



GCSE Examiners' Report

Design and Technology
GCSE
Summer 2024

Introduction

Our Principal examiners' report provides valuable feedback on the recent assessment series. It has been written by our Principal Examiners and Principal Moderators after the completion of marking and moderation, and details how candidates have performed in each unit.

This report opens with a summary of candidates' performance, including the assessment objectives/skills/topics/themes being tested, and highlights the characteristics of successful performance and where performance could be improved. It then looks in detail at each unit, pinpointing aspects that proved challenging to some candidates and suggesting some reasons as to why that might be.¹

The information found in this report provides valuable insight for practitioners to support their teaching and learning activity. We would also encourage practitioners to share this document – in its entirety or in part – with their learners to help with exam preparation, to understand how to avoid pitfalls and to add to their revision toolbox.

Further support

Document	Description	Link
Professional Learning / CPD	WJEC offers an extensive programme of online and face-to-face Professional Learning events. Access interactive feedback, review example candidate responses, gain practical ideas for the classroom and put questions to our dedicated team by registering for one of our events here.	https://www.wjec.co.uk/home/professional-learning/
Past papers	Access the bank of past papers for this qualification, including the most recent assessments. Please note that we do not make past papers available on the public website until 12 months after the examination.	Portal by WJEC or on the WJEC subject page
Grade boundary information	Grade boundaries are the minimum number of marks needed to achieve each grade. For unitised specifications grade boundaries are expressed on a Uniform Mark Scale (UMS). UMS grade boundaries remain the same every year as the range of UMS mark percentages allocated to a particular grade does not change. UMS grade boundaries are published at overall subject and unit level. For linear specifications, a single grade is awarded for the subject, rather than for each unit that contributes towards the overall grade. Grade boundaries are published on results day.	For unitised specifications click here: Results, Grade Boundaries and PRS (wjec.co.uk)

¹ Please note that where overall performance on a question/question part was considered good, with no particular areas to highlight, these questions have not been included in the report.

Exam Results Analysis	WJEC provides information to examination centres via the WJEC Portal. This is restricted to centre staff only. Access is granted to centre staff by the Examinations Officer at the centre.	Portal by WJEC
Classroom Resources	Access our extensive range of FREE classroom resources, including blended learning materials, exam walk-throughs and knowledge organisers to support teaching and learning.	https://resources.wjec.co.uk/
Bank of Professional Learning materials	Access our bank of Professional Learning materials from previous events from our secure website and additional pre-recorded materials available in the public domain.	Portal by WJEC or on the WJEC subject page.
Become an examiner with WJEC.	We are always looking to recruit new examiners or moderators. These opportunities can provide you with valuable insight into the assessment process, enhance your skill set, increase your understanding of your subject and inform your teaching.	Become an Examiner WJEC

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Executive Summary

PRODUCT DESIGN

The 2024 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, and once again in line with previous years. The total number sitting the exam remains stable but is slightly down on last year's entry. From the papers marked there seems to be a very high attempt rate for each question. 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. There is an increase in the number of candidates getting some of the more straight forward questions wrong particularly as the paper progresses. This was not so evident in 2023.

FASHION & TEXTILES

The style, structure and demand of the 2024 GCSE Fashion and Textiles paper closely followed the established format for the current qualification. The number of entries is relatively low with the majority being female.

Topics were drawn from across the specification with questions set to test candidates' knowledge and understanding acquired over the two-year period of study. 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 required candidates to demonstrate and apply detailed knowledge and understanding in extended responses.

With no evidence of any questions causing concern, the paper was considered accessible however, there was a considerable increase in the number of questions '**not attempted**' and '**partially attempted**' with generally much weaker low-level superficial 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 60. Candidate performance is similar to 2023 but does not reflect performance in 2019 (pre pandemic). Overall, this year's cohort were very much weaker and much less well prepared than in any other previous series.

Candidates who achieved high marks across the paper carefully consider the context of each question, constructed well considered responses, wrote with clarity particularly for the four AO3 questions and demonstrated good understanding of subject specific technical principles as well as overarching principles. These candidates were well prepared for the examination and should be commended for their efforts.

Weaknesses in candidate performance were consistent with past series and have all been highlighted previously. These include failure to read and consider the whole question properly and thoughtfully before attempting a response, repeating the stem of the question but failing to demonstrate a specific body of knowledge and rushing through the paper and failing to take advantage of the full **two hours** of examination time.

Some candidates do not appear to have been taught the full range of topics as listed in the full course specification. There were very obvious weaknesses in very basic technical knowledge – pattern markings, forming gathers and appliqué for example. A number of candidates do not understand command words, found at the beginning of a question and what level or type of response is expected. AO3 evaluate or analyse questions in particular require a different type of response. Candidates are not able to answer these types of challenging and demanding questions effectively to enable them to access top marks. Candidates should be reminded to consider the whole question and context before attempting an answer. Too often key elements are missed.

ENGINEERING DESIGN

The 2024 GCSE Engineering Design examination aimed to challenge candidates' comprehension of core engineering principles, problem-solving skills, and practical application abilities. The exam questions covered topics such as CNC manufacturing, ergonomic design, material properties, safety analysis, mechanical systems, and control systems, in accordance with specification 2.1.2 In-depth knowledge and understanding.

Despite the ongoing decline in cohort numbers, the performance demonstrated a diverse range of understanding and skills across different sections of the paper.

Overall, the examination was well-received, with candidates generally able to engage with the questions, although some areas highlighted the need for additional focus and exam technique training.

UNIT 2 – NEA

The requirements of the non-examined task (NEA) are now well established in most centres across Wales. In all three focus areas there was evidence of high quality innovative and creative outcomes alongside well-organised portfolios. Product Design has the largest numbers of entries, Fashion and Textiles and Engineering Design have much smaller entries.

Many of the issues outlined in this interim report have been raised previously. It is a concern that they have not been addressed by a significant number of centres. The main issue is the inaccuracy of applying the assessment criteria. Following moderation, most centre marks were accepted as accurate however some centres had an adjustment applied to their marks. These centres were considered generous across the sample and assessment strands. In Product Design this equated to 17% of centres and 13% for Fashion and Textiles. No adjustments were made in Engineering Design. Despite the WJEC publishing exemplar projects on the secure website for the sole purpose of securing greater accuracy in assessment it is apparent these are not being used.

Within NEA submissions areas that require further improvement remain consistent with previous years. Research / investigation needs to be more focused. Too much time is spent on this section but does not necessarily support candidates' design thinking. User needs and wants are central to the design process, but choice of user is often unrealistic. Whilst some candidates develop meaningful specifications others are undeveloped with criteria that seemingly 'appears'. Measurable criteria need refining. Application of assessment in the first two strands is mostly fair.

An important characteristic of an iterative design process is the incremental development through modelling and testing of ideas through to a successful outcome. Whilst this is well established in some centres it remains underdeveloped in others. It should be clear how each model or test piece improves an idea. In many centres this is not the case. Application of the assessment criteria is often generously applied in this area.

Application of the assessment criteria for 'making a prototype' varied from mostly accurate and fair to over inflated and very generous. 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. 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. This is an area that some centres need to reflect on and reconsider as they move forward with future cohorts.

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. For most centres this area requires further consideration and development as it often appeared rushed, was incomplete or simply not included.

Areas for improvement	Classroom resources	Brief description of resource
Reading the question carefully particularly in AO3 Analyse and Evaluate high tariff questions and providing an answer that fully reflects the question.	WJEC Educational Resources Website	Knowledge organisers and focus area specific blended learning resources.
Avoid presenting stock answers/prepared answers about particular topics as these do not answer extended questions fully.	Question Bank	Question Bank is a free tool which allows you to create practice question papers from thousands of WJEC past paper questions. Find the questions you need, add them to your paper and export your paper with accompanying mark scheme and examiner's comments as a PDF ready to use in the classroom.
Many candidates produce repetitive answers that duplicate the same point multiple time. This does not gain any additional credit.	Exam Walk Throughs	Aimed at learners, these materials offer practical hints and tips on how to effectively approach questions in examination papers and preparing for NEA.

DESIGN AND TECHNOLOGY

GCSE

Summer 2024

UNIT 1 – PRODUCT DESIGN

Overview of the Unit

The 2024 Product Design examination was well received. The paper was a fair test for the candidates sitting the exam, and once again in line with previous years in terms of demand and challenge. Again, questions are set in context, and the question content remain unpredictable. The total number sitting the exam remains stable but is slightly down on last year's entry. Each question had a high attempt rate with question 1 receiving the highest and question 6 still receiving an attempt rate above 96%. This suggests that candidates were confident enough to offer responses to each part of the paper and that they were able to complete the exam in the time allocation. However, the overall picture for each question of the exam is mixed. The mean mark for the paper is lower than 2023, and no question on the paper had a mean mark above 50% which is a concern. There was an increase in candidates getting some of the straightforward questions wrong this year particularly as the paper developed.

Questions 1 through 3 were generally well answered. And the first half of the paper had the highest attempt rates and 2 out of the three questions (1&3) had the highest mean marks on the paper.

Comments on individual questions/sections

- Q.1** Most candidates were able to analyse the cardboard food packaging well, there was a tendency in some cases to confuse biodegradable and recycled but outside of this most candidates were able to answer the questions in a well thought out and analytical manner. Question 1 had the highest mean mark on the paper, this however was still below 50%, which demonstrates why the mean mark for this year's paper is lower than the 2023 paper.
- Q.2** This was the most challenging question of the opening half of the exam. Candidates could describe the environmental benefits of repurposing the parts of bikes and cars and could relate them to the target market which was a big leap forward from last year. However, many struggled to explain the economic benefits of doing this and preferred to double down on the environmental benefits, of reusing the parts, ignoring the question being asked. Question 2 had the joint second highest attempt rate on the paper but the second lowest mean mark.
- Q.3** This question was a straight forward product analysis question, and it seemed to be accessible to most candidates however the trend seen in recent exams of candidates getting some straight forward sections of the question wrong was repeated here with candidates struggling to identify the purpose of the magnet that keeps the doors of the drier shut; and the purpose of the u-shaped features was a difficult concept for some to grasp. Question 3 had the second highest mean mark on the paper although this was below 40% from the joint second highest attempt rate.

Q.4 Some of the biggest issues candidates had, were with Question 4. Many candidates were unable to explain why the bottle could be considered ergonomic; a popular answer being “because it is made from recycled polymer”. This is concerning given that ergonomics and anthropometrics are a basic and fundamental part of designing any product. The middle section of the question particularly the range of colours and Trustpilot questions were well answered and will have boosted the mean mark for the question, however the last part of the question was possibly the part that caused candidates the most issues, there was a very high number of candidates who did not attempt a response to the ‘additive processes’ question or just guessed what the question was referring to.

There will never be a question in the exam that comes from outside of the specification. It is clear that ‘addition’ appears in the specification under processes, additive processes is also heavily covered in the blended learning resources produced by the board, so it can only be speculated that the change of tense to “additive’ has caused the problems observed, unless the entire Specification is not being covered by some. The pattern of candidates having a problem with the final part of this questions were obvious from Centre to Centre. Despite these obvious problems Question 4 had the third highest mean mark on the paper, however this was still well below 40%.

Q.5 Question 5 highlighted a recurring problem. Candidates struggled to explain fully how the smart speaker was produced using the ‘user centered design’ principle. A principle that should be widely used when candidates complete their NEA. The exam requires candidates to evaluate and analyse products and materials or principles from across a range of different contexts. It is often apparent however that a high proportion of Product Design candidates often struggle to apply the knowledge and experience they had gained in a school environment to an examination context. Question 5 had the lowest attempt rate on the paper.

Q.6 The trend of candidates struggling to apply knowledge gained in a practical situation is further borne out with the final question on the paper. Candidates were often unable to identify the properties of MDF, or what the pilot holes were and what the tool path was with many relating the red and black lines to a laser cutter. This question despite having a high attempt rate had a very low mean mark which barely made it above 25%, the lowest on the 2024 exam.

Summary of Key Points

- One theme that continues to prevail sadly since 2019 is the quality and presentation of written communication, the legibility of some scripts was difficult to understand.
- It is clearly evident that candidates do not prepare well for the exam on the whole. The overall performance is weaker year on year.
- Candidates do not read the question and compose their answer accordingly – often they write all they know about a topic, which does not answer the question and scores poorly.
- Practicing exam style questions, especially AO3 Analyse and Evaluate questions would benefit all candidates. Using the Question Bank resource, past papers and the Exam Walk Through would benefit all candidates
- Responses should reflect the high to low mark tariff accordingly. Responses for 1 mark questions should be brief, but 5 mark questions require extended and detailed responses.

DESIGN AND TECHNOLOGY

GCSE

Summer 2024

UNIT 1 – FASHION & TEXTILES

Overview of the Unit

The 2024 Fashion and Textiles examination paper closely followed the established format for this qualification in style, structure and demand. Topics were drawn from across the specification and questions set to test candidates' knowledge and understanding acquired over the two-year period of study. 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 demonstrate and apply detailed knowledge and understanding in extended responses.

The number of entries is relatively low when compared to Product Design. The majority of candidates are female.

With no evidence of any questions causing concern, the paper was considered accessible however, there was a considerable increase in the number of questions '*not attempted*' and 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 marks above 65. Candidate performance is similar to 2023 but does not reflect performance in the pre pandemic paper of 2019. The mean mark for every question was below half marks and for some questions well below. Performance by Welsh medium candidates, 68 in total, was slightly better but not significantly. Overall, this year's cohort were very much weaker and far less prepared than in any other previous series.

There was evidence of excellent responses within many scripts. Candidates who achieved high marks across the paper demonstrated an ability to carefully consider the context of each question, construct well considered responses, write with clarity particularly for the four AO3 questions and demonstrate good understanding of subject specific technical principles as well as overarching principles. These candidates were well prepared for the examination and should be commended for their efforts.

Many of the weaknesses in this paper were consistent with past series and have been highlighted in previous reports. Questions relating to over-arching principles such as environmental issues and sustainability were slightly stronger across all scripts. More of a concern is the lack of subject specific technical knowledge with little evidence of depth of understanding. Some candidates do not appear to have even the most basic technical knowledge such as pattern markings which are fundamental to the subject! This growing trend is a concern. Other weaknesses 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.
- Rushing through the paper and failing to take full advantage of the **two hours** of examination time.

Comments on individual questions/sections

- Q.1** The mean mark for this question was well below half marks making it the least accessible question on the paper although most candidates attempt it. Candidates did not have the technical knowledge to answer this question.
- (a) Most candidates had little understanding of fabric construction. Performance in this low tariff question that relies on recall was disappointing. Few candidates correctly identified the three weave formations; characteristics of a pile weave were generally not known.
 - (b) Technical knowledge relating to pile weave being a directional fabric were generally not known or poorly explained. A more demanding question where most did not demonstrate the depth of knowledge required.
 - (c) Most candidates correctly suggested velvet was a luxurious fabric or looks expensive.
- Question 2** The mean mark for this question was also well below half marks with a satisfactory attempt rate.
- (a) There were no issues with the first part of this low tariff question relating to renewable energy sources.
 - (b) (i) Most candidates were able to explain how globalisation has led to an increase in the fashion and textile industry carbon footprint.
(ii) was less successful as most candidates did not offer 'different' examples of manufacturers operating more sustainably. Some referenced using renewable energy sources which were given in the context of the question therefore did not gain credit or, responses did not reflect a viable means for manufacturers to reduce the industry's carbon footprint. This question was typical of candidates failing to consider the question carefully before attempting a response.
- Q.3** This was the most accessible question on the paper although the mean mark was still below half marks. Some candidates did not attempt this question.
- (a) There were no issues with this low tariff question that relied on recall.
 - (b) Most candidates demonstrated some understanding of micro-encapsulation (i) and were able to apply their knowledge and understanding to different situations (ii).
 - (c) (i) Candidates who focused their responses on the 'significance' of the thread and snap fasteners scored high marks, often full marks. Candidates who simply described the pictures did not gain credit.
(ii) Most candidates were able to explain how the LEDs enhanced the functionality of the Hi-Vis jackets.

- Q.4** The mean mark for this question was also below half marks but had a good attempt rate.
- (a) (i) No issues with this part question however it only relies on recall.
 - (ii) Most candidates had some understanding of the role of fashion forecasters in predicting future trends but very few were familiar with the term contemporary fashion(ii). Candidates should be more familiar with basic terminology used throughout the fashion and textile industry.
- (b) Overall AO3 questions (i) and (ii) were considered very accessible to most candidates though some did not attempt either of them. Both questions relate to overarching principles – the environmental impact of fast fashion and the impact on those employed to make it. These part questions were considered a strength in the paper even though they were set to be the most challenging and demanding. Clearly candidates were well prepared for this topic. Those candidates who scored full marks also showed clear evidence of appraisal and logical lines of reasoning within their respective responses which were well structured and considered. QWC assessed in (ii) was not an issue for most candidates.
- (c) Responses to upcycling the man's shirt varied although almost all attempted the question. Most presented simple or good ideas but there was little evidence of highly creative ideas. Overall, the question was well received.

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

- (a) (i) Most candidates understood why hemp is a suitable fibre for the beach bag and were able to explain why a lining improves functionality
 - (ii) There were no issues in (iii) which related to the use of anthropometrics in the development of the beach bag.
- (b) Responses to appliqué varied but overall, were disappointing. The majority of candidates seemed to guess the process by looking at the picture of the beach bag but failed to demonstrate any depth of knowledge or understanding. For example, few included references to stabilising the fabric with interfacing that would allow it to be stitched successfully. Candidates who scored full marks set out their detailed responses that would enable a third party to follow the instructions to successfully complete the process - as stated in the question. Some candidates were unfamiliar with the term appliqué. Again, technical knowledge was not always evident.
- (c) An AO3 style question - demanding and set to challenge. 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 consequently few gained full marks. On a more positive note, most candidates understood why both materials allow the beach bag to be considered environmentally friendly though very few picked up on the cotton being organic.

- (d) Another AO3 style question – demanding and set to challenge. As evaluate is the key word evidence of appraisal is required in the response, few addressed this consequently full marks were rarely awarded. A few candidates struggled with the term marketability. Many responses were similar to the previous question but did not elaborate on meeting the needs, wants and values of the intended environmentally responsible users. Many responses were superficial or did not answer the question.

Q.6 This was the second least accessible question on the paper with a mean mark just above 25% of available marks. Technical knowledge was very weak which inevitably meant candidates could not answer the questions. Some candidates did not attempt this question.

- (a) (i) A facing is the only effective method of finishing a square neckline simply because of the shape. Very few candidates identified this fact. Yet again technical knowledge was lacking.
- (ii) There were no issues with this part question.
- (iii) Responses to explaining the process of gathering a piece of fabric varied. Whilst there were some excellent responses, some described pleats which was incorrect, others seemingly had no idea what gathers were! Some included attaching the cuff which was not asked for.
- (iv) Overall knowledge of pattern markings which are fundamental in the construction of fashion and textile products was poor. Lack of technical knowledge let a large percentage of the cohort down.
- (v) A few candidates were unfamiliar with the term dart.
- (b) There were no issues with parts (i) and (ii) of this question.
- (c) (i) Most candidates understood what an overlocker would be used for but did not relate their response to an industrial setting. More care is needed when reading questions to ensure responses are relevant.
- (ii) No issues with this question.

Summary of key points

- Candidates need to be taught the full range of topics as listed in the full course specification. There were obvious weaknesses in very basic technical knowledge.
- Candidates do not understand command words or what level of response is expected.
- Mark allocations for individual questions should be considered as they are an indication of the depth needed.
- AO3 evaluate or analyse questions require different responses. 'Evaluate' questions require evidence of appraisal and 'Analyse' questions require evidence of logical lines of reasoning.
- Candidates do not consider the whole question before attempting an answer. Key elements are often missed.

This report should be read alongside the 2024, unit 1 paper and mark scheme. Centres are reminded of the item level data available on the secure website (Portal) when reflecting on their candidates' performance. Resources that support delivery of this specification are available on the WJEC website.

DESIGN AND TECHNOLOGY

GCSE

Summer 2024

UNIT 1 – ENGINEERING DESIGN

Overview of the Unit

The 2024 GCSE Engineering Design examination aimed to challenge candidates' comprehension of core engineering principles, problem-solving skills, and practical application abilities. The exam questions covered topics such as CNC manufacturing, ergonomic design, material properties, safety analysis, mechanical systems, and control systems, in accordance with specification 2.1.2 In-depth knowledge and understanding.

Despite the ongoing decline in cohort numbers, the performance demonstrated a diverse range of understanding and skills across different sections of the paper. Centres in Wales are encouraged to further engage with STEM-based studies in Design & Technology to enhance participation and performance in future cohorts.

Overall, the examination was well-received, with candidates generally able to engage with the questions, although some areas highlighted the need for additional focus and exam technique training.

Comments on individual questions/sections

Q.1.CNC Manufacturing and CAM Machines

This question focused on CNC manufacturing and the use of CAM machines. It was evident that candidates found parts of the question difficult to access to obtain full marks to each section.

- Q.1 (a)** Candidates were asked to describe one disadvantage of using CNC to manufacture a circuit board. Responses varied, with some candidates correctly identifying high initial setup costs or maintenance requirements, while others provided less relevant disadvantages. However, many candidates mis-read 'disadvantage' and offered advantages instead.
- (b)** Naming the four CAM machines shown proved challenging for some, but a majority correctly identified at least two of the CAM machines.
- (c)** Explaining two advantages of additive CAM manufacture was generally well-attempted. Although detailed explanations were sometimes lacking and most candidate were only able to identify limited responses which reflected in the marks awarded for the part of question 1.

Question 2: Prototype Modelling and Ergonomic Design

This question evaluated candidates' knowledge of prototype modelling and ergonomic considerations. Generally, candidates demonstrated a firm understanding of these topic areas.

- Q.2**
- (a) Describing one advantage of using Styrofoam for prototype models was generally well-answered, with many candidates noting its ease of shaping and low cost.
 - (b) Explaining two ergonomic considerations when modelling a computer mouse showed varying levels of understanding, with more successful candidates discussing aspects like hand comfort and button placement.
 - (c) Responses to the questions about the recycling symbol and crude oil's non-renewability demonstrated a good grasp of sustainability concepts. The environmental advantages of plant-based polymers displayed candidates' ability to relay some benefits however, answered varied in sophistication.

Question 3: Bluetooth Wireless Shower Speaker Design

Candidates' familiarity with product design and materials was tested in this question and evidence showed a well develop understanding for this series of questions.

- Q.3**
- (a) Stating two important design factors for the Bluetooth wireless shower speaker was generally well-attempted, with waterproofing and sound quality being common correct answers. Many candidates were able to access half marks or more in this question.
 - (b) Explaining the advantages of using aluminium for the mesh on the speaker saw mixed responses. Successful answers highlighted corrosion resistance and durability. It was evident that some candidates were not able to explain the properties of aluminium in relation to the Bluetooth wireless shower speaker.
 - (c) Understanding of PCBs was displayed in many cases, although some struggled with explaining the manufacturer's choice of using a PCB.
 - (d) Analysing the impact of design developments on sales was well-attempted by many, though some lacked depth in their analysis and focussed on single features.

Question 4: Safety and Mechanical Systems

This question required candidates to engage with safety analysis and mechanical system design. It was highlighted that questions that there was some level of understanding and knowledge, and most candidates were able to obtain marks in all sections of the examination question.

- Q.4**
- (a)** Analysing the safety of the soldering iron station setup was generally well-attempted and most candidates assessed half marks or more. Although some candidates focused too narrowly on specific points without considering broader safety implications.
 - (b)** Explaining the benefits and tests for CE marking of a soldering iron revealed a need for more comprehensive understanding in some responses. Few candidates were able to link the CE marking to European standards nor suggest detailed tests for the soldering iron.
 - (c)** Describing the mechanical benefits of a lever system and the material properties of cast iron showed that while some candidates had a foundational knowledge, others needed to enhance their technical explanations regarding mechanical advantage.

Question 5: Engineering Calculations and Material Evaluation

This question was challenging for many candidates, particularly regarding engineering calculations and understanding engineered manufacturing processes. This question appeared to be least accessible question for candidates on this examination, highlighting a need for a stronger grasp of engineering design calculation principles and industrial manufacturing techniques.

- Q.5**
- (a)** Evaluating the use of Kevlar in bike tyres compared to traditional rubber was well-attempted by some. Many candidates were able to gain three marks or higher, although detailed comparisons were often lacking.
 - (b)** Explaining the advantages of nylon for pulley wheels and performing mechanical advantage calculations highlighted gaps in some candidates' understanding of basic mechanical principles.
 - (c)** Evaluating the benefits of stamp pressing a component showed that while some candidates could identify some key benefits, however detailed evaluations were rarely articulated, and many candidates were able to demonstrate an understanding that awarded low marks for this question.

Question 6: Control Systems and Electrical Circuits

The final question focused on control systems and electrical circuits, assessing candidates' ability to integrate knowledge of materials, processes, and circuit design.

- Q.6**
- (a) Explaining why PVC is suitable for a warning lamp casing was generally well-attempted, though some responses lacked technical detail.
 - (b) Analysing a circuit diagram and naming components revealed varying levels of understanding, with some candidates demonstrating a mature knowledge while others struggled to identify basic inputs, processes and outputs.
 - (c) Redesigning the traffic safety cone to integrate the lamp showed some creativity, but technical feasibility varied. Several candidates only offered limited explanation when annotating design and did not address the key essential features required for the iteration of then traffic light cone.
 - (d) Completing circuit diagrams, performing voltage calculations, and understanding logic gates highlighted gaps in some candidates' electronic circuit knowledge.

Summary of Key Points

- Candidates demonstrated a solid understanding of overarching Design and Technology concepts and processes, including sustainability and classroom soldering safety.
- The cohort generally displayed strong basic factual recall abilities.
- Some centres were better prepared for the engineering design specification 2.1.2 In-depth knowledge and understanding.

General Issues in Candidate Performance

- Limited knowledge and understanding of engineering-based questions, such as commercial manufacturing processes, physical and mechanical properties, and mechanics, including calculations. These are crucial components of engineering design and are outlined in specification 2.1.2.
- Insufficient explanation in responses to access full marks.
- Not reading the questions thoroughly.
- Need for improved techniques in evaluative and analytical written communication.

Overall, the 2024 examination highlighted both strengths and areas for improvement among candidates. By addressing these recommendations, centres can better prepare their students for future assessments, ensuring a stronger grasp of engineering design principles and applications.

DESIGN AND TECHNOLOGY

GCSE

Summer 2024

UNIT 2 – NEA – DESIGN & MAKE

Overview of the Unit

The requirements of the non-examined task (NEA) are now well established in most centres that examine through WJEC. Product Design has the largest number of entries, far less for Fashion and Textiles with a very small cohort entered for Engineering Design.

There was much evidence of high quality innovative and creative outcomes alongside well-organised portfolios outlining the iterative design journey in all three endorsed routes. It was obvious these candidates had taken great pride and care with their NEA submissions and should be commended for their efforts. Equally evident were many disorganised portfolios and unfinished or partially finished outcomes. Time management was clearly an issue for many candidates.

Many of the concerns mentioned in this report have been raised in earlier reports. A significant concern is the inaccuracy of applying the assessment criteria. This is yet to be addressed in many centres.

Following external moderation, most centre marks were accepted as accurate or at least considered fair. Some centres had an adjustment applied to their marks which brings all candidate marks in line with the national standard. Candidate marks were reduced accordingly. There were no positive adjustments. Centres in receipt of an adjustment were considered generous across the sample and assessment strands. These centres consistently awarded marks from the wrong bands, where the evidence bore little resemblance to the descriptors within the selected bands. Closer scrutiny of the descriptors is required when assessing candidate work. In Product Design, 17% of centres and 13% for Fashion and Textiles had negative adjustments applied to their marks.

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. It is quite apparent these are not being used. Centre reports provide feedback on the sample presented at moderation and will outline the accuracy of assessment in respective centres.

It is also a requirement that internal standardisation between teachers and focus areas, where appropriate, takes place. In some centres this clearly had not taken place or was entirely ineffective.

NEA submissions should demonstrate an iterative process with a focus on a cyclic process of 'think - test - evaluate - rethink' in which possible design ideas are developed, tested and refined against a clearly defined design specification. This is under-developed in many centres.

It is important that candidates take responsibility for their work and that it represents their 'personal design journey' which starts with finding a 'realistic' opportunity for design and ends with a fully functioning prototype that fully meets the needs, wants and values of the intended users. Some NEA submissions seemed teacher led, whilst others did not take an iterative approach. Note teacher led approaches often impede design.

Comments on individual questions/sections

(a) Identifying design possibilities – 10 marks

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. Centres are advised to guide candidates in apportioning time according to the marks available - 10 marks available in this section equates to approximately 10% of candidate time. A lean and more focussed approach is highly recommended.

An important consideration is the identification of opportunities for design which ultimately lead to the development of possible design briefs. Whilst candidates must have access to all three contextual challenges, it is their choice how many they choose to analyse. It is not acceptable for centres to make these decisions on behalf of their candidates, which is the case in a few centres. 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. Some candidates identified genuine and realistic problems which led to the creation of innovative solutions. This approach needs to be developed across all focus areas.

Research and investigation should reflect quality and relevance over quantity as this underpins the development of ideas and supports the development of a realistic and meaningful specification. The work of professionals or companies should only be considered where it is appropriate, as stated in the assessment criteria. Too often this is included as a means of 'padding out' the portfolio but has no further influence on design. Mood boards if included should also have a purpose rather than a collection of meaningless pictures.

User needs, wants and values run through all assessment strands and should be a key consideration throughout the iterative process. This was simply unrealistic, celebrities for example in many submissions. Engaging with a real-life user or stakeholder is a far more effective means of understanding a problem. On-going dialogue with a genuine user for example is far more effective than conducting a generic questionnaire.

(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 few design briefs before focussing on one final brief which should be arrived at following careful analysis of relevant and focused research. This approach was evident in some centres but not all. Some candidates had preconceived ideas of what they intended to make and did not explore other options. This narrows down their opportunities and marks that could potentially be awarded. This requires further consideration in some centres.

All criteria listed in the design specifications should come from a thorough analysis of research and investigation and some early testing and modelling of ideas. Some candidates however produce generic lists of attributes – a ‘wish list’ with little or no reference to the research and investigation. In some specifications, dimensions and cost for example simply ‘*appear*’ with no reference to how these numeric values have been arrived at. A well-developed specification is an effective design tool which supports the evaluation of ideas as they develop. Few candidates use it in this way. A robust specification should also indicate how the finished product will be tested which is essential when evaluating the success of the outcome. Specifications need refining and further development in many centres. Most centres assessed this strand fairly; however, some superficial and underdeveloped specifications were awarded high marks whereas marks in lower bands would have been more appropriate. Centres are advised to use the exemplar projects available on the secure website to gain a better understanding of the assessment criteria.

(c) Generating and developing design ideas – 30 marks

In centres where the iterative process in fully understood outcomes were generally more successful, creative and imaginative, functioned as intended and generally met the needs and wants of users. Candidates in these centres had comprehensively modelled, tested and refined their ideas. This included practical modelling and testing of processes, techniques and finishes including handling proposed materials.

This approach supports development, the incremental development of ideas was clear. High marks are fully justified here. Candidates gain much more from a ‘hands on’ approach and most enjoy the practical aspect of this subject. The best way to gain an understanding of materials and processes is to work with them! This however was not the case in many centres where candidates were over rewarded where there was little evidence of development.

A few sketches with a few CAD models for example are not indicative of an iterative design process. In Fashion and Textiles, a toile, a few seam constructions and /or a decorative technique, often completed as a class activity is not iterative either. This limited approach better reflects the descriptors and marks in the lower assessment bands.

Alongside the development of ideas, all technical details that relate to materials, dimensions, finishes and production techniques should be considered. In many centres and across all focus areas, this still requires further development.

Every aspect of a candidate's design journey should be recorded. 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 pre-emptive logical sequence for the manufacture of their prototype in sufficient detail that a third person could make the same product. It should also 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, there is no reference to this in the assessment criteria. Overall manufacturing sequences need refining.

Many well-made and sophisticated fully functioning outcomes were seen during moderation week. These outcomes which met objectives were worthy of being credited with marks in the top bands.

Modern manufacturing techniques such as 3D printing are increasingly being used alongside more traditional methods although Fashion and Textiles candidates are yet to fully embrace new technology.

Overall, however, skills demonstrated, and the quality and accuracy of outcomes varied quite considerably. Several outcomes in all focus areas were presented in a partial or incomplete state.

It is acknowledged however that this cohort have had less experience in the workshop than in previous years. A growing concern is that non-specialist staff are delivering this course which can be limiting for candidates.

Assessment in this strand varied from 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 better fit. There must be high levels of accuracy and precision in all aspects of construction with attention paid to the quality of the finish to justify awarding marks in bands 3 and 4. It is apparent that some centres do not have a thorough understanding of the precise criteria needed to award marks in the top bands.

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

On-going analysis and evaluation of ideas and design decisions can be credited in this assessment strand. In a minority of centres this was overlooked simply because the candidate had not submitted a summative evaluation. The opportunity to award marks here should reflect the quality of the iterative process.

The quality of summative evaluation varied quite considerably. This section is worth 20% of the overall mark therefore a substantial body of work is required to secure marks in the top band. Marks awarded were often generously applied in this assessment strand. Quite often summative evaluations were presented as a brief reflection of the specification criteria alongside superficial references to testing, modifications and improvements - indicative of the descriptors in bands 1 or 2 yet often generously awarded with marks in higher bands. To justify awarding marks in the top bands summative evaluations should be presented as 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.

For most centres this area requires further consideration and development as it often appeared rushed, was incomplete or simply not included. Centres are advised to apportion time accordingly to this assessment strand particularly as up to 20 marks are potentially available here.

Summary of key points

- Greater accuracy in applying the assessment criteria. Banded assessment descriptors determine the correct band where the most appropriate mark should be awarded.
- Understanding the problem is critical if a successful outcome is to be realised.
- A user-centred approach is required.
- Design specifications must include objective and realistic measurable criteria that can be used to drive design development and to test outcomes.
- Modelling and testing of concepts, alongside on-going analysis and evaluation underpins the iterative process.
- Manufacturing skills need further development and refinement with greater attention paid to the quality of the finish.

Supporting you

Useful contacts and links

Our friendly subject team is on hand to support you between 8.30am and 5.00pm, Monday to Friday.

Tel: 029 2240 4303

Email: designandtechnology@wjec.co.uk

Qualification webpage: [GCSE Design and Technology \(wjec.co.uk\)](https://www.wjec.co.uk/gcse-design-and-technology)

See other useful contacts here: [Useful Contacts | WJEC](#)

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