

2023 NCEA Assessment Report

Subject:	Biology
Level:	Level 3
Achievement standards	91603, 91605, 91606

General commentary

Candidates had opportunities to demonstrate and apply their biology knowledge of each achievement standard. Candidates needed to divide their time equally for each question. In general, candidates attempted all questions, which increased their opportunity for success.

Many candidates wrote a long answer on information that was not asked for.

Candidates need to ensure handwriting is legible so their answers can be understood easily.

Report on individual achievement standard(s)

Achievement standard 91603: Demonstrate understanding of the responses of plants and animals to their external environment

Assessment

The examination comprised of three questions with candidates needing to respond to all. The questions required candidates to apply their understanding of plants and animals in their external environments. The questions related to the guidance provided in the 2023 assessment specifications.

Commentary

Candidates who responded to each question, using the bullet points to support and structure a concise and clear understanding of the question stem, gained higher achievement. Many candidates rewrote the resource material verbatim rather than using it to support and show their understanding. To show knowledge of processes and concepts taught at Level 8, candidates needed to show clear knowledge of biological terms and not simply rely on vague definitions in their response/s. Candidates who provided long answers, with biological information not asked for in the stem of the question, did not receive credit for this. Some candidates did not refer to the resource or use the bullet points to help structure their answer, limiting their achievement.

Grade awarding

Candidates who were awarded **Achievement** commonly:

- described the key terms and stated the advantages of the behaviours but were not able to explain why they were an advantage and link them to increased survival and reproductive success

- stated the advantages and disadvantages of the plant responses but were not able to explain why they were an advantage or disadvantage
- described hierarchy and advantages to the 'king' and females but were not able to explain how these improved reproductive success or the advantages to the gene pool
- named and defined homing, navigation methods, and taxic behaviour of salmon but were unable to explain these in any depth
- described the advantages of reproductive location and methodology of salmon but were unable to explain these in any depth.

Candidates who were awarded **Achievement with Merit** commonly:

- explained the individual adaptive advantages of the tropisms and nastic responses but did not link them together or relate them to overall greater reproductive success
- explained the individual benefits to the king and / or females and the significance of both ritualistic and actual fighting but did not relate these to increased / decreased survival and reproductive success
- explained the adaptive advantages of the different behaviours but did not relate them to the salmon or show evidence of how these different behaviours worked together
- explained key concepts well but had difficulty linking these to the big picture of reproductive success.

Candidates who were awarded **Achievement with Excellence** commonly:

- understood the unique environment and survival / reproductive strategies
- explained how the responses increased the survival and reproductive success in the particular environment, for the majority of the questions
- applied terminology correctly when discussing the responses of the organism
- showed that they could put additional knowledge into the context of the specific question asked.

Candidates who were awarded **Not Achieved** commonly:

- described tropism as a movement rather than a growth response and / or added the wrong directional adjective or omitted it completely
- described nastic responses as growth responses
- could not describe hierarchy or ritualistic fighting, and simply copied text from the resource material
- could not describe many of the key terms or understand the advantages and disadvantages of the reproductive strategy of salmon
- referred to animals and behaviours that did not relate to the context given in the question(s).

Achievement standard 91605: Demonstrate understanding of evolutionary processes leading to speciation.

Assessment

The examination comprised of three questions with candidates needing to respond to all. The questions required candidates to apply their understanding of evolutionary processes leading

to speciation in their external environments. The questions related to the guidance provided in the 2023 assessment specifications.

Commentary

Candidates who spent time planning their responses, including all the key points in their discussion, showed a clear understanding of the stem of the question and often gained higher achievement. Candidates had less success when they failed to give examples of named environmental selection pressures, geological processes, and the reason for stopping of gene flow between populations. Poor handwriting and biology literacy skills made it difficult to interpret some candidates' responses. Some candidates did not attempt all three questions, which limited their achievement.

Grade awarding

Candidates who were awarded **Achievement** commonly:

- attempted all questions
- provided accurate definitions across most questions
- identified / named / described RIMs
- described how DNA analysis might identify a new species
- named / provided example(s) of a selection pressure or geological process.

Candidates who were awarded **Achievement with Merit** commonly:

- linked evolutionary concepts to the context provided
- explained the founder effect and genetic drift effect on allele frequencies within gene pools and possible future implications in the kākāpō species
- linked the process of natural selection to the kākāpō and resulting mutations in the two populations
- linked valid selection pressures to natural selection of coprosma
- explained how RIMS prevents hybridization in the velvet worm
- explained how DNA analysis can identify new velvet worm species.

Candidates who were awarded **Achievement with Excellence** commonly:

- discussed the processes of natural selection, genetic drift, and mutation, and how they all affect both kākāpō populations
- discussed / linked the future of both kākāpō populations (island and mainland) due to both natural selection **and** genetic drift
- discussed the evolution of the Coprosma species, by adaptive radiation, throughout the Pacific, linking in phenotypes to their habitat / niche
- discussed how natural selection resulted in speciation of Coprosma after accumulation of mutations, with a lot of new species arising in a relatively short period of time due to different and vacant environments / niches
- discussed the evolution of the velvet worm in New Zealand due to various speciation events and linked in geological history (such as mountain building / orogeny) of New Zealand
- discussed how there may be more unidentified species of the velvet worm due to current lack of genetic knowledge, and what DNA analysis might show; often linking in aspects like ancestral species, mtDNA, and phylogenetic trees.

Candidates who were awarded **Not Achieved** commonly:

- did not attempt all questions
- did not define biological terms / concepts accurately. For example, inaccurately defined niche as “the environment / habitat where it lives”.
- repeated only information provided in the resource and question
- provided information not relevant to the question(s)
- incorrectly described a geological process
- used genetic terms incorrectly, e.g. DNA, gene, allele, mutation
- could not name a selection pressure or RIM relevant to the context.

Achievement standard 91606: Demonstrate understanding of trends in human evolution

Assessment

The examination comprised three questions, with candidates needing to respond to all. The questions required candidates to apply their understanding of trends in human evolution. The questions related to the guidance provided in the 2023 assessment specifications.

Commentary

Candidates who spent time planning the responses, including all the key points in their discussion, showed a clear understanding of the stem of the question and often gained higher achievement. Many candidates often wrote everything they knew about the topic without referring to the stem of the question(s), which limited their level of achievement.

Appropriate and accurate use of biological terms and definitions supported evidence of their understanding. A noticeably high proportion of candidates' answers lacked paragraphs. The use of paragraphs and of the bullet points helped structure and relate candidates' answers to the stem of the question.

Grade awarding

Candidates who were awarded **Achievement** commonly:

- attempted all three questions
- ensured they were specific with their answers and answered the question
- gave reasons for bipedal features
- understood how forest / savannah was a selection pressure for bipedalism
- described advantages of different tool uses
- described the difference between Oldowan and Acheulian tools
- described a specific advantage / s of abstract thought
- gave reasons why it took longer to migrate to Europe, often relating it to ocean crossing or colder climate
- wrote a lengthy answer, using their own knowledge and not directly answering the question
- wrote much of the same answer for each question.

Candidates who were awarded **Achievement with Merit** commonly:

- did not provide specific examples or dates
- generally had a good understanding of each question
- explained the features of the foot – most picked the toe or arch
- gave reasons for bipedal features and link them to locomotive efficiency
- explained the importance of meat / protein in human / brain development
- demonstrated understanding of how advances in tool technology brought about hominin success
- explained how abstract thought linked to human success, e.g. improvements in hunting technology such as nets or traps
- correctly described the two different dispersal theories.

Candidates who were awarded **Achievement with Excellence** commonly:

- answered the specific question with specific examples
- demonstrated knowledge of the theories and benefits of abstract thought, relating it to diet and shelter
- hypothesized sensible reasons for different travel times
- gave good / relevant reasons for *H.sapiens* successful migration, linking it to food and shelter
- clearly explained the tools / food / brain / better tools feedback loop
- explained the two dispersal theories clearly, providing dates
- answered the nuances of the question rather than reciting stock answers, i.e. they could manipulate their knowledge and tailor it to the question
- did not go straight from bipedalism to tools and fire
- answered all parts of all three questions and was able to link ideas together
- showed a planned and structured answer, using the bullet points and key stem of the question(s).

Candidates who were awarded **Not Achieved** commonly:

- did not answer or attempt to answer all three questions
- wrote a general pre-planned answer that did not address the question
- repeated information for each question
- used only the data given in the questions and resources
- gave information that was not science based
- were unable to give reasons for bipedal features
- were unable to show understanding of tool use and precision / power grips and their uses
- did not demonstrate understanding of the two dispersal theories
- provided a list of advantages *H. sapiens* had that enabled success, without linking to abstract thought, food gathering, or shelter.
- provided some knowledge that related to past years' examination questions and did not answer the question being asked.