

Field Māori
Field Sciences

New Pūtaiao achievement standards
Revision of Level 2 Science achievement standards (published in November 2014)

New achievement standards

Domain	ID	Subject reference
Pūtaiao	91766-91769	Pūtaiao 2.1-2.4

Revised achievement standards

Domain	ID	Subject reference
Biology	91153-91160	Biology 2.1-2.8
Chemistry	91161-91167	Chemistry 2.1-2.7
Earth and Space Science	91187-91193	Earth and Space Science 2.1-2.7
Education for Sustainability	90811	Education for Sustainability 2.2
Physics	91168-91173	Physics 2.1-2.6

The Ministry of Education has completed the development of the Pūtaiao achievement standards listed above and revised the related English medium achievement standards to indicate that they also derive from the *Te Marautanga o Aotearoa* achievement objectives. The report relating to the revised English medium standards may be accessed at <http://www.nzqa.govt.nz/nqfdocs/summaries/2014/nov14/revsumnov14-01.pdf>.

New Registration date **November 2015**

Date new versions published **December 2015**

Planned review date **December 2018**

Summary of development, revision and consultation process

In 2010 the Ministry of Education, in association with the New Zealand Qualifications Authority and subject working groups, began to develop achievement standards derived from outcomes in *Te Marautanga o Aotearoa* (TMoA). This development also addressed duplication of outcomes, credit parity, fairness, consistency and coherence. The development was guided by the direction of *Te Marautanga o Aotearoa* and the Standards Review Guidelines. A copy of TMoA is available at: <http://tmoa.tki.org.nz/Nga-Marautanga-o-Aotearoa/Te-Marautanga-o-Aotearoa>

Draft achievement standards were developed with the involvement of teacher subject working groups. The draft standards were the focus of wide consultation, especially with kaiako (teachers) in wharekura (secondary programmes in Māori-medium schools). Resources were also developed to support the standards.

There were no registered Pūtaiao achievement standards when this review was completed.

The English-language Science learning area achievement standards listed above were revised in November 2014 to show that they also align with outcomes in Te Marautanga o Aotearoa.

Main changes resulting from the development and revision processes

- All TMoA Level 7 (NZQF Level 2) Pūtaiao outcomes are now assessed using achievement standards.
- Grading criteria for achievement standards were reviewed in accordance with the Standards Review Guidelines.
- Four new standards were created for Pūtaiao that align to TMoA outcomes.
- NZC-derived English-language achievement standards relating to the Science learning area that were identified as meeting the outcomes in TMoA were amended to note this, and their review date changed to December 2018.

For a detailed description of the rationale for the development of the **Pūtaiao** standards see the **Appendix** at the end of this report.

None.

Impact on Consent and Moderation Requirements (CMR)

All new achievement standards have been registered on CMR 0233.

Impact on registered qualifications

None.

Impact of changes on [Exclusions List](#)

None.

Detailed list of achievement standards – classification, title, level, and credits

New achievement standards

Māori > Te Marautanga o Aotearoa > Pūtaiao

ID	Ministry reference	Title	Level	Credit
91766	Pūtaiao 2.1	Te whakahāngai huatau koiora ki tētahi rauropi whakahirahira ki te Māori	2	4
91767	Pūtaiao 2.2	Te tūhura i ngā panoni hauropi o tētahi wāhi whakahirahira ki te Māori	2	4
91768	Pūtaiao 2.3	Te whakahāngai huatau pūtaiao ā-nuku ki tētahi āhuatanga e pā ana ki a Papatūānuku	2	4
91769	Pūtaiao 2.4	Te whakahāngai huatau tātai arorangi ki tētahi whetū whakahirahira ki te Māori	2	4

Revised achievement standards

Sciences > Science > Biology

ID	Ministry reference	Title	Level	Credit
91153	Biology 2.1	Carry out a practical investigation in a biology context, with supervision	2	4
91154	Biology 2.2	Analyse the biological validity of information presented to the public	2	3
91155	Biology 2.3	Demonstrate understanding of adaptation of plants or animals to their way of life	2	3
91156	Biology 2.4	Demonstrate understanding of life processes at the cellular level	2	4
91157	Biology 2.5	Demonstrate understanding of genetic variation and change	2	4
91158	Biology 2.6	Investigate a pattern in an ecological community, with supervision	2	4
91159	Biology 2.7	Demonstrate understanding of gene expression	2	4
91160	Biology 2.8	Investigate biological material at the microscopic level	2	3

Sciences > Science > Chemistry

ID	Ministry reference	Title	Level	Credit
91161	Chemistry 2.1	Carry out quantitative analysis	2	4
91162	Chemistry 2.2	Carry out procedures to identify ions present in solution	2	3
91163	Chemistry 2.3	Demonstrate understanding of the chemistry used in the development of a current technology	2	3
91164	Chemistry 2.4	Demonstrate understanding of bonding, structure, properties and energy changes	2	5
91165	Chemistry 2.5	Demonstrate understanding of the properties of selected organic compounds	2	4
91166	Chemistry 2.6	Demonstrate understanding of chemical reactivity	2	4
91167	Chemistry 2.7	Demonstrate understanding of oxidation-reduction	2	3

Sciences > Science > Earth and Space Science

ID	Ministry reference	Title	Level	Credit
91187	Earth and Space Science 2.1	Carry out a practical Earth and Space Science investigation	2	4
91188	Earth and Space Science 2.2	Examine an Earth and Space Science issue and the validity of the information communicated to the public	2	4
91189	Earth and Space Science 2.3	Investigate geological processes in a New Zealand locality	2	4
91190	Earth and Space Science 2.4	Investigate how organisms survive in an extreme environment	2	4
91191	Earth and Space Science 2.5	Demonstrate understanding of the causes of extreme Earth events in New Zealand	2	4

ID	Ministry reference	Title	Level	Credit
91192	Earth and Space Science 2.6	Demonstrate understanding of stars and planetary systems	2	4
91193	Earth and Space Science 2.7	Demonstrate understanding of physical principles related to the Earth System	2	4

Sciences > Science > Education for Sustainability

ID	Ministry reference	Title	Level	Credit
90811	Education for Sustainability 2.2	Explain how human activity in a biophysical environment has consequences for a sustainable future	2	4

Sciences > Science > Physics

ID	Ministry reference	Title	Level	Credit
91168	Physics 2.1	Carry out a practical physics investigation that leads to a non-linear mathematical relationship	2	4
91169	Physics 2.2	Demonstrate understanding of physics relevant to a selected context	2	3
91170	Physics 2.3	Demonstrate understanding of waves	2	4
91171	Physics 2.4	Demonstrate understanding of mechanics	2	6
91172	Physics 2.5	Demonstrate understanding of atomic and nuclear physics	2	3
91173	Physics 2.6	Demonstrate understanding of electricity and electromagnetism	2	6

Appendix

Development of Pūtaiao Level 2 Achievement Standards

Process of aligning standards with Te Marautanga o Aotearoa (TMoA)

The process of aligning achievement standards with Te Marautanga o Aotearoa (TMoA) was informed by a series of audits across all learning areas conducted by Māori-medium subject specialists. After determining the extent to which the existing achievement standards met the whāinga paetae (achievement objectives) within the Pūtaiao learning area of TMoA, new achievement standards were developed for this area by a group of subject specialists working in wharekura.

The new Level 2 Pūtaiao achievement standards were developed to align with the whāinga paetae within the Level 7 Te Ao Tūroa (The Natural World) and Ngā Tautake Pūtaiao me ngā Kōrero o Mua (Philosophy and History of Science) strands of the Pūtaiao learning area of TMoA. The Ō Ahupūngao (The Physical World) and Ō Kawekawe (The Material World) strands are covered by existing Science achievement standards.

As with the Level 1 standards, the four new Level 2 Pūtaiao achievement standards are robust and challenging, bring together knowledge from science, and acknowledge direct experience of the natural world and relevant Māori traditions.

[Conditions of Assessment](#) have been developed to assist in the interpretation of achievement standards and the development of teaching and learning programmes.

Addressing duplication

The new Pūtaiao standards have been developed to be complementary to the existing NZC Science achievement standards. The Pūtaiao standards were compared in detail with the Science standards to ensure that there was no duplication. New standards were not developed within the Ō Ahupūngao (The Physical World) and Ō Kawekawe (The Material World) strands, as they would have been too similar to existing Science achievement standards.

In addition, the Science achievement standards were compared against the whāinga paetae in TMoA. Where the Science achievement standards were found to align with the TMoA whāinga paetae, they were revised to include a note to this effect.

Wharekura will have opportunities to build their own assessment programmes from a selection of achievement standards available in both Pūtaiao and Science.

Addressing credit parity

The credits allocated to the standards reflect the time required for the teaching and learning involved. All standards at Level 2 have a credit value of 4 credits.

External and internal assessment

The mode of assessment for each standard best reflects the teaching and learning involved for each standard.

Internal assessment was considered the most appropriate mode for all the Pūtaiao standards.

What has changed (summary)?

There are four new Pūtaiao achievement standards at Level 2 (AS91766–AS91769) that build on the skills and understandings developed at Level 1. They assess students' understanding of Te Ao Tūroa, utilising the Māori organisation of that strand, and drawing on content from Ō Kawekawe and Ō Ahupūngao as required.

Pūtaiao 2.1 Te whakahāngai huatau koiora ki tētahi rauropi whakahirahira ki te Māori (AS91766) requires students to apply biological concepts to a particular organism that is of significance to Māori.

Pūtaiao 2.2 Te tūhura i ngā panoni hauropi o tētahi wāhi whakahirahira ki te Māori (AS91767) requires students to provide evidence, through an investigation, of their understanding of the ecological changes that have taken place at a particular location of significance to Māori.

Pūtaiao 2.3 Te whakahāngai huatau pūtaiao ā-nuku ki tētahi āhuetanga e pā ana ki a Papatūānuku (AS91768) requires students to apply geological concepts to a topic relating to the Earth.

Pūtaiao 2.4 Te whakahāngai huatau tātai arorangi ki tētahi whetū whakahirahira ki te Māori (AS91769) requires students to apply astronomical concepts to a star that is of significance to Māori.

Revision of English-language Science achievement standards

The TMoA Pūtaiao learning area focuses on central science concepts and on the exploration of socio-scientific issues that are of particular relevance for iwi Māori.

The Māori-medium sector supports academic success for its graduates in Biology, Chemistry, Physics, and Earth and Space Science and will use the revised English-medium standards in its teaching and learning programmes.

The Agricultural and Horticultural Science standards, which are embedded within the contexts of the agriculture and horticulture industries, do not align with the TMoA Pūtaiao learning area and are therefore not included in this revision.