

Principal Assessor Report 2004

Assessment Panel:

Biology

Qualification area

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

Biology Standard Grade

Statistical information: update

Number of entries in 2003	23159 (Pre Appeal)
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Number of entries in 2004	22986 (Pre Appeal)
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General comments re entry numbers

Presentation for Standard Grade Biology remains high, showing only a small decrease in numbers. This is pleasing in a year that saw a 4.5% decrease in total Standard Grade presentations and an increase in the presentation of S4 candidates being presented for Intermediate 2 Biology, rather than Standard Grade.

Statistical Information: Performance of candidates

Distribution of awards

	%	Cumulative %
Grade 1	26.0	26.0
Grade 2	25.5	51.5
Grade 3	26.6	78.1
Grade 4	10.3	88.5
Grade 5	7.0	95.5
Grade 6	3.0	98.4
Grade 7	0.2	98.6

Comments on any significant changes in percentages or distribution of awards

The large presentation in Standard Grade Biology produces an overall range of abilities that remains very stable from year to year. It is not thought that the increase in presentation of S4 candidates for Intermediate 2 Biology (from around 200 in 2003 to around 600 in 2004) would have had a significant effect on the ability range of the Standard Grade Biology presentation. Therefore the distribution of awards remains similar to previous years.

Grade boundaries for each subject area included in the report

Standard Grade

Assessable Element - Knowledge and Understanding

Grade	Maximum Mark	Minimum Mark for Grade	% Mark
1	40	29	73
2	28	23	58
3	50	23	46
4	22	16	32
5	15	13	26
7	12	0	

Standard Grade

Assessable Element - Problem Solving

Grade	Maximum Mark	Minimum Mark for Grade	% Mark
1	40	29	73
2	28	23	58
3	50	33	66
4	32	26	52
5	25	22	44
7	21	0	

Comments on grade boundaries for each subject area

For the Knowledge and Understanding element, the Credit paper was more straightforward than in 2003 whereas the General paper was significantly more demanding. Grade boundary cut-off scores were set to allow for these differences.

For the Problem Solving element, the General paper contained some more demanding questions in an attempt to achieve better discrimination between the General candidates. Candidates continue to improve in their Problem Solving skills. Grade boundary cut-off scores were set to allow for these factors.

Each year, the setting of grade boundaries produces small changes in the distribution of awards that are not the result of differences in the ability range of the candidates or the degree of difficulty of the examination. Sometimes there is a 'bunching' of candidates within the distribution of scores. This situation tends to occur in the Problem Solving element of the General paper which usually shows a distribution of scores skewed towards the upper end of the marks range. Changing a grade boundary by one mark may produce a large change in the distribution of awards that cannot be justified. For this reason, the inclusion of some more difficult questions helps to produce a better distribution of marks and allows grade boundaries to be established that are fairer to all candidates.

Comments on candidate performance

General comments

Once again, candidates performed significantly better with the Problem Solving questions than with the Knowledge and Understanding questions.

Areas of external assessment in which candidates performed well

Markers reported the following areas of good performance:

Credit Knowledge and Understanding

- Identifying the sequence of events following pollination
- Identifying cells placed in 10% sucrose solution
- Identifying muscle and tendon tissue in the arm
- Identifying the structure which bends the arm
- Stating the muscle, bone and tendons are all composed of living cells
- Stating that different forms of the same gene are called alleles
- Identifying the genotypes of a genetic cross

General Knowledge and Understanding

- Identifying a food chain from a food web
- Identifying and giving the functions of structures from the human female reproductive system
- Identifying features of gametes
- Naming components of animal and plant cells
- Identifying the sequence of stages in mitosis

Problem Solving

- Selecting information from a graph, bar-chart, pie-chart, table, text passage, diagram and key
- Constructing graphs and charts
- Calculating ratios, percentages and non specific calculations

Areas of external assessment in which candidates had difficulty

Credit Knowledge and Understanding

- Describing a disadvantage of nuclear power
- Identifying advantages and disadvantages of sexual and asexual reproduction in plants
- Giving information about the members of a clone
- Naming the elements present in fats
- Naming a digestive enzyme for carbohydrates and proteins together with their digestion products
- Describing the functions of the lacteal and blood capillaries of villi
- Identifying the direction of exchange of blood components at the placenta
- Explaining concentration gradient with reference to a cell placed in water

General Knowledge and Understanding

- Explaining the meaning of 'producer' and 'consumer'
- Naming the habitat as a component of an ecosystem
- Giving a reason why one plant in an investigation will be able to photosynthesise
- Naming oxygen as a product of photosynthesis
- Matching parts of a flower to their functions
- Naming a 'stain' as a liquid used in the preparation of microscope slides
- Identifying structures of the eye and describing their functions
- Stating that each parent in a family tree carried only one recessive form of a gene and giving the evidence for this from the family tree
- Naming amniocentesis as a procedure for obtaining fetal cells
- Giving the word equation for fermentation in yeast
- Name two manufacturing processes which depend on fermentation by yeast
- Identifying yeast as a single-celled fungus
- Describing precautions taken when working with micro-organisms
- Explaining why Petri dishes containing micro-organisms should be kept closed

Problem Solving

Many candidates lost marks because of vague or ambiguous answers that did not fully refer to the specific situation involved in the question. Candidates often fail to make use of information contained in the question and thereby fail to address the question asked.

Specific problems were noted as detailed below:

Credit

- Identifying the change in proportion between two related quantities
- Describing the relationship between daylength and nest building activity (many candidates referred to the time of day in their answers, despite daylength being defined in the question)
- Suggesting a possible advantage to one species in beginning nest building earlier in the year
- Identifying two appropriate variables which should be controlled in an investigation
- Explaining the need for cotton wool plugs for containers in which decay micro-organisms were present

General

- Describing the trend between the number of mussels between high and low tide marks (many candidates referred to changes in mussel numbers as the tide was changing)
- Explaining the need to destarch plants for a photosynthesis investigation
- Identifying the factor involved in an investigation of woodlice behaviour (wetness, water etc rather than moisture in the air)
- Describing the response of the woodlice (use of inappropriate anthropomorphisms or not saying what the woodlice did)
- Give a reason why the apparatus should be left for 10 minutes before taking the results
- Adding a scale to a graph (missing the zero value)

Recommendations

Feedback to centres

The majority of the marks in the Knowledge and Understanding element continue to be for the straightforward recall of names, definitions, functions etc. The importance of thorough revision cannot be over-emphasised as a means of avoiding the loss of easy marks.

Candidates should be encouraged to read the questions carefully and to make sure they take account of instructions such as 'Name', 'Describe', and 'Explain' when making their answers.

Candidates should be encouraged to think carefully about any experimental situation described in a question and to make their answers relevant to that situation. E.g. when asked for factors that should be kept the same for all parts of an experiment, the stock answers of 'light, temperature and pH' may not be appropriate.

Candidates should be encouraged to use the terms contained in the question when describing trends or relationships, to ensure their answers remain relevant and that marks are not lost. Substituting time of day for daylength and movement of the tide for tide marks are good examples from this years papers.

When completing graphs and charts, candidates should be reminded that a zero value at the origin of a scale is important. These are normally included in graph questions but this cannot be guaranteed.