# Design and Technology Subject Assessment Advice

# Subjects: Communication Products

# Material Products

# Systems and Control Products

## Overview

Subject assessment advice, based on the previous year’s assessment cycle, gives an overview of how students performed in their school and external assessments in relation to the learning requirements, assessment design criteria, and performance standards set out in the relevant subject outline. They provide information and advice regarding the assessment types, the application of the performance standards in school and external assessments, and the quality of student performance.

Teachers should refer to the subject outline for specifications on content and learning requirements, and to the subject operational information for operational matters and key dates. In Design and Technology, effective and inclusive task design remains a critical factor in successful student outcomes.

# School Assessment

Assessment Type 1: Skills and Applications Tasks

Skills and applications tasks consist of specialised skills applications and materials applications. Students demonstrate skills and understanding of the materials and components, techniques, and equipment that they consider for use in Assessment Type 2.

For this assessment type, students provide evidence of their learning in relation to the following assessment design criteria: Investigating. Planning, Producing, Evaluating

Specialised Skills Application Tasks

The more successful responses commonly:

* targeted new skills and scaffolding to support evidence against the specific features
* included comprehensive evidence against all selected criteria through a variety of formats: images, scanned documents, screen captures, videos, written annotations, investigations, reports or recorded oral discussion that was most suited to the context
* presented opportunities for students to develop skills and understanding of processes required
* demonstrated skills, trial assemblies, test and quality control components as well as gaining experience using hardware and jointing products
* targeted technical language, software usage and method of reporting evidence through multimedia choice.

*The less successful responses commonly:*

* lacked evidence through missing or incomplete work
* were unable to address all selected specific features due to task design
* lacked the depth and rigour required for specialised skills application task.

Examples for Communication Products:

* creating a series of photographs using a variety of compositional techniques, identifying and demonstrating skills, processes and planning required to capture the images
* enhancing a series of photographic images to demonstrate understanding of the software program(s) being used
* producing 3D modelled images and/or 3D printed prototypes developing drawings and process skills
* demonstrating animation sequences and/or basic HTML coding for website applications.

Examples for Material Products:

* a CAD task to create a simplified 3D model product from which, renders, and orthogonal drawings and/or a prototype can be realised.
* timber joining systems such as biscuit, dowel and mortise and tenon joints, combined in a simple product, or frame.
* Metals: welded joints or lathe work, using either a combination of techniques or equipment.

Examples for Systems and Control Products:

* fitting or changing of vehicle engine or electrical component.
* application of CAM software programs where results were either simulated or run as an actual program
* used 3D printers and Laser Cutters/engravers as an output devices focussing on processes used and settings of these machines
* simple gaming basics for example, Java coding, tweening, audio and frame rates
* introductory coding exercises, which included realisation by either simulation or actual controlled robotic movement.

Material Application Task

The more successful responses commonly:

* clear identification of appropriate materials or components suitable for the student’s context
* thorough investigation of their properties, e.g. botanical, chemical or structural
* provided evidence of common uses and applications if relevant
* described qualitative and quantitative testing conducted
* used scientific testing processes to test materials in controlled conditions, enabling rigor and depth to their discussion about the outcome and in referencing against similar documented findings
* summarised results concisely, recorded analysis of these results before creating a conclusion
* utilises the 800 word count and referenced correctly.

The less successful Material Application Tasks responses commonly:

* did not identify two or more relevant materials or components to study
* completed a superficial investigation of materials or components to describe chemical or physical properties and uses
* were unable to validate the testing regimes in responses, (for example; why those tests were selected?)
* were unable to describe the test procedures
* provided limited evidence of the tests being conducted, results obtained and concluding/analytical comments.
* did not fully utilise the available word/time limit or adhered to word/ time limit requirements.

Examples for Communication Products:

* alternate software for digital imaging, with a focus on processes within the software, rather than a comparison of the overall package
* comparison of alternate CAD software components e.g. extruding, dimensioning, scaling, exporting
* software component testing or actual data/coding as a material, (e.g. testing ‘strings’ of alternate code to produce similar responses).

Examples for Material Products:

* select two materials, e.g. Pine and Australian Oak, and conduct tests to determine suitability of finishes, ability to hold fasteners, strength or durability tests, and density or ability to resist indentation
* machinability of mild steel and free cutting steel in metals.

Examples for Systems and Control Products:

* engine motor oils used as two materials testing for viscosity, alternate chemical inclusions and synthetic properties
* CAD/CAM 3D printers – ABS and PLA as the identified materials, with tests around strength, water resistance, ability to accept finishes, and distortion
* alternate coding languages were used, as components. Testing included string length, application/export capabilities, and software comparisons.

Assessment Type 2: Product

For a 10-credit subject, students create one product that allows them to demonstrate an appropriate range of skills, techniques, knowledge, and ideas. The product is supported by a product record that documents the process, including modifications, planning, and production.

For a 20-credit subject, students create one minor product and one major product that allow them to demonstrate an appropriate range of skills, techniques, knowledge, and ideas. The products are each supported by a product record that documents the process, including modifications, planning, and production. The minor product may be a component of, or designed to complement, the major product

For this assessment type, students provide evidence of their learning primarily in relation to the following assessment design criteria: Planning, Producing, Evaluating.

The more successful responses commonly:

* showed clear evidence of completion, and student involvement in the Product
* included comprehensive evidence in the form of Product Records, against all selected criteria
* used a range of evidence including. images, scans, .avi (walk through), screen captures, videos, written annotations, reports or oral recording
* clearly identified Planning and Evaluation as separate paragraphs, statements or sections
* featured an image of their final product at the beginning of the product record
* clearly stated if the minor product was a component of, or designed to complement the major product or a separate task
* included well designed and realised products where students were given a wide choice
* responded to well-structured tasks that supported successful planning, producing and evaluation outcomes

The less successful responses commonly:

* did not provide a clear product record
* were restricted to limited product choice.

Examples for Communication Products:

* focused on a maximum of 6–8 photographic images to respond to requirements of the task sheet for Major Product assessment.

Examples for Material Products:

* a drawer (minor product) as part of a cabinet (major product)
* a generated 3D modelled image of Major product (minor product) and orthogonal drawings and scaled 3D printed models or actual scaled models, using Balsa or similar (major product)
* water feature with a metals focus (major product) and a metal clamp (minor product).

Examples for Systems and Control Products:

* Robotics projects of coding of a vehicle around a nominated track or robotic arm movements
* RC Submarine programs featured the manufacture of the infrastructure and hulls of the subs (3D printed), the soldering/fitting of the internal electrics, including batteries, servos, power to transmissions, and the fitting and engineering of the flotation system.
* CAD/CAM project of a scaled realisation of a full house design, using a combination of Laser and 3D printing technologies
* the realisation and fitting of a full exhaust system.

# External assessment

Assessment Type 3: Folio

The folio consists of documentation and analysis of the product design process and product evaluation.

The investigation section of the design process includes an analysis of the impact of the product or system, and/or technologies related to it, on the individual, society, and/or the environment.

This assessment type is designed to enable students to further develop and refine their use of the design process. They investigate technical skills, analyse possible applications of these skills, and evaluate ways in which their own skills have developed and improved.

For this assessment type, students provide evidence of their learning for all specific features in the following assessment design criteria: Investigating, Planning, Evaluating.

Investigation

I1 Identification of a need, problem or challenge

The more successful responses

* demonstrated individual ideas and define the need with clarity and detail
* had a clear need for the product being designed
* had a strong focus on investigating relevant information
* showed innovation in design for the need, challenge or problem.

The less successful responses

* tended to identify the same specific outcomes for the whole class to meet
* often included a check list of production techniques or similar constraints that applied to the whole class
* were more likely to be a single brief that whole classes tried to address or when students did not investigate their own choice of product.

I2 Creation and validation of an initial design brief based on needs analysis and task identification.

The more successful responses

* had a clear design brief that included constraints or requirements
* provided a clear statement of individual needs
* were able to describe individual situations or specific personal environments that would shape the development of the product
* tended to not be overly constrained by the structure or specific demands of the initial task design.

The less successful responses

* followed a teacher template that did not directly relate to the Performance Standards
* had a set brief which did not allow students the scope to explore their product options
* occurred when design briefs were poorly addressed or not completed when tasks were too directed by teachers
* frequently tended to include statements such as “this task requires me to make a ……”.

I3 Investigation and critical analysis of the characteristics of existing products, processes, systems, and/or production techniques.

The more successful responses

* correctly reference download images of existing products
* critically reflected on features and procedures related to their product
* use tables to collate information and reduce word count in this section
* included comments on physical description, materials, possible joint types, hardware used, ergonomics, proportion, and size of the products reviewed
* were able to present a more critical review of features and effectively link these to the design brief and proposed product
* occurred where students were given the opportunity to choose their own item to design, be motivated and show genuine design processes.

The less successful responses

* put more detail into this section (to the detriment of whole folio) causing them to go over the word and or time limit
* did not critically analysis information gained
* provided limited feedback on the value of the features of the various designs
* occurred when design opportunities were not investigated, considered or evaluated adequately
* had a restricted response when a directed whole class task was used.
* often included “likes and dislikes” comments that did not provide any direction or connection to planning the product.

I4 Investigation of product material options and analysis for product use.

The more successful responses

* production techniques explored in depth
* showed evidence of testing materials through result tables and graphs and included a summary of material analysis
* related the ‘Materials Application task’ information to make reasoned decisions in the planning process.

The less successful responses

* listed the material options but without any analysis for product use
* material options not investigated and evaluated adequately.

I5 Investigation into the impact of products or systems on individuals, society, and/or the environment

The more successful responses

* discussed the impact of their product or system on individuals, society and the environment with depth
* provided evidence succinctly using sophisticated language and correct referencing
* when completed as a separate investigation, had a prescribed word count and a clear introductory paragraph, a number of paragraphs of discussion, and a conclusion
* summarised findings succinctly
* had impact studies based on well researched information that demonstrated more in-depth understanding of the topic and considered personal opinion.

The less successful responses

* only touched on an impact related to their product
* were unable to write concisely
* did not address this performance standard
* had impact studies that were superficial, lacked researched information or selected a narrow topic.

Planning

Pl1 Analysis of information to develop solutions to an identified design brief.

The more successful responses

* demonstrate progression in enterprising responses to a clear design brief
* provided multiple sketches lead to refined annotated drawings and culminate in a clearly dimensioned working drawing or model
* used images or scans of completed drawings that gave clarity to written descriptions of design outcomes
* provided annotated diagrams or images as part of the planning process
* provided an analysis of the testing process and linked findings to the planning process
* included high quality drawings, diagrams and sketches.

The less successful responses

* provided limited detail on the breakdown and assembly of articles and components
* had teacher-generated cutting & materials lists with limited student input
* included a procedure list or time line on how to construct their project with limited information
* lack of drawings or sketches or only a few drawings provided with no obvious link to the final design
* demonstrated a very limited range of ideas with some only having a single concept
* failed to link the investigating and planning components (Some evidence jumped directly to a final drawing rather than developing a range of possible options after investigating existing products).

Pl2 Communication of product design ideas, using relevant technical language.

The more successful responses

* used CAD or other drawing program to communicate design thinking
* demonstrated correct use of terminology throughout the folio
* included sophisticated or detailed drawings clearly showing the development of the design
* consistently included correct use of technical language and a range of techniques or processes that applied to the product
* included manual drawings and sketches purposefully annotated showing the development of the design process.

The less successful responses

* provided very few or no concept sketches
* lacked drawings that provided evidence of planning
* provided design solutions that lack technical language and quantitative investigations.

Pl3 Testing, modification, and validation of ideas or procedures.

The more successful responses

* identified testing used and the summarised results gained
* linked and discussed modifications to the original design brief
* displayed relevance and influence in the decisions made by the student in the selection, validation or modification of suitable materials, processes or procedures employed in the Product
* used appropriate tests that were relevant to the materials being considered.

The less successful responses

* did not undertake any testing, modification and /or validation of ideas and procedures
* used information from a Skills & Application tasks and did not adjust writing style for folio
* had limited evidence of either quantitative or qualitative testing leading to informed decision making.

Evaluating

E1 Evaluation of product success against design brief requirements.

The more successful responses

* were able to effectively link their realised product to their initial design brief
* effectively articulated their product success against their design brief
* include clear photos and images of the product indicating success of design brief requirements
* thoughtfully reflected on the original need or challenge and the degree to which a design brief has been fulfilled.

The less successful responses

* often did not relate the product back to the initial need or design brief
* were vague; for example the student as the designer was happy with the outcome but this was not supported by any evidence, connections or reasoning
* used the evaluation section to discuss how they made or what went wrong with their project during construction
* used simplistic lists, tables or check boxes of binary yes-or-no outcomes, limit the opportunity to demonstrate insight and thoughtfully considered evaluation.

E2 Evaluation of the effectiveness of the product or system realisation process.

The more successful responses

* included a critical comparison of the realisation product or system with the requirements of the initial design brief and needs analysis
* provided an explanation and justification for changes made during the realisation process or suggested improvements that could be made, based on the experience gained during construction of the product or prototype.

The less successful responses

* included “product record” documentation not required in the External assessment component, as such the evidence of Investigating, Planning or Evaluation was limited within the folio word count
* included a photo of the finished product with limited evaluation and few drawings to clarifying what was being designed
* who hadn’t finished the production stage of the product or system realisation process, were unable to test and evaluate sufficiently.

E3 Reflection on materials, ideas, or procedures, with recommendations.

The more successful responses

* presented a connected exploration of material options and related this to their design and product
* were able to make recommendations on improving their product.

The less successful responses

* did not include a photo of the final product and/ or concept sketches or design drawings thus any reflections, ideas, procedures and recommendations were not clearly evident
* had folios evidence that jumbled the order of the design process.

E4 Analysis of the impact of the product or system on individuals, society, and/or the environment.

The more successful responses

* identify the performance standard via a sub-heading, making it clear to assess
* included references or evidence that was based on research
* recognised their sources of information in the bibliography
* clearly identified the impact of the product or system on individuals, society and or the environment.

The less successful responses

* appeared to be based more on opinions gathered from other people and misconceptions rather than topic research and recognised informed sources
* did not address E4 within the folio.

General information

* Include good quality photographs of the completed or partially constructed product and clear images of concept drawings that show detailed line work.
* Product records are not a requirement for the External Assessment Type 3: Folio and are best included with School Assessment moderation materials.
* The design brief, as part of the External Assessment Type 3: Folio, should include a statement of intent, functional outcomes, aesthetic considerations, and constraints. This can be presented in dot point form