# Achievement Standard

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| **Subject Reference** | Chemistry 2.5 | | | | |
| **Title** | Demonstrate understanding of the properties of selected organic compounds | | | | |
| **Level** | 2 | **Credits** | 4 | **Assessment** | External |
| **Subfield** | Science | | | | |
| **Domain** | Chemistry | | | | |
| **Status** | Registered | **Status date** | 17 November 2011 | | |
| **Planned review date** | 31 December 2020 | **Date version published** | 20 November 2014 | | |

This achievement standard involves demonstrating understanding of the properties of selected organic compounds.

**Achievement Criteria**

| Achievement | Achievement with Merit | Achievement with Excellence |
|---|---|---|
| • Demonstrate understanding of the properties of selected organic compounds. | • Demonstrate in-depth understanding of the properties of selected organic compounds. | • Demonstrate comprehensive understanding of the properties of selected organic compounds. |

**Explanatory Notes**

1 This achievement standard is derived from *The New Zealand Curriculum*, Learning Media, Ministry of Education, 2007, Level 7. The standard is aligned to the Nature of science achievement objectives and the Material World achievement objectives, and is related to the material in the *Teaching and Learning Guide for Chemistry*, 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 for the relevant learning area.

2 Procedures outlined in *Safety and Science*: *a Guidance Manual for New Zealand Schools,* Learning Media, Ministry of Education, 2000 should be followed.

3 *Demonstrate understanding* involves naming and/or drawing structural formulae of selected organic compounds (no more than eight carbons in the longest chain) and

giving an account of their chemical and physical properties. This requires the use of chemistry vocabulary, symbols and conventions.

*Demonstrate in-depth understanding* involves making and explaining links between structure, functional groups and the chemical properties of selected organic compounds. This requires explanations that use chemistry vocabulary, symbols and conventions.

*Demonstrate comprehensive understanding* involves elaborating, justifying, relating, evaluating, comparing and contrasting, or using links between the structure, functional groups and the chemical properties of selected organic compounds. This requires the consistent use of chemistry vocabulary, symbols and conventions.

*Selected organic compounds* are limited to: alkanes, alkenes, alkynes, haloalkanes, primary amines, alcohols, and carboxylic acids.

*Properties* are limited to:
- constitutional and geometric (*cis and trans*) isomers
- classification of alcohols and haloalkanes as primary, secondary or tertiary
- solubility, melting and boiling points
- chemical reactions.

4 Chemical reactions are limited to:
- addition reactions of alkenes with $H_2$/Pt, $Cl_2$, $Br_2$, $H_2O/H^+$ (conc. $H_2SO_4/H_2O$) and hydrogen halides (including identification of major and minor products on addition to asymmetric alkenes), polymerisation
- substitution reactions of:
  - alkanes with halogens (limited to monosubstitution)
  - alcohols with hydrogen halides, $PCl_3$, $PCl_5$, $SOCl_2$
  - haloalkanes with ammonia and aqueous potassium hydroxide
- oxidation of:
  - primary alcohols to form carboxylic acids with $MnO_4^-/H^+$ or $Cr_2O_7^{2-}/H^+$
  - alkenes with $MnO_4^-$
- elimination of (including identification of major and minor products for asymmetric reactants):
  - water from alcohols
  - hydrogen halides from haloalkanes
- acid–base reactions of carboxylic acids and amines.

5 Assessment Specifications for this achievement standard can be accessed through the Chemistry Resources page found at http://www.nzqa.govt.nz/qualifications-standards/qualifications/ncea/ncea-subject-resources/.

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**Replacement Information**
This achievement standard replaced AS90309.

## 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