Achievement Standard

Subject Reference	Physics 2.1				
Title	Carry out a practical physics investigation that leads to a non-linear mathematical relationship				
Level	2	**Credits**	4	**Assessment**	Internal
Subfield	Science				
Domain	Physics				
Status	Registered	**Status date**	17 November 2011		
Planned review date	31 December 2020	**Date version published**	20 November 2014		

This achievement standard involves carrying out a practical physics investigation that leads to a non-linear mathematical relationship.

Achievement Criteria

Achievement	Achievement with Merit	Achievement with Excellence
• Carry out a practical physics investigation that leads to a non-linear mathematical relationship.	• Carry out an in-depth practical physics investigation that leads to a non-linear mathematical relationship.	• Carry out a comprehensive practical physics investigation that leads to a non-linear mathematical relationship.

Explanatory Notes

1 This achievement standard is derived from *The New Zealand Curriculum*, Learning Media, Ministry of Education, 2007, Level 7; and is related to the material in the *Teaching and Learning Guide for Physics*, Ministry of Education, 2010 at http://seniorsecondary.tki.org.nz. The standard is aligned to the achievement objectives *Physical Inquiry and Physics Concepts* in the Physical World strand and *Investigating in Science* in the Nature of Science strand.

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 for the relevant learning area.

2 *Carry out a practical physics investigation* involves:

- collecting data relevant to the aim based on the manipulation of the independent variable over a reasonable range and number of values
- drawing a graph that shows the relationship between the independent and dependent variables
- writing a conclusion which describes the type of mathematical relationship that exists between the variables.

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
- writing a conclusion that describes the mathematical relationship obtained from the experimental data.

Carry out a comprehensive practical physics investigation involves writing a discussion that addresses critical issues such as:

- a reason why there is a limit to either end of the value chosen for the independent variable
- a justification for why a variable needs to be controlled
- a description of any difficulties encountered when making measurements and how these difficulties were overcome
- the relationship between the findings and physics ideas
- a description of any unexpected results and a suggestion of how they could have been caused and/or the effect they had on the validity of the conclusion.

3 *A practical physics investigation* is an activity that includes gathering, processing and interpreting data.

4 Conditions of Assessment related to this achievement standard can be found at http://ncea.tki.org.nz/Resources-for-Internally-Assessed-Achievement-Standards.

Replacement Information

This achievement standard replaced AS90252 and unit standard 6386.

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