NEW ZEALAND QUALIFICATIONS AUTHORITY
MANA TOHU MĀTAURANGA O AOTEAROA

National Qualifications Framework Levels 1–3, 2005

Technology

National Moderator's Report

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General Guidance for Assessors of Achievement and Unit Standards

The purpose of external moderation is to provide reassurance that assessor judgments are at the national standard and are made on the basis of assessment materials that are fair and valid.

All assessment materials are expected to:

- give the learner the opportunity to meet the requirements of the standard
- have an assessment schedule that gives evidence of appropriate learner responses and clear judgments at all levels.

The Ministry of Education contracted subject experts to write assessment resources for achievement standards. These are not pre-moderated. The intention is that they are modified to suit teaching programmes and learner needs. They do not provide 'rules' but suggest different ways of assessing to the nationally registered standard.

General Overall Comment

In 2005 there was, once again, a noticeable improvement in the overall quality of the assessment material provided by assessors for assessment against achievement and unit standards.

Assessors who used the generic templates as guidelines to write assessment material for level 1, 2 and 3 standards, generally presented learners with material that guided them to demonstrate competencies at the expected level. The level 2 generic templates were revised for use in 2005; these are listed Version 4 templates. Assessors who used the Version 4 generic templates for levels 1 and 2, and Version 1 templates for level 3 standards, were not required to provide examples of evidence at each achievement grade (Achieved, Merit, and Excellence) in their assessment schedules. This was because of the detailed evidence statements provided in these templates.

Assessors need to take care that they match the correct version of the generic template to the registered achievement standard to ensure learners are not disadvantaged. The correct match in 2004 was:

	Achievement standard	**Generic template**
Level 1	Version 2	Version 4
Level 2	Version 2	Version 4
Level 3	Version 1	Version 1

Once the level 3 standards are registered in 2006 as Version 2, the generic template for these will also be updated to Version 2.

In 2005, assessors were asked to submit 2004 learner evidence along with their assessment material for moderation when learner evidence had not been assessed prior to the moderation due date. Assessors who did this received a much more informative Moderation Report than those who sent in assessment material only. When sending previous year's learner evidence for moderation, assessors need to ensure they identify the correct version of the standard(s) that the evidence was

assessed against. They also need to provide a copy of the assessment schedule against which assessor judgments on the quality of the learner evidence were made.

Where assessors wrote detailed unit outlines on how they intended to teach technology units assessed against achievement/unit standard(s), both the teaching to support learning and learner responses were closely aligned to national standards. Assessors are, once again, encouraged to submit unit outline(s) for moderation, along with their assessment material and learner evidence.

When using more than one standard to assess learner competencies in the same unit/assessment material, assessors need to ensure learners are given the opportunity to display all the competencies demanded by the achievement criteria. In 2005, some learners were disadvantaged by the assessment material/tasks because of constraints which limited the types of evidence learners could produce. In these instances, learners were denied opportunity to attain the standards.

Assessors are encouraged to submit all learner evidence produced for assessment as well as any assessor material that supports their judgment on the award of achievement grades. Assessor material may include such things as:

- assessor notes on learner achievement that justify the achievement grade awarded
- documented reflections on assessor discussions with learners
- assessor notes/jottings placed in the learner portfolio that were used to guide learners' technological practice or presentation of evidence.

Learner evidence includes:

- documentation of the technological practice they undertook and key decisions made
- 'planning' that has informed their undertaking technological practice
- photographic and/or digital images of artefacts (mock-ups, models, and/or prototypes) created as an outcome of technological practice
- results of tests and trials demonstrating the technological outcome(s) they have developed are fit for their intended purpose, according to the expectations of the standard it is assessed against. For example, if the standard requires learners to demonstrate through the use of modelling, a conceptual design's potential as fit for purpose, then evidence of testing and trialling of a model(s) needs to be submitted in the learner's evidence. Alternatively, if the standard requires a technological solution to be implemented, evidence that the solution is fit for purpose may include such things as stakeholder feedback, test results following sustained use in its intended environment, etc.

AS 90045 Version 2: *Develop a technological solution to address a given brief*

Achievement of this standard requires learners to develop a technological solution that addresses the requirements of a given brief by using planning to inform their undertaking of technological practice. The given brief may be one that learners have developed themselves, as part of a unit of work that was previously assessed against AS 90046, and/or one given by the assessor. Where a learner-developed brief is used, assessors need to check it is sufficiently challenging to allow learners to present evidence at the national standard, (see Explanatory Note 7) and that it is achievable within the available time.

Learners need to be encouraged to fully explore the situation surrounding the given brief as part of their technological practice. This exploration at times may identify a need for further refinement of the conceptual statement and/or the specifications of the given brief because of new knowledge or

insight gained from within practice. Where the need for alterations and/or additions is identified, assessors should oversee this to ensure the rigour expected at level 1 is not lost.

Planning should inform or guide learner practice from the beginning of the brief through to the finished technological solution. Planning needs to be seen as something that is dynamic, requiring constant evaluation, and sometimes refinement, to ensure a technological solution that is fit for its intended purpose is realised within constraints such as budget, time, access to resources, including stakeholders, etc.

Learners need to consult stakeholders to the issue they are resolving throughout their technological practice. Such consultation may require learners to consult not only stakeholders who have an immediate vested interest in the issue, but also with wider community stakeholders who may be affected by the development of the technological solution(s) and/or the placement of the solution(s) in its intended location. Stakeholder consultation that occurs only at the beginning and/or end of their practice does not constitute sound technological practice.

AS 90046 Version 2: *Formulate a brief to address a given Issue*

Achievement of this standard requires learners to undertake technological practice to formulate a brief that addresses a given issue. To enable learners to consider a variety of different views or opinions the given issue needs to be one that is shared by a range of stakeholders, one of whom may be the learners themselves. Identifying stakeholders to the issue and exploring their needs and/or the opportunities this presents, should be included as part of the technological practice learners undertake to develop their brief.

In formulating a brief, learners should be encouraged to investigate key factors (see Explanatory Note 6) and explore likely conceptual designs to confirm their developing brief (conceptual statement and specifications) has the potential to allow a technological outcome to be developed which satisfies the given issue. As part of this exploration, learners may need to test potential conceptual solutions against their developing brief's specifications. Consulting identified stakeholders to ensure the conceptual statement and specifications address the given issue should be an ongoing, integral part of the technological practice learners undertake to develop their brief.

To ensure learners are able to complete all of the requirements of AS 90046, assessors need to make sure an appropriate issue(s) is provided or negotiated with learners. A number of learners were disadvantaged in 2005 because the issue given to them was either not shared and/or was considered by them only at a personal level. See Explanatory Note 5 for further clarification of what is expected of a given issue for assessment against AS 90046.

AS 90047 Version 2: *Develop a technological solution by widening the use of an existing technology*

Achievement of this standard requires learners to demonstrate they have identified possible needs or opportunities, and considered key factors, to widen the use of an existing technology. As part of their technological practice, they are required to formulate a brief that provides a clear description of both the desirable outcome(s) sought, and the constraints to be met by a successful solution. Potential future impacts of the developed solution should also be explored and, where necessary, minimised as constraining and/or identified as desirable specifications within the brief.

When "widening the use of an existing technology", learners are required to adapt, modify or incorporate an existing technology or technologies to create a new technological solution (product, system or environment). This adaptation, modification and/or integration must change the purpose

and/or the performance characteristics of the existing technology or technologies. Such changes may include:

- extending the performance characteristics of an existing technology so it achieves specifications beyond those it was originally designed to achieve and/or
- taking an existing technology and incorporating it into a different context so it may perform a different function.

Selecting an existing technology, or technologies, that gives learners the opportunity to widen its use is key for learner achievement. Assessors are encouraged to work with learners to select appropriate existing technology. A number of learners were once again disadvantaged in 2005 because they selected an existing technology that was unsuitable for assessment against AS 90047.

AS 90048 Version 2: *Develop a means for ongoing production of a technological solution*

To achieve this standard, learners must identify key factors that contribute to a specific technological practice of ongoing production, formulate a brief and propose a means for its ongoing production of a product.

Learners are expected to explore the nature of ongoing production and the general principles that apply, including such things as quality control procedures, application of safety laws and stock control. Key factors identified by learners need to relate to the ongoing production of the technological solution and should consider such things as the needs/expectations for the technological solution to be produced, as well as its means for ongoing production.

Learners may use a technological solution that they have developed as part of working towards achievement of AS 90045 or AS 90047 . However, learners doing this would need to review the design of the solution to establish its suitability for ongoing production and, where necessary, adapt it for ongoing production. Alternatively, learners may:

- use an existing product and suggest adaptations to it, where necessary, to allow for its ongoing production, or
- use a conceptual design of a potential technological solution they have designed, that has taken into account the needs for ongoing production within its design.

AS 90338 – 90344 Version 2: *Develop and model a conceptual design in technology <area specific > technology*

Achievement of these standards requires learners to identify an issue, formulate a brief to address the issue, and develop and use planning to guide the development and modelling of a conceptual design within a specific technological area.

Learners are encouraged to present all the evidence they produce of undertaking technological practice to develop and model their conceptual design. This includes presenting evidence of how their research findings and planning impacted on the nature of the technological practice they undertook to:

- formulate their brief and
- develop and model a conceptual design that satisfies the issue.

Evidence of ongoing evaluation of design ideas, as well as an end-point evaluation, is expected for these standards. Testing ideas using such things as mock-ups, models, sketches and interviews should be presented as part of this evidence. Learners need to demonstrate, through testing and trialling, that their model of a conceptual design has the potential to address their identified issue.

Ongoing consultation with, and consideration of identified stakeholder needs, is an important aspect of technological practice at level 2.

Assessors need to ensure the context, or setting, presented to learners in units of work that incorporate these standards, is broad enough to allow learners to identify their own issue. They should also ensure the learning environment allows learners to:

- interact with stakeholders
- access materials
- access specialist equipment and necessary expertise
- develop and model a conceptual design in the time available.

Learners should be encouraged to identify in their planning any constraints that impact on the technological practice they intend to undertake to develop and model their conceptual design. Evidence of how these constraints are addressed in the learner's technological practice should be presented as evidence for assessment.

In 2005, few learners presented evidence of planning that demonstrated the dynamic and evolving nature of development work associated with the undertaking of technological practice (see Explanatory Note 8). Learners need to be encouraged to continually reflect on their design ideas and the technological practice used to develop them. An important part of this reflection is the testing, evaluation and modification of ideas as new information or understandings come to light through undertaking technological practice. Planning to allow testing to occur as well as modifications to planning, which take into account test findings, should be apparent in the evidence learners present. Planning can be evidenced throughout learners' practice using such communication tools as audio, written, diagrammatic, computer-based, video and modelling tools.

AS 90345 – 90351 Version 2: *Develop and implement a one-off solution in <area specific > technology*

To achieve these standards learners must identify an issue, formulate a brief to address the issue, and develop and use planning to develop and implement a one-off solution within a specific technological area.

Learners are encouraged to present all their evidence of undertaking technological practice, to develop and implement a one-off solution for assessment. This includes evidence of how their research findings and planning impacted on the nature of the technological practice they undertook to:

- formulate their brief and
- develop and implement a one-off solution that satisfies the issue.

Evidence of ongoing evaluation of design ideas, as well as an end point evaluation, is expected for these standards. Testing ideas using such things as mock-ups, models, sketches, and stakeholder interviews and surveys should be presented as part of the learner's evidence. Ongoing consultation with, and consideration of identified stakeholder needs, is an important aspect of technological practice at level 2.

Assessors need to ensure the context, or setting, presented to learners in units of work that incorporate these standards, is broad enough to allow learners to identify their own issue. They should also ensure the learning environment allows learners to:

- interact with stakeholders
- access materials
- access specialist equipment and necessary expertise
- develop and implement a one-off solution in the time available.

The issue learners select can be community-based or one that is personal to them. If a personal issue is selected, learners are still expected to identify and consider the potential impact of their one-off solution and its development on other stakeholders, as part of the technological practice they undertake.

Learners should be encouraged to identify in their planning any constraints that impact on the technological practice they intend to undertake to develop and model their conceptual design. Evidence of how these constraints are addressed in the learner's technological practice should be presented. In 2005, few learners presented evidence of planning that demonstrated the dynamic and evolving nature of development work associated with the undertaking of technological practice (see Explanatory Note 8). Learners need to be encouraged to continually reflect on their design ideas and the technological practice used to develop them. An important part of this reflection is the testing, evaluation and modification of ideas as new information or understandings come to light through undertaking technological practice. Planning to allow testing to occur as well as modifications to planning, which take into account test findings, should be apparent in the evidence learners present. Planning can be evidenced throughout learners' practice using such communication tools as audio, written, diagrammatic, computer-based, video and modelling tools.

Evidence that learners implemented their one-off solution was often not well documented. Evidence of implementing a one-off solution(s) should demonstrate that it is 'fit for purpose' in its intended location. Where a one-off solution cannot be implemented within its intended environment because of such things as direct access to its intended end user, and/or the environment where it will be placed (eg a one-off garment designed for use in winter but completed in spring), then an assimilation that tests and demonstrates the solution's suitability can be used.

AS 90352 Version 2: *Develop a means for multi-unit production of a technological outcome*

This standard requires learners to formulate a brief that considers the needs of a technological solution, that is to be produced using multi-unit production, and develop a means for the production of the solution to occur. In doing so, it is expected learners will identify and outline any design adaptations that are needed to the solution to allow it to be manufactured using multi-unit production.

Learners need to explore key factors that contribute directly and indirectly to the means of multi-unit production that is developed and present this as evidence (see Explanatory Note 4).

In 2005, many learners failed to describe the process stages of their selected means of production. They also presented little evidence to justify their estimated key resources beyond the material costs associated with component parts of the technological solution (see Explanatory Notes 7 and 8 on the evidence learners are required to present for assessment).

AS 90362, 90364, 60366, 90368, 90370, 90372 Version 2: *Demonstrate skills in <specific technological area>*

To achieve these standards learners must demonstrate they can perform skills in undertaking technological practice, to develop a technological outcome(s) that addresses an issue that they identify.

Learners need to present evidence that clearly illustrates the skills undertaken to develop a technological outcome(s). This may be presented in a one-off solution, as photographic or video evidence, illustrating where skills have been applied. Skills in undertaking ongoing evaluation of design ideas, as well as an end point evaluation – including testing ideas by developing and using such things as mock-ups, models and prototypes – are included in the skills that may be presented.

Safe and responsible learner practices in performing skills to develop a technological outcome(s) should be clearly demonstrated. The means by which learners communicate evidence of their ability to perform skills safely and responsibly to the level of competency expected at level 2, will depend on the context in which their technological practice is undertaken, the learning environment and learners' individual strengths. Where skills used are not obvious to an assessor and/or moderators, an explanation of the skill(s) and how it was conducted should be presented in the evidence submitted.

Where assessors judge a learner's competency in a skill through observation, they need to communicate the means by which this judgment was made and the level of competency observed, when learner evidence is submitted.

Where an assessor has awarded an achievement grade based on observation of demonstrated skills, assessor notes describing the skill level performed by the learner need to be submitted. Other evidence that may be used to demonstrate learners' ability to perform skills include such things as photographs of technological outcomes (models, prototypes, one-off solutions), video clips of learners undertaking technological practice, the solutions, mock-ups, or prototypes themselves, and/or documentation describing how the skills were performed, including safety practices considered by the learner.

AS 90613 – 90619 Version 1: *Develop and model a conceptual design to address a client issue in < area specific> technology*

To achieve these standards learners must formulate a brief to address a client issue, and use planning tools to develop and model a conceptual design within a specific technological area.

Learners are encouraged to present all the evidence they produce of undertaking technological practice to develop and model a conceptual design. This includes evidence of how their research findings impacted on the nature of the technological practice they undertook:

- to formulate their brief to resolve the client issue;
- identify and use appropriate planning tools to structure and guide their practice
- to develop and model a conceptual design that satisfies the client issue.

Evidence that conceptual ideas have been tested and evaluated as they are developed, through use of such things as mock-ups, models, sketches and interviews should be presented for assessment, as well as an endpoint evaluation of the potential for the conceptual design to address the client issue. Ongoing consultation with, and consideration of identified client and wider stakeholder needs are an important aspect of technological practice undertaken at level 3.

Assessors need to ensure the client issue presented in material will allow learners to demonstrate, through undertaking technological practice, the competencies expressed in the assessment criteria. This includes ensuring that any constraints on resources, such as access to the client and other key stakeholders, the time available to complete the assessment, and material availability to develop and model a conceptual design are adequate and at a level acceptable for assessment at level 3 (see

explanatory note 6). It was once again evident in 2005, that where learners did not work with an authentic client(s) and/or had restrained accesses to their client(s) their technological practice was limited, and often restricted their achievement of these standards.

To award an Achievement grade, evidence is required of the model(s) of the final conceptual design being tested, which demonstrates its potential fitness for purpose as a suitable solution to address the client issue and other stakeholder needs. This evidence was often not apparent in the learner evidence submitted in 2005.

AS 90620 – 90626 Version 1: *Develop and implement a one-off solution to address a client issue in < area specific> technology*

To achievement of these standards learners must formulate a brief to address a client issue, and use planning tools to develop and implement a one-off solution within a specific technological area.

Learners are encouraged to present all the evidence they produce of undertaking technological practice to develop and implement a one-off solution. This includes presenting evidence of how their research findings impacted on the nature of the technological practice they undertook:

- to formulate their brief to resolve the client issue
- identify and use appropriate planning tools to structure and guide their practice
- to develop and implement a one-off solution that satisfies the client issue.

Evidence of ongoing evaluation of design ideas, as well as an end point evaluation, including evidence of testing ideas using such things as mock-ups, models, sketches, interviews and prototypes, should be presented. Ongoing consultation with, and consideration of identified client and wider stakeholder(s) needs, are an important aspect of technological practice undertaken at level 3.

Assessors need to ensure the client issue presented in material will allow learners to demonstrate, through undertaking technological practice, the competencies expressed in the assessment criteria. This includes ensuring that any constraints on resources, such as access to the client and other key stakeholders, the time available to complete the assessment, and material availability to develop and model a conceptual design, are adequate and at a level acceptable for assessment at level 3 (see explanatory note 6). It was once again evident in 2005, that where learners did not work with an authentic client(s) and/or had restrained access to their client(s), their technological practice was limited, and often restricted their achievement of these standards.

To award an Achievement grade, evidence is required of implementing the developed one-off solution to demonstrate its fit for purpose, in terms of addressing the client issue and other key stakeholders needs, (or not). This was often not apparent in the learner evidence submitted in 2005.

AS 90627 Version 1: *Develop a proposal for a production process for a client*

To achieve this standard, learners must develop a proposal for a production process for multi-unit production of a client technological outcome. The proposal needs to include justifications for why the technological outcome is suitable for multi-unit production, a mode of production, and an estimation of resource requirements, availability, costs and benefits. Learners also need to provide a description of a means for production management of multiple units of the client's technological outcome, and a description of the potential impacts of the production process on key stakeholders. This includes the immediate environment where the production process will be located.

Learners are encouraged to present all their evidence of undertaking technological practice, to develop a proposal for a production process. This includes presenting evidence of how their research findings impacted on the nature of the technological practice they undertook to:

- identify the suitability of the design of the clients technological outcome
- make necessary design modification to the outcome where required
- identify a suitable mode of production
- estimate major resources
- describe a realistic means for production management.

The client technological outcome may be one that a learner developed as part of a unit of work previously assessed against another standard, and/or one given by the assessor. Where a learner-developed outcome is used, assessors need to ensure that it is sufficiently challenging to allow learners to present evidence at the standard expected (see explanatory notes) and achievable within the available time. It was once again evident in 2005, that where learners did not work with an authentic client(s) and/or had restrained accesses to their client(s) their proposal for a production process was limited, often resulting in a non-achieved grade being awarded.

Learners need to demonstrate in their evidence understanding of quality control protocols, legislative requirements, formats and other conventions that are used by technologists working in a similar context to that of their proposed production process.

Learners are encouraged to analyse an existing production process(es) for products similar in context to the client technological outcome they are working with. This will help inform the design of a suitable production process. This analysis also assists learners to justify the production process they propose as suitable for the multi-unit production of their client's technological outcome. In 2005, a number of learners submitted evidence that described a production process for the multi-unit production of a client's technological outcome but provided no evidence of why their proposal was realistic/suitable.

AS 90679, 90681, 90683, 90685, 90687 Version 1: *Demonstrate advanced skills in < area specific> technology*

To achieve these standards learners must demonstrate they can perform advanced skills in undertaking technological practice to develop a technological outcome(s) within a specific technological area.

Learners need to demonstrate advanced skills that they have operationalised during their undertaking of technological practice to develop a technological outcome(s). The explanatory notes indicate what constitutes advanced skills specific to the focus technological area. Skill in undertaking ongoing evaluation of design ideas through testing using trials, mock-ups and models, as well as an end point evaluation, using models and prototypes, should be presented as evidence to support the award of achievement grades for these standards.

Advanced skills should be demonstrated safely and responsibly within accepted codes of practices. The means by which learners communicate evidence of this will depend on the context in which their technological practice is undertaken, the learning environment and their individual strengths.

Where an assessor has awarded an Achievement grade to a learner based on an observation of advanced skills, assessor notes describing the learner's advanced skill level need to be submitted. Other evidence that may be used to demonstrate learners' ability to perform advanced skills include such things as photographs of technological outcomes (models, prototypes, one-off solutions), video

clips of learners undertaking technological practice, the solutions, mock-ups, or prototypes themselves, and/or documentation describing how the advanced skills were performed including safety practices considered by the learner.

Unit Standards

A suite of unit standards is registered which assessors may use to assess specific learner competencies in technology. These include unit standards that were written for Technology in the New Zealand Curriculum (US 1389 – US 13413 and US 14374 – US 14375) as well as those registered for the previous Design and Technology Curriculum. Most of these standards focus on assessing specific skills and knowledge. The importance of learners possessing competencies in these skills, and an understanding of this knowledge in Technology, depend on the technological area(s) and contexts learners are given the opportunity to study in.

Many of these unit standards were originally written to allow learner competencies to be assessed through the use of one-off assessment activities. However, when these standards are used to assess learner competency in Technology, they should be embedded into a unit that requires learners to undertake technological practice to develop technological outcome(s).

Selection of which unit standard(s) will be used to assess learner competencies, should be matched to the skills learners are expected to perform when undertaking technological practice. While assessors can often select the specific unit standards that will be used for assessment when planning Technology units, confirmation of the standards' appropriateness for assessment purposes, can only be validated once learners actually engage in the unit.

In Technology, the actual technological practice learners undertake, and therefore the types of skills/understanding of knowledge they exhibit, can only be determined once learners identify the actual technological practice they will undertake. Assessors who strictly adhere to using only those unit standards they have selected at the time of planning a technology unit often later:

- penalise learners whose technological practice does not demonstrate the exact skills/understanding of knowledge prescribed in the selected unit standard(s) or
- constrain learners' technological practice, and therefore their technological outcome(s), by requiring them to demonstrate the skills/understanding of knowledge specified in the unit standard(s), rather than those that are most appropriate to the technological practice they need to undertake to develop a technological outcome(s).

Embedding a mixture of achievement and unit standards in a technology unit to enable assessment of learner competencies was prevalent in 2005. While this practice is supported, assessors who use a mixture of unit and achievement standards to assess learner competencies in a technology unit need to ensure learners are given an opportunity to display all the competencies required for achievement of these standards. In a number of instances where this occurred in 2005, it was evident learners were disadvantaged when the assessment material given to them constrained the types of evidence they could produce, or did not allow learners to present the evidence required to be awarded an Achievement grade to specific standards.