

Design & Technology (Product Design)

General Certificate of Secondary Education **GCSE J305**

General Certificate of Secondary Education (Short Course) **GCSE J045**

Reports on the Units

January 2010

J305/J045/MS/R/10J

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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.

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CONTENTS

General Certificate of Secondary Education Product Design (J305)

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REPORTS ON THE UNITS

| Unit/Content | Page |
|---|-------------|
| Chief Examiner's Report | 1 |
| A551 Designing and Applying Design Skills | 3 |
| A552 Design and Making Innovation Challenge | 5 |
| A553 Making, Testing and Marketing Products | 9 |
| A554 Designing Influences | 10 |
| Grade Thresholds | 13 |

Chief Examiner's Report

General Comments

This new GCSE Product Design specification was available from September 2009.

All the four units have very similar content to the previous specification and have only minor changes which reflect OFQUAL requirements and also some centre feedback, inset feedback together with observations of markers and moderators.

Centres should note that from last September "coursework" is replaced by "controlled assessment" which is an OFQUAL requirement. It is a centre responsibility to understand the ramifications for their teaching and assessment in this regard although guidance has been and will be given in OCR inset sessions.

One factor which must be noted is that an OFQUAL requirement of all new specifications is that of the 40% terminal rule for unitised specifications. What this means in real terms for this specification is that for any one candidate at least two of the four units will need to be submitted for assessment at the end of the course when aggregation is effected by the centre. There is no restricted combination of units under the 40% terminal rules (ie any mix of the 4 units is acceptable) so it still offers terrific flexibility to centres.

Marks for the quality of candidate written communication has also been introduced at the behest of OFQUAL but will be assessed in selected parts of each unit but not throughout each unit.

Whilst the requirements for the *submission* of a CSF (mark breakdown sheet) will no longer be compulsory (it is replaced by a Controlled Assessment Cover sheet completed by the centre for the selected Moderation Sample only) centres are urged to keep detailed records of their internal assessment and, if possible also send the moderators a copy to assist in the moderation process. The annotations that were on the cover sheet were particularly helpful to moderators

With the increased use of Moderation Manager all centres are respectfully requested to ensure that the email address for the recipient within the centre is both accurate and kept up to date by informing moderationmanager@ocr.org.uk directly.

Entry codes for this unit were streamlined with A551/2 or A553/2 being the entry codes for either a paper portfolio or a CD - ROM submission (Postal Moderation). A551/1 or A553/1 is for the OCR Repository (Online moderation). (See page 34 of the specification for further guidance).

Centres are reminded that for Unit 1 Candidates are not required to make their design outcomes. However, with appropriate teacher guidance and support, the design outcomes may well be realised in Unit 3 Making, Testing and Marketing **but do not have to be**. There are distinct benefits for candidates undertaking totally different projects for A551 and A553.

All centres are reminded that there are separate moderators for A551 and A553 and therefore completely separate administration is required. A small number of centres despatched both units to the same moderator which caused difficulties for both moderators.

A good number of centres have adopted the practise of submitting the full cohorts portfolios on one CD-ROM which is both effective for centres and for moderators. Principal Moderators, still however, would prefer one CD-ROM per candidate, which helps in the overall moderation process. Several centres submitted work on a flash drive which is also acceptable practise. **Centres should note however that only paper portfolios will be returned to centres.**

Report on the Units taken in January 2010

Centres should be aware of the textbook written in support of this specification is now available from Hodder Education **ISBN 978 0340 98200 6**. Discounts are available for class sets of the text book which has proved to be very popular with both teachers and students alike. There is also a DVD teacher resource available which centres will find of great support for the new specification.

One final, but equally important, point for all centres to note. There continues to be a large number of year nine students who are being entered for the different units in this specification. Centres must understand that they have to be assessed against the National standard for KS4. There is clear evidence that the majority of these students are **not** mature enough and do not have sufficient experience to perform well at a GCSE so early in their education. The net result of so many achieving grades at a lower level, has a dramatic effect on the statistics and percentage grades overall for the remaining candidates. Centres should be minded of this when making decisions when entering candidates.

A551 Designing and Applying Design Skills

At the start of a project, candidates should clearly identify a problem or **design need** and a well-defined user or a target market affected by the problem or design need. Particulars of age, gender and interests together with details and profiles of some of the users can help to focus the design ideas on tangible concepts.

Often, candidates will find it more straightforward to know what is needed when there is a discrete user or a single client, rather than a vague, or fictitious group.

Candidates do have to know the **difference** between a need and a product.

Within IAO1, there should be supportive **evidence** of the need that gives justification to the design activity, rather than having just the personal wishes of the Candidate.

The Design Brief needs to be a simple, direct statement of what is required to satisfy the need. The design brief should be **open** and not restrictive: focussing on the **need**, rather than a specific product to be designed. The design brief should allow scope for ideas to be proposed for an innovative product, and also allow for imaginative and possibly risk taking design development to take place.

The analysis of existing products should allow the candidate to identify and explain the importance of particular features of a number of products: features that may have to be considered when compiling the specification for the solution to their design need.

Product analysis involving the examination of real products can provide more useful data than analysis using pictures of products.

Product analysis based on a set checklist of headings can, at this level of performance, be restrictive for the more able candidates, and it can miss important key information. Each product will have its own intrinsic set of features that may not neatly fit into a predetermined list. Some products, such as children's toys, will have an extensive list of user features such as shape, form, colour, size, safety, and hygiene. Other products, such as plastic bottles, will have an extensive list of functional features such as form, size, shape and texture of the cap, closure thread, and gaps in closure thread, materials, and manufacture.

Ideally, candidates should start their analysis of a product by identifying and possibly sketching key features of the product. An explanation of the purpose of these features will then provide the kind of information required to objectively consider the specification requirements for the solution to their need.

Effective product analysis, along with appropriate user research, should provide quality data that will help the candidate to formulate a helpful list of specification points.

Candidates need to ask themselves two basic questions:

- What are all the things that the user needs from this product?
- What are all the things that that this product has to do to be successful?

Candidates need to generate a range of design proposals that include appropriate explanatory detail in the form of annotation and small 'satellite' sketches that draw attention to important features of the idea such as materials, constructions, user requirements, safety, etc.

The design proposals should be evaluated against the design specification with objective substantiated statements rather than just personal opinions or tick box grids. This kind of evaluation is often presented in the form of a chart where each idea is compared with each specification point and comments made explaining how particular features of an idea meet or do not meet particular specification points. Comments such as '*It meets specification point 2*' can gain **no** credit without further qualified explanation of **how** the idea meets the specification point.

Report on the Units taken in January 2010

Clearly, a weak specification in IAO2 almost inevitably leads to a weak evaluation of ideas in IAO3.

Candidates need to clearly identify their **chosen** design proposal, and provide reasons for the choice related to the specification, user comments, or feedback, rather than personal preferences.

Modelling should take place to check on the feasibility of design ideas.

The final design proposal, which *could* be used for prototype manufacture, should be clearly identified together with informed reasons as to its selection.

The award of marks for Communication requires evidence of clarity and competence together with the use of a **range** of appropriate techniques (e.g. pictorial, orthographic, freehand sketches and formal drawings).

The Assessment scheme requires candidates to show evidence of the use of CAD and other computer applications within their design work of IAO3. In order to score highly in this 10-mark section, candidates must use CAD in their design work, rather than just as a technique to present a final idea.

A552 Design and Making Innovation Challenge

General Comments

It is clear that candidates have enjoyed the work they have carried out during the 'challenge' with many students reflecting positively on their experience. The Innovation Challenge is appropriate to candidates of all abilities with the overwhelming majority of candidates completing work in all sections of the workbook.

The 2010 theme 'Sports Day' is accessible to all students and work has been seen for each of the four set challenges with 'Relay Race' and 'Temporary Seating' proving to be the most popular challenge tasks.

Administration

Examiners have reported few problems due to centre administration errors in this session. It is however important that teachers make examination officers aware that the examination takes place in three separate stages and that workbooks should not be sent to examiners until all of the three stages are complete. To avoid delays and unnecessary 'missing script' investigation work for both OCR and the Examination Centre it is important that examination workbooks are posted to examiners as soon as the 'Time to Reflect' activity has been completed.

Centres are reminded of the requirement to submit details of the dates of the Innovation Challenge to OCR using the VAF form. A number of centres failed to submit this form before the given deadline this session. Copies of the form are available on the OCR website – www.ocr.org.uk.

The Innovation Challenge is designed to take place within a time window of the 10th January to the 25th January. Centres are not allowed to run the Challenge outside of this window.

All materials relating to examinations sent from OCR to centres will be dispatched to the examinations officer. It is important that colleagues check with the examinations officer that they have received all relevant and most up to date information prior to starting the Innovation Challenge activity. It is very important that centres use only the workbook and teacher script provided for Unit A552. Copies of the script and workbook for Unit B802 in the legacy qualification must not be used.

Examination notices must be displayed in the area where the examination is to take place and an invigilator should be present. Students should work in silence unless otherwise instructed by the teacher script.

Running the Challenge

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

Teaching colleagues and support staff must not give advice to students about the design/manufacture of their prototype product or cut materials to correct shape or dimension for students. It must be made clear to all candidates that this is an examination and we are assessing the individual student's designing and modelling capability.

Photographs

Examiners have reported concerns about the quality of photographs from some centres. Problems include: photos being printed at low resolution, photos being printed that are too small (approx postage stamp size), photos being printed on printers that are low on ink and photos that do not clearly focus on the model.

Photographs form an essential part of the assessment process. Photographs must be good quality colour images that are of an appropriate size to fit into the space provided.

The addition of a card with the candidates name within the photo aids the return of photos to students. Centres are reminded that four “teacher” photographs is the minimum required. 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 to fully illustrate the final outcome.

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.

Candidates should be encouraged to stick photos into the workbook as they are printed.

Completion of the workbook

Examiners have reported difficulty in understanding student’s work where either blunt pencils, highlight pens or gel pens have been used for written work. Please advise candidates of the need for all of their work to be legible.

Security of Workbooks

Centres are reminded of the importance of appropriate security of all workbooks between the three sessions of the Innovation Challenge. Workbooks must be returned to the examinations officer and should be stored in secure conditions.

Development of design. Evolution through making

Initial Thoughts

Candidates used a mix of text and drawings to explore the selected challenge. The majority of candidates produce a range of initial concept ideas and think creatively about the challenge that they have selected.

Candidates should be encouraged to take risks and think creatively about the design task.

Briefs

Design Briefs identified by candidates are often poorly written. Design Briefs are often too prescriptive with many candidates confusing the design brief with the specification. Candidates should be encouraged to write clear and precise design briefs that offer scope for creativity.

User/Clients

The majority of candidates identified appropriate user groups for their products. Higher performing candidates gave clear consideration of their user group whilst undertaking the design activity making clear reference to the target user and user needs.

Specifications

Specifications from most candidates are clear and precise allowing candidates to achieve full marks for this area. Candidates should be encouraged to write detailed, justified, specific points about their proposed design. A bullet pointed format was seen to be of assistance to higher performing candidates.

Ideas

Students used a mix of drawings, text, annotation and occasionally modelling/photographs to show their ideas. Lower scoring candidates reproduced the initial thoughts from box 1 of the challenge activity and disregarded both the design brief and specification from boxes 3 and 4. Higher performing candidates produced a range of creative ideas that clearly related to their design brief, specification and potential users. Drawings of both full designs and parts of designs were provided along with detailed annotation relating to materials and construction methods. Development of the design from the 'initial thoughts' was clearly evident. Designs were 'rendered' to enhance communication.

Communicating information through sketches, writing and photographs

The standard of design communication was generally good. Candidates presented their ideas using a range of annotated drawings and text. Higher performing candidates gave different views of objects or parts of objects and clearly communicated their design thinking through the use of notes and annotation. Examiners felt that many candidates work could have been enhanced with the use of rendering techniques and that centres should encourage candidates to be more adventurous in their forms of communication.

Written communication is generally good but many candidates fail to use technical vocabulary when this is appropriate.

Materials, Components, Processes, Techniques and Industrial Practice

Examiners have reported that the majority of centres have prepared their candidates well for this part of the examination. Candidates from these centres clearly understood that they were making a model rather than a 'final' product. Appropriate materials were supplied by these centres for candidates use. These materials included foam, foam board, card, balsa, clay, modelling clay, mechanism kits, polymorph, etc.

It is essential that during the product design course students undertake modelling activity in order to develop their manufacturing skills and knowledge of modelling materials.

Examiners reported that some candidates whose design work was of a good standard were limited by the materials supplied by their centres. Sheet materials such as MDF and Plywood are often unsuitable for modelling. These materials often limit the candidates ability to model designs appropriately and/or impact upon the candidates design work. Where these materials were used, the candidates' work was often incomplete because candidates were trying to

manufacture 'final outcomes' rather than 'prototype products'. Examiners have also noted that some centres have used 'junk' materials such as yoghurt pots, ice cream tubs and washing powder boxes for modelling. The use of these materials often results in a poor quality model/prototype.

Candidates must produce their own models. Using existing products such as a radio controlled toy and simply adding a component to it will not gain high marks.

Higher achieving candidates considered the choice of materials and components available and identified the most appropriate materials for the manufacture of their product demonstrating adept use of these materials. They completed their models to a high standard and the model they produced accurately reflected their design.

Analysis of ideas, models and prototypes

Peer Evaluation

The majority of candidates planned for the presentation and recorded the outcome. Clear evidence was seen of candidates using the feedback to further develop ideas. Occasionally, candidates failed to record the feedback or planning for this activity.

Development of ideas

Design development was generally good. Higher achieving candidates show clear development of their ideas between box 1 'initial thoughts' and box 5 'initial ideas'. They also show development between box 5 'initial ideas' and box 9 'developing your idea'.

It is important that candidates use notes or annotations to show how they are developing their design towards an optimum solution that satisfies the design brief, specification and needs of the user. Producing a model of the initial idea or redrawing the initial idea does not show development of the design and therefore will gain no marks for design development.

Evaluation

Many candidates produced detailed evaluations of their prototype product. Higher performing candidates clearly considered each element of the evaluation section of the workbook and also provided detailed analysis of their design in relation to the design specification.

Reflection

To score highly students should focus on the product design rather than the modelling activity. It is essential that students use the 30 minutes available to read through their workbook and reflect upon the activity they undertook. They should identify strengths and weaknesses in the design and suggest detailed alterations/improvements. Where design alterations are proposed these should be drawn and clearly communicated. Cursory written comments will not attract high marks.

A553 Making, Testing and Marketing Products

No entries were made for this unit for the January session, therefore no report is available.

A554 Designing Influences

This examination is the reincarnation of the existing B804. Whilst the examination is very similar, there are some notable changes both in terms of the structure of question 4 and in terms of the specification content. The most notable change to the structure of the question is the re-shaping of question 4 which now offers 6 marks for part [a] and 4 for part [b]. In contrast to the previous examination (B804), this question now rewards candidates for the quality of their writing. Students need to be able to present an argument carefully and provide evidence from their research to support their points of view. Thus, simply recalling knowledge, or at the other extreme writing very general arguments are unlikely to score more than 1 or 2 marks (the lower band). Furthermore, great care must be taken when preparing candidates for this question because, still, a great many candidates confuse the trendsetter and the iconic product. For example, when talking about Sir Alec Issigonis, the trend setter, many candidates merely talked about the mini rather than him and his impact both on the motor industry and society at large. Furthermore, what is also clear, is that a great many students have little understanding of sustainability in general, and more specifically sustainable design tools such as life cycle analysis which have been added to the new A554 specification. However, all that said, candidates clearly enjoy this paper. Virtually all candidates attempt every question and continue to express their ideas with confidence. Indeed, articulate, well-informed explanations of a wide range of design issues, together with some thorough and well-presented designing are being seen on more and more scripts.

Detailed comments

Question 1. The hand held controller.

Where Candidates have been well practiced in the skills of product analysis, the identification of three design features was straightforward, and the majority of answers correctly identified two or three of the design features of the games controller.

The interpretation of the anthropometric data was not always well attempted.

Many product design tasks, in both examination situations and in controlled assessment will require specific reference to quantitative information. Candidates must be familiar with this kind of chart and be well practiced in extracting information from the figures.

Aesthetics, anthropometrics and ergonomics are all terms that underpin many aspects of the design situations within this subject. Many candidates have a very clear understanding of each term. However, some candidates seem to get mixed up with all three. In the question about the use of aesthetics in the design of the controller, some candidates referred to the ease of holding, the comfort and the operation of the controls, which are clearly ergonomic issues. Creditable answers referred to the symmetrical shape, the smooth feel, the colour and the layout of the buttons.

Question 2. Low energy light bulb.

Most of the candidates were well able to give three creditable reasons why people use low energy light bulbs, with lower running costs, longer life, and better for the environment being the most popular responses.

One drawback of low energy light bulbs was usually given, but many candidates did not go on to provide an explanation. Delayed lighting up and lower light level were commonly stated drawbacks, but to score full marks, candidates needed to give additional information. So, delayed lighting up may be a problem for an elderly person going up or down stairs, and lower light level may be a problem for someone wanting to read.

Examples of renewable energy sources were very well known, with solar, wind and wave being most popular.

Life cycle energy analysis was not well known. Some confused answers gave extensive explanations of recycling. Essentially, candidates need to know that Life Cycle Energy Analysis is a tool (usually in the form of software) used by designers for calculating how much energy can be saved at each stage of a production process.

Question 3. Design features of a modern office chair.

This question is always popular and well attempted.

Most candidates were well able to identify three successful features, with adjustable height, manoeuvrability, and extensive foam padding to the seat and to the back, being the most popular responses. However there is an extensive list of features that could have gained credit: swivel and tilt facility, sloping arm rests, available in different colours, and the five wheeled base is more stable.

Explanations of why the identified features make the chair successful were also well attempted with most candidates scoring 3 or 4 of the marks available. So with the addition of wheels, the chair is more manoeuvrable making it easier for the user to get to places and to reach things without leaving the seat.

Explanations of why the 1940's chair could be considered to be more sustainable proved to be a discriminating task. Most candidates were able to identify the wood of the 1940's chair and the metal and plastic of the modern chair, but only the more knowledgeable and perceptive candidates went on to explain that the wood comes from trees, it can be harvested and re-grown, it is biodegradable and it is easier to repair, whereas the metal and plastic of the modern chair require extensive amounts of energy for production, they are not easy to separate, and they can be difficult to recycle.

Question 4. Trendsetter and Iconic product.

Alec Issigonis, Andy Warhol and Yves St Laurents had been well researched and were well represented in many of the answers to this question. Infra-red and vegetarianism were equally well researched but less popular.

In preparing for this question, candidates need to be very clear that marks will be awarded in 4a for information about the Trendsetter and that marks will be awarded in 4b for information about their Iconic product. Knowledge about the Mini Cooper, the Kaftan and the Campbell's soup painting gain credit in 4b. Knowledge of the important influences (other than the given Iconic product) and the long-term legacy of the Trendsetter have to be explained in 4a.

Candidates have to be especially careful to avoid repeating the same information in 4a and 4b, and to ensure that they give information in 4a that focuses on the Trendsetter rather than their Iconic Product.

Question 5. Design.

The formulation of the four specification points at the beginning of this question continue to be of concern to the examiners. Many candidates score no more than one or two marks.

For full credit, candidates must provide four discrete points that have **not** already been given in the question paper, so references to the Trendsetter (eg Warhol), or the Iconic Product (eg Campbell's soup painting) will gain no credit. References to the requirements outlined in the need (eg 'promotional', 'pop-up', 'card', 'Warhol', 'exhibition') cannot gain credit.

Candidates have to use their knowledge of the Trendsetter and the Iconic Product, together with their analysis of the requirements of the need to formulate 'new' points.

For example:

- The design must use repetitive images of an everyday object.
- The design must use large lettering that is easy to read.
- The card must be easy to open and easy to close.
- The card must fit into an ordinary A5 size envelope.

Generic points (e.g. strong, bold comfortable) and negative points (e.g. no sharp edges, not too heavy, no loose bits), can gain no credit.

Clearly, the purpose of the specification points is to help the candidate focus their thoughts on viable design ideas. Time spent 'thinking before writing' the specification points, will not only improve the mark score in section (a), but also help the candidate improve their performance in **all** of the other sections of this question.

To score well for the design ideas part of the question, candidates must provide a **range** of different ideas, each with explanatory **notes** (rather than just labels), and with some indication that some aspects, of some of the ideas, address at least two of their **specification points**. Typically, candidates score 3 or 4 of the available marks for design ideas.

In order to move beyond two marks in the development of ideas part of this question, candidates must provide clear evidence, in the form of **sketches** and **notes**, of developmental activity and decision making.

For the final part of question 5, it is important for candidates to provide confirmed details of their final solution including references to materials, ingredients or components, with sizes, dimensions or quantities, together with joining or mixing techniques, and indications to tools and equipment.

The notes and explanations of how the final solution meets each of the specification points are not generally well attempted. Candidates will often just say, for example, that their idea meets specification point 2. For the award of a mark, it is necessary for the candidate to explain **how** the solution meets a particular specification point, for example, '*an A5 envelope measures 230 x 160 and my card is just 200 x 150 so it will fit easily in the envelope.*'

Grade Thresholds

**General Certificate of Secondary Education
Design and Technology (Production Design (J045 J305))
January 2010 Examination Series**

Unit Threshold Marks

| Unit | | Maximum Mark | a* | a | b | c | d | e | f | g | u |
|------|-----|---------------|-----|----|----|----|----|----|----|----|---|
| A551 | Raw | 90 | 81 | 72 | 63 | 54 | 45 | 36 | 27 | 18 | 0 |
| | UMS | 120 | 108 | 96 | 84 | 72 | 60 | 48 | 36 | 24 | 0 |
| A552 | Raw | 60 | 54 | 48 | 42 | 37 | 32 | 27 | 23 | 19 | 0 |
| | UMS | 80 | 72 | 64 | 56 | 48 | 40 | 32 | 24 | 16 | 0 |
| A553 | Raw | No candidates | | | | | | | | | |
| | UMS | 120 | 108 | 96 | 84 | 72 | 60 | 48 | 36 | 24 | 0 |
| A554 | Raw | 60 | 45 | 39 | 33 | 27 | 23 | 20 | 17 | 14 | 0 |
| | UMS | 80 | 72 | 64 | 56 | 48 | 40 | 32 | 24 | 16 | 0 |

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