



## External Assessment Report 2010

Subject	<b>Biology</b>
Level	<b>Intermediate 2</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

Most candidates had been well prepared by their centres for the external assessment and attempted all questions. Some candidates must be congratulated on their ability to demonstrate a very high level of understanding and skills in Biology. However, a significant minority of candidates still performed poorly and may not have been entered at the correct level.

Centre estimates suggested an improvement in this year's candidates and this was demonstrated by improved overall performance in all sections of the paper. Almost all candidates attempted both questions in Section C and the majority of candidates used satisfactory communications skills in these questions to demonstrate their understanding of the various biology concepts. However, some candidate answers lacked the knowledge to gain the full range of marks. Answers to high level questions (eg describe and explain) were restricted for some candidates due to poor science communication skills.

## Areas in which candidates performed well

### Section A

- ◆ Questions 1 and 2 — osmosis.
- ◆ Question 5 — function of amylase.
- ◆ Questions 7, 8 and 9 — respiration and photosynthesis.
- ◆ Questions 10, 11, 12, 13 and 14 — environment and reproduction.
- ◆ Question 17 — genetic engineering.
- ◆ Question 24 — reflex action.

### Section B

- ◆ Question 1 (a)(ii) — identify features of a plant cell.
- ◆ Question 3 (b) — identify direction of diffusion in cells.
- ◆ Question 4 (c)(i) — identify site for trapping light energy in a cell.
- ◆ Question 6 (a)(ii) — complete a Punnett square for a genetic cross.
- ◆ Question 7 (a)–(d) — calculate an average; select data; draw a graph; describe a relationship.
- ◆ Question 10 (c) — state the function of heart valves.
- ◆ Question 12 (a) — state a conclusion from given results: most candidates related it to the aim as required.

### Section C

- ◆ Question 1B — structure and function of three food groups.

## Areas which candidates found demanding

Fewer candidates than expected were able to answer the following questions correctly.

### Section B

- ◆ Question 2 (a)(i)(ii) — identify the products of catalase.
- ◆ Question 2 (a)(iv) — many candidates answered ‘count the bubbles’ instead of measure the height/volume of foam.
- ◆ Question 2 (b) — many candidates used variables already shown in the diagram.
- ◆ Question 4 (d)(ii) — few ‘glucose’ answers probably due to misreading the question which asked for the carbohydrate produced during carbon fixation.
- ◆ Question 6 (b) — state the term ‘polygenic inheritance’.
- ◆ Question 12 (b) — knowledge that averaging results increases their reliability.

### Section C

- ◆ Question 1 (a) — many candidates seemed confused with the path of oxygen from lungs to tissues via the heart. In a significant number of answers, the oesophagus or stomach was included in the pathway. Many candidates made no distinction of the difference of air and oxygen, with ‘air travelling to the skin’ in many answers.

The following questions were intended to be more challenging and operated as such.

### Section B

- ◆ Question 1 (b)(ii) and (iii) — description of gasohol production and use of antibiotics.
- ◆ Question 2 (a)(iii) — few described change to addition of boiled liver, many gave water instead of hydrogen peroxide.
- ◆ Question 2 (c) — the single word ‘denatured’ is not enough for an ‘explain’ question. The change in enzyme/active site shape or substrate no longer fits the active site rarely seen.
- ◆ Question 4 (b) — very few candidates were aware of the need for a set time in a rate measurement, and many candidates did not appear to have knowledge of the possibilities for measuring photosynthesis (eg oxygen bubbles in Elodea bubbler).
- ◆ Question 4 (c)(ii) — very few candidates could identify the use of light energy in photolysis.
- ◆ Question 6 (d) — poor description of the meaning of environmental impact.
- ◆ Question 8 (b) — candidates still have a poor understanding of biodiversity.
- ◆ Question 10 (d) — many candidates stated that no blood could get to the heart, failing to recognise that it was the supply to the heart muscle/tissue that was blocked not the vena cava or pulmonary vein supplying the heart.
- ◆ Question 12 (c) — as expected, candidates find percentage increase questions challenging.

### Section C

- ◆ Question 2 (a) — desert plants: few candidates linked adaptation correctly to how it increased survival.
- ◆ Question 2 (b) — differences in chromosomes between body cells and gametes: lack of clarity produced low marks.

## Advice to centres for preparation of future candidates

Centres are reminded to keep checking the Biology pages of the SQA website ([www.sqa.org.uk](http://www.sqa.org.uk)) as these provide the most up-to-date information needed to prepare future candidates

These pages contain the most recent Arrangements document (4th edition published June 2002) as a guide to the type of course materials which should be used. Other useful materials are available, such as Update Letters and the Understanding Standards website for CPD.

The marking instructions for each year's external assessment are also on the website. These allow centres to see detailed general and specific advice for marking Biology assessments and so gauge the level of detail required for specific topics. This should help to inform the marking of internal assessments and so aid estimate setting.

Guidance is also available on how to construct prelims to meet SQA requirements for robust Appeals evidence. This will also help to prepare future candidates by ensuring that they have experience of an assessment of a similar structure and level to the external assessment.

(Intermediate 2 Biology — page 61 of the document *Estimates, Absentees and Assessment Appeals* (June 2007)).

### Learning Activities

Although the third column of the Arrangements, Learning Activities, is only advisory, they help candidates to understand the topics. Practical work or even videos are useful to bring Biology alive. For example, seeing the Elodea Bubbler experiment helps candidates to visualise the process of photosynthesis, name the products and measure the rate. Use of liver and hydrogen peroxide helps to illustrate an enzyme reaction. Candidates should be encouraged to think about what is happening to produce the results (ie oxygen in the foam re-lights a glowing splint, catalase is found in the liver).

Centres should try to at least discuss as many of the Learning Activities as possible in class.

### Graphs

The graph work of candidates was generally good. However, two problem areas were highlighted this year in Section B Question 7 (c).

- ◆ Some candidates plotted 2 or 4 bars, not the 3 bars requested.
- ◆ In this year's example only 3 bars were asked for but many candidates used a scale to allow for the 4 bars. This resulted in the required 0–50 Y axis scale occupying less than 50% of the Y axis grid.

## Information in questions

Marks were lost by candidates who failed to read questions or stems for relevant information to help with the answer. These were often the candidates with poorer language skills. For example:

- ◆ Question 2 (a)(iii) — control required to show active catalase needed.
- ◆ Question 2 (b) — variables not shown in the diagram were required.
- ◆ Question 6 (a) — R and W given for the alleles were not used in the Punnett square.
- ◆ Question 6 (b) — controlled by 'several genes' should have helped to recall the term polygenic.
- ◆ Question 9 (a) — enzymes were requested and many named organs.
- ◆ Question 10 (a) and (b) — candidates mixed up which letters were required for each part of the question.

Centres should continue to encourage candidates to read all parts of the question and underline important information. If all the questions above were answered incorrectly the candidate could have lost 11 marks by not reading all the information given in the question.

## Extended Response

Many candidates only answered one part of the question chosen in Section C, therefore reducing the number of marks available to them.

- ◆ Question 1 (a) — in some answers candidates simply named or labelled the structures without any indication of the path taken by the oxygen.
- ◆ Question 1 (b) — generally good knowledge shown in this question but lack of understanding in the difference between elements and simple structures.

Underlining the main areas to be answered before starting the answer should be encouraged, and so should re-reading of the question once candidates think their answer is complete.

Use of the marking instructions from past papers to mark their own work, or the work of peers, may help candidates to see that they can only gain full marks by answering all areas of the question.

## Statistical information: update on Courses

Number of resulted entries in 2009	6924
Number of resulted entries in 2010	7354

## Statistical information: performance of candidates

### Distribution of Course awards including grade boundaries

Distribution of Course awards	%	Cum. %	Number of candidates	Lowest mark
Maximum mark — 100				
A	25.7%	25.7%	1891	70
B	23.5%	49.2%	1726	59
C	23.4%	72.5%	1718	49
D	8.4%	80.9%	615	44
No award	19.1%	100.0%	1404	—

### 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, therefore, SQA 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 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.