Field **Sciences**

Review of *Physics* Level 2 achievement and unit standards

Unit standards

Subfield	Domain	ID
Science	Physics	6378-6380, 6382, 6383, 6385-6387, 8768-8771

Achievement standards

Domain	ID	Subject reference
Physics	90252	Physics 2.1
	90254	Physics 2.3
	90255	Physics 2.4
	90256	Physics 2.5
	90257	Physics 2.6
	90258	Physics 2.7

The Ministry of Education and NZQA National Qualifications Services have completed a review of the achievement and unit standards listed above.

New Registration date **November 2011**

Date new versions published **November 2011**

Planned review date **December 2014**

Summary of review and consultation process

In 2008 the Ministry of Education (MoE) and NZQA began to review achievement and unit standards in light of the revised New Zealand Curriculum (NZC). This Alignment of Standards (AoS) review also addressed duplication of outcomes, credit parity, fairness, consistency, and coherence. The AoS review was guided by the revised NZC itself and the Principles for Standards Review. A copy of the NZC is available at: http://nzcurriculum.tki.org.nz/Curriculum-documents/The-New-Zealand-Curriculum.

Teacher subject associations were involved in the review, and draft achievement standards were the focus of wide consultation, especially with secondary schools and teachers. Extensive resources, including student exemplars, were also developed to support these standards, and are available on the MoE and/or the NZQA websites.

The review of unit standards included consultation with tertiary providers to assess continued relevance and likely future use of the standards. Unit standards that duplicate achievement standard outcomes and those without the likelihood of future tertiary use were recommended for expiry.

National consultation was undertaken in 2010, with the results analysed by Research New Zealand. The responses were generally positive.

The review of these Level 2 unit and achievement standards was completed in time for implementation in schools in 2012. The review of unit and achievement standards at Level 1 was completed in time for implementation in schools in 2011. Standards at Level 3 will be implemented in 2013.

Main changes resulting from the review

- All NZC Level 7 (NZQF Level 2) outcomes derived from the NZC are now assessed using achievement standards, and there are no longer any unit standards linked to the NZC.
- Existing achievement standards were reviewed and new achievement standards were developed to align with the NZC. See table below.
- Grading criteria for achievement standards were reviewed in accordance with the Standards Review Guidelines.
- Unit standards that recognised similar outcomes as achievement standards were recommended for expiry. See table below.
- Unit standard 6379 was replaced by achievement standard 91171 [Externally Assessed]. See table below.
- Achievement standard 90256 [Externally Assessed] was replaced by achievement standard 91172 [Internally Assessed]. See table below.

For a more detailed description of the review of, and the changes to, the Physics standards see the appendix at the end of this report.

Impact on existing organisations with consent to assess

Current consent for			Consent extended to		
Nature of consent	**Classification or ID**	**Level**	**Nature of consent**	**Classification or ID**	**Level**
Standard	6379	2	Standard	91171	2

The scope of the consent to assess (CtA) against standards has not been extended in relation to unit standard 6382 because although there is an organisation with CtA for it, they have never reported credit. The joint MoE/NZQA Overview Writing Group responsible for this review considered that extending CtA to a replacement achievement standard was not appropriate in this case.

Impact on Consent and Moderation Requirements (CMR)
(Formerly known as AMAP)

All new achievement standards have been registered on CMR 0233.

Impact on registered qualifications

Key to type of impact	
Affected	The qualification lists a reviewed classification (domain or subfield) in an elective set The qualification lists a standard that has changes to level or credits The qualification lists a C or D category standard
Not materially affected	The qualification lists a standard that has a new title The qualification lists a standard that has a new classification

The following table identifies a qualification developed by Infratrain New Zealand that is impacted by the outcome of this review The SSB has been advised that the qualification

requires revision. The standard generated the *Affected* status.

Ref	Qualification Title	ID	SSB Name
0640	National Certificate in Design (Draughting) (Level 2)	**6379**	InfraTrain New Zealand

Impact of changes on NCEA Exclusions List

For transition purposes, the following exclusions will apply for new achievement standards.

Achievement standard	Excluded against each of these standards
91168	6386, 90252
91169	90258
91170	6382, 8768, 90254
91171	6379, 90255
91172	90256
91173	90257

Review Categories and changes to classification, title, level, and credits

The following summary shows the changes made to the standards as a result of the review. All changes are in **bold**. Where a new or a new version of an externally assessed achievement standard is registered, the following designation appears after the title **[Externally Assessed]**.

Key to review category	
A	Dates changed, but no other changes are made - the new version of the standard carries the same ID and a new version number
B	Changes made, but the overall outcome remains the same - the new version of the standard carries the same ID and a new version number
C	Major changes that necessitate the registration of a replacement achievement standard with a new ID
D	Achievement standard will expire and not be replaced

Externally assessed achievement standards categorised as category C or D expire at the end of	**December 2011**

Internally assessed achievement standards and unit standards (*except 6379 – see* below) categorised as category C or D expire at the end of	**December 2012**

Unit standard 6379 categorised as category C expires at the end of	**December 2013**

Sciences > Science > Physics

ID	Title	Level	Credit	Review Category
6378	Demonstrate knowledge of motion in one and two dimensions	2	5	D

ID	Title	Level	Credit	Review Category
6379	Demonstrate knowledge of energy, momentum and equilibrium	2	4	C
90255	Demonstrate understanding of mechanics	2	6	C
91171	**Demonstrate understanding of mechanics [Externally Assessed]**	**2**	**6**	
6380	Apply formulae, graphical and vectorial methods to find unknowns for a physical system	2	4	D
6383	Describe the development of a selected physics idea and a physics-based application	2	2	D
6385	Carry out a practical investigation of a physics-based application with supervision	2	3	D
6387	Demonstrate knowledge of elementary nuclear physics and radioactivity	2	2	D
8769	Describe, construct and determine unknowns for electrical systems	2	4	D
8770	Describe and determine unknowns for electromagnetic systems	2	2	D
8771	Describe the use and functioning of rockets, satellites and space probes	2	3	D
6386	Use graphical analysis to determine simple non-linear physical relationships	2	3	C
90252	Take measurements of physical quantities and analyse data graphically to determine a relationship	2	4	C
91168	**Carry out a practical physics investigation that leads to a non-linear mathematical relationship**	**2**	**4**	
6382	Demonstrate knowledge of waves	2	4	C
8768	Demonstrate knowledge of reflection and refraction of light	2	4	C
90254	Demonstrate understanding of waves	2	4	C
91170	**Demonstrate understanding of waves [Externally Assessed]**	**2**	**4**	
90256	Demonstrate understanding of atoms and radioactivity **[Externally Assessed]**	2	2	C
91172	**Demonstrate understanding of atomic and nuclear physics**	**2**	**3**	
90257	Demonstrate understanding of electricity and electromagnetism	2	5	C
91173	**Demonstrate understanding of electricity and electromagnetism [Externally Assessed]**	**2**	**6**	
90258	Demonstrate understanding of physics in an integrated context	2	3	C
91169	**Demonstrate understanding of physics relevant to a selected context**	**2**	**3**	

Appendix

Development of Level 2 Physics Standards

The draft matrix sets out six standards at Level 2 – three of which will be externally assessed.

Feedback from national consultation showed that the majority of respondents agreed with the outcomes as described in the standards. Some minor rewording has clarified the intent of the standards. The 2.2 standard has increased its credit value from 2 to 3 as a result of feedback on the amount of time that would typically be needed for students to cover the learning for this.

To ensure progression from the Level 1 standards some content in the three external Level 2 standards (mechanics, waves and electromagnetism) has been removed. These changes are not significant but do address, to some extent, the concerns raised in the Level 1 consultation regarding the progression to Level 2.

The internal standard (atomic and nuclear) has undergone some revision to ensure that the content covered builds on the changes made to Level 1. This standard now provides a pathway to the Level 3 atomic and nuclear standard.

2.1: *Carry out a practical investigation that leads to a non-linear mathematical relationship*

This standard is related to the practical investigation standard at Level 1 (AS90935). At Level 2 the relationship is between variables that do not have a simple proportional relationship, making this a step up from Level 1. The standard assesses an entire investigation, not a set of separate measurement tasks and graph-plotting activity. Reasons for this are the move to a single criterion for the standard, continuity from the Level 1 investigation and preparation of students for the more comprehensive investigation required at Level 3.

2.2: *Demonstrate understanding of physics relevant to a selected context*

This standard has been designed to allow considerable flexibility in the selection of contexts/content. For example, a teacher could assess a student's ability to analyse the physics underlying an application such as GPS systems, or alternatively, a teacher could deliver content on a special topic (such as 'The Crane') and assess it against this standard. The contexts in this standard are broader than the applications that are the focus of the equivalent Level 1 standard. The credit value has been increased from 2 to 3, following consultation feedback that stressed the learning time required before students can be assessed against this standard.

2.3: *Demonstrate understanding of waves*

The properties of electromagnetic spectrum have been removed from this standard. It was considered that this topic would not allow students to demonstrate depth of understanding required at Level 2.

2.4: *Demonstrate understanding of mechanics*

The set of concepts that can be assessed in this standard has been clarified in explanatory note 4.

2.5: *Demonstrate understanding of atomic and nuclear physics*

Explanatory note 4 has been modified to clarify the range of topics which should be covered to ensure that students have sufficiently broad understanding of atomic and nuclear physics appropriate to Curriculum level 7.

2.6: *Demonstrate understanding of electricity and electromagnetism*

Guidance is provided in the explanatory notes on the concepts that can be assessed for this standard. The specific contexts are not listed; there is considerable flexibility on the selection of contexts.