Course Report 2018

Subject	Biology
Level	Higher

This report provides information on the performance of candidates. Teachers, lecturers and assessors may find it useful when preparing candidates for future assessment. The report 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.

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

Section 1: comments on the assessment

Summary of the course assessment

Component 1 — question paper

The question paper broadly performed as expected. However, some questions proved to be more demanding than intended. This was taken into account when setting grade boundaries. The question paper provided good coverage of the course. Markers commented the paper had an appropriate balance of questions that assessed demonstrating and applying knowledge, understanding and skills.

Component 2 — assignment

Teachers and lecturers prepared candidates well for the assignment and, overall, candidates performed well.

This year, more assignments contained data gathered as a result of candidates' experimental work. Experimental work will be a mandatory feature of the Higher Biology assignment from session 2018–19 onwards.

Section 2: comments on candidate performance

Areas in which candidates performed well

Component 1 — question paper

Candidates generally performed well in questions requiring recall of knowledge, and were usually successful in answering skills questions involving calculations and drawing a line graph. Candidates were well prepared for these types of questions.

Section 1 (objective test)

Candidates performed well in the following questions:

Question 2	Most candidates identified substances involved in the electron transport chain.
Question 3	Most candidates described how enzymes affect activation energy.
Question 5	Most candidates identified an independent variable in an enzyme investigation.
Question 6	Most candidates described the circulatory system of a fish.
Question 10	Most candidates identified features of a perennial weed and why it should be treated with a systemic herbicide.
Question 11	Most candidates gave the reason for randomising treatment plots in a field trial.
Question 14	Most candidates described social hierarchy.
Question 15	Most candidates described cell differentiation in terms of gene expression.
Question 17	Most candidates identified an example of sexual selection.

Section 2 (restricted-response and extended-response questions)

Candidates performed well in the following questions:

Question 1(a)(ii)	Most candidates identified where thermoreceptors are found in mammals.
Question 1(a)(iii)	Most candidates described how information travels from the hypothalamus to the skin.
Question 4(c)	Most candidates described daily torpor in animals with high metabolic rates.
Question 5(a)(i)	Most candidates identified a restriction endonuclease.
Question 5(a)(ii)	Most candidates named the enzyme that seals a gene into a plasmid.
Question 6(a)(iii)	Most candidates calculated a simple whole number ratio.
Question 6(c)	Most candidates described invasive species.
Question 8(b)(i)	Most candidates described food security.
Question 9(c)(i)	Most candidates identified a test cross.
Question 10(a)(i)	Most candidates identified variables that should be controlled in an investigation.
Question 10(b)(i)	Most candidates drew a line graph.
Question 10(b)(iii)	Most candidates calculated the number of amino acids in a protein.
Question 12(a)	Most candidates identified a mutation that would cause a frameshift.

Question 13(a)(ii) Most candidates described a relationship in a table of results.
Question 14 A(ii) Most candidates described the polymerase chain reaction.

Component 2 — assignment

Section 1: aim(s)

Most candidates provided a clear aim with an independent and dependent variable from which a conclusion could be drawn.

Section 2: applying knowledge and understanding of biology

Many candidates provided a good account of the underlying biology, with expanded descriptions and explanations at a level appropriate to Higher.

Section 3: select information

Most candidates selected two sources of relevant and sufficient data that allowed them to draw a conclusion related to the aim.

Section 4: process and present data/information

Many candidates presented their data in an appropriate format that was correctly labelled. The data was accurately transferred from their raw data and correctly referenced.

Section 7: evaluation

Some candidates achieved full marks in this section by correctly evaluating data from their selected sources, one of which was an experiment.

Section 8: presentation

Most candidates produced an assignment with an appropriate title, structure and reference list.

Areas which candidates found demanding

Component 1 — question paper

Many candidates had difficulty answering questions that asked them to demonstrate knowledge and understanding of some areas of the course: gene regulation, the importance of polyploidy in evolution, and describing the effect of a frameshift mutation on a gene and protein.

Many candidates had difficulty with skills questions involving: drawing a conclusion relating to an aim, identifying features of an investigation that improve accuracy, and calculating an average change.

Section 1 (objective test)

Candidates found the following questions demanding:

Question 1	Most candidates had difficulty identifying products of fermentation in animal cells.
Question 4	Most candidates had difficulty selecting information from a line graph.
Question 7	Most candidates had difficulty selecting information from a line graph with two vertical axes.
Question 9	Most candidates had difficulty identifying features of an investigation that would increase the accuracy of results.
Question 13	Most candidates had difficulty identifying features of a feeding trial that would improve the reliability of results.
Question 20	Most candidates had difficulty stating that a constant rate of mutation allows molecular clocks to be produced.

Section 2 (restricted-response and extended-response questions)

Candidates found the following questions demanding:

Question 1(b)(ii)	Most candidates had difficulty describing how vasoconstriction would return body temperature to normal.
Question 2(a)	Most candidates had difficulty calculating an average increase in heart rate.
Question 2(c)	Most candidates had difficulty explaining why increased environmental temperature would increase the metabolic rate of a conformer.
Question 2(d)	Most candidates had difficulty naming the type of response used by conformers to maintain an optimum temperature.
Question 3(c)(ii)	Most candidates had difficulty drawing a conclusion relating to an aim.
Question 4(b)	Most candidates had difficulty describing innate behaviour in migration.
Question 5(b)	Most candidates had difficulty naming the origin of replication in a plasmid.
Question 6(a)(i)	Most candidates had difficulty describing changes in a line graph with values.
Question 7(a)(ii)	Most candidates had difficulty relating differences in absorption spectra to the concentration of carotenoids.
Question 7(b)	Most candidates had difficulty relating increased growth to increased rate of photosynthesis.
Question 8(a)(ii)	Most candidates had difficulty calculating a total from a percentage.
Question 8(b)(ii)	Most candidates had difficulty explaining the effect of the number of trophic levels on the energy availability.
Question 9(a)	Most candidates had difficulty giving a benefit of crossbreeding.
Question 9(b)	Most candidates had difficulty explaining why F_1 hybrids are not normally bred together.
Question 11B	Many candidates had difficulty describing parasitism.
Question 12(a)(ii)	Most candidates had difficulty describing the effect of a frameshift mutation on a gene and the protein produced when that mutated gene is expressed.

Question 12(b)(i)	Most candidates had difficulty describing the effect of a mutation on sequences that regulate transcription.
Question 13(c)	Most candidates had difficulty describing an event that occurs in cells and results in polyploidy.
Question 13(d)	Most candidates had difficulty explaining the importance of polyploidy in evolution.

Component 2 — assignment

Section 1: aim(s)

Some candidates stated an aim that did not clearly have an independent and dependent variable and, as a result, could not draw a conclusion. Some candidates stated a broad aim or multiple aims, which made it difficult to draw a conclusion.

Section 2: applying knowledge and understanding of biology

Some candidates had difficulty gaining marks when their topic was not directly related to the Higher Biology course. Some candidates provided knowledge at National 5 level, or did not provide expanded descriptions and explanations.

Section 5: analyse data/information

Some candidates provided calculations without giving a context, so did not achieve marks. Teachers and lecturers should advise candidates to put their calculations in context by describing the main trends quantified by the calculations. Where relationships are more complex than a simple proportional relationship, a description of the trends may be sufficient analysis without carrying out a calculation.

Section 6: conclusion

Many candidates did not achieve the mark because they gave a full description of what the results showed, rather than a concise conclusion related to the aim. Some candidates incorrectly drew a conclusion from just one source where the results in the selected information were conflicting. Some candidates did not relate the conclusion to the aim of the assignment.

Section 7: evaluation

Some candidates had difficulty using the terms ‘robust’, ‘reliable’ and ‘valid’ correctly. Some candidates confused ‘accuracy’ and ‘reliability’. Few candidates achieved full marks in this section where neither of the selected sources of data was an experiment. Some candidates achieved less than full marks because they gave the same comment for more than one source.

Section 8: presentation

Some candidates had difficulty giving the full reference for a textbook, and some had difficulty giving the title and aim for a class experiment.

Section 3: advice for the preparation of future candidates

The mandatory course content for Higher Biology has been reviewed and some areas of content have been removed. Teachers and lecturers must ensure that they are using the revised Higher Biology Course Specification for session 2018–19 onwards.

Component 1 — question paper

From session 2018–19 there will be two question papers. Question paper 1 will contain multiple-choice questions worth 25 marks and question paper 2 will contain restricted-response and extended-response questions worth 95 marks.

Candidates should be prepared to answer questions that ask them to demonstrate and apply the mandatory knowledge from the course. This mandatory knowledge is outlined in the course specification. The course support notes (appendix of the course specification) provide further detail on the depth of knowledge required for each key area of the course. The key areas **and** the depth of knowledge **can be assessed in the question paper**.

Teachers and lecturers prepared candidates well for questions involving most types of calculation, drawing line graphs, and identifying variables to be controlled. Candidates had a strong knowledge and understanding of areas such as the electron transport chain, PCR, enzymes, and circulatory systems.

There were a number of areas where candidates' knowledge was insufficient: frameshift mutations, polyploidy, molecular clocks, fermentation, thermoregulation, animal breeding, relating photosynthesis to growth, and parasitism. Teachers and lecturers should ensure all course content is covered with all candidates.

As in previous years, some candidates had difficulty answering questions involving a description or explanation, often confusing these command words. Examples of valid responses to command words are provided in the general marking principles, which are contained within the marking instructions available on the SQA website.

Many candidates continue to have difficulty answering experimental questions, particularly in identifying features of an investigation that would improve accuracy and in drawing a conclusion relating to the aim. Teachers and lecturers should advise candidates to identify the aim of the investigation and to use the aim when drawing the conclusion.

Calculating an average increase continued to cause difficulty for many candidates. Many candidates had difficulty selecting information from a line graph with two vertical axes. Candidates need the opportunity to develop and practise their mathematical skills necessary for the course.

Component 2 — assignment

Changes have been made to the structure of the Higher Biology assignment for session 2018–19. Teachers and lecturers must ensure that they are using the most up-to-date version of the Higher Biology Coursework assessment task. The document includes instructions for candidates, which teachers and lecturers must issue to candidates at the

outset. Candidates are required to carry out a practical experiment to generate data to use in the report stage of their assignment.

The Understanding Standards website contains examples of candidate evidence, with accompanying commentaries, to help teachers and lecturers develop an understanding of the standards required for assessment.

Although there was a general improvement this year in candidates' performance in the conclusion section, some provided a broad aim making it difficult for them to draw a conclusion. Teachers and lecturers should advise candidates to provide a concise aim with a clear independent and dependent variable.

Assignments with underlying knowledge from the Higher Biology course scored more marks. Candidates need to provide expanded descriptions and explanations that are at a depth appropriate to Higher level.

Candidates should select two sources of data that allow them to draw a conclusion related to the aim. They should provide only the results and not the entire scientific paper or experimental write-up.

When processing and presenting the information, candidates should ensure that they present the data in an appropriate format. They should accurately transfer the labels/headings and reference the sources properly. Calculations are not essential in this section.

In the analysis section, teachers and lecturers should remind candidates to clearly describe any complex relationships. For simple trends and relationships, candidates should use appropriate calculations. They should put the calculation in context by clearly describing what it shows.

In the evaluation section, assignments involving an experiment scored well because this gave candidates opportunities to comment on the validity and reliability of experimental design. This is a requirement of the assignment from session 2018–19. Candidates gained marks for comments about experimental error or improvements. Teachers and lecturers should advise candidates to avoid giving the same evaluation comment for different sources. Candidates should specify sources in their evaluation comments rather than making a generic comment about their selected data.

Grade boundary and statistical information:

Statistical information: update on courses

Number of resulted entries in 2017	7574

Number of resulted entries in 2018	7305

Statistical information: performance of candidates

Distribution of course awards including grade boundaries

Distribution of course awards	Percentage	Cumulative %	Number of candidates	Lowest mark
Maximum mark				
A	25.2%	25.2%	1842	80
B	24.0%	49.2%	1750	67
C	24.3%	73.4%	1772	55
D	9.5%	82.9%	695	49
No award	17.1%	-	1246	-

General commentary on grade boundaries

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.

SQA aims to set examinations and create marking instructions which 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.

Therefore, SQA holds a grade boundary meeting every year for each subject at each level to bring 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.

Grade boundaries from exam papers in the same subject at the same level tend to be marginally different year to year. This is because the particular questions, and the mix of questions, are different. This is also the case for exams set by centres. If SQA alters a boundary, this does not mean that centres should necessarily alter their boundary in the corresponding practise exam paper.