FIELD ENGINEERING AND TECHNOLOGY

Review of *Technology* Level 3 achievement standards

Subfield Technology

Domain	Id	Subject reference
Technology – General Education	90613-90628, 90676, 90677	Technology 3.1–3.6
	90678, 90679	Biotechnology 3.6–3.7
	90680, 90681	Electronics and Control Technology 3.6–3.7
	90682, 90683	Food Technology 3.6–3.7
	90684, 90685	Information and Communication Technology 3.6–3.7
	90686, 90687	Materials Technology 3.6–3.7
	90688	Structures and Mechanisms Technology 3.6

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 October 2003.

New Registration date **January 2006**

Date new versions published **January 2006**

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

General

Credit Values

The credit values of this set of achievement standards have been adjusted so that they better reflect the notional time that a student would need to cover the requirements for each achievement standard. This has meant that the credit values of Technology 3.1 and 3.2 have increased from 6 to 8, and the values of Technology 3.4, 3.5, and all Technology 3.6 and 3.7 achievement standards have increased from 3 to 4. The subject expert panel have advised that the intention is that a school/student would choose which of the achievement standards would best fit with the technology programme offered in the school. A student would not have time to develop evidence for the whole suite of achievement standards in a year's programme. Also, it is not expected that a student would attempt both Technology 3.1 and 3.2 in a one-year programme because of the significant time demands involved in these two achievement standards.

Generic vs Specific Nature of the Achievement Standards

There was support from the national consultation for a move towards generic achievement standards and this is in the same direction as indicated by the early draft of the reviewed essence statement of the curriculum. There were also concerns expressed about the potential for 'double dipping' by having both the generic versions of Technology 3.1 and 3.2 and the context specific versions of the same achievement standards. Therefore, the context specific achievement standards for Technology 3.1 (AS90614–90619) have been designated as expiring, as a first move towards the more generic approach. However, it has been decided to retain the context specific versions of Technology 3.6 and 3.7 as it was considered too early to move these to a more generic approach. The generic version of Technology 3.6 (AS90628) has been designated as expiring to remove the possibility of 'double dipping'.

Other Changes

AS90613, Technology 3.1

Title

There has been a minor change in the title with the deletion of 'in technology'.

Achievement Criteria

The first criterion has been amended. 'Developing' replaces 'formulating' to ensure consistent terminology within the achievement standard.

The second criterion has been amended. 'Planning tools' has been replaced by 'project management tools' to provide a clearer progression from Level 2. Project management tools are broader than planning tools.

The third criterion has been changed to clarify the key relationship between the conceptual design and the brief.

The fourth criterion has been clarified to better reflect the purpose of the achievement standard, by emphasising that the conceptual design is potentially fit for purpose.

Explanatory Notes
There has been a significant change in the requirements relating to brief development. These have now been more clearly described in a new explanatory note (EN) 4 that helps to define the progression from Level 2 in this area of development of conceptual design.

A new EN 5 has been added to clarify the requirements of the conceptual design being fit for purpose.

A new EN 7 has been added to clarify project management tools.

EN 9 has been extended to better clarify 'modelling'.

The original EN 14 has been deleted as the reference to 'Concerns of wider-community …' was potentially confusing and the notion is captured in the brief development. It has been clarified that this aspect was to be addressed throughout the practice.

AS90620, Technology 3.2

Title
There has been a minor change in the title with the deletion of 'in technology'.

Achievement Criteria
The first criterion has been amended. 'Developing' replaces 'formulating' to ensure consistent terminology within the achievement standard.

The second criterion has been amended. 'Planning tools' has been replaced by 'project management tools' to provide a clearer progression from Level 2. Project management tools are broader than planning tools.

The third criterion has been changed to clarify the key relationship between the one-off solution and the brief.

The fourth criterion has been amended to include the requirement of implementing and evaluating the one-off solution. Reference to wider community stakeholders has been removed from achievement with merit as this was considered to be too demanding.

Explanatory Notes
There has been a significant change in the requirements relating to brief development. These have now been more clearly described in a new EN 4 that helps to define the progression from Level 2 in this area of development of conceptual design.

A new EN 5 has been added to clarify the requirements of 'fit for purpose'.

A new EN 7 has been added to clarify project management tools.

The original EN 11 has been deleted as the reference to 'Concerns of wider-community …' was potentially confusing and the notion is captured in the brief development. It has been clarified that this aspect was to be addressed throughout the practice.

AS90627, Technology 3.3

Due to the nature of changes, AS90627 has been designated ‘C’ category, and has been replaced by AS90792.

Achievement Criteria

It was agreed that there was no significant progression between Level 2 and Level 3. The achievement standard brings in the notion of a design brief for ongoing production. This is a step up from Level 2 and is consequently a different type of practice.

In the first criterion, the reference to ‘design’ in the first sentence has been removed as it is not necessary as the design aspect is covered in the second sentence. The progression in the grades has been clarified by the addition of ‘explain’ for achievement with merit and ‘justify’ for achievement with excellence, in relation to necessary design adaptations.

A new second criterion, relating to key factors and their implications, has been introduced to clarify the progression from Level 2.

The progression in the grades has been clarified in the third criterion by the use of ‘explain’ for achievement with merit and ‘justify’ for achievement with excellence in relation to the mode of production.

The original third criterion has also been split into two criteria to clarify requirements.

The original fourth criterion has been deleted as the requirements have been covered in the other criteria.

Explanatory Notes

A new EN 4 clarifies the development of a brief that describes a suitable mode of production, and a new EN 5 gives some examples of modes of production.

AS90676, Technology 3.4

Title

‘Describe’ has replaced ‘discuss’ in the title so that it better summarises the requirements to achieve the standard. The title has also been amended to clarify that it refers to a ‘technologists’ practice’.

Achievement Criteria

A clearer progression in the criteria has been established through the use of ‘describe’, ‘explain’ and ‘discuss’ for achievement, achievement with merit and achievement with excellence respectively.

The option in the criterion for achievement with merit has been removed and now uses wording that clarifies that the emphasis is on the impact on the technologist’s practice. Reference to informing ‘own practice’ has been removed from the criterion as this is not the focus in this achievement standard.

Explanatory Notes
A new EN 3 defines 'technologist' and makes it clear that this cannot refer to a student. This note also clearly indicates that 'technologists' means two or more technologists are required.

The new EN 4 updates the references to Acts and regulations.

A new EN 6 defines the terms 'explain' and 'discuss'.

AS90677, Technology 3.5

Title
The title has been changed to indicate that a multi-unit production process is intended.

Achievement Criteria
The single achievement criterion has been split into two to emphasise the two key aspects of the achievement standard.

The progression in grades has been clarified by the expectations of 'analyse' and 'describe' for achievement, 'analyse' and 'explain' for achievement with merit, and 'analyse' and 'discuss' for achievement with excellence.

Within the criteria the word 'existing' has been inserted before 'multi-unit production process' to clarify the intent.

Reference to 'viability' has been replaced by 'sustainability' within the achievement with excellence criteria. Sustainability of production processes is considered to be more relevant in this context.

Explanatory Notes
EN 5 clarifies the requirements for sustainability.

EN 8 defines 'explain' and 'discuss'.

AS90678, AS90680, AS90682, AS90684, AS90686, AS90688 - Technology 3.6

Titles
The titles have been amended to align with the requirements for achievement.

Achievement Criteria
The word 'existing' has been added to all criteria for clarification. The words 'two or more' have been added to the achievement with excellence criterion.

The option, within achievement with merit, has been removed and the wording has been amended to indicate the focus is on explaining knowledge and how it has been synthesised in the development of a technological outcome.

The achievement with excellence criterion has been amended to clarify the requirement of the development of two or more outcomes.

Explanatory Notes
A new EN 3 has been added to define an 'existing' outcome.

EN 4 has been expanded to indicate what is intended by knowledge.

EN 5 has been added to define 'explain', 'discuss' and 'synthesise'.

An expansion of what is required for a specific area outcome and some examples will be included in the Assessment Specifications published by NZQA.

AS90679, AS90681, AS90683, AS90685, AS90687 - Technology 3.7

Titles
The titles have been changed by replacing 'advanced skills' with 'techniques' to provide a progression from Level 2.

Achievement Criteria
The wording in the achievement with merit and achievement with excellence criteria has been changed to better indicate the step up between these levels of performance.

The option, within achievement with merit, has been removed and the wording has been amended to indicate that the focus is on demonstrating complex techniques within technology.

Explanatory Notes
The original ENs 3 and 4 have been combined into a single new EN 3 that lists possible techniques.

A new EN 4 clarifies techniques and complex techniques, and a new EN 5 defines a 'high quality' outcome.

A new EN 7 has been added to clarify the legal, ethical and moral responsibilities.

External achievement standards categorised as category D expire at the end of December 2005.

Internal achievement standards categorised as category C or D expire at the end of December 2006.

Impact on Accreditation and Moderation Action Plan (AMAP)

AMAP 0226 has been updated to reflect the changes resulting from this review.

Impact of changes on NCEA Exclusions List

The exclusions list will be updated to reflect the 'D' category status of a number of achievement standards that form part of the exclusions list for Technology.

The exclusion between 3.3 AS90627 (4 credits) and unit standard 14737 (6 credits) is no longer required as the emphasis is different and students for the unit standard are required to test, evaluate and modify the model. While these may be implicit in AS90627, they are not explicit and the emphasis is on 'estimating benefits and costs'.

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

A Dates changed, but no other changes are made - the new version of the standard carries the same Id and a new version number

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 Technology
Domain Technology – General Education

Id	Title	Level	Credit	Review Category
90613	Develop a conceptual design to address a client issue in technology **Develop a conceptual design to address a client issue**	3	6 **8**	B
90614	Develop a conceptual design to address a client issue in biotechnology	3	6	D
90615	Develop a conceptual design to address a client issue in electronics and control technology	3	6	D
90616	Develop a conceptual design to address a client issue in food technology	3	6	D
90617	Develop a conceptual design to address a client issue in information and communications technology	3	6	D
90618	Develop a conceptual design to address a client issue in materials technology	3	6	D
90619	Develop a conceptual design to address a client issue in structures and mechanisms	3	6	D
90620	Develop a one-off solution to address a client issue in technology **Develop a one-off solution to address a client issue**	3	6 **8**	B
90621	Develop a one-off solution to address a client issue in biotechnology	3	6	D
90622	Develop a one-off solution to address a client issue in electronics and control technology	3	6	D
90623	Develop a one-off solution to address a client issue in food technology	3	6	D
90624	Develop a one-off solution to address a client issue in information and communications technology	3	6	D

Id	Title	Level	Credit	Review Category
90625	Develop a one-off solution to address a client issue in materials technology	3	6	D
90626	Develop a one-off solution to address a client issue in structures and mechanisms	3	6	D
90627 **90792**	Develop a proposal for a production process for a client **Develop a proposal for a production process for a client**	3 **3**	6 **6**	C
90628	Demonstrate understanding of technological knowledge in technology	3	3	D
90676	Discuss how social responsibilities to the wider community impact on technologists' practice **Describe technologists' responsibilities to the wider community**	3	3 **4**	B
90677	Analyse existing production processes and discuss in terms of stakeholder influence and impact **Analyse an existing multi-unit production process**	3	3 **4**	B
90678	Demonstrate understanding of technological knowledge in biotechnology **Explain knowledge that underpins a biotechnology outcome**	3	3 **4**	B
90679	Demonstrate advanced skills in biotechnology **Demonstrate techniques in biotechnology**	3	3 **4**	B
90680	Demonstrate understanding of technological knowledge in electronic and control technology **Explain knowledge that underpins an electronic and control technology outcome**	3	3 **4**	B
90681	Demonstrate advanced skills in electronics and control technology **Demonstrate techniques in electronics and control technology**	3	3 **4**	B
90682	Demonstrate understanding of technological knowledge in food technology **Explain knowledge that underpins a food technology outcome**	3	3 **4**	B
90683	Demonstrate advanced skills in food technology **Demonstrate techniques in food technology**	3	3 **4**	B
90684	Demonstrate understanding of technological knowledge in information and communication technology **Explain knowledge that underpins an information and communication technology outcome**	3	3 **4**	B
90685	Demonstrate advanced skills in information and communication technology **Demonstrate techniques in information and communication technology**	3	3 **4**	B

Id	Title	Level	Credit	Review Category
90686	Demonstrate understanding of technological knowledge in materials technology **Explain knowledge that underpins a materials technology outcome**	3	3 **4**	B
90687	Demonstrate advanced skills in materials technology **Demonstrate techniques in materials technology**	3	3 **4**	B
90688	Demonstrate understanding of technological knowledge in structures and/or mechanisms **Explain knowledge that underpins a structures and/or mechanisms technology outcome**	3	3 **4**	B