

# 2024 NCEA Assessment Report

<b>Subject:</b>	Generic Technology
<b>Level:</b>	2
<b>Achievement standard(s):</b>	91358, 91359, 91360, 91363

## General commentary

Candidates whose response demonstrated an authentic viewpoint or reflected their own technological practice were more likely to be awarded the higher grades. In contrast, candidates whose responses relied heavily on templates or whose technological practice was less student-led were awarded lower grades. Responses that exceeded the recommended report length typically included a significant amount of information not relevant to the assessment.

## Report on individual achievement standards

### Achievement standard 91358: Demonstrate understanding of how technological modelling supports risk management

#### Assessment

The assessment was a digitally submitted report.

#### Commentary

Many candidates started their reports with a brief description of prototyping and functional modelling rather than long, detailed definitions. This allowed them to discuss their own modelling in more detail. Many candidates successfully addressed the probability of risk as well as the severity. Some candidates wrote introductions and definitions that were too long or unnecessary. Candidates should be referencing actual modelling that has taken place and the decisions made from investigations, testing, and trialling.

Many reports included research as a form of modelling. Frequently candidates did not establish what opportunities they were deriving from their research analysis (could) or establish which desirable design elements they would pursue (should).

Some candidates did not demonstrate skills in specific modelling processes, which limited their ability to successfully model and test their ideas. In some cases, candidates did not demonstrate understanding of what advantages the chosen modelling mode provided. Candidates are encouraged to explain how the modelling tool or process can be used to test a particular element of their idea (for example, a simple card model may not successfully test a wood joint). The modelling method must be used to represent / trial the intended outcome (for example, modelling a seam in textiles using a scrap of the intended fabric). Use of computer aided design (CAD) tools, in the worst cases, detracted from the original design by radically changing it due to the constraints of the candidate's ability to use the chosen program.

Candidates who explained decisions tended to focus on a limited range of broader factors and in some cases only one. Frequently, this involved a single social factor and, in some cases, was contrived and overly engineered.

## Grade awarding

Candidates who were awarded **Achievement** commonly:

- made appropriate decisions as part of modelling exercises but with limited consideration of broader factors in their choices (should)
- attempted to justify decisions, but limited these to a single broader factor, typically a social factor
- used key words related to the assessment criteria but did not demonstrate understanding of what was required for Merit, providing specific examples and explanations that underpin considerations and decisions would have been better
- identified risks directly related to the design and development of their concept and made attempts to assess the severity, but without sufficient explanation of the implications
- communicated well the procedure carried out in their practice, but not the information gained through modelling and how this changed / influenced the next stages of the development
- made reference to consulting with stakeholders in general but were not explicit about which stakeholder.

Candidates who were awarded **Achievement with Merit** commonly:

- based their report on a brief and context that challenged them and provided opportunities to trial and test multiple design elements
- displayed high levels of modelling skills
- described in detail the different ways their ideas could be done in the early stages of the design process, such as product analysis and sketching ideas, including exploring alternative feasible ways a particular functional or aesthetic element could be considered
- identified specific stakeholders and an end user both at the start and throughout the report
- selected and targeted stakeholder feedback specific to different forms of modelling
- established early in the report what specific broader factors (social, moral, and environmental) they were measuring and testing their judgements against in making 'should' decisions
- filtered and were selective with the risks they identified, focusing on those that mattered most, and explained the implications of the risk in detail
- chose relevant and appropriate modelling methods and resources that matched particular feasible design elements they wanted to test.

Candidates who were awarded **Achievement with Excellence** commonly:

- developed a solution based on an authentic context and included typical end users as one of their stakeholders
- sought opinions from their target audience
- used an iterative process in each of the modelling stages, for example, carrying out a discussion panel as well as sending out surveys
- discussed and compared alternative ways the modelling could have been done and why the method and resources they chose were the most effective ones
- selected appropriate stakeholders through each modelling stage and discussed their matching credentials to the modelling stage
- compared the reliability and relevance of the feedback given by different stakeholders
- discussed and compared different stakeholders and what impact their feedback had on the development of the concept.

Candidates who were awarded **Not Achieved** commonly:

- used a limited range and forms of modelling
- did not demonstrate the skills to carry out a range of modelling processes
- followed and documented a making process rather than using design development and iteration
- did not include any stakeholder feedback
- did not explore and communicate the different ways they could develop an idea and make decisions on what should be the way forward
- tended to describe and make points around the subject of functional modelling without providing real and authentic examples
- employed simple bullet-point responses to templated questions or suggestions.

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## Achievement standard 91359: Demonstrate understanding of the role of material evaluation in product development

### Assessment

The assessment was a digitally submitted report.

### Commentary

Candidates often started the report by describing the technological practice undertaken. Presenting the design problem /brief allows the reader to understand the nature of the project from the start, however, some candidates went into too much depth. When presenting the design brief and specifications, some candidates developed the broader product specifications to look more closely at the performance criteria of the material. This allowed them to better meet the merit and excellence criteria through explaining and discussing the evaluation of materials and the product's design.

The most successful candidates used material evaluation procedures, underpinned by an adequate knowledge of materials, to genuinely make decisions which allowed them to develop their product. Where the design brief limited these opportunities or the selection of material evaluation procedures didn't allow for genuine choice / was used to justify a predetermined decision, the quality of the submission suffered and candidates were unable to demonstrate their understanding in these areas. Where the material evaluation procedures were candidate-driven and used authentically, the quality of the reports was significantly higher.

Many candidates used tables to present their work to effectively present the properties of a range of materials and link these to the product development decision making. However, where tables extended over several pages, unclear formatting often made marking the assessment more challenging.

Some candidates attempted the Excellence criteria by including a maintenance and disposal section in the report, often towards the end. However, often this was only a description of maintenance and disposal and the report lacked the discussion required to achieve Excellence. Candidates who gained Excellence had clearly considered the interplay between material selection and the design of the product throughout their technological practice and were able to discuss these factors, often throughout the report. Where this was not built into candidate thinking, it was challenging for them to gain Excellence.

Some candidates focussed on the procedures of material testing and evaluation without drawing conclusions or explaining the decisions made as a result of the documented procedures (determining suitability). Often this resulted in lengthy reports where achievement was limited.

## Grade awarding

Candidates who were awarded **Achievement** commonly:

- introduced the design brief and performance specifications to frame an inquiry process that focussed on material selection
- explained the connection between material properties and the performance specifications of their product
- utilised knowledge of material properties to create a shortlist for material evaluation and testing
- defined performance criteria for their product and demonstrated how these were connected to the properties of potential materials
- clearly described the material evaluation procedures, showing how this informed decisions during product development
- included visual evidence of the evaluation procedures to enhance their descriptions
- provided explanations of the material evaluation procedures but did not clarify the reasons for using specific methods.

Candidates who were awarded **Achievement with Merit** commonly:

- explained, often in some detail, the evaluation procedures undertaken to inform material selection decisions
- engaged in authentic testing / materials evaluation that was clearly student driven or highly relevant to the student practice, allowing them to explain why the procedures were undertaken
- identified the maintenance and disposal considerations linked to a particular material or materials but failed to discuss this in terms of the relationship between the materials and the design, and often added it to the end of the report rather than embedding throughout.

Candidates who were awarded **Achievement with Excellence** commonly:

- demonstrated understanding of the interplay between material properties, through evaluation and product design
- considered alternative materials or justified their choice of material
- discussed the relationship between the evaluation of materials, material selection decisions, and the product's design
- embedded these considerations throughout the response as opposed to adding an excellence section onto the end of the report
- undertook authentic practice in which material selection decisions were genuinely based on the results of the evaluation procedures and knowledge of material properties
- considered maintenance and disposal of their product during design and material selection, allowing this to form a natural part of their discussion in the report.

Candidates who were awarded **Not Achieved** commonly:

- did not identify performance specifications for the product or failed to connect them to material properties
- presented theoretical knowledge about materials or material processing without detailing the decisions taken
- described a manufacturing or fabrication process but did not conduct evaluative procedures to support material selection decisions
- framed their material evaluation as a justification for a pre-determined choice, presenting the testing as a way to validate their final product rather than to inform material decisions
- presented their report as a case study on a product that interested them, but as the report was based on somebody else's practice it was challenging to describe material evaluation procedures.

## Achievement standard 91360: Demonstrate understanding of redundancy and reliability in technological systems

### Assessment

The assessment was a digitally submitted report.

### Commentary

In a report where the understanding and knowledge is based on research, candidates must ensure they acknowledge the source of their material. Candidates must remember if they use material sourced through AI then they must interpret it themselves. They cannot present AI downloaded material as their own.

### Grade awarding

Candidates who were awarded **Achievement** commonly:

- selected an appropriate technological system or systems to report on
- described the application of redundancy to a specific technological system
- described the application of reliability to a specific technological system
- had a clear understanding of redundancy as duplication of function
- had a clear understanding of reliability as consistency of function
- provided clear evidence using technical details.

Candidates who were awarded **Achievement with Merit** commonly:

- explained why decisions about redundancy were made in the development of a specific technological system
- explained why decisions about reliability were made in the development of a specific technological system
- made the links to redundancy and reliability explicit in the development stages of a specific technological system.

Candidates who were awarded **Achievement with Excellence** commonly:

- extended their explanations into discussions by suggesting alternatives, comparing, and contrasting
- gave clear reasoning about decisions made during the design of a system to enhance either automated or human required maintenance.

Candidates who were awarded **Not Achieved** commonly:

- demonstrated a limited understanding of what a system is
- misunderstood the meaning of redundancy
- wrote in general terms about redundancy and / or reliability without linking it to a specific technological system
- had an imprecise understanding of a technological system; sometimes candidates reported on organisational systems such as people making backup copies of data or having a second pilot in an aircraft
- reproduced technical detail without linking it to redundancy or reliability
- reproduced material without acknowledgement.

## Achievement standard 91363: Demonstrate understanding of sustainability in design

### Assessment

The assessment was a digitally submitted report.

### Commentary

Reports were most successful when they demonstrated a strong independent voice, thoroughly discussed life cycle analysis (LCA) and innovation in design, and highlighted the competing priorities and compromises involved. This year, sustainability knowledge in design was weaker, with a more limited range of contexts and less student voice. There was also evidence of templated reports, particularly in the product-focused hard materials context. In some cases, using templates has restricted the ability of candidates to achieve at higher levels.

### Grade awarding

Candidates who were awarded **Achievement** commonly:

- demonstrated an understanding of the three pillars of sustainability and the role of LCA in identifying opportunities for design intervention
- incorporated a case study to identify areas for intervention, though the level of detail was often insufficient
- recognised innovation as a key strategy for enhancing sustainability outcomes, but needed further development to achieve a at a higher level.

Candidates who were awarded **Achievement with Merit** commonly:

- clearly described the three pillars of sustainability and effectively illustrated their interconnections using the Venn diagram
- clearly explained LCA and its purpose in enhancing sustainability, mainly by using a detailed case study analysis, identifying areas for intervention and showcasing key innovations. Some candidates demonstrated deeper understanding by analysing multiple case studies
- applied LCA to their own practices, identifying opportunities for intervention and proposing innovative solutions.

Candidates who were awarded **Achievement with Excellence** commonly:

- demonstrated a comprehensive understanding of sustainable design through an in-depth analysis of both a case study and their own practice
- clearly identified key competing priorities and compromises that needed to be addressed
- demonstrated an understanding that sustainability extends beyond simply using recycled materials or reducing waste
- systematically addressed each priority or compromise
- linked their decisions to sustainable design practices and to three pillars of sustainability, providing well-reasoned justifications for their choices.

Candidates who were awarded **Not Achieved** commonly:

- described the design process or explained decisions made but failed to connect them to sustainability
- did not demonstrate how completing a LCA helps designers identify areas in the design cycle for intervention and improvement
- relied on a template, which restricted their ability to achieve higher levels
- did not address the role of innovation in sustainable design.