

2024 NCEA Assessment Report

Subject:	Chemistry and Biology
Level:	1
Achievement standard(s):	92022, 92023

Report on individual achievement standard(s)

Achievement standard 92022: Demonstrate understanding of genetic variation in relation to an identified characteristic

Assessment

This assessment consisted of a report with two parts. Part A asked candidates to write an account of concepts relating to genetic variation in a population they had studied in class (the familiar context). Part B required candidates to read a short paragraph about an unfamiliar context and apply their knowledge of genetic variation to this. The report could be written or oral (audio or video).

Commentary

Many candidates had good understanding of concepts relating to genetic variation using familiar contexts (Part A), however, struggled to apply these to the unfamiliar context (Part B).

As a result, some candidates had an overwhelmingly good response for Part A but were not able to confidently respond to the unfamiliar section in Part B, which limited their overall achievement to only Achievement or Merit. This was rarely the case the other way round.

The application of knowledge in the response of Part B was often the deciding factor in determining the final grade for the candidate.

Candidates who had a strong understanding of the expected terms and concepts and able to apply these to both the familiar and unfamiliar context were able to achieve higher grades.

Candidates used a range of contexts in Part A – such as kākāpō, kiwi, takahē, Chatham Island black robin, sickle cell anaemia, stomach cancer, rock pocket mice, albinism, and cystic fibrosis.

It should be noted that this standard will be assessed as an external examination in 2025.

Grade awarding

Candidates who were awarded **Achievement** commonly:

- defined key biological terminology related to the question (**both** Part A and B) (e.g. genetic variation, mutation, sexual reproduction, genes, alleles, DNA, and chromosomes)
- described an effect of genetic variation in a population
- described how genetic variation could increase or decrease in a population
- described a health implication for the discovery of the CCR5 allele

- accurately used a Punnett square or other gene tracking methodology to describe the inheritance of a single trait
- stated the correct genotype and phenotype of individuals who are susceptible and resistant to HIV.

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

- explained the process of meiosis
- explained the process of sexual reproduction in relation to genetic variation
- explained how independent assortment or crossing over contributes to genetic variation
- explained how Punnett squares / DNA sequencing / genetic markers / other gene tracking methodology could be used to track inheritance
- explained the difference between the effects of somatic and gametic mutations
- explained a health / medical implication for the discovery of the CCR5 allele
- explained an effect of genetic variation in a population
- explained the relationship between DNA, genes, alleles, and chromosomes.

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

- linked the context to biological concepts and evaluated an unfamiliar context
- discussed why genetic variation is significant in a population with their given / familiar context
- discussed why some individuals in a population are more closely related than others
- discussed the health / medical implication of the discovery of the mutant CCR5 allele
- discussed the discovery of the mutant CCR5 allele using a gene tracking methodology (Punnett square, genetic markers, or DNA sequencing).

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

- only attempted one of Parts A or B
 - provided no relevant information in either Part A or Part B
 - did not describe key biological terminology at NZC Level 6
 - created an inaccurate Punnett square
 - did not accurately describe genetic variation, how it occurs in a population, or an effect of genetic variation
 - paraphrased the resource given in Part B without adding further understanding
 - incorrectly stated the genotype and phenotype of individuals who are susceptible and resistant to HIV.
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Achievement standard 92023: Demonstrate understanding of how the physical properties of materials inform their use

Assessment

This examination focused on the properties of materials and their uses. It consisted of three questions, with each question focusing on one type of material and the physical properties of that material in relation to its use.

Commentary

All three questions focused on covalent bonding. As a result, those candidates who had a good understanding of covalent bonding attained higher grades overall. Those candidates who had a weaker understanding of covalently bonded substances tended to struggle. Candidates are advised that an examination will often only sample the standard, rather than examining all content of the standard.

Grade awarding

Candidates who were awarded **Achievement** commonly:

- linked one or more physical properties of a material to the use of the material
- described the arrangement of particles (the structure) in the material
- described the attractive forces within the material (the bonding).

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

- explained how one or more physical properties of a material related to the use of that material
- linked the physical property to the arrangement of particles (structure) **or** the strength of attractive forces between particles (bonding).

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

- accurately identified the type of material used
- justified the use by linking one or more physical properties to the arrangement of particles (structure) **and** the strength of attractive forces between particles (bonding).

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

- did not describe physical properties related to the use of the materials
 - did not answer all questions
 - incorrectly identified the type of material
 - incorrectly described the arrangement of particles or attractive forces between the particles.
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