**Fields** **Business, Engineering and Technology, and Sciences**

**Review of *Design - Computer Graphics, Design - Graphic Communication, Generic Design, Materials Technology, Process Technology, Systems Technology, Technology - General Education, Home and Life Sciences - Textile Technology,* and *Text and Information Management - Generic* Level 1 achievement and unit standards**

**Unit standards**

| Subfield | Domain | ID |
|---|---|---|
| Design | Design - Computer Graphics | 7479, 7480 |
| | Design - Graphic Communication | 7499-7506 |
| | Generic Design | 7485-7488 |
| Technology | Materials Technology | 7522-7524 |
| | Process Technology | 7535, 7536 |
| | Systems Technology | 7545-7548, 7550 |
| | Technology - General Education | 13389, 13392, 13397, 13400, 13403, 13406, 13409, 13411, 14375 |
| Home and Life Sciences | Home and Life Sciences - Textile Technology | 6678-6684, 16834 |

**Achievement standards**

| Subfield | Domain | ID | Subject reference |
|---|---|---|---|
| Business Administration | Text and Information Management - Generic | 90030-90036 | Information Management 1.1-1.7 |
| Design | Design - Graphic Communication | 90037-90042, 90044 | Graphics 1.1-1.6, 1.8 |
| Technology | Technology - General Education | 90045-90051 | Technology 1.1-1.7 |

The Ministry of Education and NZQA National Qualifications Services have completed a review of the achievement and unit standards listed above.

**New Registration date** **January 2011**

**Date new versions published** **January 2011**

**Planned review date** **December 2014**

**Summary of review and consultation process**

In 2008 the Ministry of Education (MoE) and NZQA began to review achievement and unit standards in light of the revised New Zealand Curriculum (NZC). This Alignment of Standards (AoS) review also addressed duplication of outcomes, credit parity, fairness, consistency, and coherence. The AoS review was guided by the revised NZC itself and the Standards Review Guidelines. A copy of the NZC is available at http://nzcurriculum.tki.org.nz/Curriculum-documents/The-New-Zealand-Curriculum.

Teacher subject associations were involved in the review, and draft achievement standards were the focus of wide consultation, especially with secondary schools and teachers. Extensive resources, including student exemplars, were also developed to support these standards, and are available on the MoE and/or the NZQA websites.

The review of unit standards included consultation with tertiary providers to assess continued relevance and likely future use of the standards. Unit standards that duplicate achievement standard outcomes and those without the likelihood of future tertiary use were recommended for expiry.

National consultation was undertaken in 2009, with the results analysed by Research New Zealand. The responses were generally positive.

The review of unit and achievement standards at Level 1 was completed in time for implementation in schools in 2011. Standards at Levels 2 and 3 will be implemented in 2012 and 2013 respectively.

**Main changes resulting from the review**

- All NZC Level 6 (NZQF Level 1) outcomes derived from the NZC are now assessed using achievement standards, and there are no longer any unit standards linked to the NZC.
- Existing achievement standards were reviewed and new achievement standards were developed to align with the NZC. See table below.
- Grading criteria for achievement standards were reviewed in accordance with the Standards Review Guidelines.
- Unit standards that recognised similar outcomes as achievement standards were recommended for expiry. See table below.

For a detailed description of the review of, and the changes to, the *Technology* standards see appendix 1 at the end of this report.

## Impact on existing provider accreditations

| Current Accreditation for | | | Accreditation extended to | | |
|---|---|---|---|---|---|
| **Nature of accreditation** | **Classification or ID** | **Level** | **Nature of accreditation** | **Classification or ID** | **Level** |
| Field | Business | Any | Domain | Digital Technologies | 1 |
| Field | Sciences | Any | Standard | 91058, 91060, 91096 | 1 |
| Subfield | Business Administration | Any | Domain | Digital Technologies | 1 |
| Subfield | Design | Any | Domain | Design and Visual Communication | 1 |
| Subfield | Home and Life Sciences | Any | Standard | 91058, 91060, 91096 | 1 |
| Domain | Design - Computer Graphics | Any | Domain | Design and Visual Communication | 1 |
| Domain | Design - Graphic Communication | Any | Domain | Design and Visual Communication | 1 |
| Domain | Generic Design | Any | Domain | Design and Visual Communication | 1 |
| Domain | Home and Life Sciences - Textile Technology | Any | Standard | 91058, 91060, 91096 | 1 |
| Domain | Materials Technology | Any | Domain | Construction and Mechanical Technologies | 1 |
| Domain | Systems Technology | Any | Domain | Construction and Mechanical Technologies | 1 |
| Domain | Technology - General Education | Any | Domain | Generic Technology | 1 |
| Domain | Technology - General Education | Any | Standards | 91082-91084 | 1 |
| Domain | Text and Information Management - Generic | Any | Domain | Digital Technologies | 1 |
| Standard | 7546 | 1 | Standard | 91061 | 1 |
| Standard | 7547 | 1 | | | |
| Standard | 7485 | 1 | Standard | 91046 | 1 |
| Standard | 7487 | 1 | | | |
| Standard | 7486 | 1 | Standard | 91068 | 1 |
| Standard | 7499 | 1 | Standard | 91063 | 1 |
| Standard | 7503 | 1 | Standard | 91065 | 1 |

## Impact on Accreditation and Moderation Action Plan (AMAP)

All new achievement standards have been registered on AMAP 0233.

## Impact on existing qualifications

Qualifications that contain the reviewed standards or classifications are tabled below.

| Key to type of impact | |
|---|---|
| **Affected** | The qualification lists a reviewed classification (domain or subfield) in an elective set<br>The qualification lists a standard that has changes to level or credits<br>The qualification lists a C or D category standard |
| **Not materially affected** | The qualification lists a standard that has a new title<br>The qualification lists a standard that has a new classification |

The following table identifies qualifications developed by other SSBs that are affected by the outcome of this review. The SSBs have been advised that the qualifications require revision.

| Ref | Qualification Title | Classification or ID | SSB Name |
|---|---|---|---|
| 1367 | National Certificate in Building, Construction, and Allied Trades Skills (Level 1) | 7480, 7485, 7487, 7499, 7502, 7522, 7535, 7536, 90037, 90039, 90045 | Building and Construction Industry Training Organisation |
| 0240 | National Certificate in Electronics Technology (Level 2) | Technology - General Education | ElectroTechnology Industry Training Organisation |
| 1502 | National Certificate in Furniture (Level 2) with strands in Introductory Furniture Finishing Skills, Introductory Furniture Making Skills, and Introductory Upholstery Skills | 7480 | Forest Industries Training and Education Council (FITEC) |
| 0640 | National Certificate in Design (Draughting) (Level 2) | 7485, 7488 | InfraTrain New Zealand |
| 1473 | National Certificate in Design (Kitchen Design) (Level 2) | 7485 | Joinery Industry Training Organisation |
| 1484 | National Certificate in Joinery with strands in Kitchen Manufacturing, and Kitchen Installation | 7502 | |
| 1414 | National Certificate in Motor Industry (Automotive Body) (Level 4) with strands in Coachbuilding, Collision Repair, and Refinishing | 7485, 7486 | NZ Motor Industry Training Organisation (Incorporated) |

## Impact of changes on NCEA Exclusions List

For transition purposes, the following exclusions will apply for new achievement standards. This transition will apply until December 2011 only.

| New achievement standard | Excluded against each of these standards |
|---|---|
| 91044 | 90046 |
| 91045 | 13389, 90045 |
| 91046 | 13400 |
| 91047 | 13389, 13403,13406, 14375 |
| 91048 [External assessment] | 13389, 90050 |
| 91049 [External assessment] | 13389, 90050 |

| New achievement standard | Excluded against each of these standards |
|---|---|
| 91056 | 90048 |
| 91057 | 7523, 7524 |
| 91058 | 6678, 6679, 6680 |
| 91059 | 7524 |
| 91060 | 6680, 7545, 7548, 7550 |
| 91061 | 7545, 7546, 7547, 7548, 7550 |
| 91065 [External assessment] | 7503 |
| 91069 | 90042 |
| 91070 [External assessment] | 90031, 90032, 2781 |
| 91071 | 90031, 90033 |
| 91072 | 90033 |
| 91073 | 90033 |
| 91082 | 13392, 13397 |
| 91083 | 13392, 13397 |
| 91084 | 13392, 13397 |
| 91096 | 16834 |

For transition purposes where there is impact on qualifications, the following exclusions will apply for new achievement standards. This transition will apply until December 2012 only, when the unit standards will expire.

| New achievement standard | Existing unit standard |
|---|---|
| 91046 | 7485, 7487 |
| 91057 | 7522 |
| 91059 | 7522 |
| 91063 | 7499 |
| 91064 [External assessment] | 7502 |
| 91068 | 7486, 7488 |

**Review Categories and changes to classification, title, level, and credits**

The following summary shows the changes made to the standards as a result of the review. All changes are in **bold**. Where a new or a new version of an externally assessed achievement standard is registered, the following designation appears after the title [Externally Assessed].

Some standards are part of more than one replacement relationship and therefore appear in the table(s) more than once. This is indicated through the use of the *.

| **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 standard with a new ID |
| **D** | Standard will expire and not be replaced |

| | |
|---|---|
| **Externally assessed achievement standards categorised as category C or D expire at the end of** | **December 2010** |

| **Internally assessed achievement standards categorised as category C or D expire at the end of** | **December 2011** |
|---|---|

| **Unit standards categorised as category C or D expire at the end of** | **December 2012** |
|---|---|

Business > Business Administration > Text and Information Management - Generic
**Engineering and Technology > Technology > Digital Technologies**

Subject Reference Information Management
**Subject Reference Digital Technologies**

| ID | Ref | Title | Level | Credit | Review Category |
|---|---|---|---|---|---|
| 90030 | 1.1 | Enter text from provided material and by direct entry composition | 1 | 2 | D |
| 90031 | 1.2 | Use standard operating and file management procedures | 1 | 2 | C |
| **91070*** | **1.40** | **Demonstrate understanding of basic concepts of information management** | **1** | **3** | |
| **91071*** | **1.41** | **Implement basic procedures to produce a specified digital information outcome** | **1** | **4** | |
| 90032 | 1.3 | Access and process information from different sources | 1 | 4 | C |
| **91070*** | **1.40** | **Demonstrate understanding of basic concepts of information management** | **1** | **3** | |
| 90033 | 1.4 | Apply a decision-making model to produce a solution from a given brief | 1 | 4 | C |
| **91071*** | **1.41** | **Implement basic procedures to produce a specified digital information outcome** | **1** | **4** | |
| **91072** | **1.42** | **Demonstrate understanding of basic concepts of digital media** | **1** | **3** | |
| **91073** | **1.43** | **Implement basic procedures to produce a specified digital media outcome** | **1** | **4** | |
| 90034 | 1.5 | Communicate information from provided materials and by direct composition | 1 | 4 | D |
| 90035 | 1.6 | Manage information using a spreadsheet and a text application | 1 | 4 | D |
| 90036 | 1.7 | Apply design principles to produce documents | 1 | 4 | D |
| **91074** | **1.44** | **Demonstrate understanding of basic concepts from computer science** | **1** | **3** | **New** |
| **91075** | **1.45** | **Construct an algorithmic structure for a basic task** | **1** | **3** | **New** |
| **91076** | **1.46** | **Construct a basic computer program for a specified task** | **1** | **3** | **New** |
| **91077** | **1.47** | **Demonstrate understanding of basic concepts used in the design and construction of electronic environments** | **1** | **3** | **New** |
| **91078** | **1.48** | **Implement basic interfacing procedures in a specified electronic environment** | **1** | **3** | **New** |
| **91079** | **1.49** | **Implement basic techniques in constructing a specified electronic and embedded system** | **1** | **3** | **New** |
| **91080** | **1.50** | **Demonstrate understanding of the common components of basic digital infrastructures** | **1** | **3** | **New** |
| **91081** | **1.51** | **Implement basic procedures for servicing a personal computer system** | **1** | **4** | **New** |

Engineering and Technology > Design
**Engineering and Technology > Technology**

Subject Reference Graphics
**Subject Reference Design and Visual Communication**

| ID | Ref | Domain | Title | Level | Credit | Review Category |
|---|---|---|---|---|---|---|
| 7479 | - | Design - Computer Graphics | Create page layout with text and illustration using computer graphics | 1 | 3 | D |
| 7480 | - | Design - Computer Graphics | Produce 2D drawings using a computer drawing program | 1 | 3 | D |
| 7486 | - | Generic Design | Create and explore visual design elements | 1 | 3 | C |
| 7488 | - | Generic Design | Present design material | 1 | 3 | C |
| **91068** | **1.35** | **Design and Visual Communication** | **Undertake development of design ideas through graphics practice** | **1** | **6** | |
| 7499 | - | Design - Graphic Communication | Use freehand sketching for graphic communication | 1 | 4 | C |
| **91063** | **1.30** | **Design and Visual Communication** | **Produce freehand sketches that communicate design ideas** | **1** | **3** | |
| 7500 | - | Design - Graphic Communication | Produce a datagraphic | 1 | 4 | D |
| 7501 | - | Design - Graphic Communication | Apply plane geometry and produce development constructions in graphic communication | 1 | 4 | D |
| 7502 | - | Design - Graphic Communication | Produce an instrumental orthographic drawing | 1 | 4 | C |
| **91064** | **1.31** | **Design and Visual Communication** | **Produce instrumental, multi-view orthographic drawings that communicate technical features of design ideas** | **1** | **3** | |
| 7503 | - | Design - Graphic Communication | Produce isometric, oblique, and planometric drawings for graphic communication | 1 | 4 | C |
| **91065** | **1.32** | **Design and Visual Communication** | **Produce instrumental paraline drawings to communicate design ideas** | **1** | **3** | |
| 7504 | - | Design - Graphic Communication | Demonstrate proper use of drawing equipment for graphic communication | 1 | 3 | D |
| 7505 | - | Design - Graphic Communication | Use rendering to enhance design sketches, and for drawing presentation | 1 | 3 | D |
| 7506 | - | Design - Graphic Communication | Use a model to communicate design ideas | 1 | 3 | D |
| 90037 | 1.1 | Design - Graphic Communication | Produce freehand sketches that communicate own design ideas | 1 | 3 | D |

| ID | Ref | Domain | Title | Level | Credit | Review Category |
|---|---|---|---|---|---|---|
| 90039 | 1.3 | Design - Graphic Communication | Produce instrumental, multi-view working drawings to communicate own design ideas | 1 | 3 | D |
| 90040 | 1.4 | Design - Graphic Communication | Produce pictorial drawings using instruments and render these drawings to communicate own design ideas | 1 | 4 | D |
| 90042 | 1.6 | Design - Graphic Communication | Apply a design process and design principles to identified needs and opportunities | 1 | 5 | C |
| **91069** | **1.36** | **Design and Visual Communication** | **Promote an organised body of design work to an audience using visual communication techniques** | **1** | **4** | |
| 90044 | 1.8 | Design - Graphic Communication | Present design ideas that show design features and functions | 1 | 3 | D |
| **91066** | **1.33** | **Design and Visual Communication** | **Use rendering techniques to communicate the form of design ideas** | **1** | **3** | **New** |
| **91067** | **1.34** | **Design and Visual Communication** | **Use the work of an influential designer to inform design ideas** | **1** | **3** | **New** |

Engineering and Technology > Design > Design - Graphic Communication

Subject Reference Graphics

| ID | Ref | Title | Level | Credit | Review Category |
|---|---|---|---|---|---|
| 90038 | 1.2 | Construct and use geometrical shapes and solids to communicate design ideas | 1 | 2 | D |
| 90041 | 1.5 | Produce a mock-up and model | 1 | 4 | D |

Engineering and Technology

Subject Reference Generic Technology

| ID | | Domain | Title | Level | Credit | Review Category |
|---|---|---|---|---|---|---|
| 7485 | - | Design > Generic Design | Interpret a design brief, and select and present information for solutions | 1 | 3 | C |
| 7487 | - | Design > Generic Design | Use the design process to solve design problems | 1 | 3 | C |
| 13400 | - | Technology > Technology - General Education | Employ information or communication technologies to produce a technological solution | 1 | 6 | C |

| ID | | Domain | Title | Level | Credit | Review Category |
|---|---|---|---|---|---|---|
| **91046** | **1.3** | **Technology > Generic Technology** | **Use design ideas to produce a conceptual design for an outcome to address a brief** | **1** | **6** | |

Engineering and Technology > Technology > Materials Technology
**Engineering and Technology > Technology > Construction and Mechanical Technologies**

Subject Reference Construction and Mechanical Technologies

| ID | | Domain | Title | Level | Credit | Review Category |
|---|---|---|---|---|---|---|
| 7522 | - | Materials Technology | Select and use materials to make products or prototypes | 1 | 4 | C |
| 7524 | - | Materials Technology | Use cutting, shaping, assembly, and finishing processes in materials technology | 1 | 4 | C |
| **91057*** | **1.20** | **Construction and Mechanical Technologies** | **Implement basic procedures using resistant materials to make a specified product** | **1** | **6** | |
| **91059** | **1.22** | **Construction and Mechanical Technologies** | **Demonstrate understanding of basic concepts used to make products from resistant materials** | **1** | **4** | |
| 7523 | - | Materials Technology | Use, and care for, standard hand tools in materials technology | 1 | 4 | C |
| **91057*** | **1.20** | **Construction and Mechanical Technologies** | **Implement basic procedures using resistant materials to make a specified product** | **1** | **6** | |

Engineering and Technology > Technology > Processing Technologies

| ID | Title | Level | Credit | Review Category |
|---|---|---|---|---|
| 7535 | Create and carry out a project plan in process technology | 1 | 3 | D |
| 7536 | Develop sequence of operations for one-off construction in process technology | 1 | 3 | D |

Engineering and Technology > Technology > Systems Technology
**Engineering and Technology > Technology > Construction and Mechanical Technologies**

Subject Reference Construction and Mechanical Technologies

| ID | | Title | Level | Credit | Review Category |
|---|---|---|---|---|---|
| 7545 | - | Use levers and linkages to solve mechanical design problems in systems technology | 1 | 3 | C |
| 7548 | - | Use pneumatics to develop a system of control in a product in systems technology | 1 | 4 | C |

| ID | | Title | Level | Credit | Review Category |
|---|---|---|---|---|---|
| 7550 | - | Use hydraulics to develop a system of control in a product | 1 | 5 | C |
| **91060*** | **1.23** | **Demonstrate understanding of basic concepts used to make products from textile materials** | **1** | **4** | |
| **91061*** | **1.24** | **Demonstrate understanding of basic concepts related to structures** | **1** | **3** | |
| 7546 | - | Construct an electronic circuit using kitset componentry in systems technology | 1 | 3 | C |
| 7547 | - | Demonstrate knowledge of the construction of a low voltage electrical circuit in systems technology | 1 | 3 | C |
| **91061*** | **1.24** | **Demonstrate understanding of basic concepts related to structures** | **1** | **3** | |

Engineering and Technology > Technology > Technology – General Education
**Engineering and Technology > Technology > Generic Technology**

Subject Reference Technology
**Subject Reference Generic Technology**

| ID | | Title | Level | Credit | Review Category |
|---|---|---|---|---|---|
| 13389 | - | Develop technological solutions by using knowledge of technological practice | 1 | 10 | C |
| **91045*** | **1.2** | **Use planning tools to guide the technological development of an outcome to address a brief** | **1** | **4** | |
| **91047*** | **1.4** | **Undertake development to make a prototype to address a brief** | **1** | **6** | |
| **91048*** | **1.5** | **Demonstrate understanding of how technological modelling supports decision-making** | **1** | **4** | |
| **91049*** | **1.6** | **Demonstrate understanding of how materials enable technological products to function** | **1** | **4** | |
| 13403 | - | Use materials to produce a prototype of a technological solution | 1 | 6 | C |
| 13406 | - | Design and construct a prototype to solve a mechanism design problem | 1 | 6 | C |
| 14375 | - | Incorporate a control system into a prototype of a technological solution | 1 | 6 | C |
| **91047*** | **1.4** | **Undertake development to make a prototype to address a brief** | **1** | **6** | |
| 13409 | - | Design, model, and test a one-off production process to solve a design problem | 1 | 6 | D |
| 13411 | - | Construct a prototype of a structure capable of bearing a point load | 1 | 6 | D |
| 90045 | 1.1 | Develop an outcome through technological practice to address a given brief | 1 | 6 | C |
| **91045*** | **1.2** | **Use planning tools to guide the technological development of an outcome to address a brief** | **1** | **4** | |

| ID | | Title | Level | Credit | Review Category |
|---|---|---|---|---|---|
| 90046<br>**91044** | 1.2<br>**1.1** | Formulate a brief to address a given issue<br>**Undertake brief development to address a need or opportunity** | 1<br>**1** | 6<br>**4** | C |
| 90047 | 1.3 | Develop an outcome by widening the use of an existing technology | 1 | 6 | D |
| 90048<br>**91056** | 1.4<br>**1.13** | Develop a means for ongoing production of an outcome developed through technological practice<br>**Implement a multi-unit manufacturing process** | 1<br>**1** | 6<br>**4** | C |
| 90049 | 1.5 | Demonstrate understanding of technological knowledge | 1 | 4 | D |
| 90050<br>**91048*** | 1.6<br>**1.5** | Present an outcome developed through technological practice that addresses the requirements of a brief<br>**Demonstrate understanding of how technological modelling supports decision-making** | 1<br>**1** | 4<br>**4** | C |
| **91049*** | **1.6** | **Demonstrate understanding of how materials enable technological products to function** | **1** | **4** | |
| 90051 | 1.7 | Describe the interactions between a technological innovation and society | 1 | 4 | D |
| **91050** | **1.7** | **Demonstrate understanding of the role of subsystems in technological systems** | **1** | **4** | **New** |
| **91051** | **1.8** | **Demonstrate understanding of how different disciplines influence a technological development** | **1** | **4** | **New** |
| **91052** | **1.9** | **Demonstrate understanding of the ways a technological outcome, people, and social and physical environments interact** | **1** | **4** | **New** |
| **91053** | **1.10** | **Demonstrate understanding of design elements** | **1** | **3** | **New** |
| **91054** | **1.11** | **Demonstrate understanding of basic human factors in design** | **1** | **4** | **New** |
| **91055** | **1.12** | **Demonstrate understanding of basic concepts used in manufacturing** | **1** | **4** | **New** |

Engineering and Technology > Technology > Technology – General Education

**Engineering and Technology > Technology > Processing Technologies**

| ID | | Title | Level | Credit | Review Category |
|---|---|---|---|---|---|
| 13392 | - | Employ biological agents to develop a biotechnological product | 1 | 6 | C |
| 13397 | - | Employ food technology practices to produce a technological solution | 1 | 6 | C |
| **91082** | **1.60** | **Implement basic procedures to process a specified product** | **1** | **4** | |
| **91083** | **1.61** | **Demonstrate understanding of basic concepts used in processing** | **1** | **4** | |
| **91084** | **1.62** | **Demonstrate understanding of basic concepts used in preservation and packaging techniques for product storage** | **1** | **4** | |

Sciences > Home and Life Sciences > Home and Life Sciences - Textile Technology
**Engineering and Technology > Technology > Construction and Mechanical Technologies**

Subject Reference Construction and Mechanical Technologies

| ID | Ref | Title | Level | Credit | Review Category |
|---|---|---|---|---|---|
| 6678 | - | Use a commercial pattern | 1 | 3 | C |
| 6679 | - | Choose and adjust patterns | 1 | 3 | C |
| **91058*** | **1.21** | **Implement basic procedures using textile materials to make a specified product** | **1** | **6** | |
| 6680 | - | Prepare, cut, and mark fabric | 1 | 3 | C |
| **91058*** | **1.21** | **Implement basic procedures using textile materials to make a specified product** | **1** | **6** | |
| **91060*** | **1.23** | **Demonstrate understanding of basic concepts used to make products from textile materials** | **1** | **4** | |
| 6681 | - | Demonstrate constructing a simple textile item from chosen woven fabric | 1 | 3 | D |
| 6682 | - | Construct and evaluate an unstructured woven garment | 1 | 5 | D |
| 6683 | - | Construct a garment from knit fabric | 1 | 5 | D |
| 6684 | - | Demonstrate technique of flat pattern making and develop a garment pattern from a basic block | 2 | 5 | D |
| 16834 | - | Make a basic adaptation to a commercial textile pattern | 1 | 3 | C |
| **91096** | **1.26** | **Make basic adaptations to a pattern to enable a design to fit a person or item** | **1** | **4** | |
| **91062** | **1.25** | **Demonstrate understanding of basic concepts related to machines** | **1** | **3** | **New** |

**Appendix 1**

# The Development of Level 1 Technology Achievement Standards

## Process of Aligning Standards with *The New Zealand Curriculum*

The generic technology achievement standards have been derived directly from the achievement objectives in the Technology learning area of *The New Zealand Curriculum* (NZC).

Early consultation on the Technology learning area in the New Zealand Curriculum 2007 showed a need to more clearly articulate specific knowledge and skills at Levels 6, 7 and 8 of the NZC. In response to this, the Ministry of Education has explored the place of specialist knowledge and skills within the Technology learning area for senior secondary technology programmes. This exploration of specific technological knowledge and skills was seen as further unpacking of the achievement objectives in the New Zealand Curriculum 2007 Technology strands, in particular the technological practice and technological knowledge strands. Justification for this work is identified in the Technology learning area introductory statement, where learning in Technology combines technological knowledge and technological capability, and appropriate progression of this learning requires greater specialisation of contexts in senior secondary programmes.

A project focused on identifying and establishing progression in specialist knowledge and skill was begun in early 2009. This project also sought to recognise how specific knowledge and skill development supports generic understandings and practices in technology, and how generic understandings and practices in turn provide a broader perspective and context for the development of specific knowledge and skills. Interim results were consulted on in mid-2009.

The initial national consultation on the draft generic Technology matrix and Level 1 generic Technology standards was carried out by Research NZ in June 2009. Feedback from this consultation, along with feedback from assessment resource writers and moderators, has informed improvements to these standards as outlined in the relevant sections below.

As part of the 2009 consultation it was also signalled that additional knowledge and skill achievement standards would be developed in specialist categories of technology. This decision to develop additional knowledge and skill achievement standards was based on earlier feedback from consultation.

Through further consultation with education, industry, and tertiary experts, revisions were made to develop a Technology Specialist Body of Knowledge (BoK) that covered key aspects of knowledge and skill for technology related learning in senior secondary schooling. The following specialist areas were included in the BoK - Design; Graphics; Preservation, Packaging and Storage; Process; Manufacturing; Structures and Machines; Construction; Electronics; Digital Information; Digital Infrastructure; Digital Media; and Programming and Computer Science. The BoK used in this development can be found at: http://www.techlink.org.nz/curriculum-support/tks/resources/Technological-Context-Knowledge-and-Skills-07-2009.pdf.

The BoK provided the basis for the development of the draft specialist knowledge and skill achievement standards for Technology at Level 1. As consultation continued and standards were worked on, specialist areas in the BoK were coalesced into four broad specialist categories to sit alongside the generic strands of the Technology curriculum. Drafts of these standards were sent out for national consultation in May 2010. Feedback from the 2010 consultation informed the changes made to these standards as outlined in the relevant sections below.

There is a close relationship between the outcomes assessed in the standards with the material developed for the *Teaching and Learning Guide for Technology*. All standards have a reference to this document in the explanatory notes.

## The Level 1 Technology Matrix

The Level 1 Technology matrix provides a framework that shows the relationships between the generic Technology standards and the specialist categories of specific knowledge and skill standards, as developed from the NZC and the BoK.

Teaching and learning programmes, or courses, in Technology can be assessed from anywhere across this matrix.

### Generic Technology Standards in the Matrix

Four standards were added to the generic section of the Technology matrix as provided in the May 2010 consultation package. Two standards, 1.10 and 1.11, focus on broad considerations of Design and two, 1.12 and 1.13, focus on Manufacturing. The two Design standards will likely be used across all technology programmes. It is likely the two Manufacturing standards will be most relevant to technology programmes focusing on learning related to Processing, Construction, and Mechanical and/or Electronics within Digital Technologies.

### Specialist Categories Standards in the Matrix

Considerable discussion about the categorisation of specialist knowledge and skills has taken place over the last three years. During 2009 and 2010 specialist category/domain names for Technology have been debated with stakeholders from across the sector and the wider technology community. The category/domain names in the Technology matrix now reflect the agreed outcomes of these discussions and the May 2010 consultation feedback.

The specialist names in the matrix represent meaningful category/domain labels for a range of purposes. The agreed names are; Construction and Mechanical Technologies, Design and Visual Communication, Digital Technologies, and Processing Technologies. These specialist categories collate related groups of standards to provide guidance to teachers, schools and end user communities about student pathways from technology courses.

It is important to note that specialist categories do not necessarily name technology subjects that schools will offer students. Naming courses is a school-based decision. The matrix represents a framework of related assessment tools (standards) from which schools can select sets that appropriately assess outcomes for courses they offer.

For example:

- A course named ‘Fashion’ could assess different aspects of that programme from Processing Technologies (material development), Construction and Mechanical Technologies (garment making), Design and Visual Communication (developing and communicating design ideas) and Generic Technology (human factors in design, technological practice).
- A course named ‘Graphics and Design’ could assess different aspects of that programme from Design and Visual Communication (graphics practice, drawing), Digital Technologies (digital media), and Generic Technology (design elements, technological modelling).

## Consistency of step ups across the matrix

The following terms have been agreed to in principle as the basis of between level progressions and within standard progressions (AME) in the specialist categories of Construction and Mechanical Technologies, Digital Technologies and Processing Technologies.

- Descriptors that differentiate knowledge and skill at NCEA Levels 1, 2 and 3 are: Level 1 – Basic, Level 2 – Advanced, Level 3 – Complex. Explanatory notes unpack these in detail for each focus area.
- Knowledge related descriptors that differentiate AME are: A – demonstrate understanding, M – demonstrate in-depth understanding, E – demonstrate comprehensive understanding. Explanatory notes unpack these in detail for each focus area.
- Skill related descriptors that differentiate AME are: A – implement procedures, M – skilfully implement procedures, E – efficiently implement procedures. Explanatory notes unpack these in detail for each focus area.

Please note that the Design and Visual Communication standards do not reflect the same consistency as these standards were largely developed prior to the specialist knowledge and skills development.

## The Registered Level 1 Technology Standards

The matrix and achievement standards registered for Technology at Level 1 have therefore all been derived from the achievement objectives in the Technology learning area of the New Zealand Curriculum. There is also a close relationship with Technology Specialist Knowledge and Skills (referred to as the Technology Specialist Body of Knowledge or BoK) and the material developed for the Teaching and Learning Guide for Technology. Feedback from the May 2010 consultation, along with feedback from assessment resources writers and moderators, has informed the changes made to the draft standards. Details of these changes are provided below.

### General Changes

### Addressing Duplication

Careful consideration of the unit standards showed that there was either significant duplication with the achievement standards or the unit standards were rendered redundant by the changes in the new curriculum. The unit standards will therefore expire. No changes to these decisions were made as a result of the consultation.

## Addressing Credit Parity

The decisions made regarding credit parity were based on the guideline of one credit representing ten notional hours of learning time. In most instances the number of credits allocated in the draft standards was retained based on positive sector feedback. However, two standards in the Construction and Mechanical Technologies category/domain (standards 1.20 and 1.21) had their credit value increased to 6 credits in response to sector feedback regarding the increased time required to develop competency in working with resistant and textile materials.

## External and Internal Assessment

A reduction in the number of externally assessed standards to a total of eight across the matrix was made to ensure that students are provided with the best mode of assessment for the learning being evidenced, while still ensuring sufficient external credits are available for a range of technology courses to be endorsed. The assessment mode of four standards in the generic section of the matrix was made external (1.5, 1.6, 1.7 and 1.10), with two standards in the Design and Visual Communication category/domain being external (1.31 and 1.32) and two standards in the Digital Technologies category/domain being external (1.40 and 1.44). The assessment mode of all standards in the Construction and Mechanical Technologies and Processing Technologies categories/domains was made internal.

## Changes to the Generic Standards

Standards 1.1–1.13, related to the Technological Practice strand in the NZC, remain separated into the components of Brief Development, Planning for Practice and Outcome Development and Evaluation (further separated in the standards as Conceptual Design and Prototype Development). Feedback on this separation has been consistently favourable as it allows for greater programme flexibility and allows for the recognition of student's differing strengths across these components. The standards developed to assess outcomes from Technological Knowledge and the Nature of Technology in the NZC also remain as per the draft separation into components and intent.

No significant changes have been made to these standards from the last draft consulted on. However, changes have been made to clarify terms further, simplify explanations and increase clarity regarding AME step ups throughout standards 1.1–1.9.

The two design-related generic standards have been further refined and meanings clarified based on sector feedback. Standard 1.10 has been made external in recognition of the type of understanding being assessed and its potential relevance to all technology subjects.

The two manufacturing-related generic standards have also been further refined and meanings clarified based on sector feedback. Standard 1.13 has been extensively rewritten to better align its requirements with Level 6 of the NZC.

## Changes to the Construction and Mechanical Technologies Standards

In standards 1.20 and 1.22 the term 'building materials' has been replaced with the more common 'resistant materials'. This was in response to significant negative feedback from the teaching sector who considered 'building' did not adequately describe the range of materials suitable for this standard.

In standards 1.21 and 1.23 the term ‘textiles’ has been replaced with ‘textile materials’ in recognition that this standard applies to working with and understanding fibre, yarn and fabric which was not clearly communicated by the term ‘textiles’ on its own.

As mentioned above, the credit value of both standards 1.20 and 1.21 has increased to 6 from the original 4 credits proposed, and mode of assessment for standards 1.22 and 1.23 has been made internal in recognition that teachers are in the best position to make judgements on student evidence of the required understandings, as competence may be demonstrated over time and in multiple ways. Additional changes have been made to standards 1.20–1.23 to clarify terms further, simplify explanations and increase clarity regarding AME step ups.

Standard 1.25 has been revised to clarify terms further, simplify explanations and increase clarity regarding AME step ups. Standard 1.26 has been significantly changed to address sector feedback regarding the nature of the criteria. Both these standards have been rewritten in such a way as to encourage teachers to use them as assessment tools within larger projects of work to increase their relvance to student learning in technology.

**Changes to the Visual Communication for Technologies Standards**

Standards 1.30–1.36 comprise the seven Level 1 Graphics standards that were developed and consulted on in 2009. Through ongoing Technology learning area review and broad consultation, including direct consultation with the New Zealand Graphics and Technology Teachers Association, it was agreed in 2009 that the Ministry would include Graphics within the learning area of Technology. As discussed above, the decision has now been made to name this domain Visual Communication for Technologies.

National consultation on the draft Level 1 Graphics standards was carried out by Research NZ in June 2009 and feedback has been incorporated into the Level 1 standards. There were minor changes to the draft standards but the outcomes being assessed remain the same. The changes made were:

- There have been some numbering changes in line with ongoing renumbering as part of the complete Technology matrix, and some corrections of titles.
- Some explanatory notes have been reworded to put focus on the visual communication of design intentions explored and demonstrated through sketching.
- Some definitions were clarified to better describe the Achieved/Merit grade boundaries.
- The mode of assessment for standard 1.33, *Use rendering techniques to communicate the form of design ideas*, was changed. It was recommended that this standard be internally assessed. To meet the expectations of the external/internal mix of standards it was felt that internal assessment would be an appropriate assessment mode for this standard.

**Changes to the Digital Technologies Standards**

Changes have been made to standards 1.40–1.51 in terms of including more examples to clarify terms further, simplify explanations and increase clarity regarding parameters of what is expected and the AME step ups. This was in response to sector feedback. In some cases however, feedback requested guidance related to teaching and learning rather than assessment, and as such this feedback has been forwarded to the concurrent teaching and learning guide development for consideration.

The assessment mode of standards 1.42 and 1.50 has been made internal in recognition that teachers are in the best position to make judgement on student evidence of the required understandings as competence may be demonstrated over time and in multiple ways.

An additional standard 1.51 has been added. (Please note: in the draft standards for consultation standard 1.51 was the number used for a processing standard – see below). This standard is related to infrastructure and focuses on 'servicing' personal computers. This standard was still under development during the May 2010 consultation period.

**Changes to the Processing Technologies Standards**

A significant change was made to the draft processing standards 1.60–1.62. The draft standards had differentiated processing across viable living material and non-viable material. This was in an attempt to include biotechnological and Agricultural and Horticultural Science contexts – including those focused on intervening in the living conditions and productivy of complex plants and animals. However, the recently developed Agricultural and Horticultural Science achievement standards provide excellent assessment tools for a technology subject looking to include such a focus.

The draft processing standards, 1.60 and 1.62, therefore showed significant duplication and have now been removed. Instead, the new processing standards, 1.61 and 1.62, include a focus on understanding concepts and implementing procedures inclusive of processing all materials – including living and non-living materials, those that are biologically active and those that are not.

Other changes have been made to clarify terms further, simplify explanations and increase clarity regarding AME step ups in these standards.