

# **National Certificate of Educational Achievement**

## **2013 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

The introduction of grade score marking in 2013 has allowed Level 3 biology candidates to clearly demonstrate their range of skills and knowledge and gain recognition for their level of understanding within each question across all three external level three biology standards. Those who had learned the fundamental definitions and concepts as outlined within the achievement standards and assessment specifications were able to achieve, provided they attempted all questions.

The question context provides a framework against which candidates can apply their knowledge and demonstrate in-depth understanding. Rearranging the context and submitting it as an answer will not gain credit.

Again it is important to emphasize that the length of an answer does not equate with quality. Candidates could effectively utilise the additional time that a maximum of three external standards provides in three hours. Well-planned responses assisted in identifying their in-depth understanding that they should focus on, to obtain higher grades.

## 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 typically:**

- defined basic terms outlined within the achievement standard and assessment specifications
- described the processes involved within behavioural responses
- identified the key adaptive advantages provided within identified responses
- drew labelled diagrams to describe the accumulation and effect of auxin.

#### **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 typically:**

- rearranged the terms in the question with no attempt to answer the question
- lacked sufficient biological knowledge to attempt the standard
- could not analyse information presented graphically, for example, actograms
- were not able to identify the behavioural strategies that provided adaptive advantage, from the given resource and contextual information
- wrote about alternative responses, indicating that they had not read the question
- lacked basic understanding and incorrectly stated that light provides nutrients for photosynthesis
- made incorrect assumptions about the given information.

#### **ACHIEVEMENT WITH MERIT**

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

- used the resource material and key biological terms specified in the standard to explain the adaptive advantages of plants and animals within their specific ecological niches
- analysed actograms and linked them to a biological clock and nocturnal behaviour
- explained the mechanisms involved in plant shoot growth that enabled a plant to carry out photosynthesis
- explained the advantage of a parasitic reproductive strategy to survival.

## **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 typically:**

- understood the context of the question and wrote a concise and coherent answer linking ideas from resource material and biological knowledge appropriate at level 8
- attempted each part of the question in order to answer everything in a logical manner allowing all definitions and ideas to be communicated effectively
- linked reproductive success of spreading the risk across many nests to increased survival of the cowbirds in comparison to songbirds in USA
- identified the ecological niche and linked it to the need for parasitism comparing the increase in genetic diversity with population increase of cowbirds, resulting in the decrease in alleles/genetic diversity for song birds due to brood parasitism
- analysed graphs based on comparisons and explained these using data/calculation and appropriate biological terms, linking to adaptive advantage within an ecological niche
- drew clear and correctly labelled diagrams explaining how auxin works to stimulate cell elongation and therefore differential cell growth in positive phototropism and negative geotropism for a *shoot*.

## **OTHER COMMENTS**

It is important that candidates read the question and resource material carefully and focus on what has been asked in the question. For example, where a question asks specifically for the effect of auxin on shoot growth, the answer should not focus on root growth.

## **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 typically:**

- used the bullet points as guides to demonstrate understanding of evolutionary processes and speciation
- were able to define either allopatric or sympatric speciation
- were able to make good use of relevant resource material and biological vocabulary
- gave valid reasons for events occurring such as reproductive isolation leading to speciation
- were able to correctly identify or describe the patterns, rates and processes of evolution even though they might not have used the terminology correctly
- used the following terms appropriately, organism, species, speciation.

## **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 typically:**

- did not answer all questions
- re-wrote the resource material without modification
- did not understand the distinction between key terms and ideas e.g. allopatric/ sympatric
- had not learned the required concepts, terms and definitions, or used them incorrectly; and provided irrelevant or incorrect examples
- did not recognise the link between speciation, natural selection and adaptation over time
- did not use acceptable curriculum Level 8 biology vocabulary associated with this standard.

## **ACHIEVEMENT WITH MERIT**

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

- used the bullet points and resource material to expand and support their answers
- were able to explain speciation and give evidence to support their answers, linking with examples given in the resource material
- could explain events leading to different types of speciation, for example in the Takahe and Pukeko
- applied their understanding of key concepts such as adaptive radiation to their responses
- related natural selection to changes in allele frequencies and or/ gene flow and the consequences to evolution and genetic diversity
- were able to identify and explain different reproductive isolating mechanisms and how these isolated gene pools and lead to speciation
- demonstrated in-depth understanding of the effect selection pressures have on natural selection and speciation, for example in different species of skinks.

## **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 typically:**

- used correct biological terminology and responded with well-structured answers
- integrated examples from the resource material into their discussion
- referenced the resource material within answers
- could explain a realistic outcome where a genetic variation impacted upon phenotypes
- could link environmental change and niche differentiation to gene flow/ natural selection
- used knowledge of allele frequencies changing, and lack of gene flow to demonstrate an understanding of speciation and evolutionary patterns
- were able to discuss evolutionary outcomes if environment changes and organisms are exposed to different selection pressures
- could compare and contrast the different types of evolutionary examples given in the resource material to clearly demonstrate their understanding of evolution.

## **OTHER COMMENTS**

Candidates were able to achieve at merit and excellence level where they had a clear understanding of evolutionary agents and how selection pressures and genetic makeup support the processes of natural selection and speciation. Candidates should understand the role of reproductive isolating mechanisms and how they contribute to the process of speciation and differentiate between patterns of evolution. It is also recommended that candidates are familiar with the geological events that are likely to have shaped New Zealand evolution.

## **91606 Describe aspects of human evolution**

### **ACHIEVEMENT**

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

- described the trends concerned with human evolution
- supported descriptions with diagrams and sketches
- understood the concept of adaptive advantage and how this applied to aspects of human evolution
- showed an understanding of the species of hominins and key aspects associated with them.

### **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 typically:**

- demonstrated a lack of understanding of the concept of 'trends' as being how things move or change over time
- demonstrated limited ability to recall and state trends associated with Human Evolution concepts
- stated adaptive advantages relevant to the question with too little frequency
- restated aspects of material in the question, rather than giving supporting information.

### **ACHIEVEMENT WITH MERIT**

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

- applied the concept of adaptive advantage to all aspects of relevant questions
- demonstrated understanding of the interrelatedness between the trends in human evolution and the adaptive advantages that they came from or led to
- showed the ability to interpret key aspects of evidence provided and integrate this into their responses to questions
- demonstrated an understanding of changing selection pressures as trends in Human Evolution progressed.

### **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 typically:**

- demonstrated an ability to integrate their understanding of changing selection pressures with their understanding of adaptive advantages as they relate to trends in Human Evolution
- showed understanding of the interrelatedness of the trends and the reciprocal effects
- manipulated evidence and give justification to support their answers
- gave clear accounts of question specific hominins including their ways of life, most significant adaptive advantages and relative timing in terms of our human lineage.

### **OTHER COMMENTS**

Candidates who could produce a comprehensive or in-depth evaluation of evidence statements by applying their knowledge, clearly demonstrated their understanding and largely achieved at merit level or above.