

## Achievement Standard

<b>Subject Reference</b>	Biology 1.1		
<b>Title</b>	Carry out a practical investigation in a biological context, with direction		
<b>Level</b>	1	<b>Credits</b>	4
		<b>Assessment</b>	Internal
<b>Subfield</b>	Science		
<b>Domain</b>	Biology		
<b>Status</b>	Registered	<b>Status date</b>	30 November 2010
<b>Planned review date</b>	31 December 2014	<b>Date version published</b>	30 November 2010

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

### 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>.
- 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.
- 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.
- 6 *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.
- 7 Conditions of Assessment related to this achievement standard can be found at [www.tki.org.nz/e/community/ncea/conditions-assessment.php](http://www.tki.org.nz/e/community/ncea/conditions-assessment.php).

**Replacement Information**

This achievement standard replaced AS90161.

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**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