

## Assessment Report

# Level 2 Biology 2017

Standards [91156](#) [91157](#) [91159](#)

### Part A: Commentary

Successful candidates wrote clear, concise and accurate answers, using appropriate biological language at level 7 of the New Zealand Curriculum. They generally attempted all the questions in each booklet and did not rewrite resource material already provided in the question.

Candidates who achieved the standard correctly demonstrated understanding of the key words and ideas in the questions and addressed all bullet points. Candidates gaining Merit explained (how and why) links between biological ideas or concepts specific to the standard that related to the question. If they drew diagrams, the diagram was clear and provided concise annotations which added depth and detail to their responses.

Candidates gaining Excellence responded to all bullet points and also addressed the stem of the question. They comprehensively integrated resource material appropriately to further justify and evaluate their understanding.

### Part B: Report on standards

#### 91156: Demonstrate understanding of life processes at the cellular level

Candidates who were awarded **Achievement** commonly:

- showed a clear understanding of key terms and wrote succinct definitions
- provided an accurately labelled diagram of a chloroplast and labelled it correctly
- identified where light-independent and light-dependent reactions took place
- provided word equations for aerobic and anaerobic respiration, and photosynthesis
- attempted to address all of the bullet points for each question
- attempted all questions in the examination paper
- described that skin cells are susceptible to more damage therefore need to be replaced more regularly
- identified factors that affect the rate of photosynthesis
- described the purpose of mitosis.

Candidates who were assessed as **Not Achieved** commonly:

- provided descriptions that were below level 7 of the New Zealand Curriculum
- provided definitions that were incomplete or inaccurate
- repeated information presented in the question
- did not attempt all question parts in the examination paper
- were unable to draw and label a chloroplast
- confused photosynthesis and respiration
- were unable to correctly identify the stroma in a chloroplast (many confused stomata and stroma or thought the lumen was the stroma)
- were unable to identify the locations of the light-dependant and light-independent processes of photosynthesis
- were unable to show an understanding of the differences in mitosis rate of different body cells.

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

- showed greater understanding of a concept by linking accurate descriptions to how or why a biological process occurred
- explained the processes of cellular respiration and photosynthesis accurately
- related the concepts in this standard to the contexts presented
- gave detailed explanations for more than one of the required ideas as prompted by the bullet points in the question
- explained the process of mitosis accurately
- explained disadvantages and advantages of aerobic and anaerobic respiration.

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

- provided thorough discussion for key biological concepts in each question by making correct links between multiple concepts
- linked back to the stem of the question and incorporated the given contexts in each question
- provided comprehensive evidence, making links between the processes and the correct biological concepts
- communicated effectively by writing thorough concise answers
- supported answers with relevant annotated diagrams.

### **Standard specific comments**

Many candidates missed keywords such as 'semi-permeable' when describing osmosis.

Explanations of how limiting factors affect rate of photosynthesis was often done poorly and cost many candidates higher achievement.

Candidates often wrote about plant adaptations instead of environmental factors that affect rate of photosynthesis.

Some candidates missed glucose and/or ATP when describing respiration. Many did not know the equation or location of anaerobic respiration in the cell. Respiration was described incorrectly as breathing.

Some candidates gave a detailed account of DNA replication only and did not address the mitosis process itself.

## 91157: Demonstrate understanding of genetic variation and change

Candidates who were awarded **Achievement** commonly:

- completed a dihybrid cross Punnett square and determined phenotype ratios
- showed understanding of key terms such as bottleneck, founder effect, natural selection and migration
- attempted to answer all bullet points of each question
- used key biological terms correctly e.g. chromosomes, alleles (not genes), gene pool (not location).

Candidates who were assessed as **Not Achieved** commonly:

- gave descriptions that were below level 7 of the New Zealand Curriculum
- re-stated the given information
- left many question parts unanswered
- provided incorrect descriptions of the key ideas of the standard
- confused bottleneck effect and founder effect
- were unclear about a gene pool
- were anthropomorphic in their understanding of natural selection, and suggested animals/humans could alter behaviour to select the correct mutation.

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

- provided accurate explanations with detail
- explained the difference between linked and unlinked genes
- explained bottleneck effect, founder effect and genetic drift using the context given
- explained biological ideas relating natural selection to lactose persistence mutation in humans and increased survival
- incorporated resource material in their answers
- explained how mutations caused new alleles
- explained how migration affected gene frequency.

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

- showed comprehensive understanding of biological ideas and how they were linked
- supported their answers by integrating resource materials given in the question
- answered all parts of the question, including the question stem
- discussed the graph data explicitly, or linked to it strongly in their answer. They also linked genetic drift in relation to why Kaimohu has such low biodiversity. Discussed how genetic drift affects allele frequencies in both small and large populations
- thoroughly and accurately discussed how migration results in gene flow/interbreeding between populations, and then linked this idea to the different levels of lactose tolerance seen in the populations, and distances between those populations. Linked migration of humans to gene flow between populations altering allele frequency and comprehensively discussed how natural selection affects different populations.

### Standard specific comments

Some candidates described key concepts at lower than level 7 of the New Zealand Curriculum. Students incorrectly described:

- the idea that dominant genes are “stronger”/ ensure survival/ are the result of beneficial mutations
- that lactose persistence was due to an allele carried by cattle that enable milk to be consumed
- that migration is random movement to a new habitat/ location
- bottleneck and founder effect – that fewer individuals in a population mean there are fewer genes.
- that genes are lost from a population (genetic drift, founder effect, migration) rather than alleles.

Some candidates did not understand homologous pairs and could not correctly use the term when describing meiosis.

Natural selection and the link to variation in the original population, and reproductive success that increased a particular allele in the gene pool were not well understood by some candidates.

Alleles and genes were used interchangeably by some candidates.

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## 91159: Demonstrate understanding of gene expression

Candidates who were awarded **Achievement** commonly:

- wrote clear, correct definitions
- provided answers to the bullet points only and did not address the stem of the question
- drew and labelled a diagram correctly
- attempted all questions
- described the process of protein synthesis including the main stages, transcription and translation
- recognised that mutation affects the base sequence
- were able to transcribe a sequence of DNA
- described effects of a substitution mutation
- described a metabolic pathway.

Candidates who were assessed as **Not Achieved** commonly:

- provided descriptions that were below level 7 of the New Zealand Curriculum
- failed to complete all questions, including bullet points
- were unable to describe key biological concepts, for example, transcription, translation, mutations
- showed a lack of understanding of the sequence of stages in protein synthesis.

Candidates who were awarded Achievement with Merit commonly:

- explained biological concepts in relation to a context correctly
- made some links between biological concepts while attempting all bullet points, but did not answer the stem of the question
- explained the process of protein synthesis
- related the change in the base sequence (substitution) to the effect on the amino acid sequence and consequently protein folding and therefore its function overall.

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

- wrote comprehensive answers that included clear and accurate explanations of key concepts which were linked to the stem of the question
- showed clear understanding of all aspects of protein synthesis
- used the given contexts to fully explain their ideas
- fully explained the effects of substitution mutations to the final protein
- linked the mutation with a change in the structure of the protein formed to how it affected its function
- discussed degeneracy of the code
- discussed how genes and enzymes control a metabolic pathway
- showed clear understanding of a mutation at the start/end of a metabolic pathway and its effects on phenotype.

### Standard specific comments

Some candidates confused translation and transcription.

Some candidates were prepared for particular questions that were not, in fact, in the paper but included these answers inappropriately.

## **Biology subject page**

### **Previous years' reports**

[2016 \(PDF, 0KB\)](#)

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