Achievement Standard

Subject Reference	Physics 1.1				
Title	Carry out a practical physics investigation with direction				
Level	1	**Credits**	4	**Assessment**	Internal
Subfield	Science				
Domain	Physics				
Registration date	27 October 2004	**Date version published**	27 October 2004		

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

Achievement Criteria

Achievement	Achievement with Merit	Achievement with Excellence
• Carry out a practical physics investigation.	• Carry out a quality practical physics investigation.	• Carry out and evaluate a quality practical physics investigation.

Explanatory Notes

1 This achievement standard is derived from *Physics in the New Zealand Curriculum,* Learning Media, Ministry of Education, 1994, 'Developing Scientific Skills and Attitudes', pp. 42-43; and *Pūtaiao i roto i te Marautanga o Aotearoa*, Learning Media, Ministry of Education, 1996, 'Ngā Pūkenga me Ngā Waiaro ki te Pūtaiao', pp. 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.

3 An *investigation* is an activity covering the complete process: planning, collecting and processing data, interpreting, and reporting on the investigation. It will involve the student in the collection of primary data.
The investigation will be directed. This means that general instructions for the investigation will be specified in writing and direction will be given in the form of the equipment and/or chemicals from which to choose. A template or suitable format for planning the investigation will be provided for the student to use.

4 Investigations should be based on situations in keeping with content in:
- The Physical World stand of the Science in the New Zealand Curriculum, Learning Media, Ministry of Education, 1993; and Pūtaiao i roto i te Marautanga o Aotearoa, Learning Media, Ministry of Education, 1996, up to and including Level 6
- Level 6 of the physics curriculum.

Possible contexts are given in the curriculum documents.

5 A *practical physics investigation* will involve*:*
- a statement of the purpose – this may be an aim, testable question, prediction, or hypothesis based on a scientific idea
- identification of a range for the independent variable or sample
- measurement of the dependent variable or the collection of data
- collecting, recording and processing data relevant to the purpose
- a conclusion based on interpretation of the processed data.

6 A *quality physics science investigation* enables a valid conclusion to be reached. This would normally involve:
- a statement of the purpose – this may be an aim, testable question, prediction, or hypothesis based on a scientific idea
- a method that describes: a valid range for the independent variable or sample; a description of and/or control of other variables; the collection of data with consideration of factors such as sampling, bias, and/or sources of error
- the recording and processing of data to enable a trend or pattern (or absence) to be determined
- a valid conclusion based on the processed data in relation to the purpose of the investigation.

7 *Evaluate* means to justify the conclusion in terms of the method used. Justification will involve, where relevant, consideration of the:
- reliability of the data
- validity of the method
- physics ideas.

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