GCE

Design & Technology

Advanced GCE **A2 H453**

Advanced Subsidiary GCE **AS H053**

OCR Report to Centres

June 2012

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, OCR Nationals, 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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OCR REPORT TO CENTRES

Overview

This new specification was deliberately broadened to allow access to candidates from eight focus material areas. The majority of candidates in this session had a Resistant Materials focus with large numbers from Textiles and Graphics. There were a significant number of candidates entered from Engineering, Manufacturing and Built Environment and Construction. It was also pleasing to see an increasing number of candidates from a Food specialism.

The majority of centres are familiar with the examining routine and candidates are expanding their range of design thinking. It is important that when preparing candidates for this examination, techniques are employed to allow candidates to present ideas quickly and to familiarise themselves with the workbook and the time allocation for each section. Candidates should not try to predict the challenge and include pre-prepared work, such as specifications, in their job bag.

It is also advisable to read through the teachers' instructions for both Session 1 and 2 before embarking on an Advanced Innovation Challenge for the first time with students.

There were a large number of outstanding F522 Product Studies presented this year. More candidates are submitting work as e-portfolios for this Unit. Candidates make very good use of digital technologies to record the development of their work in 'real-time' and show effective evidence of interactive dialogue.

Centres are reminded that when submitting e-portfolios for F522: Product Study, care should be taken to ensure that video files are appropriate in terms of value to the project. Some candidates included large numbers of lengthy High Definition video files, resulting in excessively long times for the presentations to load. Centres are reminded to test the presentations to ensure that they are packaged correctly. In a number of cases the video files were not accessible. It would be helpful if candidates included a separate folder for video files so that if moderators cannot access the files through the presentation they would still be able to be viewed.

The standard of work presented for F523 Design, Make and Evaluate continues to be of a good standard with some projects of an exceptionally high quality. There were an increasing number of candidates making direct contact with clients. Where the candidate had genuinely liaised with the client, this experience of designing for a third party had enabled them to develop an appreciation of the full design and make process within a realistic commercial context.

The majority of responses to F524/01 and F524/02 were for Resistant Materials with significant numbers attempting the Graphics Products and Manufacturing questions.

The overall standard on both papers was good, although in some cases, candidates attempted a question that they were obviously not prepared for. Some candidates attempted the Built Environment and Construction question in F524/01 or F524/02 with very little understanding of the specialist material and constructional detail required to achieve the full range of marks.

A number of candidates used the product given in part (a) of the F524/01 question paper in their attempts at answering parts (b), (c), (d) and (f). Where this is appropriate it is to be encouraged, but in many cases it restricted access to the higher mark range. When answering parts (b), (c), (d) and (f), candidates have the opportunity to draw from a wider range of possibilities.

The following reports contain detailed breakdowns of general candidate performance of the June 2012 assessment session. They also include very valuable guidance and tips on how to access the full range of marks available.

It is helpful if the reports are read in conjunction with the full specification and appropriate mark schemes.

F521 Advanced Innovation Challenge

General Comments

Administration

It is important that both examination papers are dispatched to the appointed examiner in one package as soon as the reflection paper has been completed on the date set by OCR. Candidates will have access to their challenge work booklets during session 2; however they are not to write in it.

Answers must be completed in the booklets provided, there is additional space in the challenge booklet should candidates require it; however, the use of this space should be labelled carefully with the box number that the work relates to. Additional paper of any kind should not be stuck into the challenge booklet. The front of the challenge paper indicates that additional paper will not be marked. Candidates are not allowed to access the internet during this examination.

All materials relating to examinations sent from OCR to centres will be dispatched to the examinations officer. Examination notices must be displayed in the area where the examination is to take place and an invigilator, who is not the teacher, should be present. The teacher is there to read the instructions.

Running the Challenge

Centres are reminded that the role of the teacher is that of a facilitator and not that of a normal classroom teacher. They are there to provide access to modelling materials, monitor health and safety issues and read the teacher script to candidates, elaborating and explaining where this is indicated.

Teachers must not:

- give advice to candidates about the design or manufacture of their product;
- cut materials to the correct shape or dimension for students.

It must be made clear to all candidates that this is an examination to assess the individual student's designing and modelling capability.

It is advisable to read through the teachers' instructions for both Session 1 and 2 before embarking on it for the first time with students. Session 1 is sat on the same day as Session 2; candidates will review and refer to their Session 1 work during Session 2; however they are not allowed to add to it.

A number of candidates approached the challenge with pre-conceived ideas and failed to respond directly and creatively to the design challenges. A few candidates misinterpreted challenges, either because they did not read them with sufficient care or because they chose to base their work on practiced work to previous design challenges.

The themes for the examination deliberately give little opportunity to prepare specification points or ideas in advance of the examination to prevent over-preparation of candidates. Each challenge has **two specific key areas** that candidates will need to address fully with fresh innovative thinking to respond to the challenge.

It is the centre's responsibility to provide a suitable range of modelling materials for candidates. It is not advisable for candidates to bring their own materials for modelling, as this will hamper design thinking. There is still evidence of candidates bringing in their own modelling materials despite this advice being published previously.

A 'job bag' should contain inspirational materials, images and information about materials, anthropometrics that could be useful when designing. Candidates must not share resources or job bags during this examination.

The quality of photographs is generally good but examiners have reported some problems with the photographs presenting candidates' work. These problems include; failing to focus on the object and photographs being printed at a size too large for the allocated positions within the workbook. Photographs must be stuck into the correct boxes in the booklet, a small number of candidates stuck photographs of existing products in place of where the pictures of the models should be. It is important that the centre provides colour images of a good quality.

Centres are reminded that three photographs is the minimum required, although additional photos can be added to the workbook. This is particularly important if it is necessary to show other parts or views of an artefact or mechanisms to fully illustrate the final outcome. Extra photographs can be included in the evaluation or progress report boxes.

It is recommended that if candidates wish to annotate photographs, that a second print is produced and stuck into either the appropriate section of the workbook or into the 'additional space' and clearly labelled and then annotated.

Security of Workbooks

Centres are reminded of the importance of appropriate security of all workbooks between the three sessions of the Innovation Challenge.

Work of Candidates

Again some highly creative work has been seen this session from candidates who have shown both design flair and sound technical knowledge. A significant part of the preparation for the exam should include techniques to allow the candidates to present ideas quickly and practice of workbook completion under timed conditions. Examiners are aware of the pressure on candidates in this examination and marks are awarded with this in mind.

Areas such as specification, evaluation of ideas and final products and the reflection paper continue to discriminate well between candidates. They are testing higher order thinking skills and these areas should be taught throughout the AS course.

The Challenge Assignment

Initial Thoughts

Candidates used a combination of text and drawings to explore the challenges within the theme of 'annual events' and identified possible design areas/problems. Some candidates failed to think creatively about the challenge or context and suggested only very predictable responses. Many candidates failed to consider the challenges of designing a product for an annual event. Many candidates explored ideas in depth; thinking creatively, whilst considering the indoor or outdoor environment, users and space they were designing for. A number of candidates did not fully engage with the challenges set, missing one or both of the two key points and so lost marks in this first section. Many candidates covered only one of the two key points in this section with candidates becoming focused very quickly on the one point. Those scoring highly explored the challenge widely, expressing their thoughts and expanding further on them.

Design Brief

Candidates should be encouraged to write clear and precise design briefs that develop the design challenge further and offer scope for creativity. The majority of candidates identified the appropriate user groups for their products. The best design briefs expanded upon the design challenge clearly adding users and extra market information in them.

Specification

The more successful responses were where candidates concentrate their thinking on the functional and user needs of the product in the design situation and ensure that the relevance of all points are explained. Generic specification points cannot be awarded marks. Candidates should be advised to focus on functional aspects when writing a specification. Specific detail is required for high marks in this section, eg weight, size and material properties. Specifications made up of vague or generic points or lacking justification for the points given made it hard for candidates to access the top mark band.

There are still a significant amount of candidates that do not read the design challenges properly and respond to this section without addressing the key points in the challenge.

Ideas

This section has seen an encouraging improvement and candidates are sketching a good range of ideas in most cases. The quality of annotation seen was generally very good, with relevant notes relating to the specification and construction and material details. The best candidate responses also had integrated sources of influence in their ideas section.

Initial ideas on the whole were creative, with some excellent examples of innovative thinking, and good use of annotation and sketching. Higher performing candidates produced a range of functionally different ideas that clearly related to their specification, situation and the potential users. Originality and creativity are key aspects of this criterion. It was encouraging that fewer candidates just presented one idea in this section compared to previous sessions.

Candidates used a combination of drawings, text, annotation and occasionally modelling/photographs to show their ideas. Higher performing candidates gave different views of objects or parts of objects and clearly communicated their creative design thinking and included specific detail of materials and manufacture/constructional techniques. This is an area that still needs developing, many candidates do not include details of specific materials and manufacturing techniques that could be used for the product.

An improvement was seen in the evaluation section this session with good evaluative annotation in the designing section. Candidates had clearly detailed why they had chosen their idea but also why they had disregarded others. Where evaluations were poor, candidates had not explained why they took the idea forward and why others were rejected. Quite often strengths of ideas are discussed with no mention of disadvantages.

Reference to sources of inspiration/job bag was usually given although not always with pictures. The better examples of evidence from job bags were where candidates had collected a very broad range of items and took their inspiration from unrelated inspirational objects. Candidates should be advised against copying or presenting existing solutions as their own. In a few cases some candidates had just collected modelling materials for their job bags; this can hamper design thinking and should be avoided.

Many candidates had a clear structure to present their feedback in box 10 showing comments/response/modifications. Clearly this is something that is influenced by good practice in coursework.

Development of Ideas

There has been some improvement in this section, most candidates use notes or annotations to show how they are developing and improving their design towards an optimum solution that satisfies the design brief, specification and needs of the user. Again only the most able candidates suggested specific materials and very few considered methods of manufacture for their developed idea. Materials were often generic eg wood, plastic or not appropriate for the design. It should be remembered that in this section the materials and construction are those that would be used for the product should it be manufactured commercially and not those that would be used in the workshop or for the model making.

It is also expected in this section that the size of the product is considered. Dimensions of individual features, components and/or thicknesses of materials are considered by the more able candidates.

Candidates should be advised against modelling extensively at this stage of the challenge. Usually this is not successful because there is insufficient time in which to consider the practicalities of the real product.

Plan for Modelling

Action plans were mixed, often these were very general and referred to ‘cutting out all pieces from the materials’ and similar vague statements. The best candidates produced detailed flow or block diagrams referring to individual parts of their model and the actions required/equipment needed to make them, some even allocating time to each action.

Recording Progress and Modelling

Many candidates are meeting the criteria in the middle band of marks – this is mainly due to two reasons; models that do not fully reflect the developed idea and poor reflection and recording sections.

Some candidates gave only brief statements in their progress reports with no real detail to show examiners what modifications/amendments or successes have been made. Those who used extra photos or sketches of details of their models tend to complete these boxes more successfully. Candidates that provide little more than a cursory description of what they have done in the modelling are unable to reach the top band of marks for the progress report – reflection of modelling should illustrate with sketches/photos technical problems they have encountered and highlight how they have overcome these.

Most centres have a better understanding of the type of models required although many candidates concentrate exclusively on the aesthetics of their design ignoring any functional detail (eg folding mechanisms). There were some excellent examples of models – however, some candidates are still using inappropriate materials, hindering the success of the final model. The main point here is for candidates to use appropriate modelling materials to enable them to fully reflect their design. Candidates need to be able to develop their quicker modelling skills using a variety of materials. Creative use of common inexpensive materials is probably the easiest way for candidates to score well in this section. Kits should not be used for final models as it restricts the candidate’s ability to model their design accurately and skilfully; as does the use of existing products to form part of, or most of their model. The use of collected materials should also be avoided (cereal boxes, plastic bottles). The use of skills section cannot be highly marked if candidates have just stuck together collected items to form a model. Candidates that provide little more than a cursory description of what they have done in the modelling are unable to reach the top band of marks – reflection of modelling should illustrate with sketches/photos technical problems they have encountered and highlight how they have overcome these.

Evaluation

Some improvement was seen this session for the evaluation section. Candidates who structure the section as ‘strengths and weaknesses', ‘evaluation’ and ‘modifications’ usually achieve success in this section. However, many candidates fail to record further modifications in sufficient detail and some don’t indicate any possible weaknesses of their product. A very small number of candidates talked about their model and not the product so failed to score any marks.

The best responses clearly evaluate against the specification, provide strengths and weaknesses and realistic improvements with sketches. This is still however one of the weaker areas in most candidates responses. Again, only the most able candidates evaluated their product, most tended to purely describe rather than evaluate their product. Where candidates did evaluate they tended to focus on strengths with little mention of weaknesses in their product and in doing so restricted their marks. Similarly, there can be a tendency to repeat the specification rather than evaluating their product against their specification and justifying how their product had met the relevant specification point.

Comments on Individual Challenges

Challenge One – novelty items for an environmental charity, this was a reasonably popular question with a wide range of creative responses. Although the items designed often lost sight of the charity itself and ended up concentrating on recycling.

Challenge Two – relaxation for four people, this was the most popular question by far, in some centres most candidates chose the same challenge. The vast majority designed seating areas – usually seating and tables, often with some sort of shelter. There were some highly creative responses that considered relaxation beyond seating, perhaps with lighting, entertainment and activities to encourage socialising. A significant minority of candidates lost marks by ignoring the need to accommodate four people, a key aspect of the challenge.

Challenge Three – an interactive product for a children’s charity – this was a popular choice of question where several different approaches to this challenge were seen. Some candidates focussed on the need to raise money (interactive collection boxes), some on the need for raising awareness (with no reference to collecting money) and others designed products to be sold (showing some influence from challenge one).

Challenge Four – directing visitors around a sporting event – this was again a popular question. Some very innovative proposals involving new technologies (GPS, phone apps and other electronic devices) were presented. The majority of candidates focused on the sporting theme within the question, which was a key aspect.

Challenge Five – system to assist security at a music event – again a popular challenge. Most responses were usually based around security barriers, often incorporating new technologies to incorporate the wider elements of signage or advertising.

Challenge Six – product to be sold on a store, made from locally sourced produce or materials. This question saw fewer responses; however a variety of responses were seen from food produce to small craft type items.

Reflection Paper

It was pleasing to see more candidates producing more focused responses and addressing the bullet points; accessing the full mark range available. It is evident that the more successful candidates are planning their answers ensuring all bullet points are addressed in relation to the topic of the question. Not all candidates support the points fully with specific examples in reference to their product.

Question 1

Almost all candidates showed some understanding of the topics anthropometrics and ergonomics.

A significant number struggled to score marks because their discussions did not accurately target the bullet points of the question – some candidates talked generically about the use of anthropometric data but many of them did not state specific data that they would consider to improve the ergonomics of their product. They frequently talked about the sizes of people without focusing on what part of the body they would need the sizes of and how they would use them to improve their product. Often they would talk about the importance of percentiles referencing the 5^{th}, 50^{th} and 95^{th} percentiles but their answer showed a lack of real understanding and application of the knowledge to answer the question.

Most candidates gave modifications to improve the ergonomics of their product with common answers talking about colour and usability. To achieve the 'S' marks candidates needed to support their points with sketches, examples or full justification ie why they would change the colour. Some candidates lost focus of ergonomics and ended up talking about functional and safety improvements.

The cost implication of the ergonomic modifications was the least well answered part of the questions. Answers tended to misunderstand the question and talk about processes rather than impact and its effect on cost. Simple comments such as ‘would cost more/less/about the same’ often seen with little justification, common answers included cost would increase due to increased material, although not often explaining how or why. Many candidates did not mention the possibility of standard components and all seemed to assume they would have to start making the entire product again from scratch.

Question 2

In question 2 candidates talked confidently, describing modifications they would make to improve the aesthetic appeal of their product. Most modifications related to colour, patterns and sometimes shape. Only more able candidates supported their improvement with justification or a sketch to explain the improvement further.

The second and third bullet points asking for slightly more technical and analytical thought were more challenging. Some candidates showed a lack of understanding of what was meant by commercial viability – only the more able candidates answered this successfully linking how their suggested improvement would make their product more commercially viable.

When talking about levels and methods of production candidates frequently talked about a level of production, batch production being a common answer, but did not explain a method of production in detail for any part of their product so were unable to gain all the marks available.

It should be noted that it is stated in the specification:

"candidates have the opportunity to reflect on the challenge by answering questions that require them to consider their product. These will be derived from a design, manufacturing or marketing perspective, including: sustainability and the environment; product life; social, moral and cultural issues; environmental issues; inclusive design; the human interface; aesthetics; scale of production; production technologies; fashion; marketing; commercial issues."

These areas should be taught through the 'AS' course, and students should learn to apply knowledge to products when evaluating and analysing. Candidates should be familiar with technical terms related to these topics.

F522 Product Study

General Comments

Moderators appreciated the efficient and prompt actions by most centres to upload their marks onto the system and to send samples in response to the e-mail requests. This efficiency had a major impact on the smooth running of the moderation process. Most centres are now using the interactive CSF form, which correctly totals candidate marks and together with meeting the requirement to send the Centre Authentication form (CSS160) and the MS1 has made administration considerably smoother.

If transcription or arithmetical errors are reported to the centre these cannot be corrected by the moderator on screen and it is very important that Examination Officers change the centre entries on the system. This has been a problem in previous sessions and centres are thanked for their interaction with this process that has run far more efficiently this session.

The purpose of the moderation process is to bring all samples seen to within a common national standard. This is achieved by scaling any centre that falls outside the acceptable OCR tolerance. The usual practice for any centre which has not been scaled but which is approaching the accepted tolerance is to inform the centre of this on the moderator report to centres. Some centres have large scalings and there is generally a detailed report that identifies specific areas of the assessment criteria that need attention. Increasingly however there is a need to refine marks by making very small adjustments in a number of areas. This is best communicated by repeating a comment used on some A2 specification centre reports where this is also evident:

"The centre is reminded that although marks for individual sections may be just one mark lenient, if this applies to several sections there will be a cumulative effect on the total mark for the Unit which will necessitate an adjustment"

This is a very informative comment and will be used in future where appropriate for this Unit. Centres should consider this as a minor re-alignment of their marks in line with national standards.

There has been a very noticeable increase in the percentage of candidates submitting work as an e-portfolio. Some inspirational work has been seen, in particular with the 'real time', 'hands on' approach usually evident in the 'product focus', strengths and weakness comparison' and 'testing sections'. This feature however makes the most impact in the 'development of improvement section' where it is a mandatory requirement and often used as a feature of 'ongoing evaluation'. Moderators report with enthusiasm how engaging some of these presentations can be in particular the 'interactive dialogue' where candidates discuss and crucially respond to comments made by third parties.

There needs to be a word of caution expressed to some centres who are allowing candidates to submit very large files, these take a considerable time to load and are sometimes linked to web based interactive content. This development is counter productive. There is also a noticeable increase in centres submitting files using PP2010. There is still a stated OCR requirement to submit files in PP 2003 or earlier. In practice 2007 gives us very few problems and runs efficiently on most systems. OCR has responded to enquiries on PP2010 by pointing out that we have a strategy to view these and moderators use file converters in some cases. This process does not work if the video files have not been embedded by the centre on to the candidates CD/DVD. The safest option is to save in 2003 or 2007 using the 'package for CD' option format and then check whether the file can be viewed on a standard XP laptop. This situation is made far worse by the ability of PP2010 to 'invisibly embed' videos into the presentation – ie they are not available as separate video files in the 'Package for CD' screen shot and can not be accessed separately if they fail to run in the presentation. Sending video files in a separate folder on the CD/DVD would help in case presentations did not work.

Excellent and inspirational work is still produced by candidates submitting A3 folders. In particular work in the 'creative and innovative ideas section' often provides free flowing high quality annotated sketching which is sometimes not evident in e-portfolios. Candidates submitting using paper folios need to ensure that the mandatory requirement for interactive dialogue is met. This can be achieved by real time –first hand comments either added directly to design sheets or on 'overlay sheets'. Retrospective or 'neatly typed up' comments reformatted after discussions should not be encouraged and often have a negative effect on outcomes. Actual comment by those making them and the responses of the candidate are required in' real time' – as they actually happen and not later!

There is still a marked 'divergence of approach' developing between CD/A3 presentations and the best advice would be for both of these routes to develop the strongest feature of the other – in essence CD presentations often have outstanding use of real time interactive dialogue but sometimes tend not to develop the freedom of design ideas expected through high quality annotated sketching (scanning in whole design sheets would be an advantage). A3 folders are generally stronger on the quality of detailed annotated sketching in the development of ideas section but sometimes lean too heavily on retrospective comments that are often typed. This does not meet the requirement for 'real time interactive dialogue'. Meeting in the middle would be an excellent idea! Centres however should note that submitting both A3 and CD content for one individual candidate is not allowed.

Section by section guidance on Product Study requirements for Unit F522

These comments are common to most sessions and are added to when moderators raise additional issues for attention.

This product study should take candidates 30 hours to earn up to 120 marks.
1 hour's work should notionally equate to 4 marks

OCR recommended A3/PP allocations are indicated for each section– the total should not exceed 20

Product focus and analysis (8) (2 x A3/PP)

Products can be selected from any of 8 different focus areas:

Built Environment and construction, Engineering, Food, Graphic Products, Manufacturing, Resistant Materials, Systems and Control, Textiles.

For marks in the top band all of the following should be addressed:

Detailed description of the intended purpose of **one single selected named** product (not a range)
Key Criteria used in the design of the product
The needs of the manufacturer
The needs of the consumer.

Where all four of the above have not been covered the centre should consider awarding marks in the lower bands. Moderators report that the needs of the manufacturer section are not covered to sufficient depth.

Some candidates and some whole centre groups are still considering generic groups of products. The first page of the candidate product study should state quite clearly and categorically what **specific, single named product** has been selected for analysis.

- Candidates who do not present real time evidence and interactive dialogue should not be marked in the top band.

Ongoing comments from Moderators:

- A wide range of interesting products were chosen
- Many centres are now showing the chosen product actually being used with the use of video
- Some centres are not encouraging the candidates to show an image of the product in this section
- The section relating to 'manufacturers needs is still the weakest area in this section. Points raised are often very generic
- Some centres are allowing candidates to pick generic product areas like 'toothbrushes' but on the whole this section is very good. Many centres are showing the product in use
- Analysing products students had produced as part of GCSE coursework requirements is not appropriate and should be discouraged.

Strengths and weaknesses comparison (12) (2x A3/PP)

Good candidates should be encouraged to analyse the strengths and weaknesses of a *product* in *comparison* with similar products. Good responses often include a conclusion or summary, which relates similar products back to the single selected named product. Poor responses often include charts and tables populated with Internet images with no identification of the strengths and weaknesses of the selected product. Candidates should be encouraged to show evidence of actually using a range of products, which are compared with the selected product. For marks in the top band the following should be addressed: function, suitability of materials and manufacturing processes, ergonomics, aesthetics and cost.

Ongoing comments from Moderators:

- Candidates are not comparing a range of products against the original
- It is not obvious which is the better product
- Limited conclusions drawn
- Little evidence of the candidates actually experiencing the products
- A 'hands on' approach to this section is required!
- (There is now good evidence that this is being adopted)
- Some centres introducing video to this section which enhances the work
- 'Old table' format still being used by some centres. Some candidates however had made these interactive by the embedding of videos in the charts. This is an excellent feature to be encouraged
- Weaker candidates are still relying on internet images/information.

Moral Implications (8) (1 x A3/PP)

Identify and analyse the moral implications associated with environmental, social and economic issues in the design and use of the product.

Moral implications should be considered in relation to the design and use of the product chosen for study:

The clear emphasis of this section is now on the **moral implications** associated with three specific issues. Centres need to prepare candidates for this by organising and structuring **ethical debates** about the environment, social cultures and economic issues. The term 'economical *issues'* should be avoided as it encourages a discussion of general cost issues, which is not what is intended. A far wider debate about the effects of the global economy and exploitation of workers is required. This section is very poor in many cases and moderators are making large reductions. Marks in the top band are not awarded in many cases. Centres may wish to consider inviting staff from 'critical thinking' or business departments to facilitate discussions, or inviting in visiting speakers.

Ongoing comments from Moderators:

- Many centres are not presenting a good response to this section and are content to award marks in the middle band for average responses
- There are still cases where centres award top band marks for 'middle band thinking'
- It is the perception of many moderators that some centres are not actually targeting the top band
- In some cases where top band marks are inappropriately awarded it can have the effect of moving the whole centre out of tolerance
- The ethical consideration of moral implications needs to be integrated into the AS course – it contributes to other areas of study.

Brief and specification for improving the product (8) (1 x A3/PP)

The design brief presented should relate to improving the single selected chosen product in some way. Centres should award marks in the lower bands where an improvement is not identified, or where the proposal is to redesign a complete product. Moderators still report that many candidates are still trying to improve too many aspects of their selected product.

- Proposals to redesign a complete new product should always be marked in the lower bands.

Specifications need to be detailed and justified, resulting from the objective analysis of the original product. Where there is little or no justification centres should award marks in the lower bands. It can help if the justification for each specification point is clearly identified by using a different font size, style or colour – better candidates often use this technique, and it would help candidates in the middle and lower bands.

Ongoing comments from Moderators:

- The majority of candidates identified an improvement or in many cases a number of improvements. (One will do!)
- The specification was not drawn from the analysis of the original product
- Many focused on ergonomic improvements
- Colour code, italics and tables were used to good effect
- This section is generally accurately marked by centres
- 'Most centres scored highly – nice to see more detailed briefs this year.'
- Still some instances of weaker candidates trying to redesign the whole product.

Development of improvement (56) (10 x A3/PP)

This section relies on the integration of three separate requirements for successful completion. There is a very large allocation of marks for this assessment criterion; this is deliberate as it was considered during the development of this Unit that this is where the majority of candidates would choose to spend their time and energies. As there will be many different approaches to this section appropriate to different focus areas, it might be helpful to consider that the expectation in relation the notional guideline of 4 marks per hour means that candidates should devote 14 hours to this section.

56 marks is a very large allocation to accurately apportion in three mark bands and in the past many centres found this difficult. For the last three sessions OCR has provided a new CSF F522 form to make this task easier. The 56 marks have now been broken down into three sections as identified below. Additional advice is also given on the new CSF F522 form to award marks in different bands within each section. The new interactive mark sheet is available on the OCR web site. Please make sure this new form is used in the future as it enables marks to be appropriately awarded and cuts down clerical and addition errors. Please note that only the interactive form automatically adds up candidate marks.

The three sections:

Present a wide range of innovative/creative initial ideas, which demonstrate a high level of development using high quality annotated sketching, real time digital images and interactive dialogue. (14 marks)

The expectation here, for marks in the top band, is that a wide range of innovative/creative initial ideas are presented which demonstrate a high level of development using high quality annotated sketching. Simplistic sketches with little or no annotation should be awarded marks in the lower band. The expectation is that a specific improvement is developed, a few candidates try to re-design a whole product, and this is not the intention of this section.

Integrate this with real time evidence of a wide range of appropriate prototype models. (36 marks)

Moderators again reported that some very high quality models were presented using a range of modelling materials. Many moderators however pointed out that some centres were concentrating on producing one high quality single prototype. This may produce a high quality outcome but will not access the full range of marks available for the development of a wide range of appropriate prototypes.

Evaluate ideas against the specification in real time and justify the choice of one idea worthy of being taken forward. (6 marks)

It is important that candidates evaluate their ideas against the specification and clearly justify decisions made. Where little reference is made to the specification, centres should award marks in the lower band. No marks at all should be awarded where there is no reference to the specification. Centres should note that it is impossible for candidates to access these marks if the original specification is missing. Zero for the specification automatically results in zero for the evaluation against it.

Where candidates choose to annotate their ideas sheets, they must make it clear which specification points are being cross-referenced. Colour highlighting can help in this respect. Better candidates clearly rationalise the choice of one idea to be further developed. Interactive dialogue is mandatory in the development section, this can be best addressed by ongoing evaluation which seeks the views of others and then provides evidence of responding to points raised.

Ongoing comments from Moderators:

- For this specification, for all focus areas, there is a need for presenting innovative and creative ideas which are annotated. This is required for an E-portfolio as well as A3 portfolios
- In a small but significant number of submissions there was no evidence at all of any annotated design sketches, where no work is being presented – no marks should be awarded
- The use of ‘interactive dialogue’ is mandatory in the development section – real time comments from third parties should be an essential feature
- For this specification centres should encourage the use of ongoing evaluation on the candidate ideas sheets
- Previous practice of tabulating responses to this section could still be relevant to the justification of an idea to be taken forward but should not be encouraged as the main mechanism for ongoing evaluation which is best provided in real time as ideas develop
- ‘We still need to see developed annotated sketching’ – ‘marking of this is too high.’ ‘Often marks are awarded in the top band for poor work
- General standard of sketching quite poor
- A great deal of 2D sketching

- Some evidence of on-going evaluation through annotation, video and audio
- Good use of CAM modelling
- Range of modelling materials used
- Some good instances of centres integrating the modelling more and using it to develop the idea
- Some very high quality models which enabled realistic testing to take place
- Good quality photographic evidence in most centres
- Table approach to evaluation used less and candidates are using other pupils to evaluate with the use of video
- Significant number of good quality but single products produced, not a wide range
- Centres scored better when candidates developed through their sketches
- There should be a more exploratory route throughout this section – pretty sketching is one thing – proper development and experimentation is another
- Still some centres awarding high marks for few models but more instances of integrated modelling/development from the better candidates
- Many centres are still awarding high marks for terminal evaluation rather than ongoing
- Students who constantly referenced their spec deserve the higher marks.

Testing of final developed idea (12) (2 x A3/PP)

There is no requirement to make a test rig – candidates can if they want to! (Many candidates again produced test rigs in this session) Any appropriate method or system to formally test and evaluate the final developed idea will meet this requirement. Testing must be formally planned and implemented. Appropriate tests might include using a product or getting others to use it, wearing it or getting others to wear it or eating it or getting others to eat it. A scientific or technical test could also be appropriate for some focus areas. Whichever method is thought by the candidate to be appropriate – there must be formally presented results. The results should be presented in real time, clearly and concisely. Many candidates are still using customer surveys; some of these produce low level numerical data, which was of little value. Candidates should be encouraged to deepen the level of their analysis. It is worth emphasising again that real time evidence is required. Copying out neatly the responses of others is counter productive – it could actually result in reduced marks if there was no real evidence of real people being involved. Presenting blank questionnaires in this section should be discouraged.

Ongoing comments from Moderators:

- Test rigs are still being produced rather than testing the final design. (these are still acceptable but should not be contrived)
- Testing of the product often involved a customer survey or a questionnaire, which produced low-level numeric data
- Some excellent examples of testing by outside agencies related to the chosen product
- Videos used well by centres using PowerPoint in this section
- Centres should make candidates aware of the need to plan as well as carry out testing; this feature is often omitted and leads to moderation adjustments. In general if no planning is evident marks should not be awarded in the top band
- Appropriate testing is open to interpretation but many centres are awarding marks for limited testing – a questionnaire to friends seems to be the order of the day for many.

Produce a summary of the results of the product development with detailed analysis of how the prototypes and final tests contributed to establishing the validity of the chosen idea.

Present one further improvement in detail. (8) (2 x A3/PP)

In addition to the presentation of the final test results, Candidates should summarise the results of their prototyping and suggest one further possible improvement to the product. There are three distinct sections to this assessment criterion. For marks in the top band, all three areas need to be considered. Better candidates show a clear annotated sketch of a further improvement. Analysis of results is also a more complex matter than simply stating results in a table.

Ongoing comments from Moderators:

- Some candidates completed a separate section as a conclusion; others relied on the summary produced during the development section
- Centres are awarding high marks in this section without addressing all three aspects
- Many centres are awarding marks just for the analysis of the testing – this section requires a broad look back at the whole process of development.

Communication (8 marks)

Use a wide range of high quality text, graphical techniques, digital technology, and interactive dialogue as appropriate to present information. (8 marks All 20 A3 sheets/PP slides)

The use of ICT must be included in the range of communication techniques used in the presentation of the folder; an over-dependence on the use of ICT/CAD should however be avoided. A combination of different approaches is to be encouraged. Candidates should not over enhance the background of their ideas sheets if this impairs the clarity of presentation. Moderators reported again that it is hard to read through some ‘over decorative backgrounds. Some candidates spend a disproportionate amount of time in enhancing the appearance of their pages, often at the expense of clarity. Candidates presenting on CD still need to provide evidence of annotated sketching. This assessment requirement is not met by scanning in a few small images amongst other computer generated designs. Many candidates try to avoid this issue.

- For this specification the use of ‘real time digital images’ is mandatory – they have to be used to record evidence of work as it actually happens
- OCR is encouraging the use of short video clips, with sound bites (interactive dialogue) recorded as part of an E-Portfolio on a CD
- If the preferred option is to continue to use a paper portfolio – digital photographs must be used and interactive dialogue must be presented in alternative forms which show a positive response to the first hand opinions of others. Overlay sheets could provide an opportunity for comment without affecting the quality of candidate presentation. Comments should not be retrospective and re-typing should be avoided
- Communication in this specification relates to the whole product study
- Candidates should not over-enhance the background of design sheets
- The use of Arial 10 pt (min) should be encouraged for PowerPoint presentations – this is widely available and does not corrupt
- It is absolutely essential that all individual CD’s are trialled on an independent XP laptop to ensure that all video clips and sound files have been correctly transferred to the folder. Candidates should be discouraged from using files from Ipods, Itunes, and mobile phones if they are not compatible with a standard PP presentation
- Additional steps should be taken for the next session to ensure that files produced by candidates using PP2010 can be viewed fully on a standard pre 2010 XP laptop
- The overall ethos for this specification is based on ‘real time recording ‘of events as they actually happen. The expectation was that the majority of centres would submit projects as e-portfolios – this remains the OCR preferred option.

Ongoing comments from Moderators:

- The vast majority of folders were well organised and matched the layout of the mark scheme
- Many cases of imaginative use of digital technology and some interactive dialogue. Centres should be encouraged to use digital technology to enhance the quality of the candidates work
- Centres should be encouraged to develop e-portfolios at the earliest opportunity
- Candidates using PowerPoint are advised not to over-enhance their presentations as dynamic effects can detract from academic content
- Some candidates are still spending a considerable amount of time detailing the manufacture of models – there are no marks for this
- More accurately marked this year – centres are appreciating the importance of interactive dialogue.

Summary of Main features for Unit F522

- The ethos of the Unit remains – a single specific named product is selected and shown in use – a detailed description of the product is given together with needs of manufacturer and consumer. Key criteria are identified. Throughout the study an identified improvement is developed, tested and evaluated
- A 'real time' digital image of the selected product in use will be an essential feature
- Products for analysis can be selected from any of 8 different focus areas
  - Built Environment and construction, Engineering, Food, Graphic Products, Manufacturing, Resistant Materials, Systems and Control, Textiles
- Work can be presented on 20 sheets of A3 paper or CD ROM equivalent to current OCR approved standard. (currently PP)
- Please consult the OCR guidance booklet for submitting E-Portfolios. In particular guidance on 'Pack and Go' or ‘Package for CD’ facility for PowerPoint. Videos will not work without this facility being used. This booklet stipulates acceptable formats and should be strictly observed
- For the Product Study please do not over enhance backgrounds
- Please use Arial font at least 10pt – this is widely available – can be read easily – does not corrupt
- If video clips are used: 3–5 of no more than 20 sec. each would be appropriate. Make sure they work from an individual CD on an independent stand-alone laptop
- A candidate must submit either an A3 paper folder **or** an individual CD **not** both
- A Centre can submit some candidates work as A3 paper folders and some as CD's
- Centre and candidate name and number must be on all paper and individual CD's
- CD's must have full details on both the outside cover and written on the actual CD
- Work must be recorded in real time and digital technologies must be used
- The ideas section and modelling are linked in a section called 'Design Development'. The approach to this section will differ depending on the focus area studied by the candidate. The key thing is that the development is appropriate to the product and the focus area
- For this specification prototype modelling should be fully integrated in to the development of creative ideas and ongoing evaluation. Different focus areas should respond with an appropriate balance of prototyping which suits the development of improvement for their selected product
- Centres and candidates should note that creative/innovative ideas should be presented through a wide range of high quality annotated sketching. It is essential that this is represented in both A3 and CD based project
- It is important that all focus areas do respond with presenting an appropriate range of prototyped developments.
- One single ‘final prototype' is not within the overall ethos of the specification

- The requirement to make a test rig is no longer necessary this has been replaced with the need to plan and implement an appropriate test on the final developed idea it is however still possible to submit one if it is considered an appropriate test
- Communication skills should include the use of digital technology, and interactive dialogue – candidates who fail to use these techniques should be marked in the lower bands
- Interactive dialogue involves discussing the selected product/comparative products/prototype development/ongoing evaluation and testing with others and responding to suggestions made. It could be used in other sections –many candidates use this feature to advantage in the moral implications section. In all cases evidence of interaction should be recorded in real time with the active comments of those involved recorded first hand and not retrospectively. Re-typing of genuine first hand comments is totally counterproductive and should be avoided.

- **For future sessions it is absolutely essential that centres take steps to ensure that work produced by candidates using PP2010 can be viewed on a standard pre 2010 XP laptop.**

- **Consideration should be given by centres to the file size of some candidates' presentations. Complex presentations that take a long time to load are counterproductive.**

F523 Design, Make and Evaluate

General Comments

Most Centres submitted their marks to the Moderator using the correct forms There were fewer arithmetic errors on the CSF form this session, although a significant number of candidates' folders or CD's were not clearly labelled with Centre Number and Candidate Number.

Candidates had chosen a range of coursework titles that were appropriate to the requirements of the examination. There was considerable variation in complexity and demand, in terms of both designing and making. Whilst it was pleasing to see sensibly scaled projects on the whole, in some cases the overall complexity and sophistication of the projects as executed and the range and/or depth of skills involved in the design development, making and evaluating was insufficient for candidates to attain the marks awarded by the centre. In these cases adjustments were necessary to bring the centres assessments into line with the OCR standard. Projects that were simpler and more straightforward in nature were generally more successful when tackled from a commercial standpoint.

Generic responses to the assessment criteria were common, where responses did not relate directly to the specific project and which lacked the focus and relevant detail required at A2 level. Such work was often over-rewarded by centres, where marks in the lower bands were more appropriate.

In most cases there was limited reference to the commercial and marketing aspects of design and manufacture throughout the project, although it was pleasing to see the benefit of greater reference to the needs of a client or specific target audience.

Some candidates' portfolios did not follow the assessment headings. In these cases it was difficult to follow the process of design and to interpret the evidence presented.

Skills in a wide range of ICT, CAD and CAM applications were seen, and some candidates presented a professional standard of work. A surprising number of candidates did not provide evidence of CAD, and centres should note that although this is no longer a specific named requirement in the Assessment Criteria, it is nevertheless a reasonable expectation if high marks are to be supported. Some candidates relied heavily on CAM, and in some cases limited practical skills were evident beyond this.

An increased number of candidates, approximately 50%, used PowerPoint software to record and present their coursework as an electronic portfolio. Some file sizes were excessive, and Moderators frequently had to wait for several minutes for files to open. Scanned images were often too faint, and annotation difficult to read. Centres are reminded that a single PowerPoint file is the OCR approved format, although other files, including video clips, may be embedded or hyperlinked. Most candidates submitting e-portfolios took advantage of the opportunity to include short video clips, and this did have a positive impact on the folder as a whole. It is important that centres check that the PowerPoint plus videos and linked files operate on a stand-alone computer before sending e-portfolios to the Moderator. For this Unit, e-portfolios may be submitted on memory stick, and centres are permitted to burn all e-portfolios to one CD or DVD for moderation.

Comments on Individual Sections

1 DESIGN BRIEF (3 marks)

Present a design brief for a marketable product

Four key areas need to be addressed in this section for maximum marks to be possible:

- Details of the CLIENT and the CONTEXT – the target market/client, the situation, the problems, the need……
- A clear and precise BRIEF – what the candidate will be designing, making and evaluating
- Clear reference to MARKETING – the important aspects of design and manufacture if this product is to be marketable
- Reference to KEY ISSUES that will be important during the designing.

Many responses were more wordy than necessary. Candidates are reminded that photos and images with appropriate annotation are a very effective form of communication that can replace large amounts of text.

The marking of this section tended to be lenient when compared with the OCR standard, where the key areas had not been targeted. The majority of candidates attained the middle mark band.

2 INFORMATION, INSPIRATION and INFLUENCES (9 marks)

Obtain information relevant to the design of the product

Present a range of evidence to show the sources of inspiration and influences on the designing

The best responses in this section consisted of focused and relevant research that included plenty of first hand information and experiences. High marks were frequently given when there was no primary research or ‘personal-contact’ investigation, and little inspiration derived from the evidence.

Many candidates included large amounts of ‘generic’ or ‘standard’ research (for example ‘anthropometric data’, materials information) without any analysis that would relate it to the project. Mood boards with no annotation or text showing the relevance and benefit gained from the images selected were common.

These factors resulted in centres’ marks being lenient in many cases in this section. For marks to enter the top mark band (7–9 marks) there must be clear evidence of:

- personal contact (person to person, not via email or letter etc) with a client or representation of the target market

  AND/OR

- personal contact with existing/similar products (the actual products – not internet images, photograph, etc).

Similarly, relevant quantitative and technical data such as measurements, capacities, weights, and timings, are necessary if high marks are to be awarded.

3 DESIGN SPECIFICATION (3 marks)

Produce a design specification for the product

Design Specifications were usually well structured with appropriate headings. However, many candidates tended to produce a lengthy list of generic points that were vague and based on their own thoughts and feelings rather than the analysis of their research.

Very few candidates referred specifically to the work in Section 2 to justify their specification points. A minority included specific performance targets that would be useful when evaluating and testing their designs and products.

For the highest mark to be awarded in this section, candidates must state detailed requirements by reference to specific aspects of the product, including technical, numerical, measurable targets. This should include sizes (eg maximum or minimum/range of adjustments, positions), capacities, weights, quantities, nutritional values, costs/budgets, performance, life span, and features required, wherever possible.

Candidates' responses mostly fitted the descriptor for the middle assessment box, with few candidates scoring full marks. Centres' assessments in this section tended to be lenient when compared with the OCR standard.

4a DESIGN, DESIGN DEVELOPMENT and MAKING (57 marks)

Demonstrate competence in the design, design development and making of the product, to include the following package of evidence:

- **the generation and exploration of design possibilities**
- **the use of digital technologies**
- **experimenting and modeling**
- **the refining and defining of a final design through ongoing evaluation, and**
- **the planning and making of the product.**

The package of evidence presented by candidates in this section should include all five key areas listed above.

The overall sophistication, difficulty, and intellectual challenge involved in the designing and making will influence marks in this section. A simpler project will need to be carried out in considerably greater depth to achieve the same marks as a more complex project.

In general, candidates displayed an integrated approach to designing, with freehand sketches, 2D and 3D modelling including computer modelling and evaluative commentary used to communicate design thinking and a progression of design.

In many cases, centres' marking in this section was lenient when compared with OCR benchmarking and standardising examples.

- **the generation and exploration of design possibilities**

Most candidates produced a useful range of initial design possibilities, with some fluent and open-minded approaches evident. Some responses showed little innovation or exploration and were based on fairly obvious commercially available designs. It is important that candidates show genuine progression from initial concepts through to final solution – in a significant number of cases a more thorough development phase (to expand and confirm design detailing) was needed rather than a huge jump from a chosen design concept to final chosen product.

- **the use of digital technologies**

Digital technology such as photography, scanning, CAD, and videos were widely used. CAM was often used in the modelling and making processes, with candidates usually presenting appropriate evidence to support the centre assessments. The use of digital technology by some candidates was of a professional standard, but the quality of photographic images was less praiseworthy in some cases. Moderators reported excellent use of CAD programs such as SolidWorks, and it was also pleasing to see SketchUp being used as a development tool in addition to being used to visualise a final idea.

- **experimenting and modeling**

Candidates used experiments, trials, visualisations and simulations in an integrated way to test design possibilities, to explore different concepts and design details, and to aid the development and refinement of their designs. A strong influence from the Advanced Innovation Challenge Unit at AS level was evident in some cases. Some centres made good use of full scale modeling to determine ergonomic suitability.

To raise attainment, candidates are encouraged to further expand their design development through modelling and experimenting. The benefits of using modeling and trials as a means to further explore ideas, to develop the design, and to obtain helpful client feedback cannot be overstated.

- **the refining and defining of a final design through ongoing evaluation**

In general, centres' assessments of the level of competency demonstrated by candidates in this section were lenient when compared with the OCR standard. Greater attention to technical aspects in the refining and defining stage of design development is needed to improve candidates' performance. Details of dimensions, materials, construction, ingredients, components, and fittings, are crucial to access higher marks.

The quality of ongoing evaluation varied considerably. Stronger responses included client feedback at several stages of the design development, evaluating ideas and suggesting improvements.

Annotation of design possibilities was often descriptive, with features being labelled rather than being evaluated against the key requirements in the Design Specification. Formal charts entitled 'Evaluation of ideas against the Specification' were common, and these were less effective than spontaneous annotation added in 'real time' around design sketches, CAD images, and photographs of models.

- **the planning and making of the product**

Some candidates included evidence of planning but this was often more of a retrospective log or diary of making. Planning was sometimes very superficial, including limited material of value, and elements such as: 'Fetch the saw', 'Mark the material using a pencil and ruler', and 'Use the saw carefully to cut the material'. The identification of the major stages of the making to show that a logical process and priorities have been followed is the key requirement.

There was a wide variety in the quality and scope of product manufacturing, with an increasing number of candidates including CAM. Centres' assessments were sometimes generous with high marks awarded to well finished but undemanding products. In general, centres' marking tended to be lenient when compared with the OCR Standard.

4b INNOVATION (15 marks)

Show innovation

In a few cases, centres had awarded a mark in the top mark band, alongside marks in lower bands in most other sections of this Unit. Although this is not an impossible scenario, only in rare cases might high marks be justified in this section alongside much lower marks in other sections. Marks are normally expected to be *'proportionate'* to marks in other sections. An assessment of the innovation shown will be influenced by the overall complexity, challenge, and level of difficulty involved in the project as a whole.

A few centres had prompted candidates to produce specific information about how and where they had shown innovation, and to point specifically to evidence in the folder. This approach is encouraged as a positive means of supporting the centre's mark in this section.

5 TESTING and INDEPENDENT EVALUATION of the FINAL PRODUCT (9 marks)

Show evidence of the testing of the final product against the specification

Identify and state strengths and weaknesses in the product

Respond to independent evaluation

There are three clear requirements for candidates' responses if they are to satisfy the assessment objective:

- TESTING to the Specification
- STRENGTHS and WEAKNESSES
- INDEPENDENT EVALUATION.

For the highest mark to be awarded, all three elements need to be covered thoroughly and in depth. In many cases the Moderator was unable to confirm high marks awarded by the centre where candidates had not clearly addressed all three requirements.

Centres' assessments in this section tended to be lenient when compared with the OCR standard, with the most common shortcomings being:

- Evaluation against the Specification conducted subjectively by the candidate without meaningful and rigorous testing in the intended situation or context
- Client feedback not arranged
- Technical and numerical detail missing from the identified strengths and weaknesses
- Independent evaluation arranged with the candidate's peers or teachers rather than genuinely independent representatives of the target market or experts in the relevant field.
- Lack of clear authenticity/direct contact with independent others.

6 MARKETING PRESENTATION (15 marks)

Using appropriate techniques create a marketing presentation suitable for the final product

Responses in this section continue to improve. However, it was evident that many candidates had to rush this important aspect to meet deadlines.

Many candidates were unable to spend sufficient time on the analytical and strategic planning requirement for the marketing of their product, and spent their time on a 'worked through example'. In some cases the choice of media for the advertisement was inappropriate for the product, and this made it difficult for Moderators to support the marks awarded by the centre.

It is recommended that centres make the teaching of the principles of marketing a higher priority. In a significant number of cases candidates did not show consideration of the basic aspects of product distribution, selling, and promotion.

The majority of responses warranted marks in the middle assessment band. For marks in the highest mark band to be awarded, a thorough, in-depth coverage of all key aspects is needed, including designs for promotional materials such as posters, leaflets, advertisements, presentations, and websites. Responses covering a more limited range of aspects in depth, or a wider range in less depth, should be given marks in the middle mark band.

Specific marketing aspects needing consideration in this section include:

- The 'Unique Selling Proposition' (USP)
- The '4 P's of Marketing' – Product, Price, Place, and Promotion
- Suitable media for the promotion of the product
- Product identity and branding
- A product 'logo' or trademark
- Packaging – the presentation and protection of the product.

7 REVIEW and REFLECTION (9 marks)

Review and reflect on the effectiveness of the designing and making process that led to the final product

Consider the possible wider implications and impact of the product, including possible future developments

There are three clear requirements for candidates' responses if they are to satisfy the assessment objective:

- REVIEW and REFLECT
- WIDER IMPACT
- FUTURE DEVELOPMENTS.

For the highest mark to be awarded, all three elements need to be covered thoroughly and in depth. In many cases the Moderator was unable to confirm high marks awarded by the centre where candidates had not clearly addressed all three requirements.

In many cases it was evident that candidates allowed insufficient time to address the requirements of this section effectively. Responses were often rushed and incomplete.

Consideration of the wider implications and impact of the product was often generalised rather than specific to include how the product would be manufactured if commercially available at an appropriate scale of production. Few candidates mentioned aspects such as energy and water consumption in relevant and specific detail.

Specific considerations in this section include:

- An insight into the process of designing and making
- Honest comments about the learning that has taken place
- Use of Life-Cycle Analysis (LCA) to evaluate the wider impact of the product
- Moral, ethical, and sustainability issues, together with economic and manufacturing issues
- The likely success of the product in the market-place
- Developments relating to potential industrial and commercial production (diagrams)
- Future developments including quality improvement or design variations (diagrams).

Centres' assessments in this section tended to be lenient when compared with the OCR standard.

F524/01 Component 1

General Comments

The most popular question was Question 6 Resistant Materials followed by Question 4 Graphic Products. The vast majority of candidates fully complied with the rubric but some attempted more than one question. This should be discouraged as the quality and detail of the response for this paper would be limited and it would restrict the amount of time that they spend on the F524/02 paper. This consequently impacts upon the overall mark.

Parts (a), (b), (c), (d) and (f) were common across all questions.

For part (a), most candidates were able to give at least two justified design requirements for the given product. A number gave generic product requirements or very brief, simplistic and unjustified statements, which did not receive a mark.

Many candidates achieved high marks for part (b). Most were able to give two examples where anthropometric data would be used in the design of the context given. A significant number of candidates focussed on wider ergonomic features, which did not gain any marks.
Some candidates answering Question 6 did not achieve marks by focusing on the drinks container rather than the tray as instructed.

Part (c) was generally well answered. The most common correct responses were that goods/products must conform to the description given and that the goods/products should be fit for purpose. A number of candidates did not achieve full marks by giving very brief descriptions of warranties and guarantees, or safety issues, without reference to the Sale of Goods Act.

Part (d) was generally well answered. Geothermal and wave were the most popular choices. Most candidates used an annotated sketch to support their answer. The majority of candidates clearly explained the benefits to society of their selected energy production system but many did not explain the system. The best responses described the main principles of the system and focussed on the environmental and cost benefits.

Part (e) assesses specific material content from the focus area.
Most candidates answered (e) (i) well, stating a specific material example with appropriate properties or performance characteristics given for Questions, 1,2,4,5,6 and 8. In some cases, reasons for choice of material were not related to the requirements of the product in question. There were no responses to Question 3.

For part (e) (ii), most questions include the instruction for candidates to *'Use a flowchart and/or annotated diagrams to support your answer'.*

In most cases candidates made the decision to use annotated diagrams to ensure that they include sufficient detail to access higher marks. Some candidates produced very detailed and full flowcharts to include the same level of technical detail. A significant number of candidates however produced a flowchart with very limited detail to describe the given process, and consequently did not achieve good marks.

A number of candidates did not fully comply with the rubric for (e) (ii). Some candidates missed key elements of the question eg batch size was not considered for some questions. For Question 6, it would be very unlikely that a batch of 250 trays would be injection moulded.

Part (f) was a 'discuss' question of which centres are familiar with. Candidates were generally well prepared to raise and explain a range of issues and include supporting evidence or examples.

The mark scheme for part (f) has been amended to fit into a 'best fit' assessment banding.

Details what is required for a Level 3 (6–8 marks) is shown below.

Clear, cogent and well-structured response with two or three issues well explained.
Good use of examples and additional evidence to support discussion.
Good use of technical vocabulary.

There was a wide range of responses to part (f). Some candidates gave full and detailed responses raising issues such as the opportunity for new products, increased functionality of products and cost implications. A number of candidates did not access the higher mark ranges by giving general responses on how designers select materials for products and did not focus on 'the availability of new and smart materials'.

A number of candidates missed out on achieving full marks by not including additional evidence or examples of smart materials to support their answer.

Further comments related to parts (e) and (f) are referred to in the Comments on Individual Questions.

Comments on Individual Questions

Question 1 Built Environment and Construction

More candidates attempted this question this year. Some gave very detailed and structurally correct responses to the construction of an internal load bearing partition. Some candidates attempted this question with no understanding of accepted construction techniques.

Question 2 Engineering

Although a very limited number of candidates attempted this question, the responses to parts (e) (i) and (e) (ii) were generally good.

Most candidates correctly identified a specific plastic and gave two appropriate properties. Some candidates used a flowchart with annotated diagrams to produce reasonable descriptions of the process to manufacture the seat rail. Not all candidates included full details of the special tooling required and quality control checks employed.

Question 3 Food

There was a very limited response to this question.

Question 4 Graphic Products

For (e) (i) many candidates stated card as an appropriate material. Only specific types of card such as solid white card or card 160–300 gsm, achieved a mark.

Whilst there were a number of very good answers to (e) (ii), a significant number produced very brief flowcharts, lacking in detail.

The best responses made good use of annotated diagrams, in some cases as part of a flow chart, to fully describe the process of embossing and the application of a high gloss finish to the perfume box. Some candidates did not comply with the rubric and described cutting and printing processes.

Question 5 Manufacturing

A number of candidates attempted this question. Almost all identified an appropriate material with appropriate properties for the side section of the ladder for (e) (i). Although aluminium was accepted as an appropriate material, aluminium alloy would be more appropriate.
There were a few excellent responses to (e) (ii). Most candidates produced flow charts (including appropriate sketches) of the extrusion of the side section. Most candidates described appropriate quality control checks.

Question 6 Resistant Materials

This was the most popular question with a wide range of responses. There was a wide range of materials proposed for (e) (i), the most common being aluminium, stainless steel and ABS. Most candidates gave two appropriate properties.

Some responses to (e) (ii) were outstanding; fully detailed methods describing the production of a batch of 250 trays, including details of the jigs and formers required.

A number of candidates did not access full marks by not taking into consideration the lip of the tray.

Some candidates described methods, eg Injection moulding would not be appropriate for a batch of 250.

Question 7 Systems and Control

There was a very limited response to this question. Most candidates correctly stated an appropriate type of battery for (e)(i).

A few candidates achieved high marks by drawing a spur gear system with a correct reduction ratio.

Question 8 Textiles

Very few candidates attempted this question.

Most were able to identify an appropriate fibre for the neck-tie and were able to give appropriate performance characteristics for part (e) (i).

There were some outstanding responses to part (e) (ii). They were fully detailed and were a combination of flowchart and annotated diagrams. Some candidates did not access the full mark range by not giving full details of pattern pieces.

F524/02 Component 2

General Comments

(Reference should be made to the published generic mark scheme for this unit when reading this report.)

It would help examiners if Centres encouraged candidates to circle the question number attempted on the first answer sheet and to write their name and candidate number on each answer sheet.

Comments on each of the marking criteria:

Specification Points (S):

Candidates are asked to write three specification points. To be awarded full marks each point must be directly relevant to the brief and justified in relation to the function of the product, the potential user or the manufacturer of the product.

Many candidates continue to lose marks in this section by simply repeating information given in the question or making generic points relating to issues such as the need to be cost effective, aesthetically appealing or ergonomically suitable. Factors such as these are relevant to *all* products so to be given credit in this section they must be carefully justified indicating more specifically how each would influence the design of the product.

Candidates are strongly advised to consider the key functional aspects of the product when writing their specification points. All specification points should be over and above the basic outline for the product set out in the question.

Range of Ideas (R):

To achieve high marks in this section there are two complementary demands: firstly to produce a number of **different** concept solutions to the design brief set in the question, secondly to develop each concept to show details of possible alternatives and to consider how modifications could better suit the needs of user and manufacturer. Particular credit is given for innovative ideas, which show an original approach to the design brief.

The majority of candidates performed quite well in the first of these demands but many failed to reach the higher marks because they showed little if any evidence of development beyond the initial concept. In a few cases ideas presented were unrealistic with little prospect of fulfilling the design brief. High marks cannot be awarded for ideas, which are completely unsuitable, with little or no prospect of satisfying the set brief even if a suitable number of different ideas are present.

Technical Detail (D):

Assessment of this criterion was based on three strands:

- consideration of methods of construction, assembly or manufacture;
- understanding of suitable materials, components, or ingredients;
- details of dimensions or quantities.

At this level of examination candidates are expected to have detailed knowledge of materials and components, and how these are used to construct, assemble and manufacture commercial products from their focus area. In this unit they are expected to be able to relate this knowledge to their own design proposals. The more successful candidates showed good subject knowledge by offering realistic options for construction and justified choices of materials by reference to their properties and performance. In some cases suggestions for construction and materials were inappropriate whilst a significant number of candidates made no reference to specific materials or construction details at all. No credit can be given for generic terms such as 'wood', 'metal' ,'plastic' or 'card'. A significant number of candidates draw detailed diagrams of manufacturing processes. This is unnecessary and no additional credit can be given for these diagrams.

In most cases dimensional detail was somewhat lacking with only overall sizes given. For full credit in this area at least some more detailed dimensions must be given, for example thicknesses of material or sizes of standard components, which would be used to produce the product.

Evaluation of ideas with reference to specification and volume production (E):

This was done well by some candidates who considered how the product would be used and manufactured and drew attention to both positive and negative aspects of their designs.

Unfortunately in many cases comments were summative rather than evaluative becoming simple statements that did not show any evidence of balance in value judgement.

A few candidates used summary tables to evaluate their ideas, often with simple ticks or crosses, or scores out of ten to show success or failure. This should be discouraged because it does not allow the candidate to show the depth of thought necessary for high marks at this level.

Final Developed Outcome (F):

This section has improved significantly over the last few sessions with most candidates showing a complete final idea with specific features identified. A significant number of candidates produce detailed final evaluations sometimes with a summary of strengths and weaknesses for the product. This is not necessary to achieve high marks and it is clear that some candidates must spend a considerable amount of time on this final sheet.

Communication (C):

The mark awarded for communication is based on a combination of factors:

- The overall clarity of presentation evident in the layout of the three design sheets of the paper
- The range and quality of graphical skills evident
- The use of clear annotation which communicates the quality of the candidate's design thinking.

There seems to be a growing trend for candidates to use lengthy descriptive text throughout the paper. This is often very difficult to decipher and is not an effective way to communicate design thinking. When preparing for this unit it is important that candidates practice the use of a range of graphical techniques (for example 2D, 3D sketching, cross sections, exploded views) and the appropriate use of these to show construction and assembly detail.

Techniques of annotation (for example using arrows to connect comments to specific points) avoiding long passages of text would also help candidates communicate speedily and effectively.

The more able candidates show impressive skill, managing to communicate broad concepts whilst also including useful detailed sketches and informative notes on clear, attractive sheets.

Comments on Individual questions:

Question One: Roadside farm shop

As in previous sessions this question seemed to attract non-specialists who could not support their ideas with sound technical knowledge. Many candidates did not seem to understand the term 'permanent structure' with obviously temporary buildings or portable display stands commonly seen. Such ideas are not appropriate, given the clear instruction in the question and so cannot be rewarded highly for the assessment of 'range of ideas'.

Question Two: Transporting sports equipment

This question was reasonably well answered although most solutions were clearly based on existing products of one sort or another.

Question Three: Seasonal ingredients

Too few responses have been seen to make general comments about this question.

Question Four: Display/delivery of vegetables

This was a popular question with many answers showing a good understanding of the construction and manufacture of graphic products. A significant minority lost marks because they did not consider the need for the product to be dual purpose; to both display the vegetables in the shop and to act as a delivery container. For weaker candidates the range of ideas consisted of boxes in the shapes of different vegetables with little consideration of the major functional requirements of this dual purpose display/delivery container.

Question Five: Moving heavy items round a garden

For most candidates the basis of the ideas offered were existing products. However, many showed good consideration of the functional requirements of the product incorporating some innovative, practical ideas that considered the needs of the user and the constraints imposed by the environment in which it would be used.

Question Six: Standing from a seated position

Most candidates produced a good range of ideas to aid elderly people to stand from a seated position, with many showing real empathy with the needs of potential users of the product. Unfortunately, many candidates gave no indication of how the mechanisms that formed the basis of their ideas would actually operate or be manufactured.

Question Seven: Innovative cycle light

Too few responses have been seen to make general comments about this question.

Question Eight: Sustainable baby wear

Relatively few candidates really considered the need for sustainability in any depth. Many were designed as conventional garments for babies or young children and added decorative detail making reference to images or text relating to green issues.

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