

2024 NCEA Assessment Report

Subject:	Biology
Level:	3
Achievement standard(s):	91603, 91605, 91606

General commentary

Successful candidates accurately described biological processes and defined biological terms.

In the main, candidates attempted all three questions, and responded to the question asked, and attempted to address the bullet points that supported each question. This was positive, making it easy to identify evidence of their understanding of the concepts. Practice with examinations is evident. Candidates who met with success at higher levels provided additional information that demonstrated depth of understanding of the questions.

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 2024 assessment specifications.

Commentary

Some candidates wrote on information that was not asked for (e.g. phytochrome) and lacked precision in their responses, e.g. writing chemotaxis and not positive chemotaxis. Candidates wrote well on the benefits of behaviours and were then able to link this to the overarching question.

The specifications for 2024 provide terms candidates should learn and understand to support success in the exam, e.g. biological clocks, actogram use, and kin selection. It was good to see evidence of understanding these terms.

Grade awarding

Candidates who were awarded **Achievement** commonly:

- could describe key terms and state the advantages of the behaviours in the three questions, but were not able to explain why they were an advantage and / or link them to increased survival and reproductive success
- could define and describe key terms and state the advantages and disadvantages of the animal behaviours, but were not able to explain why they were an advantage or disadvantage in Question 1

- described key terms such as positive chemotaxis, negative geotropism, entrainment and zeitgeber, but were not able to explain their mechanisms, how these improved reproductive success, or the advantages to the gene pool in Question 2
- named and defined homing, territory and its advantages, but were unable to define kin selection effectively or its significance in Question 3.

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

- could explain the individual adaptive advantages of the relationships or behaviours, but did not link them together or relate them to overall greater reproductive success in Question 1
- could explain individual components of the question, such as negative gravitropism or why the kōwhai was a short-day plant, but did not relate these to increased/decreased survival and reproductive success in Question 2
- could explain advantages of territorial behaviour and co-operative behaviours but did not understand kin selection and its significance in Question 3 overall; could explain key concepts well but failed to link these to the big picture of reproductive success.

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

- demonstrated understanding of the unique environment and survival/reproductive strategies for the named species in Question 1
- discussed how the responses increased the survival and reproductive success for the named species, in their particular environment, in the majority of the questions
- demonstrated understanding of and could apply terminology correctly when discussing the responses of the organisms
- demonstrated understanding of the questions and linked together various aspects of the questions in the context of the behaviours or responses specific to this standard; demonstrated more than their general knowledge in the context of the question, for example: in Question 2, linked the biological clocks of both the kōwhai and the bumblebee to reproductive success and survival of both species; in Question 3, linked the benefits of cooperative behaviour and kin selection to reproductive success and survival for the babbler and chicks.

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

- only partially described key terms such as competition, chemotaxis, geotropism
- missed out key definitions such as nocturnal and hibernation for Question 1, named rhythms for Question 2, or kin selection and territory for Question 3
- could not describe key concepts in their own words and simply copied text from the resource material.

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 2024 assessment specifications.

Commentary

Candidates showed they had prepared well for this standard by demonstrating a comprehensive understanding of the biological processes involved in evolution and speciation, and provided accurate descriptions of evolutionary concepts, linking this to the context material provided in the questions.

Candidates who spent a short amount of time planning their responses often gained success by including all the key points in their discussion. Some candidates need to provide more detail when defining terms at Level 8 of the New Zealand Curriculum.

Grade awarding

Candidates who were awarded **Achievement** commonly:

- provided full and accurate definitions for the key terms
- identified the pattern/rate of evolution in graphical form
- correctly named reproductive isolation mechanisms that were appropriate to the context given in the question
- provided an appropriate example of a selection pressure
- described that distantly related species will have more differences in their DNA/genetic profile
- stated that bird and bee wings are examples of analogous structures

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

- provided clear explanations, showing good reasoning as to why the evolutionary processes were important
- answered the questions with detail, and the answers linked to the resources provided
- explained the biological benefit of Māori practices
- were able to name and explain what might prevent hybridisation in wallabies on Kawau Island
- explained how named selection pressures influence convergent evolution
- explained how DNA/genetic differences can be used to show convergent evolution – similar structures formed by different mutations/genes.

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

- integrated the stimulus material on the divergent evolution and allopatric speciation of the kōura, linking in the accumulation of random mutations coding for different phenotypes; and demonstrated how the concepts of gene flow and founder effect had an influence on the species
- compared the adaptive radiation of wallabies in Australia (due to abundant niches) with the lack of radiation in New Zealand (fewer niches)
- discussed how genetics is used to show structures are analogous; links this to different mutations for the bird and insect wings and selection pressures of the phenotype coded for in the context provided.

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

- did not define the terms accurately, missing out key words
- repeated information from the given context without additional information or explanation
- misidentified concepts
- gave definitions for key words that were unrelated to the question.

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 2024 assessment specifications.

Commentary

Candidates demonstrated a generally good understanding of the topic content. Those who were able to link human evolution concepts performed exceptionally well. However, some fell short of Excellence by not connecting ideas effectively across parts of the same question.

Candidates who attempted all three questions and produced concise work, weaving in trends in human evolution to the advantages of changes, provided a wide range of responses that demonstrated good, creative thinking.

Some candidates recited previous marking schemes or repeated a single term too often in an attempt to demonstrate their understanding, e.g. positive feedback loop.

While many students wrote more concise answers this year, many still did not use paragraphing to structure their response.

Grade awarding

Candidates who were awarded **Achievement** commonly:

- could not fully explain the anatomical differences and/or adaptations between the chimp and human spines, pelvis, and valgus angle, or describe habitual bipedalism
- referred to many body parts not called for in the questions
- provided limited or vague explanations of a named brain region
- could state how twisted fibres were used for food gathering, in reference to using bags, but explanations were weak
- did not know about the Levallois technique and confused it with rope.

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

- explained key anatomical differences between the spine, valgus angle, and pelvis but missed points like energy efficiency, shock absorption, and survival trade-offs
- mentioned that the advantages outweighed the disadvantages
- wrote well, linking Neanderthal success in the cold environment
- could come up with good ideas about brain developments that would have improved later hominins, rather than referring to early hominin behaviour.

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

- discussed advantages and disadvantages well and most also mentioned that advantages outweighed disadvantages
- provided responses that were highly detailed and accurate, making effective connections between ideas, resulting in well-structured answers
- described habitual bipedalism, linking anatomical features like the spine curvature, valgus angle, and pelvis structure to efficiency in long-distance walking and survival advantages in humans

- included discussion of the trade-offs of bipedalism, such as spine injuries and difficulty and pain during birth, and explained how these disadvantages are outweighed by benefits
- discussed how Neanderthal used fibres as a tool, referencing the Levallois technique, demonstrating cognitive abilities and problem-solving skills; were able to discuss a suitable brain region that enabled mathematical understanding of cord-making and its implications for survival in a cold climate
- linked the small body size of *H. floresiensis* to reduced resource demands, discussing how this enabled survival on an isolated island with limited resources.

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

- did not fully describe the anatomical differences and adaptations between the chimp and the human spine, pelvis and valgus angle, or could not describe habitual bipedalism
- mistook arboreal for quadrupedalism
- left one question blank
- described the structures of spine pelvis and valgus angle but did not link to locomotive efficiency
- repeated parts of the question
- did not know many of the key terms, especially 'habitual'; many thinking it was related to a habitat
- wrote a memorised answer that did not answer the question
- could describe how Neanderthals could use tools but could not link this to a health benefit
- could describe how Neanderthals could use fibre but could not link this to food gathering
- stated one or two concepts and then kept repeating them.