

Achievement Standard

Subject Reference	Science 1.6		
Title	Investigate implications of the use of carbon compounds as fuels		
Level	1	Credits	4
		Assessment	Internal
Subfield	Science		
Domain	Science - Core		
Status	Registered	Status date	30 November 2010
Planned review date	31 December 2020	Date version published	20 November 2014

This achievement standard involves investigating implications of the use of carbon compounds as fuels. This includes the properties of carbon compounds and the importance and effects of their uses and combustion products on humans or the environment.

Mutual exclusion exists between this standard and AS90932.

Achievement Criteria

Achievement	Achievement with Merit	Achievement with Excellence
<ul style="list-style-type: none"> Investigate implications of the use of carbon compounds as fuels. 	<ul style="list-style-type: none"> Investigate, in -depth, implications of the use of carbon compounds as fuels. 	<ul style="list-style-type: none"> Investigate, comprehensively, implications of the use of carbon compounds as fuels.

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 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](#).

- In the Science learning area of the New Zealand Curriculum, 'investigate' has the broad meaning of scientific research (carrying out an 'inquiry'). In this standard

investigation involves collecting information about implications of the use of carbon compounds as fuels.

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 investigation.

- 3 *Investigate* typically involves making and recording observations, processing, interpreting, identifying, classifying and describing selected properties of carbon compounds and implications of their use as fuels. Selected properties include melting point, boiling point and combustion reactions. This requires the use of chemistry vocabulary, symbols and conventions (including names and structural formulae), and writing word equations.
- 4 *Investigate in depth* typically involves making links between the selected properties of carbon compounds, their uses as fuels and implications of their uses as fuels. This could include comparing physical properties and chemical properties of different carbon compounds, the use of different carbon compounds as fuels and implications of the use of different carbon compounds as fuels. This requires the use of chemistry vocabulary, symbols and conventions (including names and structural formulae), and completing symbol equations.
- 5 *Investigate comprehensively* typically involves explaining, elaborating, justifying, relating, evaluating, comparing and contrasting, or analysing the links between the selected properties of the different carbon compounds, their uses as fuels and implications of the use of different carbon compounds as fuels. This requires explanations that consistently use chemistry vocabulary, symbols and conventions (including names and structural formulae), including writing balanced symbol equations.
- 6 *Implications of the use of carbon compounds as fuels* consider the importance and effects of their uses and combustion products on humans or the environment and could include: the efficiency of fuels, air or thermal pollution, effect on global climate, ocean acidification, use of non-renewable resources and/or food crops for fuels.
- 7 *Carbon compounds* include alkanes and alcohols. Systematic names and structural formulae of carbon compounds are restricted to straight chain alkanes of up to eight carbon atoms, methanol, and ethanol.
- 8 Conditions of Assessment related to this achievement standard can be found at <http://ncea.tki.org.nz/Resources-for-Internally-Assessed-Achievement-Standards>.

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