NEW ZEALAND QUALIFICATIONS AUTHORITY
MANA TOHU MĀTAURANGA O AOTEAROA

National Qualifications Framework Levels 1–3, 2004

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 judgements 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 student the opportunity to meet the requirements of the standard
- have an assessment schedule that gives evidence of appropriate student responses and clear judgements 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 student needs. They do not provide 'rules' but suggest different ways of assessing to the nationally-registered standard.

General Overall Comment

In 2004 there was a noticeable improvement in the overall quality of the assessment material that assessors provided their students for assessment against achievement and unit standards.

Assessors who used the generic templates as guidelines to write assessment material for the internal standards, generally presented their students with material that guided them to demonstrate competencies at the level expected. The Level 1 and 3 generic templates for the internal achievement standards were revised for use in 2004. Assessors who used these generic templates were not required to provide examples of evidence at each achievement grade in their assessment schedules, due to the detailed evidence statements provided in the templates. The Level 2 generic templates will be revised for use in 2005 to reflect the Version 2 Level 2 standards and align with the Level 1 and 3 templates.

It was evident in student evidence submitted for moderation in 2004 that, where assessors wrote detailed unit outlines, both the teaching to support learning and student responses were more closely aligned to the national standard. In 2005, assessors are encouraged to submit their unit outline(s) for moderation along with their assessment material and student evidence.

Use of one or more achievement standards to assess student competencies in the same technology unit/assessment material is allowed. In a number of instances in 2004, it was evident that students were disadvantaged when the assessment material provided constrained the types of the evidence that they could produce, hence denying them opportunity to attain the standards. Assessors need to ensure that students are provided with an opportunity to display all of the competencies required of unit/achievement standards.

While assessors can often select the specific achievement/unit standards that will be used for assessment when planning a Technology unit, confirmation of the appropriateness of these standards can only be validated once students are actually engaged in the unit. Assessors who strictly adhered to using only those standards that they had pre-selected at the time of planning their technology unit were shown in moderation to often later penalise students, where:

- technological practice did not demonstrate the exact skills/understanding of knowledge and/or technological practice that was prescribed in the pre-selected standard(s), or
- students' technological practice and outcomes were constrained by requiring them to demonstrate specific skills and/or understanding of knowledge specified by the pre-selected standard(s), rather than the knowledge and/or skills that were more appropriate to the technological practice that they undertook.

In 2005, assessors are encouraged to confirm the actual unit/achievement standards that individual students will be assessed against, once the nature of the technogical practice is established from within student practice.

Assessors are encouraged to submit all the evidence that students produce for assessment against an achievement/unit standard for moderation. This includes all the evidence of 'planning' that has informed their undertaking technological practice. Where artefacts (mockups, models and/or prototypes) are created as an outcome of technological practice, evidence of their existence in the form of photographs or video clips also needs to be presented. This evidence should demonstrate that the technological outcome(s) is fit for its intended purpose in accordance with the expectations of the achievement/unit standard it is being assessed against. For example, where an achievement standard requires evidence that a 'one-off solution has been

implemented and is fit for its intended purpose', evidence needs to be provided to allow moderators to make a judgement that this is the case. In 2004, moderators were sometimes asked to confirm assessor judgements on the award of a unit/achievement standard(s) to students when it was apparent that not all of the evidence that the assessor had made their initial judgement on was submitted for moderation.

AS 90045 v2: *Develop a technological solution to address a given brief*

Achievement of this standard requires students to develop a technological solution that addresses the requirements of a given brief through the undertaking of technological practice that is informed through planning. Assessors need to ensure that the given brief is sufficiently demanding to allow students the opportunity to reach an excellence standard.

The brief may be one that a student has developed themselves, as part of a unit of work that was previously assessed against AS90046, and/or one given by the assessor. Where a student-developed brief is used, assessors need to ensure that it is of sufficient challenge to allow students to present evidence at the national standard (refer to Explanatory Note 7 for AS 90045) and that it is achievable within the available time.

Students need to be encouraged to fully explore the situation surrounding the given brief as part of their technological practice. This exploration may identify a need for further refinement of the conceptual statement, and/or the specifications, due to new knowledge or insight being gained from within practice. Where the need for alterations and/or additions is identified, assessors should oversee this to ensure that the rigour expected at Level 1 is not lost.

Planning should inform/guide student practice from the onset of the brief through to the finished technological solution. Students need to consult with stakeholders in the issue they are resolving throughout their technological practice. Consultation with stakeholders at the beginning and/or end of their practice only does not constitute sound technological practice.

Assessors who used the version 2 generic template to guide their writing of assessment material in 2004 were found to present their students with sound guidance on the evidence that was required for award of Achievement for version 2 of AS90045.

AS 90046 v2: *Formulate a brief to address a given issue*

Achievement of this standard requires students to undertake technological practice to formulate a brief that addresses a given issue. To enable students to consider a variety of different views or opinions, the issue needs to be one that is shared by a range of stakeholders (one of whom may be the student). Identification of stakeholders in the issue should be included as part of the technological practice undertaken by students to develop the brief.

In formulating a brief that allows a technological solution to be developed, students should be encouraged to investigate key factors (see Explanatory Note 6 AS90046) and explore likely conceptual solutions to confirm that their developing brief (conceptual statement and specifications) is likely to satisfy the given issue. As a part of this exploration, students may need to test potential conceptual solutions against their developing brief specifications. Consulting with identified stakeholders to ensure that the conceptual statement and specifications will address the given issue should be an ongoing integral part of the technological practice undertaken by students in developing the brief.

To ensure students are able to complete all the requirements of AS90046, assessors need to ensure that an appropriate issue(s) is provided or negotiated with students. A number of students were disadvantaged in 2004 due to the issue not being shared, but rather considered only at a personal level by the student – see Explanatory Note 6 for further clarification.

Assessors who used the version 2 generic template to guide their writing of assessment material in 2004 were found to present students with sound guidance on the evidence that was required for award of an achievement grade for version 2 of AS90046.

AS 90047 v2: *Develop a technological solution by widening the use of an existing technology*

Achievement of this standard requires students to provide evidence that they have identified possible needs or opportunities and considered key factors to widen the use of an existing technology. As part of student 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, minimalised as constraining and/or identified as desirable specifications in the brief.

To develop a technological solution that 'widens the use of an existing technology' students are required to adapt, modify or integrate an existing technology into a new technological solution (product, system or environment). Such adaptation, modification and/or integration must change the purpose or the performance of the existing technology. This may encompass:

- taking an existing technology and incorporating it into a different context, and/or
- extending the performance characteristics of an existing technology so that it meets specifications beyond those for which it was first designed.

The selection of an existing technology that allows students to widen its use is the key for student achievement of AS90047. Assessors are encouraged to work with their students to ensure that selected existing technologies are appropriate, so that students are able to present evidence for all requirements for achievement of AS90047. A number of students were disadvantaged in 2004 due to selecting an existing technology that was unsuitable for assessment against AS90047.

Assessors who used the version 2 generic template to guide their writing of assessment material in 2004 were found to present students with sound guidance on the evidence that was required for award of an achievement grade for version 2 of AS90047.

AS 90048 v2: ***Develop a means for ongoing production of a technological solution***

Achievement of this standard requires students to identify key factors that contribute to a specific technological practice of ongoing production, to formulate a brief for a product that is intended to be produced through ongoing production, and propose a means for its ongoing production.

Students need to explore the nature of ongoing production and the general principles that apply, including such things as quality control procedures, application of safety laws, stock control, etc.
Key factors identified by students should relate to the product to be produced, the nature of ongoing production, and how the two interact.

Students may use a technological solution that they have developed as part of working towards achievement of AS90045 or AS90047 as their chosen solution. Where this occurs, however, students are required to review the design of the solution to establish its suitability for ongoing production and where necessary adapt it for ongoing production. Alternatively, students 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 technological solution that they have designed that has taken into account the needs for ongoing production from the start of their technological practice.

Assessors who used the version 2 generic template to guide their writing of assessment material in 2004 were found to present students with sound guidance on the evidence that was required for award of an achievement grade for version 2 of AS90048.

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

Achievement of these standards requires students to identify an issue, formulate a brief to address the issue, and to develop and use a plan of action to develop and model a conceptual design within a specific technological area.

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

- formulate their brief
- develop their plan of action, and
- develop and model a conceptual design that satisfies the issue.

Evidence of ongoing evaluation of design ideas, as well as an endpoint evaluation including evidence of testing ideas using such things as mock-ups, models, sketches and interviews, should be presented as part

of this evidence. Ongoing consultation with and consideration of identified stakeholder(s) needs is an important aspect of technological practice at Level 2.

Assessors need to ensure that the selected context or setting for a unit that incorporates 90338–90344, is broad enough to allow students to identify their own issue, while also being appropriate to allow students to undertake technological practice.

Students should be encouraged to identify any constraints on the technological practice they undertake to develop and demonstrate through modelling that their conceptual design is fit for its intended purpose. Evidence of these considerations needs to be presented for assessment. In saying this however, assessors need to ensure that identified constraints on student technological practice do not impede students to such an extent that they cannot provide the required evidence for assessment. The learning environment should allow students the opportunity to:

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

Plans of action can be developed on a format decided upon by the student in negotiation with the assessor, or may be evidenced throughout students' practice using such communication tools as audio, written, diagrammatic, computer-based, video and modelling tools. The undertaking of ongoing reflection, evaluation and modification of plans of action as new information/ understandings come to light, should be apparent in the evidence submitted for assessment.

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

Achievement of these standards requires students to identify an issue, formulate a brief to address the issue, and to develop and use a plan of action to develop and implement a one-off solution within a specific technological area.

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

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

Evidence of ongoing evaluation of design ideas, as well as an endpoint evaluation including evidence of testing ideas using such things as mock-ups, models, sketches and interviews, should be presented as part of this evidence. Ongoing consultation with, and consideration of identified stakeholder(s) needs, is an important aspect of technological practice at Level 2. Assessors need to ensure that the selected context or setting for a unit is broad enough to allow students to identify their own issue, while also being appropriate to allow students to undertake technological practice.

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

Students should be encouraged to identify any constraints on the technological practice they undertake to develop a technological solution. Evidence of these considerations need to be presented for assessment. In saying this however, assessors need to ensure that identified constraints on student technological practice do not impede students to such an extent that they cannot provide the required evidence for assessment. The learning environment should allow students the opportunity to:

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

Evidence that the student has implemented their one-off solution needs to be presented for assessment. This evidence needs to demonstrate that the solution is fit for its intended purpose, through meeting the specifications of the brief as well as addressing any concerns expressed by key stakeholders and those in the wider community.

Plans of action can be developed on a format decided upon by the student in negotiation with the assessor, or may be evidenced throughout students' practice, using such communication tools as audio, written, diagrammatic, computer-based, video and modelling tools. The undertaking of ongoing reflection, evaluation and modification of plans of action as new information/ understandings come to light, should be apparent in the evidence submitted for assessment.

AS 90352–90358: *Develop a solution in <area specific> technology and a process for its on-going production*

Assessment using achievement standards 90352–90358 requires students to formulate a brief that considers the need for the on-going production of a solution within a specific technological area. The aim is to develop a solution that can be manufactured by ongoing production and propose a means for its ongoing production, including estimating key resources, their availability, likely sales revenue and major costs.

Students are encouraged to present for assessment all of their evidence 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,
- develop their plan of action and
- develop a solution that allows for its on-going production.

Evidence of ongoing evaluation of design ideas, as well as an endpoint evaluation including evidence of testing ideas using such things as mock-ups, models, sketches and interviews, should be presented as part of this evidence. Ongoing consultation with, and consideration of identified stakeholder(s) needs, is an important aspect of technological practice at Level 2.

Students need to demonstrate that they have identified and incorporated appropriate quality control protocols, legislative requirements, formats and other conventions used by technologists who work in a similar context to that of their solution.

Students should be encouraged to identify any constraints on the technological practice they undertake to develop a technological solution and a means for its on-going production. Evidence of these considerations need to be presented for assessment. In saying this, however, assessors need to ensure that identified constraints on student technological practice do not impede students to such an extent that they cannot provide the required evidence for assessment. The learning environment should allow students the opportunity to:

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

AS 90362, 90364, 60366, 90368, 90370 and 90372

Achievement of these standards requires students to demonstrate that they can perform skills in undertaking technological practice, to develop a one-off technological solution(s) and/or a solution(s) for ongoing production within a specific technological area.

Students are encouraged to present evidence for assessment from their technological practice to develop and implement a one-off solution and/or solution for ongoing production. Skill in undertaking ongoing evaluation of design ideas as well as an endpoint evaluation, including the testing of ideas by developing and using such things as mock-ups, models and prototypes, should also be presented for assessment.

Safe and responsible student practices in performing skills to develop and implement a one-off solution(s) and/or solution(s) for ongoing production should be clearly demonstrated. The means by which students communicate evidence of being able 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 student's individual strengths.

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

Achievement of these standards requires students to formulate a brief to address a client issue, and use planning tools to develop and model a conceptual design within a specific technological area.

Students are encouraged to present for assessment all the evidence they produce of undertaking technological practice to develop and model a conceptual design. 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, and
- to develop and model a conceptual design that satisfies the client issue.

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

Assessors need to ensure that the client issue presented in material that is used for assessment against AS90613–AS90619 will allow opportunity for students to demonstrate, through undertaking technological practice, the competencies expressed in the achievement standard 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 possible technological solutions are adequate and at a level acceptable for assessment at Level 3. It was evident in 2004 that where students did not work with an authentic client(s) and/or had restrained accesses to their client(s) that their technological practice was limited, often restricting their achievement

Planning tools used by students to structure their technological practice can be developed on a format that is decided by the student in negotiation with the assessor. Evidence of review and use of these tools to guide technological practice should be evidenced throughout students' practice, using communication tools such as audio, written, diagrammatic, computer based, video and modelling tools. Undertaking ongoing reflection, evaluation and modification of planning, as new information/understandings is uncovered, should be evident in the student evidence submitted for assessment.

Evidence of modelling and testing conceptual designs to establish their suitability (fitness for purpose) as solution(s) that address the client issue and other key stakeholders is required for Achievement for AS90613–AS90619.

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

Achievement of these standards requires students to 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.

Students are encouraged to present for assessment 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, and
- to develop and implement a one-off solution that satisfies the client issue.

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

Assessors need to ensure that the client issue presented in material that is used for assessment against AS90620–AS90626 will allow opportunity for students to demonstrate, through undertaking technological practice, the competencies expressed in the achievement standard assessment criteria. This includes ensuring that any constraints on resources, such as access to the client and other key stakeholder, the time available to complete the assessment, possible technological solutions and ability to implement the developed one-off solution, are adequate and at a level acceptable for assessment at Level 3. It was evident

in 2004 that where students did not work with an authentic client(s), and/or had restrained accesses to their client(s), their technological practice was limited, often resulting in a non-achieved grade being awarded.

Planning tools used by students to structure their technological practice can be developed on a format that is decided by the student in negotiation with the assessor. Evidence of review and use of these tools to guide technological practice should be evidenced throughout students' practice, using communication tools such as audio, written, diagrammatic, computer-based, video and modelling tools. Undertaking ongoing reflection, evaluation and modification of planning, as new information/understandings are uncovered, should be evident in the student evidence submitted for assessment.

Evidence of modelling and testing conceptual designs, and implementing the one-off solution to establish its suitability (fitness for purpose) as solution(s) that address the client issue and other key stakeholders, is required to meet the standard.

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

Achievement of this standard requires students to develop a proposal for a production process for multi-unit production of a client technological outcome. The proposal needs to include justifications of why the technological outcome is suitable for multi-unit production, a mode of production, and an estimate of resource requirements, availability, costs and benefits. Students 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, including the immediate environment where the production process will be located.

Students are encouraged to present for assessment all of 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 client's technological outcome
- make necessary design modification to the outcome where required
- identify a suitable mode of production
- estimate major resources, and
- describe a realistic means for production management.

The client technological outcome may be one that a student developed as part of a unit of work that was previously assessed against another standard, and/or one given by the assessor. Where a student-developed outcome is used, assessors need to ensure that it is of a sufficient challenge to allow students to present evidence at the standard expected (refer to the explanatory notes for AS 90627) and that it is achievable within the available time. It was evident in 2004 that, where students 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.

Evidence of ongoing evaluation of ideas, as well as an endpoint evaluation including evidence of testing ideas using such things as mock-ups, models, sketches and interviews, should be presented as part of this evidence. Ongoing consultation with, and consideration of identified stakeholder(s) needs, is an important aspect of technological practice at Level 3.

Students need to demonstrate that they have identified and incorporated appropriate quality control protocols, legislative requirements, formats and other conventions used by technologists who work in a similar context to that of their proposed production process. Student analysis of an existing production process(es) for products similar in context to the client technological outcome is encouraged, to inform the design of a suitable production process.

Students should be encouraged to identify any constraints on the technological practice they undertake to develop their proposal for a production process, and provide evidence of consideration of this for assessment. In saying this, however, it is the assessor's role to ensure that the development of a proposal for a production process for the client is manageable for the student, within any learning environment constraints such as access to resources including the client, access to specialist equipment and expertise, within the time available.

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

Achievement of these standards requires students to demonstrate that they can perform advanced skills in undertaking technological practice, to develop a technological outcome(s) within a specific technological area.

Students need to demonstrate advanced skills that have been used during their undertaking of technological practice to develop technological outcome(s). The explanatory notes provide an indication of what constitutes advanced skills specific to the focus technological area. Skill in undertaking ongoing evaluation of design ideas through testing, using trials, mockups and models, as well as an endpoint evaluation using models and prototypes, should also be demonstrated.

Advanced skills should be demonstrated safely and responsibly within accepted codes of practices. The means by which students communicate evidence of being able to perform advanced skills safely and responsibly within accepted codes of practice will depend on the context in which their technological practice is undertaken, the learning environment and students' individual strengths. Evidence may be presented using such things as photographs, video clips, the solutions/mockups/ prototypes themselves and/or documentation of the skills performed and safety practices considered in the record of technological practice undertaken by students.

UNIT STANDARDS IN TECHNOLOGY

A suite of unit standards is registered that assessors may use to assess specific student competencies in technology. These include unit standards that were written for Technology in the New Zealand Curriculum (US1389–US13413, US14374–US14375) as well as those registered for the previous Design and Technology curriculum. The majority of these standards focus on assessing specific skills and knowledge. The importance of students possessing competencies in these skills, and an understanding of this knowledge in Technology, is dependent upon the technological area(s) and contexts that students are provided opportunity to study in.

While many of these unit standards were originally written to allow student competencies to be assessed through the use of one-off assessment activities, when used in Technology they should be embedded into a unit that requires students to demonstrate their competency through undertaking technological practice to develop technological outcome(s).

Selection of which unit standard(s) will be used to assess student competencies should be matched to the skills that students 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 a Technology unit, confirmation of the standards, appropriateness for assessment purposes can only be validated once students actually engage in the unit. The actual technological practice that students undertake, and therefore the types of skills/understanding of knowledge that they exhibit, can only be determined once students determine the actual technological practice they will undertake. Assessors who strictly adhere to using only those unit standards that they have pre-selected at the time of planning a technology unit have been shown to often later penalise students, where:

- technological practice does not demonstrate the exact skills/understanding of knowledge prescribed in the selected unit standard(s), or
- students' technological practice, and therefore their technological outcome(s), is constrained 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).

Assessors who use a mixture of unit and achievement standards to assess student competencies in the same technology unit need to ensure that students have an opportunity to display all of the competencies required for achievement of these standards, as expressed in the achievement criteria. In a number of instances where this occurred in 2004, it was evident that students were disadvantaged when the assessment material provided to students constrained the types of the evidence that they could produce.