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Examiners' Report June 2009

GCE

GCE08 Biology (8BI01)

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June 2009

Publications US021143

Contents

Maximum mark 40

Mean mark..... 26.1

Standard deviation..... 6.7

Types of reports.
Out of a sample of 381 projects, 35% were Visit reports and 65% were reports on Issues. The low number of Visit reports compared to the 56% from 2008 was rather disappointing and similar to the numbers observed in the early SNAB pilot years. However, there was a very welcome 73% increase in the *variety* of Issue reports; although rather 'safe' unambitious topics such as stem cells and cystic fibrosis were still the favourites. Some report titles such as 'Intelligent design', 'Human evolution' or 'Homosexuality' were inappropriate because the students could not possibly address the assessment criteria. What is the problem and how is it being solved? One or two centres went on a field course and as a result, their students did not score well at all.

Issue Topic	%
Stem cells	9
Cystic Fibrosis	5
HIV	3
Alzheimer's	2
Breast cancer	2
Cancer	2
Cannabis	2
Global Warming	2
Obesity	2
Steroids	2
TB	2
Cloning	1
Antibiotic resistance	1
CVD	1
Genetic engineering	1
Malaria	1
Parkinson's	1
Smoking	1
Biofuels	1
Blood doping	1
Conservation	1
Depression	1
Evolution	1
GM crops	1
Honey bee decline	1
Osteoporosis	1
Polar bears	1
Prader Willi syndrome	1
Migraine	1

Other issues covered included: ADHD, African Wild Dogs, Ageing, Algae and global warming, Altitude training, Amputee lifestyle, Angiogenesis inhibitors, Animal behaviour, Animal Testing, Animals in captivity, Anorexia, Asthma, Autism, Aye Aye conservation, Bee decline, Biodiversity & Polar Bears, Biological passport, Biological Warfare, Bioterrorism, Blood transfusion, Blue Iguana, Bovine Growth Hormone, Breastfeeding, Capybara, Cervical cancer, Cheetahs, Chernobyl, Chlamydia, Cholera, Clean Water, Cod, Colour blindness, Coral bleaching, Corpse preservation, Creatine, Crufts, Dalmations, Deforestation, Designer babies, Dinosaurs, DNA fingerprinting, Drug use & mental health, Drugs in sport, Ecotourism, Elephants, Epilepsy, European rabbits, Euthanasia, Eutrophication, Extinct animals' genomes, Extra terrestrial life, Female infertility, Fish farming, Foot & Mouth, Frozen Ark, Galapagos extinction, Galathamine, Gene splicing, Giant Pandas v. Water Voles, Golden Lion Tamarin, Great Barrier Reef, Grey Squirrels, Growing new hearts, Hay fever, Heart Disease, High altitude, Homosexuality, Honey, Hospital acquired infections, HRT, Human evolution, Human Population, Human Velocity, Hunting Whales, Huntingdon's Disease, Hybrid Organisms, Influenza vaccine, Insomnia, Intelligent Design, IVF, Jelly fish, Jurassic Park, Komodo Dragons, Limb Regeneration, Lizard tails, LSD, Mad Cow disease, Male hormonal contraceptives, Mekong river conservation, Mobile Phones, Mountain Gorillas, MRSA, Multiple Births, Music therapy, Myxamatosis , Narcolepsy, OCD, Oral hygiene, Orang-utan conservation, Organ donors, Pesticides, PGD, Polio vaccination, Prickly pear cactus, Psychotherapy, Rabbits, Radiotherapy, Red Palm Weevil, Red Pandas, Ricketts, Schizophrenia, Seasonal Affective Disorder, Selective breeding, Shark populations, Skin Cancer, Spider silk, Spinal Injuries, Sporting Performance, Sticklers syndrome, Synthetic blood, Thalassaemia, Therapeutic cloning, Tigers, Tissue engineering, Tocilizumab, Vaccines, Video Games, Vivisection, Weight Loss, Wolves, Yoghurt and Zoonotic diseases.

Visit Topic	%
Zoo	56
Body world	8
Slimbridge wetlands	8
Port Lympne wildlife park	8
Portsmouth university	6
Hospital	6
Sewage works	4
Brewery	2
Arabian wildlife centre	2
National park	2
Nucleotron (Bracheotherapy)	1
Cheese farm	1
Fish farm	1

Zoos are still by far the most popular venues for a Visit with even more schools going to a zoo compared to the SNAB pilot, but there is still no further increase in the *variety* of visits. For more detailed comments on the individual assessment criteria, see below.

Marks awarded.
A sample of 318 projects this summer showed a mean score of 26.7 (sd 6.7) for the Visit reports compared to 25.8 (sd 7.1) for the Issues, but this difference was not significant ($p>0.1$). Both of these means are much better than the mean observed in 2008 for the SNAB Visit / Issue reports, suggesting that these new assessment criteria are much more accessible for the students.

The distribution of marks for the various criteria is shown below as a %of the possible total i.e. 100%for 1.1a would mean that all students got the maximum of 2 marks.

Criteria	Description	Issue 2009 %	Visit 2009 %	%diff
1.1a	Identify problem or question	74	77	4
1.1b	Description of problem	80	82	3
1.2a	Discuss methods or processes	73	83	14
1.2b	Data or solutions to problem	45	39	-13
1.3a	Valid, reliable data / graphs, tables etc	33	24	-27
1.3b	Methods appropriate or effective?	47	52	11
2.1a	Implications identified	74	86	16
2.1b	Implications discussed	51	59	16
2.2a	Advantages discussed	53	66	25
2.2b	Risks discussed	45	49	9
2.3a	One alternative solution discussed	56	58	4
2.3b	Another alternative solution discussed	32	35	9
3.1	Sources used	83	84	1
3.2a	Bibliography	72	74	3
3.2b	Sources acknowledged in text	75	65	-13
3.3a	Sources valid or reliable?	71	69	-3
3.3b	Evidence for source validity	7	13	86
4.1	SPG / well set out	75	71	-5
4.2	Technical language and visuals	61	62	2

Problem and solutions
The data show clearly that although many candidates are pretty good at describing the biology involved, they are not quite so good at explaining precisely what the problem is. Some candidates were still working to the old criteria and did not always make this point very clear and it was left to the examiner to decide on the problem from the description given. Some candidates raised several questions and it was difficult to see where the emphasis was going to be. One clear cut question or problem is best. Some candidates thought that a pure description of a biological topic was enough here e.g. an account of HIV without looking at treatments; usually this meant that any experimental/investigative work was overlooked, and consequently there was no data or solution.

Some reports just posed a question which was very difficult to answer in terms of a solution or providing data e.g. 'Does embryo selection always produce designer babies? or 'Should cannabis be approved for treatment of certain medical conditions?. Reports based on a problem such a medical condition or near extinction of a particular species often worked well but reports on topics such as Global Warming or Deforestation did not because they usually involved little in the way of biology. Some reports described the problem in great detail and often data and methods related to the problem itself rather than the solution.

Solutions were sometimes dealt with in a very short paragraph right at the end. Many centres seemed to fail to have grasped the emphasis on 'How Science Works' rather than just descriptive biology. Some reports described two issues and much work identified an audience as for the old SNAB specification. Indeed, a surprising number seemed to be working from the old SNAB specification!

In addition, although most students were quite good at describing what biologists do, they found it more difficult to be analytical by giving data and explaining why the methods or solutions were effective or appropriate. A common problem was a generic textbook-type description of the methods e.g. 'drugs to treat coronary heart disease' rather than specific research examples which have associated data. Consequently, some reports were far too descriptive.

Implications and alternatives

Many candidates are good at identifying the implications of the methods or solutions employed but are not so good at explaining them. Many candidates tended to identify the implications associated with the problem itself rather than the solution. They also seemed to find it more difficult to discuss or explain the advantages or risks and often just gave lists of benefits and disadvantages. Many found it difficult to offer and discuss any alternative solutions: good alternatives were actually quite rare.

These last points are indicators of a good discussion where the candidate has clearly understood the topic being investigated. Just like the SNAB years from 2000, many students still find it quite difficult to be analytical rather than purely descriptive and this is a skill that centres really do need to work on. The written papers for Units 1 and 2 also showed that 'How Science Works' questions were not so well done and this is probably due to students following practical instructions without really being required to think critically about them i.e. not enough discussion of ideas and implications within the practical lesson itself.

Source material

Many were good at using source material and acknowledging it, but although they could give an opinion on whether their source material was valid, they were particularly poor at giving any evidence. Although only 3.9% managed to gain maximum marks for a discussion of source validity, this was better than the 2.4% for the 2008 SNAB Visit / Issue reports. Interestingly, the difference between visits and issues for giving evidence as part of a discussion of source validity was not significant ($p>0.05$) although the visits did seem superior in this respect.

<u>It needs to be stressed that the SNAB or Edexcel textbook will not be accepted as the non-web source.</u> This is a piece of coursework where one might expect some extra research.

Communication

Most reports were very well written and presented but many were short of appropriate 'visuals' in the form of graphs, tables etc. Many just had a collection of pictures, not all of them being relevant. However, some old SNAB centres that are used to writing for an audience seemed to do particularly well here.

General

Candidates seemed to tackle this piece of assessment much better than in previous years; the fact that only one issue was to be addressed was an improvement. The marks were often very centre specific, as has been observed for SNAB, in that centres where the criteria were studied and adhered to generally performed better than those centres where it was obvious that the candidates had had very little guidance. Reports that used the criteria as the main focus produced some very good accounts.

Still, far too many candidates talked of their 'essay' and it is clear that these centres have not given sufficient guidance to the students. This is not an essay; it is an analytical piece of work looking critically at 'How Biologists Work'.

A few cases of malpractice were seen, where candidates had lifted whole websites or parts of websites and had presented it as their own work. Centres need to be aware that if their students are given a talk and the lecturer has obtained some of the material from the internet, then unless they properly acknowledge this source, a Google search might suggest that the students themselves have obtained this material and presented it as their own. Although cases of suspected malpractice are small in number, centres must remember that they are responsible for their students properly acknowledging source material.

Administration

Centres are reminded that there are Guidance Documents and FAQs on the Biology homepage of the Edexcel website. These contain useful information on the methods of submission and the paperwork needed from centres.

Please note the following:

- 6BI03/1B work MUST be submitted as hard copy; CD submission is not permitted.
- All work submitted must be accompanied by the "Marking and Authentication Sheet", duly signed by teacher and candidate. For 1B submission, no marks need to be filled in.
- Work which is not accompanied by a signed Marking and Authentication Sheet will NOT be marked, in accordance with JCQ regulations.
- Centres should also submit evidence that the core practicals have been completed: the Record Sheet fulfils this requirement.

Both forms can be found in the "Unit 3" folder on the Edexcel Biology homepage:
http://www.edexcel.com/quals/gce/gce08/biology/Pages/default.aspx

APPENDIX A
Unit Grade Boundaries And Uniform Marks

The raw mark obtained in each module is converted into a standardised mark on a uniform mark scale, and the uniform marks are then aggregated into a total for the subject. Details of the method of aggregation are given in Appendix B.

For AS examinations, the two examined unit tests (6BI01 & 6BI02) each have a weighting of 40% with a maximum of 120 uniform marks; and the coursework unit* (Unit 6BI03) has a weighting of 20% with a maximum of 60 uniform marks.

For the A2 units, the two examined unit tests (6BI04 & 6BI05) also each have a weighting of 40% with a maximum of 120 uniform marks; and the coursework unit* (Unit 6BI06) has a weighting of 20% with a maximum of 60 uniform marks.

Therefore, for candidates taking the full A level, the four examined unit tests (6BI01, 6BI02, 6BI04, 6BI05) each have a weighting of 20% with a maximum of 120 uniform marks; and the two coursework units* (Unit 6BI03 & 6BI06) have a weighting of 10% with a maximum of 60 uniform marks.

The table below shows the boundaries at which raw marks were converted into uniform marks in this examination. The A and E grade boundaries are determined by inspection of the quality of the candidates' work. The other grade boundaries are determined by dividing the range of marks between A and E. Marks within each grade are scaled appropriately within the equivalent range of uniform marks.

Unit grade boundaries

Unit	Maximum mark	Grade				
		A	B	C	D	E
	Uniform marks					
	60	48	42	36	30	24
	Raw marks					
6BI03	40	34	30	26	22	18

*or written alternative for International centres

APPENDIX B
The Uniform Mark System for AS and A level Unit Schemes

The result for each unit will be issued as a standardised mark on a uniform mark scale. AS Biology has a total of 300 uniform marks and A level Biology has a total of 600 uniform marks.

Tables 1 and 2 show the numbers of uniform marks required to gain each subject grade in AS and A level Biology. They also indicate the number of uniform marks in units with various weightings that will aggregate into the appropriate subject grade. These provide a guide to the level of performance in each unit.

The uniform marks shown for each unit do not necessarily represent the actual mark range used for marking. Grade boundaries for A and E are set at Awarding meetings on the basis of candidate performance on the actual mark range used. These boundaries are then converted to the uniform marks shown in the tables, with intermediate values calculated accordingly.

Table 1 – Advanced Subsidiary Subjects

Subject		Unit Weighting					
Grade	UMS	20%	30%	$33\frac{1}{3}$%	40%	50%	60%
Max mark	300	60	90	100	120	150	180
A	240	48	72	80	96	120	144
B	210	42	63	70	84	105	126
C	180	36	54	60	72	90	108
D	150	30	45	50	60	75	90
E	120	24	36	40	48	60	72

A candidate for AS Biology or must take three modules, weighted at 40% for the two written units (6BI01 & 6BI02), and at 20%for the coursework unit (6BI03).

	Uniform mark obtained	Approximate level of performance
Unit 1	78	C
Unit 2	88	B
Unit 3	50	A
Subject Total	216	Subject Grade = B

Table 2 – Advanced Level Subjects

Subject		Unit Weighting				
Grade	UMS	10%	15%	$16^{2}/_{3}$%	20%	25%
Max mark	600	60	90	100	120	150
A	480	48	72	80	96	120
B	420	42	63	70	84	105
C	360	36	54	60	72	90
D	300	30	45	50	60	75
E	240	24	36	40	48	60

A candidate for A level Biology must take six units, weighted at 20% for the two written units (6BI01, 6BI02, 6BI04 & 6BI05), and at 10% for the coursework units (6BI03 & 6BI06). The candidate in this example has five units in the bank.

	Uniform Mark Obtained	Approximate level of performance
Unit 6BI01	86	B
Unit 6BI02	76	C
Unit 6BI03	44	B
Unit 6BI04	98	A
Unit 6BI05	*	
Unit 6BI06	36	C
	Partial Total in Bank = 340	

The candidate already has 340 uniform marks in the bank. If a Grade C is required in the subject, the candidate must obtain at least 20 UMS marks from Unit 5 or if a Grade B is required the candidate must obtain 80 UMS marks or more from Unit 5.

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