

Achievement Standard

Subject Reference	Physics 1.1		
Title	Carry out a practical physics investigation that leads to a linear mathematical relationship, with direction		
Level	1	Credits	4
		Assessment	Internal
Subfield	Science		
Domain	Physics		
Status	Registered	Status date	30 November 2010
Planned review date	31 December 2020	Date version published	20 November 2014

This achievement standard involves carrying out a practical physics investigation that requires the graphical representation and mathematical description of a linear relationship, with direction.

Achievement Criteria

Achievement	Achievement with Merit	Achievement with Excellence
<ul style="list-style-type: none"> Carry out a practical physics investigation, with direction, that leads to a linear mathematical relationship. 	<ul style="list-style-type: none"> Carry out an in-depth practical physics investigation, with direction, that leads to a linear mathematical relationship. 	<ul style="list-style-type: none"> Carry out a comprehensive practical physics investigation, with direction, that leads to a linear mathematical relationship.

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 Physical Inquiry and Physics Concepts achievement objective in the Physical World strand and the Investigating in Science achievement objectives in the Nature of Science strand, and is related to the material in the *Teaching and Learning Guide for Physics*, 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](#).

- 2 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.
 - 3 *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 materials from which to choose. A template or suitable format for planning the investigation will be provided for the student to use.
 - 4 A *practical investigation* is an activity that includes collecting, processing and interpreting data. The investigation must lead to a linear mathematical relationship.
 - 5 *Carry out a practical physics investigation* involves:
 - developing a method for collecting the data
 - collecting primary data, with units, relevant to the purpose, based on the manipulation of the independent variable over a reasonable range and number of values
 - drawing a graph, based on the data
 - writing a conclusion that links the processed data to the identified trend on the graph.
 - 6 *Carry out an in-depth practical physics investigation* involves:
 - controlling the variable(s) that could have a significant effect on the results
 - using technique(s) that increase the accuracy of the measured values of the dependent (and independent, if appropriate) variable
 - drawing a linear graph, valid for the data
 - writing a conclusion that states the equation of the relationship.
 - 7 *Carry out a comprehensive practical physics investigation* involves writing a discussion that validates the conclusion. The discussion may include as appropriate:
 - a justification for the accuracy-improving techniques used
 - a reason that there is a limit to either end of the value chosen for the independent variable
 - a justification why a variable needs to be controlled.
 - a description of any difficulties encountered when making measurements and how these difficulties were overcome
 - a link between investigation findings and applicable physics ideas
 - a description of any unexpected outcomes of the processing of the results and a suggestion of how these outcomes could have been caused and/or the effect they had on the validity of the conclusion.
 - 8 Conditions of Assessment related to this achievement standard can be found at <http://ncea.tki.org.nz/Resources-for-Internally-Assessed-Achievement-Standards>.
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Replacement Information

This achievement standard replaced unit standard 6375 and AS90180.

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