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Examiners' Report/ Principal Examiner Feedback

Summer 2012

GCE Biology (6BI03) Paper 1A & 1B

Practical Biology and Research Skills

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Research Skills

Unit 3 involves generic 'How Science Works' skills and so the actual topic could be anything! It could be a Visit; it could be a topical Issue. There is no limit on word length. The candidates need to:

- Identify and describe a biological problem;
- Discuss how scientists are solving this problem, giving the data or evidence;
- Show how effective or appropriate this solution is, giving the data or evidence;
- Identify the implications of the scientists work, including any benefits or risks;
- Identify and discuss any possible alternative solutions, in the light of the implications;
- Use source material and quotes, both web and non-web;
- Acknowledge these sources;
- Evaluate these sources, giving the evidence for validity;
- Communicate ideas effectively, using relevant visuals.

Types of reports

Out of a sample of 471 projects, 42.3% were Visit reports and 57.7% were reports on Issues. The number of visit reports is greater than the 30% of 2011 and is to be welcomed. Last year's 19% increase in the ***variety*** of Issue reports has been maintained, showing that candidates are still being encouraged to take on original pieces of work that interest them. In addition, there was a small increase in the variety of visits which is excellent. The table below shows a tremendous variety of interesting and original ideas for reports into the work of scientists. Malaria, Alzheimer's and Parkinson's disease and in fact, diseases in general still seem to be very popular, presumably because there is an obvious problem that needs solving. However, there are still a few reports on inappropriate titles for which there is no obvious problem and consequently no obvious solution.

Zoos are still by far the most popular venues for a Visit but there are a few more innovative visits and interviews with GP's or patients. For more detailed comments on the individual assessment criteria, see below.

Issue Topic	**%**
Malaria	4.0
Parkinson's	3.7
Alzheimer's	3.3
Cystic fibrosis	2.9
Huntingdon's disease	2.6
Lung cancer	2.2
Stem cells	2.2
CVD	1.8
Diabetes	1.8
Autism	1.5
HIV / AIDS	1.5
Schizophrenia	1.5
Cancer	1.1
Chronic Kidney disease	1.1
Multiple Sclerosis	1.1

Together with (in equal order of frequency) Atherosclerosis, Bone marrow transplant, Breast cancer, Cervical Cancer, Colon Cancer, Depression, Haemophilia, Leukaemia, Motor Neurone disease, Obesity, Oil spills, Organ transplants, Red Squirrels, Tasmanian Devil, TB, Abiraterone and prostate cancer, Acute Myeloid Leukaemia, ADHD, Alcohol & Dementia, Alcohol abuse, Aloe Vera & Cancer, Amu leopards, Animal testing, Animals in drug testing, Anorexia, Antidepressants, Antivenom production, Arthroscopic stabilisation, Artificial reefs, Artificial vision, Asian Elephant poaching, Aspirin and Heart Attacks, Asthma, Astigmatism & LASIK laser surgery, Athlete's foot, Animal cognition, Bisphenol A in plastics, Black Rhinoceros, Blindness, Blue fin tuna, Brain tumours, Brazilian merganser, Breast implants, Bumblebees, Burns, Calcineurin Inhibitors, Californian Sea Otters, Cancer & aspirin, Borderline personality disorder, Blood doping, Chronic Immune, Thrombocytopenic Pupura, Chronic Myeloid Leukaemia, Chronic sinusitis, Chytridiomycosis, Cirrhosis, CJD, Cleft Palate, Colony collapse disorder, Common brown lemurs Coral reefs, CVD & Statins, Damaged connective tissue, Coeliac disease, Dengue Fever, Dental caries, Depression & ECT, Depression & St John's Wort, Dicamba resistant crops, Dilated Cardiomyopathy, Donor hearts, DNA profiling, Edwards Syndrome, Bowel cancer, Biofuels, Endotheliotropic Herpes in Elephants, Energy crisis, Epibaditine & Pain, Epilepsy, Equine osteoarthritis, Bipolar disorder, Erectile dysfunction, Fast food, Fibro adenoma, Fibromyalgia, FIV, FOP, Gastric cancer, Gene silencing & Huntingdon's, Genetic screening, Giant Panda numbers in China, Glaucoma, Horse leg fractures, Golden rice, Grey wolf reintroduction,, Hand rearing in zoos, Health problems in young horses, Honey bees, Hypertrophic, Cardiomyopathy, Infectious mononucleosis, Infertility, Infertility after cancer, Inflammatory bowel disease, Influenza variations, Kakapo, Kidney Stones, Influenza , Kidney rejection, Loggerhead turtles, Low cholesterol diet and CVD, Insomnia, Macular Degeneration, Migraine, Millennium seed bank, Mitochondrial disease, Morphine addiction, MRSA in young children, MRSA, Muscular Dystrophy, Non-biodegradable polymers, Obesity and gastric bands, Olympic performance, Omega 3 in the diet, Onchocerciasis, Oriental fruit fly, Overheated chickens, Oxytocin as a 'cure' for Schizophrenia, PCOS, Peanut Allergy, Pedigree dogs, Pink Amazon Dolphin, Polar bear tracking, Polar bears, Post natal depression, Prostate cancer, Prosthetic arms, Rabies, Red Pandas, Refractive Eye Surgery, Seasonal Influenza, Severe combined immunodefiency, Sickle Cell Anaemia, Skin cancer, Slow Loris, Snake venom in medicine, Snow leopards, Somatosensory feedback in prosthetic limbs, Stem cell differentiation, Stem cell organ transplants, Steroids, Strokes, Suicide & alcohol, Sumatran tigers, Swine Flu, Tanning, TB in cattle, Temporal lobe epilepsy, Tiger hunting, Tiger corridors, Tooth loss, Tourette's syndrome, Trypanosomiasis, Urinary tract infections, Uterine fibroids, Vampire bats & strokes, Sumatran Rhinoceros, Water voles, White bengal tigers, Zopiclone, Zebra fish & heart regeneration.

Visit Topic	**%**
London Zoo	21.6
John Innes Centre	21.6
Colchester Zoo	15.6
Howlett's Wildlife Park	6.0
Port Lympne Zoo	6.0
Marwell Zoo	6.0
Harlow Car Garden	5.0
Brewery	5.0
Visit to Vet (Foot & Mouth disease)	4.5
Dartmoor Zoo	2.0
Chester Zoo	1.5
Kew Gardens (Orchids)	0.5
Pig Farm	0.5
Organic Farm	0.5
Selayang Hospital	0.5
Honey Farm	0.5
Interview with Mental Health Nurse	0.5
Interview with Schizophrenic patient	0.5
Interview with GP	0.5
Talk on strokes	0.5
University	0.5

Marks awarded

The sample of scripts this summer showed a mean score of 29.1, better than last year and with no difference between Issues and Visits. The data confirm yet again that these assessment criteria are still more accessible for the students compared to the original SNAB criteria before 2009. Indeed, 15.9% of 'top' candidates got more than 36/40 marks in this sample compared to 15.6% in 2011 and only 10% in 2010 or 2.8% in 2009. This is excellent.

In addition, at awarding in July, there was no significant difference between the moderated (1A) scripts and the examined ones (1B).

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

Criteria	Description	2012 %
1.1a	Identify problem or question	97.8
1.1b	Description of problem	78.9
1.2a	Discuss methods or processes	91.1
1.2b	Data or solutions to problem	50.3
1.3a	Valid, reliable data / graphs, tables etc	43.4
1.3b	Methods appropriate or effective?	61.9
2.1a	Implications identified	76.6
2.1b	Implications discussed	63.3
2.2a	Advantages discussed	67.5
2.2b	Risks discussed	58.6
2.3a	One alternative solution discussed	70.5
2.3b	Another alternative solution discussed	62.7
3.1	Sources used	91.2
3.2a	Bibliography	95.6
3.2b	Sources acknowledged in text	71.2
3.3a	Sources valid or reliable?	61.3
3.3b	Evidence for source validity	25.1
4.1	SPG / well set out	86.4
4.2	Technical language and visuals	71.9

Problem and solutions

Compared to 2011, the data show that candidates are better at explaining precisely what the problem is but are still finding it more difficult to explain the biology behind it.
Once again, some reports still just posed a question which was very difficult to answer in terms of a solution or providing data. Others, again as in 2011, still described the problem in great detail and often any data or evidence related to the problem itself rather than the solution.

There was a significant improvement in candidates' ability to describe what biologists actually do and give data or evidence to support the discussion. However, there was no further improvement in their ability to explain why these methods or solutions were effective or appropriate. There are still too many reports that are far too descriptive.

Interestingly, there were yet more reports on diseases or conditions where it was much easier to identify a problem, discuss it and then look at the solutions, ie treatments. However, many of these reports on diseases tended to give too descriptive an account of the treatments or the drugs without actually saying what people were doing. Many of these used data and evidence that was far too complicated and consequently, they found it almost impossible to explain. Sometimes this resulted in some degree of plagiarism.

Implications and alternatives

Like last year, many are good at identifying the implications of the methods or solutions employed but are not so good at explaining them. However, there was a significant improvement in the number discussing the implications of the **solution** rather than the problem itself. This is excellent.

However, there was no obvious improvement for risks, advantages or alternative strategies for solving the problem outlined.

Source material

Candidates were quite good at using source material, acknowledging it and giving an opinion on whether their source material was valid but there was no improvement on 2011. However, there was a significant improvement on the number that either provided evidence for their source evaluation or that analysed the data from a named source. Although this is excellent, it still remains the major source of weakness in most candidates' source evaluation.

It needs to be stressed yet again for a small number of centres that the SNAB or Edexcel textbook will not be accepted as the non web source. This is a piece of coursework where one might expect some extra research.

Communication

- Most reports were very well written and presented but some were still short of appropriate 'visuals' in the form of graphs, tables etc. Far too many reports used graphs or diagrams of very poor quality, sometimes almost impossible to read. There is nothing wrong with redrawing or replotting these to aid understanding as long as the source is then acknowledged.

General comments from the examining and moderating team

- Overall there has been a huge improvement in the standard of work candidates are producing for this unit. It is evident that many schools are using the assessment criteria properly and giving candidates very good guidance.

Section 1

- Although 1.1 is well done overall, some candidates explained a great deal of biology but failed to focus on a specific problem. This issue was sometimes compounded by ill-defined or non-existent 'solutions' for 1.2. Common examples were:

    - a description of a disease and a brief account of the treatment, with confusion between preventative and curative measures – and no clear scientific trial/procedure (and no data) associated with the treatment;

    - a description of an endangered species, but with no focus on a specific cause of the threat, or a specific way of addressing it. (Too many of these reports were vague accounts of keeping them in captivity, protecting habitats or instituting new laws.)

    - global issues that lacked specific scientific methods and supporting data, such as climate change and loss of coral reefs.

- One area where there is a potential problem is 1.2a, where it was quite often apparent that although candidates were describing studies, often in a lot of detail, they didn't really understand what the research was about. This was shown by the amount of cut and pasted work obvious here. The better candidates did add a paragraph or two in their own words, the weaker ones didn't.

Section 2

- For 2.1, economic implications were generally well answered. Environmental implications were the group that was most likely to be more about the problem than the solution. Some centres produced good ethical implication but others were very weak. Some candidates confused the issue with side effects.
- Those candidates that discussed moral judgements for 2.1 invariably did so in terms of religion, and then 'God' was almost invariable against it. There was little attempt to put both sides or to discuss life and death issues in a humanist way or to invoke a compassionate God who would be in favour of something.
- Animal research issues were very frequently put into 'animal rights' language using anti references. There was very little use of references from either places such as 'Understanding medical research' or based on the Animals (scientific procedures) act 1986 which should be the first port of call for teachers (for home centres) in regard to Daphnia ethics in module 1. However, a few candidates had ethical accounts that did

justify the use of animals in terms of the philosophy of the greater good and balance of rights.

Section 3

- Very few centres did well on source evaluation for 3.3. There was some attempt to cross reference but quite a few continued to be vague about it with no detail about what data or information had been cross referenced or where the cross referencing source could be found.
- Candidates were often successful in discussing a non-web source with a few actually beginning to explain the nature of peer review but then web based sources were evaluated poorly, often NHS and charity web sites. A few candidates had no idea what peer review was. There was even a reference to an article in the Daily Mail being peer reviewed.
- Candidates are also still struggling with the cross referencing of sources for 3.3 where they don't have a good understanding of how to evaluate the sources, often resulting in a very long, vague discussion focussed too much on opinion.
- Some discussions of source evaluation were simply a CV for the author or the date of the publication. Appearance of an article in the national press does not guarantee reliability. The list of qualifications of the author or the fact that it was a recommended textbook was insufficient.

Section 4

- Often visuals for 4.1 such as photographs, maps, diagrams etc. can add a great deal to a report but only if this material is carefully selected and annotated to illustrate the points made in the text.

Administrative Issues

A significant number of centres are not sending in the practical review sheets or in some cases, not sending the OPTEMS sheets for 1A or sending the marks to Edexcel to be placed on the website.

Centre priorities

- Being able to discuss what scientists do when solving a problem and giving the evidence;
- Using data or evidence when discussing what scientists do and how effective their work is;
- Being able to give the evidence for any critical evaluation of source material or commenting on the validity or reliability of the data used.

Plagiarism

12 individual reports were potential cases of malpractice where candidates had lifted whole websites or parts of websites and had presented it as their own work. Although cases of suspected malpractice are still small in number, centres must remember that they are responsible for their candidates properly acknowledging source material. It is unfortunate that there seemed to be an increase in potential plagiarism this year.

Indeed, one centre had advised all their candidates to copy and paste the details of whole drug trials and then to discuss the details. Some candidates failed to acknowledge the scientists' work and whether or not the details of the drug trials are acknowledged, the candidates will only get credit for what they say, not what the scientists say. In some cases, it was very difficult indeed to work out what was actually the candidate's own work.

Another centre placed all the details of the visit 'talk' on the school intranet. Although this is good idea, it is not helpful to have candidates simply copying and pasting this straight into their report.

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