



Course Report 2016

Subject	Biology
Level	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 and assessors in their preparation of candidates for future assessment. 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 documents and marking instructions.

Section 1: Comments on the Assessment

Component 1: Question paper

The question paper proved to be well balanced and provided good coverage of the course. There was an appropriate balance of demonstrating knowledge and understanding, applying knowledge and understanding, and skills questions.

Candidates were well prepared for the examination and often used the correct vocabulary in answering questions. However, some candidates failed to achieve marks as they did not respond to the command word in the question, particularly when asked to explain.

Questions requiring candidates to show recall of knowledge were well done, with some exceptions (which are detailed later). Application of knowledge to new situations continued to cause difficulty.

Biotechnology questions proved more challenging than predicted. These questions are detailed later in the report.

Questions involving calculations were well done in comparison to previous years.

Candidates did not perform well in those questions asking for an explanation of experimental results, with the majority of candidates simply describing the results. Most candidates failed to draw a conclusion that related to the aim of the experiment.

Component 2: Assignment

Candidates demonstrated a real improvement in their performance. Most sections of the assignment were well answered with candidates scoring well. The analysis, conclusion and evaluation sections continue to be the most challenging.

Section 2: Comments on candidate performance

Areas in which candidates performed well

Component 1: Question paper

Section 1 (Objective Test)

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| 1 | Most candidates could identify a type of gene mutation. |
| 2 | Most candidates could correctly put in order the events in PCR. |
| 4 | Most candidates could identify directional, disruptive and stabilising selection. |
| 8 | Most candidates could relate heart chambers to type of circulation. |
| 9 | Most candidates could identify an example of aestivation. |

- 15 Most candidates could identify the absorption spectrum for chlorophyll.
19 Most candidates could give an example of altruism.

Section 2

- 1(a) Most candidates could identify an amino acid.
2(c)(ii) Most candidates could list substances required for DNA replication.
3(a) Most candidates could distinguish between tissue and embryonic stem cells
3(c) Most candidates gave a therapeutic use of stem cells.
5(a) Most candidates could identify sympatric speciation.
7 Most candidates could describe anabolism and catabolism.
8(a) Most candidates could do a times greater calculation.
8(b) Most candidates could describe a relationship in a table.
11(a)(i) Most candidates could identify an independent variable.
12(a)(i) Most candidates could identify a vector in a parasitic relationship.

Component 2: Assignment

- Section 1: Almost all candidates produced an appropriate aim for their investigation.
Section 2: Most candidates were able to show good knowledge and understanding of the biology underlying their investigation at a depth appropriate to Higher.
Section 3: Most candidates were able to select two pieces of data/information that were relevant to their investigation and allowed for a conclusion to be drawn.
Section 4: Most candidates were able to process and present their raw data.
Section 8: Most candidates produced a report that was logically structured, had an appropriate title and contained references.

Areas which candidates found demanding

Component 1: Question paper

Section 1 (Objective Test)

- 5 Many candidates found difficulty with interpreting a phylogenetic tree.
11 Many candidates found difficulty describing glycolysis.
14 Most candidates found difficulty describing an event in the Calvin cycle.
17 Most candidates found difficulty selecting values from a graph with two vertical axes.

Section 2

- 1(d) Most candidates found difficulty describing alternative RNA splicing.

- 2(c)(i) Most candidates found difficulty relating the antiparallel nature of DNA to DNA replication.
- 2(d) Most candidates found difficulty explaining why cells carry out DNA replication.
- 3(b) Most candidates found difficulty explaining cell differentiation in terms of protein synthesis.
- 4(c) Many candidates found difficulty explaining why longer roots would increase plant growth.
- 5(a)(ii) Most candidates found difficulty stating the importance of isolation barriers in speciation.
- 6(b)(i) Many candidates found difficulty identifying the phase of growth where secondary metabolites are produced
- 6(b)(ii) Most candidates found difficulty suggesting an ecological advantage.
- 6(c) Most candidates found difficulty explaining how a growth curve shows viable cell count.
- 9(b)(i) Many candidates found difficulty describing how antibiotics can be used to select modified bacteria.
- 10(a)(ii) Many candidates found difficulty describing a control experiment.
- 10(c) Most candidates found difficulty drawing a conclusion relating to the aim of an experiment.
- 11(a)(ii) Most candidates found difficulty identifying an aspect of an experiment which ensured reliable results.
- 11(c) Most candidates found difficulty in explaining how increased leaf area would increase seed yield.
- 12(b) Many candidates found difficulty in explaining the effect of a parasitic relationship on the host.
- 13(c) Many candidates found difficulty with explaining how an invasive species can be identified.
- 13(e) Most candidates found difficulty with describing genetic diversity

Component 2: Assignment

- Section 5: The analysis section was poorly done as many candidates did not fully analyse their data. Instead, there was a tendency to give a fairly superficial analysis that failed to identify key figures that supported all the trends and relationships shown. Even when comparing data from two sources, a partial analysis must contain relevant figures from the tables and/or graphs being compared.
- Section 6: Many candidates failed to gain the conclusion mark because they stated a conclusion that either did not answer the aim or was unsupported by the data/information in their report.
- Section 7: Many candidates struggled with the evaluation section. There was a tendency to use the terms valid, reliable and robust incorrectly and candidates often muddled these. This meant that they might, for example, give a justification

for data being reliable when the justification actually indicated that the data was valid.

Section 3: Advice for the preparation of future candidates

Component 1: Question paper

Cognisance needs to be taken of the mandatory knowledge that can be assessed in the question paper. The mandatory knowledge is outlined in the Course Assessment Specification.

Candidates performed well in questions where they were asked to demonstrate knowledge and understanding by providing the name of a process such as sympatric speciation. However, candidates had difficulty with demonstrating knowledge and understanding questions in certain areas. Centres should review their teaching of these areas, which include RNA splicing, antiparallel nature of DNA, gene expression, glycolysis, phases of growth, Calvin cycle, invasive species and genetic diversity.

Candidates also found difficulty with aspects of the course that were formerly part of the Higher Biotechnology course. Centres should review their teaching of these areas, which include explaining the phases of the microbial growth curve and details of recombinant DNA technology.

Processing skills involving calculations were well done, as were presenting skills such as drawing a graph.

Skills involved in planning an experiment — such as describing a control, ensuring reliable results and drawing a conclusion relating to the aim — caused difficulty for many candidates.

Candidates must understand the difference between the terms 'describe' and 'explain'. Too many candidates are mixing these terms up and failing to provide the detail needed to access the marks.

Component 2: Assignment

It was encouraging to see a real improvement in the quality of the assignments produced this year.

Centres are advised to ensure that they are using the Instructions for Candidates and Assignment Marking Instructions to prepare candidates for the assignment.

An appropriate title is required for the report. The title should reflect the content of the report. 'Higher Biology Assignment' does not constitute a title.

Centres are advised to steer candidates away from multiple or vague aims — these result in candidates failing to achieve the conclusion mark. Ideally, the aim should have a clear independent and dependent variable.

To gain marks for applying knowledge and understanding of biology, candidates must provide explanations that are at 'Higher level'.

Candidates must include their selected raw data/information in the report. Candidates should also ensure that two relevant and sufficient sources are included.

The marking of the processing and presenting data/information section was changed this year, benefitting many candidates. The chosen format must be a graph, table, chart or diagram. If more than one piece of raw data/information had been processed and presented as a graph, table, chart or diagram, each piece of processed data was marked separately, and candidates were given the best mark obtained.

Candidates should be advised that when processing and presenting data it is not necessary to include some form of calculation. Full marks can be obtained by, for example, presenting tabular data as graphs. Where candidates need to round values to enable accurate graph plotting, each figure must be rounded to the same number of decimal places.

Candidates should be encouraged to fully analyse data — simply restating results will not gain any marks. To gain full marks, two sources should be fully analysed. This will often include calculations — for example percentage change, average increases etc. However, candidates should describe what the calculations show.

Candidates should be made aware that any conclusion drawn must refer to their aim(s) and be supported by the data/information in the report.

When candidates are evaluating data/information, they must use the terms 'valid', 'reliable' and 'robust' correctly. Candidates whose assignment includes an experiment may allow several opportunities for evaluation points on validity, reliability and limitations of procedures.

Full references should be given at the end of the report. Candidates must provide page numbers or ISBN numbers when referencing books. Candidates using SQA Past Papers as a source must reference this with the subject, year, level and question.

Grade Boundary and Statistical information:

Statistical information: update on Courses

Number of resulted entries in 2015	2572
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Number of resulted entries in 2016	7493
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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 -				
A	24.0%	24.0%	1799	80
B	22.5%	46.5%	1688	68
C	22.2%	68.8%	1666	57
D	10.5%	79.3%	787	51
No award	20.7%	-	1553	0

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 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 Biology, this does not mean that centres should necessarily alter boundaries in their prelim exam in Higher Biology. 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.