

## Principal Assessor Report 2004

**Assessment Panel:**

**Biology**

**Qualification area**

**Subject(s) and Level(s)  
Included in this report**

**Biotechnology Intermediate 2**

## Statistical information: update

Number of entries in 2003	126(Pre Appeal)
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Number of entries in 2004	104 (Pre Appeal)
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### General comments re entry numbers

There has been a decrease in entries by 17% from 2003. The number of presenting centres dropped slightly from 13 (in 2003) to 12 (10 schools and 1 F.E college). There was one new presenting centre (a school). The most noticeable feature this year was the low number of entries per centre, ranging between 6 and 14.

## Statistical Information: Performance of candidates

### Distribution of awards

Distribution of awards	%	Cum %	Number of candidates	Lowest mark
A	14.4	14.4	15	69
B	15.4	29.8	16	59
C	24.0	53.8	25	49
D	11.5	65.4	12	44
No award	34.6	100	36	0

### Comments on any significant changes in percentages or distribution of awards

Candidates showed an improvement in performance compared to 2003 and this is reflected in a higher percentage of A awards and a lower percentage of no awards compared with 2003.

## Grade boundaries for each subject area included in the report

Grade Boundaries	Lowest mark	Percentage of maximum marks
A	69	69
B	59	59
C	49	49
D	44	44
No award	0	0

### General commentary on passmarks and grade boundaries

- While SQA aims to set examinations and create mark schemes which will allow a competent candidate to score a minimum 50% of the available marks (notional passmark) and a very well-prepared, very competent candidate to score at least 70%, it is almost impossible to get the standard absolutely on target every year, in every subject and level
- Each year we therefore hold a passmark meeting for each subject at each level where we bring together all the information available (statistical and judgmental). 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 senior management team at SQA
- We adjust the passmark downwards if there is evidence that we have set a slightly more demanding exam than usual, allowing the pass rate to be unaffected by this circumstance
- We adjust the passmark upwards if there is evidence that we have set a slightly less demanding exam than usual, allowing the pass rate to be unaffected by this circumstance
- Where the standard appears to be very similar to previous years, we maintain similar grade boundaries
- 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 are different. This is also the case for exams set in centres. And just because SQA has altered a boundary in a particular year in say Higher Chemistry 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
- Our main aim is to be fair to candidates across all subjects and all levels and maintain standards across the years, even as arrangements evolve and change.

### Comments on grade boundaries for each subject area

The 2004 examination was judged to be of a similar standard to the 2003 paper. The grade boundaries for A and C awards were therefore kept the same as last year which are close to the *a priori* values of 70% and 50% respectively.

## Comments on candidate performance

### General comments

Candidates' performance overall was fairly satisfactory and it was pleasing to note that the number of very low scoring performances decreased substantially from 2003.

Candidates performed well in Section A (multiple choice) and less well in Section B (short answer questions). Section C (extended response questions) responses were disappointing, with many candidates scoring very low marks (0 or 1).

### Areas of external assessment in which candidates performed well

#### Section A

Candidate response was strong in many areas. KU aspects of Unit 1 were well understood e.g. questions 2 (conjugation), 4 (virus structure) and 6 (*Mucor* reproduction). Response to PS questions was more variable, although whole number ratios (Q 13), magnification calculations (Q 16), selecting information from a graph (Q 19 & 25) and drawing a conclusion (Q 23) produced a high number of correct responses. Unit 2 questions produced correct responses by the majority of candidates e.g. Q 12, 15 & 18 on practical microbiological skills.

#### Section B

Questions on Unit 2 e.g. q.Q1 and 8(b) on microbiological techniques, were completed to very high standards by the majority of candidates. Areas of KU which showed high levels of competence included some parts of photosynthesis (Q 4), antibiotics (Q 5), and genetic modification (Q 10). Graph drawing (with little support in the question) in Q 3 showed an improvement from previous years, with more evidence of the understanding of scaling and the use of keys. Other areas of PS which were well completed included selecting from a graph (Q 2(b)(i)), completing a table (Q 5(a)), calculating an average (Q 10(a)) and commenting on controls and improvements (Q 10(c)). In general, many candidates answered Q 10, which was set in an unfamiliar context, to a high standard.

#### Section C

Section C produced a small number of excellent responses from candidates. In qQ1, genetic engineering was completed to higher standards than sewage treatment and in Q 2, enzymes produced better responses than saprophytic/parasitic nutrition. The choice of extended response questions was more balanced this year, with titles fairly equally chosen by candidates.

## Areas of external assessment in which candidates had difficulty

### Section A

Candidates had more difficulty with PS questions than KU questions. Examples of these areas include complex calculations (Q 11), drawing a conclusion from a graph (q. 20) and selecting controls for an experiment (Q 5). KU areas that proved challenging included relative size of micro-organisms (Q 14), micro-organism involved in yoghurt production (Q 22) and methane production (Q 24).

### Section B

Many candidates surprisingly had difficulty with 'C'-type KU questions, notably those demanding recall or single pieces of knowledge. Examples include areas from both Units 1 and 3 e.g. anaerobic respiration (Q 2(b)(iii)), single-cell protein production (Q 3(d)), use of nitrates (Q 6(b)), energy fixation and release (Q 6(d)) and citric acid production (Q 7(d)). As in previous years, questions asking candidates to explain aspects proved discriminatory. Candidates frequently either used a *description* in their answer or merely *repeated* what was stated in the question. Examples of this type of question include Q 4(c)(ii) on photosynthesis and Q7 (b)(i) on explaining the result of an experiment. Many candidates failed to describe precisely trends on graphs e.g. in Q 8(a), where average root lengths either increased or decreased with increasing growth substance concentration *before levelling out*.

### Section C

Responses in Section C were disappointing. In Q 1A many candidates simply ignored the diagram as a stimulus for a response and consequently produced responses which bore little resemblance to the question. In Q1B many candidates simply re-stated what was written in the five boxes in the diagram without attempting to offer a *description* of what was happening during Stages 1 – 3. Q2B in particular proved testing with many candidates off target and writing in depth in areas such as parasitic diseases eg malaria.

## Recommendations

### Feedback to centres

- The content of Unit 2 was very well taught and understood by candidates.
- PS questions involving simple calculations (averages, percentages, ratios etc) were completed well.
- Centres require to give candidates more practise in writing extended response answers (Section C).
- Presentation of data e.g. drawing line graphs, including scaling and use of keys, was completed well.
- Candidates had difficulty with some of the basic KU ('C-type' questions) of Units 1 & 3 particularly in Section B
- Candidates were not secure in answering questions that demanded an explanation.
- Centres tended to over-estimate candidates' performance at grade C but were better at estimating A grade candidates.
- It is important that centres refer to the up-dated Intermediate 2 Biotechnology arrangements document (Fifth edition – March 2004) for clarification to depth of treatment to content, especially in areas of KU.