



## External Assessment Report 2012

Subject(s)	<b>Human Biology</b>
Level(s)	<b>Higher</b>

The statistics used in this report are pre-appeal.

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

Candidates continue to be well prepared for the exam and the standard of response was similar to previous years.

## Section A: Objective test

Performance in the objective test was slightly better than in 2011, but this was in line with the performance in the years that preceded last year.

## Section B: Restricted responses

Candidate responses in this section were similar to last year. Generally, candidates were good at naming biological terms and providing descriptions but less comfortable giving detailed explanations. Built into this section are a number of 'A' type questions. These questions are designed to challenge candidates and allow them to demonstrate A grade knowledge and skills. Questions which were designed to be intentionally demanding included:

Question 1 (a) (iii)

Question 2 (b) (ii)

Question 3 (b) (ii), (b) (iii)

Question 4 (a) (iii), (a) (iv), (b) (ii)

Question 6 (c)

Question 7 (d) (ii)

Question 8 (b) (ii) — 1 mark

Question 10 (b), (c)

Question 11 (a), (b), (c), (d)

Question 12 (a) (ii) — 1 mark

Question 12 (d) (ii) — 1 mark

## Section C: Extended responses

Candidate performance in this section was significantly poorer compared to last year. Option 1A on the carbon cycle proved much less popular (20%) than option 1B on the nervous system (80%). Option 2A on substance exchange was chosen by only 8% of candidates with 92% choosing option 2B on temperature control.

## **Areas in which candidates performed well**

Candidates showed good knowledge of:

- Question 1 (a): Active transport
- Question 1 (c): Mitochondrion structure and function
- Question 2 (d): Vaccination
- Question 3 (b): Mutation
- Question 4 (b) (iii): Enzyme activators
- Questions 5 (a) (i), 5 (b) (i): Parts of the heart
- Question 6: The menstrual cycle
- Question 7 (a) (iii): The position of the SAN
- Question 8 (a): The blood vessels associated with the liver
- Question 8 (b): Bile and its function
- Question 8 (c): Substances stored in the liver
- Question 9 (b): Function of the corpus callosum
- Question 9 (c): The autonomic nervous system
- Question 10 (d): Myelination and maturation
- Question 12 (a) (iii): Factors that reduce death rates
- Question 12 (b) (i): Pesticides
- Question 12 (b) (iii): Methods of increasing food production

Candidates performed well in the following problem solving tasks:

- Question 4 (a) (ii): Identifying experimental variables
- Question 4 (a) (iv): Constructing graphs
- Question 7 (a), 12 (a) (i): Describing trends in graphs
- Question 7 (d) (i), Question 10 (a): Making predictions

## **Areas which candidates found demanding**

As mentioned above, a number of questions are intentionally demanding as they are designed to be answered by A-grade candidates. Candidates found the following questions particularly demanding:

Question 1 (a) (iii): Explaining how the kidney tubule cell was adapted for reabsorption. Candidates did not relate the folded surface to providing a large surface area for reabsorption.

Question 2 (b) (ii): Describing two functions of cell P. Many candidates appeared not to know the difference between describing and explaining. The functions were shown in the diagram and simply had to be described to be awarded the mark.

Question 3 (b) (ii): Explaining how a mutation alters the structure of a gene. Most candidates did not mention changing the order of nucleotides or bases in their answer.

Question 3 (b) (ii): Explaining why a mutated gene fails to produce the desired protein. Many candidates did not realise that the protein produced will contain an altered sequence of amino acids.

Question 3 (c): Naming the term for the process of using family histories to determine genotypes. A number of candidates did not appear to know the terms genetic screening/counselling.

Question 4 (a)(iii): Improving the reliability of the investigation. Many candidates did not indicate that the experiment should be repeated at each concentration of trypsin.

Question 4 (a) (vi): Suggesting why high concentrations of trypsin had no effect on the rate of reaction. The majority of candidates did not realise that the size of the film or thickness of gelatine had become the limiting factor.

Question 4 (b) (i): Site of trypsin activation. Many candidates were unaware that this is the small intestine.

Question 4 (b) (ii): Explaining why some enzymes are produced in an inactive form. Many candidates were unaware that this prevents them digesting the cells/organs that produce them.

Question 10 (b): Selecting the correct information from a table. A number of candidates thought this referred to the stages that the boys had gone through.

Question 11 (a): Minimising variation between sample groups of people. Many candidates misinterpreted this and talked about experimental variables not participant variables.

Question 11 (d): Drawing conclusions from an investigation. A high proportion of candidates did not refer back to the aims of the investigation to give the correct answer in terms of recall from short- and long-term memory.

Question 1B (ii): Discussing converging and diverging neural pathways. This was poorly done by most candidates as they tended to provide inadequately labelled diagrams.

Question 2B: Describing mechanisms of temperature control. Many candidates gave descriptions that lacked sufficient detail, eg answers on shivering had to mention muscles and answers on sweating had to mention evaporation.

## **Advice to centres for preparation of future candidates**

### **General**

The majority of candidates appeared to be well prepared for the Human Biology exam.

One area of concern was the large number of candidates who incorrectly described vasodilation /vasoconstriction. Many candidates provided descriptions of blood vessels moving closer to the skin or further away from it. Few candidates seemed to know that it is the arterioles which constrict or relax controlling blood flow to the skin.

Centres should emphasise to candidates that they must relate conclusions back to the original aims of an investigation. Failure to do this cost candidates two marks in Question 11.

Centres should also highlight the difference between 'describe' and 'explain' questions. In 'describe' questions candidates will normally be using information given in the question while in 'explain' questions they will have to use their own knowledge and understanding.

There is always at least one question in the paper where candidates have to add detail to a diagram. This year there were two — Question 5 (a) (iii) and Question 8 (a). Many candidates leave the diagrams blank suggesting they fail to spot them or understand what they have to do. Centres should make candidates aware of this type of question to candidates.

There is also always at least one question in the question paper that requires candidates to enter units. This year there were two — Question 7 (d) (i) and Question 10 (a). A lot of candidates do not add units and consequently lose these marks. Centres should also point out this type of question to candidates.

Candidates continue to struggle to read graphs that contain two vertical axes. More candidates gave the wrong answer (23) than gave the correct answer (18) for Question 7 (b). This question could provide centres with a training opportunity on how to read these graphs.

Diagrams drawn to support extended response answers in Section C must be properly labelled. Many diagrams were made to describe converging and diverging pathways but lack of labels meant most candidates failed to gain marks for them.

The unstructured extended response questions in Section C were poorly done this year. This partly reflects the level of demand of the questions, but many candidates wrote short responses which were never going to score 5 marks and so trigger the awarding of 'coherence' and 'relevance' marks. Centres should encourage candidates to manage their time carefully so that sufficient time is allocated to the extended response questions so that they do not run out of time.

## Statistical information: update on Courses

Number of resulted entries in 2011	4,266
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Number of resulted entries in 2012	4,356
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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	20.3%	20.3%	885	87
B	22.8%	43.1%	992	72
C	24.8%	67.9%	1081	58
D	10.8%	78.7%	470	51
No award	21.3%	100.0%	928	-

## **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.