Course Report 2016

Subject	Biology
Level	National 5

The statistics used in this report have been compiled before the completion of any Post Results Services.

This report provides information on the performance of candidates which it is hoped will be useful to teachers, lecturers and assessors in their preparation of candidates for future assessment. It is intended to be constructive and informative and to promote better understanding. It would be helpful to read this report in conjunction with the published assessment documents and marking instructions.

Section 1: Comments on the Assessment

Component 1: Question paper

This component of the assessment performed as expected. Markers commented that most candidates were able to attempt all questions and they felt that there was a good balance of accessible questions as well as a number which presented a challenge for the more able candidates.

The question paper was constructed to give a good balance of marks across the three units, and included opportunities for candidates to display a range of skills as well as demonstrate and apply their knowledge and understanding.

There was evidence that some candidates are not reading the questions carefully enough, and this leads to incorrect or partially correct answers.

Candidates continue to confuse ‘describe’ and ‘explain’, which results in failing to express a detailed answer appropriate to the question.

Some candidates were poorly prepared to answer questions in specific areas of the course.

Component 2: Assignment

This component of the assessment performed as intended, with many candidates making a good or very good attempt at all sections.

Markers commented that although many centres seemed to have prepared their candidates more thoroughly for the assignment this year, there was still immense variation in the level of support that candidates had received. Candidates who worked their way systematically through the candidate guide performed well in this component.

Overall, the performance has improved compared to last year, and many centres seem to understand more confidently what is required.

A good diversity of topics was apparent this year, but care must be taken in the selection to ensure that it relates to the National 5 course. Although there is more evidence of relevant data being included, some candidates are still choosing data that is too complex and beyond their skill level when it comes to processing.

Section 2: Comments on candidate performance

Areas in which candidates performed well

Component 1: Question paper

Section 1

Question

2 Most candidates were able to work out the solutions in which most cells would become plasmolysed.

4	Most candidates could identify correct DNA base pairing.
5	Most candidates demonstrated their knowledge of the composition of hormones.
6	Most candidates could identify the substances involved in carbon fixation.
7	Most candidates could select the correct experimental set up to allow comparison.
10	Most candidates were able to identify the correct conclusion from the data given.
11	Most candidates demonstrated their knowledge of where male gametes are produced in a plant.
13	Most candidates could identify the generations involved in a genetic cross.
15	Most candidates showed an understanding of the term ‘niche’.
18	Most candidates showed an understanding of mutation giving rise to new alleles.
19	Most candidates demonstrated an understanding of the use of indicator species.
20	Most candidates could predict the effect of change in a food web.

Section 2

1(b)(ii)	Part 1 - Most candidates were able to name a method of transport through a membrane.
2(a)(i)	Most candidates could select the correct terms associated with the given reaction.
2(c)	Most candidates could name the substance of which enzymes are composed.
3(a)(i)	Most candidates could identify a plasmid.
3(b)(ii)	Most candidates were able to name a factor to be controlled in a fermenter.
7(b)(ii)	Most candidates could name the cells involved in stomatal control.
8(b)	Most candidates could construct a pie chart.
10(a)(i)	Most candidates could identify an organism which is both predator and prey.
11(a)(i)	Most candidates could calculate an average.
11(a)(ii)	Most candidates could complete the pyramid of biomass.
13(a)	Most candidates demonstrated that they understood the term ‘mutation’.
13(b)(iii)	Most candidates demonstrated that they understood the meaning of natural selection.
14(a)(i)	Most candidates were able to draw a conclusion from the results of the investigation.

Component 2: Assignment

1	Most candidates were able to state an appropriate aim.
2	Most candidates could give a suitable application and state its effect on society or the environment.

4	Most candidates could select relevant information from their sources.
5(a)	Most candidates could present their data/information in an appropriate format.
8(a)	Most candidates presented a report with good structure and used appropriate headings.
8(b)	Most candidates were able to provide suitable references.
8(c)	Most candidates presented a report that was clear and concise.

Areas which candidates found demanding

Component 1: Question paper

Section 1

Question

3	Some candidates found difficulty in selecting the appropriate graph to represent the information in the diagram.
7	Some candidates were unable to demonstrate knowledge of chromosome complement being maintained in cell division.
11	Many candidates found difficulty with the understanding of ‘polygenic’ and the type of variation associated.
16	Some candidates found difficulty in carrying out a calculation from the data given.

Section 2

3(a)(ii)	Some candidates found difficulty in carrying out the calculation from the given data.
4(a)(i)	Many candidates were unable to fully explain why muscle cells require many mitochondria.
4(b)	Many candidates found difficulty in describing the fermentation pathway. Some were clearly unaware of what it was and others used the term ‘anaerobic’, which is incorrect.
5(a)(ii)	Many candidates did not read the question fully and did not follow the instruction to use information from the table.
5(b)	Many candidates did not know the name of the vessel supplying the heart with blood.
6(b)(ii)	Many candidates were unable to explain why predicted and actual ratios often differ.
7(a)(ii)	Many candidates did not read the question carefully enough and gave answers which were not about additions to the apparatus shown.
7(b)(i)	Some candidates found difficulty in applying their knowledge of transpiration to this situation.
8(c)(ii)	Some candidates found difficulty in carrying out a percentage calculation.
9(a)	Many candidates found difficulty in explaining why only the target cells were affected.

9(b) Many candidates found difficulty in naming the type of glands which release hormones.

9(c) Some candidates were unable to select the substance released in response to low glucose levels.

11(b)(i) Many candidates found difficulty in explaining why their selected species was the least likely to compete.

11(b)(ii) Many candidates found difficulty in explaining why the competition was interspecific.

12(a)(i) Many candidates found difficulty in calculating an average over a period of time.

12(a)(ii) Many candidates did not read the question fully and did not follow the instruction to use information from the table.

13(b)(i) Many candidates found difficulty in suggesting the reason for converting figures to percentages.

13(b)(ii) Many candidates found difficulty in applying their knowledge and skills to the given situation.

14(a)(ii) Many candidates found difficulty in explaining the purpose of the control in this situation.

14(b) Some candidates were unable to state the term for the use of a predator as an alternative to pesticides.

Component 2: Assignment

5(b) Many candidates found difficulty in processing their raw data accurately. This was sometimes due to the selection of data that was too complex and beyond the skill of the candidate to handle successfully.

5(c) Many candidates found difficulty in labelling their processed data correctly. This was sometimes due to the complexity of the data, but at other times it was due to careless errors in labelling, eg the incorrect copying of the axis label of a graph.

5(d) Many candidates found difficulty in making a suitable comparison between their chosen pieces of data/information, or failed to state that no comparison was possible as they referred to different aspects of the topic under investigation. A significant number of candidates failed to even attempt this section.

6 Many candidates found difficulty in drawing a valid conclusion that was related to the stated aim and supported by evidence in their report.

Section 3: Advice for the preparation of future candidates

Component 1: Question paper

Centres are encouraged to make sure that they are using the most recent version of SQA materials. These are available on the SQA website.

Cognisance needs to be taken of the terminology used in the National 5 Biology Course Assessment Specification — it differs in many areas from that used in previous courses. An example of this is found in question 4(b), where some candidates were discussing anaerobic respiration, which is not the same as fermentation. Candidates also struggled with the concept of polygenic.

Candidates need to spend time consolidating the mandatory knowledge of the course, and develop their understanding of it to the point where they are able to apply it to new and unfamiliar situations. The course assessment tests the application of knowledge as well as its demonstration.

Candidates should be encouraged to take their time and read all parts of a question thoroughly. Questions 5(a)(ii) and 12(a)(ii) both referred the candidate to the information in the table to formulate their answers, but many candidates chose to ignore this and failed to gain marks as a result. There was also evidence that other questions had not been read carefully enough. The time allocated for the examination should not pose a problem for candidates in terms of reading questions carefully before attempting an answer.

Candidates must understand the difference between the terms ‘describe’ and ‘explain’ — too many candidates are mixing these terms up and failing to provide the detail needed to access the marks.

Candidates should be given opportunities to practice questions where the answers require explanations or extended pieces of writing — many candidates struggled to express themselves in these types of questions.

Candidates should also be given opportunities to practice the full range of skills — these can be found in the Course Assessment Specification on the SQA website. Some candidates struggled with the experimental type questions, eg questions 11(b)(i), 13(b)(i) and 14(a)(ii), and questions involving calculations.

Candidates should be encouraged to review answers to their calculations to see if their answer is feasible or not. Some candidates gave answers that were unrealistic.

The use of a ruler in the completion of graphs/charts should be encouraged. The lines for a pie chart must all originate from the central point and connect with the ‘tick’ marks around the perimeter.

Component 2: Assignment

Centres are advised to make sure that they are using the most up-to-date version of the guidelines issued for the assignment, and are encouraged to make the Candidate’s Guide

available for all candidates. It is useful to follow the format and structure given, although not essential.

The choice of topic for the assignment needs careful consideration. It must relate to the National 5 Biology course and allow the candidate to be able to demonstrate a good knowledge of biology relevant to the course and their investigation. The underlying biology involved in Section 7 of the assignment must be appropriate to the National 5 Biology course.

An appropriate title is required for the report, and this should not be a reiteration of the aim. The title should reflect the content of the report. ‘National 5 Assignment’ does not constitute a title.

Centres are advised to steer candidates away from multiple aims — this generally results in candidates failing to achieve the conclusion mark as they rarely address them all.

The topic chosen needs to allow the candidate to give an application which is related to their aim and to go on to explain the effect that it has on society/environment. This effect should not be described as the effect on an individual but as an effect on society as a whole or on the environment.

In Section 3, although the candidate is no longer required to use the terms ‘relevant’, ‘reliable’, ‘perspective’, there is still a requirement to provide valid reasons as to why they chose their presented pieces of data/information.

Candidates are encouraged to label their two pieces of raw data as such and to identify which piece of processed data has been developed. Too many candidates are not making this clear enough. References for these pieces of raw data must be provided.

It is no longer a requirement to change data into two different formats, as the same format may be used for each piece of raw data, eg a table of information may be processed into a bar graph and a pie chart also processed into a bar graph. However, it should be noted that it is inappropriate to process a line to a bar graph or vice versa — the data from discrete variation, and that from continuous variation, must be presented in the correct format. Whilst there is an opportunity to present processed information as a summary, these are often poorly attempted, with the summary being inadequate as it misses too much out, or is too wordy (and in some cases is longer than the original information).

Data should be chosen carefully to ensure that it can be processed accurately. The format that it is to be changed into should also be carefully considered. Much of the data available can be too complex and leads to inaccuracy when being converted to another format. At least 90% of the data must be processed accurately to gain the marks.

Centres are reminded that data from a candidate’s experiment can be used in the report, ie from Outcome 1. However, candidates should not have processed this data prior to the communication stage of the assignment if it is to be used.

Candidates may work in groups when carrying out experimental procedures to generate data for their report. However, candidates must write up their report individually using their own words.

A comparison is required between the two pieces of data. In too many cases this is being omitted. If the data cannot be compared, a statement to that effect can be included and an explanation provided.

Candidates are too often not succeeding in providing a suitable conclusion. This must relate directly back to their aim and be supported by evidence given in the report. Too many conclusions are just the candidate's opinion and are not based on evidence within the report.

In Section 7, candidates are required to describe the underlying biology related to their topic. The marking of this section was changed this year, benefitting many candidates. A mark was awarded for each relevant description and/or explanation at National 5 level. Three relevant descriptions and/or explanations at National 5 level gained three marks.

Centres are advised to remind candidates that the report must be written in their own words as no marks will be awarded for information copied from research materials.

Centres are reminded that references are required in enough detail that the information the candidate has accessed could be retrieved.

Centres should advise candidates that reports should be clear and concise. Excessively short reports may be self-penalising due to lack of content, while overly wordy reports may lose the conciseness mark.

Centres are reminded that the communication stage of the assignment should be written up by the candidate under controlled conditions. Marking by centre staff and redrafting by candidates is not permitted.

Centres are also reminded that the communication stage is not a timed assessment and may be completed over a number of periods. However, centre staff should retain the reports between periods so that candidates cannot work on them outwith the controlled conditions. Giving feedback to candidates is not permitted.

Grade Boundary and Statistical information:

Statistical information: update on Courses

Number of resulted entries in 2015	21635

Number of resulted entries in 2016	21211

Statistical information: Performance of candidates

Distribution of Course awards including grade boundaries

Distribution of Course awards	%	Cum. %	Number of candidates	Lowest mark
Maximum Mark -				
A	29.3%	29.3%	6207	70
B	21.4%	50.6%	4532	60
C	22.7%	73.3%	4809	50
D	9.1%	82.4%	1932	45
No award	17.6%	-	3731	-

General commentary on grade boundaries

- While SQA aims to set examinations and create marking instructions which will allow a competent candidate to score a minimum of 50% of the available marks (the notional C boundary) and a well prepared, very competent candidate to score at least 70% of the available marks (the notional A boundary), it is very challenging to get the standard on target every year, in every subject at every level.

- Each year, SQA therefore holds a grade boundary meeting for each subject at each level where it brings together all the information available (statistical and judgemental). The Principal Assessor and SQA Qualifications Manager meet with the relevant SQA Head of Service and Statistician to discuss the evidence and make decisions. The meetings are chaired by members of the management team at SQA.

- The grade boundaries can be adjusted downwards if there is evidence that the exam is more challenging than usual, allowing the pass rate to be unaffected by this circumstance.

- The grade boundaries can be adjusted upwards if there is evidence that the exam is less challenging than usual, allowing the pass rate to be unaffected by this circumstance.

- Where standards are comparable to previous years, similar grade boundaries are maintained.

- An exam paper at a particular level in a subject in one year tends to have a marginally different set of grade boundaries from exam papers in that subject at that level in other years. This is because the particular questions, and the mix of questions, are different. This is also the case for exams set in centres. If SQA has already altered a boundary in a particular year in, say, National 5 Biology, this does not mean that centres should necessarily alter boundaries in their prelim exam in National 5 Biology. The two are not that closely related, as they do not contain identical questions.

- SQA's main aim is to be fair to candidates across all subjects and all levels and maintain comparable standards across the years, even as arrangements evolve and change.