# 2018 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

The more successful Specialised Skills Application Tasks responses commonly:

* were clearly of suitable Stage Two standard, albeit, the first skills task can be a scaffolding/common task, designed to provide an equitable opportunity across the cohort
* were individually ‘tailored’ to facilitate individual and challenge-based learning preparing them for AT2
* included comprehensive evidence against all nominated 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
* provided opportunities for students to demonstrate skills, trial assemblies, test and quality control components as well as gaining experience using hardware and jointing products
* targeted the language or software to help the students, or allowed the students to choose the media they were most comfortable to work with

*The less successful Specialised Skills Application Tasks responses commonly:*

* didn’t provide enough evidence (missing or incomplete work) to be able to support the teacher/school grade
* there didn’t seem any logical relationship between work to be completed in AT2
* required students to complete responses to ‘unrealistic’ tasks that were essentially over assessed e .g. students were unable to address all nominated specific features to the required Stage 2 standard
* lacked the depth and rigour required for Stage 2
* had discrepancies between the learning and assessment plans (LAPs) stated tasks and the tasks completed and assessed

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 using either a combination of techniques or equipment, both gas and electric. An emphasis on weld quality and minimisation of distortion in the joining/welding process.
* Application of Finishing Systems, featuring preparatory sequences, and a brief study of appropriate selections – maybe aligned to a Material Applications task.
* Machining examples, e.g. parallel turning to tolerance diameters and lengths, screw cutting, ‘fitting’ etc.

Examples for Communication Products:

* Creating geometry for use with advanced manufacturing equipment, e.g. 3D printers and Laser technologies.
* Creating children’s toys, and other appropriate models featuring a variety of materials, to be cut out using a laser. Plastics, wood products and fibre based materials.
* 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 System 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

The more successful Material Application Task responses commonly:

* featured clear identification of appropriate materials or components suitable for the student’s context
* were thorough in 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 consistently, and to Stage 2 standard
* 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:

* didn’t identify two or more relevant materials or components to study
* didn’t comprehensively describe the material chemical or physical properties and common uses
* were unable to validate the testing regimes – why those tests were selected
* were unable to describe the test procedures
* provided limited evidence of the tests being conducted
* didn’t result the tests and then provide concluding/analytical comments
* exceeded the word count
* featured task designs that precluded student opportunity to engage meaningfully against the nominated assessment design criteria (ADC), and related specific features

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 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 System 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 and 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:

* included comprehensive evidence in the form of Product Records, against all nominated 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 evaluating 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
* demonstrated critical thinking and analysis in the Product Record
* had task sheets that was well structured, provided clear guidelines and assessment requirements
* included task design that ensured that assessment was targeted, relevant, and not over-assessed

The less successful responses commonly:

* did not provide a clear product record, which was unable to provide clear evidence against the nominated Assessment design criteria (ADC), and specific features
* were restricted due to task design requirements that did not enable students to demonstrate evidence at the highest level
* resulted in work of marginal Stage 2 standard, in terms of depth and rigour
* were over assessed in the Assessment Type, resulting in diluted coverage of all the nominated specific features
* were simplistic, and lacked depth

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)
* evening wear garment (major product) and accessories (minor product)
* furniture constructed using a combination of materials, including metals, high grade and recycled timbers, and resins

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
* using CAD and with advanced manufacturing technologies, to design, draw, and prototype a range of products, including children’s toys, playground equipment, USB locks, RC model car
* using web pages to audience their images effectively
* built communication media web pages and apps

Examples for System 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 commonly:

* were detailed and relevant

The less successful responses commonly:

* involved the whole class using a teacher developed template where students filled in information by answering questions (While this may be a useful strategy for supporting some students, the result often limited the results across the entire class group and tended to result in similar and consistent lower level responses by students.)

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

The more successful responses commonly:

* had individual statements which allow students the scope to explore their product options
* had statements of intent and design briefs reflecting individual student or client’s needs

The less successful responses commonly:

* did not reflect individual student needs or interests
* occurred when classes had the same brief which did not allow students the scope to explore their product options

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

The more successful responses commonly:

* flowed from a clearly identified need or challenge and an elaborated design brief, informing and giving clear purpose to the investigation process
* was characterised by a combination of a broad preliminary analysis of examples that progressively refine to clear examples of outcomes that more closely align with the design brief
* demonstrated good depth of research with appropriate referencing, included supporting examples and made good links to the product
* critically reflect on features/procedures related to their product
* use tables and other formats to get the information across with suitable word count
* was addressed at a more detailed level, more frequently, when students had control over their product selection and the research component of the design process
* occurred when the students tended to work though their initial ideas with an eye that was more finely tuned to meeting their own particular needs
* consulted and discussed their project with a wider audience, collecting a broader range of possible ideas while still addressing the design brief requirements

The less successful responses commonly:

* demonstrated limited research and frequently tended to directly copy one of the few options presented in section
* was often limited by set design requirements in the design brief
* provided limited ideas identified by students and in many instances students often used the same examples and resources as others in their class for their research
* when only one idea was identified and discussed in the research phase
* showed a lack of connectedness between the design brief and the idea that students selected

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

The more successful responses commonly:

* showed evidence of testing materials and sometimes included a summary that demonstrated material analysis
* showed a direct link of the materials to their product

The less successful responses commonly:

* did not address this at all or only listed the materials without any analysis evident
* did not adequately considered materials or link materials to their product

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

The more successful responses commonly:

* explained impacts of their product or system using different perspectives
* were able to investigate their impact succinctly using sophisticated language

The less successful responses commonly:

* only touched on an impact related to their product
* did not address this performance standard

### Planning

Folios that demonstrated better planning processes generally focused on the Design rather than the construction or realisation process. This usually resulted in a product that was well structured and generally reflected a higher level of sophistication. There is evidence that planning is still a difficult area that is being overlooked by many students. As a result students may leap directly into production. This potentially resulted in a simplistic product that lacked sophistication.

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

The more successful responses commonly:

* featured high quality drawings/diagrams
* provided multiple sketches that led to refined and annotated drawings that culminated in a clearly dimensioned working drawing or model
* used annotations on their drawings and sketches to describe their critical thinking or how they were clarifying and refining problems

The less successful responses commonly:

* had low quality drawings that reflected a lack of engagement in the design process
* had few concepts identified from the research undertaken
* did not use graphics when developing concepts or stating the final product design

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

The more successful responses commonly:

* Correct terminology was used throughout the more successful folios and these folios also tended to apply annotations to more sophisticated drawings.
* developed a number of concepts based on their research
* explored a number of different ideas that satisfied the initial criteria identified by students
* communicated concepts related to the design brief and included specific features that were consistent with the requirements the student had stated in their needs analysis or listed in their functional requirements
* maintained a consistent theme, shape or function with some variations developed by the student that explored options and allowed the student to refine their design
* demonstrated effective use of graphics within the design process (Graphics is a component of technical communication and provides a legitimate application of technical terminology)
* used technical sketching and the use of 3D sand 2D freehand drawings to explore ideas and develop ideas and concepts
* provide clear images or photographs of concept drawings

The less successful responses commonly:

* did not apply correct terminology or terminology effectively
* tended to not use many drawings or annotations on drawings
* demonstrated poor use of technical language
* lack graphics showing or explaining the development of concepts
* only one idea was evident and this was the final product supported by superficial or very limited research
* Very limited graphics were evident in the D grade and lower grade folios
* were unable to describe the projects shape and size effectively

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

The more successful responses commonly:

* Folios showed evidence of effective quantitative or qualitative testing with the results considered.
* In the more successful folios testing was purposeful and connected to making informed decisions for the final product.

The less successful responses commonly:

* did not address this requirement or the work was undertaken at a superficial level, often being unrelated to the designed product
* did not adequately documenting the product development process, often providing little or no evidence of planning, testing and modification
* showed limited evidence of either quantitative or qualitative testing leading to informed decision making

### Evaluating

On a whole the evaluation section was only adequately completed.

The most successful Folios addressed all sections for Evaluation in a sophisticated manner.

#### E1 Evaluation of product success against design brief requirements

The more successful responses commonly:

* The best student responses had a clear design brief and reflected back to their original needs and features effectively
* Provided a photograph of the realised product

The less successful responses commonly:

* did not address this specific feature due to limited design brief preparation
* tended to reiterate the design process or in many examples, the construction process rather than reflecting on the original intent and design brief

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

The more successful responses commonly:

* 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 commonly:

* were able to detail the strengths and weaknesses of their product superficially but did not usually include any insightful analysis

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

The more successful responses commonly:

* reflected concisely on materials , ideas, or procedures used with recommendations
* selected key areas that was pertinent to the product or system success and development, reflecting on and noting recommendations

The less successful responses commonly:

* did not reflect on the ideas or procedures
* did not reflect on the materials they chose to use in the construction of their product

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

The more successful responses commonly:

* focussed on the impact the materials they used would have on the environment and community
* concisely addressed the impact their product would have on society and the environment

The less successful responses commonly:

* omitted to provide evidence for this specific feature which therefore affected the overall mark

### 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