National Certificate of Educational Achievement

2014 Assessment Report

Biology Level 3

91603 **Demonstrate understanding of the responses of plants and animals to their external environment**

91605 **Demonstrate understanding of evolutionary processes leading to speciation**

91606 **Demonstrate understanding of trends in human evolution**

COMMENTARY

Candidates who could recognise the key concepts within each of the standards and could describe them succinctly gained at least an Achieved grade. Quantity does not equate to quality and long, poorly planned, descriptive answers did not provide candidates with Merit or Excellence. Answers which showed the use of biological ideas and scientific evidence in explaining concepts and then linked relevant ideas into concise responses were evident at both Merit and Excellence. Candidates who wrote less but put their time into considering what the question asked for, and then planning their responses, achieved higher grades. These candidates also successfully answered all of the questions. Repeating the information provided in the resource and producing rote learned responses to questions regardless of relevance lost candidates valuable time and overall achievement of the standards in many cases. Candidates who were familiar with the biological terms referred to in the achievement standards and who could describe them were advantaged in the examinations. Level 3 Biology questions frequently refer to examples from New Zealand and the South Pacific. Although it is not essential, a general understanding of basic New Zealand geography can be helpful to candidates.

It is important to note that the descriptors used for Achievement, Achievement with Merit and Achievement with Excellence were changed when the standards were last reviewed and the previously used terms of describing, explaining and discussing have been more clearly defined. For example, at Excellence the linking of ideas may involve justifying, relating, evaluating, comparing and contrasting and analysing. Candidates should be prepared to analyse data and draw comparisons. They need to be able to use their learned knowledge and apply it to new, unknown situations.

The ability to recognise patterns and trends from data, such as graphs, and use it to support biological explanations is an important biological skill. Candidates should expect to demonstrate this skill as a part of their understanding of biological patterns, relationships and processes.

STANDARD REPORTS

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

ACHIEVEMENT

Candidates who were awarded Achievement for this standard demonstrated the required skills and knowledge. They commonly:

- defined basic terms outlined within the standard and assessment specification
- described the processes involved within responses to the environment
- identified key adaptive advantages provided for their responses
- described trends from graphical, tabulated and pictorial data.

NOT ACHIEVED

Candidates who were assessed as Not Achieved for this standard lacked some or all of the skills and knowledge required for the award of Achievement. They commonly:

- rearranged the terms in the question with no attempt to answer the question
- lacked sufficient biological knowledge to gain credit

- could not analyse information presented graphically
- were not able to identify with the given context
- left questions out completely
- wrote a lot of incorrect information that did not relate to the question.

ACHIEVEMENT WITH MERIT

In addition to the skills and knowledge required for the award of Achievement, candidates who were awarded Achievement with Merit commonly:

- used the resource material and key biological terms specified in the standard to explain the adaptive advantages of the behaviour asked for
- analysed unfamiliar data and linked this to a biological behaviour or relationship
- explained the advantages specific to the question. For example nastic movements, not tropisms and territorial behaviour, nor hierarchical behaviour
- explained how data showed an interrelationship, supporting it with specific information from the graph.

ACHIEVEMENT WITH EXCELLENCE

In addition to the skills and knowledge required for the award of Achievement with Merit, candidates who were awarded Achievement with Excellence commonly:

- understood the content of the question and wrote a concise and coherent answer, linking ideas from the resource material and biological knowledge, appropriate at this level
- attempted each part of the question in a logical manner, allowing all definitions and ideas to be communicated effectively
- made significant links between appropriate concepts and an experimental graph to analyse and explain the trends shown in the graph
- analysed an actogram to give both a trend and an understanding of how a biological clock can be free running and the consequences of this behaviour
- produced realistic explanations of the benefits to a plant in displaying plant rhythms.

OTHER COMMENTS

It is important that candidates relate their answers in this standard to the intent of the standard. AS91603 is concerned with understanding of the responses of plants and animals to their external environment. Answers that relate to speciation and evolutionary patterns are largely irrelevant, unless they help to explain behavioural relationships. Candidates also need to avoid an excess of being anthropomorphic in their answers, particularly in referring to plant relationships.

Candidates who did well in this examination commonly remained on the question topic and kept their responses relevant and concise, avoiding excessive, repetitive descriptions. Also, they considered both aspects of a behaviour and not just one. For example, when talking about the benefits of plant nastic responses, this included both, the benefits of leaves being up during the day and the benefits of leaves being down during the night.

91605 Demonstrate understanding of evolutionary processes leading to speciation

ACHIEVEMENT

Candidates who were awarded Achievement for this standard demonstrated the required skills and knowledge. They commonly:

- defined and described relevant reproductive isolating mechanisms
- defined co-evolution
- described selection pressures acting on organisms
- defined speciation, including allopatric speciation
- described the geographical barriers that separated named birds
- distinguished between allopatric and sympatric species.

NOT ACHIEVED

Candidates who were assessed as Not Achieved for this standard lacked some or all of the skills and knowledge required for the award of Achievement. They commonly:

- copied out information from the resource material, without modification
- could not describe evolutionary concepts, terms and definitions listed in the explanatory notes of the standard
- provided irrelevant or incorrect examples to explain concepts
- gave vague descriptions without making any links to the context of the question
- could not identify the evolutionary basis for animal-plant relationships given in a context.

ACHIEVEMENT WITH MERIT

In addition to the skills and knowledge required for the award of Achievement, candidates who were awarded Achievement with Merit commonly:

- explained how allopatric and sympatric could occur, using appropriate contexts
- applied prior knowledge to unfamiliar contexts in a coherent manner
- used resource material to support their explanations
- demonstrated understanding of how named selection pressures select for different phenotypes
- explained how a co-evolutionary relationship can lead to increased reproductive success
- were able to identify and explain the processes involved in the speciation of kaka and kea
- could explain the effects of recent predation on the genetic diversity of kaka, recognising evolution as an on-going dynamic process.

ACHIEVEMENT WITH EXCELLENCE

In addition to the skills and knowledge required for the award of Achievement with Merit, candidates who were awarded Achievement with Excellence commonly:

- integrated examples from the resource material in a coherent discussion
- discussed the evolutionary outcomes when organisms are subjected to different selection pressures

- discussed the concept of speciation and the difficulties in defining whether it has occurred by referring to additional information, such as hybrid breakdown, insufficient time or existence of subspecies
- could explain the dynamics of a co-evolutionary relationship and how it relates to survival
- applied prior knowledge to new and unfamiliar contexts to produce logical, reasoned explanations.

OTHER COMMENTS

The focus of this achievement standard is on evolutionary patterns and processes that lead to speciation and not relationships between plants and animals. Although the two aspects are inevitably connected, candidates should ensure that they focus more on the evolutionary aspects foremost in this standard. Evolutionary relationships are likely to relate to co-evolution, divergence, convergence and natural selection. Answers should be based on evolutionary principles and the ability to analyse, evaluate, compare and contrast outcomes based on the information provided that demonstrate Excellence. The explanatory notes of 91605 includes the concepts of genetic drift and gene flow, which by association includes founder effect and bottlenecks. Candidates should be using these concepts within their responses.

Some candidates display a lack of basic geographical awareness of New Zealand and the South Pacific. As many New Zealand examples are used as resources in this achievement standard, it is advantageous to spend a small amount of time focusing on candidates' basic awareness of the geography of the area, especially for those who are less familiar with New Zealand.

91606 Demonstrate understanding of trends in human evolution

ACHIEVEMENT

Candidates who were awarded Achievement for this standard demonstrated the required skills and knowledge. They commonly:

- described tool cultures correctly
- demonstrated knowledge of hominin dispersal theories
- were familiar with the names of key hominins, their characteristics, structural and behavioural adaptations
- clearly stated trends
- supported descriptions with labelled diagrams of Oldowan tools and dispersal theories
- were able to place key hominins in space and time relative to each other.

NOT ACHIEVED

Candidates who were assessed as Not Achieved for this standard lacked some or all of the skills and knowledge required for the award of Achievement. They commonly:

- confused Homo habilis tool culture with that of later hominins
- were unable to describe the shape of Oldowan tools
- wrote, in detail, about structures not associated with the question
- wrote about changes in structures, but did not describe them
- misidentified parts of the skull

- did not recognise Homo sapiens as modern humans
- confused the terms dispersal with diverging, and inbreeding with interbreeding
- failed to recognise that gene flow leads to genetic similarities and that a lack of gene flow leads to divergence.

ACHIEVEMENT WITH MERIT

In addition to the skills and knowledge required for the award of Achievement, candidates who were awarded Achievement with Merit commonly:

- could explain why weakening of the jaw muscle would effect a change in the structure of the skull
- understood that fewer attachment structures in the skull would mean more space, allowing for a larger brain
- could explain the manufacturing process of the correct tool culture
- explained uses of the tool beyond that given in the resource
- were able to link ideas from the resource material correctly to explain similarities and differences between hominin populations
- understood the idea of divergence being indicative of a shared common ancestor.

ACHIEVEMENT WITH EXCELLENCE

In addition to the skills and knowledge required for the award of Achievement with Merit, candidates who were awarded Achievement with Excellence commonly:

- understood the context of the question and produced a concise answer that linked their biological knowledge with the resource material
- could identify and discuss selective advantages of behaviours appropriate for the hominin group
- identified the probability of Homo habilis having been a scavenger and justified the benefits to the species of this behaviour
- recognised the use of tools as a breakthrough in cultural evolution
- understood the concepts of genetically similar and genetically different with regards to hominin dispersal and how this related to modern hominins
- were able to assimilate the resource evidence provided and use it constructively to produce comprehensive explanations.

OTHER COMMENTS

Questions in this standard that relate to dispersal theories may not necessarily involve "Multi-regional" or "Out of Africa" and candidates need to be prepared to analyse the questions, given the available information and apply their knowledge, using a range of concepts.

Candidates also need to be aware that they will not gain an Achieved grade if they merely re-write the resource information as their answer. The resource provides the context for the question, enabling candidates to demonstrate their own knowledge and biological analytical skills and is not intended to be used as an answer in itself. Skilful use of the resource material in developing more complex answers will enable some candidates to achieve at Merit and Excellence levels.