



External Assessment Report 2015

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

The statistics used in this report are prior to the outcome of any Post Results Services requests.

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

There was an increase in entries for the 2015 Revised Higher Biology. The general performance of candidates was very good and there was a slight increase in pass rate and a significant increase in candidates achieving grade A. The average score for Section A was 21.50 from 30; for Sections B and C combined, the average score was 57.80 from 100. However, since overall there were very few candidates (205) from four centres, interpreting results statistically does require extreme caution and comparisons with the Unrevised or New Higher Biology question papers should not be attempted. It should also be remembered that this was only the fourth examination of the Revised Arrangements for Higher Biology, and that therefore candidates had use of only three past papers, although a Specimen Question Paper (and its Marking Instructions) were published in February 2012.

Literacy levels were excellent, and there was evidence of well constructed and lengthy, well illustrated responses to the extended response questions in Section C. Spelling of biological terms was generally very good.

Numeracy levels were very good and, in particular, candidates handled questions involving calculations very well. Graph drawing was excellent. 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 from the source when describing these.

Areas in which candidates performed well

Section A

Candidates performed especially well in Questions 6 and 9 from Unit 1; Questions 11, 13, 16 and 19 from Unit 2; and Questions 24, 28 and 30 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.

- 1(a) it was pleasing to note that candidates grasped the new content from a familiar area.
- 1(b)(i) high-level answers in selection of information.
- 2(a) as expected, candidates had no problems in concluding from the simple table.
- 3(a) no problems with range, but candidates were simply asked to quote values and did not have to calculate the range.
- 4(a) good understanding of common ancestor idea.
- 6(b) as expected, candidates had a good knowledge of ligases.
- 7(a)(ii) 1 basic conclusion from data handled well.
- 9(a) good knowledge from a potentially unfamiliar context.
- 10(b)(ii) candidates had no difficulties with basic arithmetic mean.

- 10(b)(iii) candidates gave good answers when both sets of data had to be used.
- 11(d)(i) excellent graph drawing.
- 13(a)(iii) as expected, candidates had a sound knowledge of categories of symbiosis.
- 14(d) good understanding of link between human activity and ecosystem degradation shown.

Section C

Candidates favoured 1B on *Mutations* over 1A on *Gene expression*. However, the average marks for the 1A option was higher than that for 1B. Candidates dealt with gene expression very well, often using labelled diagrams and had clearly practised tackling these types of questions.

Candidates strongly favoured 2A on *Membranes* over 2B on *Microorganism growth*. Marks for both options were quite similar. In 2A, labelled diagrams proved to be a valuable source of marks for many candidates. In 2B, it was pleasing that nearly all candidates realised that they should divide growth into named phases.

Areas which candidates found demanding

Section A

Candidates had difficulty with 7 from Unit 1; Questions 14 and 18 from Unit 2 and Questions 22 and 29 from Unit 3.

In 7, there was evidence that candidates really did not know the sequence of milestone events in evolution and many assumed that land plants must have preceded animals. There was evidence that some were unsure of what a vertebrate is.

Section B

- 1(c) many candidates thought chloroplasts have plasmids.
- 2(c) few candidates were able to describe stem cells differences to national standard those who had the correct vocabulary fared best here.
- 2(d) there was evidence of lack of knowledge here.
- 4(c)(i) few candidates could give the relatively straightforward answer, and interpreted the as being more complex than intended.
- 4(c)(ii) almost every candidate opted for picking out ethical issues rather than the biological issues related to neutral mutation and disease complexity.
- 5(e) there was evidence of a lack of knowledge about yeast plasmids and their role in transformation.
- 9(b)(i) few candidates linked the shredding of cabbage to surface area for growth of bacteria.
- 10(a)(iii) many candidates found the multi-part calculation challenging.

- 10(b)(i) a significant number of candidates focused in on the fact that there were three trials as being important in reliability rather than the replicate cattle in each group.
- 11(b) candidates lacked clarity in describing the control often simply stating that the algae should be left out.
- 11(d)(ii) many candidates did not give rate or effectiveness of photosynthesis as part of their answer.
- 11(e) although many candidates gave appropriate colorimeter readings, they were not clear that this wavelength was being transmitted or reflected from *Scenedesmus*.
- 13(a)(i) few candidates talked about co-evolution or the intimacy of the relationship here.
- 13(a)(ii) this was poorly done; most candidates simply said oxpeckers could get food rather than answering in terms of the ease of feeding/locating food or gaining an energy advantage.
- 14(c) there was evidence that many candidates were uncertain of this area and did not answer in term of vacant niches.

Section C

- Q1A There was some confusion regarding the difference between a primary transcript and mature mRNA.
- Q1B Many candidates spent a lot of time on the different type of substitution at the expense of time which was needed on polyploidy.
- Q2B Many candidates failed to give details of the biological features and events which characterise each phase. Some had difficulty describing conditions needed for growth and many candidates simply listed conditions such as temperature and pH but did not give adequate accounts of these.

Advice to centres for preparation of future candidates

It is good practice to ensure that candidates attempting Higher Biology have appropriate prior attainment at SCQF Level 5.

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 — for example, the use of statements used to describe stem cells and the related research, the descriptions of advantages and limitations of personalised medicine, and the vocabulary used to describe symbioses.

Proportional treatment of skills of scientific inquiry and of knowledge and understanding area is needed in teaching and learning. Candidates should be aware of the demands of problem solving questions, and should be encouraged to practise with data and practical questions from 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 question paper. This may help in the pitching of answers to questions involving, for example, control 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 — using 'higher' might gain marks that using 'high' would not.

In dealing with the milestones of evolution, candidates should be aware of the order in which these occurred. Distinction between primary transcripts and mature mRNA should be emphasised. In accounting for the growth curve of micro-organisms, candidates should be aware of the biological processes occurring during the different phases and how conditions for growth are controlled in bioreactors.

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 and the design of appropriate controls are 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. As highlighted previously in this report, the study of Marking Instructions from past years is highly recommended.

Statistical information: update on Courses

Number of resulted entries in 2014	131
Number of resulted entries in 2015	204

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	34.8%	34.8%	71	90
B	20.1%	54.9%	41	76
C	26.0%	80.9%	53	62
D	9.3%	90.2%	19	55
No award	9.8%	-	20	-

For this Course, the intention was to set an assessment with grade boundaries close to the notional values of 50% for a Grade C and 70% for a Grade A. Question 7 in Section A and Question 4(c)(ii) in Section B were intended to be accessible to all candidates; however they proved more difficult than intended. The grade boundaries were decreased by 2 marks for Upper A, Grade A and Grade C to reflect this.

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.