

Achievement Standard

Subject Reference	Science 1.9		
Title	Demonstrate understanding of biological ideas relating to genetic variation		
Level	1	Credits	4
		Assessment	External
Subfield	Science		
Domain	Science - Core		
Status	Registered	Status date	30 November 2010
Planned review date	31 December 2014	Date version published	30 November 2010

This achievement standard involves demonstrating understanding of biological ideas relating to genetic variation.

Achievement Criteria

Achievement	Achievement with Merit	Achievement with Excellence
<ul style="list-style-type: none"> Demonstrate understanding of biological ideas relating to genetic variation. 	<ul style="list-style-type: none"> Demonstrate in-depth understanding of biological ideas relating to genetic variation. 	<ul style="list-style-type: none"> Demonstrate comprehensive understanding of biological ideas relating to genetic variation.

Explanatory Notes

- This achievement standard is derived from *The New Zealand Curriculum*, Learning Media, Ministry of Education, 2007, Level 6. It is aligned with the Evolution achievement objectives in the Living World strand, and is related to the material in the *Teaching and Learning Guide for Science*, Ministry of Education, 2010 at <http://seniorsecondary.tki.org.nz>.
- Demonstrate understanding* involves recognising, naming, drawing, and giving characteristics of, or an account of, genetic variation.
- Demonstrate in-depth understanding* involves explaining how or why genetic variation occurs.
- Demonstrate comprehensive understanding* involves linking biological ideas about genetic variation. It may involve explaining, elaborating, applying, justifying, relating, evaluating, comparing and contrasting, or analysing.

- 5 *Biological ideas relating to genetic variation* are limited to concepts and processes connected with:
- the continuity of life based on the inheritable nature of DNA
 - links between DNA and variation in phenotypes
 - variation in phenotypes as adaptive features.
- 6 Biological concepts and processes relating to the inheritable nature of DNA will be selected from:
- the roles of DNA in both carrying instructions to the next generation and determining phenotype
 - the relationship between DNA, alleles, genes, and chromosomes
 - the way in which genotype determines phenotype
 - the way chromosomes exist as pairs so that individuals inherit two copies of each gene.
- 7 Biological concepts and processes relating to variation in phenotype will be selected from:
- the significance of an allele as an alternative version of a gene
 - the role of mutations in forming new alleles
 - the role of meiosis in generating gametes (students are not required to provide the names of the stages of meiosis)
 - the significance of sexual reproduction (in producing a new mix of alleles)
 - the patterns of inheritance involving simple monohybrid inheritance showing complete dominance, sex determination, possible genotypes, and phenotype ratios.
- 8 Biological concepts and processes relating to variation in phenotypes as adaptive features will be selected from:
- inheritable and non-inheritable variations that exist within a group of living organisms
 - differing rates of survival by various members of a group may depend on their phenotype
 - the importance of variation within populations (population and species survival) in a changing environment such as pest infestation, disease, drought, or flood
 - the advantages and disadvantages of sexual reproduction.
- 9 The student must be familiar with the following genetic language and conventions: gene, allele, mutation, genotype, phenotype, gamete, zygote, dominant, recessive, homozygous, heterozygous, pure breeding, Punnett square, and pedigree chart.
- 10 Assessment Specifications for this achievement standard can be accessed through the Science Resources page found at www.nzqa.govt.nz/ncea/resources.

Quality Assurance

- 1 Providers and Industry Training Organisations must be accredited by NZQA before they can register credits from assessment against achievement standards.
- 2 Accredited providers and Industry Training Organisations assessing against achievement standards must engage with the moderation system that applies to those achievement standards.

Accreditation and Moderation Action Plan (AMAP) reference

0233