

Moderator's Report Principal Moderator Feedback

Summer 2018

Pearson Edexcel GCE Advanced Subsidiary
In D&T: Graphic Products (6GR01)

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The work seen in this the final year, was from a very small number of centres. It was again largely appropriate and met the assessment requirements of the unit. Almost all centres submitted work in three discernible sections, which were usually physically divided within one portfolio into product investigation, product development and product manufacture. This physical division of the sections often aided the candidates in recognizing the important differences in the individual assessments for each section.

Most marks were supported by appropriate annotation and this helped moderators when writing E9 feedback to centres. Again, 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.

This year electronic submissions were very much in the minority and the vast majority of work seen was in A3 portfolio format.

Product Investigation

In Product Investigation, candidates need to select a product that contains at least two materials and is manufactured using more than one process. They are required to investigate the selected product under the headings: performance analysis, materials and components, manufacture, and quality. Candidates, under teacher guidance have complete choice in selecting appropriate products for investigation. Work can be presented in either A4 or A3 format, however the vast majority of candidates submit in A3 format.

Despite a very formulaic approach to this section we commonly see adjustment from the highest assessment levels as candidate regularly fail to meet the requirements in the highest assessment criterion.

The work in this section tended to be well presented, with clear and useful balance between graphic and tabulated written format. Centres often use a template system to enable candidates to construct their thinking although if any errors are inherent then the entire class makes the same mistake. There are still a significant minority of centres utilising the same products for all their candidates. Whilst this is recognised as an easily managed system the work can often turn out to be formulaic and very similar. The utilisation of a wider range of products in the centre for this part of the submission often helps the centre to discover different products, manufacturing techniques, and processes; consequently, extending the knowledge base for commercial manufacturing processes and aiding understanding for the unit 2 examination. This section was generally well presented by schools, and the majority of centres followed a similar pattern of presentation.

The use of ICT helped candidates to organise and manage their work. Although the wholesale copying of information and then pasting onto sheets is not helpful; centres should discourage this practice from the outset, as the structure of the vocabulary and language used often stands out from other work submitted by the same candidate.

The best work was seen where candidates had disassembled products in order to analyse the component parts in detail or at the very least had used or handled the products. Some candidates used only photographs of products to investigate, which severely limited their experience in this section. In a small number of cases no image was offered at all for the product and the moderator was left in a difficult position to agree the accuracy of the work submitted.

Criterion A - Performance analysis

Even in these the last days of the qualification, many centres do not justify how the designer has met the specification points being raised by the candidates. It is all too common to see candidates listing specification points that the product has met but do not explain how they have been met. This is a key aspect of higher mark assessment. 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. A large number of candidates don't consider the commercial manufacturing process when justifying the shape of products; instead, tending to stick rather generically to the aesthetic or ergonomic properties. To state that a drinks bottle is shaped cylindrically to fit in your hand is not the whole story and some connection to the manufacturing requirements should be made, e.g. printing pressing; there are additional marks to be accessed through engagement with manufacturing processes. Similarly, some candidates failed to justify the materials properties in the materials section. Stating instead the choice of materials rather than the property requirements of the materials to do the specific job required, after all there is an entire section to follow to discuss choice of materials. Many candidates stated that there was a need for the product to perform in a certain way (advertise or seal easily etc.) but failed to state how this point was met, hence their likelihood of meeting the agreed assessment criterion was very limited.

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. The choice of a similar product to compare and contrast was again central to reaching the higher marks and many candidates missed the opportunity to consider this fully. Many candidates instead selected products that were too similar, such as a glass perfume bottle, compared to another make of glass perfume bottle. Where candidates pursued these very similar products, opportunities to compare and contrast were minimal. A minority of candidates didn't offer any information, or image, about their second product; therefore, it was difficult to see if the information in compare and contrast was indeed correct. The inclusion of images in this process allows the moderator to more easily approve centre marks.

Criterion B – Materials and components

This section is often the most successfully completed in the product investigation and the most accurately marked. The centres clearly have a good idea of what is required. The

performance this year is as previously described, dominated by the formulaic approach, which aids the clarity of communication but discourages creativity and real investigation in to the materials requirements. There were fewer instances of centres focusing on too many materials in a shallow way, most centres focused on products with about three different materials. A number of candidates missed out on the top marks by not directly relating the information to the product, and too few used good technical terms for the materials properties.

Advantages seem to be covered and disadvantages were often left to the readers own determination. Alternative materials were usually suggested, however their justification again failed to focus on the specific material properties to do the job required of the product. Where material alternatives are not obvious the candidate should return to the product to seek an alternative component or make a reasonable attempt at suggesting an alternative with justification for choice. It is not acceptable to state no alternative is available. If this is truly the only way forward, the product selected is probably inappropriate for this submission.

Sustainability was addressed by most candidates but again, often at a generalised or superficial level. Candidates sometimes failed to apply their analysis directly to their chosen product. 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.

Criterion C – Manufacture

It was again, rarely a problem for a candidate to identify a manufacturing process, but it was increasingly uncommon to see that process fully justified in terms of the need for the process in the products manufacture. There were a large number of entries that settled on a description of the manufacturing processes, indeed often copying wholesale from text or internet sources rather than justifying why the choice had been made. There was also an increase in missed opportunities to offer advantages and disadvantages against the chosen processes in this section. The biggest short coming for most candidates was still to not be able to state why injection moulding is the best manufacturing process for the screw top on the bottle, or why blow moulding is seen to be the most appropriate process for making the bottle itself.

The majority of candidates offered something to do with the impact on the environment, although many again slipped into talking about the material rather than the process of manufacture, and few really got to the heart of the issue in this section. In the more successful submissions, candidates had been encouraged to investigate the environmental impact of the manufacturing of the product, not just the production of materials.

Criterion D – Quality

This section is much improved and centres have clearly made some steps forward in the delivery of this section. The work submitted was largely correctly broken down into a whole process QA system, and then identifying individual QC steps within that process.

The process needs to be explained in terms of the entire manufacture of the product, giving examples of general checking and testing that would take place in the whole process from design to dispatch. Within the quality control examples it is not good enough just to say 'make sure that' or 'check that'. These points should already have been made in the QA process but the statements in the QC process should be specific and state how the quality control checks take place. Quality Standards are often exemplified by candidates but it is not so regularly explained in terms of how it helps maintain the quality of the product and what the manufacturers must do to obtain the specific standard. The requirement of gaining a standard marque through meeting a series of tests was often over-looked.

Product Design

In Product Design, candidates are required to submit at least one design task appropriate to the required levels of response, and in so doing, demonstrate their design competencies. They are encouraged to be as creative as possible, and to support this there is no requirement for the designed product to be manufactured, which means there are no constraints placed on designs through the limitations of manufacturing resources. Candidates have the option in Product Manufacture of making what they design as part of the manufacture section that follows.

During designing, candidates are expected to produce: a range of initial design ideas accompanied by technical annotation; a review of design ideas based on product specification requirements; and development of designs into a final design proposal, that includes details that would allow a skilled third party to manufacture the intended product.

This section was a better submission than it has been in previous years. The work was sometimes too simplistic and lacked detail and depth, but it tended to be accurately marked. At the higher levels the work sometimes lacked the detail for the higher marks asked, with a tendency to be more body styling than in depth designing.

Criterion E - Design and development

The work submitted in this section requires centres to submit alternative designs that are realistic and detailed. The candidates need to give themselves the opportunity to present information that sells their knowledge about a given topic, or technical aspect of a materials application or processes. Offering a new external shape for a building or a bottle gives little to talk about except style or form. Detail is applied through the discussion of the sub-systems in the design and how these factors would be overcome by the designer. 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 evaluative summary statements that focused on the set design criteria. Information about the key structural elements of a building and the materials/processes they would utilise are sought. As are the key additions found on moulded glass perfume bottles, such as embossed logos and the inclusion of gilding or metallic elements to enhance the bottle's

features, not to mention the various methods of enclosure or accessing methods for the perfume itself. This technical detail is sought, and indeed seen, in higher marked candidates, the use of sub-system considerations in the design work would help guide the use of this applied technology.

Development of a final design proposal varied from (a minority of) varied high quality explorations, to an explanation of what manufacturing will take place for a given product. Good levels of credit were achieved by candidates where they understood that development meant 'change'. This was illustrated 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. The work in this section was consistently reported to be disappointing by the moderators: too little change was taking place, modelling preceded the final design presentation, and was apparently included in many occasions just as a tick box exercise; it was rarely used to inform design decisions.

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 almost always evident, but ever increasingly not as a developmental tool. Too often it was offered at the end of the process to 'prove' the final design would work. Similarly, where CAD was used, often the final design was not significantly different from, or improved on, the early attempts. The best use of the CAD was to show clear changes, and make realistic presentations of how the changes will work in the final product, then assess them and choose the way forward to the final design. A viable working drawing in orthographic view was then invariably supported with a 3D presentation derived from the orthographic.

The evaluation of this section was completed well, the work was often formally evaluated at the end; the designs were often evaluated as they progressed, and centres often developed a formula approach to ensure this was completed. Evaluative commentary could then accompany the development of the section, as a result, the specification could be used to objectively evaluate at the end.

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. In some cases, candidates had been taught to use a variety of appropriate presentation techniques well. The use of CAD was widespread and often of high quality, many candidates demonstrated expert skills in using CAD programs they were familiar with. There was, again, insufficient evidence of candidates producing drawings and enough information for a skilled third party to manufacture a designed product. Where orthographic working drawings were produced,

these were very often generated automatically from 3D CAD sketches, which is acceptable.

Product manufacture

In Product Manufacture candidates are required to plan, make and test one or more products that match the manufacturing criteria of the task. If a single product is made, it must be manufactured using more than one material and process; and if more than one product is produced, the collective group must contain more than a single material and process. In this section of the portfolio, it is strongly recommended that teachers set the manufacturing tasks in order to ensure that candidates improve competencies and learn new skills in preparation for A2 tasks. It is a rule that where CAM is used, it must not exceed 50% of product manufacture. It is recommended that a range of products be submitted to enhance the range of advanced manufacturing skills on display. Where more than one product is made, planning and testing should only be evidenced once. It is not enough in this section to offer a range of manufacturing processes, but that range should be commensurate with AS level, the basic use of sander or glue gun, can hardly be considered as appropriate manufacturing processes; however, casting, clay work, complex mould making and laminating wood are more appropriate to the level, and therefore, will attract appropriate marks.

It is a requirement that clear photographic evidence is submitted that shows the quality and complexity of challenge, relating to all manufacturing tasks.

Making was the most productive element for most candidates in eliciting marks, and overall some very good standards were presented. Centres most commonly submitted work through a range of product outcomes, in the hope of increasing the range of advanced skills in evidence. The most successful centres usually offered two product outcomes, often from different graphical pathways, i.e. architecture and packaging. Some had found demanding projects that allowed for a very wide range of skills in the single outcome, such as a board game. Centres should note that the over-reliance on the use of 3D printing can restrict the range of making skills in evidence if it is wholly or largely 3D printed. This must be balanced with other modelling skills and the candidates must produce a range of skills, not just repeat the same ones. There are still occasions where centres rely too heavily on evidencing skills that are not demanding enough for GCE level: the placing of a given mould in the vacuum former, and its processing, cannot be compared to the candidate who has prepared a complex mould and added, for example, extraction holes and draft angles, to manufacture a quality vacuum formed output.

A major growth area in manufacturing is the undertaking of the class set project. Candidates can work from a given diagram or picture, but they must decide how to proceed in making the model; from deciding appropriate materials to the final processing and assembly of the product. The use of centre provided; jigs, patterns, templates and files, will significantly reduce the candidate's access to the top range of marks in this section. Clearly if a centre makes a net for a candidate to drop graphic images on, there is little in high level skills involved in this. Similarly, where candidates are instructed on how to manufacture, for example: being given instruction booklets, or told to use specific

jigs to aid manufacture/moulds to form around; then the work will not be credited to the candidate. This route through manufacturing must be carefully handled, with centres ensuring that all aspects of credited manufacture are the candidates own work.

Criterion G – Production plan

This section was usually completed to a good standard and accurately marked. Detailed production plans of the manufactured product appeared in most folders, with clear evidence of tools/processes chosen. A small number of centres do not offer a sequence of key deadlines. This is often most usefully delivered via a Gantt chart, with broad deadlines offered for key components. 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. There are also a minority of centres producing process statements in their plans that lack significant detail, statements such as 'turn bottle on lathe - 3hours' or 'make vacuum forming mould – 2 hours'. These give no indication that the candidate understands the rigors of the process being undertaken; which could be a cause for concern, and certainly lacks the detail required for the marks at the higher end of the scale. Detailed timings were occasionally missing from the plans, often blocks of days, or lessons, were cited but considered too vague.

Criterion H - Making

The work in this section was mostly leniently marked, with level of demand being the main issue that prevents the candidates from meeting their potential. It is not enough to simply collate a list of process completed, if those processes are simple basic steps that could be undertaken by a KS3 or 4 candidate. Some centres opted to set only one manufacturing task, which is acceptable; however, a significant number of these tasks used only a single material. This does not match the criteria for the higher levels of response despite being leniently assessed 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 fulfill 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 3D 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, and can enhance the range of skills seen in this section.

The majority (and increasing year on year) of centres embraced the ethos of this section and set manufacturing tasks that allowed candidates to experience a range of materials, processes and techniques. An approach planned to develop skills that candidates could call upon when designing and making their A2 project, additionally, some high quality outcomes were seen. Most centres set two tasks and a few set three, but one of these tended to be a paper based output such as a leaflet or advertising material. Some centres opted for a single yet complex product, such as a board game, with packaging, the playing pieces, board and cards/components in the game. It is possible to maintain level of demand with some products, if they have a range of processes that can be

recognised as more demanding, or involve the manufacture of jigs or moulds to make the product.

Naturally there were occasions when the level of demand was wanting, and candidates were thus unable to access the full range of marks. Where a centre set group tasks, the work was often structured too heavily for the candidates to access the full range of marks available. Candidates should only be given working drawings and should then be asked to establish their own choice of materials and production processes for the manufacture of the product. Yet again too many centres were not able to manage this situation satisfactorily and candidates all produced exactly the same products with no input from them about choice of materials, some even having cutting lists supplied by the centre. In these instances the candidates often did not live up to the high expectations placed upon them, especially in comparison to candidates who had negotiated their own manufacturing and choice 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, i.e. 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.

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 a range of skills and processes. It is vital that centres control the range of skills utilised in the manufacturing section, in order that candidates demonstrate a range of manufacturing processes. A simplistic guide is a 50/50 balance of CAM output to more traditional modelling skills. It should be noted that the use of a graphics manipulation package such as in the compilation of the external graphics on a packaged item, this will count towards the range of manufacturing skills.

Where photographic evidence was shown of the making it made it much easier to credit a range of making skills, techniques and materials. Additionally, the moderators would welcome a photographic manufacturing record for the 2nd or 3rd products manufactured, although there is no requirement to offer any other planning or testing paperwork for these items. Safety awareness was invariably demonstrated through statements within the schedule of making.

Criterion I – Testing

The submissions for this area were disappointing in their level of quality; many candidates are still completing subjective evaluations and leaving the testing as a minor aspect. Moderators have reported that tests are not being explained and evidenced as thoroughly as required, therefore, this is not feeding into the evaluations making them less realistic and focused. Centres need to be aware that a good range of tests should to be carried out and that these should be clearly explained, justified and put into context.

To enable the evaluation and testing to take place, with some value attached, it is worth the candidate 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. It was also a significant source of evidence of the use of third party testing, where this had not been evident elsewhere in the portfolio.