Field Sciences

Review of *Science* Level 2 achievement and unit standards

Unit standards

Subfield	Domain	ID
Science	Earth Science	6360-6362
	Science - Core	6351, 6352, 21610

Achievement standards

Domain	ID	Subject reference
Science - Core	90312	Science 2.1
	90764	Science 2.7
	90766	Science 2.8
	90767	Science 2.5
	90768	Science 2.9
	90771	Science 2.2
	90772	Science 2.3

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.

For a more detailed description of the review of, and the changes to, the *Earth Science* and *Science - Core* 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**
Domain	Earth Science	2	Domain	Earth and Space Science	2
Domain	Science - Core	2	Domain	Earth and Space Science	2
Standard	6360	2	Domain	Earth and Space Science	2

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 NZQA – National Qualifications Services qualification is affected by the outcome of this review and has been updated as part of the review of the qualification in 2011.

Ref	Qualification Title	Classification or ID
0233	National Certificate in Science	Earth Science

The following table identifies qualifications developed by other SSBs that are affected by the outcome of this review. The SSBs have been advised that the qualifications require revision.

Ref	Qualification Title	Classification or ID	SSB Name
0453	National Diploma in Surveying (Level 6) with an optional strand in Mine Surveying	6360	InfraTrain New Zealand
1323	National Certificate in Diving (Instruction) (Level 6)	Earth Science	Skills Active Aotearoa Limited

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
91187	90312, 6361, 6360
91188	90771, 6352
91189	90767, 6362
91192	90764

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 categorised as category C or D expire at the end of	**December 2012**

Unit standards categorised as category C or D expire at the end of	**December 2013**

Sciences > Science

ID	Ref	Domain	Title	Level	Credit	Review Category
6351		Science – Core	Report on the historical development of a scientific idea, with supervision	2	4	D

ID	Ref	Domain	Title	Level	Credit	Review Category
6352		Science – Core	Report on an issue affecting the environment from a scientific perspective, with supervision	2	4	C
90771	2.2	Science – Core	Research information to present a scientific report	2	3	C
91188	**2.2**	**Earth and Space Science**	**Examine an Earth and Space Science issue and the validity of the information communicated to the public**	**2**	**4**	
6360		Earth Science	Identify geological features from recorded visual information	2	2	C
6361		Earth Science	Investigate and report on the geology in an area	2	4	C
90312	2.1	Science - Core	Carry out a practical scientific investigation with supervision	2	4	C
91187	**2.1**	**Earth and Space Science**	**Carry out a practical Earth and Space Science investigation**	**2**	**4**	
6362		Earth Science	Demonstrate an understanding of fossils	2	3	C
90767	2.5	Science - Core	Describe New Zealand's geological history	2	3	C
91189	**2.3**	**Earth and Space Science**	**Investigate geological processes in a New Zealand locality**	**2**	**4**	
21610		Science – Core	Collect, and use computer technology to store and process, numeric data for a scientific purpose	2	4	D
90764	2.7	Science – Core	Describe the nature and life cycle of stars	2	2	C
91192	**2.6**	**Earth and Space Science**	**Demonstrate understanding of stars and planetary systems [Externally Assessed]**	**2**	**4**	
90766	2.8	Science – Core	Describe the chemical properties and effects of fertilisers	2	4	D
90768	2.9	Science – Core	Use physics concepts and principles to describe the behaviour of light	2	4	D
90772	2.3	Science - Core	Describe the factors and processes involved in the evolution of New Zealand's plants and animals	2	4	D

ID	Ref	Domain	Title	Level	Credit	Review Category
91190	2.4	Earth and Space Science	Investigate how organisms survive in an extreme environment	2	4	New
91191	2.5	Earth and Space Science	Demonstrate understanding of the causes of extreme Earth events in New Zealand [Externally Assessed]	2	4	New
91193	2.7	Earth and Space Science	Demonstrate understanding of physical principles related to the Earth System [Externally Assessed]	2	4	New

Appendix

Development of Level 2 Earth and Space Science Standards

The Level 1 achievement standards were developed in such a way as to allow providers to offer assessments for science courses that offer a broad based science approach or a more specialised approach. This was a compromise that necessitated some duplication of outcomes in the matrix for Level 1 science.

The Level 2 achievement standards derived from the Science curriculum learning area have been developed in a different way. A distinct set of standards has been developed for each of the contextual strands in the curriculum. Biology standards derive from the Living World strand, Chemistry from the Material World strand, Physics from the Physical World strand, and Earth and Space Science (ESS) from the Planet Earth and Beyond strand. Each of these sets of standards also reflects aspects of the Nature of Science strand as appropriate.

The name 'Earth and Space Science' was chosen for two reasons – first it reflects the focus on earth and astronomical systems, and second, it is a name that is distinct from the previous Level 2 'Science' standards. The latter standards were developed for use in a 'general' science type course that covered outcomes from across all strands in the earlier curriculum statement. The new Earth and Space Science standards are a specialised set of standards derived from curriculum level 7 in the same way as the biology, chemistry and physics standards are.

Process of Aligning Standards with the New Zealand Curriculum

The standards reflect the Achievement Aims (AA) and Achievement Objectives (AO) of the Planet Earth and Beyond (PEB) strand, the Nature of Science strand and the Using Physics AO of the Physical World strand at curriculum Level 7.

The titles in the Level 2 ESS matrix have been derived from the relevant curriculum learning area(s) in the following way.

ESS 2.1 *Carry out a practical Earth and Space Science investigation* is aligned with the Nature of Science strand Investigating in Science AO and Understanding about Science AO.

ESS 2.2 *Examine an Earth and Space Science issue and the validity of the information communicated to the public* is aligned with the Nature of Science strand Participating and Contributing AO, and Communicating in Science AO.

ESS 2.3 *Investigate geological processes in a New Zealand locality* is aligned with the PEB strand Earth Systems and Interacting Systems AO.

ESS 2.4 *Investigate how organisms survive in an extreme environment* is aligned with the Living World strand Life Processes AO.

ESS 2.5 *Demonstrate understanding of the causes of extreme Earth events in New Zealand* is aligned with the PEB strand Earth Systems and Interacting Systems AO and Nature of Science strand Understanding about Science and Communicating in Science AOs.

ESS 2.6 *Demonstrate understanding of stars and planetary systems* is aligned with the PEB strand Astronomical Systems AO and Nature of Science strand Understanding about Science and Communicating in Science AOs.

ESS 2.7 *Demonstrate understanding of physical principles related to the Earth system* is aligned with the PEB strand Earth Systems and Interacting Systems AO.

The domain *Earth Science* was designated lapsing as part of this review and was replaced by a new domain *Earth and Space Science*.

Addressing Duplication

Some existing unit standards and new achievement standards assess essentially the same outcomes. Where this occurs the unit standards have been recommended for expiry. There is no duplication of outcomes in the new ESS achievement standards and those in the new biology, chemistry or physics achievement standards.

Addressing Credit Parity

Each ESS standard has been allocated 4 credits. Each standard assesses an outcome that would require approximately 40 notional hours of learning, practice and assessment for an average candidate studying at the appropriate curriculum level.

Providers are expected to select the appropriate standards from the matrix of standards available at this level. It is not intended that any student would be assessed against all these standards in a typical science programme – this would result in teaching, learning and assessment overload.

External and Internal Assessment

The standards that primarily assess investigative skills in the widest sense are assessed internally. External assessment would place constraints that would limit the sample of evidence students could present.

The standards that primarily require understanding of key concepts are assessed externally.