

## Achievement Standard

<b>Subject Reference</b>	Science 1.1		
<b>Title</b>	Carry out a practical science investigation with direction		
<b>Level</b>	1	<b>Credits</b>	4
		<b>Assessment</b>	Internal
<b>Subfield</b>	Science		
<b>Domain</b>	Science – Core		
<b>Registration date</b>	21 October 2003	<b>Date version published</b>	21 October 2003

This achievement standard involves carrying out a practical investigation, with direction, by planning the investigation, collecting and processing data, and interpreting and reporting the findings.

### Achievement Criteria

Achievement	Achievement with Merit	Achievement with Excellence
<ul style="list-style-type: none"> <li>Develop a plan that identifies some key variables.</li> <li>Collect, record and process information appropriate to the investigation.</li> <li>Present a report with interpretations relating to the investigation.</li> </ul>	<ul style="list-style-type: none"> <li>Develop a feasible plan.</li> <li>Collect, record and process information appropriate to the investigation.</li> <li>Present a report with interpretations and a conclusion linked to the purpose of the investigation.</li> </ul>	<ul style="list-style-type: none"> <li>Develop a workable plan.</li> <li>Collect, record and process sufficient information appropriate to the investigation.</li> <li>Present a report with interpretations and a conclusion linked to the purpose of the investigation. Provide a comprehensive evaluation or discussion of the investigation.</li> </ul>

### Explanatory Notes

- This achievement standard is derived from *Science in the New Zealand Curriculum*, Learning Media, Ministry of Education, 1993, 'Developing Scientific Skills and Attitudes', p. 42–51; and *Pūtaiao i roto i te Marautanga o Aotearoa*, Learning Media, Ministry of Education, 1996, 'Ngā Pūkenga me Ngā Waiaro ki te Pūtaiao', p. 70–85.

2 Procedures outlined in *Safety and Science: a Guidance Manual for New Zealand Schools*, Learning Media, Ministry of Education, 2000, should be followed. Investigations should 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 An *investigation* is an activity covering the complete process from planning to reporting and will involve the student in the collection of primary data.

If a student enters for assessment against AS90186, Science 1.1, as well as any of: AS90156, Agriculture and Horticulture 1.1, AS90161, Biology 1.1, AS90169, Chemistry 1.1, or AS90180, Physics 1.1, the investigations must be in different 'subject' areas. For example, if a student is being assessed against AS90161, Biology 1.1, and is also being assessed against AS90186, Science 1.1, then the major emphasis of their investigation for AS90186, Science 1.1, cannot be biological.

4 Investigations should be based on situations arising from content drawn from up to science/pūtaiao curriculum Level 6. Possible contexts are given in the curriculum documents.

5 The investigation will be directed. Student procedural instructions for the investigation will be specified in writing, and templates or suitable formats for planning and reporting will be provided.

6 *Planning:*

- The plan will contain the *purpose* of the investigation. This may include an aim, testable question, prediction or hypothesis based on a scientific idea.
- The student should be provided with the opportunity to undertake some form of trialling or checking of the plan so it can be adapted if required.
- A *workable plan* includes a valid range for key variables and details of how they will be measured. The influences of other variables have been taken into account and, if necessary, methods for their control are stated. A scientific method to collect data is described and shows consideration of factors, such as sampling, bias, sources of error and sufficiency of data. Some checks to ensure the plan is workable have been made.
- A *feasible plan* is one that could be workable, but lacks detail.

7 *Collection, recording and processing of data:*

- The plan is followed and data, appropriate to the investigation, are *collected and recorded* in a table or other systematic way.
- *Data processing* would usually involve calculations (eg averaging and/or graphing) to establish a relevant pattern or trend.

8 *Interpretation and reporting:*

- *Interpretations* of the processed data that relate to the purpose of the investigation are given.
  - The *report* follows the format clearly specified in written guidelines by the assessor and would usually include the following sections:
    - plan, including the purpose of the investigation and final method used
    - recorded data
    - processed data, showing links to the recorded data
    - interpretations and a conclusion, including a generalised statement linking the findings of the investigation with the purpose of the investigation
    - evaluation or discussion, which may include limitations of the investigation, other variables that had not been foreseen, difficulties in measuring, difficulties in the use of equipment, limitations of the findings and impact on the outcome and, where relevant, suggested solutions or pathways for further investigation and links to science concepts or ideas.
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**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