

## Achievement Standard

<b>Subject Reference</b>	Biology 2.1		
<b>Title</b>	Carry out a practical investigation in a biology context, with supervision		
<b>Level</b>	2	<b>Credits</b>	4
		<b>Assessment</b>	Internal
<b>Subfield</b>	Science		
<b>Domain</b>	Biology		
<b>Status</b>	Registered	<b>Status date</b>	17 November 2011
<b>Planned review date</b>	31 December 2014	<b>Date version published</b>	17 November 2011

This achievement standard involves carrying out a practical investigation in a biology context, with supervision.

### Achievement Criteria

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

### Explanatory Notes

- 1 This achievement standard is derived from *The New Zealand Curriculum*, Learning Media, Ministry of Education, 2007, Level 7. It is aligned with the following achievement objectives in the Nature of Science stand:
- Investigating in Science
    - Develop and carry out investigations that extend their science knowledge, including developing their understanding of the relationship between investigations and scientific theories and models
  - Understanding about Science
    - Understand that scientists have an obligation to connect their new ideas to current and historical scientific knowledge and to present their findings for peer review and debate;
- and is related to the material in the *Teaching and Learning Guide for Biology*, Ministry of Education, 2010 at <http://seniorsecondary.tki.org.nz>.

Investigations must be based on contexts arising from content at Level 7 of *The New Zealand Curriculum*, Learning Media, Ministry of Education, 2007, Living World strand.

Procedures outlined in *Safety and Science: a Guidance Manual for New Zealand Schools*, Learning Media, Ministry of Education, 2000, must be followed.

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.

2 *Carry out a practical investigation* involves:

- developing a statement of the purpose written as a hypothesis linked to a scientific concept or idea
- using a method that describes:
  - for a fair test: a range for the independent variable, the measurement of the dependent variable and the control of some other key variables
  - for a pattern seeking or modelling activity: the data that will be collected, range of data/samples, and consideration of some other key factors
- collecting, recording, and processing data relevant to the purpose of the investigation
- interpreting and reporting on the findings
- reaching a conclusion based on the student's processed data which is relevant to the purpose of the investigation
- identifying and including relevant findings from another source.

*Carry out an in-depth practical investigation* involves:

- using a method that describes:
  - for a fair test: a valid range for the independent variable, the valid measurement of the dependent variable and the control of other key variables with consideration of factors such as sampling bias and sources of errors
  - for a pattern seeking or modelling activity: a valid collection of data with consideration of factors such as sampling bias and sources of errors
- collecting, recording, and processing data which enables a trend or pattern (or the absence of a trend or pattern) to be determined
- reaching a valid conclusion based on the student's processed data which is relevant to the purpose of the investigation
- a discussion of the biological ideas relating to the investigation that is based on the student's findings and those from other source(s).

*Carry out a comprehensive practical investigation* involves justification of the choices made during the sound investigation, ie evaluating the validity of the method or reliability of the data and explaining the conclusion in terms of the biology ideas relevant to the investigation.

3 A *practical investigation* is an activity covering the complete investigation process: planning and carrying out the investigation, collecting primary data, processing and interpreting data, and reporting on the investigation. Students may make changes to their initial method as they work through the investigation.

4 Assessment against this standard may be based on a stand-alone or an individual investigation that can contribute findings to a larger group or class investigation. In a

group or class investigation, individual findings may be discussed and individual students may interpret their own findings in the light of other students' investigations and findings. Findings from outside the group or class such as published information or historical findings relevant to the investigation may also be used.

- 5 The nature of the investigation could be the manipulation of variables (fair test), the investigation of a pattern or relationship or the use of models.
- 6 It is intended that this investigation be carried out with supervision. This means that the teacher provides guidelines for the investigation such as the context for the investigation, instructions that specify the requirements for a comprehensive investigation, and broad experimental conditions such as the availability of equipment or chemicals. Students then develop and complete the investigation from the initial guidelines given by the teacher. Supervision may involve discussion between teachers and individual students in order to clarify the students' ideas and may also involve teachers managing the process of sharing findings.
- 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).

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### Replacement Information

This achievement standard replaced AS90457.

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### 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