2015 NCEA Assessment Report

Technology Level 3 91612, 91613, 91614, 91617, 91632, 91636, 91638

Report on standards

1. Assessment Report for 91612: Demonstrate understanding of how technologiccal modelling suports technological development and implementation

Achieved	Candidates who were assessed as Achieved commonly: • showed they could differentiate between functional modelling and prototyping in the process of developing a technological outcome • explained competing and contestable factors involved in the creation and/or use of the outcome that was being tested by the modelling • explained how modelling has been used to address the competing and/or contestable factors that they have identified • explained how the modelling has influenced their decision making during the development and implementation of an outcome.
Not Achieved	Candidates who were assessed as Not Achieved commonly: • described the technological practice undertaken without specific reference to the functional modelling and prototyping components • did not explain how the range of modelling used had meaningfully informed decision making • used case studies where student voice was unclear • described some modelling practices but did not link them to relevant competing or contestable factors. • included sketches, screenshots, diagrams and photos with no link to how these related to the modelling undertaken • described technological modelling in a general manner with no reference to their own or other's specific practice • identified a range of functional modelling which was used but did not expand the description to include prototyping or the evaluation of a prototype in situ • described technological modelling without identifying how it was used to address competing and/or contestable factors relating to an outcome.
Achieved with Merit	Candidates who were assessed as Achieved with Merit commonly: • explained in some depth the different forms of modelling used and the relevance of the evidence the modelling provided • gave detail about how relevant competing and contestable factors were addressed by the modelling • explained the changes made in the planned development of an outcome because of the functional modelling that took place • reflected on what could be changed in the development because of prototyping • made explicit links between decisions made and the modelling practices carried out.
Achieved with Excellence	Candidates who were assessed as Achieved with Excellence commonly: • included a comprehensive and reflective discussion which showed how technological modelling can be used to defend and validate decisions made during their own technological development • detailed how both functional modelling and prototyping influenced the development of an outcome and gave valid reasons for specific decisions they made • clearly showed how key factors were resolved through evidence gained from modelling processes and a clear understanding of the difference between competing and contestable factors.

Standard specific comments	In 2015 more candidates demonstrated that they understood the difference between competing and contestable factors.

2. Assessment Report for 91613: Demonstrate understanding of material development

Achieved	Candidates who were assessed as Achieved commonly: • provided a report that was clear and concise, including an introduction that stated clearly what material(s) and product(s) and specific enhancements were being described • used referenced materials such as charts and diagrams from credible sources to describe the manufacturing processes and concepts and development of a specific material(s) • made judicious use of downloaded text and refrained from using advertorial material and brand endorsements as a source of their information • used relevant diagrams and visual material to describe the specific enhancement of a product in relation to the material used and used captions and titles to establish links to their commentary • wrote a clearly structured and organised report that made clear links between the material, its development and implications on the design, development, production, maintenance and disposal of specific products. This required the candidate to understand the relationship between the material, the enhancement to the product / material and the product functionality • described the material and/or the product in relation to ongoing maintenance and disposal, dependent on the context that addressed the criteria and did not merely focus on sustainability or recycling • described clearly the relationship between the development of a material from a historic to contemporary application within a product and how the product has evolved or developed from the material enhancement. This however was not the main focus of the report but served to set the context and the perspective of the development • described the manufacturing process of a specific material and related it to the performance of the product being discussed • described the enhancement of the product as a result of material development • identified the properties of the material and linked this to a specific end product/s performance characteristics • integrated the properties of a material into the impact on a product • embedded knowledge was linked to practice and or class case studies / guest speakers and/or industry visits • described the enhancement of the product in terms of characteristics such as washability, tensile strength, durability, flexibility, weight in relation to enhancement of speed, general speed enhancement, viscosity, taste, flavour, texture, preservative action and extension of shelf life, nutritional value • described the material(s) in relation to the design, development, production, ongoing maintenance and disposal of products specified.
Not Achieved	Candidates who were assessed as Not Achieved commonly: • provided a report without any referencing of information, diagrams or pictures • wrote a generic report that did not address specific materials, enhancements or aspects of the design, development, production, ongoing maintenance and end of life disposal of specific product • used evidence typically associated with internally assessed standards as the basis of their report without addressing the criteria of this standard • used significant downloaded material that was un-mediated and showed limited understanding or links to product enhancement • used information not retrieved from credible sources, i.e advertorial material that was a sales recommendation for a product or material • identified a material but did not describe the development or enhancement • described the application of a material in practice however did not describe the

	enhancement in relation to the product • described their own product and materials used and processes which did not address the issues of material properties, enhancements or maintenance and/or the design, development, production, ongoing maintenance and end of life disposal of the product • provided a lengthy historical perspective with little or no relevance to the material or the enhancement of a product • included excessive amounts of information that did not relate to the enhancement of a specified product • provided evidence of the construction and issues encountered when developing a project that the candidate had made without describing the development of the materials used, their impact on the products performance or the implications of the material chosen in relation to a specific enhancement • provided charts on the manufacturing process without discussion or description on the development of the material • provided visual material and pictures that had no or little relevance to the report and were not used to explain or unpack concepts required by the standard • described and compared the development of more than one material without providing links to a product • described the manufacturing and development of a material without describing the enhancement of a product • described the manufacturing process and the development of a product without clearly describing the implications on the product • provided a list of material properties without relating it to an end product • used a template chart to describe the desired properties of a product/s without identifying a material • provided only parts of the list of elements in the criteria of design, development, implementation, maintenance and disposal • provided processes in the form of their own practice with no material enhancement description • provided lengthy background history only of a product e.g. swimwear or car materials used over time without reference to other aspects of the criteria.
Achieved with Merit	Candidates who were assessed as Achieved with Merit commonly: • used referenced material, sources where relevant, this material was mediated and examples given • used the information gathered from a range of credible sources and gave detailed, examples and rationale for the relationship between material, enhancement and product in a well-constructed report format • made links to a wide range of technological experiences; the candidates own experience, class study, field trips and external material and information • demonstrated knowledge of material properties and made clear links as to how material properties enhanced the development or evolution of a product • explained how the material impacts on the design - aesthetic and functional attributes of the product identified • explained how the material impacts on the maintenance and life cycle of the product, and how the material disposal impacts on health and environmental factors • provided detailed examples of how the material enhancements have led to new and innovative product development • explained the historic application of material to contemporary application and enhancement • provided explanation of the material properties related to the specific material development • described the manufacturing process of the specified material and provided charts and /or diagrams to illustrate the development of the material that were referenced appropriately • integrated and explained the material properties during the report explaining the material development • provided detailed examples and reasons of ‘how’ when explaining the impact of a materials properties on a product • explained the implications of the material such as environmental impact, disposal and care of the material on the end product and provided evidence and examples if

	this • made links between the structure and composition of the material and the performance enhancement of the product • provided explanation of specific components rather than a total product e.g. bike frame compared with a bike or airplane wings compared with an airplane as a whole • explained the maintenance and disposal of a material further than recycling - this may include by-products and environmental impact • provided a report that explained succinct descriptions of the product enhancement using valid data and statistics.
Achieved with Excellence	Candidates who were assessed as Achieved with Excellence commonly: • used downloaded material judiciously and referenced accurately and appropriately • synthesised the information and wrote this in their own voice in a well-structured report • made synthesised statements and relational links between the product, material and performance enhancement • explained the concepts and processes used in the manufacturing processes/ development of the material in detail and with valid evidence derived from a range of credible sources including technical data • explained how these developments had enhanced a product and / or lead to development of new and innovative products • explained how the enhancements in material have led to development of enhanced products and explained how these products have significantly enhanced sport performance, market performance, health safety performance, speed, durability, life cycle • provided evidence when describing the material development e.g. explained the molecular structure and the impact of the structure on the performance of a materials and its enhancement of the end product • explained the inclusion of a material in the development of a product to enhance performance of that product and/or consumer use • provided descriptions and explanations of the implications of the material with relevance to the end product and the impact it had on the performance in a wider context, discussing the impact on the environment relating to maintenance and disposal • explained and provided sufficient evidence to show how the properties of a material have been developed over time to enhance a product • provided rationale for the material properties and the enhancement of the product with justified research and diagrams • explained the impact that the material had on the life, care, repair and maintenance of an end product • explained maintenance, care and disposal of a material further than recycling and explained the impact of maintenance on the product use and reuse • were provided with scope to explain the combination of both material and product to allow explanation of concepts and processes in the development of the material • provided a report that was clearly set out and often used guidance in the form of report writing and preparation for report writing • used correct terminology and interpreted information in their own words, applying justified evidence of how the selected material enhanced the product.
Standard specific comments	The focus of this assessment task is on material development, often from base components, for example, such things as nutrients or ingredients, base elements, fibres; and the material development's impact on the design, development, implementation, maintenance and disposal of specific products. Candidates are required to demonstrate their understanding of the relationship between a specific material and its development, enhancements that the material brings to products, and the specific product within the frame of the design, development, production, ongoing maintenance and end of life disposal of the product. Comparisons of materials within a product is not the focus of this standard. Candidates who wrote about the relationship between materials, enhancements, product performance and the design, development, production, ongoing maintenance and end of life disposal of the product materials from within the context of a course were able to demonstrate effective understanding of material development. This use of authentic context for reporting also supported candidates to write coherently in their own voice to

	demonstrate their own understanding from their range of Technological experiences and multiple other sources of information. Candidates who used relevant information to address the criteria succeeded. Candidates who narrated a story of their technological practice did not. Candidates must address the criteria of this standard to achieve. It is critical for candidates to select materials and products where there is sufficient detailed information from a range of sources to use to demonstrate understanding within the report. Candidates who chose a material and a product where information was readily available, and who made use of specifications of technical details were able to explain concepts and processes more readily than those who chose contexts with limited availability of resource information. In general, candidates who achieved were able to describe a specific material or materials, identified an enhancement which contributed to the specific product performance, such as speed, strength, flexibility, nutritional value, texture washability, durability, viscosity, flavour, and identified this in relation to a specific context or usage. The development of a material over time in an historical and/or contemporary context gave the opportunity for candidates to define both the development and enhancement features of both material(s) and the product(s). It is not necessary to compare and contrast features in this standard as the criteria require the candidates to describe and explain the relationship between the above aspects, that is, the relationship between the material , its development, the enhancements and the design, development, production, ongoing maintenance and end of life disposal of the product. Candidates who focused on their own practice and product development were significantly limited in their achievement as they were unable to describe or explain the development of the basic materials within specified products. If student practice is the focus then candidates must relate the material, and enhancements to the product specified. Candidates who did not understand that the material referred to in the standard is not synonymous with the term fabric were often severely disadvantaged. Candidates who are sourcing, referencing, and using information from a range of sources need to ensure the credibility of the sources and ensure that they are not plagiarising the information. Candidates should avoid advertorial material available that may not support their understanding and might not be accurate. Large amounts of unmediated text do not support candidate achievement and should be both limited and referenced. Candidates must demonstrate understanding of information and make sense of this relative to the criteria of the standard. Candidates who succeeded produced a clearly structured report that demonstrated understanding of the language of the context of the report and generally wrote in their own voice with minimal downloaded material. Critical thinking and the ability to synthesise information is a skill that candidates require at this level of the curriculum in order to achieve within this standard. Candidates who provided a distinct and well defined introduction outlining the material, the enhancement and the product made the direction and content of their report clear. It is possible for candidates to obtain high levels of achievement within this standard when discussing feasible future products making it clear that some aspects are yet to be tested or include materials from trials of materials in the testing and development phase and make evidence based hypotheses about the long term feasibility, maintenance and disposal of the products once it is beyond the prototype stage. Candidates who succeeded addressed the aspect of maintenance and disposal of products and materials in its widest sense and did not rely on sustainability or recycling as the basis for their discussion.

3. Assessment Report for 91614: Demonstrate understanding of operational parameters in complex and highly complex technological systems

Achieved	Candidates who were assessed as Achieved commonly: • distinguished between complex and highly complex technological systems • provided an example of a complex system and identified the operational parameters within this system as a measurable range of values (e.g. 10°C minimum - 25°C maximum temperature in an air conditioning system) • identified and explained one or more concepts that lead to the establishment of operational parameters (e.g. concept of optimum ambient temperature for humans) • explained the implications that these concepts had on the design as well as the development of the system • provided an accurate explanation of how the operational parameters allow the system to function • provided an accurate explanation of how the operational parameters enable maintenance in the system. Maintenance is clearly linked to operational parameters • identified a highly complex system that is self-regulating and/or intelligent as well as the operational parameters associated with this highly complex system • explained social factors that influenced the establishment of the operational parameters in a highly complex system • explained technical factors that influenced the establishment of the operational parameters in a highly complex system.
Not Achieved	Candidates who were assessed as Not Achieved commonly: • chose simple technological systems as opposed to complex and highly complex systems • produced information that was technically inaccurate • failed to identify operational parameters associated with a complex system • wrote about concepts used in the design and development of technological systems, but failed to link these to operational parameters • wrote about maintenance in a technological system but failed to link these to operational parameters.
Achieved with Merit	Candidates who were assessed as Achieved with Merit commonly: • explained in detail with examples of how a highly complex system operates within its parameters (e.g. air fuel ratio in fuel injection systems operates between 12:1 to 17:1) • discussed, taking into account different ideas, why social and technical factors influenced the establishment of operational parameters in a highly complex system.
Achieved with Excellence	Candidates who were assessed as Achieved with Excellence commonly: • discussed, by comparing and contrasting different ideas, of how operational parameters influenced the design, development and maintenance of systems (both complex AND highly complex systems).
Standard specific comments	Overall candidates demonstrated a good understanding of operational parameters in technological systems. Candidates would benefit from structuring their reports in such a way that it corresponds with the criteria outlined on the marking schedule.

4. Assessment Report for 91617: Undertake a critique of a tehnological outcome's design

Achieved	Candidates who were assessed as Achieved commonly: • structured their report in a manner that ensured all of the aspects required for Achievement were covered. • explained the concept of good design • explained views of design • explained judgement criteria used to determine the quality of the design of Technological Outcomes • recognised that different judgement criteria can be used to judge good design depending on time, tastes and societal values • explained how ideas about good design have shifted to cater to societies new demands, for example, sustainable products and social benefit

	• critiqued the design of a Technological Outcome using recognised design judgement criteria to a level that reflected 'appraisal'.
Not Achieved	Candidates who were assessed as Not Achieved commonly: • did not appraise a specific technological outcome but rather a generic product type • misinterpreted "appraisal" to be broadly describing and explaining the function and appearance of a Technological Outcome rather than judging it against recognised judgement criteria (often characterised by inclusion of copious technical data). • omitted to include evidence that related to one or more of the assessment criteria for achieved (as stated within the commentary) • chose a Technological Outcome that had limited scope • wrote a fact based historical account of the development of a Technological Outcome with no/limited reference to recognised judgement criteria • utilised teacher provided templates that did not adequately cover the requirements for this Standard.
Achieved with Merit	Candidates who were assessed as Achieved with Merit commonly: • discussed why contemporary judgement criteria are important for design decision making and evaluated the quality of a selected Technological Outcome using judgement criteria • evaluated the quality of a Technological Outcome in accordance with clearly defined judgement criteria (Dieter Ram, British Design Council etc.) • included commentary on contemporary judgement criteria, for example: sustainability, user friendliness, socially beneficial, ethically sourced materials and emotional resonance etc. • chose a Technological Outcome they had personal experience and knowledge of to critique.
Achieved with Excellence	Candidates who were assessed as Achieved with Excellence commonly: • selected judgement criteria that were appropriate to the Technological Outcome and the reasons for their selection was clearly articulated • often explored how design decisions were often a compromise in order to meet the requirements of conflicting criteria requirements • personalised the Judgement Criteria to be used which also promoted greater levels of personal voice • chose a Technological Outcome to be critiqued that aligned their own Technological Practice • identified areas where future enhancements to a Technological Outcome may be possible.
Standard specific comments	Candidates responded to the 10 page limit by being more concise and targeting specific content. The award of Merit or Excellence relies on a step-up in evidence quality which relates to the exploration and selection of criteria used for the critique, and the actual critique of a Technological Outcome. Candidates made two common errors; they either did not include evidence of 'why criteria for judging the quality of design change over time", and/or, they did not develop an actual critique. Reports with headings that reflected the requirements stated in the assessment schedule, and the requirements of the Explanatory Notes, were considerably more likely to achieve. Reports that did not achieve with Excellence or Merit often failed to do so because the report did not actually critique a Technological Outcome. Reports without explicitly stated judgement criteria to be applied in the critique were often disadvantaged as success of the critique depended upon the criteria. Reports with an introductory paragraph that clearly stated the judgement criteria to be used in the critique immediately prior to the actual critique were significantly advantaged. Candidates who prudently selected judgement criteria had scope to discuss constraints,

	limitations, compromises and justify why certain decisions had been made. Successful reports often explored the impact of design criteria upon design of a Technological Outcome. Reports with a mismatch between a specific context and generic criteria often had limited scope for discussion. Reports of this nature often contained a large amount of generic waffle. Candidates often do not understand the thinking that underpins individual judgement criteria. For example, sustainability is often misinterpreted as recycling. Also social benefit was misinterpreted as 'fun-ness' and entertainment value. Candidates who did not understand the criteria they used in their critique did not achieve Merit or Excellence grades. Candidates who critiqued a Technological Outcome that they could touch and deconstruct were advantaged. Where candidates linked the critique to their Technological Practice, their reports were often authentic and relevant and demonstrated personal voice. Reports that succeeded often transferred the knowledge gained from a critique into the on-going development of their own Technological Outcome. Merit level reports often presented critique criteria as binary yes/no decision points rather than as graduated and contestable. Excellence reports often developed discussions and justifications that relied upon the presence of varying and contesting viewpoints leading to a decision.

5. Assessment Report for 91632: Demonstrate understanding of complex concepts of informtion systems in an organisation

Achieved	Candidates who were assessed as Achieved commonly: • chose an organisation with all the components of an information system • chose an information system about which they had sufficient detailed information • used relevant examples from within an organisation • described components and then explained the interactions between components of an information system • provided clear, consistent and accurate explanations of the difference between data, information, and knowledge with explanations related to the selected organisation • explained more than one characteristic of good information using relevant examples from within the selected organisation • explained more than one end-user consideration using relevant examples of the importance of the considerations within the selected organisation • explained how security management is handled within the selected organisation.
Not Achieved	Candidates who were assessed as Not Achieved commonly: • did not provide any relevant examples to demonstrate understanding • relied too heavily upon the published exemplars • specified hardware but did not explain how the hardware interacted with other components • provided lists of components of the information system without explaining how the components functioned with other components • clearly differentiated between data, information, and knowledge and used the terms interchangeably within their report • focused upon a system that was not an information sysytem • focused upon an information system that was not within an organisation

	• focused upon an fictitious organisation. • omitted one or more of the key standard criteria within the report • did not understand the difference between data and information.
Achieved with Merit	Candidates who were assessed as Achieved with Merit commonly: • discussed how information provides value to the organisation with relevant examples • discussed the impact of end-user considerations on components of the system • discussed the implications of security requirements upon the information system.
Achieved with Excellence	Candidates who were assessed as Achieved with Excellence commonly: • provided detailed relevant examples for points made in the report • discussed how the information system adds value to the organisation often with reference to improvements compared to previous systems • often revisited the definitions of 'good' (fit for purpose) information and the concept of adding value in evaluating a system • evaluated more than one trade-off between characteristics of good information; provided relevant, detailed examples to justify the selection of one characteristic over the other • evaluated more than one trade-off between security and end-user considerations • used the organisations information requirements and/or end-user requirements to evaluate whether a system was fit for purpose.
Standard specific comments	Candidates must reference any sources. Candidates succeeded where they focused on an information system within an organisation and how the components of the information system interacted to provide value to the organisation. This implies that there must be an information system and there must be an organisation. Where candidates did not consider an actual information system in an actual organisation, they often did not succeed. Candidates who understood the information needs of an organisation and its end users were able to evaluate the system against the system's capacity to deliver information that met these needs. Candidates who did not show understanding of the information needs of an organisation often did not convince the marker that they really grasped the nature of information. When candidates reported on organisations that did not have all the components of an information system, the report did not provide sufficient evidence for the standard. Reports that focused upon the Cleveland College exemplar often did not provide any detailed examples beyond what was already provided in the exemplars. Reports that focused upon a case study outside of a school setting or provided detailed examples of their own school's information system beyond those provided in exemplars were most often able to demonstrate the understanding required for achievement of the standard.

6. Assessment Report for 91636: Demonstrate understanding of areas of computer science

Achieved	Candidates who were assessed as Achieved commonly: • wrote about the problems that are associated with computer science • used a template to support candidates • were able to talk about commonly-used computer science areas in day-to-day use • utilised heavy teacher direction or a template.
Not Achieved	Candidates who were assessed as Not Achieved commonly: • only attempted one topic instead of two • wrote about topics other than the ones specified in the standard • failed to describe the key problems that are addressed in the selected areas of computer science • failed to explain examples of the practical application in the selected area and/or

	failed to demonstrate the key techniques or algorithms • attempted one topic to a high standard and made little effort with the other • copied material from either the internet or the Field Guides without showing understanding • did not read the standard requirements • confused the topics intent e.g. Software Engineering with software testing • copied examples directly from the internet or the Field Guides without showing any understanding (ARIANE 5 Rocket for example) • failed to DESCRIBE the key problems in enough detail to be able to explain the techniques used. • failed to EXPLAIN the key technique • gave in depth commentary on the social impact or future in a world of AI without describing the key problems, or explaining examples of practical application of the techniques or algorithims • wrote verbosely eg. talked to chatbots with no structure or purpose, or talked about programming languages with no basis, or moving images without having an explanation to follow. • made incorrect interpretations about data. Candidates who wrote a report that was not at a Year 13 standard could not achieve. A Year 13 Achievement Standard asks candidates to explain key techniques. Listing information is not explaining.
Achieved with Merit	Candidates who were assessed as Achieved with Merit commonly: • were able to do a practical activity and DISCUSS and EXPLAIN it eg write about the advantages and disadvantages of the computer science area, or • did not use a template • provided student voice based on the activities, examples or investigations. Explanations were reasoned and accurate.
Achieved with Excellence	Candidates who were assessed as Achieved with Excellence commonly: • wrote about the problems, practical activity, and also wrote about future ideas, how these could be used to support developments • linked to real examples, eg software companies experiences, rather than information about the companies • were able to integrate the techniques or algorithims into a practical example and explain with examples why they were used and the benefits or disadvantages. For example: 1. Agile vs. Waterfall for an actual example or case study, or 2. how an intractable problem can be mitigated, or 3. how line algorithms or matrices can improve performance.
Standard specific comments	The Areas of Computer Science must be selected from formal languages, network communication protocols, complexity and tractability, intelligent systems, software engineering, graphics, and visual computing. Candidates did well keeping to the 10 pages of the report. Candidates wrote concisely and targeted relevant concepts. Candidates were advantaged when they: • reported both an explanation of and an attempt to perform the Turing test • reported on the protocols rather than the infrastructure when discussing Network Protocols • produced evidence relating to computer graphics that went beyond games. • considered more than one algorithm in relation to computer vision • explained more than a simple regular expression when considering formal languages • considered more than one algorithm in relation to Complexity and Tractibility.

7. Assessment Report for 91638: Demonstrate understanding of complex concepts used in the design and construction of electronic environments

Achieved	Candidates who were assessed as Achieved commonly: • referred to practical work which they had personally undertaken and demonstrated their understanding in terms of their own practical experiences • supported their submission with annotated program code, photos and circuit diagrams of their own original work • covered all the required areas: software and hardware and microcontrollers.
Not Achieved	Candidates who were assessed as Not Achieved commonly: • worked on and wrote projects that had a narrow scope of concepts or had concepts at too low a level • reproduced a lot of sometimes quite complex information about devices that did not demonstrate that the candidate actually understood the material that was being presented • reproduced unannotated program code, photos and diagrams from unacknowledged sources • did not present material that was clearly in the context of their own technological experiences • presented information which they could not show that they had actually used.
Achieved with Merit	Candidates who were assessed as Achieved with Merit commonly: • demonstrated a practical familiarity with the concepts they were talking about • wrote about concepts that had a level of complexity.
Achieved with Excellence	Candidates who were assessed as Achieved with Excellence commonly: • wrote fluently and knowledgeably from their own practical experience • demonstrated a thorough operational understanding of the concepts outlined in the Achievement Standard • presented the interdependent nature of the concepts involved, relating one aspect to another rather than presenting each concept • provided descriptive details of how they had overcome problems in developing their solutions. These descriptions lent a significant level of authenticity to the candidates work because it is not possible to generate these sorts of narratives unless one has actually lived through a problem • submitted a report related to a project that naturally provided many opportunities to demonstrate a significant breadth and depth of understanding at the level expected by the standard.
Standard specific comments	Candidates who submitted less than 10 pages were not disadvantaged. Reports on grade boundaries were not improved by being longer. Often the reverse was true, with candidates presenting material they did not understand in an attempt to fill up the report. This frequently worked against the candidate. Candidates should restrict their report to what they actually understand. Those candidates who clearly demonstrated understanding complex concepts used in the design and construction of electronic environments wrote in their own voice, providing evidence from their own work and technological experience to support any referenced material. Candidates who simply reproduced images and tables of data from sources such as internet sites and teacher notes often did not demonstrate their own understanding. Reports that reproduced supplied or sourced material without relating the identified knowledge to a specific context often did not demonstrate understanding. The use of annotated program code, photos and diagrams helped candidates demonstrate their understanding. Program code, photos and diagrams presented as evidence without specific annotation often did not contribute to demonstration of student understanding. Candidates should be taking or obtaining their own images to ensure that it is their own work. Candidates do not need to present non-technical aspects of their projects; they should limit their report to the design and construction aspects of electronic environments. Extra information about the project reduces their ability to meet the standard because of

	the10 page limit. Program code needs explicit explanation to demonstrate conceptual understanding. Many candidates presented program printouts with descriptive comments; these seldom provided evidence of conceptual understanding. Candidates need to provide descriptions of program code at more than line by line level as often (at the level of work seen in this standard) are complex concepts found in one of program code. Code should be broken into segments and then the activity of the program code described for Achieved, explained for Merit and justified or comparisons made for Excellence. Many candidates provided technical data about LCD and semiconductor construction; generally this did not demonstrate evidence of their understanding. However when candidates presented their understandings about the use of such devices within the electronic environment, demonstration of conceptual understanding was evident.