Achievement Standard

Subject Reference	Chemistry 2.1				
Title	Carry out quantitative analysis				
Level	2	**Credits**	4	**Assessment**	Internal
Subfield	Science				
Domain	Chemistry				
Status	Registered	**Status date**	17 November 2011		
Planned review date	31 December 2019	**Date version published**	20 November 2014		

This standard involves carrying out quantitative analysis.

Achievement Criteria

Achievement	Achievement with Merit	Achievement with Excellence
• Carry out quantitative analysis.	• Carry out in-depth quantitative analysis.	• Carry out comprehensive quantitative analysis.

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 *Quantitative analysis* involves collecting primary data from an acid-base titration, and processing both primary and secondary data to solve quantitative problems.
- The standard solution to be used in the titration may be provided. The titration procedure and balanced equations will be provided.
- Student selected data will be used in determining the accuracy of the titration.

Carry out quantitative analysis involves:

- collecting titration data that contains at least three titre values that fall within a range of 0.4 mL; the average titre value must be within 0.8 mL of the expected outcome
- solving quantitative problems that use the relationships $n=m/M$ and $c=n/V$ to calculate one variable given the other two (the relationships are not given). Molar masses for substances may be provided. Calculations must be carried out using appropriate procedures (not provided).

Carry out in-depth quantitative analysis involves:

- collecting titration data that contains at least three titre values that fall within a range of 0.4 mL; the average titre value must be within 0.5 mL of the expected outcome
- solving quantitative problems that involve at least two steps and require application of relationships such as $n=m/M$ and $c=n/V$. Titration calculations must be carried out correctly using only concordant titre values.

Carry out comprehensive quantitative analysis involves:

- collecting titration data that contains at least three titre values that fall within a range of 0.2 mL; the average titre value must be within 0.2 mL of the expected outcome
- solving quantitative problems that involve more than two steps, and the use of stoichiometric principles. Answers to calculations must demonstrate correct units and appropriate use of significant figures.

4 Conditions of Assessment related to this achievement standard can be found at http://ncea.tki.org.nz/Resources-for-Internally-Assessed-Achievement-Standards.

Replacement Information

This achievement standard replaced AS90306, AS90763 and unit standard 8940.

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