GCSE EXAMINERS' REPORT

GCSE
DESIGN AND TECHNOLOGY
Design and Technology in the 21st Century

SUMMER 2023

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DESIGN AND TECHNOLOGY

GCSE

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DESIGN AND TECHNOLOGY IN THE 21ST CENTURY

General Comments

Over 9,500 candidates sat this GCSE Eduqas Design and Technology paper - 99% of candidates did attempt all questions and it was pleasing to see almost all selected and answered just one Question 6. Fifty-three percent of candidates selected in-depth questions on Natural and Manufactured Timbers. Few chose Ferrous and Non-Ferrous Metals and Thermosetting and Thermoforming plastics.

There was a notable decline in technical knowledge, identifiable properties of materials and design and make processes founded within the design cycle. Question 6 answers and in-depth knowledge of selected materials, were below those expected at this level. The pandemic could well be the reasoning however, we encourage centres to access the vast array of resources available on the WJEC Secure Website to support their students in preparing for the examination paper.

Candidates now have a sound knowledge of sustainable issues associated with product design and these were the questions most easily accessed on the paper. The mathematic questions continue to be answered well by the candidates though, we do encourage centres to ensure all calculation workings are shown so as not to disadvantage those who make errors when calculating final answers; marks are now allocated for workings. Calculations involving percentages continue to perplex candidates and do need further practice.

Weaknesses continue to lie with knowledge of materials and their associated working properties. Candidates often guess a property or refer to the material's 'strength' or 'durability' without justifying how or why they are appropriate to the product being discussed. Expanding their knowledge of individual properties against a wide range of domestic products is required to ensure candidates can access these types of questions and attain full marks.

Preparing students for questions that relate to the design and make processes of the design cycle is encouraged. In addition, practice of banded and higher tariff questions is still encouraged. Few candidates are able to attain full marks for such questions as they fail to provide balanced and/or justified answers.

Comments on individual questions/sections

1. Design and Technology and our world.

Candidates are not fazed by the structure of the paper and started this year with a very good attempt rate for Question 1.

(a) Candidates were able to read the table presented to calculate the missing figures. Some did struggle to calculate how much cheaper the annual running costs were for an electric car. Candidates often find percentage calculations tricky. Further practice would be of benefit, encouraging them to show all their workings which some are still failing to do and are being penalised for not doing so.

Almost all candidates are familiar with non-renewable energy sources, successfully naming an alternative to crude oil as an example.

Few candidates understood the term 'market-pull', a term clearly listed and defined in the specification. A simple description was only required.

(b) The environmental and social impact of global manufacture is very familiar to the candidates, who provided a range of examples in their written text. Many tried to explain and justify answers provided but often failed to relate to car manufacture as highlighted in the stem of the question.

2. Materials Technology

Challenging questions on modern materials were attempted, with some good use of terminology in justifying answers provided.

(a) Candidates are very familiar with smart materials and found the completion of the table straightforward.

(b) It was felt few really understood the properties of a Shape Memory Alloy (SMA) although they used the image to attempt this question and with some success.

(c) Few candidates were aware of the properties of Glass Reinforced Plastic (GRP) and did not, in the majority of cases, refer to the composite properties. Candidates are familiar with surf boards so could identify suitable properties of GRP but did struggle to explain with clarity and reference to the composite properties required for this question.

Both Shape Memory Alloy (SMA) and Glass Reinforced Plastic (GRP) are listed as modern materials in the specification. Students should be very familiar with both of these materials, their properties and end uses.

(d) Glass Reinforced Plastic is a more sustainable material to manufacture but is difficult to recycle as separating the composites is difficult. Few candidates were able to reference sustainable qualities of this material referring to the properties only. Analysis, justifying responses provided, proved very challenging for most candidates. Further practice of these higher-level questions is required to ensure full marks can be gained.

3. Electronic Systems, Programmable Components and Mechanical Devices

This question was accessed well and become the most successfully completed question of the paper.

(a) Candidates read the question well to identify correctly from the image provided, a circuit board and the LEDs.

(b) Most candidates could identify another product that could use the components of a flashing light. Popular answers referenced components of a car, such as the indicators, taking inspiration from the question that followed. Candidates are familiar with flow charts often written in their NEA's so found this question very accessible. Much success was founded in identifying correctly the order the parking sensors would operate. Identifying the feedback route was less successfully answered so does need further practice.

(c) Very little problem was founded in calculating the gear ratio of the LEGO merry-go-round. Fewer candidates could calculate the number of rotations the merry-go- round would make if the handle was rotated three times. Very few candidates were successful in explaining the motion of a rack and pinion gear. The function of mechanical systems offering examples of each, are a prerequisite of the specification and need to become a focus in GCSE teachings.

4. Materials

Candidates are becoming more familiar with properties of a range of common materials used in product design, although those identified are still narrow and involve some guess work. Using the properties/characteristics of 'strong' and 'cheap' are not acceptable responses and often responses fail to refer to the materials being discussed. Knowledge of textile materials continues to be notable poor.

(a) The starter question was accessed well – most candidates could identify the weight of paper is measured in grams per square metre and that recycling paper results in weaker fibres. Answers provided for question (ii) rarely referred to the cell structure of the packaging that protects the product from impacts.

(b) All candidates attempted this question, but much guess work was employed, many candidates did not understand the characteristics of a deciduous tree. Most however, were able to describe why beech wood was a suitable material for the toothbrush though it was considered candidates used common sense to answer this question rather than understanding the true properties of beech wood. Reference was made most frequently to the durability of the wood when wet.

(c) Few identified the meaning of polyvinyl chloride (PVC) correctly but almost all could identify a suitable target market for the bag. Although candidates did not know the name of PVC, they could reflect upon the properties and discuss the suitability of the finish for the bag. Candidates justified their answers well referring to the protection this finish offers the contents of the bag. However, few candidates referenced nylon in their responses limiting the ability to gain the full 4 marks. The characteristics of knitted fabric are not well understood by candidates, few reference the stretchability afforded by knitted materials which would make it unsuitable for a bag.

(d) Candidates are familiar with non-ferrous materials, and most could state they do not contain iron. Some chose to identify a property of non-ferrous metals which was not awarded any marks. Aluminium, gold and brass were the most common materials identified as alternative non-ferrous metals suitable for jewellery. Most candidates referenced non-ferrous metals do not rust which make them suitable for jewellery, but they often failed to explain why this is a useful property. Developing answers to attain full marks needs further practice.

5. Generic Questions:

The least successfully answered question, with a lower completion rate.

(a) Some candidates failed to give a specific material for the product selected and some identified an unsuitable material. A poor response to (i) did not penalise candidates if answering (ii) with suitable properties. Many candidates failed to evaluate the properties they had selected limiting the marks that could be awarded. They also referenced – unsuitably – to sustainability.

(b) It was felt candidates understood the terms 'anthropometrics' and 'ergonomics'

(c) but could not apply their knowledge to the questions posed. As a consequence, these questions were not accessed well by a number of candidates. Those who were successful referred to measurement over aesthetics or appearance when identifying ergonomic considerations though struggled to evaluate the reasons for their selection. Most candidates understood the usefulness of disassembly, so answers provided were well described. Writing a short statement as a design brief proved difficult for many candidates who tended to write design specification criteria instead. Few were awarded the 2 marks available. This was surprising. Question 5 will, at times, refer to the design cycle and processes associated with NEA criteria.

(d) Candidates found drawing the letter E relatively easy and were able to calculate the total area of the letter drawn.

6. In-depth Knowledge

Almost all candidates were able to follow the instructions about selecting and answering just one material area. There was less consistency in answers provided from the different material areas this year – metals and plastics proved to be the less popular of materials selected and the least successful in marks awarded. There was a notably lack of knowledge of industrial equipment in all material areas but on the whole, candidates showed creativity when designing. There continues to be an improvement in structuring evaluative and analytical questions though they are still implicit rather explicit requiring more specific, rather than generic, examples.

7. Electronic Systems, Programmable Components and Mechanical Devices

(a) Most candidates could not identify the purpose of the notch on the IC. A few candidates identified the purpose as showing the location of the first pin. Candidates do need to be taught the importance of polarity when populating components to a circuit board.

When responding to this question, some candidates reflected on their experiences of populating circuit boards within the classroom. The resistor question was not well answered. The majority of the candidates could identify a resistor but could not correctly identify the purpose of colour bands on the resistor. Being prepared for the significance of colour coding needs to be known by future candidates. Most candidates provided generic responses when explaining the benefits of using circuit boards in manufacturing modern electronics – the cost-effectiveness, speed in manufacture, and more accessible, were common responses. Explanations or justifications were missing from most responses. Some candidates recognised the pillar drill when stating the name of the equipment used to create holes in the circuit board. However, some candidates could not name this very common piece of equipment. It would be helpful to encourage candidates to use technical terms within the in-depth sections of the paper. Candidates do need to be made aware of the functions of mechanical devices and how these can be used to produce different movements, changing the magnitude and direction of forces. Few answered question (a)(v) well choosing to draw two different sized pulleys, which was an incorrect response.

(b) Some candidates identified the correct minimum length of the circuit board but did not show all their workings and therefore missed out on maximum marks. Most candidates were not able to calculate the number of LED support pieces that could be cut from a sheet of plastic measuring 200cm x 90xm. However, some marks were allocated for presenting a correct part of their workings.

(c) Some candidates coherently analysed how the circuit boards could be manufactured ethically. Most answers referred to good working conditions and fair pay. A few candidates provided specific and relevant answers justifying the manufacture of circuit boards in an environmentally friendly way. Most responses to this question were too implicit and did not make explicit reference to the ethical use of circuit boards in electronic products. Candidates are expected to provide evidence of specific and relevant examples of products in the answers they provide.

(d) Most candidates' responses show partial knowledge of the need for testing and evaluating and focus on fault finding, saving time and money, and aspects of safety to improve the product. To gain higher marks, candidates must reflect on their experiences using CAD software packages to test circuit designs or employing their knowledge of repairing malfunctioning circuit boards.

7. Papers and Boards

(a) Many candidates were able to correctly identify an appropriate method used to create a shiny gloss finish on the packaging, and then continued to correctly identify a benefit of applying that finish. Many candidates were able to identify why tabs are used in the construction of the packaging, although many did not explain their suggestions to be awarded the 2 marks. Very few candidates were able to state the name of the equipment used to create a clean, sharp fold in packaging nets. Centres are advised to ensure that candidates are aware of a full range of tools used to create paper and board products, both in the school and the industrial environment.

Designing a cardboard insert to stop the Juicy Salif from moving around when it is in the packaging box was tricky for a number of candidates. It is recommended that candidates read the question carefully to ascertain what is being asked of them.
Successful responses had clear diagrams and annotations, the design was practical and functional. Weaker responses had unclear diagrams with few, if any, annotations/notes and the solution was not practical or functional.

(b) Most candidates were able to correctly select and calculate the length of side A; workings were included in answer provided. Most candidates were unable to calculate how many leaflets could be printed from a sheet that measured 1 metre x 1 metre – in previous papers, candidates have been able to complete this method of calculation. Many used an area calculation rather than working out how many fitted along the length and width of the sheet.

(c) Successful responses coherently analysed how the designer could ensure the packaging was produced in an ethical and environmentally friendly way and technical points were included. Many candidates however, focussed only on environmental rather than both environment and ethical factors. Practicing analytical style questions may help candidates access these high tariff questions more easily, ensuring Band 3 attainment.

(d) Successful responses demonstrated a good level of technical knowledge regarding the need for testing and evaluating that made judgements and evidenced the candidate's ability to evaluate, highlighting both advantages and disadvantages. Weaker responses made too few points or focused only on the advantages rather than providing a balanced argument required for evaluative answers.

8. Timber and Manufactured Boards

(a) Candidates easily identified a suitable finish to protect the toolbox. However, a number struggled to identify plywood as the material used to create the panels of the toolbox. Most candidates were able to state that glue and pins together creates a stronger, more durable join. Some failed to explain their answer by referencing the toolbox's use. A number of candidates could not state the correct name given to the try square as a piece of equipment used frequently (in the classroom). Designing a simple bird box, recycling the toolbox, was completed successfully and creatively. Candidates included both sketches and notes in their responses, many being awarded full marks. Weaker responses included unclear diagrams with few, if any, annotated notes. The solutions displayed did not use all the components of the toolbox and so were unimaginative and did not fulfil all the requirements of the question.

(b) Most candidates were able to correctly select and calculate the length of side A; workings were included in answer provided. Most candidates were unable to calculate how many bases could be cut from a sheet that measured 244cm x 122cm – in previous papers, candidates have been able to complete this method of calculation. Many used an area calculation rather than working out how many fitted along the length and width of the sheet.

(c) Successful responses coherently analysed how the designer could ensure the toolbox was produced in an ethical and environmental way and technical points were included. Most candidates managed to analyse both environmental and ethical factors in their responses, formulating a well-developed, logical chain of reasoning. Remembering to offer an argument for both advantages and/or disadvantages would ensure Band 3 requirements are always met.

(d) Successful responses demonstrated a good level of technical knowledge when discussing the need to test and evaluate during the processes of designing and making the toolbox. Candidates could successfully reference tests conducted within their classrooms. Some were able to highlight both the advantages and disadvantages to gain full marks. Weaker responses made too fewer points or focused only on testing rather than both testing and evaluation, not providing a balanced or detailed response to the question posed.

9. Metals: Ferrous and Non-Ferrous Metals

(a) The weakest set of responses were produced when answering questions from the Ferrous and Non-Ferrous metals Question 6. Most candidates referred to painting as a suitable finish for the toolbox, few referred to polishing or using clear lacquer. Dip coating was an acceptable response and one a few candidates suggested. Question (a)(ii) was not accessed well by candidates with a very small number being able to identify a process that could have been used to create the panels of the toolbox. Some candidates suggested rivets provided a join for the mild steel sheet, but most didn't recognise or understand a rivet is a component even though an image had been provided in the stem of question (a). Old leg callipers is a piece of equipment unfamiliar to candidates and few accessed this question successfully. Additionally, very few candidates showed an understanding of a drilling jig and therefore struggled to use notes and sketches to answer question (a)(v). Many candidates failed to attempt this question.

(b) Most candidates were able to correctly select and calculate the length of side A; workings were included in answer provided. Most candidates were unable to calculate how many bases could be cut from a sheet that measured 244cm x 122cm – in previous papers, candidates have been able to complete this method of calculation. Many used an area calculation rather than working out how many fitted along the length and width of the sheet.

(c) Some candidates coherently analysed how the toolbox could be manufactured ethically. Most answers referred to good working conditions and fair pay. A few candidates provided specific and relevant answers justifying how the manufacture of the toolboxes could be made in an environmental way. Most responses to this question were too implicit and did not make explicit reference to the toolbox's production. Candidates are expected to provide evidence of specific and relevant examples of production processes in the answers they provide.

(d) Candidates could reflect on their classroom experiences of testing and evaluating when responding to this question. Responses were broad and varied, although few could evaluate any disadvantages of testing and evaluating during the process of designing and making, limiting the ability to be awarded maximum marks and reaching Band 3 requirements.

10. Thermoforming and Thermosetting Polymers

(a) Most candidates were able to identify why polyethylene would be used to manufacture the Rubik's edge puzzle. However, many candidates were unable to identify an appropriate property of nylon which would make it suitable for a flexible ball joint.
It is encouraged that the full range of polymers and their properties are questioned and rehearsed from the in-depth section of the specification.
Most candidates were able to correctly explain why the Rubik's edge puzzle used flexible ball joints, accurately relating to the function of the product.
Many candidates did not correctly identify Injection Moulding equipment. The creative design question was poorly answered; candidates seemed unfamiliar with blister packaging and how it would be vacuum formed. More practice answering technical process questions is recommended.

(b) Candidates were able to correctly calculate the minimum length of material needed for side A of the display stand. Most candidates, however, were unable to calculate the number of sticker sets that could be printed from a length of vinyl - many used an area calculation rather than working out how many could fit along the length and width of material.

(c) Successful responses coherently analysed how the designer could ensure the Rubik's Edge Puzzle was produced in an ethical and environmentally friendly way. There was a good number of technical points. Many candidates however, focussed only on environmental rather than both environment and ethical factors. Practicing analytical style questions may help candidates access these high tariff questions more easily, ensuring Band 3 attainment.

(d) Successful responses demonstrated a good level of technical knowledge regarding the need for testing and evaluating that made judgements and evidenced the candidates' ability to evaluate, highlighting both advantages and disadvantages. Weaker responses made too few points or focused only on advantages. Weaker responses made too few points or focused only on the advantages rather than providing a balanced argument required for evaluative answers.

11. Fibres and Textiles

(a) Most candidates recognised tie dye as the dye pattern effect shown on the t-shirt image and knew elastic bands are frequently used to resist the dye. Few understood the benefits of Flat-Fell seams in clothing construction. Most referenced comfort rather than the durability of this seam type or that it encases the raw edges of the fabric. Understanding the purpose and characteristics of the main seams used in clothing construction is important and is best understood by sampling these seams in the classroom. A round blade/knife, used to cut knitted fabric in industry, was not recognised by many candidates even though identified specifically as an example in the specification. Candidates design creatively which was evident when asked to design a simple shopping bag, reusing a t-shirt. Most were able to sketch an idea and annotate with notes to explain their design thinking. Both notes and sketches were required to attain the 4 marks available and encouraging candidates to read the requirements of the question is recommended.

(b) Most candidates chose to add the length of the t-shirt to the length of the sleeve to arrive at the correct answer of 74cm. Any candidates who chose to calculate using the neck rib measurements were also awarded the marks. Almost all candidates accessed the marks for this question.

Very few candidates were able to calculate the number of pattern pieces that could be cut from a length of fabric measuring 200cm x 90cm – most attempted this question dividing the area of the rib into the area of the material length, which is an incorrect method of calculation.

(c) Candidates are well rehearsed in discussing ethical and environmental considerations during product manufacture. Answers, however, were quite narrow, focusing on carbon footprint in transportation and poor working conditions/pay of employees. It is recommended reviewing the mark scheme, using it to help broaden candidates understanding of the extensive range of ethical and environmental issues associated with the textile industry. Coherency with an ability to analyse examples provided in written text is improving year on year with maximum marks becoming more attainable. Less able responses failed to expand on their initial points to form a detailed, coherent discussion.

(d) Candidates could reflect on their classroom experiences of testing and evaluating when responding to this question. Responses were broad and varied, although few could evaluate any disadvantages of testing and evaluating during the process of designing and making, limiting the ability to be awarded maximum marks and reaching Band 3 requirements.

Summary of key points

The main areas candidates could improve attainment:

- Becoming familiar with the specification and in particular the amplification of content honing in on technical words/skills and processes.
- Becoming more familiar with a broader range of properties and characteristics associated with the specification materials, avoiding reference to ‘strong’ and ‘cheap’.
- Practicing questions that require developed and justified answers – using the Question Bank on the Eduqas website should help.
- Ensure natural, synthetic, blended and mixed fibres, and woven, non-woven and knitted textiles are fully taught to prepare all candidates for exam success.
- Becoming familiar with industrial equipment used in product manufacturing.
- Practice answering questions that can reflect on both positives and negatives, advantages and disadvantages. This will help attain Band 3 of the in-depth higher tariff questions.
- Using the resources available on both the WJEC Secure Website that include past papers and CPD PowerPoints and the teaching resources on the Eduqas D&T website.

I hope the feedback provided above will help centres to prepare for the 2024 examination season.

DESIGN AND TECHNOLOGY

GCSE

Summer 2023

COMPONENT 2 – NEA – DESIGN AND MAKE

General Comments

This academic year sees only the second full award of the GCSE Design and Technology qualification, with all adaptations removed, since 2019. The number of centres examining through Eduqas continues to grow with a significant increase in new centres in 2023 with entries this year exceeding 9,500. External moderation through centre visits continues to be well received by most centres and is overall, a positive experience.

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 few centres had a positive adjustment applied to their original marks as a result of candidates not being fully rewarded for the work produced. A significant number of centres 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, often two bands adrift and where the evidence bore no resemblance to the descriptors within the selected bands. It is a requirement that internal standardisation between teachers/material areas takes place. It is concerning that in some centres this clearly had not taken place or was entirely ineffective.

The WJEC/Eduqas 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.

Most centres guide their candidates to produce creative and innovative work that solves realistic problems and reflects an effective iterative process; these centres should be commended for their efforts. However, there is a significant increase in the number of teacher led/ formulaic approaches to the non-examined assessment that do not represent an iterative process. Some centres provide a structured format or folio template to complete the NEA task. This should be avoided as this guidance will limit the mark awarded to the candidate.

Centres are reminded that a critical feature 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 this process.

Comments on individual questions/sections

(a) Identifying and investigating design possibilities – 10 marks

Candidates must in the first instance have access to all three contextual challenges, they might however choose to analyse all three, two or even one but the critical point is that a range of problems/opportunities are identified which leads to the identification of a broad range of problems, but it is their choice. It is 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. Where candidates focus on one problem or have preconceived ideas, a mark in a lower band is more appropriate.

User needs and wants are an important theme running throughout all the assessment strands, and are a key consideration in user-centred design and throughout the iterative process. 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

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 '*appeared'* with no reference to how these numeric values had 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, sometimes two bands below 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 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 high-fidelity modelling such as CAD should be introduced. 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 centres where the iterative process is strong 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 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 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. For many this was not the case.

Application of the assessment criteria for this section varied from mostly fair to over inflated and very 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) Manufacturing 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; it does not represent a sequence for manufacture.

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 in the work produced. 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 can be very 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. Centres are reminded to cross moderate internally, and especially where candidates produce multi material outcomes. A standardised approach prevents inconsistent application of the marking criteria.

(e) Analysing and evaluating design decisions and prototypes - 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, 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. 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 and essential to the eventual success of the prototype product.
- A full understanding of the problem to be solved 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 free digital resources, available of the main website that support the delivery of this GCSE qualification in Design and Technology.

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