

Examiner's Report Summer 2009

GCE

GCE Design & Technology - Product Design (8GR01)

Edexcel is one of the leading examining and awarding bodies in the UK and throughout the world. We provide a wide range of qualifications including academic, vocational, occupational and specific programmes for employers.

Through a network of UK and overseas offices, Edexcel's centres receive the support they need to help them deliver their education and training programmes to learners.

For further information, please call our GCE line on 0844 576 0025, our GCSE team on 0844 576 0027, or visit our website at www.edexcel.com.

Summer 2009

Publications Code US021905

All the material in this publication is copyright

© Edexcel Ltd 2009

Contents

1.	6GR01 - Portfolio of Creative Skills	5
2.	6GR02 - Design and Technology in Practice	13
3.	Statistics	17

Principal Moderators Report, Summer 2009
GCE AS Design & Technology: Product Design
Graphic Products Unit 6GR01

General

The work seen in this first year included, in the vast majority of cases, suitable submissions for the new coursework structure. A small number of centres had submitted work that was a straightforward design and make project as in previous years, but these candidates failed to achieve at the levels expected as reflected by the centre marking. The overwhelming majority of candidates submitted three discernible sections to their coursework, which were usually physically divided in one portfolio into product investigation, product development and product manufacture.

However, it is levels of response that determine whether outcomes are appropriate and these tended to be mixed. The best work came from centres that introduced elements of choice and diversity into their tasks encouraging individual work that fulfilled course requirements but allowed candidates to express their skills and talents. Many centres adopted a formulaic approach where all candidates investigated the same product, were given a very prescriptive design brief and all produced the same manufacturing task. This approach often resulted in almost exact replication of work from candidate to candidate and limited opportunities for individuals to express their competencies.

The requirements of the Product Investigation element of the course were unfamiliar to centres, but the vast majority coped well with this change, producing commendable work. Most of the problems in this section tended to be associated with the comparison of products that were too complex, or too similar. Centres are comfortable with the familiarity of designing and making and standards were as always, mixed. There was some high quality design work seen, but not a great deal of the 'blue-sky' approach was in evidence, which was disappointing as this section was designed to allow creativity beyond the constraints of materials and processes found in centres.

Some centres offered more than one design project as evidence in this section; this usually replicated skills already evidenced and often gave no benefit to the candidate. There were occasions where a project was submitted as a supplementary 2d design element, this is not a requirement for this submission and candidates can design just about anything in this section, although 3d products seemed to be more popular and allowed candidates to demonstrate the skills required that addressed the mark scheme.

Making was the most productive element for most candidates in eliciting marks and overall, some very good standards were presented, although a few centres allowed candidates to submit work that was barely of KS4 quality.

Marking by teacher assessors was in the main acceptable, but generous. Most marks were supported by appropriate annotation and this helped moderators when writing E9 feedback to centres.

Moderators did not report any great administration problems coming from centres, beyond some addition errors, incorrect transfer of some marks to OPTEMS from CABs and some CABs not signed by teachers and candidates.

Some centres did not label folders and pages clearly. This made the moderation process much more difficult for the moderators. Centres should ensure that each page in the portfolio is clearly labelled with candidate name and number, and title each page so it can be clearly connected with the relevant section of the coursework.

Of much greater concern was the number of centres who did not know that the 6141 D&T course had been superseded by 6RM01 and submitted work marked on the wrong CABs, to the old format of a single integrated coursework project. This caused difficulties in moderation and in dealing with such instances so as not to penalise candidates wrongly guided through no fault of their own.

Product investigation

There was a very wide spectrum of responses seen in this assessment section, ranging from excellent to very weak and success was largely dependent upon the products selected for investigation. Predictably, this element of assessment caused students most problems as might be expected considering that it was new to their experiences. The best work was seen where candidates had disassembled products in order to analyse the component parts in detail. A few candidates used only photographs of products to investigate, which severely limited their experience in this section. Other high quality work was achieved where centres had allowed candidates a choice in products to investigate. Where the same product was investigated by all candidates in a cohort, there was replication of information and a lack of individuality when work was presented.

If candidates are to be allowed to express their individual expertise and academic insight, centres need to be very cautious about only offering a single product for an entire cohort to investigate. Evidence from this year's submissions shows that such an approach leads to generic and formulaic responses that are of little benefit to candidates and are often no more than hoop-jumping exercises.

It was surprising to note how many centres submitted products that were not traditionally associated with Graphic Products, more so with resistant materials. Whilst this in itself would not be penalised, evaluating a graphic product does lend itself so well to the teaching of the associated graphic theory knowledge required for the examination. To disassemble a product such as a packaging item, allows openings for the investigation of plastic moulding, printing, card cutting etc.

It was disappointing to observe that a number of candidates had blatantly plagiarised exemplar work which was placed on Edexcel's website to guide and help centres understand the requirements of this assessment section. In one instance, kettles were being investigated, but several candidates had used almost the entire example placed on the website and even left the title 'specification for a glue gun' on their work after slight adjustments to the content.

Criterion A - Performance analysis

Most candidates were successful at this section. The most successful scenario for the majority of candidates was to set the evidence out as described in the assessment criteria; form, function etc, and then go on to detail each of the elements and attribute them to the products to be compared. Too many candidates still did not give sufficient detail to earn the maximum marks; they failed to justify their choices.

A few still dealt in generic terms and some gave the information about the function etc., and failed to apply it to the chosen items.

The choice of a similar product to compare and contrast was central to reaching the higher marks and many candidates failed to consider this fully, selecting products that were too similar such as 3-pin plugs that differed only in the material used for the body, kettles both made from the same plastic, very similar iPods and almost identical hand-operated tin openers. Where candidates pursued these very similar products, opportunities to compare and contrast them were minimal. Some centres failed to recognise the need to compare and contrast at all.

As part of this criterion, candidates are expected to compare and contrast two similar products using the technical specification they have developed when putting themselves into the product designer's place. Some candidates did this very well, but many simply described the two products without comparing and contrasting them against points of specification.

Criterion B - Materials and components

Most candidates scored in the mid range with some ease, but a large number of the candidates did not really consider wholly appropriate materials, many suggested materials were not appropriate to the product. In a number of cases the alternative were completely inappropriate and in the vast majority of these cases this was due to an unselective approach to the use of the Internet. Wholesale copying of information and then pasting onto sheets is not helpful and we need centres to discourage this from the outset as the structure of the vocabulary and language used often stands out from other work submitted by the same candidate.

When describing the environmental impact of using particular materials, the majority of responses were generic and superficial, usually mentioning energy use, depletion of resources and problems of disposal. A better focus would have been to consider extraction and processing of raw materials, processes when producing specific materials and disposal of specific products after their useful lifespan.

Criterion C - Manufacture

Too often candidates gave a general answer to this section, many candidates simply made a drawing of the method of manufacture and did not relate it to their product or part of their product. Some very effective chart documentation methods were used in the last section for advantages and disadvantages but in this section often abandoned. Where the processes were identified they were often very well answered. The alternative methods of production were sometimes neglected. An alternative form of manufacture should be stated, even if a covering justification of its lack of effectiveness was added. The majority of candidates dealt with the impact on the environment, although many slipped into talking about the material rather than the process. The justification of various printing processes tended to be given scant attention which was surprising for Graphic Candidates. In this section particularly, there was well spread evidence of plagiarism, where candidates had copied and pasted exemplar material from Edexcel's website and claimed it as their own.

Criterion D - Quality

In terms of this section of the assessment criteria, on the one hand it could be the easiest element of the product investigation, if the candidates had been taught to answer this section, but in many ways it offered the weakest answers. Many candidates struggled to understand what was required to achieve success.

Quality control was fully understood by the majority of candidates. With the mention of checks, measurements and alignment of colours the majority showed a good understanding of how control would be implemented. The real improvements came when they directly related their comment to the product rather than talking in general terms.

There was no clear understanding of Quality Assurance and what it meant for many. More could have been made of the BS and Kite mark etc or indeed of examples such as Tesco's silver label etc. The best candidates used the relevant BS numbers and explained how they were applicable to their chosen product. They also went on to talk about branding and brand loyalty arising from quality assurance.

Not many candidates were able to describe a Quality Assurance system for their product. The QA system exemplified on Edexcel's website for a glue gun was commonly plagiarised in its entirety.

Product Design

Criterion E - Design and development

There were some excellent examples of creative design seen in this assessment section, particularly where candidates were not constrained by having to manufacture what they had designed. There were few risk taking 'blue sky' designs, with the vast majority of centres setting topics that stayed within the safety zone of what they have been comfortable with in the past, or indeed adopting a resistant material approach to their designing. A significant number of centres adopted the approach of designing a product that would be manufactured later, which was disappointing as it is not in line with the ethos of the course and not what was hoped for from the candidates. However, candidates are not penalised for adopting this approach.

This was generally a strong section. Many produced a range of alternative ideas. Some centres entered more than one project, often to no real gain. Those that settled on a design early on were disadvantaged. They invariably failed to develop their idea to its potential, or show how they had thought about it, and produced the result from a series of small but incremental steps. The best all-round work came from candidates who added informed, succinct and useful annotation to designs, which demonstrated their understanding of materials and processes likely to be used in manufacture, and who presented summative evaluative statements focused on the set design criteria. In a number of cases the designs lacked some detail eg house designs that were simply exteriors need to show more complexity.

Development of a final design proposal varied from high quality to non-existent. Good levels of credit were achieved by candidates where they understood that development meant 'change', and that they should illustrate this by bringing together the best or most appropriate features of their design ideas into a coherent and refined final design proposal that met all of the design criteria.

For successful development there should be evidence of the final design proposal having moved on from an original idea through the results of graphical exploration and evaluation. It is not acceptable to simply take an initial idea and make superficial or cosmetic changes to it and then present it as a final developed proposal. Candidates should include as much detailed information on all aspects of their developed design as possible, as this is an opportunity to show knowledge and understanding of their design and make activities.

The use of modelling was an improvement on previous specifications and could help the candidates to be much more objective in the annotation that they submitted. This important aspect of design development should be used to test features such as proportions, scale, mechanical details, sub-systems etc. At the end of the development section, most candidates were able to produce a clear and detailed final design proposal that included some technical details of materials, processes, techniques, fixtures and fittings that would be used during product manufacture, but not many objectively evaluated the proposal against the design criteria.

Where CAD was used the results were often clearer and with greater resolution. Interestingly, where the CAD was used the degree of understanding of materials, processes and techniques was better. It may have been that through spending more time on a single design project more elements had been resolved. However, too often the final design was not significantly different from, or improved on, the early attempts. The best use of the CAD was to bring the work up to the standard where the product was capable of third party manufacture. A viable working drawing in orthographic was then invariably supported with an isometric derived from the orthographic. Interestingly many of the architectural modellers used the programme Google Sketch-up for this stage and to very good effect.

The evaluation of this section was not a feature that many candidates spent time on. Candidates should be encouraged, or at least well advised, to create a design specification at the outset of this task. That way they may more readily access the full annotation marks. Evaluative comment can then accompany the development of the section and the specification be used to objectively evaluate at the end. The design criteria sometimes appeared for the first time at the end, and it was often skimpy. Generally the better candidates covered this section with some pithy bullet points that could not have taken long to address. The justification of this section was invariably good when it was completed.

Criterion F - Communicate

Many candidates achieved good marks in this assessment section. Credit in this section can be gained from communication evidence throughout the design portfolio. However, the level of communication was very varied. The candidates, in some cases, had been coached to use a variety of media to good effect. It is important that centres realise that the non-use of CAD is no longer an option. To centres without this facility there are options of free downloadable software such as the use of Google Sketch Up, which can be easily utilised.

The use of CAD was often of high quality and the vast majority of candidates demonstrated expert skills in using CAD programs they were familiar with. There was good evidence of candidates producing drawings and enough information for a skilled third party to manufacture a designed product, but the quality and skills used varied greatly. A disappointing feature of this section was the widespread lack of basic

drawing ability. It was obvious that some centres had spent time on developing skills in drawing and this was reflected in the work presented by their candidates, but in many other instances, drawing and sketching was weak and lacking in precision.

Product manufacture

Criterion G - Production plan

candidates from centres familiar with the 'old' AS course scored well in this section, as in fact did the majority of candidates. Marks were readily accessible for information that included a sequence of production stages in the correct order, consideration of time and scale of production. Many candidates included health and safety and quality control, features which were not necessary, but added to the detail of the plan. This section was usually completed to a good standard. Detailed production plans of the manufactured product appeared in most folders, with support from Gantt charts, flow diagrams, working drawings and cutting lists. A diary was often given as supporting evidence, although this did not support the assessment in this section it was useful as a guide for criterion H.

Detailed times were commonly missing from the plans, often blocks of days, or lessons, were cited but considered to vague. We must see the candidates, in this section, using their understanding of materials and processes and not producing a record of manufacture; it must be planned in advance.

Criterion H - Making

Without doubt, this assessment section elicited the highest percentage of marks for most candidates from those available in any section. Many centres opted to set only one manufacturing task, which is acceptable. However, a significant number of these tasks used only a single material, which does not match the criteria for the higher levels of response despite being generously rewarded by centres. The assessment criterion states that a 'range' of appropriate materials must be selected and that candidates should work with a 'variety' of materials, processes and techniques. In order to fulfil these requirements, the use of at least two materials and processes must be evidenced. It is important to note that candidates for Graphic Products do not need to submit a 3 and 2d element for this submission, but where they did it no doubt supported the understanding of the theoretical elements involved in other parts of this course.

The majority of centres embraced the ethos of this section and set manufacturing tasks that allowed candidates to experience a range of materials, processes and techniques, planned to develop skills that candidates could call upon when designing and making their A2 project, and some high quality outcomes were seen. Most centres set two tasks and a few set three, which seemed to prove difficult to complete successfully in the time allowed.

There was often an excellent range of projects with a high level of making skills shown. However, on occasions the level of demand was wanting and candidates were thus unable to access the full range of marks. Where very tight single tasks were set and all candidates in a cohort were given the same detailed working

drawing, cutting list and materials, the outcomes were often difficult to differentiate between unless high quality photographs showing individual skill levels were provided. In much of the work presented, there were opportunities for candidates to make manufacturing decisions, such as choice of materials from those available in a centre, choice of joining techniques, use of certain processes, finishes etc, which would have given candidates more ownership of their work and helped in differentiation.

The Level of accuracy and precision needs to be in-built to the project selected. Using a laser for cutting and printing did mean that some of the projects were unable to show a full range of skills and techniques. The work produced was unquestionably of a good quality, but this is not within the spirit of the course or the exam or demonstrating arrange of skills and processes.

In general, marks awarded by centres in this assessment section were agreed during moderation, and where there were discrepancies between centre and moderator marks, this was often because candidates had not justified their selection of materials. Where candidates were given no choice of materials, for example when a task involved aluminium casting, they should still have an understanding of why that material was appropriate to the product under construction ie good strength to weight ratio, printability, fluidity for moulding, good light conductivity, etc. This information should be offered as justification. Where it was carried out successfully, justification of selection was evidenced through annotation of photographs of making or in the plan for production. Where photographic evidence was shown of the making it made it much easier to credit a range of making skills, techniques and materials. Safety awareness was invariably demonstrated through statements within the schedule of making.

Criterion I - Testing

To enable the evaluation and testing to take place with some value attached it is worth the centres putting together at the outset a specification for the projects undertaken. Candidates then should apply tests to the specification points and use this data to inform their evaluation of the product manufactured. The majority of candidates failed to earn full marks as they carried out an evaluation solely from a personal stand-point. Where third parties were involved, often with a questionnaire, results were fuller and more interesting in that they usually carried a broader spectrum of comment.

The use of photographic evidence was invaluable at this stage and often conveyed the outcomes or experiences of testing at a glance. Elements of the making could be reviewed at this stage to show difficulties or more often moulds, jigs and fixtures that had been used to ensure accuracy and precision.

**Principal Examiners Report, Summer 2009
GCE AS Design & Technology: Product Design
Graphic Products Unit 6GR02**

General

Many examiners reported that the quality of writing has deteriorated to such an extent that it has become very difficult to understand when combined with poor syntax. The space provided for answers in the exam paper should be more than adequate for candidates to put their answer in. The space also provides a good guide to how much is expected for an answer. Candidates having to go outside this area need to think whether their answers sufficiently concise or not. Frequently answers were rambling and because of this important points were missed.

Question 1(a)

Most candidates were able to identify advantages of using desktop publishing when producing card design ideas. Some mistakenly referred to the manufacturing of the card which was not what was required.

Question 1(b)

Generally a very well answered question. Candidates showed a clear understanding of the health and safety issues associated with working at a computer.

Question 1(c)

It was surprising that so many candidates failed to score any marks with this question. Very few appeared to have a full working knowledge of piezoelectric crystals.

Question 1(d)

As with question 1(c), very few candidates appeared to have a full working knowledge of phosphorescent pigments.

Question 2(a)i

Generally a well answered question. Many candidates failed to link “computer check” with colour consistency. Many were able to link colour bars with densitometers but failed to mention that the feedback to the computer can adjust the colour.

Question 2(a)ii

There were many good responses to this question, but a sizeable minority gave answers relating to colour bars again. Many candidates showed little knowledge of methods of quality control in high volume printing.

Question 2(b)i

Some very good responses to this question but frequently candidates gave an explanation of the answer. Describe questions require a statement and an explanation to go with the statement as the mark scheme shows.

Question 2(b)ii

There were very few answers that gained full marks. Many candidates failed to attempt the question at all. The majority gave answers that showed little knowledge of the subject but decided to make guesses at the process. Poor attempts at offset lithography, screen printing and some hybrid systems were offered gaining no marks.

Question 3(a)

The vast majority of candidates scored highly on this question showing a sound knowledge of the value of Styrofoam™ as a modelling material. Unsubstantiated statements such as lightweight or cheap gained no marks, examiners were looking for more such as “lightweight so easy to handle.”

Question 3(b)

Generally a very well answered question with a high proportion scoring 3 or 4 marks. Few scored full marks due to answers being repetitive and rambling and giving too much detail about a particular benefit and not covering a range of points adequately.

Question 3(c)

A large number of candidates gained full marks on this question. The qualities of the sketching varied considerably but as the marks were being awarded for specific interpretation of the given drawings and not for quality it allowed for maximum marks to be frequently awarded.

Question 4(a)i

Very few candidates were able to correctly identify a suitable polymer for vacuum forming.

Question 4(a)ii

Although many candidates scored highly on this question a sizeable minority either showed a limited knowledge of the vacuum forming process or no knowledge at all.

Question 4(b)

Candidates scored highly on this question. Most correctly identified the British standards kite mark symbol and the suitability for children symbol.

Candidates failed to identify that the CE sign was from European Common Market just that it was from Europe.

Question 4(c)

Candidates were clearly familiar with cartonboard as a material and its usage which allowed them to score highly but with few managing full marks. This was mainly due to and giving too much detail about a particular benefit and not covering a range of points adequately.

Question 5a

The majority of candidates were able to score half marks or more but few managed full marks showing a good understanding of the properties of expanded polystyrene. Notable errors included “it was a strong material and a good conductor of heat”.

Question 5(b)

This was a reasonably well answered question by many candidates correctly approaching an evaluating question by raising points for and against. Candidates often spent time comparing aluminium with other materials and not addressing the properties that made it fit for purpose or not. When answering this type of question candidates should remember that any statement must be justified. Consequently answering by bullet points will considerably reduce the marks awarded.

Statistics

			Grade Boundaries				
			A	B	C	D	E
Unit 6GR01	Raw Marks	90	73	64	56	48	40
	UMS	120	96	84	72	60	48

			Grade Boundaries				
			A	B	C	D	E
Unit 6GR02	Raw Marks	70	48	43	38	33	28
	UMS	80	64	56	48	40	32

Further copies of this publication are available from
Edexcel Publications, Adamsway, Mansfield, Notts, NG18 4FN

Telephone 01623 467467
Fax 01623 450481

Email publications@linneydirect.com

Order Code US021905 Summer 2009

For more information on Edexcel qualifications, please visit www.edexcel.com/quals

Edexcel Limited. Registered in England and Wales no.4496750
Registered Office: One90 High Holborn, London, WC1V 7BH