



Course Report 2015

Subject	Human Biology
Level	Higher (New)

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 and assessors 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.

Section 1: Comments on the Assessment

Component 1: Question Paper

Section 1 (Objective Test): this section performed well. However, some questions proved slightly more challenging than expected.

Section 2: some questions in this section proved to be more demanding than expected. In comparison to the old Higher Human Biology question paper, the new Higher Human Biology paper contains more applying knowledge questions and fewer demonstrating knowledge questions. In general, it was the applying knowledge questions that candidates found the most challenging. This was taken into account when setting the grade boundaries.

Component 2: Assignment

Most assignments were well organised and well written. Candidates chose topics that linked to the new Higher Course and so were able to demonstrate good knowledge and understanding. The analysis and evaluation sections proved to be the most challenging.

Section 2: Comments on candidate performance

Component 1: Question Paper

Section 1 (Objective Test): this section was generally well done, with the average score being 13 out of 20. There were a few questions requiring the application of knowledge where candidates did not use all the information provided and therefore did not work out the correct answer.

Section 2: the average score in this section was 38.5 out of 80. Candidates were generally good at demonstrating knowledge, but found applying knowledge much more challenging. It was encouraging that many candidates showed good data-handling and numeracy skills. Many candidates misinterpreted questions.

Component 2: Assignment

The average score for the Assignment was 11.5 out of 20. Candidates generally structured their reports well, but many reports were too long. Some reports contained too many pieces of data which all had to be processed and presented. This resulted in candidates making more errors and losing marks as a result.

Section 3: Areas in which candidates performed well

Component 1: Question Paper

Section 1

- ◆ Questions 2, 4, 9, 12, 13, and 14: most candidates demonstrated that they had the required knowledge about these topics.
- ◆ Questions 1, 10, 11 and 16: the majority of candidates could apply their knowledge and answered these questions correctly.
- ◆ Questions 5, 7, 8, 18 and 20: most candidates had the skills required to solve these problems.

Section 2

Most candidates demonstrated good knowledge of the following Course areas:

Question 1(a), (b)	stem cells
Question 2(a)	anabolic pathways
Question 4(a)	energy investment in glycolysis
Question 5(b), (c)	lactic acid and the design of slow twitch / fast twitch muscle fibres
Question 6(a)(i)	removal of cells for CVS
Question 7(a), (b)	reasons for increased obesity and calculation of BMI
Question 10(c)	storage of facts in the cerebrum
Question 11(a)(i)	the role of mast cells
Question 13(c)	pandemic spread of disease
Question 14A	hormonal control of the menstrual cycle
Question 14B	the cardiac cycle

Most candidates performed well in the following skill areas:

- ◆ Processing information: Questions 8(c), 8(d)(iii), 12(c) and 13(a)(ii) — generally, candidates were good at performing calculations.
- ◆ Selecting information: Questions 7(a), 8(a), 8(b), 8(d)(i), 12(a), 12(b), 13(a)(iii) — candidates generally were good at selecting data from graphs and tables.
- ◆ Presenting information: Question 3(b) — the majority of candidates could draw a line graph correctly.
- ◆ Making predictions: Question 8(d)(ii) — most candidates could make this prediction.
- ◆ Designing practical investigations: Question 3(a) — the majority of candidates could identify two variables that needed to be kept constant during the investigation.

Component 2: Assignment

Section 1: Almost all candidates provided an appropriate aim for their investigation.

- Section 2: Most candidates explained the underlying human biology at a depth appropriate to Higher.
- Section 3: Most candidates were able to select two pieces of data that were both relevant and sufficient.
- Section 8: The majority of candidates produced a report that was logically structured, had an appropriate title and contained references.

Section 4: Areas which candidates found demanding

Component 1: Question paper

Section 1

- 3 A large majority of candidates had difficulty with this which required the application of knowledge. They had the knowledge that the mRNA strand contained seven triplet codes, but were unable to use the diagram to identify that these translated into only 5 different amino acids.
- 6 Many candidates thought the reaction rate was increasing not decreasing.
- 15 A majority of candidates predicted 15 hours instead of 10 hours. They did not use the information that it would be legally okay to drive with a blood alcohol concentration of 80 mg/100cm.
- 17 and 19 Many candidates did not demonstrate sufficient knowledge of the immune system.

Section 2

- 1(c)(ii) Many candidates did not know that stem cells can be used as model cells to study how diseases develop or for drug testing.
- 2(b) Many candidates did not realise that the order of bases or nucleotides is altered with the result that the enzyme has an altered order of amino acids.
- 2(c) This was a challenging question. Most candidates realised that individuals with the disease had no glycogen stores to replace glucose used, but they were expected to also indicate that during exercise glucose is used for respiration or to provide energy or ATP.
- 2(d) Many candidates were unable to describe the patterns of inheritance shown by recessive and sex-linked conditions.
- 3(b)(ii) Most candidates described the pattern of the graph however the conclusion must relate to the aim which was to find out about the 'damaging' effects of UV

radiation.

- 4(b) This was a challenging question. Candidates had to apply their knowledge and suggest that the shape of the active site would be changed by the binding of magnesium ions and so enzyme activity would be increased.
- 4(d) Most candidates were unaware that in a reversible reaction a build-up of product, in this case fructose-6-phosphate, causes the reaction to change direction.
- 5(a)(ii) Many candidates were unaware that creatine phosphate runs out after 10 seconds.
- 6(a)(ii) A large number of candidates were unaware that cells needed to be cultured prior to examining chromosomes.
- 6(a)(iii) Many candidates did not know that the advantage of CVS is that it can be carried out earlier in the pregnancy than amniocentesis.
- 6(b) Many candidates were unaware that biochemical tests are carried out to detect normal changes in the concentration of substances in a pregnant woman's blood.
- 7(d) Many candidates gave definitions of the terms and obtained a mark however failed to apply this knowledge to encouraging a healthy BMI e.g. to adopt a healthy diet or to increase exercise levels.
- 9(a) The majority of candidates could not define summation.
- 9(b) This was a challenging question. Most candidates were aware mitochondria produce energy, but failed to relate their answer to the synapse shown.
- 9(c) Most candidates struggled to gain two marks here. There was confusion between agonists and antagonists, as well as between re-uptake proteins and receptors.
- 10(a) Many candidates managed to name organisation and elaboration and so gained a mark. However, most candidates did not apply this knowledge correctly to the diagram.
- 11(a)(ii) Many candidates lost this mark because they talked about NK cells inducing pathogens, rather than infected cells, to undergo apoptosis.
- 11b Many candidates were unaware that phagocytes engulf pathogens before displaying their antigens on their surface.

Component 2: Assignment

- 4 Some candidates lost marks when converting raw data into a table or graph by not accurately transferring labels from the original data. In order to plot figures accurately, data often needed to be processed first, by rounding it up, to figures that could be accurately presented. Many candidates did not do this and therefore lost a mark for accuracy. Some candidates did not link the source of their raw data to a 'complete' reference elsewhere in the report.
- 5 Many candidates lost marks here as they did not fully analyse their data. For example, if a graph contained two plotted lines, candidates were expected to analyse both lines, describing the key trends. A partial analysis of two sets of data could gain the candidate a mark, but only if they compared each set of data. Many candidates did not make this comparison and therefore did not score marks in this section.
- 6 Some candidates stated a conclusion that did not relate to their aim. If the aim related to a specific time period or location, the conclusion had to refer to this. In addition the data used in the report had to support the conclusion given.
- 7 Many candidates lost marks here because they had difficulty evaluating the Assignment and did not support their evaluation with appropriate justification.

Section 5: Advice to centres for preparation of future candidates

Component 1: Question paper

The new Higher Human Biology question paper contains more applying knowledge questions. Candidates should be encouraged to read these questions carefully and to try and use all the information provided. Candidates often produced responses that demonstrated relevant knowledge but which failed to apply this knowledge to the question asked.

Questions that start with the word 'suggest' are designed to be more challenging questions where candidates are expected to apply their knowledge in a new situation. Candidates should be encouraged to consider the knowledge that they have of the topic before attempting to apply that knowledge in the unfamiliar context.

Candidates seemed generally well prepared for the question paper. However, there were a number of areas where many candidates did not demonstrate adequate understanding. Topics included production of karyotypes, biochemical testing, summation of stimuli, antagonists and the immune system.

It was encouraging to see candidates generally doing well in skills-based questions. When evaluating experimental questions, candidates should be reminded that conclusions must

link to the aim of the investigation. Candidates should also realise that at Higher it is not sufficient to simply say 'repeat the investigation' in order to improve its reliability.

Component 2: Assignment

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

It is important that candidates remember to provide an appropriate title that is separate from the aim of their Assignment.

Candidates should be encouraged to produce a straightforward aim that allows for a straightforward conclusion to be drawn. Complex or multiple aims make it difficult to produce conclusions that address all aspects of the aim.

Candidates should focus on selecting relevant data from two different sources. The information must be sufficient to allow both data sets to be processed and then presented in a different format.

Centres are reminded that data from a candidate's experiment can be used in the report ie from Outcome 1.

Candidates should be wary of making summaries when processing data. These can lose marks for accuracy and are often very similar in format to the original data.

Candidates should make sure that they can accurately read figures from a graph which they intend to process and present as a table. Some graphs in scientific journals do not indicate exact figures and as such they cannot be accurately processed.

Candidates must fully analyse their data. There must be some reference to the key points on the X-axis of graphs or the first column of a table, ie the independent variable.

When evaluating data, candidates should be encouraged to use the terms valid, reliable and robust correctly. It is important that candidates produce a justification that supports each evaluative comment made.

Full references, for all sources of data used, should be given at the end of the report. A cross-reference, which clearly links to the full reference, should accompany each piece of raw data in the report.

Statistical information: update on Courses

Number of resulted entries in 2014	0
Number of resulted entries in 2015	1709

Statistical information: Performance of candidates

Distribution of Course awards including grade boundaries

Distribution of Course awards	%	Cum. %	Number of candidates	Lowest mark
Maximum Mark - 120				
A	22.8%	22.8%	389	79
B	22.8%	45.6%	390	65
C	23.3%	68.9%	399	52
D	11.9%	80.8%	203	45
No award	19.2%	-	328	0

For this Course, the intention was to set an assessment with grade boundaries at the notional values of 50% for a Grade C and 70% for a Grade A. Overall the course assessment proved to be more difficult than intended due to a number of items. The grade boundaries were decreased by 6 marks for Upper A, 5 marks for Grade A and 8 marks for 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.