

Achievement Standard

Subject Reference	Science 1.7		
Title	Investigate the implications of the properties of metals for their use in society		
Level	1	Credits	4
		Assessment	Internal
Subfield	Science		
Domain	Science - Core		
Status	Registered	Status date	30 November 2010
Planned review date	31 December 2016	Date version published	12 December 2013

This achievement standard involves carrying out practical activities to investigate the implications of the properties of metals for the way that they are used in society.

Mutual exclusion exists between this standard and AS90933.

Achievement Criteria

Achievement	Achievement with Merit	Achievement with Excellence
<ul style="list-style-type: none"> Investigate the implications of the properties of metals for their use in society. 	<ul style="list-style-type: none"> Investigate, in depth, the implications of the properties of metals for their use in society. 	<ul style="list-style-type: none"> Investigate, comprehensively, the implications of the properties of metals for their use in society.

Explanatory Notes

- This achievement standard is derived from *The New Zealand Curriculum*, Learning Media, Ministry of Education, 2007, Level 6. It is aligned with the Nature of Science and the Material World strands, and is related to the material in the *Teaching and Learning Guide for Science*, 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](#).

- This investigation involves collecting information about the implications of the properties of metals for their use in society. The information could come from a variety of sources such as direct observations, collection of experimental data, resource sheets, photos, videos, websites and reference texts.

The procedures outlined in *Safety and Science: A Guidance Manual for New Zealand Schools*, Learning Media, Ministry of Education, 2000, must be followed during any practical component of the investigation.

- 3 *Investigate* involves gathering primary data, making and recording experimental observations of the physical and chemical properties of metals, and also typically includes describing, gathering, processing, interpreting, identifying, classifying and giving an account of the properties of metals and the implications for their use in society. This requires the use of chemistry vocabulary, symbols and conventions (including names and formulae), and writing word equations.
 - 4 *Investigate in depth* involves making links between the physical and chemical properties of metals and the implications for their use in society. This requires explanations that use chemistry vocabulary, symbols and conventions (including names and formulae), and completing symbol equations.
 - 5 *Investigate comprehensively* typically involves explaining, elaborating, justifying, relating, evaluating, comparing and contrasting, or analysing the links between the chemical and physical properties of metals and the implications of their use in society. This includes the activity series of metals and requires explanations that consistently use chemistry vocabulary, symbols and conventions (including names and formulae), including writing balanced symbol equations.
 - 6 *Implications* include the consequences of particular properties for the ways that metals are extracted from their ores, treated to prevent corrosion, or used for specific purposes.
 - 7 *Properties* include:
 - Physical properties may include - melting point, colour, lustre, hardness, ductility and malleability, electrical and thermal conductivity, density.
 - Chemical properties may include - reaction with oxygen, water and acids (HCl, H₂SO₄).
 - 8 Conditions of Assessment related to this achievement standard can be found at www.tki.org.nz/e/community/ncea/conditions-assessment.php.
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Quality Assurance

- 1 Providers and Industry Training Organisations must be accredited by NZQA before they can register credits from assessment against achievement standards.
- 2 Accredited providers and Industry Training Organisations assessing against achievement standards must engage with the moderation system that applies to those achievement standards.

Accreditation and Moderation Action Plan (AMAP) reference

0233