Achievement Standard

Subject Reference	Physics 1.5				
Title	Demonstrate understanding of aspects of heat				
Level	1	**Credits**	4	**Assessment**	External
Subfield	Science				
Domain	Physics				
Status	Registered	**Status date**	30 November 2010		
Planned review date	31 December 2016	**Date version published**	16 January 2014		

This achievement standard involves demonstrating understanding of aspects of heat and may include using methods when solving related problems.

Mutual exclusion exists between this standard and AS90943.

Achievement Criteria

Achievement	Achievement with Merit	Achievement with Excellence
• Demonstrate understanding of aspects of heat.	• Demonstrate in-depth understanding of aspects of heat.	• Demonstrate comprehensive understanding of aspects of heat.

Explanatory Notes

1 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 objectives in the Physical World strand and the Communicating in Science achievement objective 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 *Demonstrate understanding of aspects of heat* typically involves providing evidence that shows awareness of how simple facets of phenomena, concepts or principles relate to given situations. This may include using methods for solving problems involving aspects of heat.

3 *Demonstrate in-depth understanding of aspects of heat* typically involves providing evidence that shows how or why phenomena, concepts or principles relate to given situations.

4 *Demonstrate comprehensive understanding of aspects of heat* typically involves providing evidence that shows how or why phenomena, concepts or principles are connected in the context of given situations. Statements must demonstrate understanding of connections between concepts.

5 Evidence may be written, mathematical, graphical or diagrammatic.

6 *Aspects of heat* will be limited to a selection from the following: temperature, thermal expansion, heat energy (including kinetic theory), specific heat capacity, conduction, convection, radiation, efficiency of heating, insulation, phase changes, latent heat, the relationships

$P = \frac{E}{t}$ $Q = mc\Delta T$ $Q = mL$.

7 Assessment Specifications for this achievement standard can be accessed through the Physics Resources page found at http://www.nzqa.govt.nz/qualifications-standards/qualifications/ncea/ncea-subject-resources.

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