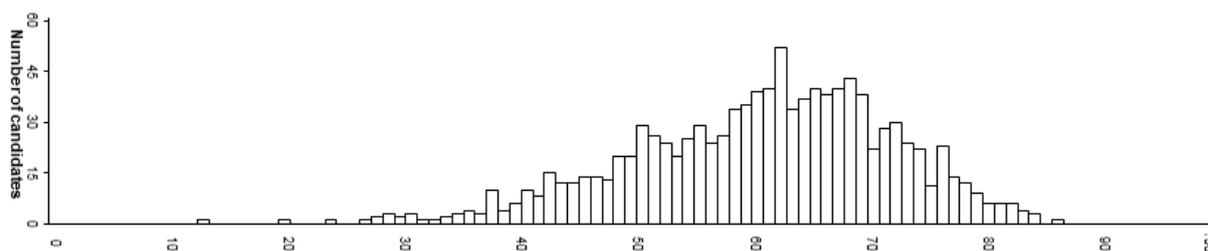




Summary report for candidates on the 2014 WACE examination in Biological Sciences Stage 3

Year	Number who sat	Number of absentees
2014	1080	9
2013	1604	18
2012	1673	19

Examination score distribution



Summary

The examination had three sections. Section One: Multiple-choice comprised 30 questions, Section Two: Short answer comprised five questions and Section Three: Extended answer comprised six questions in two parts, A and B. Candidates were required to answer all questions in Sections One and Two, and four questions in Section Three, two from Part A and two from Part B.

The mean score for the examination was 61.13%, with a standard deviation of 11.31%. The maximum mark was 86.5% and the minimum was 13%.

Section means and standard deviations are as follows:

Section One: Multiple-choice	Mean	74.59%	Standard deviation	11.65%
Section Two: Short answer	Mean	55.79%	Standard deviation	11.54%
Section Three: Extended answer, Part A	Mean	63.13%	Standard deviation	20.91%
Section Three: Extended answer, Part B	Mean	45.97%	Standard deviation	17.15%

The scores for each of the four components were positively correlated with the examination total, with the strength of the correlation ranging from 0.95 (Section One: Multiple-choice) to 0.76 (Section Three: Extended answer, Part A).

General comments

All candidates attempted Section One and Section Two. Virtually all candidates attempted both Parts A and B in Section Three. The high proportion of attempts for all components of the examination implies that the examination could be completed within the allocated time.

The overall mean score (61.13%) indicates that the examination was of an appropriate standard. The overall standard deviation (11.31%) and range of marks (86.5% to 13%) suggests that paper achieved good discrimination. The standard deviations, and ranges in marks, were highest for Section Three, Part A and Section Three, Part B, suggesting that these were the most discriminating parts of the examination.

On average, candidates performed well in Section One, which had a mean score of 74.59%. Candidates performed worst in Section Three, Part B, which had a mean score of only 45.97%.

In general, candidates appeared to have a good understanding of most of the syllabus. The quality of answers for recall questions was generally good, but those which required the application of information were often poor.

Candidates typically struggled with a range of topics within the 'Continuity of Life' area of the syllabus, particularly the more conceptual aspects or applications. Many candidates did not appear to understand the processes of genetic drift, mutation, sexual selection or speciation. Some candidates were also unable to describe how microarrays can be used to identify particular genes. Many did not understand the relationships between chromosomes, genes and alleles.

Many candidates were seemingly unable to develop logical, cohesive and comprehensive descriptions, discussions or explanations when required. Explanations were often superficial and even the more substantive answers typically did not draw different points together to illustrate cause and effect. Also, answers were often given in very vague, imprecise and/or informal language.

There were several instances where candidates did not focus their answers on the question asked. The most notable of these was Question 39, which asked candidates to describe the processes involved in water moving from the soil into a root cell. Many candidates concentrated their answer on the roles that cohesion, adhesion, capillary action and transpiration play in moving water through the plant.

Advice for candidates

- Read the question carefully and make sure that you answer the question asked.
- Use formal and precise language, and scientific terminology, in answering questions.

Comments on specific sections

Section One: Multiple-choice

Attempted by 1080 Candidates Mean 22.38(/30) Max 30.00 Min 9.00

All candidates attempted all 30 questions. In percentage terms, the mean score was 74.59%. The standard deviation was 11.65% and the marks ranged from 100% to 18%. The correlation with the examination total was 0.82.

The mean scores for individual questions ranged from 0.97 (Question 13) to 0.28 (Question 24). The mean scores for Questions, 7, 8, 13, 14, 20, 27 and 28 were above 90%. Questions 7, 8, 13 and 14 required students to interpret data in a table or phylogenetic tree. Questions 20, 27 and 28 tested factual recall from different areas of the syllabus. The mean scores for Questions, 2, 4, 24 and 25 were below 50%. Question 2 asked about the principles governing the ethical handling of animals. The most commonly-selected incorrect answer suggested that the governing principles are replace, reduce and restrain (rather than replace, reduce and refine). Question 4 asked about the relationships between chromosomes, genes and alleles in a eukaryotic cell. The most commonly-selected incorrect answer indicated that a eukaryotic cell will have more genes than alleles. Candidates are reminded that alleles are alternative forms of a gene and that a diploid cell contains two alleles per (autosomal) gene and therefore more alleles than genes. Question 24 asked about the difference between facilitated and simple diffusion. Two incorrect answers were commonly selected - one suggested that facilitated diffusion uses energy, whereas simple diffusion does not - the other suggested that simple diffusion is more rapid than facilitated

diffusion. Candidates are reminded that facilitated diffusion is more rapid than simple diffusion and does not use energy. Question 25 asked candidates to calculate the rate of water used by a twig from data in a table. The majority of candidates did not notice that the table gave the cumulative amount of water used by the twig in a 12 minute period.

Section Two: Short answer

Attempted by 1080 Candidates Mean 27.89(/50) Max 43.00 Min 4.00

All candidates attempted this section. In percentage terms, the overall mean score was 55.79%, ranging from 86% to 8%. The standard deviation was 11.54%. The correlation with the examination total was high at 0.95, partly because this section contributed the most marks. The mean scores for questions 31, 32, 33 and 35 ranged from 62.94% to 54.07%. The mean score for Question 34, which mainly tested topics in the 'Continuity of Species' area of the syllabus, was only 43.26%.

Section Three: Extended answer Part A

Attempted by 1076 Candidates Mean 6.31(/10) Max 10.00 Min 0.00

Almost all candidates attempted this part. The mean score for individual questions ranged from 76.92% to 40.85%.

Section Three: Extended answer Part B

Attempted by 1073 Candidates Mean 4.60(/10) Max 8.75 Min 0.00

Almost all candidates attempted this part. Based on the mean score, candidates found this part of the examination the most challenging.