Principal Assessor Report 2003

Assessment Panel:	Biology

Qualification area

Subject(s) and Level(s) included in this report	Biotechnology Intermediate 2

Statistical information: update

Number of entries in 2002	
Pre appeal	80
Post appeal	80

Number of entries in 2003	
Pre appeal	126

General comments re entry numbers

There has been an increase in the number of entries by 56% from 2002. The number of presenting centres rose from 10 to 13 (11 schools and 2 F.E colleges). There were two new presenting centres, one school and one F.E. college.

General comments

The overall impression of the marking team was that this was a weaker group of candidates than in the three previous years. This is reflected in this year's awards: a lower percentage of overall A awards and upper A awards and a higher percentage of no awards.

Grade boundaries at C, B and A for each subject area included in the report

Grade boundaries expressed as a percentage mark in brackets.
Maximum mark = 100

Year	Upper A	A	B	C
2002	83 (83%)	71 (71%)	61 (61%)	52 (52%)
2003	82 (82%)	69 (69%)	59 (59%)	49 (49%)

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 syllabuses evolve and change

Comments on grade boundaries for each subject area

Grade boundaries for A and C grades are fairly close to last years boundaries. The paper was judged to be more difficult by 3 marks at the C grade boundary and by 2 marks at the A grade boundary.

Comments on candidate performance

General comments

Candidates' performance overall was satisfactory, although the percentage of no awards was worryingly high at about 50%.

A detailed analysis of candidates' scripts, including calculation of facility values for all questions in Sections A and B, was carried out. This confirmed that in the main, questions performed as planned.

Areas of external assessment in which candidates performed well

Candidates performed strongly in Section A (multiple choice) and less well in Section B (short answer questions). There was evidence of better responses in Section C (extended response questions) this year than in previous years, especially in Q.1. This may partly be a reflection of the decision to drop the coherence mark (1 mark) from this question.

In Section A, candidate response was strong in some PS areas, including % calculation (18) and selecting information from a graph (q 22 & 23). In KU, candidates performed especially well in some areas from Unit 1 (q 1 & 9) and Unit 2 (q 6 & 8).

In Section B, candidate response was strong in certain PS areas. Most notably those involving drawing bar and line graphs (q 6(a) and 9(a)), although there was still evidence of carelessness in labelling axes correctly. PS questions involving simple mathematical analysis, including ratios and percentages (q 2(b), 8(a), 10(a) (i) & (ii)) were completed to a high standard. Candidates gave good descriptions of initial trends when describing patterns on graphs (q 4 (c) (i)), but often did not gain the second mark because they failed to note all of the trends on the graph. Areas in Section B from Unit 2 were completed to a high standard (q 5 (c) & 6 (c) (i) – (iii)). KU areas which were well understood included asexual reproduction (q 1 (c)), types of micro-organisms involved in sewage treatment (q 3 (c) (i) & (ii)) and production of insulin by genetic engineering (q 5 (a) & (e)).

In Section C, both extended response questions were completed to a high standard.

Areas of external assessment in which candidates had difficulty

In Section A, areas of PS which candidates found challenging included questions based on experiments, especially q 21 (experimental controls) and q 24 (making a prediction). Unit 1 KU questions that proved testing included biochemical synthesis (q 3), mycorrhizal associations (q 4) and parasitic nutrition (q 5). From Unit 3, candidates found KU questions on fermentation fuels (q 15 & 16) difficult.

In Section B there were a number of questions that were testing for candidates. As in previous years, these included questions that asked candidates for an *explanation* (q 1(d), 2(a)(ii) and 4(c)(ii)). Candidates often answered these types of problems by describing some aspects of the results from the question. For example in q 4(c) (i), candidates were asked to describe a trend from a graph, which many did fairly well. However in q 4(c)(ii), when they were asked to *explain* a different part of the graph, most candidates resorted to a description as in part (i). Some areas of PS proved challenging to candidates. In particular, experimental questions that required candidates to describe controls (q 7(a)(i)), draw conclusions (q 7(a)(iii) and give a reason for a conclusion (q 5(b)) proved discriminatory. Some areas of KU in Section B were poorly understood. These included structure/function of parts of bacteria (q 1(b)), conjugation (q 1(d)), sewage treatment (q 3(a) & (b)), details about *Mucor* (q 8(b) & (c)) and nitrification/nitrogen fixation (q 10 (b) & (c)(i)). Overall it was

disappointing to note that candidates did not know some of the expected detail covered in Unit 3. The pattern of describing biotechnology processes in terms of organism, raw material used, conditions required, product and use/benefit of product(s) was not evident. Thus candidate response in some 'C-type' questions (q 2(c)(i), 4(a)(i), 7(c) and 9(c)(ii) & (iii)) was poorer that expected.

In Section C in both Q 2A & B many candidates, surprisingly, failed to give any details of the preparation of person or bench in the aseptic procedures. In Q 2B, some of the descriptions of the procedures failed to recognise that the micro-organism in the question being sub-cultured was a fungus, and not a bacterium. As a result many of the responses were confused or incorrect.

Areas of common misunderstanding

No major areas identified.

Recommendations

Feedback to centres

- The content of Unit 2 was well taught and understood by candidates
- PS questions involving simple calculations (averages, percentages, ratios etc) were completed well
- candidates showed an improvement in the completion of extended response questions (Section C)
- presentation of data e.g. drawing bar and line graphs was completed well
- overall candidates were less secure in KU than PS
- some of the basic content detail of Unit 3 had not been retained by candidates
- candidates struggled with PS questions involving unfamiliar experimental situations which asked for detail in areas such as controls, drawing conclusions and making predictions
- candidates were not secure in answering questions that demanded an explanation.
- centres have tended to over-estimate candidates' performance at both C and A grade
- it is important that centres refer to the up-dated Intermediate 2 Biotechnology arrangements document (Fourth edition – June 02) for clarification to depth of treatment to content.