GCSE EXAMINERS' REPORTS

GCSE
DESIGN AND TECHNOLOGY

SUMMER 2023

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DESIGN AND TECHNOLOGY

GCSE

Summer 2023

UNIT 1 – ENGINEERING DESIGN

General Comments

The GCSE Engineering Design examination paper aimed to assess candidates' understanding of engineering design principles, problem-solving skills, and their ability to apply knowledge to practical scenarios. Encompassing mechanics, computer control, engineering manufacturing methods and materials as part of the comprehensive study provided in the specification, 2.1.2 In-depth knowledge and understanding. The cohort number for this course has dropped considerably since 2019 and it is concerning that centres in Wales are not embracing STEM based studying in Design & Technology.

The examination was well received by candidates and from the evidence seen it appears to be an accessible paper for most. With a positive increase of scripts totalling marks exceeding 50 of the available 100 marks, and fewer below 30 marks. Notably, question 5; the mechanics section emerged as a cohort-wide area of weaker performance. It consists of essential mathematical and scientific content within this course specification. Centres would benefit from more detailed focus within the specific technical subject matter that Engineering Design offers.

Comments on individual questions/sections

Q.1 The first question was attempted by all candidates and appeared to be accessible. Most candidates scored well on this question.

(a) Generally, answered correctly. Candidates could clearly recall information from their understanding of Life Cycle Analysis.

(b) Generally, well answered. Candidates were able to describe an advantage and disadvantage of the use of packaging.

(c) (i) This question was answered well in around half of the cohort papers. Candidates were able to explain the impact of batteries on the environment. Some answers should explain in greater detail to gain the maximum marks.

(ii) The majority of candidates were able to name a suitable alternative portable power source. A few candidates were only able to name a source with little or no description to support their understanding.

Q.2 These questions were accessible and attempted by all candidates. Candidates demonstrated an understanding of sustainable wind energy however, a few candidates lacked detail and explanation in some sections of the question.

(a) Nearly all candidates were able to suggest the importance of considering the location of the wind turbine. Some candidates would have benefitted by explaining the importance of their answers in more depth.

(b) Nearly all were able to recognise the four different parts of a wind turbine.

(c) Many candidates illustrated a good understanding of advantages and disadvantages of using wind turbines for the generation of electricity. Candidates demonstrated a greater understanding of the advantages compared to the disadvantages for this question.

Q.3 This question had a mixed response and appeared to be accessible by half of the candidates. Many answers demonstrated a good understanding of the sub-sections.

(a) Generally, a well answered question demonstrating some understanding of biometric devices and their advantages. It was evident that several candidates had some limited understanding of biometrics and communicated this with a lack of explanation.

(b) Most candidates were able to correctly judge whether the statements about biometrics were true or false.

(c) (i) Candidates could explain why copper and PVC were used for the cable of the biometric device. Several were able to recall that copper was a conductor of electricity, however only about half stated that PVC was an insulator or suggested any other physical or mechanical properties that would allow marks to be gained.

(ii) Some candidates were able to explain the disadvantages of using biometrics, however answers were limited and required additional explanation to gain full marks.

Q.4 This question appeared to be accessible by many candidates. Most candidates gave this question a fair attempt, but they failed to address the exact requirements of the question.

(a) Generally, the answer to this question were limited with many candidates focussing on aesthetics in detail and neglecting to analyse the social and environmental forces for the two products. Some candidates constructed a comprehensive analysis addressing such forces in detail with high quality written communication. Many candidates displayed some sound content, but most would benefit from planned extended written exercises to structure content more coherently.

(b) (i) About half of the cohort were able to recall the stages of the Product Life Cycle. Other candidates unfortunately, did not use the correct terminology.

(ii) The majority of candidates were able to demonstrate their understanding of the introduction stage of the Product Life Cycle with some accuracy. More detailed descriptions would enable candidates to obtain the full marks awarded.

(c) (i) About half of the candidates were able to offer enough detail to describe the term ‘obsolescence’. Some were awarded full marks, however others required more accurate description for full marks.

(ii) Only some candidates were able to explain an advantage of obsolescence of the headphones/earphones for the manufacturer. Many focussed of the advantages to the customer instead.

Q.5 This question was the least accessible to candidates with a mean mark of only 7.6. It was evident that many candidates failed to score well in several parts of this question, particularly regarding calculations, engineering manufacturing processes and material properties.

(a) (i) Many candidates were able to correctly recall the type of gear used in the adjustable spanner.

(ii) Most of the cohort were able to describe one advantage of the spanner in the image

(iii) Below half of the candidates were able to access full marks in this question. Many could make some basic justification of a type of process that would be used, however only some could state a correct and suitable manufacturing process.

(b) (i) Generally, candidates were able to identify the spanner with the greater mechanical advantage. About half could also describe a suitable reason for their choice.

(ii) Several candidates were able to gain some marks with the moments calculation question. Many candidates in the cohort did make some mistakes with calculations, the two most common were (a) dividing the length and force rather than multiplying, and (b) forgetting to convert the units of measurement from millimetres to metres.

(c) (i) Most candidates were awarded marks for describing the benefits of the cordless wrench.

(ii) Few candidates accessed full marks for the rotational speed of the chuck. However, some candidates were able to gain marks for gear ratio calculations.

(iii) Very few candidates provided information that was awarded marks. It was evident that there was not a substantial knowledge of the properties of high-speed steel (HSS) across the cohort.

Q.6. The final series of questions on the examination paper focused on control systems which included knowledge of materials and manufacturing processes. It was evident that some centres were more prepared for the engineering design specification 2.1.2 In-depth knowledge and understanding. All candidates attempted this question and were able to access some parts of Q.6.

(a) Several candidates were able to complete the sentences with the correct words.

(b) About half of the cohort were able to explain with detail the properties of polypropylene that make it a suitable material for the car bumper. Few offered enough information to access full marks for this question.

(c) Many candidates misread or misunderstood this question. Instead of evaluating the use of injection moulding, they explained the step-by-step process. Few candidates achieved higher marks in this question.

(i) Most candidates were able to answer this question correctly.

(ii) Again, few candidates demonstrated the ability to evaluate the use of automation when mass producing vehicles. Instead, many candidates focussed on explaining the benefits of this method of manufacturing. They gained marks for this, however very few candidates gained full marks.

(d) Most candidates were able to achieve marks for completing the flowchart. Marks awarded did range across the cohort, however the majority of candidates were awarded 7 of the 8 marks available. Most neglected to include a loop arrow from the 'Distance <40?' decision back to the start.

Summary of key points

- Candidates appeared to have a greater understanding of Design and Technology concepts and processes that overarch all three Design and Technology specialist areas, such as Life Cycle Analysis, sustainable energy etc.

- Generally, candidates' ability of basic factual recall is displayed across the cohort.

- Some centres were more prepared for the engineering design specification 2.1.2 In-depth knowledge and understanding.

General issues in candidates performance include:

- Limited knowledge and understanding of more engineering-based questions such as commercial manufacturing processes, physical and mechanical properties and mechanics including calculations. All of which encapsulate engineering design as a course and is present on the course specification 2.1.2 In-depth knowledge and understanding.

- Failure to offer greater explanation to a question to access full marks.

- Failure to read the question properly.

- The need to develop techniques of extended written communication.

DESIGN AND TECHNOLOGY

GCSE

Summer 2023

UNIT 1 FASHION & TEXTILES

General Comments

The style and structure of the 2023 GCSE Fashion and Textiles paper closely followed the established format for the current qualification and tested of a wide range of topics across the specification. To ensure accessibility, different types of questions were included from low tariff questions that rely mostly on recall to more challenging and demanding questions that require candidates to apply their knowledge and understanding in extended responses. With a number of past papers currently in existence and with the support of question banks, all candidates seemed familiar with the format of the paper.

The number of entries for this qualification is relatively low when compared to Product Design with the majority of candidates being female. With no evidence of any questions causing concern, the paper was considered accessible to most candidates. There was, however, a marked increase in the number of questions '*not attempted'* or only *'partially attempted*' with generally much weaker low-level responses overall. A significant number of candidates achieved a total mark below 40 and, in some cases well below, with very few achieving total marks above 65. This is not in line with past series. Advance information does not appear to have had any impact on candidate performance. Overall, this year's cohort were very much weaker and much less well prepared than in any previous series.

General weaknesses in candidate performance include:

- Failure to read and consider the whole question properly and thoughtfully.
- Repeating the stem of the question but failing to demonstrate a specific body of knowledge.
- Failure to '*explain*.' An '*explanation*' requires a fact and an elaboration of that fact.
- Not addressing the requirements of AO3 style questions – evaluate requires evidence of appraisal, analyse requires logical lines of reasoning.
- Subject specific technical knowledge is very weak.
- Writing with clarity and clear meaning; handwriting was not always legible.
- Rushing through the paper and failing to take advantage of the **full two hours** of examination time to consider and respond to the questions more thoughtfully!
- Significant increase in unnecessary doodling across papers.

Comments on individual questions/sections

Q.1 The mean mark for this question was just above half marks with a 100% attempt rate.

(a) (i) This low tariff question which relies on recall eased candidates into making a positive start to the paper, most were able to correctly identify the fibre from each of the sources pictured.

(ii) Most candidates were able to list the environmental benefits of the featured fibres; this is considered recall of facts but still worthy of some credit. Candidates who included reasoning within their response were awarded full marks.

(b) A more demanding question about the specific properties of bamboo and its suitability in clothing. Responses varied. Few candidates were able to name properties that are specific to bamboo most responses included strong, absorbent or soft, whilst correct did not demonstrate depth of knowledge. Marks awarded for the explanation depended on the named property. (c) Most candidates correctly identified chenille as the yarn pictured.

Q.2 The mean mark for this question fell well below half marks but at least all candidates attempted the question.

(a) Candidates who fully explained - fact and elaboration of said fact - why batch and mass production were suitable scales of production for the featured products gained full marks but were few in number. Some described features of each type of production but did not relate it to the products. Generally, more candidates understood why the T shirt would be mass produced.7

(b) Reponses varied to this question. Most candidates described the features of the thermal cool bag but did not explain anything about the functional requirement of the user. To reiterate listing facts is not an explanation. A few candidates missed the point that functional requirements were being tested not aesthetics. Most responses focused on the bag keeping food cool, but being thermal it would also keep food warm. This was a high tariff question that demanded some depth of knowledge and understanding in the response. Few gained full marks.

Q.3 Not all candidates attempted this question and with a very low mean mark the majority of candidates did not have the knowledge and skills to answer the question.

(a) There were no issues with this part question, most candidates were able to explain the processes of tie and dye and stencilling.

(b) (i) This question required some technical knowledge, but few were able to demonstrate it. In appliqué, reinforcing fabric with interfacing for example, stabilises the motif, makes it easier to stitch and achieve a good result. Very few knew this, consequently few gained full marks.

(ii) A more demanding question which challenged most candidates and yet again, full marks were rarely awarded. Most of the responses were superficial, focussing on just reusing scraps as an environmental benefit when the question is about more than that. Too many candidates focussed on the latter part of the question and overlooked the whole question.

(c) Explaining the term co-ordinated when referring to Laura Ashley print fabric was too challenging for a large number of candidates. Responses were often vague and did not explain. Once again full marks rarely awarded. Quite simply it's about linking a range of prints, stripes, geometrics and plain fabric through a common colour palette. Few understood this.

Q.4 This was the least accessible question on the paper with a mean mark closer to quarter of the available marks. Most candidates lacked technical knowledge to be able to maximise on the marks available. Some did not attempt this question.

(a) (i) A low tariff question that relies on recall. Most candidates were able to explain why binding is a suitable finish for the fleece fabric.

(ii) There were no issues with how to attach a binding to an edge. There were some excellent responses to this part question.

(b) (i) Many candidates lacked technical knowledge and did not recognise the knit diagram as weft knitting. This is basic information at GCSE level and simply was not known.

(ii) Most candidates gained some marks when describing advantages of wearing a knitted fabric but few included the technical detail expected at this level. Some referred to fleece in this part question when it is quite clearly tested in the next question. It is essential that candidates are taught the importance of reading the whole question before attempting to answer.

(c) An AO3 style question is demanding and set to challenge. Evaluate, in this question, requires evidence of appraisal in the response. Few candidates understand this consequently few gained full marks. On a more positive note, most candidates understood why brushing the fleece would support the function of the gilet.

(d) Another AO3 style question set to challenge knowledge and understanding. As analyse is the key word, responses need to be supported with logical lines of reasoning. Few candidates showed evidence of this skill in their responses. On a more positive note, most candidates demonstrated some knowledge and understanding about the life cycle of the fleece gilet. Some referred to sales and the product life cycle which was incorrect. Quality of written communication which was assessed in this question was mostly good.

Q.5 Yet again, the mean mark fell well below half marks for this question. Some candidates did not attempt the question.

(a) This question relied on recall of knowledge.

(i) Most candidates correctly identified biomimicry as the correct answer.

(ii) There were no issues with naming two sources which can be used to gain inspiration although vague and non-specific responses such as the internet were not credited.

(iii) This question was specifically about digitally printing directly on to fabric, few candidates understood this consequently few gained full marks. Most referred to generic advantages of using CAD/CAM. To reiterate an earlier point, candidates must be taught to read and consider the whole question before attempting a response.

(b) Analysing the effectiveness of Velcro as a fastening, another AO3 question, was mostly done well. The technicalities of using and applying this fastening were understood by most candidates.

(c) (i) A few candidates did not attempt to answer this part question, a simple labelling exercise relying on recall, missing out on critical marks as the labels were given.

(ii) Another AO3 question set to challenge, few candidates scored full or high marks as they simply described the diagram in (i). Detailed technical knowledge relating to the benefits of fabric which include a permeable membrane was lacking across the cohort. Please note, this type of fabric is not used in general sportswear as some candidates suggested.

Q.6 This was the second least accessible question on the paper with a mean mark well below half marks. Again, technical knowledge was very weak which inevitably meant candidates could not access the available marks. Some candidates did not attempt this question.

(a) (i) This part question relied on recall of basic textile knowledge. There were no issues with underlining the correct style details although some candidates could not name both.

(ii) Most candidates were able to explain the purpose of using pleats on the waist of the dress.

(iii) Most candidates were able to explain how pleat is formed. Overall, this part question was done well although a number of candidates did not attempt it.

(iv) Finishing a hemline on a textile product is considered basic technical knowledge, not many candidates achieved full marks here as most only offered half a response for example 'overlock it' which on its own, is not an acceptable finish.

(b) (i) A simple question that relies on mostly on recall. Most candidates correctly inserted colour into the first space but failed to fully explain the stimulus that would cause the reaction. Correct answers include 'change in temperature'. Candidates should be encouraged to check their answers more carefully to ensure the completed sentence makes sense.

(ii) Most candidates described an appropriate functional reason for using thermochromic thread on the dress although a few gave aesthetic reasons which was incorrect.

(iii) This question was more challenging and set to test technical knowledge, few achieved full marks. Mercerisation requires fabric to be soaked in caustic soda, few knew this. Whilst technically incorrect, credit was given for suggesting a chemical is applied, this could however apply to several other finishes. Detailed knowledge was not evident.

(c) (i) Most candidates correctly placed and drew the symbol for 'place on a fold'. Some did not attempt this question, other had the right placement but wrong symbol.

(ii) Most candidates correctly identified the seam line, and a few were able to elaborate on this. Some candidates did not attempt this question.

(d) Overall responses were quite disappointing for this question. Given they follow or at least should follow, an iterative process in the NEA it was surprising that a large percentage of candidates could not successfully answer this question. Full marks were rarely awarded.

Summary of key points

- Candidates need to be taught the full range of topics as listed in the full course specification, systematically and thoroughly throughout the two-year duration of the course. There were very obvious weaknesses in basic technical knowledge.
- Candidates need to understand command words, found at the beginning of a question and what level or type of response is expected. 'Explain' for example requires a fact and elaboration of the fact. It is not a list of different points.
- AO3 evaluate or analyse questions require a different type of response. Candidates need regular practice at answering these types of challenging and demanding questions.
- It is critically important that candidates consider the whole question before attempting an answer. Too often key elements are missed.
- Candidates need to be familiar with examination style questions and how to answer questions in a way that will enable them to maximise on the marks available.

This report should be read alongside the 2023, unit 1 paper and mark scheme. Centres are reminded of the item level data available on the WJEC secure website when they reflect on their candidates' performance. Centres are reminded to make use of the many digital resources that support the delivery of this GCSE Fashion and Textiles course, available on the main and secure WJEC websites. It is hoped that the feedback provided in this report will enable centres to reflect on the strategies and advice given to their candidates as they prepare for the 2024 examination.

DESIGN AND TECHNOLOGY

GCSE

Summer 2023

UNIT 1 – PRODUCT DESIGN

General Comments

The 2023 Product Design examination seems to have been well received. The evidence available suggests that the paper was a fair test for the candidates sitting the exam, in line with previous years. The total number sitting the exam remains stable but is slightly up on last years at 4138, 18% of candidates answered the exam through the medium of Welsh. The Item Level Data shows that the vast number of candidates attempted every question. Question 5 had the lowest attempt rate at just over 97%. This suggests that candidates were confident enough to offer a response to each part of the paper and that they were able to complete the exam in the time allocation. However, the overall picture from the exam is mixed. The mean mark for the paper was significantly lower than last year at 38% and only one question on the paper (Q4) gained a mean mark of 50% or more. The data available shows that question 5 caused candidates significant issues with many unable to access marks outside the lower mark categories. This year also saw an increase of candidates getting 10 marks or less (4%), 36 candidates (1%) didn't score any marks at all, a mixture of no attempts and incorrect responses. Up from last year's total of 9. All of this data suggests that the exam was not as accessible as previous years. This is a disappointing development given there was advanced information available to teachers about the 2023 examination.

Every attempt is made during the exam production process to make each examination accessible to all candidates, as has been the case in every year of the specification the exam is 'ramped' with questions designed to test to the entire cohorts knowledge and understanding of the subject, and after consideration of the school experience the candidate would have received post covid, the advanced information was produced and made available to all centres and teaching staff involved to aid in the teaching of the specification. The advanced information covered a large proportion of the exam but reviewing the data from the 2023 exam it is difficult to judge what impact this made to the performance of the candidates.

The exam requires candidates to evaluate and analyse products and materials across a range of different contexts. It was apparent however that a larger proportion than anticipated struggled to apply the knowledge and experience they had gained in a school environment and apply it to an examination context. More candidates than usual failed to read and understand the questions; there were many responses that required explanation or a description of a process or a material that were too brief and lacked depth and all too often were one-word answers. This limits the marks the candidates can be awarded for each response and is in part an explanation for such a low overall mean mark. Questions 2 and 3 are good examples of this issue. This may be a legacy of the pandemic and reduced contact time in school when the candidates were in the early years of their secondary education, as it seems that the quality and presentation of written communication has suffered, a development that occurred last year but was significantly worse during this year's paper, the legibility of some scripts was difficult to understand.

Comments on individual questions/sections

Q.1 This was attempted by virtually every candidate but produced only the 4th highest mean mark of the six questions. 3.7 out of 10, 38%

(a) Lots of candidates were able to score two marks here and gave satisfactory responses, as most were familiar with the term 'market pull'.
(b) This question drew some good answers, and it was clear to see from the responses which candidates had used anthropometric data in their NEA. Some confused anthropometrics and ergonomics but were still able to gain some credit.
(c) Many could give an economic benefit for the handle; few could correctly identify a social benefit.

Q.2 This question saw the highest attempt rate, most candidates are familiar with aluminum and its properties, and the question as a whole drew the third highest mean mark, despite there being some confused responses from some candidates about extrusion.

(a) Well answered by most, many gaining 3 or 4 marks. Most candidates were able to state that Aluminum is either lightweight or strong, which gained one mark. The better responses discussed the material's strength to weight ratio and explained why it being lighter benefited the bike carrier. Aluminums' resistance to some forms of corrosion was also given credit.
(b) This proved to be a hit or miss question. Those who knew what ABS was could answer the question, some combined the picture with the materials name and made a good effort in identifying two properties of ABS that made it suitable, some concentrated of the rubberised grip attached to the ABS and some repeated the responses they had given to part (a).
(c) This question drew some surprising responses. Most were able to identify two valid issues when using a solar bike light and accessed the higher mark categories. Others however, displayed a fundamental misunderstanding of how a solar light functioned. A large number of responses contained reference to the light not working if the sun was not out, suggesting the light came on only when the sun shone on it, and stated that the light wasn't needed in the day, rather than the light being recharged by the sun for use later when it went dark.
(d) This question saw some strong responses, but a number of candidates could not identify why the rack had two locks.
(e) One of the questions on the paper that caused candidates the most issues, only a small number of candidates could explain why the roof bars where manufactured using the extraction process

Q.3 This question can be split into two halves. Most where familiar with a power pack product and were able to answer the questions that asked them to explain why the power pack existed and review the accessories contained within it. The questions that required more analytical thinking of more in-depth knowledge at the back of the question caused more problems for candidates. Again over 99% of candidates attempted the question, but it drew the 4th highest mean mark at 38%.

(a) (i)(ii)(iii) All sections were well answered by most and the most accessible part of the question. It is clear candidates are familiar with this type of product.

(b) (i) Most candidates were able to give one good benefit for the LEDs
(ii) Some candidates struggled to come up with a limitation for the LEDs, although this question was answered well by most.

(c) (i) The word transparent was misunderstood by a lot of candidates, those who knew what transparent meant were able to access the higher mark bands.
(ii) Most candidates did not know what polycarbonate was or why it made a good material to use when injection molding.

(d) (i)(ii) Despite vac forming being a common workshop process it was clear that many had not experienced or had seen vac forming taking place, poorly answered and could perhaps be explained by the lack of time candidates had had in the school workshop in years 8 and 9. Highlighting some of the experiences they may have missed out on.

Q.4 This question proved to be the most accessible question within the paper, it drew the third lowest attempt rate but far and away the highest mean mark. Most sections of this question were answered satisfactorily. It is the only question on the paper to get a mean mark of over half at 55%.

(a) Lots of candidates where able to explain why the self-assembly goals were popular for pupils of primary school age.

(b) (i) It was clear that many centres had covered life cycle analysis and the majority of candidates were able to at least name the 4 stages of the LCA.
(ii) Whilst some explained what would happen for the manufacturer after point A, a pleasing number were able to articulate exactly what it meant for the manufacturer directly at point A on the life cycle analysis
(iii) The majority of candidates were able to identify that the product would be cheaper, some may not have been able to explain any more than that, lots were able to gain the full 2 marks here
(iv) Most were able to attempt and state a correct answer here. Those that were able to explain some of the options available to the manufacturer scored highly.

Q.5 This was the question with the lowest attempt rate and the lowest average mark on the paper 23%. All sections of this question required extended writing in some form. QWC was assessed in part c. The question really tested the candidates analytical thinking and evaluate the work of Dyson rather than describe one aspect of his work. Candidates' inability to form constructive and objective responses was clear.

(a) Many candidates chose to focus on one aspect of a Dyson product with many focusing on the ball of the hoover, rather than concentrating on why Dyson's products have such a large market appeal. Many were unable to access more than three marks when they focused on such a narrow part of Dyson's products.
(ii) On the whole this question drew some weak responses, many trying to explain that 'form follows function' was actually the other way around and went to great lengths to state that Dyson's products look better than they work. Similar to part (a) most failed to gain more than three marks.

(c) This was not a question directly about the Design Council but required candidates to draw parallels to the Councils mantra of "Discover, Define, Develop and Deliver' with their own iterative journey during their NEA.

It asked candidates to identify the inspiration behind the products, and how the designs they created had changed incrementally before deciding on and manufacturing a final product. Only a limited number of candidates were able to draw directly upon their experience completing their NEA and were then able to describe the iterative design process. In most cases candidates were able to access some marks, even in the most basic responses, but few gained more than 5 marks. The weakness of responses in this section stemmed from the inability of too many candidates to form an evaluative or analytical response that went into detail about how the designer had taken inspiration and added or changed through modelling and testing to create a final product. Responses in this section should be a piece of extended writing and this is where QWC is awarded, and the inability to articulate responses effectively in any depth has dragged the mean mark down. It has to be said that not all candidates struggled to answer this question, and some quality responses were seen.

Q.6 This paper's final question proved to be a little less accessible than anticipated, given the questions context of producing a basic product in a school setting using tools and equipment the vast majority of candidates should have been familiar with.

(a) (i) The vast majority of candidates were able to give at least one reason why the material could be considered sustainable. With many able to give two, allowing them to gain at least 3 marks out of 4.

(ii) Again, the many of candidates were able to give at least one reason why the material could be considered sustainable. With some able to give two, allowing them to gain at least half marks or slightly more. But given this was about laser cutting this is a disappointing statistic.

(iii) Candidates were able to show some understanding of how to engrave using a laser cutter but not enough were able to do it in enough detail to get full marks.

Summary of key points

- Failure to read and understand some of the questions properly.
- Candidates failure to 'explain.' and articulate themselves fully when more detailed or evaluative responses are required.
- Some candidates' poor written presentation throughout the exam, making more papers than anticipated almost illegible.
- High number of no attempts and incorrect responses.

DESIGN AND TECHNOLOGY

GCSE

Summer 2023

UNIT 2 – NEA – DESIGN AND MAKE

General Comments

The current academic year sees only the second full award of the GCSE Design and Technology qualification, with all adaptations removed since 2019. The majority of candidates follow the Product Design route with substantially fewer candidates entered for Fashion and Textiles and Engineering Design.

Following moderation, most centre marks were accepted as accurate with no adjustments made. Some centres will have had an adjustment applied to their marks. This is to bring all candidates into line with the national standard. A number of centres (49 for Product Design and 7 for Fashion and Textiles) however that were consistently generous across the sample will have a negative adjustment applied which will reduce the marks awarded to candidates accordingly. It is a concern that these centres did not apply the assessment criteria accurately with marks consistently awarded from the wrong bands, sometimes two bands adrift and where the evidence bore little resemblance to the descriptors within the selected bands. No adjustments were made in Engineering Design. It is a requirement that internal standardisation between teachers and focus areas, where appropriate, takes place. It is a concern that in some centres this clearly had not taken place or was entirely ineffective. The WJEC provides exemplar NEA projects, on the secure website, with sole aim of supporting centres in securing greater accuracy in assessment. Centres are strongly advised to access this valuable resource to support standardisation of assessment and to avoid having adjustments applied to their marks in future. Centre reports provide feedback on the sample presented at moderation and will outline the accuracy of assessment in respective centres.

Centres are reminded that a critical point of this assessment is that candidates take ownership of their work, that it represents a ‘personal journey’ and shows the iterative development of a fully functioning prototype that fully meets the needs, wants and values of the users. The emphasis should be on a ‘think – test – evaluate - rethink’ cyclic process where possible design ideas are tested, developed and refined against a clearly defined design specification. In a large percentage of centres, the NEA submissions did not reflect an iterative design process and in some centres the whole approach was teacher led.

Comments on individual questions/sections

(a) Identifying design possibilities – 10 marks

Candidates must in the first instance have access to all three contextual challenges, they can choose to analyse all three, two or even one but the critical point is that a range of problems/opportunities are identified which leads on to the identification of a broad range of problems, but it is their choice. Marks awarded in this section should reflect the range of opportunities/ problems that have been identified. Where candidates have only focussed on one problem or have a preconceived idea, a mark in a lower band is a better fit. It is also not acceptable for centres to choose a contextual challenge for the whole cohort to follow as appears to be the case in a minority of centres.

User needs and wants are a critical theme running throughout all the assessment strands and are a key consideration throughout the iterative process and in user-centred design. The identification of users was underdeveloped or simply unrealistic in many centres. Candidates will find engaging with a 'real' user or stakeholder far more beneficial than a celebrity for example. Interviewing a real user/stakeholder is a more effective means of understanding a problem rather than a generic questionnaire for example.

Centres are advised to guide candidates in apportioning their time according to the marks available. Research and investigation should reflect quality and relevance over quantity as this underpins the development of ideas and informs the final brief and specification. The work of professionals or companies should only be considered where it is appropriate, as stated in the assessment criteria. The work of designers for example should be used to inform ideas and not there to 'pad' out the work as is often the case. Mood boards should have a purpose rather than a collection of meaningless pictures. A leaner more focussed approach is recommended.

This area was generally assessed fairly in most centres, although the relevance and quality of the work produced should reflect the mark awarded, not the quantity.

(b) Developing a design brief and specification – 10 marks

In order to justify awarding marks in the top bands, candidates are required to consider a range of problems and outline a number of design briefs before focussing on one final brief. The final design brief should be arrived at following careful analysis of realistic research, their understanding of the problem and the task ahead which is crucial to the eventual success of the product. This approach was clearly understood in some centres and marks awarded were considered fair.
Sometimes lower achieving candidates have preconceived ideas of what they intend to make, other options are not explored. This approach narrows down their opportunities and marks that could potentially be awarded. For some centres this requires further consideration and development.
Criteria listed in the specification should derive from careful analysis of research and early testing and modelling of ideas. This was not the case in many centres where candidates produced generic lists of attributes – a 'wish list' with little or no reference to the research and investigation. In some specifications dimensions and cost simply '*appear'* with no reference to how these numeric values have been arrived at. Quantifiable, measurable criteria are critical aspects when evaluating the success of the final outcome. A robust specification should also indicate how the end product will be tested.
A well-developed design specification is an effective design tool that is used to drive design thinking and to evaluate ideas as they evolve. Only a minority, of mostly higher achieving candidates use the specification in this way but the vast majority do not therefore cannot access marks in the high mark range. This also impacts on potential marks that could be awarded in assessment strand (e).
Most centres assessed this strand fairly however some superficial and underdeveloped specifications were awarded high mark whereas a mark in a lower band, would have been more appropriate. Centres are advised to use the exemplar projects available on the secure website to gain a better understanding of applying the assessment criteria.

(c) Generating and developing design ideas – 30 marks

Candidates need to have a good understanding of the problem and a clear understanding of the needs and wants of users in order to create a solution that solves the identified problem. This is problematic for some if the problem hasn't been fully explored and reference to users is vague or even unrealistic.

Pre-conceived ideas or teacher led approaches also impede design. Initial ideas should be broad and wide ranging, supported by low-fidelity modelling which allows candidates to quickly identify the strengths and weaknesses of their ideas and gain a better understanding of the task ahead. This approach also helps candidates identify where more relevant targeted investigation is needed or where ideas need further development or rejection. As ideas evolve, higher fidelity modelling such as CAD should be introduced where appropriate. The specification is a design tool that should be used to drive development as well as consulting stakeholders/users; this is generally an area that requires much greater consideration and development in all endorsed areas.

In centres where the iterative process is understood outcomes were more successful, creative and imaginative, functioned as intended and generally met the needs and wants of users. High marks are fully justified here. However, in a number of centres candidates were over rewarded where there was scant evidence of development. A few sketches with a few CAD models for example do not equate to an iterative design process therefore high marks cannot be justified. Candidates should also be encouraged to physically test materials; construction processes and finishes as their ideas evolve and not simply record these factors as a 'textbook style' exercise within research. The best way to gain an understanding of materials and processes is to work with them! Technical details that relate to materials, dimensions, finishes and production techniques should also be considered alongside the development of ideas. This needs to be developed further in all focus areas and in most centres.

Candidates should be encouraged to record every aspect of their design journey as they progress through the iterative process. Design should be focussed, relevant and well-documented with clear evidence of analysis and evaluation of ideas, test pieces and models as ideas progress towards a final solution. It should be clear how candidates arrive at the final prototype stage. In many NEA submissions this journey was unclear.

Application of the assessment criteria for this section varied from mostly fair to over inflated and generous. Centres are reminded to carefully consider the assessment descriptors when applying marks and consult the exemplar NEAs for standardisation purposes when assessing work in future.

(d) Making a prototype – 30 marks

Candidates are required to present a logical sequence for the manufacture of their prototype. This should be in pre-emptive text that a third person would need to make the product. It should include a defined timeline as stated in the assessment criteria, health and safety considerations, constraints, and reference to end testing. Please note a pictorial diary of manufacture is not required.

Skills demonstrated, the quality and accuracy of outcomes varied. Many sophisticated and well-made outcomes were seen during the moderation week which met objectives, fully functioned and were worthy of being credited with marks in the top bands. Increasingly centres are embracing technology with modern manufacturing techniques such as 3D printing, as well as using more traditional methods. Candidates generally enjoy this aspect of the GCSE course, and this is evident during the moderation process. Most demonstrate good skills when using tools, equipment, and machinery though it is acknowledged that this cohort have had less experience in the workshop than in previous years. In some centres, inappropriate materials and processes were used, obviously this can limit the marks awarded. A small number of outcomes were presented in a partial or incomplete state. More worryingly, some candidates had been supported by non-specialist staff which is a concern as it is limiting for candidates.

Application of the assessment criteria for this strand varied from mostly accurate and fair to over inflated and very generous; high marks were often awarded where the assessment descriptor in at least the band or two bands below would have been a more appropriate fit. In order to justify awarding marks in bands 3 and 4, there must be high levels of accuracy and precision in all aspects of construction with attention paid to the quality of the finish. This is an area that some centres need to reflect on and reconsider as they move forward with future cohorts.

Centres are reminded to cross moderate internally, and especially across focus areas. The standardised approach prevents inconsistent application of the marking criteria.

(e) Evaluating a prototype's fitness for purpose – 20 marks

Evidence of on-going analysis and evaluation throughout the iterative journey can be credited within this assessment strand. In a minority of centres this was overlooked simply because the candidate had not submitted a summative evaluation. Where the iterative process is underdeveloped, lack of user interaction with little reference to the design specification for example, the opportunity to award marks here is reduced.

The quality of summative evaluations varied but many were quite well written in the form of a critical appraisal, with the design brief, specification, views of users and reference to end testing fully considered. More robust specification criteria would better support candidates in this area particularly with end testing against measurable criteria. End testing through user trials in situ is of paramount importance when gauging the success or otherwise of the final outcome. This should be evidence based so photographic images or a film of testing in situ are recommended. This is also an opportunity for further design. For most centres this area requires further consideration and development as it often appeared rushed, was incomplete and simple not included. Centres are advised to apportion time accordingly to this assessment strand particularly as up to 20 marks are potentially available here. Marks awarded were often generously applied in this assessment strand.

Summary of key points

- All assessment strands build on one another, with clear links throughout, one section informing the other.
- User needs and wants are critical throughout the iterative process, essential in user-centred design and to the eventual success of the prototype product.
- Understanding the problem is critical.
- Design specifications should include objective and realistic measurable criteria that can be used to drive design development.
- Modelling and testing of concepts, alongside on-going analysis and evaluation underpins the iterative process.
- Proportionate time needs to be spent on each assessment strand. Some candidates did not complete the final evaluations, or they were rushed; too much time spent elsewhere where activities were not relevant or focused.
- Greater accuracy in applying the assessment criteria. Banded assessment descriptors help determine the correct band where the most appropriate mark should be awarded and what the work deserves.

It is hoped that the feedback provided in this report will enable centres to reflect on the strategies and advice given to their candidates as they prepare for the 2024 non-examined assessment. Centres are reminded to make use of the many digital resources, freely available of the website, that support the delivery of this GCSE qualification in Design and Technology.

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