

National Certificate of Educational Achievement

2012 Assessment Report

Biology Level 3

- 90715 Describe the role of DNA in relation to gene expression**
- 90716 Describe animal behaviour and plant responses in relation to environmental factors**
- 90717 Describe processes and patterns of evolution**
- 90719 Describe trends in human evolution**

COMMENTARY

This was the final year for examinations to assess these achievement standards.

Candidates who achieved the standards used the bullet points provided under each question as a guide and responded to the given context of each question to expand their answers. The context provides the biological background through which candidates can apply their skills and level of understanding and demonstrate what they have learned. Repeating the context shows none of the above and does not gain achievement.

Candidates who had learned the concepts, terms and definitions relating to each of the standards were able to apply them, even at a basic descriptive level. Those gaining excellence demonstrated evidence of planning through clearly expressed and integrated responses. These were usually more concise, relevant and showed appropriate linking of concepts.

Candidates, who write long descriptive, repetitive answers under time pressure may run out of time, fail to answer all questions and produce scripts that are illegible.

STANDARD REPORTS

90715 Describe the role of DNA in relation to gene expression

ACHIEVEMENT

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

- answered all three questions and used the expected key words
- were able to describe protein synthesis
- understood the lac operon model, using the diagram as an aid
- described the gene-gene interaction or a basic metabolic pathway.

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:

- confused protein synthesis with DNA replication
- could not identify parental and F1 genotypes from given information
- were unable to interpret the lac operon diagram and could not accurately describe the role of the repressor
- used incorrect or contradictory terminology.

ACHIEVEMENT WITH MERIT

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

- linked multiple steps to show how a mutation carries through transcription and translation
- identified parental and F1 genotypes from a given context and elaborated on their answer, linking outcomes to a gene-gene interaction
- drew annotated diagrams of a metabolic pathway

- explained how the operon was involved in the breakdown of lactose.

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:

- comprehensively explained how gene mutation occurs in DNA and affects the shape of the final protein
- explained the operon and linked it to a feedback mechanism
- drew a fully annotated diagram of a metabolic pathway and included enzymes
- understood and made use of the context of the question and could incorporate it into a coherent response.

OTHER COMMENTS

90716 Describe animal behaviour and plant responses in relation to environmental factors

ACHIEVEMENT

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

- described key terms outlined in the standard
- were able to describe tropisms, but could not explain how or why they occurred
- related fundamental ideas on timing and animal behaviour, but could not link them or clearly explain 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:

- did not use appropriate terminology in descriptions
- could not distinguish key ideas such as tropism, taxis or nastic response
- confused the terms individual and species, using species to describe individual animals
- linked territorial behaviour with protection from predators rather than other groups of the same species
- could not identify timing mechanisms or named zeitgebers as timing mechanisms
- confused exogenous and endogenous rhythms.

ACHIEVEMENT WITH MERIT

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

- explained how auxin acted on shoot and root cells
- explained why pukeko carried out certain behaviours
- linked biological clock to an endogenous rhythm and an appropriate environmental cue
- focused on the main stem of the question and not just the bullet points.

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:

- wrote clearly, linking ideas in a logical way, rather than doing each bullet point separately
- gave clear, in-depth explanations of concepts such as the phytochrome system, linking it to timing
- demonstrated both broad and in-depth understanding of concepts by answering questions thoroughly
- applied their knowledge and biological skills to discuss novel contexts, such as plant growth in zero gravity.

OTHER COMMENTS

Candidates need to be familiar with the key terms given within the explanatory notes of the standard and be able to define them.

90717 Describe processes and patterns of evolution

ACHIEVEMENT

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

- were able to describe the cause/events leading to different types of speciation
- gave valid reasons for events occurring such as flowering at different times leading to sympatric speciation
- applied their understanding of key concepts such as natural selection and speciation to their responses
- were able to correctly identify or describe the patterns, rates and processes of evolution even though they might not have used the correct terminology
- were able to read and interpret graphs and use the information on the graph to explain evolutionary patterns.

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:

- re-wrote the resource material without modification
- did not understand the distinction between key terms and ideas, such as allopatric and sympatric
- showed a lack of understanding of the required concepts, terms and definitions, or used them incorrectly, and provided irrelevant or incorrect examples
- answered the questions without focusing on evolutionary concepts, instead using terms that were more appropriate to animal behaviour and plant responses.

ACHIEVEMENT WITH MERIT

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

- described the cause or events leading to speciation
- made effective use of relevant resource material
- wrote clear definitions of evolutionary events and provided valid reasons for their occurrence
- explained reproductive isolating mechanisms and how they lead to speciation
- showed understanding of the effect the environment and selection pressures have on natural selection and speciation.

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:

- compared and contrasted the different types of evolutionary examples given in the resource material to clearly demonstrate their understanding of evolution
- discussed how natural selection influences and changes allele frequencies and how this influences speciation, linking their responses to the context of the question
- used knowledge of changing allele frequencies, mutations and lack of gene flow to demonstrate understanding of speciation and evolutionary patterns
- referred to the resource material and integrated examples from it into their discussion.

OTHER COMMENTS

In this standard candidates should ensure their examination responses are written from an evolutionary focus and not that of animal behaviour and plant responses. Although the concepts will overlap, the prime focus should be that of evolution.

90719 Describe trends in human evolution

ACHIEVEMENT

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

- identified differences in skull features and/or what these related to
- used correct terms for skull and endocranial features of skulls shown
- described how the uses of fire improved the life of earlier hominins
- described accurately two dispersal theories
- decoded the questions correctly so they could answer what was actually asked.

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:

- failed to answer the question that was asked or only answered part of it
- wrote general answers which appeared to be based on previous years' questions
- used incorrect terms or had poor understanding of correct terms
- restated information given in the question
- lacked sufficient detail in describing Multiregional and Out of Africa theories
- failed to identify *H. sapiens* in the dispersal theories, instead referring to hominin or human, which was not specific enough.

ACHIEVEMENT WITH MERIT

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

- explained how or why skull features can indicate change in both diet and culture
- linked the use of fire to subsequent benefits or advancement with respect to cultural and biological evolution
- showed a clear understanding of modern human dispersal using genome similarities and Y-chromosome evidence
- used key terms accurately and gave appropriate scientific evidence to support their answers.

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:

- considered all parts of each question and used correct biological terms to plan and link ideas to show wider understanding of the key concepts learned
- compared and contrasted information to develop a discussion with respect to skull features, use of fire and dispersal theories
- demonstrated a clear understanding of the differences between biological and cultural evolution
- demonstrated evidence of planning in clearly expressed and integrated responses.

OTHER COMMENTS

Candidates are reminded that scientific evidence relating to human evolution may include skeletal remains, nuclear and mitochondrial DNA, tools, evidence from scientific and comparative dating. Candidates may need to apply their knowledge or understanding of the above within the context of any question within this standard.