2015 NCEA Assessment Report

NZQA
NEW ZEALAND QUALIFICATIONS AUTHORITY
MANA TOHU MĀTAURANGA O AOTEAROA
QUALIFY FOR THE FUTURE WORLD
KIA NOHO TAKATŪ KI TŌ ĀMUA AO!

Technology Level 2 91358, 91359, 91360, 91363, 91367, 91371

Report on standards

1. Assessment Report for 91358: Demonstrate understanding of how technologiccal modelling suports risk management

Achieved	Candidates who were assessed as Achieved commonly: • identified a range of technological modelling practices including both functional modelling and prototyping strategies • identified risks that were relevant to the success or failure of a technological outcome identified during modelling • considered input from multiple identified stakeholder groups. Input was evaluated and guided the ongoing development of a technological outcome • described what 'could' be done with regard to what is possible and 'should' be done with regard to what is economically viable, ethical, sustainable, socially acceptable, or similar relevant responses.
Not Achieved	Candidates who were assessed as Not Achieved commonly: • included no risks or risks that were not directly related to the success or failure of the technology outcome • described various modelling strategies without relating these to either risk or stakeholders • used the candidate as the sole stakeholder • used case studies and/or research in a narrative manner without showing candidate voice or understanding.
Achieved with Merit	Candidates who were assessed as Achieved with Merit commonly: • within a relevant context, discussed multiple examples of modelling processes that facilitated the identification of risk together with the type, severity and probability of that risk occurring • discussed examples of 'could' and 'should' decisions that occurred during different stages of product development and how the related modelling practices guided those decisions • used a structured approach to writing, submitting work that contained appropriate headings, well-structured paragraphs and a methodical approach that addressed all of the bullet points contained in explanatory note two of the standard.
Achieved with Excellence	Candidates who were assessed as Achieved with Excellence commonly: • discussed multiple examples of the use of modelling to gather differing types of evidence from different stakeholder groups that were both valid, reliable and provided ongoing guidance in the development of a technological outcome • discussed a variety of modelling practices, within specific contexts, and why those modelling strategies were used with different stakeholder groups.
Standard specific comments	Reports were generally well presented. Most reports were computer generated and met the specifications with regard to font size and length. There were a handful of reports that did not meet the specification of the standard – small fonts, illegible handwriting or length greater than 10 pages were noted. Reports on disc in PowerPoint format were usually not successful. Reports often contained a discussion of the candidate's own practice, that of professional technologists, or more theoretically based evidence. Successful candidates used one or more of these approaches to demonstrate their understanding of modelling together with

	an analysis of the modelling used. Some candidates used a provided template or list of headings for their submission. Where these templates were complete and well-structured, they were of use to the candidate. In several cases, these templates were not complete and made it impossible for the student to achieve the standard. Templates based on the headings in explanatory note 2 of the standard were more likely to be successful. Similarly, some candidates were provided a MS Word table containing headings for the candidate to complete. These candidates faced the size constraints of the provided table and struggled to display their understanding of the standard. In some cases, a portfolio of work was presented that was designed to meet the requirements of several assessments. It was not always clear to markers which evidence was relevant to AS91358. Moreover, these assessments were often over length and rarely successful. Case studies of practising technologists were a feature of many submissions. These case studies are not required and were not always useful. Case studies were useful where candidates discussed the practice of the professional technologists and, in some cases, discussed or compared that practice with their own. Case studies were not useful where the candidates recounted the practice of the technologists without any discussion or reference to modelling. Most successful reports began with a general introduction that showed understanding of both Functional Modelling and Prototyping. This understanding was further elaborated later in the report. Candidates who could not clearly differentiate between these two components of modelling did not achieve. In a significant number of reports, candidates did not address the requirements of the standard. Often these unsuccessful reports looked more like a conceptual design or prototyping assessment where the candidate discussed a step-by-step approach to developing an outcome with little reference to the process of modelling. Reference to ‘stakeholders’ was made in almost all reports. Successful reports explained the role of the stakeholder, their influence in the product development and the point in the modelling process where different stakeholders were used. The mention of generic stakeholders, without reference to their role, input or influence, often led to a Not Achieved grade. Explanatory note 3 of the standard contains the term ‘prototyping’. Successful reports did not need to contain discussion or explanation regarding a prototype. An understanding of the process of prototyping is however required to meet the standard. The term ‘risk’ in the standard title refers to the risk associated with the successful development of a product. It does not refer to workshop safety, food safety or other related risks. The ‘reduction of risk’ is certainly an important part of this standard. A discussion as to how modelling guided the reduction and/or management of risk is required, and for a Merit grade the type, severity and probability of risk must also be included. It is not sufficient to state a particular modelling process allowed the ‘reduction of risk’ without further discussion, identification and elaboration. The terms ‘could’ and ‘should’ from the explanatory notes were often not addressed well by candidates. The term ‘could’ relates to the technically feasible outcomes identified by the modelling process. The term ‘should’ will contain the possible outcomes, identified by the modelling, that are worthy of further development. When discussing factors that ‘should’ be considered candidates might evaluate manufacturing capability, economic viability, social acceptability, sustainability, social acceptability and ethics. Candidates may also need support with their writing skills. The absence of headings, structure and general clarity in candidate writing made it difficult to identify student understanding. Poorly structured reports that did not communicate understanding were often awarded Not Achieved grades. In all cases, a holistic evaluation of candidate submissions was made. Areas of strength were sometimes sufficient to compensate for weaknesses in another part of a submission.

2. Assessment Report for 91359: Demonstrate understanding of the role of material evaluation in product development

Achieved	Candidates who were assessed as Achieved commonly: • presented some, often minimal, research about properties of materials with some, often minimal, application of this research to their specifications • showed some evidence of material testing • reported on the testing of materials for use • reported upon materials evaluation processes.
Not Achieved	Candidates who were assessed as Not Achieved commonly: • produced a report based on the Level 1 criteria • did not show evidence of performance specifications • did not show evidence related to performance properties • reported on modelling rather than material testing • downloaded a large part of the report from the internet.
Achieved with Merit	Candidates who were assessed as Achieved with Merit commonly: • explained the performance properties of the outcome; explained why different material evaluation procedures were undertaken and how this impacted on the choice of materials that were used in their outcome • explained how they developed their knowledge of the suitability of materials for their outcome • indicated maintenance and disposal concerns of their outcome, but did not develop these in depth • indicated why the evaluation procedures performed on a material were relevant to the performance specifications of their brief • used the information gathered from their stakeholders to inform their material selection.
Achieved with Excellence	Candidates who were assessed as Achieved with Excellence commonly: • developed their discussions by relating their findings to other outcomes • discussed the relationship between performance properties and performance specifications throughout their report as well as discussing the maintenance and disposal in relation to their outcome • discussed their technological experiences, often related to their practical work and often not from a case study, which enabled a clear demonstration of the candidate's understanding • demonstrated a full understanding of what they had learnt about the materials tested, the properties of the materials and why these were chosen in relation to the performance specifications of the final product.
Standard specific comments	Most candidates presented submissions on A4 pages within the 10 page limit. A few candidates used smaller font, which was a disadvantage. A few candidates used A3 photocopies of folio work from their internals which did go over the 10 pages of A4 limit. Only the first 10 pages of evidence were marked. Candidates who submitted less than 10 pages were not disadvantaged. There was a big improvement in the quality of the reports submitted; personal voice was more often evident. Referencing had improved significantly in many reports. Some unsuccessful candidates could possibly have been successful if they had improved either their referencing or the relation of sourced information to some form of personal understanding. More genuine evidence of testing was evident in the reports and applied to the material choices for an outcome. There appeared to be minimal advantage for candidates who included work from their own practice and from a case study, as they often failed to link the two. Most often the entire evidence for the grade came from the candidate's own practice. Many successful candidates produced reports with clearly headed sections, e.g. - relationship between performance properties and performance specifications - material evaluation procedures undertaken - knowledge/techniques underpinning a procedure. However, some candidates responded to frameworks in a manner that clearly demonstrated a lack of understanding.

3. Assessment Report for 91360: Demonstrate understanding of redundancy and reliability in technological systems

Achieved	Candidates who were assessed as Achieved 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 • described the social, cultural and or environmental importance of reliability and redundancy.
Not Achieved	Candidates who were assessed as Not Achieved commonly: • had 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; e.g. some candidates reported on organisational systems such as people making backup copies of data • reproduced technical detail without linking it to redundancy or reliability.
Achieved with Merit	Candidates who were assessed as Achieved with Merit commonly: • explained why decisions regarding redundancy were made in the development of a specific technological system • explained why decisions regarding reliability were made in the development of a specific technological system • made the links explicit in the development stages of a specific technological system to redundancy and reliability.
Achieved with Excellence	Candidates who were assessed as Achieved with Excellence commonly: • discussed how redundancy influenced design and maintenance decision making in development of a system • discussed how reliability influenced design and maintenance decision making in the development of a system.
Standard specific comments	Generally, candidates presented their work in a suitable manner. Most candidates provided submissions on A4 pages within the 10-page limit. Candidates who submitted less than 10 pages were not disadvantaged. Reports were often not improved by using all of the 10 pages. Generally, the reverse was true, with candidates appearing to present material they had not understood in an attempt to fill up the report. This frequently worked against the candidate. Candidates should restrict their report to what they actually understand. Candidates were required to demonstrate their understandings of redundancy and reliability in technological systems. Candidates chose from a wide range of appropriate systems. Candidates who based their reports upon existing, rather than their own, electronic systems generally did better because the candidate's own practice seldom included the redundancy aspects of systems required to meet the standard. Candidates who purposefully chose systems where there was sufficient information on the design and maintenance aspects of technological systems did well. When choosing systems to write about in the report, candidates need to make sure that they have access to all the information they need. Many candidates did not satisfactorily cover the design and maintenance aspects; those who did presented information on aspects such as automatic detection and indication of errors, systems that can automatically correct errors, extra reliability or redundancy to avoid human input and features of the systems that assisted maintenance personnel. Many candidates included diagrams and images but seldom referred to these in their explanations. Images and diagrams should be strategically used to support candidates' own explanations and discussions. Many candidates did not satisfactorily reference their work. This is a requirement.

4. Assessment Report for 91363: Demonstrate understanding of sustainability in design

Achieved	Candidates who were assessed as Achieved commonly: • explained a Life Cycle Analysis (LCA) model and the Sustainability Venn Diagram and then used these to inform their own Technological Practice and/or critique a product and the practice of others • explained how design decisions or interventions could increase the sustainability of a product • explained how life cycle analysis of an outcome enabled them to identify innovative practice which addressed social, economic or environmental concerns and was able to contribute to, and enhance, product sustainability.
Not Achieved	Candidates who were assessed as Not Achieved commonly: • included models of Life Cycle Analysis (LCA) and/or the Sustainability Venn Diagram with no descriptors that showed understanding • explained Life Cycle Analysis (LCA), but with limited evidence that informed the considerations to determine the focus for design interventions • produced a report that was limited to how and why materials may be produced, recycled or reused; or limited their report to explanations about how to prolong the life of an outcome • explained the life cycle of a material such as cotton, plastic or aluminium without incorporating 'design' • produced a report where large sections were "cut and paste", with no student voice or discussion of own technology practice.
Achieved with Merit	Candidates who were assessed as Achieved with Merit commonly: • explained how Lifecycle analysis (LCA) influenced innovations made by designers in case studies • submitted evidence derived from their own Technological Practice • conducted an LCA of an existing product and explained the focus for design innovation. This knowledge was often applied within their own development of a sustainable technological outcome • explained how the competing priorities and compromises were managed within the development and lifecycle of a sustainable technological outcome • showed an in depth understanding of sustainability in design. In particular, design decisions that impacted on the sustainability of the outcome (both positive and negative).
Achieved with Excellence	Candidates who were assessed as Achieved with Excellence commonly: • emphasised the competing priorities and compromises made as a result of lifecycle analysis in the development of a sustainable technological outcome. This was often evident within naturally occurring evidence where a student was required to address dilemmas and balance in different aspects of the LCA, conflicting social, environmental and economic factors and demands within their own practice • discussed how life cycle analysis can influence a technologist's design decisions to improve the social, economic or environmental sustainability of an outcome • discussed their own technological practice, and that of other technologist/s, in relation to sustainability in design • included a high level of independent voice and reflective comments of their practice that justified the compromises made and illustrated an demonstrated an understanding of sustainability in design.
Standard specific comments	Gains in overall achievement were most evident at the higher grades. The majority of successful candidates explored Life Cycle Analysis (LCA) and used the 'Sustainability Venn Diagram' to identify areas where economic, environment and societal related factors could be influenced and resolved by innovative design decisions to increase the sustainability of a product. Often candidates were able to identify alternatives that would increase the sustainability of a product, both within their own technological practice and/or in the practice of others. A considerable number of candidates reported on life cycle analysis without showing evidence of understanding of life cycle assessment as a method for assessing the environmental aspect of a product through its life cycle. A common issue was

	candidates stating, inaccurately, that 'the product meets the LCA', where LCA is an assessment of all the outputs and inputs into a product's life from raw materials to its disposal. Successful candidates almost all used the "Venn Diagram" to identify viable, bearable, equitable and sustainable considerations that impact on a designer's decision making process, and how these impact on the life cycle of the product. Reports that followed a template that included what/when questions often enabled candidates to gain achieved grades however, this often limited higher achievement where explanations are required. Where, candidates were supported by a sound report structure that included sections that highlighted compromises and competing priorities, the depth of discussion was enhanced and the candidate was then likely to achieve higher grades. Reports would benefit from proof reading for consistency, as there were instances where candidates had contradictions in their reports, claiming things were sustainable and then later claiming they were not. Long reports often had large sections that did not address the standard. It is essential that the candidate's chosen context aligns with the Achievement Standard and enables the candidate to demonstrate an understanding of sustainability in design.

5. Assessment Report for 91367: Demonstrate understanding of advanced concepts relating to managing shared information within information systems

Achieved	Candidates who were assessed as Achieved commonly: • identified and explored a real existing system within a real existing organisation, most commonly Kamar SMS or Google Drives within school settings • reported real details about each of the systems within the organisation • listed hardware and software for an information system, and described their functions • identified users of the information system and described, access rights, privacy requirements, and management of copyright within the organisation • described both the legal and ethical considerations present in an organisation, and the related procedures and policies employed by the organisation to ensure that the privacy processes and appropriate permissions were applied • described the organisation's back up procedures/conventions • explained the organisation of the above concepts within processes that manage data to the point where it became information fit for specified purposes.
Not Achieved	Candidates who were assessed as Not Achieved commonly: • produced reports that were so poorly structured that it was difficult to extract any relevant information • reported upon commonly used web sites (such as Facebook, YouTube or Tumblr) and were unable to produce the evidence required by the standard • reported upon a fictional organisation and were unable to produce the evidence required by the standard • often reported "assumed" detail for an organisation's procedures • listed hardware and software without describing how they affected the systems and or processes • did not identify Input, Output, Storage and Manipulation correctly for data entering into a specific information system and outputting as fit for purpose information. For example, manipulation was often described as correcting data that was incorrectly inputted into the information system • did not accurately explain how the system took data and turned it into information that was fit for purpose.
Achieved with Merit	Candidates who were assessed as Achieved with Merit commonly: • explained how all of the advanced concepts (hardware, software, input output, storage manipulation, back up, privacy, permissions) worked together in a process to produce information that was fit for purpose • discussed the advantages and disadvantages of the overall information system in a specific organisation

	• clearly explained the processes within an organisation to manage the permission etc. • explained the backup and data security process and procedures employed by an organisation and the importance of these • explained the importance of an organisation's responsibilities with regards to privacy, legal and ethical issues and how their particular organisation addresses these issues.
Achieved with Excellence	Candidates who were assessed as Achieved with Excellence commonly: • were able to evaluate effectiveness of information's systems, back-up systems and privacy and permission • provided comprehensive review of various components of an information system within the context of an organisation requirements for shared information • were able to give recommendations for backup procedures and procedures relating to privacy and permission, and were also able to evaluate the overall information system in a specific organisation • clearly explained the processes within an organisation to manage the permission etc. • discussed their chosen organisation's information system in detail, evaluating the components, and offered alternative procedure where they felt it was warranted.
Standard specific comments	All candidates complied with the new 10-page limit when submitting their reports. The vast majority of candidates chose their school as the case study. The candidates who chose their school as the case study were able to achieve this standard as they had ready access to the key staff involved in the management of all the components of their school's information system. Some candidates who chose other businesses also had the same benefits. Candidates who chose organisations such as Facebook or Google were not able to comprehensively discuss back-up procedures and legal/ethical issues; in many cases they made assumptions based on their school's procedures. While most candidates were able to identify and explain data input and output clearly, many candidates failed to show a clear understanding of data manipulation, in particular how raw data is turned into information and output in terms of a report. Good examples of this included candidates explaining how teachers entered their NCEA assessment grades and then this was turned into school reports and grade point averages. Many candidates described their school's approach to legal and ethical considerations, but few evaluated the robustness of the school's procedures or suggested alternative processes. Candidates performed well when they listed the main components of an information system and then discussed the role of each component. Their reports were well-structured and the evidence was easy to locate for markers. Some candidates wasted pages describing the hardware components of their school's computer network without specifically relating this to the school's information system. In some cases this resulted in commentary on back-up, legal and ethical considerations being shortened as candidates appeared to have limited pages left for these sections. The key difference between Merit and Excellence grades for many candidates was their ability to evaluate and discuss an organisation's information system rather than explain the significance of the individual components and describe the advantages and disadvantages of each. Candidates who attained Excellence grades evaluated the components and suggested alternatives. For example, they suggested alternative options for back-up such as online as opposed to taking tapes home. Candidates who gave authentic examples attained higher grades. One candidate gave an example of the school's absence system failing when data was input incorrectly, resulting in an embarrassing situation for the school.

6. Assessment Report for 91371: Demonstrate understanding of advanced concepts from computer science

Achieved	Candidates who were assessed as Achieved commonly: • followed a prescribed template • described ways in which different types of data could be represented using bits, such as text, colour, numbers, audio, images, and etc. • described the concept of encoding information using compression coding and typical uses of compression coding such as images, audio, and etc. • described the concept of encoding information using error control coding and typical uses of error control coding such as parity, ISBN, and etc. • described the concept of encoding information using encryption coding and typical uses such as protecting confidentiality and integrity of sensitive data • provided examples from human-computer interfaces and described how the examples illustrate the usability heuristics.
Not Achieved	Candidates who were assessed as Not Achieved commonly: • missed entire sections of the achievement standard • often discussed issues unrelated to the achievement standard • described only one or two of the three required concepts of Data Representation, Encoding and Usability Heuristics • described only one or two of the three required concepts of encoding: -Compressing coding, Error Control coding, and Encryption • described only one way in which different types of data could be represented using bits, such as text, numbers, images, etc. • copied material verbatim from other sources and, in doing so, failed to show their own understanding • lacked detail in their descriptions • produced irrelevant material, for example, cover sheets, printouts of device specifications, or tables from the Internet.
Achieved with Merit	Candidates who were assessed as Achieved with Merit commonly: • discussed current issues/methods in computer science rather than old ones • compared and contrasted different ways in which different types of data could be represented using bits; such as ASCII and Unicode, 8 bit and 24 bit colour, etc. and discussed the implications • discussed how a widely used technology is enabled by one or more of compression coding, such as JPEG, ZIP, etc., or error control coding such as ISBN, etc., or encryption, such as Internet banking, email, etc. • observed others using a given human-computer interface, such as a chosen device, software application, etc., so that they could evaluate the HCI against Nielsen's usability heuristics • used annotated photographic or diagrammatic evidence to demonstrate their understanding. • gave detailed and personalised answers to the questions.
Achieved with Excellence	Candidates who were assessed as Achieved with Excellence commonly: • evaluated a widely used system for compression coding, such as ZIP; or error control coding, such as ISBN; or encryption, such as e-mail message encryption techniques • suggested a number of relevant improvements to a given human-computer interface based on their evaluation of the HCI in terms of Nielsen's usability heuristics • did original research beyond what the class was taught • wrote in their own voice, providing evidence from their own experiences to support any factual or referenced material • used 'student voice' related to their own investigations to show comprehensive understanding • produced neatly formatted documents which contributed to their understanding • conducted personalised experiments to demonstrate their understanding • demonstrated in-depth understanding.
Standard specific comments	The overall standard of work improved this year.