

Achievement Standard

Subject Reference	Biology 1.1		
Title	Carry out a practical investigation in a biological context, with direction		
Level	1	Credits	4
		Assessment	Internal
Subfield	Science		
Domain	Biology		
Status	Registered	Status date	30 November 2010
Planned review date	31 December 2016	Date version published	12 December 2013

This achievement standard involves demonstrating investigation skills by collecting, processing, and interpreting primary data in a biological context, with direction.

Achievement Criteria

Achievement	Achievement with Merit	Achievement with Excellence
<ul style="list-style-type: none"> Carry out a practical investigation in a biological context, with direction. 	<ul style="list-style-type: none"> Carry out an in-depth practical investigation in a biological context, with direction. 	<ul style="list-style-type: none"> Carry out a comprehensive practical investigation in a biological context, with direction.

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 Nature of Science and Investigating in Science strands, and is related to the material in the *Teaching and Learning Guide for Biology*, Ministry of Education, 2010 at <http://seniorsecondary.tki.org.nz>.

This standard is also derived from Te Marautanga o Aotearoa. For details of Te Marautanga o Aotearoa achievement objectives to which this standard relates, see the [Papa Whakaako](#).

- The procedures outlined in *Safety and Science: A Guidance Manual for New Zealand Schools*, Learning Media, Ministry of Education, 2000, must be followed during the practical investigation. Investigations must comply with the Animal Welfare Act 1999, as outlined in *Caring for Animals: A Guide for Teachers, Early Childhood Educators, and Students*, Learning Media, Ministry of Education, 1999.

- 3 The primary data being collected may come from field work, laboratory practical work, or from the use of models.
- 4 *With direction* means that general instructions for the investigation will be specified in writing and direction will be given in the form of a purpose, an outline of the method, and the equipment and/or organisms from which to choose. A template or suitable format for planning the investigation will be provided for the student to use.
- 5 *A practical investigation in a biological context* includes: making accurate measurements, recording primary data, appropriate processing of the data (eg calculations, tabulating, graphing), techniques relevant to the biology context (eg culturing micro-organisms, use of a microscope, quadrat sampling), identification and control of variables, interpretation of processed data, relating findings to the purpose to reach a conclusion.
- 6 *Carry out a practical investigation in a biological context* involves:
- developing a method with sequential steps for collecting data. The collection method will include:
 - identification of the range of the independent variable or the sample (at least three values)
 - measurement of the dependent variable (or the collection of field data) with units
 - collecting, recording and processing primary data relevant to the purpose. The raw data must be within a range of values feasible for the context.
 - reaching a conclusion based on interpretation of the processed data.
- 7 *Carry out an in-depth practical investigation in a biological context* involves:
- a statement of purpose written as a hypothesis
 - a method that includes: a valid range for the independent variable (or sample); a description of, and where possible control of, other significant variables that may affect the results; accurate measurement of the dependent variable (or collection of field data) with units and consideration of factors such as sampling bias, and/or sources of error
 - a method of collecting, recording and processing data that enables a trend or pattern (or its absence) to be determined
 - a valid conclusion based on interpretation of the processed data that links to the purpose of the investigation.
- 8 *Carry out a comprehensive practical investigation in a biological context* involves justifying the choices made during the in-depth investigation, i.e. evaluating the validity of the method or reliability of the data and explaining the conclusion in terms of applicable biological ideas.
- 9 Conditions of Assessment related to this achievement standard can be found at www.tki.org.nz/e/community/ncea/conditions-assessment.php.

Replacement Information

This achievement standard replaced AS90161.

Quality Assurance

- 1 Providers and Industry Training Organisations must have been granted consent to assess by NZQA before they can register credits from assessment against achievement standards.
- 2 Organisations with consent to assess and Industry Training Organisations assessing against achievement standards must engage with the moderation system that applies to those achievement standards.

Consent and Moderation Requirements (CMR) reference

0233