



External Assessment Report 2011

Subject	Biology
Level	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 general performance of candidates in the 2011 Higher Biology Examination was very good and this has resulted in increased average marks and improvements to pass rates. Increases in average mark were noted across all three sections of the paper. The average score for Section A was 20.6 from 30 and for Sections B and C combined the average score was 55 from 100.

Literacy levels were good and improvements were particularly noted in candidates' responses to structured questions in Section B which required explanations, and there seemed to be a greater appreciation of the need to make several points when writing a complex explanation. There was little evidence this year of candidates confusing explanations with descriptions.

There was a marked improvement in answers to extended response questions in Section C.

However, deteriorating standards were noted in the spelling of biological terms such as mitochondrion, phospholipid, aleurone and thyroid. While current marking instructions allow some flexibility, centres are reminded that it is good practice to emphasise to candidates the need for correct spelling. There was some evidence of poorer standards of handwriting leading to problems with legibility.

Numeracy showed strengths and areas for further development. There were excellent responses to questions in Section B, which required graph reading and the calculation of percentage and ratio. As in previous years, difficulty was seen with scaling and labelling in graph drawing, although the plotting of data points and the drawing of the graph line itself were strong.

Note

As always, certain questions are designed with the specific intent that they challenge candidates and allow the demonstration of knowledge and skills related to Grade A.

In Section A, Questions 1, 9, 10, 11, 14, 18, 20, 23 and 24 were set with this broad intention.

In Section B, Questions 1 (c) and (d), 2 (d), 3 (c), 4 (a)(i) and (b), 5 (a)(iii), 6 (a)(i) and (b)(i), 8 (b)(ii), 9 (a)(ii), 10 (b), (c) and (d), 11 (a), 12 (a)(ii), 14 (b) and (c) are examples of questions in this category.

In Section C, as always, certain extended response marks, often those with two-part explanations, are designed to be more demanding than others.

Areas in which candidates performed well

Section A

Candidates performed especially well in Questions 2, 3, 4, 6 and 7 from Unit 1; Questions 16 and 20 from Unit 2; and Questions 22, 26, 28, 29 and 30 from Unit 3.

Section B

Question 1 parts (a)–(c) were generally well done.

Question 2 was well answered and it was pleasing to note that candidates were using the term ‘final hydrogen acceptor’ as a method of describing the role of oxygen in aerobic respiration. It was disappointing, though, to see many candidates thinking that oxygen accepted elemental carbon atoms from Krebs cycle.

Question 6: The data question was answered very well this year even although the context had been perceived as difficult by Setters.

Questions 7 and 8 were generally well done.

Question 11 (b) was well answered although fewer candidates than predicted could describe the role of thyroxine.

Question 12: Candidates seemed able to use their knowledge of the lac operon to interpret the graph, even although difficulties with this had been anticipated.

Question 14 was answered very well.

Section C

The extended responses were generally very well answered this year with increases in the average marks throughout.

Candidates predictably favoured Question 1A on water balance over Question 1B on meiosis, although the average marks attained for each question were very similar. A very good grasp of the biological ideas involved in the responses to both questions was shown by candidates.

Candidates favoured Question 2B on viruses and lymphocytes over Question 2A on carbon fixation, and the average mark for the 2B option was significantly higher than that for 2A. The steps involved in the production of new viruses were well understood and recalled by candidates.

Areas which candidates found demanding

Section A

Candidates had more difficulty with Questions 1 and 10 from Unit 1; Questions 11, 13, 14, 15 and 18 from Unit 2; and Questions 21, 23 and 24 from Unit 3.

Section B

Question 1 (d): Many candidates did not pick up on the need to use information from the diagram, in particular the role of the cilia in movement towards food or their role in the movement of food into the organism itself.

Question 3 (c): Many higher-scoring candidates were not able to link temperature to the rate of respiratory enzymes and carry on to relate this to the release of energy for active uptake.

Question 5 (a): There were problems in notating the gamete genotypes — many candidates did not notate the sex chromosomes and others failed to use the mandatory supra-scripts for the sex-linked alleles.

Question 6 (a) (i): Values from the graph were not quoted in many cases and some candidates failed to mention the units related to the various values that they did quote.

Question 9 (a) (i): Candidates continued to offer answers which convey the idea that they believe territorial behaviour completely 'prevents' competition — this negates an otherwise correct answer.

Question 9 (b): Many candidates did not read the question carefully enough and offered 'habituation' rather than 'avoidance' as the answer.

Question 10: Weaknesses were still apparent in the responses to questions on the purposes of control and the idea of reliability. Candidates should be aware that the responses given at Higher level need to be more detailed than those acceptable at Intermediate 2 or Standard Grade Credit level. For example, it was necessary for candidates this year to realise that reliability was improved by using 50 rice grains **at each GA concentration**.

Question 11 (a): Many candidates offered the idea that a new exoskeleton 'stops' further growth thus negating an otherwise correct answer.

Question 13: Very poorly done. This was planned as a C-type question but many candidates simply did not have the basic knowledge to answer.

Question 14 (d)(i): Many answers conveyed the idea that blood flow to the skin was achieved by blood vessels moving deeper into the skin.

Section C

Question 1A: While this question was generally well done, candidates often did not give the locations of the osmotic losses and of the chloride secretory cells as the mouth and gills. As usual, many candidates wrote about desert rats burrowing but did not mention their nocturnal behaviour.

Question 1B: This question was well answered but candidates often missed out terminology from the Arrangements such as 'gamete mother cell'.

Question 2A: The least well answered of the extended responses. Many candidates missed out 'reduction' of GP to carbohydrate as specified in the Arrangements document. In showing the carbon fixation cycle, many responses did not show the required arrowheads indicating the progress of reactions and showing the required understanding of substrates and products. Very few candidates even mentioned enzymes.

Question 2B: This was the best answered extended response question. Most candidates distinguished between the 'host' nucleic acid and the 'viral' nucleic acid. However, there was evidence of the over-teaching of the role of lymphocytes and many candidates offered unnecessary detail on immunity.

Advice to centres for preparation of future candidates

As always, it is good practice to ensure that candidates attempting Higher Biology have appropriate prior attainment.

It is worth sharing with candidates the points made in this report and in reports from previous years. The 'Areas candidates found demanding' sections could be especially helpful.

It is highly recommended that candidates are given the opportunity to work with published marking instructions from previous years' exams. This may help, for example, in the pitching of answers to question involving variables and control. Marking instructions are published on SQA's website (www.sqa.org.uk).

Candidates must ensure that writing is legible.

Candidates should be reminded that using additional paper provided at the rear of the question paper booklet is encouraged and preferable to attempting to squeeze answers into margins.

Use of the vocabulary offered in the Arrangements document continues to be important.

The need for careful spelling of biological words should be emphasised.

Words such as 'always', 'never', 'prevents' and 'stops' should be used with care as they can sometimes negate otherwise correct answers.

Candidates should be reminded that graph labels should come directly from data table headings and should include the units given there. Scale values must enclose all data and it should be noted that zeros are required. It is good practice to keep individual scales separate and supply a zero for both scales as appropriate. Candidates should know that a ruler will be needed for graph drawing. In cases where candidates are asked to give values from the graph, then these must be given for marks to be awarded. The choice of values to give should reflect the general pattern or trend in the data.

In notating metabolic pathways, the use of arrowheads is mandatory as is the use of superscripts to chromosome symbols in notating sex-linked alleles (for example X^r).

Choice of extended response questions is important. Study of marking instructions from past papers is highly recommended.

Statistical information: update on Courses

Number of resulted entries in 2010	9,291
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Number of resulted entries in 2011	9,767
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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 130				
A	22.6%	22.6%	2,209	92
B	23.6%	46.2%	2,308	77
C	25.4%	71.7%	2,484	62
D	11.1%	82.8%	1,083	54
No award	17.2%	100.0%	1,683	-

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, therefore, SQA 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 Head of Service 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.