FIELD SCIENCES

Review of *Chemistry* Level 3 achievement standards

Subfield	**Science**	
Domain	**Id**	**Subject reference**
Chemistry	90694-90700	Chemistry 3.1-3.7

The Ministry of Education and the Secondary Education Group Assessment business unit of NZQA have completed a review of the achievement standards listed above that were registered in December 2003.

New Registration date **November 2005**

Date new versions published **November 2005**

Planned review date **March 2008**

Summary of review and consultation process

This review is part of the planned cycle of review that takes place after the first year of use of the achievement standards.

- Initial feedback and comments were collated from teachers/schools, moderators, examiners, markers, material developers, and other stakeholders.
- This information was reviewed by a subject expert panel and recommendations were made in March 2005.
- The recommendations were sent out for full consultation to secondary schools, tertiary institutions, and others in the education sector, in April/May 2005.
- Feedback from this full consultation has informed the changes described below.

Main changes resulting from the review

AS90694, Chemistry 3.1

Title
This has been changed to ' …involving quantitative analysis' as a better way of expressing the requirements of the achievement standard. The phrase 'variations into the amount of a substance' in the previous title did not clearly identify what the achievement standard entailed.

Achievement Criteria
The achievement criteria have been collapsed into one criterion for each grade of achievement to allow a more holistic judgement to be made and to reflect changes in equivalent Science achievement standards. The difference between the grades of achievement now relates to the quality of design and analysis.

Explanatory Notes
These have been amended to be in keeping with the achievement criterion. The information has been reorganised and new information added.

AS90695, Chemistry 3.2

Changes have been made for consistency with the equivalent achievement standard at Level 2, which is AS90306, Chemistry 2.2.

Title
This has been changed to 'Determine the concentration of an oxidant or reductant by titration' to reflect the requirements for achievement. Determining the composition is required for the achievement with merit and achievement with excellence grades.

Explanatory Notes
- Explanatory Note 4 has been amended to clarify that only one conversion is required.
- Explanatory Note 5 requirements have been amended to be appropriate in relation to AS90306, Chemistry 2.2. The requirements have been tightened because students are required to have greater expertise at Level 3 than at Level 2.
- Achievement: limited precision requires accuracy within 0.6mL of the expected answer and concordancy (2 titres in range 0.6mL).
- Achievement with merit: reasonable precision requires accuracy within 0.4 mL of the expected answer and concordancy (3 titres in range 0.4mL).
- Achievement with excellence: high precision requires both accuracy (within 0.2mL of the expected answer) and concordancy (3 titres in range 0.2mL).

AS90696, Chemistry 3.3

Achievement Criteria
Minor changes have been made to the criteria for achievement and achievement with merit. 'Identify' has been removed, as this is inherent in the 'describe' aspect of the criterion. The achievement criterion for achievement with merit has been changed from 'use' to 'explain and apply' to be in line with other subfield Science achievement standards at Level 3. The achievement criterion for achievement with excellence has been changed from 'analyse and interpret' to 'discuss'.

Explanatory Notes
- Explanatory Note 3 has been added to clarify the calculations that could be required for assessment against this achievement standard.
- In Explanatory Note 4 for oxidants, the conditions for MnO_4^- have been clarified and for reductants, 'metals' has replaced Zn, Mg, Fe, and Cu to be consistent with AS90311, Chemistry 2.7.
- In Explanatory Note 5, definitions of terms have been added for clarification.

AS90697, Chemistry 3.4

AS90697, Chemistry 3.4, and AS90699, Chemistry 3.6 have been designated review category C and have been replaced by AS90780, Chemistry 3.4. Please see **AS90780, Chemistry 3.4** below.

AS90698, Chemistry 3.5

Title
The title has been changed to 'Describe aspects of organic chemistry' with the details about the structure, physical properties, reactions and the selected functional groups provided in the explanatory notes.

Achievement Criteria
These have been changed to reflect the changed title. Also the achievement criterion for achievement with merit has been changed from 'apply' to 'explain and apply', and the achievement criterion for achievement with excellence has been changed from 'analyse' to 'discuss'.

Credits
The credits have been increased from four credits to five to better reflect the learning time required.

Explanatory Notes
- These have been amended and reorganised to clarify the achievement standard.
- Explanatory Note 2 lists the aspects of organic chemistry that are required.
- Explanatory Note 3 lists the specific functional groups.
- Explanatory Note 5 lists the properties required.
- Explanatory Note 6 relates to the reactions. The list of oxidising agents has been clarified. Formatting has been changed to connect reagents to types of reaction.
- Explanatory Note 7 has been added to define terms.

AS90699, Chemistry 3.6

AS90697, Chemistry 3.4, and AS90699, Chemistry 3.6 have been designated review category C and have been replaced by AS90780, Chemistry 3.4. Please see **AS90780, Chemistry 3.4** below.

AS90700, Chemistry 3.7

Title
The title has been changed to 'Describe properties of aqueous systems' to reflect the emphasis of the achievement standard. Aspects in relation to principles of equilibrium are included within the explanatory notes.

Achievement Criteria
The wording has been changed to reflect the changed title and the terms 'describe', 'explain', and 'apply and discuss' have been used to differentiate between the grades of achievement.

Explanatory Notes
- These have been reorganised to reflect the changes made to the achievement criteria.
- Explanatory Notes 3, 4 and 5 expand on the properties and evidence required.

Explanatory Note 6 has been added to define terms.

New AS90780, Chemistry 3.4

This achievement standard has replaced AS90697, Chemistry 3.4 and AS90699, Chemistry 3.6. The replacement is to address consultation feedback that students being assessed against five externally assessed achievement standards were under tight time constraints in the examination. Nuclear transformations have not been included in the replacement achievement standard.

Achievement standards 90697 and 90699, categorised as category C, expire at the end of December 2005.

Impact on Accreditation and Moderation Action Plan (AMAP)

None.

Impact on existing qualifications

None.

Impact of changes on NCEA Exclusions List

The exclusion between 90699 and 8948 has been removed from the List.

Summary of main changes to achievement standards' Ids, classification, titles, levels, and credits

The following summary shows the changes made to the achievement standards as a result of the review. All changes are in **bold**.

Key to review category

B Changes made, but the overall outcome remains the same - the new version of the standard carries the same Id and a new version number

C Major changes that necessitate the registration of a replacement achievement standard with a new Id

D Achievement standard will expire and not be replaced

Subfield Science
Domain Chemistry

Id	Title	Level	Credit	Review Category
90694	Carry out an extended practical investigation into variations in the amount of a substance **Carry out an extended practical investigation involving quantitative analysis**	3	4	B
90695	Determine the composition of an oxidant or reductant by titration **Determine the concentration of an oxidant or reductant by titration**	3	2	B
90696	Describe oxidation-reduction processes	3	3	B
90697 and 90699 **90780**	Describe selected atomic, molecular and ionic properties Describe and use thermochemical principles **Describe properties of particles and thermochemical principles**	3 3 **3**	3 3 **5**	C C
90698	Describe the structure and reactions of organic compounds containing selected organic groups **Describe aspects of organic chemistry**	3	4 **5**	B
90700	Describe aqueous systems using equilibrium principles **Describe properties of aqueous systems**	3	5	B