



External Assessment Report 2014

Subject(s)	Biology (Revised)
Level(s)	Higher

The statistics used in this report have been compiled before the completion of any Post Results Services.

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 assessment and marking instructions for the examination.

Comments on candidate performance

General comments

There was a slight decrease in entries for the 2014 Revised Higher Biology course, but an additional centre entered candidates.

The **general performance** of candidates in the 2014 Revised Higher Biology examination was very good, but there was a slight decrease in pass rate and a significant drop in candidates gaining grade A. The average score for Section A was 21.53 from 30 and for Sections B and C combined, the average score was 51.79 from 100. However, since there were very few candidates (132) from four centres, interpreting results statistically does require extreme caution, and comparisons with the Unrevised paper should probably not be attempted. This was only the third examination of the Revised Arrangements for Higher Biology, so candidates had use of only two past papers, although a Specimen Question Paper (and its Marking Instructions) was published in February 2012.

There was evidence that candidates generally found the Problem Solving questions very challenging, and that many seemed to have difficulty with Question 1 in Section C, which contained extended response options with quite general titles.

Literacy levels were very good and, although the Extended Response questions in Section C were answered poorly in terms of marks, there was evidence of well constructed and lengthy responses. Spelling of biological terms was generally very good.

Numeracy levels were good but candidates struggled with questions involving the selection of data which required further processing. In describing trends in data, candidates should be aware of the crucial importance of **changes** in data trends and the need to quote figures and units when describing these.

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. These questions are:

Section A: Questions 1, 5, 9, 13, 14, 21, 25, 28 and 30.

Section B: Unit 1 Questions 1a(ii) [1 mark], 1d; 2c(iii); 3b; 4a (i). Unit 2 Questions 5e [2 marks]; 6a, 6d; 7b (i) [1 mark], 7c; 8c [1 mark]; 9a (i) and (ii). Unit 3 Questions 10c (ii) [1 mark], 10c (ii); 11a [1 mark]; 12a (i) [1 mark], 12a (iii), 12a (iv), 12b (i), 12b (ii) [1 mark], 12b (iii); 14b [1 mark].

Section C: Some 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, 4, 6 and 10 from Unit 1; Questions 12, 19 and 20 from Unit 2; and Questions 26, 27 and 29 from Unit 3.

Section B

The following questions were answered particularly well. Most candidates clearly understood the questions and were able to make appropriate responses.

Question 1(a):	It was pleasing to note that candidates grasped new content from a familiar area.
Question 1(b)(i) and (ii):	Again, the new content on DNA replication was tackled well.
Question 2(a):	Good understanding of genetic code shown.
Question 5(a):	As expected with familiar content.
Question 7(a):	Good, careful graph drawing.
Question 7(e):	Simple prediction by extrapolation done well.
Question 8(a):	Basic selection of data tackled well.
Question 9(c):	Candidates dealt with the wording in question stem very well.
Question 10(a):	As expected with familiar content.
Question 14(a):	Potentially complex units did not present a problem here.

Section C

Candidates very strongly favoured Question 2A on *Stem cells* over Question 2B on *Genomics*, and the average marks for the 2A option were higher than that for 2B. Candidates dealt with stem cells very well and had clearly practiced tackling questions on ethics, most avoiding the pitfalls of this area. Genomics and phylogenetics might prove to be problematic areas for some candidates.

Areas which candidates found demanding

Section A

Candidates had more difficulty with Questions 1, and 5, from Unit 1; Questions 13 and 14 from Unit 2 and Questions 21, 24, 25, 28 and 29 from Unit 3.

Section B

Question 2(c)(iii):	Candidates had difficulty linking base sequence to amino acid sequence and go on the link amino acid sequence to the overall shape of the protein molecules in space.
Question 3(b):	Few candidates were able to describe the failure of chromosomes to separate during cell division which can lead to polyploidy.
Question 4(a)(i):	Many candidates were unable to find the vocabulary to describe the sympatric isolation suggested by the information in the question stem.
Question 4(a)(iii):	The need for any hybrid offspring produced to be infertile was not emphasised by many candidates.

Question 5(d):	The need to mention electrons as well as hydrogen ions was not appreciated by many candidates.
Question 5(e):	Linking inner membrane surface to the electron transport chain and then linking energy release to muscle cell activity was a significant challenge for candidates.
Question 7(c):	Many candidates were unable to pinpoint the use of the per 'cm ² ' units to allowing individuals with differing skin surfaces to be compared.
Question 7(f)(ii):	Only a small number of candidates appreciated that 'thermoregulator' was a more concise answer than simply using the term 'regulator'.
Question 8(b):	The induction of enzymes needed for citrate production during lag phase was not appreciated by many candidates.
Question 9(a)(ii):	Few candidates linked winter with limited food or lower temperatures and the consequent adaptive advantage of lowering metabolic rate.
Question 10(c)(ii):	The ecological benefits of accessory pigments in nature was not appreciated by many candidates.
Question 11(a):	Difficult context for many candidates and they failed to mention survival of resistant individuals to breed and pass on their resistance to offspring.
Question 11(b):	Many candidates failed to note that this is a comparative situation and the population of <i>E. coli</i> in antibiotic A is higher than in antibiotic B at the start
Question 12(b)(ii):	Candidates had difficulty following the explanation through from the link between the presence of the toxin and reduced leaf damage allowing more photosynthesis to the increased yield.
Question 12(b)(iii):	Multi-step calculation proved very challenging.
Question 14(b):	Many candidates were uncertain of this area.

Section C

Question 1A and B:	This question was poorly done; there was evidence that candidates found the more general nature of the questions (A Biodiversity and B Food security) challenging, as opposed to the highly specific areas of the Arrangements which are asked more commonly in the unrevised papers.
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Advice to centres for preparation of future candidates

- ◆ As highlighted in previous reports, it is good practice to ensure that candidates attempting Higher Biology have appropriate prior attainment.
- ◆ It is essential to realise the very significant differences between the Revised and Unrevised Arrangements for Higher Biology. Although certain topics appear in both sets of Arrangements, the vocabulary, contexts and emphases are often different. The additional detail given in the descriptions of problem solving skills should be noted.

- ◆ Use of the vocabulary offered in the Arrangements documentation is crucial, eg the use of the names of respiratory intermediates, the use of terms such as ‘inducer’ when describing control of metabolism, and the vocabulary used to describe habitat fragmentation and habitat corridors.
- ◆ Proportional treatment of skills of scientific enquiry and of knowledge and understanding of the area is required in teaching and learning. Candidates should be aware of the demands of problem solving questions, and should be encouraged to practice with data and practical setting questions from SQA past papers.
- ◆ 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 any published Marking Instructions from previous years’ SQA question papers, and those from the Specimen Paper. This may help in the pitching of answers to questions involving, for example, variables in experiments and ethical issues in medical science, as well as tackling questions involving detailed explanations.
- ◆ Candidates should be aware of the need for comparative language in questions where comparisons are sought — stating ‘higher’ might gain marks that stating ‘high’ would not.
- ◆ In dealing with the growth curve of micro-organisms, candidates should be aware of the biological processes occurring during the different phases.
- ◆ Practical work continues to be very important in Biology, and candidates should continue to be exposed to apparatus and experimental procedures appropriate to their studies. The classification of variables is crucial.
- ◆ Candidates should be aware that descriptions of graphical or tabulated data require values, especially those at which a trend changes, to be quoted.
- ◆ Choice of extended response questions is important. Study of Marking Instructions from past years is highly recommended.
- ◆ Candidates should be aware that answers to extended response questions might involve selecting information from across several areas of a Unit.

Statistical information: update on Courses

Number of resulted entries in 2013	163
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Number of resulted entries in 2014	131
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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	26.7%	26.7%	35	88
B	21.4%	48.1%	28	73
C	31.3%	79.4%	41	58
D	9.9%	89.3%	13	50
No award	10.7%	-	14	-

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.