The order of presentation of questions in Section A of the paper generally follows the pattern of the topics presented in the MER specification. However the nature of environmental issues is such that there may be some overlap in questions.
- ◆ Questions may contain both knowledge and understanding and problem-solving questions, eg question 1 in the 2012 paper.
- ◆ Where questions include information as a passage, diagram or table, candidates should not expect all of the answers to come from that information unless this is precisely stated eg 'from the food web' ..., 'from the flow chart' ... 'using the information above'... see question 4 (a), 4 (b), 4 (c).
- ◆ The number of marks and lines allocated for an answer indicate the expected level of response. Too often candidates give minimum answers and drop a mark.
- ◆ Candidates must be prepared to 'describe ...' by answering in a sentence and not giving a one word answer.

- ◆ Candidates must respond to both aspects of a question which begins ‘describe and explain’.
- ◆ Candidates should be given the opportunity to practise questions which begin with ‘justify’/ ‘explain’/ ‘compare’/ ‘account for’, and ‘explain/describe’ and ‘explain’ as these prove difficult for many.
- ◆ The opportunity to practise should also be given for numerical problems — percentage change, graphs, and ratios. Note that scales on graphs should be inclusive and normally start on each axis with a zero.
- ◆ Many areas of the coursework topics lend themselves to review by essay. Practice in essay writing is essential.
- ◆ Candidates tend to do better in structured essays where the pattern is set by sub-headings. All parts of this essay should be attempted. Candidates should be encouraged to adhere to the sub-heading format when answering this type of essay.
- ◆ Candidates have greater discretion over the content of unstructured essays, which can be wide ranging as long as the facts are related to the title. Candidates should be encouraged to check the factual content of these essays to ensure that they include as many relevant facts as possible and that each aspect of the essay has been addressed eg question 9B in the 2012 paper – describing changes in Scotland’s industry and current sustainable practices.
- ◆ Questions and marking schemes for past papers and NAB unit tests provide precise definitions and exemplification, giving a good indication of the knowledge base candidates require.

Certain topics of the specification proved troublesome for some students in the 2012 paper. These areas are detailed in the section ‘Areas which the candidates found demanding’ and are worth noting.

Statistical information: update on Courses

Number of resulted entries in 2011	220
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Number of resulted entries in 2012	243
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Statistical information: Performance of candidates

Distribution of Course awards including grade boundaries

Distribution of Course awards	%	Cum. %	Number of candidates	Lowest mark
Maximum Mark 110				
A	23.0%	23.0%	56	74
B	23.0%	46.1%	56	63
C	27.6%	73.7%	67	52
D	8.2%	81.9%	20	46
No award	18.1%	100.0%	44	-

General commentary on grade boundaries

- ◆ While SQA aims to set examinations and create marking instructions which will 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.
- ◆ Each year SQA therefore holds a grade boundary meeting for each subject at each level where it brings 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.
- ◆ An exam paper at a particular level in a subject in one year tends to have a marginally different set of grade boundaries from exam papers in that subject at that level in other years. This is because the particular questions, and the mix of questions, are different. This is also the case for exams set in centres. If SQA has already altered a boundary in a particular year in, say, Higher Chemistry this does not mean that centres should necessarily alter boundaries in their prelim exam in Higher Chemistry. The two are not that closely related as they do not contain identical questions.
- ◆ 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.