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Examiners' Report

Summer 2013

GCE Biology (6BI03) Paper 1A/1B: PRACT.BIOL.& RESEARCH

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GCE Biology - June 2013 6BI03/1A

Research Skills

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

This analysis is based on a random sample of 275 reports.

The % of Visits was about 27% which is not as good as 2012 and about the same as in 2011. The most popular venues for visits are still zoos with a small number going to hospitals.

This sample showed that there was a further decrease in the *variety* of Issue reports. The most popular Issue report was Obesity together with Parkinson's disease and Diabetes like last year.

Issue Topic	**%**
Obesity	3.0
Parkinson's	3.0
Diabetes	2.5
Lung cancer	2.5
Alzheimer's	2.0
HIV	2.0
Malaria	2.0
Schizophrenia	2.0
Acute lymphoblastic leukaemia	1.5
Brain tumour	1.5
Cystic fibrosis	1.5
Depression	1.5
Kidney failure	1.5
Melanoma	1.5
Arthritis	1.5

together with (in equal order of frequency, Coral reefs, Bipolar disorder, Black rhinos, Cervical cancer, Downs Syndrome, Elephant populations, Epilepsy, Haemophilia, Liver cancer, Multiple Sclerosis, Panda breeding programmes, Siberian tigers, Thalassemia & pregnancy, Beta thalassemia, Chemotherapy, Malaria, Acne, Acute Myeloid Leukaemia, AIDS, Alcohol & the brain, Altitude travelling, Alzheimer's & Aricept, Alzheimer's vaccine, Amur tiger, Anxiety, Arthritis & turmeric, Artificial hearts, Artimisinin combination therapy, Asiatic lions, Aspirin & Cancer, Aspirin & Strokes, Asthma, Auditory neuropathy, Autism & stem cells, Biofuels, Black footed ferret conservation, Bladder cancer, Blood doping, Breast cancer, Breast cancer and exercise, Caffeine & Alzheimer's, Cancer cures, Canine Addison's disease, Canine syringomyelia, Captive breeding, Chemotherapy and infertility, Childhood leukaemia, Chlamydia, Chronic lymphocytic leukaemia, Climate change and polar bear, Colon cancer, COPD, CVD, Deep brain tumours, Diabetes & pregnancy, Diabetes & stem cells, Elephant farmer conflict, Endometrial cancer, EpiSkin, Eczema, Female infertility, Foot & Mouth disease, Genetic screening, Giant panda, Great barrier reef, Great White Shark conservation, Guillain Barr syndrome, Hepatitis C, Honey & Superbugs, Honey as an antibiotic, Huntingdon's disease, Insects as a protein source, Keratoconus, Leopard extinction, Leukaemia, Lewy bodies in Parkinson's, Lewy body dementia, Long segment tracheal stenosis, Malaria resistance & gene expression, Mother to child HIV transmission, Mountain gorilla, Mouse plagues, MRSA, Noise induced hearing loss, Non-small cell lung cancer, Orang-utan population decrease, Organ failure, Orzudex, Osteoarthritis, Osteoporosis, Ovarian cancer, Paediatric genu varum, Pancreatic cancer, Paralysis, Penguin extinction, Phage therapy, Pneumonia, Polio, Poor oral hygiene, Postnatal depression, Progeria, Prostate cancer, Protein CD22 & Lung cancer, Rice bacterial blight, Safe vaccines, SARS, Schizophrenia & memory deficit, Sinusitis, Somatic gene therapy, Spina bifida, Spinal cancer, Stem cells & deafness, Strokes, Sumatran tiger extinction, Syphilis, Tay Sachs disease, TB, TB and Fluoroquinolones, TB in cattle, Tigers, Type 2 diabetes, Varroa destructor parasite, Vitamin B & Alzheimer's, Vitamin D & Eclampsia, White tigers and Whooping cough.

Visit Topic	**%**
London Zoo	27.0
Twycross Zoo	21.6
North Yorkshire Wildlife Park	20.3
Port Lympne Zoo	16.2
Chester Zoo	9.5
Hospital Visits	5.4

Marks awarded.
The sample of scripts this summer showed a mean score of 28.0, not as good as last year's score of 29.1. Again, there was with no significant difference between scores for Issues and Visits. In addition, only 8.4% of 'top' candidates in this sample got more than 36/40 marks compared to 15.9% in 2012. This is a little disappointing.

Although this sample is not necessarily representative of all candidates, it does compare well with preliminary data for the whole cohort which shows a slight decrease in the % of candidates achieving grade 'A'.

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

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

Criteria	Description	2012 %	2013 %
1.1a	**Identify problem or question**	97.8	99.3*
1.1b	**Description of problem**	78.9	75.5
1.2a	**Discuss methods or processes**	91.1	82.5
1.2b	**Data or solutions to problem**	50.3	42.1
1.3a	**Valid, reliable data / graphs, tables etc**	43.4	36.0
1.3b	**Methods appropriate or effective?**	61.9	61.2
2.1a	**Implications identified**	76.6	69.5
2.1b	**Implications discussed**	63.3	56.6
2.2a	**Advantages discussed**	67.5	64.5
2.2b	**Risks discussed**	58.6	61.6*
2.3a	**One alternative solution discussed**	70.5	71.1*
2.3b	**Another alternative solution discussed**	62.7	61.9
3.1	**Sources used**	91.2	89.2
3.2a	**Bibliography**	95.6	97.5*
3.2b	**Sources acknowledged in text**	71.2	76.9*
3.3a	**Sources valid or reliable?**	61.3	51.5
3.3b	**Evidence for source validity**	25.1	17.6
4.1	**SPG / well set out**	86.4	83.7
4.2	**Technical language and visuals**	71.9	75.8*

Problem and solutions

Compared to 2012, 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.

As in previous years, some reports still just posed a question which was very difficult to answer in terms of a solution or providing data. A few are still describing the problem in great detail and often any data or evidence relates to the problem itself rather than the solution.

There was no obvious improvement in students' ability to describe what biologists actually do and give data or evidence to support the discussion. Nor was there any improvement in their ability to explain why these methods or solutions were effective or appropriate. There are still too many reports that are descriptive rather than analytical.

One interesting observation is that the % of reports on human diseases in this sample was 57% overall, compared to 42% in 2012, 49% in 2011 and only 32% in 2010.

This increase in diseases does indicate a clear problem to solve but far too many students are including graphs, data and methodology that they clearly do not understand. A significant number simply paste details of drug trials in with little of their own comment. Sometimes, the data or diagrams were of very poor quality and difficult to read. It cannot be stressed too highly that candidates will only be given credit for their own analysis of the evidence, not what the scientists think.

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.

There was a slight improvement in the discussion of risks or alternative strategies for solving the problem outlined.

Source material

Students in this sample were better at using source material and acknowledging it. However, they still find it very difficult to give a reasoned opinion on whether their source material was valid. Too many simply quoted the scientists' qualifications or expertise rather than focus on the source material itself.

The use of data or evidence in this discussion of source validity showed no improvement at all and remains the major source of weakness in most candidates' source evaluation.

Source evaluation remains an extremely good discriminator.

Communication
Most reports were very well written and presented but some were still short of appropriate 'visuals' in the form of graphs, tables etc. 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. There was at least some improvement in the use of technical language.

General comments from the examining and moderating team.

Section 1.

- Although 1.1 and 1.2 were well done overall, some candidates explained a great deal of biology but failed to match it to the problem itself. Questions were mostly clear and well explained and although the methods were also explained quite well by most candidates, some lacked data as part of the discussion.
- For 1.3, candidates had most trouble discussing how the method was appropriate but those that focused on a disease tended to do better. Many candidates described methods which included terms like placebo, double blind and repetition but did not go on to explain them.
- Some centres have clearly understood and interpreted the criteria well and in these there was a wealth of data, critically evaluated and analysed.
- The choice of topic is crucial and this has got to be guided by the teacher. It's clear that some topics chosen can't, and never will, really address the marking criteria adequately. However, there did seem to be less of these this year. Many teachers are clearly sharing and explaining the assessment criteria with the students. This seems to be quite centre specific. There are still a few non biological reports mainly on climate change or global dimming. There was also a number on the medical use of cannabis as the title but ended up more on the legalising of cannabis.
- There were marked differences between those centres who really prepared candidates for this exercise and those who appeared to give very little guidance. In some of the weakest cases candidates appear to have been taken on a visit and told to write a report with no guidance as to what the report should try to achieve. Students from these centres seemed unaware of the criteria on which their work would be assessed. Too many candidates just give a title and information about a topic without making the problem or its cause really clear. Topics such as 'Diabetes' or 'polar bears' are not specific enough.

Section 2.

- Many found it very difficult to discuss social issues effectively and concisely.
- A few centres are still writing about the implications and benefits and risks of the problem but these were usually the ones who had chosen an inappropriate topic.
- A significant number of candidates also failed to note that they were expected to identify TWO implications and explain each of these briefly. Some candidates failed to note the areas from which these implications

could be chosen. The term ethical is not fully understood and economic implications were most commonly chosen.

Section 3.

- Evaluation of references was often very vague and was often a CV of the author. Peer review was mentioned by some but often not explained at all. Cross-referencing to check the information from the sources was rare.
- Many candidates' source evaluation was too superficial and they were saying something along the lines of 'I cross referenced this source and my other sources agreed with it' but not actually providing any actual evidence of cross referencing. In other words, how did the sources agree?
- Source evaluation is still a weak area with many candidates offering cursory comments about reliability. Typically, 'because the author has been working on this it must be reliable and they couldn't afford for it not to be'. Cross referencing was not evident except in all but the best.
- In a few 1A centres, marks were readily awarded for using the word "reliable" when the student's commentary was clearly insufficient for any marks in 3.3a. The word reliable had not been explained at all. Sometimes marks were given for section 3.3b when there was no evidence of it at all.
- Candidates who went on visits rarely give credit to the organisation or the people who talked to them. Too many candidates who went on visits rarely did further research and only used the information they were told on the visit which made all their reports too similar. Peer reviewing is rarely explained and cross referencing rarely states the piece of information they are using. The qualifications of the authors and the status of the organisation are still the most popular.
- Many candidates failed to complete 3.3 although they made some comment on their sources. They did not appreciate that this was to be done for only 2 of their sources, and the sources chosen, should be verified for their reliability and likely validity. Appearance of an article in the national press does not guarantee reliability

Section 4.

- Many reports were far too long – 4000 words. This was due to large sections setting out the problem. This sort of detail is not needed. Also some whole centres seemed to have had little guidance on how to set out the report and consequently lacked sub-headings and missed answering many of the sections well. These tended to be on the topic of endangered animals or visits to zoos
- Too often, the visuals used weren't really relevant and this was especially true for candidates who had picked a conservation related topic. They were clearly struggling to come up with appropriate data.
- There seemed to be a higher percentage of students (and centres) this year who were attempting to address the marking criteria effectively. Almost all reports were well presented with clear sub-headings which reflected the marking criterion sections. The candidates were focused therefore on at least attempting to address each criterion
- The number of candidates using their standard text book as their sole non-web source has fallen which is another improvement.

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;
- Ensuring that any data or evidence is legible and of good quality;
- Being able to give the evidence for any critical evaluation of source material or commenting on the validity or reliability of the data used.
- Being able to explain terms such as ‘placebo’, ‘drug trial’, ‘reliable’, ‘valid’ or ‘peer review’ rather than just give them.
- Giving the information itself when cross referencing and claiming that the ‘information’ from two sources agreed.

Plagiarism

Slightly fewer 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 students properly acknowledging source material.

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