National Moderator Report 2025
Materials and Processing Technology

The following report gives feedback to assist assessors with general issues and trends that have been identified during external moderation of the internally assessed standards in 2024. It also provides further insights from moderation material viewed throughout the year and outlines the Assessor Support available for Materials and Processing Technology.

Insights

92012: Develop a Materials and Processing Technology outcome in an authentic context

Performance overview:

This standard requires students to progress through stages of technological practice to develop an outcome that is fit for purpose, with measurable physical and functional specifications. The practices used will vary depending on the technological context, e.g. resistant, textiles, food, electronics, and on each individual brief. A physical outcome must be created, as this is a key part of technological practice. A physical item is something tangible with a real material presence.

The standard can be effectively met when students engage in authentic, personalised contexts, even if all students are making the same outcome. Popular contexts include tuakiri (identity), sustainable design, and manaakitanga (hospitality). Students who were not limited in their choice of outcome or in the way their evidence was collated and published were more successful.

Outcomes where students choose their own context and where the outcome is intended for an end user other than the student usually show better evidence of meeting the standard.

Measurable specifications for the outcome need to be evaluated and explained as either met or not met. At the Achieved level, a tick in a box is enough to show evaluation, and an explanation of how the specification was met can be implied within the evidence of technological practice, such as in a photograph, sketch, or annotations. An outcome can also be partially fit for purpose, but it must address the requirements of the brief.

Evidence that meets the standard includes a photograph of the outcome in the actual or modelled intended environment.

For Merit, students showed evidence of refining (changing or modifying) their outcomes. Most changes were related to the appearance, function, or choice of materials and processes. These refinements increased the chances of meeting the end user's needs.

Successful Merit students gathered feedback at least twice during development, from more than one stakeholder. They used methods like Google Forms, post-it notes, feedback charts, and star diagrams. This feedback clearly influenced the development of the outcome's physical and functional features, as well as the selection of materials, techniques, or procedures.

Samples that clearly explained how stakeholder feedback and other technological practices (e.g. modelling) informed decision-making were moderated at Merit. Decisions had to show improvement in the outcome's fitness for purpose, even if the improvements were minor.

Comparing trial results and gathering relevant feedback provided stronger evidence of informed decision-making during development.

For Excellence, the evidence included analysis that explored the connection between stakeholder feedback and the development of the outcome. Successful students compared different feedback

and used graphic organisers like charts, mind maps, and diagrams to show connections between ideas and how feedback related to different development stages.

At Excellence, students judged the outcome's fitness for purpose as it developed and evaluated how well it met the end user's needs upon completion. The physical outcome was tested in the actual environment, and the evaluation gave value to the specifications by communicating in measurable terms how they had been met or not met.

Practices that need strengthening:

When the evidence only described broad attributes of the outcome, it often did not meet the standard. This showed a lack of understanding of the specific requirements for the authentic outcome. Specifications need to be measurable, both physically and functionally, in order to meet the standard.

When students gathered extensive evidence showing the steps taken to produce their outcome, rather than focusing on the technological practices used in its development, the sample was less likely to meet the standard.

A common issue was the lack of analysis on how stakeholder feedback influenced the development of the outcome. Simply duplicating, describing, or rewording the feedback was not enough. Students need to compare, consider, and apply the feedback to achieve higher grades. This was difficult if the feedback was not relevant or purposeful for developing the fitness for purpose or specifications of the outcome.

If there was interaction with only one stakeholder, or if the student was the sole stakeholder, it limited the opportunity to present relevant feedback and achieve grades higher than Achieved. Where the student was one of the stakeholders, the evidence of feedback was often not clearly related to development but simply confirmed the students thinking. For higher grades, feedback must come from at least two stakeholders and at least two different stages of development.

When Merit grades were adjusted during moderation, assessors needed to ensure that the evidence of how the feedback was applied during development was clear.

The final evaluation should assess the fitness for purpose of the outcome, not just reflect the development process. An evaluation or reflection that describes the construction process is not required.

For group work, additional evidence of individual technological practice and individual specifications was needed in some samples.

Heavily templated documents prepared by the assessor often did not allow for authentic student evidence. When using templates and writing frames, assessors need to ensure that they allow students to record personalised evidence for all aspects of the standard.

Large volumes of evidence are not required for this standard, and students are encouraged to succinctly summarise the evidence submitted.

In a few samples, the expectations of level 6 were not met. This was because the evidence did not show sufficient technological understanding or practice, and/or the outcome was not at the expected level of development or finish.

92013: Experiment with different materials to develop a Materials and Processing Technology outcome

Performance overview:

This standard requires students to experiment with different materials to develop a Materials and Processing Technology outcome. While evidence of development is required and a physical outcome must be created, the scope of the evidence of development is not the same as what is needed for 92012.

Students were more likely to achieve the standard when experimentation involved the use of two or more materials. The materials may come from the same material group, but students who pre-selected a single material to use were less likely to attain the standard.

The standard was met when students applied one or more of the methods in Explanatory Note (EN) 3 to more than one material, in order to explicitly explore the materials' properties. Where the evidence shows the student observed material properties when combining, manipulating, transforming, or forming a range of materials, the standard will be met when the materials used in these experiments were seen in the creation of the outcome.

The outcome must be purposeful and evidence will show that the student has achieved a specific intention. A single photograph could demonstrate this.

Students who explored material properties through physical testing or trialling of materials were most likely to achieve. Research into different materials and their inherent properties, or simulation of material testing, was not enough on its own to meet the standard.

At Merit, the ongoing experiments should comprehensively explore the material properties, specifically by employing the techniques outlined in EN3. This is referred to as examination in the standard, as the experiments go beyond a one-time study of the material properties and guide students to make deliberate choices regarding the selection of properties and use of materials.

At Merit, successful students refined the use of materials (filtered out suitable/unsuitable materials) because of the ongoing, deeper investigation using methods in EN3. The refinements of the use of materials could be significant or minor, and ideally would increase the likelihood of the outcome being purposeful. To secure a Merit grade, feedback gathered from more than one stakeholder at different stages of development should be clearly incorporated, and the feedback will likely consider material properties.

For Excellence, the evidence included an analysis exploring the connection between materials' properties and creation of a purposeful outcome. Successful students generally showed ongoing analysis throughout the sample as the experiments were completed, and also supported the analysis with data from research or stakeholder feedback.

Successful evidence at Excellence also used the analysis of the material properties as reasoning or evidence of why materials were selected or rejected. This justification would relate in some way to the capacity or ability of the outcome to be purposeful.

While the standard does not explicitly require the outcome to be tested in the actual or modelled intended environment, this evidence was often present when students were working at Excellence.

Practices that need strengthening:

When the evidence focused heavily on the technological practices used to develop the outcome and associated specifications, it often did not meet the standard. While attributes and specifications are good technological practice, they are not required for this standard.

The criteria "Experiment with different materials" was often misunderstood. Students need to use the methods explained in EN3. A common mistake was that students observed inherent characteristics of materials such as tensile strength, flavour, appearance, flammability, nutritional value, water resistance, etc, without using the specified methods (transforming, combining, manipulating, or forming).

Another issue was that students often used methods for transforming, combining, manipulating, or forming materials with the goal of selecting appropriate processes, techniques, tools, and equipment, rather than exploring material properties. If material properties are not observed, the standard cannot be met.

To attain Merit, more than one stakeholder should be consulted at more than one point during development.

When Merit grades were adjusted during moderation, assessors needed to ensure that the evidence of refinement was related to the selection of materials based on their properties, rather than just refining the appearance or function of the outcome, or the choice of tools, equipment, processes, and techniques.

The requirement to ‘evaluate different materials’ was also often misinterpreted as a final evaluation of the outcome's fitness for purpose, or as an evaluation of how well the student met the requirements of the assessment activity. For 92013, the evaluation at Excellence would require assessing, testing, and analysing the properties, suitability, and performance of the materials. This is where the standard also differs from 92012.

When aiming to 'upcycle', many students chose premade objects like clothing or household items, treating them as distinct materials. Although this is a valid approach to sourcing materials, it often limited their ability to experiment because of the prefabricated nature of the selected items.

The standard encourages collaborative experimentation. In samples where group work is undertaken, evidence of individual student observations and independent technological practice is required.

In some cases, students considered design elements or material characteristics as material properties. The focus should be on the performance properties of materials that determine how they behave when transformed, combined, manipulated, or formed, and their suitability for particular applications.

In a few samples, the expectations of level 6 were not met because the evidence did not show sufficient technological understanding or practice, and/or the outcome was not at the expected level of development or finish.

The evidence for this standard was often also used for the external 92014. Often, the focus of the evidence was on demonstrating an understanding of sustainable practices in the development of a Materials and Processing Technology outcome, rather than exploring material properties.

In many Processing Technology samples, evidence of what was observed about the properties of the ingredients or electronic components when combined or manipulated was not explicit.

Heavily templated documents prepared by the assessor often did not allow for authentic student evidence. When using templates and writing frames, assessors need to ensure that they allow students to record personalised evidence for all aspects of the standard. Large volumes of evidence are not required, and students are encouraged to summarise the most important findings from their experiments and show how these have informed the selection of material properties for the purposeful outcome.

91608: Undertake brief development to address an issue within a determined context

Performance overview:

This standard requires students to develop a brief from the investigation of an authentic issue and the related context considerations. Integral to this standard is the purposeful selection of key stakeholders and wider stakeholders (at least two of each) who offer relevant perspectives and feedback (on the context, identified issue and the ensuing measurable specifications).

Documentation that included an initial, revised and final brief reflective of the views of the stakeholders as evidence of the influence of ongoing feedback is required.

Communicating the final brief with comprehensive specifications that reflect the needs of the unique social and physical environment is required for the standard to be met. Students were most successful when they had generated a range of relevant attributes for the outcome and used stakeholder feedback to develop those attributes into detailed measurable specifications, including physical, functional and manufacturing specifications.

Students who gained Merit and Excellence were able to demonstrate and justify how the specifications allowed the judgement of fitness for purpose in the broadest sense in each iteration of the brief.

91610: Develop a conceptual design considering fitness for purpose in the broadest sense

Performance overview:

This standard requires students to develop original designs (more than one unique idea which is not a replication of existing ideas or a modification of one idea) and select a conceptual design that has the potential to address the brief. Successful evidence used targeted research, functional modelling and feedback from relevant sources to inform the development of a conceptual design which could eventually be evaluated as fit for purpose in the broadest sense. A focus on gaining feedback from a range of relevant stakeholders using open-ended questions allows students to gain relevant and in-depth information to confirm or inform developing ideas. Evidence gathered via these sources will validate assumptions about the design and guide refinement of the idea.

Limiting an evaluation of fitness for purpose to a judgement on how the conceptual design would look and function in the intended environment demonstrated insufficient understanding of the standard. Evidence of fitness for purpose in the broadest sense is required throughout the documentation and evidence which triangulates the ongoing research, fitness for purpose in the broadest sense and stakeholder feedback provided a better opportunity to demonstrate Excellence.

91611: Develop a prototype considering fitness for purpose in the broadest sense

This standard requires students to develop a prototype to be trialled in a chosen social and physical environment to gain evidence of fitness for purpose. The standard was able to be met when students considered the influence of the wider social and physical environment when determining the suitability of materials and/or components, practical techniques and processes. Successful evidence used functional modelling and feedback from a range of sources to inform the development of a prototype which could eventually be explained as fit for purpose in the broadest sense. Feedback from a range of relevant stakeholders using open-ended questions allows students to be more knowledgeable and conversant during the development of the prototype. All evidence gathered, including results from testing and stakeholder feedback, validates assumptions about the effectiveness of the potential prototype.

For Merit, an evaluation is required which communicates how materials and/or components, practical techniques and processes are combined effectively to create a refined prototype.

Evidence of fitness for purpose in the broadest sense is required throughout the documentation (not just in the final evaluation), and evidence which triangulated the ongoing testing, fitness for

purpose in the broadest sense and stakeholder feedback provides better opportunity to demonstrate Excellence.

91620: Implement complex procedures to integrate parts using resistant materials to make a specified product

Performance overview:

This standard requires students to implement complex procedures to integrate two or more assembled parts using resistant materials to make a specified product.

The standard was able to be met when evidence included measurable specifications agreed prior to the product being made. Trialling and feedback to inform the selection of the most suitable complex techniques to use to integrate two or more assembled parts is crucial evidence. A schedule of ongoing tests is needed, reviewed at key reference points as the outcome is developed to reduce the chance of error. Those reference points must be used to check the integration is precise.

The implementation of the complex procedures to ensure the product meets specifications must comply with relevant health and safety regulations when undertaking preparation, integration and testing. Evidence of the final outcome to show the function of the integrated parts is also required.

Evidence of the skilful, then efficient implementation of complex procedures to integrate parts is required to attain grades above Achieved. Successful students provided evidence of the manner in which techniques were implemented, regardless of whether the specified product met specifications and the quality of the finished product.

Where assessors provided evidence from observations and attested the student's grade at Merit or Excellence, assessment decisions were generally reliable.

Practices that need strengthening:

Where grades were changed in moderation, assessors need to ensure that the procedures used were comparable to those listed in the standard in terms of complexity of techniques required. The degree of accuracy and precision required is what makes the procedure complex.

A lengthy work log is not required for this standard, but evidence must show the student has planned the order in which the item is to be made and identified when testing for precise preparation and integration is to occur. These schedules should be established before construction begins.

Evidence of students making class projects where products are similar are more likely not to reach the standard. Students using teacher-led briefs and specifications may be disadvantaged in their ability to make an informed selection from the trialling of techniques.

Evidence of the integration environment is often insufficient, meaning the student cannot reach Achieved. Photographic or written evidence of the preparation of the parts for integration, and of the selection and set up of tools, equipment and assembly aids in the workshop is required alongside sufficient evidence of relevant health and safety practices. Lists of workshop rules or a tick on an assessment schedule by the assessor does not attest compliance. Where photographs of the individual student applying correct practices are used, the evidence is more likely to reach Achieved.

Some assessors are still using Version 3 of the standard. Since 2020, the standard clarified the requirement for trialling of techniques and scheduling.

91643: Implement complex procedures to process a specified product

Performance overview:

This standard requires students to implement complex procedures that require a diverse range of processing operations to be performed in a particular order. This order is based on knowledge of techniques and operations, and feedback on the testing must inform the selection of those techniques or procedures.

The standard was able to be met when evidence included measurable specifications, including material specifications, that were agreed prior to the product being made. Students must show they have used the flow diagram to execute the processing operations and tests. The diagram must show how the student has modified the processing operations after reflecting on the feedback. A flow diagram developed by the student must include feedback loops, interactions between processing operations and testing to ensure the quality of the final outcome is controlled and consistent.

Evidence of testing beyond a single sample is required. Students will randomly select samples, test them for desired properties and then repeat the process, exactly replicating the measurements in an identical production run. This allows for students to gather evidence of how the quality of the end product is assured in further production runs.

Yield and financial costs, including the cost of energy and labour, must be calculated. For Merit, the student must predict these factors and compare them to actual per unit costs. All testing and implementation of the complex procedures must be undertaken in a manner that complies with relevant health and safety regulations. Photographs of the final outcome are needed.

Where assessors provided evidence from observations and attested the student grade at Merit or Excellence, assessment decisions were generally reliable.

Practices that need strengthening:

Where grades were changed in moderation, assessors need to ensure that the processing procedures used are comparable to those listed in the standard in terms of complexity of techniques required. At Level 3, evidence should focus on techniques that require a diverse range of processing operations to be performed in a particular order based on knowledge of techniques, operations and testing feedback.

Evidence of replicant testing is required to reach the standard. This does not involve trialling different recipes or substituting ingredients or changing quantities. Replicant testing is trialling exactly the same procedures and measurements, more than once, to test a sample across two batches. This practice checks for consistency in quality assurance.

A lengthy work log is not required for this standard, but the evidence must demonstrate a flow diagram has been developed and followed. A well-structured flow diagram should incorporate multi-tasking of operations and quality control. The students who annotated/modified their flow diagram in response to feedback and test results to show corrective action where needed were more likely to reach Achieved.

The standard also requires sufficient evidence of students applying techniques to comply with relevant health and safety practices. Lists of kitchen rules or a tick on an assessment schedule by the assessor do not attest compliance. Where photographs of the individual student applying correct practices are used, the work is more likely to reach Achieved.

Assessors need to ensure that evidence clearly indicates how each student has executed complex procedures independently and accurately (Merit), and in a manner that economised time, effort and materials (Excellence). A tick in a box on the assessment schedule is not sufficient attestation for higher grades.

The following feedback assists assessors with general issues and trends that have been identified during external moderation of the internal Technology standards. It does not clarify specific standards, but provides further insights from moderation.

Volume of Evidence Produced

Some students produce an excessive volume of evidence. Students are not required to submit evidence beyond the criteria of the standard. This is mostly evident in Technology, where students document irrelevant information such as unconnected research related to materials and trials.

Students who critically select evidence for documentation are concise and achieve at higher levels. These students document alternatives that are significant in making informed design decisions.

Many submissions use templates and writing frames to manage the volume of student evidence. These have been mostly successful for the skills-based standards (commonly known as implement standards). Most effective templates for skills-based standards have been as little as 1-2 A3 pages, with relevant text and photographs or audio/video inserted by the student and/or annotations from the assessor.

When using templates and writing frames, assessors need to ensure that they allow students to record evidence for all aspects of the standard.

Merit and Excellence at Level 3

When making assessor decisions regarding Excellence, consideration needs to be given to the overall quality of the evidence. This is critical when making a judgement at the Merit/Excellence boundary.

Consideration of ‘fitness for purpose in the broadest sense’ is a major step up in Level 3 Generic Technology standards. Successful students only considered issues that were meaningful in their design. These students considered broadest-sense issues throughout the design development, rather than an evaluation at the end of design. Producing concise and connected information provided students with better opportunity to demonstrate Excellence.

Students who reached higher grades in skills-based standards implemented complex procedures independently, accurately (Merit) and in a manner that economised time, effort and materials for a sustained period of the assessment (Excellence). Where assessors attest student grades at Merit and Excellence, details must be provided by the assessor of how the student implemented complex procedures with independence, accuracy and economy. A tick in a box on the assessment schedule is not sufficient attestation for higher grades.

Selection of techniques/procedures

For standards that have selection as part of the criteria, students who research or trial alternative methods, allowing them to make an informed choice of a technique or procedure, will succeed in meeting the standard’s requirement for selection. For example, in resistant materials the student might research or trial different welding methods and select the most suitable. In textiles, the student might research or trial different ways of doing a welt pocket and select the most suitable.

Assessor Support

NZQA offers online support for teachers as assessors of NZC achievement standards. These include:

- Exemplars of student work for most standards*
- National Moderator Reports*

- Online learning modules (generic and subject-specific)**
- Clarifications for some standards*
- Assessor Practice Tool for many standards**
- Webcasts*

*hosted on the NZC Subject pages on the NZQA website.

**hosted on Pūtake, NZQA's learning management system. Accessed via Education Sector Login.

We also may provide a speaker to present at national conferences on requests from national subject associations. At the regional or local level, we may be able to provide online support.

Please contact workshops@nzqa.govt.nz for more information or to lodge a request for support.

To give feedback on this report click on this link.