

# **Design and Technology: Resistant Materials**

General Certificate of Secondary Education **J306**

General Certificate of Secondary Education (Short Course) **J046**

## **OCR Report to Centres**

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**June 2013**

OCR (Oxford Cambridge and RSA) is a leading UK awarding body, providing a wide range of qualifications to meet the needs of candidates of all ages and abilities. OCR qualifications include AS/A Levels, Diplomas, GCSEs, Cambridge Nationals, Cambridge Technicals, Functional Skills, Key Skills, Entry Level qualifications, NVQs and vocational qualifications in areas such as IT, business, languages, teaching/training, administration and secretarial skills.

It is also responsible for developing new specifications to meet national requirements and the needs of students and teachers. OCR is a not-for-profit organisation; any surplus made is invested back into the establishment to help towards the development of qualifications and support, which keep pace with the changing needs of today's society.

This report on the examination provides information on the performance of candidates which it is hoped will be useful to teachers in their preparation of candidates for future examinations. It is intended to be constructive and informative and to promote better understanding of the specification content, of the operation of the scheme of assessment and of the application of assessment criteria.

Reports should be read in conjunction with the published question papers and mark schemes for the examination.

OCR will not enter into any discussion or correspondence in connection with this report.

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## Overview

This report provides an overview of the work seen in the written examination Units 2 and 4 and the Controlled Assessment Units 1 and 3, for candidates who took the examination during this series. It precedes a more detailed 'Report to Centres' from each subject area within the Innovator Suite and highlights general issues that have occurred across the suite of specifications. This is the fourth year of the Innovator Suite.

This report has been prepared by the Chief Examiner, Assistant Chief Examiners, Principal Examiners and Principal Moderators and covers all specifications within the Innovator Suite. It should be read in conjunction with the examination papers, the mark schemes, and the marking criteria for assessment given in the specification booklets.

Centres are reminded that it is also an Ofqual requirement that candidates are now credited for their accurate use of spelling, punctuation and grammar across all four units.

### Written Examinations – Units 2 and 4

#### Unit 2

For this examination series of the GCSE Innovator suite entries were seen from all six subject specialisms.

The overall performance and range of results for Unit 2 was generally the same as seen in the January 2013 series. There are variations within the subject specialisms and Centres would benefit from reading the individual subject reports for this unit.

It was pleasing to see that many candidates had been well prepared for the examination by Centres and clearly had a sufficient knowledge base to answer the questions. It has been encouraging to see that candidates have been able to access the higher marks. There was also a significant improvement in the extended response style question\* this series, with candidates giving detailed answers combining good subject knowledge with an ability to produce a structured response.

In **Section A** of the papers most candidates across the suite attempted to answer all questions, with few candidates giving no response (NR), although these do still occur. Candidates should be encouraged to attempt these types of questions if unsure, rather than giving no response at all.

Candidates generally demonstrated an improved understanding of sustainable design, but were often still hampered by their exam technique. Misunderstanding or misinterpreting the question, or not reading the question carefully enough was evident throughout the suite of papers. Candidates must be encouraged to take notice of the key word in the stem of the question to identify whether the question requires them to explain, describe, discuss, state, name or give.

There was less duplication of answers seen during this examination session, although one area of concern is that of the 'scattergun' approach to answering questions. Candidates need to be aware that where one answer is asked for and multiple answers are given by the candidate, candidates will lose the mark for the correct answer if an incorrect answer is also given. Some candidates approached these questions by supplying multiple answers, writing everything they can think of about the subject. Examiners cannot credit the one correct response out of several provided in a question which explicitly asks for '**one** reason' or '**one** example' because the candidate has not adhered to what has been asked for. It would be unfair on other candidates who had several possible answers in mind but addressed the question and selected their one final answer to provide rather than 'hedging their bets'.

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**Section B** of the papers showed a greater range of responses in terms of quality and teachers need to ensure they read the subject specific reports for further detailed feedback on specific issues and individual question performance.

**Candidates need to be careful that they do not repeat the question in their answer or repeat the same point within their answers.**

The questions marked with an asterisk \* provided candidates with an opportunity to give a detailed written answer combining good subject knowledge with an ability to produce a structured response. Many candidates did manage to use subject specific terms in their answers, but at times lacked sufficient depth and tended to be repetitive which compromised marks.

Hand writing at times was difficult to decipher and candidates need to do everything possible to ensure that their writing is legible. Centres are reminded that candidates are marked on spelling, punctuation and grammar on this question.

It was noticeable that where extra paper was required to continue a question response, many candidates did not reference the question number on the extra sheets used. It is important that Centres instruct candidates how to highlight where they are continuing an answer on a different page in the examination script to ensure that examiners are clear where an answer continues on a separate page in order that the candidate's full response is considered.

**Centres need to be aware that questions may appear on the back page of the examination document and candidates should be encouraged to check carefully that they have completed ALL questions.**

### Unit 4

For this examination series of the Innovator suite entries were seen from all six subject specialisms. The overall performance of candidates was varied across the suite once again this series.

Some key areas which Principal Examiners have highlighted as giving scope for improvement are as follows:

- Candidates should attempt every question.
- It is important that candidates read the questions carefully to determine exactly what is required before attempting an answer. It can be helpful for candidates to highlight what they consider to be the 'key' words or instructions.
- In those questions that require candidates to produce sketches and notes, it is essential that answers are made as clear, detailed and technically accurate as possible.
- There were many instances where examiners were unable to decipher illegible handwriting and poor quality sketches.

### Controlled Assessment – Units 1 and 3

Most Centres have been prompt in the dispatch of documentation to OCR and moderators, which is to be commended. **It is important that Centres return the portfolios to the moderator within three days of receiving the sample request.**

Centres are reminded to forward form CCS160 to moderators. It is helpful if Centres also include a record of the marks allocated to each candidate for each of the marking criteria sections.

**Candidates producing paper portfolios should be entered for postal (02) moderation. Candidates producing their portfolio on a CD or memory stick should also be entered for postal (02) moderation.**

Centres must ensure that if candidates are entered through the repository (01), the portfolios must be uploaded via Interchange and **NOT** sent through to the moderator on a disc. The preferred format of files presented for this type of moderation needs to be PowerPoint, PDF or Word, with work saved in ONE file only and numbered, not as individual sheets saved as different files.

Portfolios should be clearly labelled with the Candidate and Centre name and number, with the unit code and title also evident. (*Specification – 5.3.5 Presentation of work*) This is particularly important when the Centre submits work via the OCR Repository, where individual files are used to store portfolio work. Centres must ensure that candidates clearly label each file using the marking criteria section headings; this facilitates a more effective completion of the moderation process.

**Centres are also reminded to ensure that the OCR cover sheet is included with each portfolio of work, outlining the theme and the starting point chosen by the candidate.**

**JCQ documentation on Controlled Assessment** (September 2011 – August 2012) clearly states that any guidance given to candidates must be clearly recorded. *4.5.2 When marking the work, teachers/assessors **must not** give credit in regard to any additional assistance given to candidates beyond that which is described in the specification and **must** give details of any additional assistance on the appropriate record form(s). **This includes providing writing frames specific to the task.** (eg outlines, paragraph headings or section headings).*

In light of the information given above, Centres need to take care when using writing frames in the controlled assessment portfolios.

Many candidates included a bibliography or referenced their research sources, which was pleasing to see. **It is good practice to ensure that candidates acknowledge sources of information used for the development of their portfolio work.** *5.3.2 Definitions of the Controls* section in the specification states: “The teacher must be able to authenticate the work and insist on acknowledgement and referencing of any sources used”.

Centres are to be reminded that the ‘*controlled assessment task must NOT be used as practice material and then as the actual live assessment material. Centres should devise their own practice material using the OCR specimen controlled assessment task as guidance.*’ *Specification – Section 5.2.2 Using Controlled Assessment Tasks.*

It is a requirement in the Making criteria that candidates “*demonstrate an understanding and ability in solving technical problems*”. **Centres must therefore ensure that problems encountered are written into the record of making, for the higher marks.** Marks were compromised here this examination series.

4.1 ‘Schemes of Assessment’ clearly states that “*A Minimum of two digital images/photographs of the final product showing front and back views*” should be evident in the candidate portfolio. **It is the Centre’s responsibility to ensure that photographs are evident, are of a good quality and are of the candidate’s own work.**

# A561 Introduction To Designing and Making

**Please read this report in conjunction with that for A563 as together they form the two controlled assessment units for the innovator specification.**

## Introduction

Paper portfolios still remain the most popular medium for entering the candidates work and whilst repository entries have remained steady, there has been an increase in the number of Centres using other electronic storage methods to enter candidates work. However, there were concerns mentioned in connection with some of these portfolios due to the quality of the design work that was presented in this style of work. In some cases the reproduction techniques used to show this work, in what were predominantly PowerPoint presentations, were, of such a low quality that it was difficult to see the content and detail of the designs. It is important in all cases that the moderator is able to see the full range of work which shows all of the presentation techniques used by the candidates.

It should also be remembered that in this unit candidates should be developing a prototype product which should enable them to show some creativity in their work. The emphasis should be on the candidates experiencing an introduction to designing and making within the 20hrs of controlled assessment.

It is for this reason, that along with evidence of the more traditional materials and process that we connect with 'Resistant Materials', we also accept prototypes where **parts of the prototype** may be made in foam, balsa, jelutong instead of a more durable timber, aluminium instead of steel or silver, plastozote instead of acrylic etc. This would then demonstrate an understanding of how the 'real' product might be made, have most of the function of the 'real' product but not be so demanding in time spent on production or finish.

Whilst the majority of Centres have a clear understanding of the regulations relating to controlled assessment, there still remains evidence that some of the work presented for moderation did not comply with the levels of control stated for this unit of work in the specification. Teacher guidance and the use of writing frames create a very formulaic approach to the work and as a result, candidates are restricted from showing the individuality which is expected in this unit. Our advice would be to take great care when making the distinction between guidance and prescription during these periods and centre's should be aware of the guidance offered in the document '**Guide to Controlled Assessment in Design Technology**' which can be downloaded from the OCR website.

## Administration

Most Centres provided individual Controlled Assessment Cover Sheets for each candidate with clear and relevant information which was helpful to the moderation process; however Centres are also reminded that moderators still need to receive the Centre Authentication form CSS160 as without either of these forms moderation cannot take place.

There should be at least two photographs supplied of the end prototype and these are normally supplemented by others that the candidate presented when recording the stages in producing the practical work. These photographs are an important element of the postal moderation process and Centres are requested to ensure that they supply photographs which are of a sufficient size to provide full details of the prototype product that the candidate has produced.

It should be worth noting that it is the Centres responsibility, and not the candidates, to provide at least two clear photographs of the end product in each of the folders.

## Assessment

In a few cases, it has become evident this year, that although centres understand the concept behind the use of “best fit” descriptors to assess the work, they did not use the full range of marks available in each of the response categories. Where this method was then applied across a number of the assessment strands it resulted in a recommendation being made by the moderator for the Centre’s marks to be adjusted in order to reflect the standard of work seen in the candidate’s portfolio.

Centres are reminded that there is a full range of documentation, including downloadable forms and other subject specific support materials on OCR’s website: [www.ocr.org.uk](http://www.ocr.org.uk)

## Performance of Candidates

The more successful candidates work was clearly focused upon the requirements of the assessment criteria which indicated the preparation candidates had received before starting the controlled elements of this unit of work.

In this cohort some of the more common issues which again affected candidate’s achievement included:

### Creativity

- A “range” of existing products being shown in the creativity section of the portfolio without the candidates **concluding what trends or design features they had identified**

### Designing

- Limited **evidence of modelling techniques** being employed to support the development of the design ideas.

### Making

- The lack of a **written commentary** to support the marks awarded on how they overcame technical problems in the making. Far too often centres are rewarding the candidates in this assessment strand purely on what they have observed rather than evidence provided by the candidate.

### Evaluation

- The evaluation being focused upon the product rather than the process of designing the prototype.

Whilst other factors were identified as being:

### Creativity

- Questionnaires and charts are still appearing with no summary or analysis of the findings which should be seen as the main reason for producing them.
- There is still little mention of the users’ needs, only superficial reference to colour/material/cost preference.
- Candidate’s **not editing research information** or providing summary conclusions as to what they had learned from producing these materials.

### Designing

- Design ideas which did not show the variety of techniques and quality of presentation described in the assessment criteria.

### Making

- Limited photographic and written evidence in the record they needed to produce of the key stages in making the prototype.



## Creativity

In this assessment strand candidates are required to select a theme set by OCR in the specification for this subject as part of the control guidance for the unit. This theme can, however, be contextualised in order to best suit Centre specific circumstances. This requirement is not always that evident in a number of the portfolios that we moderate and centres attention is drawn to this initial response being a high level control statement in the specification.

Once the theme is stated the candidate will then need to identify a specific product or starting point that is associated with the theme to complete a product analysis. For example, if the chosen theme is 'Travel' a candidate may decide to design and model a prototype hand held game which can be used 'on the move'.

This assessment strand and the use of the word "creativity" as an assessment heading has clearly caused some confusion in centres who have not adapted their previous work from the legacy specifications to meet the content expected in this unit. It is intended that the word creativity, as used in this assessment, should be related to how the candidate shows this ability through the work they present in identifying trends or design features from their research work.

Centres should be aware that in order to award marks in the "works competently" category for this assessment strand, the candidates need to show evidence that they have successfully edited their research materials with clear summaries of what they intend to take into their own designing. In this way research work such as a questionnaire produced to find out the needs of the user can still be completed, but within the "controlled" environment it is the results or conclusions only that we would expect to see in the portfolio.

**Successful candidates** clearly showed how they had selected their own problem area from the list of controlled assessment themes stated in the specification. They carried out a thorough analysis of one existing product and then by editing information from other similar research they were able to identify what were good design features and explained the significance of any trends in these existing products. By using notes, sketches and photographs they were also able to give examples of intended users and their likely needs when using the product. From this, candidates were then able to analyse the information that they had gathered before using this to generate a concise design brief that clearly identified the product and users.

## Designing

Candidates should begin this assessment strand with a detailed list of specifications for their own prototype product that they have identified in the previous section of their project work. They should be encouraged to use the information that they have identified from analysing the needs of the user, design features and technological trends in developing their design ideas through to a final proposal for the practical work.

The vast majority of candidates used freehand sketching to illustrate their initial design ideas with basic annotation, which sometimes provided little in terms of detail or explanation. The quality of presentation also varied both within centres and across the whole cohort, with some candidates being awarded very high marks for what was a range of limited design ideas. In other cases candidates had combined a variety of presentation techniques to develop their design ideas towards a working prototype product.

Centres should also be aware that some of the methods they employ for uploading the design work into e-portfolios has resulted in very unclear images of the candidates hand drawn ideas. Our advice would be ensure that the images are scanned into the presentation as accurately as possible and to avoid the use of photographing the pages as this does not allow the clarity of the candidates work to be fully appreciated during the moderation process.

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There also continues to be a gradual increase in the use of both 2D and 3D modelling, however, some centres still need to be reminded that it is a stated requirement in the specification, and therefore the assessment criteria, that candidates show evidence of these techniques in developing their design solutions.

Ref specification content 3.1 (page 9)

“They develop their design and use modelling before making and testing their prototype”.

Develop Designing Skills –

“Use appropriate modelling techniques to aid product development”.

**Successful candidates** having analysed their brief and the conclusions that they had reached from the research were then able to produce a clearly structured design specification which related to the product that they intended to design. Design ideas were presented using a range of graphic techniques, including the use of CAD, which were supported by detailed annotation. Modelling helped them to develop the final solution where they were then able to give details of sizes, possible materials, likely construction methods and processes. Reference to the specifications then helped them to give reasons for the choice of the prototype product that they intended to make.

### Making

Encouragingly we have seen fewer examples of candidates producing large items of practical work for assessment, as this unit is intended to provide an introduction to designing and making where the practical outcome is a prototype product.

However, Centres should also be aware whilst expecting candidates to complete large artefacts is clearly unreasonable in the time allowed for this unit; candidates must provide enough evidence of the use of “Resistant Materials”, and not just complainant materials, in the production of their prototype product.

Candidates should be able to show a variety of construction techniques in the making of the prototype product and where this includes CAM they should be made aware that there also needs to be evidence of other techniques used in conjunction with this in order to comply with the requirements of the assessment criteria. Please note that the higher mark range should not be applied to these products, however well-assembled, unless a variety of processes are used in the construction of the prototype.

Centres are also reminded that if a prototype, or part of one, has been produced using CAM as one of the manufacturing processes than the use of screen shots or CAD drawings to show “ownership” of this process should also be expected.

Whilst the majority of candidates had planned the stages of making their product to some degree or other before starting to make the prototype, there were also portfolios where no pre-planning was evident and yet centres had awarded marks well into the “works competently” assessment responses. Therefore, Centres are reminded that when assessing the making of the prototype product, the planning provided by the candidate should be taken into account when deciding upon the overall mark to award.

Unfortunately, even after stating this in all my previous reports on this unit, Centres are still awarding marks for how the candidates overcame any technical difficulties **without** there being any formal evidence recorded by the candidate. This has resulted in the highest number of recommended adjustments again, for any of the assessment strands in this unit. Our advice in this instance would be to highlight this information in the record of the key stages mentioned above or to produce a separate sheet in the portfolio.

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**Successful candidates** made appropriate choices of materials, tools and equipment and worked skilfully and safely to produce a high quality prototype product suitable for the intended user. They showed evidence of having used a variety of making processes in producing the product and where CAM had been used as one of these techniques they provided supporting evidence in the form of screen shots, which indicated understanding and ownership of the manufacturing system. Planning the stages of manufacture had clearly been produced before they started the practical work. Candidates were then able to demonstrate their ability to solve any technical problems in the record they made of the key stages, in creating the prototype through comprehensive notes and visual evidence.

**Evaluation**

It still remains disappointing to see the number of candidates who have based their evaluation on their prototype product and how it functioned rather than modifications to improve the designing and making process as stated in the wording of this assessment.

Centres are reminded that the Specification for Unit A561 clearly states the evaluation should be of the **designing and making process** and not how well the final product functions. Furthermore that any modifications proposed by the candidate should be of ways to improve the designing and making process that they have completed in developing the final prototype product.

Finally attention is drawn to the marking criteria for spelling punctuation and grammar which has three different response levels which should be applied when marking the work presented by the candidate in this assessment strand.

**Successful candidates** critically evaluated the processes involved in designing and making the prototype in this unit of work as opposed to the product itself (as in unit A 563). With reference to their initial planning, and the record they produced of the stages in making their prototype product, they were then able to reflect and suggest modifications to improve the design, modelling and prototyping processes using specialist terms with a clear emphasis on the correct use of spelling, punctuation and grammar.

## A562 Sustainable design

### Introduction

The preparation for the examination appeared to have been carried out well at centres, and technical knowledge was quite apparent, but several questions were not answered correctly as the candidates had not read the question as carefully as they might have done.

In Section A of the paper most candidates attempted to answer all questions, with few candidates giving no response (NR) answers. Centres need to be aware that where a candidate has provided multiple answers to a single response question, no marks will be awarded.

In Section B some of the responses to the QWC question did not contain sufficient technical information, or were unstructured in their format (too many candidates used bullet points, which do not constitute a discussion). Candidates need to be careful that they do not repeat the question in their answer, or introduce their answer by writing the question as a preface; the former gains no marks, and the latter wastes time and space. Similarly, candidates should not use certain terms as obvious 'stock' answers without clear and unequivocal qualification; such answers include: 'Environmentally friendly' and 'better for the environment' or 'damages the environment'; To 'recycle' and 'recycling is good for the environment'; 'cheaper', 'lighter', 'better' and 'stronger'.

### Section A

- 1 Virtually all candidates recognised that the correct answer was Product needs less material in its manufacture.
- 2 A majority of candidates chose the correct answer Take account of the values of society.
- 3 Very well answered, with almost all candidates correctly identifying Planned obsolescence.
- 4 A good majority of candidates were able to pick the correct Carbon footprint.
- 5 The majority of candidates chose the correct Assist in designing a similar product that may be more eco-friendly.
- 6 Many candidates struggled to identify British Standards Institution as the correct answer.
- 7 This was poorly answered with surprisingly few candidates being able to name the Kite Mark.
- 8 Many candidates were able to state the term Biodegradable.
- 9 This question was poorly answered with candidates being unable to identify Thermosetting as the correct answer.
- 10 This again was poorly answered with very few candidates giving a correct response.
- 11 The majority of candidates were able to correctly identify true, A television on standby still uses electrical power.
- 12 The majority of candidates were able to correctly identify true, Manufacturers must follow COSHH regulations.

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- 13** The majority of candidates were able to correctly identify false.
- 14** The majority of candidates were able to correctly identify false.
- 15** A slight majority of candidates were able to correctly identify false.

**Section B**

- 16(a)** There was a mixture of candidate responses. Good answers referred to recycling plants for melting down and recognising the differences between the two metals.
- 16(b)(i)** Good responses referred to how well the scales work, and what the scales actually do (accurately weigh ingredients).
- 16(b)(ii)** Few candidates scored highly on this question. Candidates achieving marks referenced the fit of the product to the human body/senses and how this makes the scales easy/comfortable to use/see the dial.
- 16(c)(i)** Correct answers referred to how the shape had changed from a dish to a bowl, or that the material had changed from metal to plastic.
- 16(c)(ii)** Good answers expanded upon the need for larger/deeper bowls, or easier/accurate read-outs, although many candidates let themselves down referring to how the design of the scales had changed, not why. Higher level candidates also made reference to technology push/consumer pull.
- 16(d)** This was surprisingly poorly answered. However, some candidates correctly identified plastic has to be pre-moulded into sheets prior to forming (more energy required), that the method creates more waste than other forming systems and that electrical power is needed both for heating the plastic and forming the vacuum.
- 17(a)** The majority of candidates scored full marks. Additions such as padded seating/arm rests, back support, steering mechanism (even just a length of rope), foot rests were all acceptable. Some candidates did not gain the full three marks by neglecting to add notes to their sketches.
- 17(b)** Good responses referred to sustainable, fast growing, less damaging to the environment when cut down.
- 17(c)** This question had a mixed response and correct answers made reference to disassembly, setting apart the metal components (nuts, bolts, wheels) and converting the timber to make smaller products (bird box) or to repair fences or other garden furniture.
- 17(d)\*** This question tests candidates' written skills (Quality of Written Communication – QWC) as well as their knowledge, and is highlighted by an asterisk. Candidates who gave good responses presented the facts in a structured way, using such grammatical constructions such as conjunctions, transitional words and who focused upon the question, and referred to reclamation, de-nailing, cleaning, disinfection, de-bugging, quality, and reuse. Although many of these points were seen in responses, too many candidates discussed recycling techniques or discussed the purchase of products made from recycled or reclaimed materials, rather than keeping to a discussion of the issues of the use of recycled or reclaimed materials.

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- 18(a)** Surprisingly few candidates were able to correctly name a material that could be used to manufacture external-quality nuts and bolts to construct the slide. Acceptable answers included stainless steel, aluminium alloy, nylon or brass/bronze.
- 18(b)** This question asked for a sketch of the recycling symbol to be found on a plastic toy. Too many candidates drew just the loop and only gained one mark.
- 18(c)(i)** A minority of candidates were able to correctly identify the meaning of the two letters CE.
- 18(c)(ii)** A good response from candidates correctly identifying that the CE mark confirms that someone has made a judgment about the product's conformity to relevant European legislation or regulation, and that it is fit for use. It also allows the product to be sold in Europe.
- 18(d)** Many candidates missed the clue in the question ("With reference to the slide...") and general answers relating to repair or redundancy – other than a good definition – were not credited. Repair by replacing a tread or tightening loose bolts were worthy, but rarely seen. Many candidates assumed that redundant meant that the product was unfixable rather than unnecessary to the user.
- 18(e)** This question asked about reducing energy when transporting goods to a consumer, not if the products were to be transported. Good responses referred to re-designing a product to make it lighter, stackable or flat-packed in order to get more products onto a transporter, thus saving energy, was credited, as was reducing the volume of packaging to arrive at the same result.

## A563 Making Quality Products

**Please read this report in conjunction with that for A561 as together they form the two controlled assessment units for the innovator specification.**

### Introduction

Centres should be aware that the focus of this unit should be on the making of a quality product and within the 20hrs of controlled time. Therefore, in this unit of work candidates will be expected to further develop skills and abilities gained while undertaking Unit A561 in order to design and make a **fully functioning quality product**. Further to this it should also be noted that our advice remains that teachers need to take great care when making the distinction between guidance and prescription when conducting controlled assessment.

Centres are required to ensure that candidates do not pursue the same 'theme' for their work as submitted or intended for submission in Unit A561. A full list of themes for each unit of work can be found on the relevant pages of the specification.

### Administration

Centres used the full range of options to present candidates work and portfolios were sent for moderation in paper, repository or e-portfolio formats. However, two issues were identified below during the moderation process and centres are asked to be aware of the issues when entering and presenting work for assessment –

- A number of Centres entered for the repository option but didn't upload work but instead sent paper folios or electronic files instead.
- Some electronic files were difficult for the moderator to navigate with "links" in the presentation to other parts of the portfolio rather than a clear progression of slides.

Many Centres provided notes on the Controlled Assessment cover sheets for each candidate along with a CSF form with the sample of work that had been requested.

Centres are also reminded that moderators will still need to receive the Centre Authentication Form CSS160 with the MS1 which is sent to the moderator.

Centres are reminded that there is a full range of documentation, including downloadable forms and other subject specific support materials on OCR's website: [www.ocr.org.uk](http://www.ocr.org.uk).

### Performance of Candidates

Candidates generally performed better in this unit than in the other controlled assessment for this specification. However, as in A561, some of the more common issues which affected candidate's achievement included:

- The lack of formal detail (written notes) to support the marks awarded on how they overcame technical problems in the making. This is becoming quite a concern as although this has now been highlighted in every Examiner's report there are still far too many not addressing this assessment requirement.
- Little evidence of suitable modelling techniques being employed that would support the development of the design ideas.
- The presentation and annotation of the design ideas was of a limited quality and this was not reflected in the marks awarded by a few centres.



## Designing

*This assessment strand has three separate marks than can be awarded –*

- *An appropriate and considered response to a brief and a detailed specification for a product produced as a result of analysis.*

A number of Centres have still not fully grasped that in this initial assessment strand candidates are only required to produce a design brief for their intended product together with **some** supporting evidence to show what conclusions they had reached, from any related research that they had previously conducted.

The allocation of marks in this section of the portfolio should be seen as an indication of the amount of work that should be produced by the candidates and the advice that we offer would be to show this response in about two sheets of concise work.

By editing the supporting evidence a considered response could possibly include:

- Sizes of any items important to the design of the intended product.
- Relevant design features of other similar products.
- The needs of the intended user group.
- The nature of how and where the product is likely to be used.

The design specifications produced by candidates also varied in content and detail. Many contained vague statements such as ‘must be the right size’ and yet were given high marks by some centres. If students were to justify each specification point it would improve the quality of specifications. Some candidates did provide uniquely detailed specifications that clearly applied to the product they intended to make. A good specification forms an essential checklist that will guide the candidate through this controlled assessment.

- *The production of a range of creative design ideas using a variety of techniques.*

Most candidates used freehand sketching to illustrate their initial design ideas, though these were often of very poor quality and enhancement techniques were then rarely used. Some candidates generated and developed detailed ideas which were fully explained with annotation whilst others provided little explanation of their ideas. Most candidates identified a chosen idea but a few then failed to explain their choice of design solution.

Where CAD was used, it was generally used well but mostly to present a final, detailed design, with Google “sketch up” proving to be the most popular software used by the candidates.

Some candidates who had used these techniques to present a final design for their prototype had failed to include in their folders the evidence of any developmental work that they had clearly undertaken. In this instance we always recommend that a series of screenshots of the work they had undertaken would have seen them gaining greater credit through the assessment criteria.

Disappointingly some Centres have not, however, understood the need for modelling to be included as part of the designing process. In some cases high marks had been awarded without there being any real evidence to support this.

As in A561 it is essential that candidates include evidence of modelling work to show how the product has developed from their earlier designs and to make informed decisions about materials and construction techniques in order to gain full credit for their work.



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- *The use of detailed drawings and annotation to communicate these ideas.*

The final mark in this assessment strand should be used to indicate how well the candidate has communicated the details of the product they have chosen to produce for this unit. In some cases it was difficult to see any evidence of the final product as candidates moved straight from a series of design ideas onto the planning required for production. Higher achieving candidates were able to provide details of construction, sizes and materials at this stage of their portfolios which then helped them to produce a suitable plan for construction of the chosen product.

**Successful candidates** Clearly showed how they had selected their own problem area from the list of controlled assessment themes stated in the specification. They were then able to produce a design brief for their intended product together with some supporting evidence to show what conclusions they had reached from any related research that they had previously conducted. A clearly structured specification resulted from this which was specific to the product that they intended to design. Design ideas were then presented using a range of graphic techniques, including the use of CAD, and were supported by detailed annotation. Modelling helped them to develop the final solution where they were then able to give details of sizes, possible materials, likely construction methods and processes. Reference to the specifications then helped them to give reasons for the choice of the product that they intended to make.

## Making

*There are three main requirements in this assessment strand that the candidates need to address –*

- *The planning and making of a Quality product.*

Some form of planning was almost always evident in the candidates portfolios with the higher achieving candidates providing detailed sizes, materials & production methods in designing and then producing a step by step guide of their making prior to starting practical work. However, some Centres presented the initial planning and the record of making as one section of work but then marked this twice under the different stated criteria. Centres are therefore reminded that planning must be produced before manufacture and cannot be rewarded twice in the assessment of the work.

It is expected that candidates planning shows each intended stage of manufacture along with health & safety issues, tools, equipment and processes required to make the product.

The quality of work seen by moderators in this cohort of entry was generally good across the full range of abilities. Centres are starting to become far more realistic in terms of their expectations due to the obvious time constraints in this unit of work, although there were still some very ambitious projects being attempted.

CAD/CAM, especially laser cutting, is now more widely incorporated into the practical work that we see in both controlled assessment units with most candidates presenting evidence through the use of 2D Design/Corel Draw/Pro Desktop/Solid Works software. Centres are reminded that where candidates use CNC techniques to produce the final product they should be used in conjunction with other construction methods as stated in the specification guidance. Further reference to this issue is also made in the report for unit A561.

- *Recording the making of the product*

Centres need to be more aware of the importance of the marks in the following two assessment strands as the six marks that can be awarded for evidence of this work is equal to the current grade boundaries for this unit.

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Some Centres appeared to assess this work without using any discretion towards the statements in the mark scheme when it came to judging the details provided by the candidates. The work presented to record the key stages of making was in many cases limited and was usually just a few written notes or the presentation of generic stock images of processes, tools, equipment rather than evidence of the candidates' own making.

Our advice would be to provide photographic and written evidence of the candidates own work to support this process and where this was evident and detailed many of the candidates were able to achieve full marks for this assessment.

- *Details of how they overcame any technical problems in the making of the product.*

**Centres attention is also drawn to the requirement that in order to achieve the marks that can be awarded for identifying how the candidates overcame technical problems they must provide written evidence of this in their portfolios.** Our advice would be to ensure that candidates clearly state these issues in the record they make of producing the product or on a separate sheet in their portfolios.

**Successful candidates** made appropriate choices of materials, tools and equipment and worked skilfully and safely to produce a high quality product suitable for the intended user. They showed evidence of having used a variety of making processes in producing the product. Where CAM had been used as one of these techniques candidates provided supporting evidence in the form of screen shots which indicated understanding and ownership of the manufacturing system. Planning the stages of manufacture had clearly been produced before candidates started the practical work and they were then able to demonstrate their ability to solve any technical problems in the record they made of the key stages in creating the product through comprehensive notes and visual evidence.

## Evaluation

With the requirement here to evaluate the function of the product as opposed to the design processes, as in A561, it was encouraging to note that there were far fewer recommendations to adjust Centre marks.

By evaluating their products firstly against the specifications candidates were able to base their conclusions on the product and how it functioned having previously conducted a series of tests to see how it performed in use. From this they were then able to suggest modifications through notes and detailed sketches.

Please note also that in this assessment strand the quality of the candidates spelling, punctuation and grammar through the portfolio should also be taken into account when deciding upon the final mark to award.

**Successful candidates** Showed evidence of having tested their completed product in use and compared this to their list of specifications. From this they were then able suggest improvements to their product using a series of notes and sketches. Throughout this assessment strand they also showed evidence of the correct use of specialist terms and showed accurate use of spelling, punctuation and grammar.

# A564 Technical aspects of design and making

## General comments

Candidates' knowledge of basic techniques when working with wood, metal and plastic was extremely weak.

Candidates need to make their sketches large and clear and provide meaningful written notes that **add** to the information given in their sketches.

Questions marked with an asterisk\* provide candidates with the opportunity to give detailed written answers combining good subject knowledge with an ability to produce structured, coherent responses. While there were some good individual points expressed in both questions, candidates failed to gain maximum marks.

In addition, candidates could improve their examination technique by reading the questions carefully and responding to the instructions given in the questions.

## Comments on specific questions

### Section A

#### Question 1

- (a) Most candidates were able to describe how the waste would be removed and the shape made flat and smooth. Most candidates named an appropriate saw and the use of glasspaper, [usually referred to as 'sandpaper'], files and sanding disc to make it smooth.
- (b) Many candidates gained some marks for this question but the overall standard was disappointing. There were many over-complicated solutions, lacking clarity and devoid of any practical or technical accuracy. Some were wall-mounted and some set into the ground using concrete.

Many candidates did not address the bullet points listed in the question. These are designed to help candidates focus on the important points of the design problem. Marks are allocated specifically for answering these points. However, there were some very good solutions that were simple and involved the use of a vertical rod, clearly attached to the sign, accompanied by information relating to the constructions and materials used.

- (c) Many candidates gained at least one mark by stating the use of design software or by naming a specific machine used for CAM. It was encouraging to read many descriptions that provided accurate details of how CAD-CAM could be used to produce the words on the sign. The best answers included references to computer-aided design software, [often accurately named], the use of the software to model font/text etc the transfer of this information to a linked machine, [also often accurately named] and the setting of machine parameters. There was an over dependence on the use of a laser cutter, without any additional information, by many candidates.

#### Question 2

- (a) Most candidates were able to give at least one reason for the suitability of acrylic for the game. Most answers referred to it being easily moulded, lightweight and available as colourful or as clear plastic.

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- (b) This question was well-answered. Many candidates described how the acrylic base could snag and spin, that it could cause injury or that the hole would be inaccurately drilled. Many candidates simply repeated the question by stating 'to stop it moving' for which no credit could be given.
- (c) Many candidates named at least one process; vacuum forming and injection moulding being the two most common processes. Blow moulding was stated by a minority of candidates.
- (d) There were very few correct answers. It was disappointing to read answers including the use of PVA which is specifically used with wood.
- (e) Many candidates did not read the question carefully and gained few, if any, marks. The question asked candidates to describe **how** each tool or item of equipment would be used and not **what** they were used for.
- (f) There were many good answers to the benefits of globalisation; the most common containing references to the use of cheap labour and the potential for cheaper goods.

**Question 3**

- (a) Very few candidates failed to achieve maximum marks for this question.
- (b) The best answers showed a halving joint that would slot together. Other excellent solutions included the use of dowel, with some candidates showing the off-set position of the drilled holes. Some candidates failed to achieve maximum marks because their sketches lacked accuracy; for example, the cut out slots were not of equal depth. Some candidates did not read the question carefully and provided sketches showing how the partitions would be joined to the inside of the hardwood block.
- (c)\* There was a range of answers explaining the importance of thorough research when designing products. However, it was disappointing that many candidates referred mainly to the use of research to find out what was already on the market. There was little reference to the primary research that all candidates should have undertaken during this course. For example, when designing a DVD rack it would have been important to find out how many DVDs would be stored, their sizes and possible location. Many candidates simply repeated the same point over again.

**Section B****Question 4**

- (a) Most candidates were able to name a tool that could be used to measure a length of brass tube.

Fewer candidates could name an appropriate tool used to mark the brass tube, marking gauge being proposed by some candidates. Even fewer could name a hacksaw to cut the brass tube to length.

- (b) Most candidates were unable to give a reason for the suitability of brass for the supports. The most common incorrect answer was '*strong*'.
- (c)(i) Most candidates could not name a heat process used to join the brass hooks to the brass support. The most common incorrect answers were brazing and welding. Although technically, the correct answer was silver or hard soldering, examiners accepted 'soldering' as long as there were no references to a soldering iron or soft soldering techniques.

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- (c)(ii)** The majority of candidates were able to state a safety precaution associated with a heat process.
- (d)** Many candidates gained at least one mark for showing a suitable joint; the most common being dowel, lapped, halving and finger joints. Many candidates did not achieve maximum marks due to the poor quality of their sketches.
- (e)** Few candidates achieved maximum marks with the main modification being the substitution of the permanent corner joint with some form of screwed joint.

**Question 5**

- (a)** This question aimed at providing candidates with an opportunity to demonstrate their designing ability combined with technical knowledge. As was stated previously, the bullet points were to act as a guide or focus for candidates. There were some excellent designs showing some form of shape sorting toy with clear labels pointing out the materials and constructions involved in its manufacture and how they would make sure it was safe for children to use.
- (b)\*** The majority of candidates stated that the main advantage to manufacturers and consumers of making toys from plastic was that plastic was cheaper than wood or metal. Only a minority explained that it was through the manufacturing processes such as injection moulding used for volume production that the unit price could be reduced and so assisting both the manufacturer and consumer. Few answers referred to the use of fabrication when working with wood or metal. Many answers contained irrelevant references to environmental advantages.

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