NZQA
New Zealand Qualifications Authority
Mana Tohu Matauranga O Aotearoa

Assessment Report

Level 1 Technology 2016

Standards 91048 91049 91050 91053 91070 91074

91048: Demonstrate understanding of how technological modelling supports decision-making

Candidates who were awarded **Achievement** commonly:

- named the technological outcome they had developed
- provided evidence of understanding the purpose of functional modelling and or prototyping
- applied the modelling to the named technological outcome
- provided legible evidence as a result of modelling (either in the report or from their workbook)
- described briefly the specific decisions made in relation to the developing outcome.

Candidates who were assessed as **Not Achieved** commonly:

- used generic terms unrelated to their product
- wrote in general terms about technological modelling without referring to their own practice
- wrote about the production process
- used a 'pros' and 'cons' approach without the decisions informing their practice.
- provided no evidence of their own modelling
- made more than one product with no evidence that any of the products were developed as a result of modelling.

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

- clearly explained the need to undertake technological modelling in order to achieve an identified technological outcome
- stated reasons as to why the selected forms of modelling were appropriate
- explained how the modelling, evidence, and subsequent decisions were specific to the identified outcome with examples given from candidate portfolios
- stated and explained the next steps as a result of the decision making in the candidate practice

- fully explored the technical feasibility (how to make it happen and how it is happening) of the potential outcome throughout development
- researched and considered the social acceptability (should it be happening in terms of the social and physical environment) of the potential outcome throughout development.

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

- provided an in-depth report relevant throughout to a developing outcome
- undertook both functional modelling and prototyping as the outcome developed
- discussed each example of modelling (functional and prototyping) for its relevancy, the need, subsequent evidence and decisions (both positive and negative)
- submitted clear evidence of the modelling and outcome
- discussed the decisions made by the candidate and how the risks were managed as a result of communicating with stakeholders
- considered both technical feasibility and social acceptability throughout their practice to inform decisions based on fitness for purpose in order to meet the brief.

Standard-specific comments

Reports that reflected on candidates own technological modelling of one outcome using specific language associated with the technological area tended to achieve higher grades. In general, there was an improvement in the quality of the modelling, leading to impressive technological outcomes. Most reports were within the 10-page limit.

Where a ‘whole class’ approach had been taken to undertake modelling, the candidate understanding appeared limited and a generic report was written. Reports written based on a formatted scaffold and/or several outcomes often limited the depth of the report.

It is important to check that any evidence scanned or copied in to a report is legible in order for the candidate to achieve the highest grade possible.

Case studies should be used to inform candidate practice rather than sit as a ‘stand alone’ exercise.

91049: Demonstrate understanding of how materials enable technological products to function

Candidates who were awarded **Achievement** commonly:

- identified what they were designing and making and highlighted their required specifications, which helped link the chosen material(s) and their performance properties to their project

- wrote their report around their own technological experience, e.g. related the material being researched to their own project work
- described the composition and structure of at least one material, through either diagrams or written text
- identified the performance properties of at least one of their chosen materials
- described how their chosen material(s) were able to be manipulated because of the composition and structure of the material(s) e.g. plywood can be nailed/screwed close to the edge; cotton is easy to dye
- explained how they manipulated the chosen material(s) to allow their technology product to function, e.g. to stop the mild steel frame from rusting I coated it with paint; to stop the edges of my garment fraying, I overlocked all edges; I sanded all surfaces to get them smooth and then coated them with varnish to protect them
- completed a bibliography
- wrote the report in their own words, demonstrating their understanding of how their chosen material(s) enabled their project to function.

Candidates who were assessed as **Not Achieved** commonly:

- presented information that did not clearly identify either the composition or structure of their chosen material or materials
- presented limited or no evidence describing how composition or structure of their chosen material or materials allowed the material to be manipulated
- presented limited or no evidence explaining how the chosen material or materials were manipulated (worked) to allow their project to function
- misinterpreted what constitutes a material
- focused on a number of materials involved in their project but did not present evidence of describing how the composition and structure allowed the material to be manipulated or explain how a material had been manipulated to allow the project to function.

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

- presented evidence of interaction between their project specifications, material research and how they link (interact) to each other
- researched two or more materials; however, candidates can gain Merit from only researching one material
- presented evidence explaining how material or materials composition and structure determines the material or materials performance properties, e.g. It depends on how long the length of the cotton fibre is when it’s picked … The longer it is the stronger the yarn spun from the cotton; the higher the carbon content the stronger but more brittle it is
- presented evidence explain how the material or materials composition and structure determines the ways the material or materials can be manipulated (worked) e.g. When you cream butter and sugar, it helps with leavening because the sharp edges of the crystals cut air into the fat…; If you cut a piece of wood with the grain, it will be easier because you are not going against the grain; When I used a trimmer, it was much easier going with the grain and didn’t burn the wood; … this is because of the way knit stitches allow the fabric to be moved and stretched in all directions. However, because the way the yarns are arranged in my plain weave fabric, there is no room for stretch except for the bias.

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

- based their reports on their own experiences through the use of trialling and testing of different materials and communication with experts in the chosen field, whilst developing their own project
- compared and discussed in depth the composition, structure, and performance properties of different types of materials that enabled their project to function in different ways
- concentrated on two to three materials, allowing them to research and write a more in-depth report.

Standard-specific comments

Successful reports used more than one material to offer explanation and demonstrate understanding of material reaction, interaction, and consequence, where one material alone may not have provided the opportunity to provide Merit and Excellence responses.

Some candidates misinterpreted what constitutes a material. This problem was especially prevalent in food contexts. The focus should be on the individual ingredients, e.g. flour, sugar, eggs, etc.

Manipulation of materials is the aspect that is still not well understood. Candidates often described a sequence of procedures based around their project rather than practices and processes that are required as a result of the material's property.

Producing a 10-page report did not guarantee a candidate would obtain a Merit or Excellence grade. Candidates often repeated their information two or three times instead of building on their initial comments with more in-depth explanations of the interaction between their chosen materials, how the composition and structure determined how they could manipulate the material, and how this manipulation allowed the project to function.

The information on how materials are grown, processed, and produced, though useful, often occupied much of a report. This information may have little or no value or relevance to the intention of the report. Successful reports presented researched material that was relevant, accurate, and, where appropriate, reflected local context.

91050: Demonstrate understanding of the role of subsystems in technological systems

Candidates who were awarded **Achievement** commonly:

- selected at least one technological system
- identified at least two subsystems within the technological system
- described the roles of at least two subsystems within a system

- described using accurate technical terms how these subsystems worked together to make the overall system function
- limited their report to simple descriptions of the purposes of the subsystems and did not give detailed or in-depth explanations of the subsystem or its specific function.

Candidates who were assessed as **Not Achieved** commonly:

- misunderstood what a subsystem is referring to components as subsystems, e.g. LEDs and resistors
- submitted lengthy explanations of how their own circuit worked at a component level but did not identify the subsystems within their system
- identified subsystems but did not describe the roles of the subsystems
- did not relate how the various subsystems they described worked together to achieve the objective of the system
- gave inaccurate, vague, or general descriptions of subsystems within a system
- often used incorrect terminology about systems
- described non-technological systems such as biological, managerial, or organisational systems.

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

- explained how specific control functions were performed between various subsystems in a technological system
- had a correct understanding of feedback and explained how control information was taken from an output subsystem back to an input subsystem to control, adjust, or regulate the behaviour of the system
- explained at least two advantages and two disadvantages of at least one subsystem within the technological system
- included some explanations of design, development, and maintenance but did not extend these with discussion points such as detailed comparisons, contrasting aspects, and/or justifications to lift their grade to an Excellence.

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

- discussed both advantages and disadvantages of at least one subsystem within a particular technological system through comparisons or by evaluating specific decisions made by technologists
- discussed all three aspects of design, development, and maintenance decisions made by technologists regarding subsystems and their implications on a particular technological system.

Standard-specific comments

Candidates were required to demonstrate their understanding of the role of subsystems in technological systems. Candidates wrote reports that communicated their understanding often using diagrams or pictures to assist their explanations.

A significant number of candidates addressed only the achieved criteria in their report and did not attempt to explain feedback or control within a technological system. This was particularly evident when students described their own project (e.g. a railway crossing barrier arm) which had no feedback but only control.

A continued issue this year was the significant number of candidates who did not gain Merit or higher grades because they incorrectly referred to looping constructs within their program code as feedback paths in a system.

A number of candidates did not gain Merit or Excellence grades because their explanations of feedback, and in some cases control, were incorrect. Feedback in technological systems does not include how the system gives information about its operation to users of the system; technological feedback is a self-regulating feature of technological systems and occurs without human interaction or intervention.

A number of candidates referred to individual components such as resistors as subsystems within their project; typically, a resistor within a circuit does not provide a function that would relate to its being a subsystem within the system chosen, as typically a resistor operates in conjunction with at least one other component to provide a function. A capacitor, though, might meaningfully be described as a subsystem in terms of its filtering/noise reduction purposes with regard to the overall system.

91053: Demonstrate understanding of design elements

Candidates who were awarded **Achievement** commonly:

- identified and described how design elements had been applied within their own, or others practice and contexts
- identified and described both the subjective and objective considerations within a specified context
- described how the design elements contributed positively and/or negatively to the quality of the design.

Candidates who were assessed as **Not Achieved** commonly:

- interpreted design elements incorrectly showing limited understanding
- provided design element definitions without commenting on how they had been applied within a Technological Outcome
- identified the relevant design elements present within a product but did not describe the effect these elements had on the quality of the specified context.
- submitted large quantities of ‘supplied and/or non-referenced information’ that the candidate had not processed/personalised or applied to the context

- presented evidence that predominantly reflected the evidence requirements of another standard (91072)
- did not provide images.

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

- identified, described, and explained how design elements had been applied to the Technological Outcome(s) chosen
- compared, contrasted, and evaluated the application of design elements, either within their own practice or the practice of others
- explained how specific elements had been applied to improve the aesthetics and/or function of a product
- reflected on the development of a product and how the application of design elements affected the product
- illustrated the application of design elements throughout the development of their outcome throughout their report.

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

- demonstrated independent research, design, and ongoing and reflective analysis within their practice
- compared, contrasted, and evaluated the application of design elements, either within their own practice and/or the Technological Outcomes, and often discussed how the interaction of different design elements impacted on the quality of the design
- placed an emphasis on how the application of design elements affected their own practice and discussed how it affected design decisions.

Standard-specific comments

Candidates were required to demonstrate their understanding of design elements. This involved commenting on where and how design elements have been utilised with a Technological Outcome(s). In addition, students were also required to consider how the application of these design elements has affected the quality of the design.

Candidates who aligned their report to their own Technological Practice were more likely to gain Merit and Excellence grades. They often provided greater levels of explanation that related to how the application of design elements affected a design by commenting on their own design decisions during the development of a product.

Candidates who submitted a report that incorporated evidence for multiple standards often struggled to provide the in-depth evidence needed. This was most prevalent in Digital Technology submissions where 91072 was a focus. Candidates often applied design elements but did not provide sufficient description and/or explanation relating to the impact that the design elements had on the quality of the design (objective/subjective, aesthetics/function).

At the higher levels, students were more likely to place equal emphasis on both the subjective and objective considerations (or aesthetics and function). This enabled many students to comment on

how the application of design elements was often a compromise (e.g. By moving this here it improves the design unity but will make manufacture more difficult, therefore I will need to …).

91070: Demonstrate understanding of basic concepts of information

Candidates who were awarded **Achievement** commonly:

- showed some understanding of key features of operating systems and were able to describe two to three features in their own words
- chose two to three software applications they had used during the year and described at least two features of each application
- described clearly their own file management techniques, often with screenshots of their own file/folder structures
- were able to describe how they used file compression and managed threats to data during the course of the year
- showed understanding of at least two ethical issues by describing each issue in relation to the management of information and how it affected their practice when completing digital projects or assessments
- showed limited understanding by writing in third person with little reference to how the features and techniques were applied in their own work
- wrote comprehensively about familiar concepts (such as file management) but did not go into details on others (such as features of operating system or applications).

Candidates who were assessed as **Not Achieved** commonly:

- identified key features of operating system and/or application software but did not describe the features
- explained the general purposes of operating system and application software but did not identify or describe any key features
- gave detailed description of hardware in a computer (CPU, RAM, etc) which is not related to this standard
- had screenshots of their file/folder structure but no explanation of why it was set up in this way or what considerations were given
- gave definition of ethical issues such as copyright and privacy but made no connection with their own practice in these areas
- missed one or more of the four sections (operating system, application software, file management and ethical issues)
- showed little understanding due to copying or paraphrasing from other resources.

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

- personalised their report with work they had completed during the year; the report showed evidence of their own practice, backed up by annotated screenshots of their own work
- showed in-depth understanding by explaining the purposes of key features of operating system and application software in their own work in order to achieve the intended outcome
- discussed the importance of file management and why they had chosen the file structure and naming conventions in their school work and/or home files
- had used compression techniques during the year (such as zipping files, compressing images) and were able to describe the use and purpose of compression in their own work
- wrote about a range of threats to data and how to keep their data safe from these threats from personal experience, as opposed to “textbook” answers
- had used a variety of storage devices in their own practice and were able to compare them in terms of what they used each device for and why
- covered the Achievement and Merit requirements well but missed some of the three Excellence criteria.

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

- explained how operating system and application software interact in relation to their everyday use of the computer
- had used different application software to complete a task and were able to draw conclusions based on these experiences to justify their choice of application software for a particular task
- had worked with a range of file types and were able to accurately compare and contrast different file types for different purposes; examples were given from their own practice and decisions were justified in terms of why a file type was more suitable in a particular situation
- related the report closely to their own work and practices.

Standard-specific comments

It is not necessary to list or describe the internally assessed standard the candidate has completed during the year.

Students aiming for Merit or Excellence should ensure that their reports are complete and each of the four sections is covered adequately within the 10-page limit. In particular, the file management section involves four concepts: naming conventions, file/folder structuring, file compression, and managing threats to data, plus storage devices for Merit. Naming conventions are more than “use appropriate file/folder names”.

Students are expected to describe one operating system only. They are not required to compare operating systems (Mac vs Windows) or describe different types of operating systems (e.g. single user, multi-user, real time, etc).

Some students confuse software features with language features when discussing features of applications like Notepad++, Brackets or Python IDLE. For example, they talked about how the HTML tags or CSS styles helped them create web pages. They should instead describe application features that help them read and write code faster and more accurately, for example, colour coding, line number, or code completion.

Students are not required to list and describe all the file types they have used over the course of the year. File types should be compared based on the need of a task, not described separately with

no reference to other similar types.

This standard covers a comprehensive range of concepts in Information Management. Many candidates did not achieve with Merit or Excellence because their reports did not cover enough of the required criteria to demonstrate understanding.

Candidates using a template often succeeded. On the other hand, some of these templates included irrelevant content while others did not provide guidance for all required aspects of the standard.

Using very directive templates (such as tables or questions) often restricted student's responses and did not enable them to show in-depth understanding.

91074: Demonstrate understanding of basic concepts from computer science

Candidates who were awarded **Achievement** commonly:

- used their own words and acknowledge sources when appropriate
- described the purpose and key features of an algorithm
- gave one example of the cost of an algorithm
- described the roll of higher and lower level languages and the role of a complier
- described the concept of HCI
- gave an example of Human Computer Interaction with a given device.

Candidates who were assessed as **Not Achieved** commonly:

- did not attempt all three sections
- completed given templates with short answers showing little or no understanding
- copied examples from the CS Field Guide with no evidence they understood the underlying concepts
- did not show understanding of the difference between a higher and lower level language
- did not describe the role of a compiler
- discussed the usability of a given device without showing any understanding of HCI concepts.

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

- explained the importance of algorithms and gave examples
- explained the cost of an algorithm by comparing two different algorithms for the same task
- used their own programmes for comparisons and provided images with explanation
- showed understanding of the role of higher level, lower level languages and the function of a compiler

- showed a clear understanding of HCI concepts
- made comparisons of the usability functions between two devices and related these to HCI concepts.

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

- discussed comparisons between algorithm costs, languages and usability tests
- used examples of their own work to demonstrate understanding
- sections were clearly answered, but links were also made between concepts which showed clear understanding and comprehension.

Standard-specific comments

The major concern with the student work for this standard was the number of common templates. In many cases, students were given a series of closed questions and gave short answer responses. This did not give students the opportunity to show any understanding of the underlying concepts. This affected a number of students and resulted in quite a high number of Not Achieved grades.

Candidates who used their own voice were advantaged. Those who gave examples of an algorithm's cost using their own examples were able to show greater understanding when making comparisons and drawing conclusions. A number of students used examples from the CS Field Guide or teacher-provided examples. In these cases, clear understanding of an algorithm's and scalability were not always evident. Some students spent pages determining the costs of two different iterative algorithms but didn't compare the different costs and what this could mean.

Candidates who gave examples of higher and lower level languages and were able to explain the differences and similarities between the two, generally attained higher grades. A number of students compared two higher level languages, e.g Java and C. Some students used HTML and CSS as example of programming languages, which is incorrect.

The HCI section was generally the weakest with many students not clearly describing the role of a user interface or factors that contribute to the usability. A number of students launched into a discussion on a given device without explaining HCI concepts. Candidates who showed understanding of HCI concepts and then related these to comparisons of specific devices attained higher grades.

Technology subject page