Achievement Standard

Subject Reference	Science 3.3				
Title	Describe genetic processes				
Level	3	**Credits**	4	**Assessment**	External
Subfield	Science				
Domain	Science – Core				
Registration date	9 November 2005	**Date version published**	9 November 2005		

This achievement standard involves describing genetic processes.

Achievement Criteria

Achievement	Achievement with Merit	Achievement with Excellence
• Describe genetic processes.	• Explain genetic processes.	• Discuss genetic processes.

Explanatory Notes

1 This achievement standard is derived from *Science in the New Zealand Curriculum,* Learning Media, Ministry of Education, 1993, achievement objective 4 of the Making Sense of the Living World strand, p. 68. This achievement standard is also related to *Pūtaiao i roto i te Marautanga o Aotearoa*, Learning Media, Ministry of Education, 1996, Ō Mataora: Te Whē, Whāinga Paetae 3 and Whāinga Paetae 4, pp. 32–33.

2 *Genetic processes* refers to genetic expression and applications of gene technology.

3 *Genetic expression* relates to its role in gene technology and will involve a selection from:

- structure of DNA and its role in carrying the genetic code (double helix, nucleotides, base pairing, triplets, coding strand)
- structure and function of RNA (messenger RNA, transfer RNA, ribosomal RNA)
- DNA replication, which includes functions of DNA polymerase, ligases
- stability of DNA and the effect of point mutations on gene expression
- protein synthesis, which includes the role of DNA in determining the structure and function of a protein, and how that protein is produced (tRNA, mRNA, rRNA, amino acids, RNA polymerase, codons, anticodons, peptide bonds, polypeptides, transcription, and translation).

4 *Applications of gene technology* will involve a selection from:
- restriction enzymes, ligation, polymerase chain reaction, DNA probes, DNA profiling, DNA sequencing, gene cloning, transgenesis, gene therapy
- the implications of gene technology and associated issues.

5 Terms
- *Describe* requires the student to recognise, name, draw, give characteristics of or an account of.
- *Explain* requires the student to provide a reason as to how or why something occurs.
- *Discuss* requires the student to show understanding by linking scientific ideas. It may involve students in justifying, relating, evaluating, comparing and contrasting, analysing.

6 A Pūtaiao context could involve issues associated with gene technology, including concerns regarding interspecific gene transfer.

Quality Assurance

1 Providers and Industry Training Organisations must be accredited by the Qualifications Authority 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 0226