

Principal Moderator Feedback

Summer 2015

Pearson Edexcel GCE
in Biology (6BI03)
Practical Biology & Research Skills

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GCE Biology - June 2015 Visit or Issue Report (6BI03)

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 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 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 252 reports.

The % of Visits was only 6% which is the lowest ever, the most popular venues for visits being the John Innes Centre, with a small number going to zoos or Kew Gardens. One student went on an expedition to Ecuador.

This sample showed that the variety of Issue reports stayed about the same. The most popular Issue reports were Diabetes, Schizophrenia and Alzheimer's together with Leukaemia, Malaria, Cystic Fibrosis and HIV.

Issue Topic	%
Diabetes	4.6
Schizophrenia	3.8
Alzheimer's	3.4
Leukaemia	3.4
Malaria	3.4
Cystic fibrosis	3.5
HIV	3.5
Multiple sclerosis	2.1
Antibiotic resistance	1.7
Breast cancer	1.7
Giant pandas	1.7

Honey bee extinction	1.7
Parkinson's	1.7
Arthritis	1.3
Aspirin and blood pressure	1.3
Black rhinos	1.3
Ebola	1.3
Golden rice	1.3
Organ transplantation	1.3
TB	1.3

together with (in equal order of frequency, Binge drinking, Bovine TB, Cheetah conservation, Dengue Fever, Depression, Epilepsy, Global warming, Golden Lion Tamarin, Lung cancer, Obesity, OCD, Osteoporosis Prostate cancer and transurethral hyperthermia, PTSD, Tiger extinction, Sumatran tigers, Abraxane and breast cancer, ALS, Anorexia, Asian Elephant extinction, Asthma, Ballet dancer injuries, BCG and diabetes, Bengal tigers, Bipolar disorder, Black footed ferrets, Brain tumours, Bulimia, Canine Addison's disease, Cannabis, Chimpanzees, Choroideremia, Cognitive therapy and depression, Colour blindness, Congestive heart failure, DCD, Decreasing cetacean population, Demand for meat, Dementia, Eating disorders, Endemic trachoma, Epilepsy, European bison, Eutrophication and ultrasonic irradiation, Evolution, Fibrates and cirrhosis of liver, Football, Freezing eggs for IVF, Ganges River dolphin, Genetic diversity in tigers, GM mosquitoes, Cervical cancer, Haemophilia, HIV in children, Hodgkin's Lymphoma, HRT and Alzheimer's, Hypertension, Iberian lynx, Immunotherapy, Infertility, Influenza, Insomnia, Insomnia and blue light, Javan rhinos, Jellyfish, Kiwis, Koalas low genetic diversity, Loggerhead sea turtles, Lou Geyrig disease, Lymphatic filariasis, Major depressive disorder, Maudsley family based treatment, Measles, Migraine, Mitochondrial disease, Motor neurone disease, Mountain gorillas, MRD and leukaemia, MRSA and Dalvabancin, Narcolepsy, Neonatal tetanus, Niacin instead of statins, Oil, Omega 3 and bipolar disease, Orang utan extinction, Organ donation, Organ rejection, Organ shortages, Osteoarthritis, Peanut allergy, Phenylketonuria, Philippine crocodile, Prada-Wili syndrome, Pulmozyme, Red Pandas, Red squirrels and parapox, Refractory coeliac disease, Refractory depression, Sleeping sickness, Smoking, Snakebites, Spinal Cord injury, Strangles, Tachycardia, Testicular cancer, Tooth decay, Traditional Chinese Medicine, Vitiligo, White rhino, IVF and embryonic screening, Amur tiger, iPS cells, Orcas, Chronic granulomatous disorder, Gorillas, Amur leopard, Spinal Cord injury in dogs, White rumped vulture, Sick cell anaemia.

Marks awarded.

The sample of scripts this summer showed a mean score of 29.2, not quite as good as last year's 30.3 but better than the 28.8 of 2013. Again, there was no significant difference between the scores for Issues and Visits, despite the low number of Visits in the sample. Also, 13.9% of 'top' candidates in this sample got more than 36/40 marks which is not as good as the 15.0% from last year.

Although this sample is not necessarily representative of all candidates, it does compare well with preliminary data for the whole cohort which show the % of candidates achieving grade 'A' is 28.3%, not as good as last year's 32.7% but better than the 24.3% from the previous year.

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: i.e. 100% for 1.1a would mean that all students got the maximum of 2 marks.

Overall, the distribution of the marks is very similar to previous years.

Criteria	Description	2014 (%)	2015 (%)
1.1a	Identify problem or question	99.5	99.4
1.1b	Description of problem	85.2	88.2
1.2a	Discuss methods or processes	79.7	90.2
1.2b	Data or solutions to problem	39.2	44.9
1.3a	Valid, reliable data / graphs, tables etc	44.5	49.9
1.3b	Methods appropriate or effective?	59.1	69.8
2.1a	Implications identified	73.4	76.9
2.1b	Implications discussed	56.7	55.9
2.2a	Advantages discussed	66.3	67.6
2.2b	Risks discussed	62.2	61.9
2.3a	One alternative solution discussed	83.8	81.3
2.3b	Another alternative solution discussed	76.9	71.2
3.1	Sources used	92.3	87.7
3.2a	Bibliography	92.4	94.1
3.2b	Sources acknowledged in text	75.9	82.4
3.3a	Sources valid or reliable?	64.6	49.3
3.3b	Evidence for source validity	26.5	23.4
4.1	SPG / well set out	82.9	95.5
4.2	Technical language and visuals	67.6	78.0

Problem and scientists' solutions

Compared to 2014, the data show that candidates are still pretty good at explaining precisely what the problem is. Although they are still finding it more difficult to explain the biology behind the problem, there has been a slight improvement: 88.2% success compared to 85.2% last year.

There was an improvement in students' ability to describe what biologists actually do and give data or evidence to support the discussion. There was also a small improvement in their ability to explain why these methods or solutions were effective or appropriate. However, there are still too many reports that are descriptive rather than analytical.

The % of reports on human diseases in this sample was 68%, compared with 50% last year, 57% in 2013, 42% in 2012, 49% in 2011 and 32% in 2010.

This considerable emphasis on diseases does indicate a clear problem to solve but far too many students are still 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 must be stressed highly that candidates will only be given credit for their **own** analysis of the evidence, not what the scientists think.

Implications and alternatives

Compared with last year, slightly more candidates could identify the implications of the methods or solutions employed but were still not so good at explaining them.

There was no further improvement in discussing alternative strategies for solving the problem outlined.

Source material

There was no obvious improvement in using source material and acknowledging it. Students still find it difficult to give a reasoned opinion on whether their source material was valid. Still 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, 23.4% compared to 26.5% last year. Source evaluation remains the major source of weakness in most candidates' but it also remains an extremely good discriminator.

Communication

There was some improvement in communication and most reports were very well written and presented. However, a few 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.

General comments from the examining and moderating team.

There were some excellent pieces of work this year, showing full understanding of the criteria, both in option 1A and 1B. The use of sub headings has helped candidates address the criteria more clearly. This year, there were fewer unusual topics and many on a variety of diseases or conditions.

Some candidates scored well because they had a good grasp of the purpose of the assessment and the marking criteria, whereas others did poorly because their reports deviated a lot from these criteria.

There is still evidence that some problems are centre specific. For example, in one large centre, every candidate had compiled detailed descriptions of implications, benefits, risks, benefits of implications and risks of implications for each alternative solution described for 2.3.

Problem

- *This was done well by most students.*
- *For all centres, candidates were able to identify a relevant biological problem/ question/ issue. However, some candidates failed to describe the problem with some biology behind it. For example, candidates that chose to focus on a disease described the effect of the problem on society with very little discussion on the biological pathways.*

Methodology

- *This was done well by most students but there is still not enough data in some cases.*
- *More students seemed to be discussing reliability well together with the appropriateness of the methodology.*
- *Methods/ solutions were identified and described for the vast majority of candidates. However, for 1.2b there was a lack of data for quite a few. Some candidates discussed more than one solution in their report. These were credited as alternatives for 2.3.*
- *Discussion on the effectiveness of the solution was almost always attempted but candidates were lacking in providing evidence and discussion on the appropriateness.*
- *Like previous years, many candidates struggled to achieve the maximum mark for this section. A minority of candidates failed to*

describe sufficient practical detail – or chose case studies where accessing such details was difficult.

- *As usual, reports based on zoo visits often scored badly. Many candidates/centres seemed to have the impression that generic information provided by a zoo speaker is adequate. Instead, candidates choosing captive breeding programmes as their case study need to hunt down publications describing protocols for breeding programmes in more detail. Candidates also need to appreciate that (with rare exceptions) the procedures involved are not carried out at a single zoo.*
- *Candidates from some centres used a plethora of jargon, abbreviations, etc. that was not appropriate for AS Level. This might suggest that these method accounts (usually about testing efficacy of new treatments for disease) had been pasted from source. In any case, an abundance of unexplained notations in tables and graphs often meant that marks were forfeited for 1.2.*

Implications

- *Most centres did this well.*
- *The implications of the solution for the vast majority, was excellent. Economic and ethical implications were very popular. However, for the economic implications the actual cost was not always identified. Some candidates discussed the implications of the problem and others confused this section as benefits and risks.*
- *Benefits and risks were identified but not always fully discussed. They were also discussed in 1.3b, the appropriateness of the solution. Reports based on diseases listed the side effects of the drug.*
- *Although many candidates performed well here, they would be well advised to separate accounts for 2.1 and 2.2 in their layout. Some candidates attempted to cover implications, benefits and risks in one section – meaning that there was too much overlap in treatment.*

Alternatives

- *Some alternatives were still not linked to the main solution.*
- *Two alternatives to the solution discussed in 1.2 were identified by the vast majority. Quite a few were described in detail. Those that focused on diseases identified alternative drugs and therapies as the solution. For those that focused their reports on an endangered species, they often struggled to identify alternatives (as most had mentioned them all in 1.2 and were treated as one solution).*
- *Candidates generally performed well; for some this section was far too long – and certainly disproportionate to the overall report.*

Sources

- *Generally, the referencing was good, an improvement from the previous years. However, some still did not include a non-web source or were citing a standard course textbook. The non-web references were not*

always fully referenced with the year, publishers, date and pages used. On the other hand, the web references were better.

- *Candidates were required to site at least 3 sources including the non-web in the report. All candidates were credited here.*

Source evaluation

- *A few centres had clearly trained students to do cross referencing but most students failed to get full marks here.*
- *Evaluating references was again very poor. Some candidates cross referenced sources and explained peer review to obtain marks.*
- *Candidates continue to find it difficult to evaluate material – and many, I suspect, really don't understand what 'evaluation' properly means. Too many of them still resort to meaningless (and highly subjective) statements about qualifications of the scientists involved. However, a minority of centres had clearly noted advice from previous years – so their candidates covered cross-referencing and explanations of peer review to a consistently high standard.*

Communication

- Spelling, punctuation and grammar were largely correct and students were able to obtain 2 marks for this. Nearly all of the reports included clear sub-headings and were well set out. An improvement from previous marking series.

Centre priorities (despite improvements, these are still priorities).

- Using data or evidence when discussing how effective the scientists' 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 for named sources.
- 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

Only 2 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 very small in number, centres must remember that they are responsible for their students properly acknowledging source material.

Practical work and authentication sheets

Some centres are still not sending these in and have to be asked for them.

The authentication sheets are an essential guarantee from the centre that the work is the candidates' own.

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