

National Certificate of Educational Achievement

2011 Assessment Report

Technology Level 1

- 91048 Demonstrate understanding of how technological modelling supports decision-making**
- 91049 Demonstrate understanding of how materials enable technological products to function**
- 91050 Demonstrate understanding of the role of subsystems in technological systems**
- 91053 Demonstrate understanding of design elements**
- 91070 Demonstrate understanding of basic concepts of information**
- 91074 Demonstrate understanding of basic concepts from computer science**

COMMENTARY

Candidates whose reports contained level 6 curriculum content were advantaged.

Candidates provided evidence for Achievement standard 91048 by submitting evidence of the technological modelling undertaken in the development of a technological outcome. The modelling may have been within the student's own technological practice or within the development of another's outcome.

Candidates were required to communicate their understandings of technological modelling and how it informs decision-making.

Candidates were successful when they clearly showed they understood what was being modelled and why. Evidence of briefs was often helpful as it showed what needed to be modelled to ensure the final outcome would be fit for purpose or potentially fit for purpose.

Candidates who used case studies to identify modelling practices and then applied these to their own practise often showed a deeper and more comprehensive understanding of modelling.

Candidates whose reports contained generic descriptions of modelling were often unsuccessful as the descriptions were often not related to anything specific.

Candidates awarded Not Achieved often identified modelling practices and identified evidence without relating this knowledge to anything specific about decisions made as a result of the modelling.

Candidates whose reports were constructed using templates to capture modelling practices were sometimes constrained by the templates. In some templated reports, understanding of how specific modelling informed the specific development of a specific technological outcome was often not clear. In submissions such as these, candidates needed to ensure that evidence of specific modelling was present.

The use of *annotated* photographic and diagrammatic evidence developed in practice to demonstrate their understandings assisted candidates to achieve. Photographs and diagrams presented as evidence without specific annotation often did not demonstrate understanding.

Candidates who worked in a food technology context who were unsuccessful often did not provide specific details about what was being modelled, what was done as a result of the modelling, and why the modelling was done. Candidates who were successful in the above often used specific language around food chemistry and testing.

Candidates were disadvantaged where evidence for the standard was presented in a report longer than the specified 14 pages.

Photocopied material from portfolios that could not be read because of the quality of the photocopying could not be marked.

Photocopied material where several pages had been reduced e.g., four A4 to one A4, often obviously disadvantaged candidates as the resulting page could not be read.

ACHIEVEMENT

Candidates who were awarded Achievement for demonstrated the required skills and knowledge. They commonly:

- identified the purpose of modelling

- described the modelling carried out to test and trial ideas within a specific technological practice
- described what was done as a result of modelling in a specific context
- used examples from case studies to demonstrate an understanding of modelling in a specific context
- provided photographic evidence with explanations of ideas within a specific technological practice.

NOT ACHIEVED

Candidates who were awarded Not Achieved lacked some or all of the skills and knowledge required for the award of Achievement. They commonly:

- identified the modelling
- summarised their technological practice
- showed little evidence of specific modelling
- did not have clear evidence of what was being modelled
- provided generic descriptions of modelling without identifying the results of the modelling and what was done as a result of the modelling.

ACHIEVEMENT WITH MERIT

In addition to the skills and knowledge required for the award of Achievement, candidates who were awarded Achievement with Merit commonly:

- explained what was being modelled and why
- explained the actions taken as a result of modelling in terms of the next stage in the development of a technological outcome
- used case studies to demonstrate an understanding of modelling in a specific context
- identified risk as a result of the modelling and explained how this was overcome within a specific context
- wrote explanations showing a breadth and depth of understanding how modelling informed decision-making.

ACHIEVEMENT WITH EXCELLENCE

In addition to the skills and knowledge required for the award of Achievement with Merit, candidates who were awarded Achievement with Excellence commonly:

- explained the reason for the modelling undertaken
- discussed the results of findings through modelling
- used the findings from modelling to proceed through to prototyping
- provided in-depth information on the type modelling and its findings
- justified fitness for purpose through both functional and practical reasoning
- responded to unexpected findings (risk identification) and discussed potential solutions (what should happen)
- provided a broad and comprehensive report on modelling used within technological practice
- identified risk through modelling and overcame the risk through further modelling
- examined case studies used modelling processes within their own technological practice
- explained the purpose of the modelling that was undertaken, how this modelling identified risks, and what options were considered as a result of this.

91049 Demonstrate understanding of how materials enable technological products to function

COMMENTARY

Candidates awarded Achievement with Merit or Achievement with Excellence commonly researched materials related to their own project work. Candidates who related the material to a specific context were advantaged. Candidates were also advantaged when two materials were covered with sufficient depth and then compared and contrasted.

Students who wrote their report and included more than two materials struggled to gain merit because the content was not in sufficient depth.

Candidates who made good use of diagram and pictures to assist with an explanation of the structure of the materials e.g. in fabrics the weave of the material, in timber the cells of the tree etc, were also advantaged.

ACHIEVEMENT

Candidates who were awarded Achievement for this standard demonstrated the required skills and knowledge. They typically:.

- described the composition and properties of a material
- researched one material linked to their project work.

NOT ACHIEVED

Candidates who were awarded Not Achieved for this standard lacked some or all of the skills and knowledge required for the award of Achievement. They commonly:

- missed the structure component of the material in their report.
- wrote about a product e.g. Britton motor cycle, sports shoes etc looking at the materials used in the product but didn't consider the composition or structure and how these were manipulated to make the product function.
- did not demonstrate understanding by using the knowledge identified from research sources by relating the knowledge to a specific context.

ACHIEVEMENT WITH MERIT

In addition to the skills and knowledge required for the award of Achievement, candidates who were awarded Achievement with Merit commonly:

- expanded on manipulation of the material and explained how the material was treated to make the manipulation effective
- researched and wrote a report around a material that they have had experience with and were going to use in their project work.

ACHIEVEMENT WITH EXCELLENCE

In addition to the skills and knowledge required for the award of Achievement with Merit, candidates who were awarded Achievement with Excellence commonly:

- researched individually rather than following an assigned template
- completed research in relation to materials for a specific technological outcome being developed.
- compared and contrasted more than one material (but no more than three) and then justified why they were choosing one material over others.

91050 Demonstrate understanding of the role of subsystems in technological systems

ACHIEVEMENT

Candidates who were awarded Achievement for this standard demonstrated the required skills and knowledge. They typically:

- selected an appropriate technological system
- identified at least two subsystems within the technological system
- described the roles of at least two subsystems
- described how these subsystems worked together (required support from each other) to make the overall system function.

NOT ACHIEVED

Candidates who were assessed as Not Achieved for this standard lacked some or all of the skills and knowledge required for the award of Achievement. They typically:

- copied material verbatim from the other sources (particularly the internet) and, in doing so, failed to show their own understanding of the roles of subsystems.
- identified subsystems in a technological system and described their roles but did not describe how these subsystems worked together
- described non-technological systems such as the human body
- did not understand that a subsystem is more than a component but that it has a transformation process itself.

ACHIEVEMENT WITH MERIT

In addition to the skills and knowledge required for the award of Achievement, candidates who were awarded Achievement with Merit typically:

- 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 the 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.

ACHIEVEMENT WITH EXCELLENCE

In addition to the skills and knowledge required for the award of Achievement with Merit, candidates who were awarded Achievement with Excellence typically:

- 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 aspects of design, development, and maintenance decisions made by technologists regarding subsystems and their implications on a particular technological system.

COMMENTARY

Candidates were required to demonstrate their understandings of the role of subsystems in technological systems. Candidates chose from a number of alternatives and wrote reports that communicated their understanding often using diagrams or pictures to assist their explanations. In general, few students did not achieve; however, many did not gain Merit or Excellence because they either had an incorrect understanding of feedback or gave no feedback within their report.

91053 Demonstrate understanding of design elements

ACHIEVEMENT

Candidates who were awarded Achievement for this standard demonstrated the required skills and knowledge. They typically:

- 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 to the quality of the design.

NOT ACHIEVED

Candidates who were assessed as Not Achieved for this standard lacked some or all of the skills and knowledge required for the award of Achievement. They typically:

- presented downloaded information that had not been processed, nor related or applied the information to a specified context.
- did not provide appropriate images to support the validity of their commentary.
- submitted evidence that identified what design elements were, rather than how design elements had been used
- 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.

ACHIEVEMENT WITH MERIT

In addition to the skills and knowledge required for the award of Achievement, candidates who were awarded Achievement with Merit typically:

- identified, described, and explained how designed elements had been applied to the context(s) being examined
- critiqued more than one product and explained the variables that underpinned the application of design elements across contexts.
- evaluated the application of design elements, either within their own practice or the practices and outcomes of others.

ACHIEVEMENT WITH EXCELLENCE

In addition to the skills and knowledge required for the award of Achievement with Merit, candidates who were awarded Achievement with Excellence typically:

- selected contexts that allowed them to explore both the subjective and objective design elements.
- often compared and contrasted the application of design elements in more than one technological outcome/product.

- considered and discussed how the application of design principles had impacted on the quality of the specified context(s).

OTHER COMMENTS

A broad range of contexts and technological areas were submitted by candidates who used a variety of methods to present evidence. The two most common methods that allowed candidates to access all levels of the standard were:

- a separate and stand alone activity that was sometimes conducted as a class activity. Candidates often selected images/products from a provided range.
- evidence from a candidate's technological practice. This was often edited extracts from activities that analysed existing products, and the ongoing evaluation of a candidate's own practice and outcomes.

It was evident that student achievement at the higher levels was enhanced by prudent selection of the contexts studied. Many of these candidates also critiqued and evaluated the use of design elements within their own technological outcomes and compared it with the practice of others.

Candidates did not achieve if they had not demonstrated understandings of design elements. To do so candidates were required to 'critique' the use of design elements within a specified context. In most cases successful candidates either, described, explained and/or discussed how and why design elements had been used within images or products. Some unsuccessful candidates carried out a lot of in-depth research of design elements but did not apply or use the knowledge in a specific context.

Often, the level of achievement was influenced by the literacy levels of the candidates. Many candidate submissions did not include a suitable range of conjunctions and connectives within their critique. These words often underpin and differentiate 'describe, explain, and discuss'. They are also the identifiable step-ups between the grades and are an area where many students who were awarded Not Achieved could make significant gains.

91070 Demonstrate understanding of basic concepts of information management

ACHIEVEMENT

Candidates who were awarded Achievement for this standard demonstrated the required skills and knowledge. They typically:

- identified an operating system and provided a general description of two or three key features of that operating system
- identified at least two common software applications and provided a description of more than one key feature of each software application
- described correct procedures for structuring and naming files and folders
- described a common technique used for compressing files
- described a procedure to manage a threat to data such as installing virus protection software or performing regular back-ups
- described ethical issues related to information management

- provided some annotated screen captures as evidence of their understanding of operating system key features, application software key features, and/or file management procedures
- wrote a majority of the report in their own words and provided a simple reference list for information retrieved from outside sources.

NOT ACHIEVED

Candidates who were assessed as Not Achieved for this standard lacked some or all of the skills and knowledge required for the award of Achievement. They typically:

- used information directly from Internet sites, commercially produced resources, NZQA exemplars, or teacher notes without processing the information into their own words or referencing sources
- completed provided templates but did not demonstrate their own understanding
- provided no evidence for one or more of the standard criteria (operating system key features, application software key features, file management procedures, ethical issues related to information management)
- provided lists of key features of application software or operating systems with no related descriptions
- provided brief definitions of application software or lists of outcomes that might be produced using the software without related descriptions of the key features of the application
- provided a rote definition of an operating system without related descriptions of the key features
- provided verbatim definitions of copyright law and the privacy act with no demonstration of understanding of the concepts
- provided step-by-step procedures relating to file management or use of application software without a purpose for performing the steps' descriptions of the key features
- submitted a digital information outcome, such as a recipe book or brochure, with no supporting evidence of their knowledge
- submitted evidence unrelated to the standard, such as detailed computer hardware comparisons
- did not relate the information presented in the report to a specific context either through descriptive examples or annotations.

ACHIEVEMENT WITH MERIT

In addition to the skills and knowledge required for the award of Achievement, candidates who were awarded Achievement with Merit typically:

- explained the purpose of an operating system and related their descriptions of the key features to the operating system's purpose
- explained how they utilised an operating system's key features in their daily work by providing descriptive examples or annotated screen captures
- explained the purpose of a range of software applications and related their descriptions of the key features to the application's purpose
- explained how they utilised the key features of application software to enhance, create or edit their own outcomes by providing descriptive examples or annotated screen captures
- explained the purpose and importance of adhering to good file management procedures with reference to procedures they followed in their own work

- explained the purpose of file compression and how they utilised file compression techniques to facilitate exchanging files, enhance an outcome or protect files
- explained a range of threats to data and how to manage the threats, including reference to storage devices they used for backing up important data
- described the concepts of privacy, file security, copyright or appropriateness of material in relation to their own work
- demonstrated clear candidate voice throughout the report and provided references for material used from outside sources.

ACHIEVEMENT WITH EXCELLENCE

In addition to the skills and knowledge required for the award of Achievement with Merit, candidates who were awarded Achievement with Excellence typically:

- explained a range of examples which demonstrated how the operating system and the application software interacted whilst they were creating an outcome or performing a task
- justified why they chose a software application to perform a task or complete project, linking the justification to the key features of the application
- justified the selection of a software application to perform a task by comparing their choice with alternative options, linking the justification to the key features available in each application
- compared and contrasted the purposes of a range of related file types
- provided justification for selection of a particular file type for a specific purpose, most often in relation to projects they had completed
- demonstrated comprehensive understanding by providing detailed exemplification of concepts in relation to their own work.

OTHER COMMENTS

Candidates who clearly demonstrated understanding of basic concepts of information management wrote in their own voice, providing evidence from their own work and experience to support any factual or referenced material.

Candidates who applied sourced material in a specific context made good use of the sources. Where knowledge identified from a source was applied in the specific context, it was obvious that the candidate had demonstrated understanding.

Candidates whose reports relied heavily on NZQA exemplars, Internet sites, commercially available resources or supplied notes did not often clearly demonstrate their own understanding and often earned Not Achieved grades.

Candidates who plagiarised often did not demonstrate understanding. Some candidates awarded the Not Achieved grade did not correctly cite references or did not include any references for sourced material.

Candidates should be made aware that nominally changing sourced material using synonyms for key words or re-ordering the sentence structure does not constitute presenting their own work.

Candidates with heavily templated reports did not demonstrate in-depth or comprehensive understanding and rarely earned Achievement with Merit or Achievement with Excellence.

Candidates were not advantaged by defining every type of operating system provided as examples in the explanatory notes of the standard. Candidates who defined each type of operating system often relied heavily on internet sources and tended to provide verbatim

definitions with no attempt at describing an operating system's key features or explaining the purpose in their own words. Effective reports focused on describing the key features and explaining the purpose of the operating system(s) that the candidates were familiar with using in their classwork or at home.

Candidates were not advantaged by providing the purpose and key features of every software application they are familiar with or every file type in existence. Effective reports focused on the specific software applications and file types that candidates utilised to produce projects during their years' work in a digital technology course.

Annotated screen captures were an effective means of demonstrating understanding. Screen shots that were cropped to show just the essential evidence to back up the description advantaged candidates. Screenshots that included whole un-cropped windows often disadvantaged candidates as markers often found evidence difficult to identify.

It is not necessary to submit actual outcomes produced in conjunction with the report e.g. recipe books or brochures.

Ethical issues should be described in terms of how they related to the candidate's experiences in creating their own digital information outcomes as definitions of copyright law and privacy acts do not demonstrate understanding.

91074 Demonstrate understanding of basic concepts from computer science

COMMENTARY

Candidates whose work was presented in a variety of font sizes and styles were not advantaged. Candidates who produced well formatted and well structured documents were advantaged as formatting and structure do make a contribution to demonstration of understanding. In particular, small screen shots, text too small to read, and graphs with unlabeled axes did not contribute to a demonstration of understanding.

Candidates who clearly demonstrated understanding of basic concepts from computer science wrote in their own voice, providing evidence from their own work and experience to support any factual or referenced material.

Candidates who applied sourced material in a specific context made good use of the sources. Where knowledge identified from a source was applied in the specific context, it was obvious that the candidate had demonstrated understanding.

Candidates whose reports relied heavily on NZQA exemplars, internet sites, commercially available resources or supplied notes did not often clearly demonstrate their own understanding and often earned Not Achieved grades.

Candidates with templated reports often did not demonstrate understanding. In particular, reports which consisted of answers with no context demonstrated no understanding. Candidates whose reports did not adequately distinguish between a supplied question and the candidate's response often did not demonstrate understanding. Reports that reproduced supplied or sourced material without relating the identified knowledge to a specific context often did not demonstrate understanding. For example, a common task for algorithms was the quicksort. Candidates who explained by means of their own experiment often demonstrated understanding. Candidates who simply reproduced an explanation from a website often found understanding difficult to demonstrate.

Some candidate reports contained a gap between the evidence presented and a genuine demonstration of understanding. Some reports did not distinguish adequately between an algorithm and a program, making relatively simplistic claims. For example, candidates claimed, 'a program is a lot of algorithms together', without reference to a program's characteristics: precise language, rules of syntax, and coding structures. Also, some candidates presented tables of numbers 'relating' to algorithm costs without reference to how the numbers were produced. Often in this type of report, descriptions had been reproduced without any reference to specific context. This reproduction reflected the candidate's lack of understanding of the basic concepts.

In considering Human Computer interfaces, some candidates confused functionality of devices with usability. Candidates who were clear on the difference between *how easy a device is to use* (usability) and *what the device can do* (functionality) presented evidence relating to usability and avoided presenting evidence relating only to function. Candidates who presented evidence relating to mainly to functionality often did not demonstrate the required understanding.

ACHIEVEMENT

Candidates who were awarded Achievement for this standard demonstrated the required skills and knowledge. They commonly:

- demonstrated some understanding of the basic concepts from computer science
- described key characteristics of algorithms, programs, and informal instructions
- described an algorithm for a task, showing some understanding for the kinds of steps that can be in an algorithm
- attempted to determine the cost of an algorithm of a particular size
- described the role and characteristics of programming languages
- described the roles of high-level and low-level languages and the need for a compiler
- described the role of a user interface and factors that contributed to its usability.

NOT ACHIEVED

Candidates who were awarded Not Achieved for this standard lacked some or all of the skills and knowledge required for the award of Achievement. They commonly:

- did not demonstrate understanding of basic concepts from computer science
- described only one or two of the three required concepts
- lacked detail in their descriptions
- attempted to paraphrase without understanding
- did not provide evidence for all of the standard's requirement when using a template.

ACHIEVEMENT WITH MERIT

In addition to the skills and knowledge required for the award of Achievement, candidates who were awarded Achievement with Merit commonly:

- demonstrated in-depth understanding of basic concepts from computer science
- explained how algorithms are distinct from related concepts such as programs and informal instructions
- showed understanding of the way steps in an algorithm for a task can be combined in sequential, conditional, and iterative structures

- determined the cost of an iterative algorithm for a problem of size n
- explained how the characteristics of programming languages are important for their roles
- explained the need for programs to translate between high-level and low-level languages
- explained how different factors of a user interface contributed to its usability.

ACHIEVEMENT WITH EXCELLENCE

In addition to the skills and knowledge required for the award of Achievement with Merit, candidates who were awarded Achievement with Excellence commonly:

- demonstrated comprehensive understanding of basic concepts from computer science
- articulated their understanding in their own words and from personal experience
- compared and contrasted the concepts of algorithms, programs, and informal instructions
- determined and compared the costs of two different algorithms for the same problem of size n
- compared and contrasted high-level and low-level languages
- explained the different ways in which high-level programming languages are translated into machine language
- discussed how different factors of a user interface contributed to its usability by comparing and contrasting related interfaces.