

Iterative Design Challenge (J310 / 02 & 03)

GCSE (9-1) in Design & Technology

Understanding and internally marking the NEA

1. An outline for understanding and applying the GCSE Marking Criteria



WELCOME!

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Domestics



Please turn off
your mobile
phone



Cloakroom
Facilities



Please only
smoke in the
designated
areas



Refreshment times



Emergency
Exits
Fire drill



Lunch



Course Aims and Objectives

- Understand administrative requirements for submitting work
- Provide an outline of the intentions of how to interpret the Marking Criteria for the new GCSE qualifications when internally marking
- Discuss considerations and implications of applying the Marking Criteria in the first year of assessment to give some confidence for those having to internally mark their own students
- Network with colleagues
- Ask questions



PLAN OF THE DAY

- 10.00–10.45 Administration and regulations
- 10.45 Coffee**
- 11.00–12.30 Understanding the Marking Criteria
- 12.30 Lunch**
- 1.30–2.45 Exploring the sample folder and applying the Marking Criteria
- 2.45 Coffee**
- 3.00–4.00 Reviewing application of the Marking Criteria
- 4.00 Close**



NEA – Product Development - summary

- **50%** of the GCSE qualification
- **40 hours** approx.
- **5** assessment **strands** with a total of **23** assessment **statements**
- **100 marks** total
- Learners must identify a **context** that connects to one of the challenges given by OCR on 1st June annually

If a learner does not identify a context connected to the theme, this will impact on marks possible in Strand 1



- Strands 3 and 4 assess the **graphical and practical outcomes** through the communication of the designing and the making of the final prototype(s)

Strand 1 - EXPLORE (A01)	20
1.1 Investigations of the context	
1.2 Design brief	
1.3 Investigations of user and stakeholder needs and wants and the outlining of stakeholder requirements (non- technical specification)	
1.4 Investigations of existing products and design practices	
1.5 Exploration of materials and possible technical requirements	
1.6 Technical specification	
Strand 2 - CREATE: Design Thinking (A02)	34
2.1 Generation of initial ideas	
2.2 Design developments	
2.3 Development of final design solution(s)	
2.4 Critical thinking	
Strand 3 - CREATE: Design Communication (A02)	16
3.1 Quality of chronological progression	
3.2 Quality of initial ideas	
3.3 Quality of design developments	
3.4 Quality of final design solution(s)	
Strand 4 - CREATE: Final Prototype (A02)	20
4.1 Quality of planning for making the final prototype(s)	
4.2 Quality of final prototype(s)	
4.3 Use of specialist techniques and processes	
4.4 Use of specialist tools and equipment	
4.5 Viability of the final prototype(s)	
Strand 5 - EVALUATE (A03)	20
5.1 Analysis and evaluation of primary and/or secondary sources	
5.2 Ongoing evaluation to manage design progression	
5.3 Feasibility of the design solution	
5.4 Evaluation of the final prototype(s)	
TOTAL MARKS	100

NEA - Assessment Objectives

AO1		AO2		AO3	
EXPLORE		CREATE		EVALUATE	
Identify, investigate and outline design possibilities to address needs and wants		Design and make prototypes that are fit for purpose		Analyse and evaluate - design decisions and outcomes, including for prototypes made by themselves and others - wider issues in design and technology	
Strand 1		Strand 2	Strand 3	Strand 4	Strand 5
Process			Outcomes		Process
		Design Thinking	Design Communication	Final Prototype(s)	
Marks	20	24	16	20	20 Total 100



NEA – Chronological e-portfolio

- Not a linear process through the marking criteria but the story of the iterative design process as it happens, in the order it happens, recorded in real-time
- A single folder must contain all the evidence the learner is presenting for assessment
- Submitted electronically in OCR-approved format or as a paper folder (supported with video/audio files)
- High quality videos and images are important
 - Videos must work, otherwise marks will be lost
 - Evidence in the portfolio is assessed - not the actual models/prototype(s)

If a learner presents insufficient video/photographic evidence, this will impact on the marks possible



NEA – Chronological e-portfolio

- Assessors will look for evidence **throughout** the portfolio
- Evidence must be referenced / signposted to point assessors to the work presented against each of the marking criteria
 - An example of how this might be done is shown on the next slide
 - If a Centre does not do this in conjunction with each candidate then marks may be lost if assessors cannot readily find the evidence*
 - A statement in the portfolio such as "I asked my stakeholder and they saidX...Y...Z..." is **insufficient evidence** that a conversation has actually taken place*
- All sources of information and assistance must be clearly indexed and acknowledged

"The Candidate Declaration Form states: "Presenting materials copied from other sources without acknowledgement is regarded as plagiarism"



Location of evidence for each assessment category

Assessment Statement	Evidence on Slide / Page number	Supporting notes to aid assessors
1.1 Investigations of the context	1, 2, 3, 4, 5	
1.2 Design Brief	5	
1.3 Investigations of user and stakeholder needs and wants.....	2, 3, 5, 12, 15 and 21	Slide 21 – List of requirements slide - captures how and when user/stakeholder needs have been identified
1.4 Investigations of existing products and design practices	7, 8 and 12 through 16 (early iterative design slides)	Existing products have been analysed and used for inspiration. Please note slides 13 and 14 where video analysis takes place
1.5 Exploration of materials and possible technical requirements	8, 13, 14 and 21	Slide 21 – List of requirements slide - captures how and when technical requirements have been identified
1.6		
2.1		
2.2		

NEA – Key influences on marks in all categories

- Level of thinking, complexity, sophistication and difficulty involved
- Level of innovation and creativity
- Depth of approach and appropriateness of skills involved
- Level of refinement and attention to detail
- Level of focus and relevance
- Stakeholder and user involvement and collaboration
- Project management and organisation



Internal Assessment

Four Mark Bands

- Select the most appropriate mark band for the candidate

Strand 4 – Create: Final Prototype(s) (AO2)

	Mark Band 1 (1-5)	Mark Band 2 (6-10)	Mark Band 3 (11-15)	Mark Band 4 (16-20)
Quality of planning for making the final prototype(s)	Often little or no input to the making process.	Generally supports the management of the making process with some relevant requirements identified from the technical specification.	Good level of detail and relevance, covering most requirements identified from the technical specification to manage the making process.	Comprehensive and relevant, covering all requirements identified from the technical specification to effectively manage the making process.
Quality of final prototype(s)	Inaccurate and/or basic standards demonstrated. Finishing may not be appropriate and/or the outcome would not present well to a stakeholder.	Sufficient standard demonstrated through a generally accurate outcome. Finishing is adequate but the outcome could be better presented to stakeholders.	Good standard and levels of accuracy demonstrated. Finishing is appropriate and the outcome will present well to a stakeholder.	Excellent standard, demonstrating high levels of accuracy. Finishing is appropriate and the outcome will present well and provide impact to a stakeholder.
Use of specialist techniques and processes	Limited and rarely appropriate to material/component being used.	Sufficient, but are not consistently appropriate to material/component being used.	Good and are consistently appropriate to material/component being used.	Excellent and are effective and consistently appropriate to material/component being used.
Use of specialist tools and equipment	Use and selection of hand tools and/or machinery are limited and rarely appropriate. Digital design and/or manufacture "is" limited and demonstrate little or no skill or knowledge.	Use and selection of hand tools and machinery are sufficient, but not always consistently appropriate. Digital design and manufacture "are" used appropriately, but demonstrate sufficient skills and knowledge.	Use and selection of hand tools and machinery are good and consistently appropriate. Digital design and manufacture "are" used appropriately to demonstrate good skills and knowledge.	Use and selection of hand tools and machinery are effective and consistently appropriate. Digital design and manufacture "are" used effectively and appropriately to demonstrate excellent skills and knowledge.
Viability of the final prototype(s)	Little or no links to the technical specification and demonstrating limited potential to become a marketable product.	Meets some of the technical specification and demonstrating some potential to become a marketable product.	Meets most of the technical specification and demonstrating good potential to become a marketable product.	Meets all of the technical specification and demonstrating excellent potential to become a marketable product.
	1 2 3 4 5	6 7 8 9 10	11 12 13 14 15	16 17 18 19 20

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Internal Assessment

- Make your judgements on how convincingly a candidate meets each statement within the mark band.

limited or sparse effort	Good standard and levels of accuracy demonstrated. Finishing is appropriate and the outcome will present well to a stakeholder.	Excellent high level design present a sketch
identify	Good and are consistently appropriate to material/component being used.	Excellent complete material
tools and if not one "are" "is" but used	Use and selection of hand tools and machinery are good and consistently appropriate. Digital design and manufacture "are" used appropriately to demonstrate good skills and knowledge.	Use and machines complete design a effective demonstrates knowledge
if doing it	Meets most of the technical specification and demonstrating some potential to become a marketable product.	Meets a specific specific machine

Just meets the standard.

Adequately meets the standard.

Convincingly meets the standard.

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Key dates and submission

- Contextual Challenges released on 1st July
- Entries received by 21st February
- Marks submitted by 15th May

The following forms are **mandatory**:

- Candidate Declaration Form** (every candidate. Only those in the sample need to be submitted to OCR, others should be retained in centre for JCQ visits)
- Candidate Record Form** (only for sample candidates submitted to OCR, but recommend to do for all. A separate resource has been produced to help teachers obtain evidence locations from candidates)
- Centre Authentication Form** (to be retained in centre for JCQ visits)

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CANDIDATE RECORD FORM

Strand 1 - Explore			MB1		MB2		MB3		MB4												
Investigations of the context						✓															
Design brief							✓														
Investigations of user and stakeholder needs and wants and the outlining of stakeholder requirements							✓														
Investigations of existing products and design practices								✓													
Exploration of materials and possible technical requirements								✓													
Technical specification								✓													
	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Total Strand Mark											10										

We would advise you to

We would advise you to complete the Candidate Record Form electronically to avoid error. If you are then submitting paper folders, these forms can either be printed out once completed or saved into the same memory stick as the video/audio evidence from student's portfolios.

Make your best fit judgements against the statements for each mark band, then tick the respective box on the Candidate Record Form

When completing the form any Total Strand Mark and Total Component Marks are automatically completed for you to avoid any clerical errors. This is calculated from taking the average of your best fit judgements for each strand and then totalling them.

Total Component Marks 65 /100

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CANDIDATE RECORD FORM

Stand 1 - Explore	Evidence Location	Observations
1.1 Investigations of the context		
1.2 Design brief		
1.3 Investigations of user and stakeholder needs and wants and the outlining of stakeholder requirements		
1.4 Investigations of existing products and design practices		
1.5 Exploration of materials and possible technical requirements		
1.6 Technical specification		

Offer page, slide or other specific location where evidence can be found

Offer your observations of to clarify points that support your internal assessment.

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CANDIDATE DECLARATION FORM

Work submitted for assessment must be the candidate's own. If candidates copy work, allow candidates to copy from them, or cheat in any other way, they may be disqualified.

Candidate declaration

Have you received help/information from your teacher(s) to support the development of your design solution or final prototype(s)?

☐ No ☐ Yes (give details below or on a separate sheet if necessary)

Have you received help/information from anyone other than subject teacher(s) to support the development of your design solution or final prototype(s)?

☐ No ☐ Yes (give details below or on a separate sheet if necessary)

Please list below any books, leaflets or other materials (e.g. DVDs, software packages, internet information) used to complete this work that acknowledge in the work itself. Presenting materials copied from other sources without acknowledgement is regarded as plagiarism.

I have read and understood the above. I confirm I produced the attached work without assistance other than that which is acceptable within the specification, or I have stated explicitly the guidance received within this form.

Date:

Authentication of work is essential with the reformed qualifications. In D&T we want to allow students as authentic a design situation as possible, therefore the must be transparent with any advice and feedback they receive from others.

They should not adopt any feedback as their own, but rather be clear as to how they obtained feedback and demonstrating how they have reflected on the feedback given.

It is essential that every candidate completes a declaration form. We would recommend that the forms are completed when they hand over their final submissions.

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Strand 1 - EXPLORE**What is assessed in Strand 1?**

- The work being assessed in this strand will be evidenced from the complete portfolio
- This assessment relates to the quality and relevance of all the exploration undertaken during the project, and the opportunities, needs and technical information identified as part of these investigations



Strand 1 - EXPLORE (Max. of 20 marks)**1.1 Investigations of the context**

Mark Band 1 (1–5)	Mark Band 2 (6–10)	Mark Band 3 (11–15)	Mark Band 4 (16–20)
Superficial investigations identify little or no problems and/or opportunities for further consideration.	Investigations are of sufficient quality to identify some problems and/or opportunities for further consideration.	Investigations offer a good level of detail and identify a breadth of problems and opportunities for further consideration.	Comprehensive investigations identify a breadth and/or depth of challenging problems and opportunities for further consideration.



Strand 1 - EXPLORE**1.1 What is being assessed?**

- The quality of investigations (within the chosen context) into a number of potential opportunities, needs or problems which could be a suitable focus for the project.



Strand 1 - EXPLORE

1.1 Relevant evidence could include

- Contact with potential stakeholders and users
- Mind maps, mood boards, visits, interviews, observations, surveys, focus groups
- Photographic and video evidence

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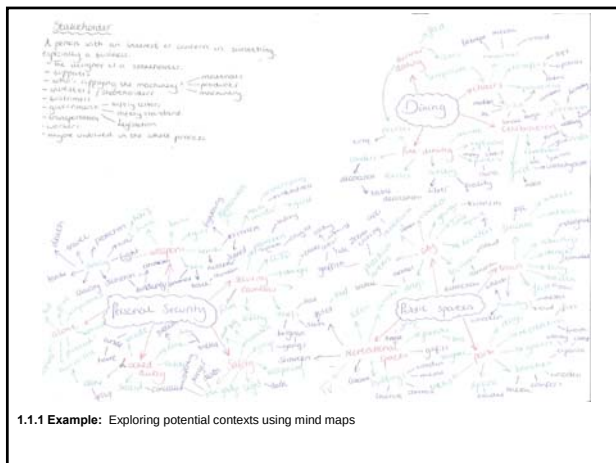
Strand 1 - EXPLORE (Max. of 20 marks)

1.1 Which mark band?

Lower Mark Bands	Higher Mark Bands
Few 'known/safe' options explored	Several 'unknown/challenging' options explored
Learner is detached from the context and gains a limited understanding of problems and opportunities	Learner is actively involved in an authentic context / situation and fully understands the potential problems and opportunities
Limited depth and clarity in investigations around the context	Learner follows-through possibilities with further investigations to clarify and confirm their thinking
Limited secondary sources used that don't support thinking	Relevant primary and secondary sources used to support and validate thinking
Little structure and analysis	Different methods, including visual / graphic, used to structure thinking and analysis

Discuss what **higher** mark band and **lower** mark band responses might look like for your own DT 'area'

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1.1.2 Example: Examples of visual mindmaps, with potential possibilities identified and listed

[illegible]

Strand 1 - EXPLORE (Max. of 20 marks)

1.2 Design brief

Mark Band 1 (1–5)	Mark Band 2 (6–10)	Mark Band 3 (11–15)	Mark Band 4 (16–20)
Limited relevance to the context and little or no identification of a primary user or other stakeholders.	Some relevance to the context and identification of a primary user and/or other stakeholders.	Mostly has relevance to the context offering scope for challenge and identification of a primary user and other stakeholders.	Clear and full relevance to the context offering scope for challenge and a focused identification of a primary user and other stakeholders.

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Strand 1 - EXPLORE

1.2 What is being assessed?

- The candidate's understanding and interpretation of the context
- The relevance, focus and direction for the project
- The clarity and detail of the problems and issues for attention
- The scope for challenge involved
- Identification of primary users and other stakeholders

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Strand 1 - EXPLORE

1.2 Relevant evidence could include

- A statement of the specific problem(s) the candidate is looking to solve through their design project
- Names and details of primary users and other stakeholders
- Consideration of the challenges likely to be faced through the project, including input from expert stakeholders if needed
- A list of areas and key issues expected to need attention
- Photographs, audio, video, diagrams and text

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Strand 1 - EXPLORE (Max. of 20 marks)

1.2 Which mark band?

Lower Mark Bands	Higher Mark Bands
States a product/outcome that may not be clearly linked to the chosen context	An open brief that clearly states the problem to be solved relating to the chosen context
Very basic and generic tasks likely to be involved in the project	Specific tasks that challenge the context are highlighted and discussed
Little consideration of key issues and their level of importance	Areas for particular attention in the designing, e.g. safety, usability, function are highlighted
Limited contact with, or consideration of stakeholders and users	Contact with, and the influence of stakeholders and users is explained and clearly evident
Mostly text	Diagrams, audio/video to clarify intentions

Discuss what **higher mark band** and **lower mark band** responses might look like for your own DT 'area'

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Design Brief

Create a contemporary piece of cycle wear suitable for a 21st century commuter. Your design should omit obvious sports details such as bright and fluorescent colours, lycra and bold logos. Instead you should focus on stealth branding and discreet detail to include tailored features and reflective trims. Your garment must be suitable to be worn on a bike to commute to work but should also be able to function 'out of the saddle' in the workplace.

Stakeholders:

- Cyclists (inclusive but focused on users – see users / user representative)
- High street fashion retailers e.g. TOPMAN, H&M, River Island, Zara, New Look
- Cycling organisations
- Regulators and British Standards
- Potential investors – funding partners
- Material suppliers
- Component manufacturers (buttons, threads, poppers, zips etc.)

Primary Users:

- Commuters who cycle to work
- Young men
- Fashionable urban professionals



User representative for this project:

Ethan Robinson
When he is cycling to work he likes to stay cool. He works in a design agency so looking fashionable in the office is paramount. He does not have changing facilities at work so a multifunctional garment that can be worn on the bike and around the office would be very useful. He therefore agrees that there is a need for a range of products to be sold in a fashionable high street store that would suit his needs.

Design Brief Commentary:

With the increasing environmental concerns and worries about climate change more and more people are deciding to use bikes as an environmentally friendly way to perform the daily commute. There is already a wide range of cycling specific sportswear available on the market to suit all types of rider. However, I believe that there is a gap in the market for the young urban professional who would like a multifunctional garment that can be worn on the bike and also looks stylish and fashionable when in the office.



Next steps:

- Carry out investigations into:
1. user and stakeholder needs and requirements
 2. relevant wider issues and implications (e.g. sustainability, social, environmental)
 3. relevant existing products
 4. relevant design practices and approaches
- A variety of different methods and approaches will be needed in these investigations. I will first need to plan these out so that I don't miss anything important

1.2.1 Example: This cycle shirt project collates all relevant information to form a Design Brief that includes the names and details of users and stakeholders. The learner has also identified their next steps to support their iterative process

Strand 1 - EXPLORE

1.3 Relevant evidence could include

- Visits, interviews, observations, focus groups and surveys
- Consideration of Who? What? Where? When? Why? and How?
- Reference to ergonomics, anthropometrics and wider issues such as social, ethical, sustainability, etc.
- Photographs, audio, video, diagrams and text
- A 'master' list of requirements that is added to and updated through the project

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Strand 1 - EXPLORE (Max. of 20 marks)

1.3 Which mark band?

Lower Mark Bands	Higher Mark Bands
Limited investigations of relevance and value, with superficial and generic needs of users identified	Structured investigations throughout the project when required that identify specific user needs
Little or no contact with users and stakeholders	Genuine contact with "users" and "stakeholders"
Mostly secondary sources such as the internet, recorded randomly and lacking clarity	A clear and real time record of investigations, primary and secondary
Stakeholder requirements are generic with little direct relevance and value to the candidate's chosen context, often unsupported	Stakeholder requirements are clear, detailed and specific to the candidate's design focus and identified appropriately throughout the project
Any requirements stated limit the scope for innovation and creativity	Requirements are open-minded and flexible where possible, giving a breadth of opportunity

Discuss what **higher mark band** and **lower mark band** responses might look like for your own DT 'area'

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Questions asked	Analysis of responses	Interview with potential customer/user
1. How old are you?	1. 100% of my responses were completed by people under the age 25. Therefore, I will make sure that my product is modern.	I interviewed a fellow guitarist named Kasia, and asked them questions about their playing. (Click on the video below).
2. Are you male or female?	2. 100% were female although I am aware that all genders play the guitar so I will use a colour that is generally appealing.	-Kasia plays the guitar 3 or 4 times a week, which is quite often, therefore my product is ideal for her.
3. How often do you play the guitar?	3. My most frequent response was 'everyday', which is great, although I know that this is enough time to have a phone, etc. so I know they will probably benefit from my product.	-She says that she experiences problems such as her fingers hurting, losing her shape, dropping pick-ups and her arm falling off while she is playing. This suggests that I may have to design some new accessories that come with the box, in order to solve the problems she encounters when playing. For example a rubber ring that fits in the end of the guitar, to ensure that the strap will not fall off.
4. How many guitars do you own?	4. Kasia said that they own 1-2 guitars, one said that they owned more than that and the last said that they did not own one. This proves that enough people own at least one guitar for my product to have a chance at selling.	-Other also says that she looks for colour, style and durability when buying an accessory for her guitar. Therefore I need to make sure that my product is colourful, stylish and durable.
5. Roughly how many guitar accessories do you own? (eg. guitar strap, pick-ups)	5. The majority said that they owned less than 10 accessories, although based on the number that said they owned at least one guitar, I'm sure they have at least one accessory to go with it. This tells me that my box will not have to store that many accessories.	-Kasia mentioned that she uses various accessories such as capo, pick-ups and guitar strap, so I will need to include a wide variety of accessories and maybe even some new ones.
6. Do you think you would benefit from a product that would help organise your playing?	6. Most said that they would not, but those who do are the people that said they do not own or play a guitar. I believe that people who regularly play guitar will benefit from my product.	-Overall, she said that she would definitely be interested in buying a product for her guitar that would organise her accessories.
7. Which accessories do you use the most?	7. Most gave a wide range of accessories that they use, which tells me that I must include at least three or four spaces for different types of accessory in my box.	
8. Would you prefer to have all of your accessories stored together in one place?	8. The majority said they would, so I can confirm that my product will sell and will solve the problem of organisation in guitarists' life.	
9. How much would you be willing to pay for a durable, high quality product for your guitar?	9. The average price willing to be paid was £25. This tells me that my product will sell at a decent price and most would be willing to pay this cost.	
10. What is the main factor you look for when buying a guitar related product? (eg. comfort, style)	10. The most common response was 'style', and a few also said that they like a product to be multi-functional. This informs me that my product needs to look stylish and sleek. It also tells me that I should try to incorporate the box into having another function as well.	



CLICK TO WATCH INTERVIEW

Conclusions

Based on my Analysis of User/Market Issues my product must:

- Be **durable**, so that people will want to buy the product because it lasts.
- Use **materials that are low cost yet quality**, so that the product will be an acceptable price range.
- Hold a **decent number of accessories**, including new ones that solve issues such as painful fingers.
- Be **small and discreet**, so that it doesn't look out of place on the end of the guitar.
- Be **stylish and modern**, because all my responses were from young people.

1.3.1 Example: The learner plans for and carries out a survey with potential stakeholders, to identify specific needs and requirements. A more in depth interview is done with a primary user. Videos and text are used to record and summarise the specific problems

Interviewing my Primary User – Fraser Maxwell

My User is a student from York University who lives in a studio apartment in the city centre. With it being such a small space he usually finds it difficult to store all his personal items. I decided to use Fraser as my client as I believed he would be the ideal client interested in space saving furniture.

Summary of Interview

- During our conversation, he described that he was particularly interested in colours such as red, blue and black which matches the rest of his apartments.
- He thinks that his apartment often gets messy from dirty laundry, shoes, DVD's and people clutter is also a problem, for example when friends or family come to visit.
- He prefers to spend more money on a higher quality product which will perform multiple practical functions and also has storage space available to use.
- He would be interested in a product that is also up to date with technology, for example the use of electrical mechanisms which require less effort to do than manually.

My Clients Apartment

These are photos that were took of my clients apartment showing the floor plan and all the different spaces in the room.

CLICK TO PLAY

Large shelving units are in place but my client does not like them.

Here is a view from the corridor to the entrance of the kitchen and the living area/clothing area.

Here are photos of me interviewing my client Fraser. We also discuss possible products that would be suitable and be helpful for Fraser to manage his space better with a stylish approach.

Here is a video clip showing some of the scenes during the interview. It shows us discussing topics such as living space, storage space.

Here is the floor plan of the apartment showing how all the rooms connect and are also separated.

This is the bathroom which shows what facilities are in there.

Here is the kitchen area, here you can see how nearby the other room influences the whole apartment.

This is another view of the bedroom, as you can see there is a possible extra storage space down the wardrobe which are fitted into the wall.

1.3.2 Example: Interview with primary user along with hands on investigation of a potential location

Master List of Requirements

Requirement	Identified by	Weight	Explanation / Justification for inclusion in the requirements
Weight no more than 800g	Candidate, confirmed by primary user	25	After weighing different lights I found the mean weight was about 400g. The cyclist should not use the product as a handbag to the speed they can go on their bike.
A minimum light intensity of 100-150 lumens	Candidate	25	Most existing bike lights have a light intensity of about 100 lumens, which illuminate the road adequately.
All parts must be sealed or waterproofed to protect the circuitry from water when cycling in the rain	Candidate	25	If it is not, the circuit may short circuit and potentially leave a cyclist without lighting at night.
Selling price between £40 and £80	Candidate	25	To fit within the price range of other similar products already on the market.
Keep packaging small, achieving this through detachable parts assembled by the user when purchases	Hafford (stakeholder)	10	From a marketing and distribution point of view, keeping the retail package as small as possible is crucial, especially when high volumes of products and packages are concerned.

1.3.3 Example: Master list of requirements

Strand 1 - EXPLORE

1.3

Comparison to related marking criteria

1.3

(this marking criterion) assesses the **investigation** of the needs and wants of stakeholders and users, and the identification of requirements

5.1

assesses the candidate's ability to **analyse** and **evaluate** primary and secondary data throughout their portfolio, including the information /data obtained in criteria 1.3, 1.4 and 1.5

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Strand 1 - EXPLORE (Max. of 20 marks)**1.4** Investigations of existing products and design practices

Mark Band 1 (1–5)	Mark Band 2 (6–10)	Mark Band 3 (11–15)	Mark Band 4 (16–20)
Little or no information or sources of inspiration are identified that offer support to design iterations and thinking.	Some information and/or sources of inspiration are identified that may not always be relevant but do offer some influence on design iterations and thinking.	Good amount of relevant information and sources of inspiration are identified to influence design iterations and thinking when required throughout the design process.	Comprehensive and relevant information and sources of inspiration are identified to influence on design iterations and thinking when required throughout the design process.

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Strand 1 - EXPLORE**1.4** What is being assessed?

- The candidate's use of appropriate methods and skills to explore existing products, systems and design practices
- The obtaining of relevant information and inspiration that influence the candidate's design thinking and development of design solutions

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Strand 1 - EXPLORE**1.4** Relevant evidence could include

- Tests and observations of existing products in use, comparisons between products, reference to product reviews and forums
- Exploring products and systems that are different, as well as similar, to the focus of the project
- Consideration of design influences such as the work of other designers/companies, product disassembly, mimicry etc
- Photographs, audio, video, diagrams and text

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[illegible]

Strand 1 - EXPLORE

1.4 Comparison to related marking criteria

1.4 (this marking criterion) assesses the candidate's **investigation** of existing products and design practices to obtain information and inspiration (carried out as required through the iterative design process)

5.1 assesses the candidate's ability to **analyse** and **evaluate** all primary and secondary data throughout their portfolio, including the information / data obtained in 1.3, 1.4 and 1.5



Strand 1 - EXPLORE (Max. of 20 marks)

1.5 Exploration of materials and possible technical requirements

Mark Band 1 (1–5)	Mark Band 2 (6–10)	Mark Band 3 (11–15)	Mark Band 4 (16–20)
Superficial consideration of materials and/or possible technical requirements.	Some relevant consideration of materials and possible technical requirements.	Informed consideration of materials and possible technical requirements when required throughout the design process.	Full and objective consideration of materials and possible technical requirements when required throughout the design process.



Strand 1 - EXPLORE**1.5 What is being assessed?**

- The quality and depth of the candidate's exploration of relevant materials carried out as appropriate **during** their iterative designing
- The candidate's consideration of the physical and performance requirements for their design

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Strand 1 - EXPLORE**1.5 Relevant evidence could include**

- Exploration of the properties of different materials, finishes, components and processes that may be suitable for the chosen product or system
- Investigations that identify technical information such as performance requirements or anthropometric data, relevant to the design focus and context
- Requirements that the investigations reveal are added to the candidate's master list of requirements, with explanation
- Photographs, audio, video, diagrams and text

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Strand 1 - EXPLORE (Max. of 20 marks)**1.5 Which mark band?**

Lower Mark Bands	Higher Mark Bands
Secondary, generic information on materials	First-hand testing of different materials, finishes, components etc
Little consideration of broader implications of material choice and technical decisions	Includes relevant consideration of commercial, social, ethical, sustainability and other issues
Limited consideration of performance requirements or any other relevant data	Consideration of different performance requirements (e.g. speed, accuracy etc) and other data that is relevant to the design iterations
Little relevance and value in the investigations	Specific and appropriate technical requirements are identified and added to the master list

Discuss what **higher** mark band and **lower** mark band responses might look like for your own DT 'area'

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Strand 1 - EXPLORE**1.5 Comparison to related marking criteria**

1.5 (this marking criterion) assesses the quality and relevance of the candidate's **exploration** of materials and possible technical requirements

5.1 assesses the candidate's ability to **analyse and evaluate** all primary and secondary data throughout their portfolio, including the information / data obtained in 1.3, 1.4 and 1.5

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Strand 1 - EXPLORE (Max. of 20 marks)**1.6 Technical specification**

Mark Band 1 (1–5)	Mark Band 2 (6–10)	Mark Band 3 (11–15)	Mark Band 4 (16–20)
Inaccurate, outlines basic details and/or is incomplete making it difficult for a third party to understand.	Generally accurate, outlines details that communicate some requirements to a third party.	Good levels of accuracy, outlines details that communicate most requirements to a third party.	High levels of accuracy, outlines details that clearly communicate all requirements to a third party.

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Strand 1 - EXPLORE**1.6 What is being assessed?**

- The accuracy and detail of the information for the manufacture of all parts of the design solution in an industrial and commercial context
- The completeness of the information for a third party to understand all requirements and fulfil the manufacture and assembly of the final product

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Strand 1 - EXPLORE

1.6 Relevant evidence could include

- Formal drawings
 - of the assembled complete product, including dimensions, labelled component parts and details for assembly
 - of each component part of the design solution, including dimensions and technical details of materials, finishes, including details for commercial/industrial manufacture
- Details of bought-in components and suppliers
- Sufficient explanation of functionality and intentions that can't be explained on a drawing.

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Strand 1 - EXPLORE (Max. of 20 marks)

1.6 Which mark band?

Lower Mark Bands	Higher Mark Bands
A low level of skill across a limited use of different methods that lacks accuracy	A high level of skill using different methods, including CAD, to ensure accuracy
Little or no materials and finishes outlined and/or details that relate to school workshop manufacture	Technical details of materials, finishes, including details for relevant commercial/industrial manufacture
A lack of clarity that makes it difficult for a third party to follow	Clarity in communicating full details of the final design solution

Discuss what **higher** mark band and **lower** mark band responses might look like for your own DT 'area'

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ORTHOGRAPHIC

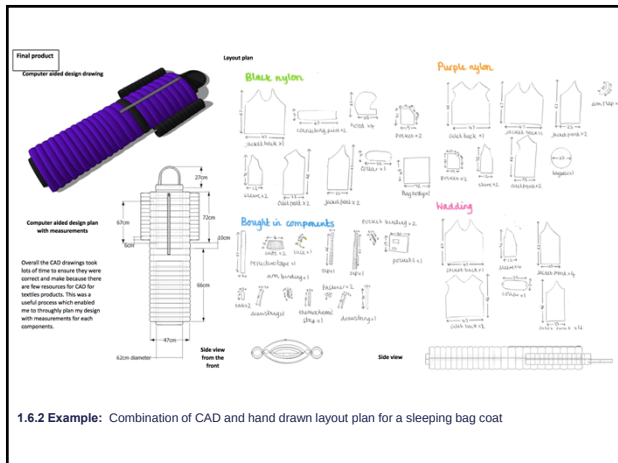
Lamp components Not to Scale

MATERIAL	THICKNESS (mm)	LENGTH (mm)	HEIGHT (mm)	QUANTITY FOR ASSEMBLY	TOTAL NUMBER
Planned frame	4	80	200	1	4
Acrylic layer	3	80	200	1	4
Mahogany	18	120	120	-	2
Various acrylic pieces	-	-	-	8 different sizes and colours	36 different sizes and colours

CUTTING LIST

Minor changes took place for the wooden base including:
Mahogany as the main material
CNC route two fairly large components of the same size

1.6.1 Example: CAD drawings for a lamp, fully dimensioned with a cutting list and material details



Technical Specification (Prototype)

Below is my final specification table that has been composed from the most significant needs and requirements identified on P1. I have also considered additional points that arose through my iterations and further research.

Ref.	Point	Justification	Does the final design solution meet the point?
P1	Must be solar powered.	This was identified through general research on P1.	Yes - element is solar powered and will also store charge in the rechargeable battery.
P2	Must be securely attached & not interfere with existing elements.	This was identified through element location research on P1.	Yes - element is attached by clamping around the centre pins. Both to secure.
P3	The element must be eye catching and brightly coloured.	The new element will need to fit with the current colour scheme as identified on P1.	Yes - the predominant purple and yellow colours match the existing elements.
P4	The element should be interactive.	The questionnaire identified a positive response to interactivity P5.	Yes - the Arduino circuit allows for interactivity through the use of LEDs and PTH switches.
P5	The element should not disturb local residents.	Otherwise the element may have a negative impact.	Yes - I have used LEDs over buzzers as an output to reduce disturbance of local residents.
P6	The element must not be able to be removed easily.	Iteration 2 on P12 identified that both would be the most secure option available.	Yes - the brackets used in the final design hold together and the both are covered on them.
P7	Must be easy to install.	Be that it is easily be attached to existing elements.	Yes - the main element itself can be produced by CNC machinery, the brackets can be cast. A PCB would need to be produced for the electronics but it is relatively simple design.
P8	The element should consider viability for mass production.	In order to minimise costs and improve ease and speed of manufacture.	Yes - the main element itself can be produced by CNC machinery, the brackets can be cast. A PCB would need to be produced for the electronics but it is relatively simple design.

Prototype Parts List

Part No.	Material / Component	Specification / Dimension	Qty
1	Purple Acrylic	300x300x3mm	1
2	Yellow Acrylic	150x150x3mm	1
3	Clear Acrylic Tube	42"x300mm	1
4	ABS Filament	50g Any Colour	1
5	Self Adhesive Vinyl	Yellow A4 sheet	1
6	M3 Bolt	3x10mm	6
7	Arduino Board	Arduino Uno Board	1
8	Arduino Shield	To Fit Uno Board	1
9	LED	10mm Red	6
10	LED Chip (Soldering)	10mm Black	6
11	PTH Switch	10mm Button Size	6
12	Resistor (50K)	5000	6
13	Resistor (PTMS)	10KΩ	6
14	Rechargeable Battery	12V, 1.80Ah	1
15	Solar Panel Kit	Appropriate Size	1
16	Heat Shrink	3.3mm (2.1)	X
17	Wire	Single Core (26AWG)	X

The part numbers link to the technical drawings on the following pages.

1.6.3 Example: Circuit details for an electronics project along with a parts list and check against requirements

Strand 1 - EXPLORE

1.6 Comparison to related marking criteria

1.6 (this marking criterion) assesses the clarity and level of detail in the **technical specification** and **working drawings** for the commercial manufacture of your final design solution

2.3 assesses the level of **design thinking skills in the progression** to your final design solution, with refinement to meet all requirements

3.4 assesses the **formal presentation / communication of the final design solution**, e.g. formal illustrations, formal models, rendered drawings etc., to give clarity and impact

Strand 2 - CREATE: Design Thinking

What is assessed in Strand 2?

- The work being assessed in this strand will be evidenced from the complete portfolio
- This assessment relates to the appropriate ideas, design iterations and developments throughout the designing and the level of design thinking and problem solving
- The assessment of **Strand 3** relates to the appropriate quality of the graphical and practical outcomes throughout the designing, in order that a third party would be able to understand the candidate's intentions



Strand 2 - CREATE: Design Thinking (Max. of 24 marks)

2.1 Generation of initial ideas

Mark Band 1 (1-6)	Mark Band 2 (7-12)	Mark Band 3 (12-18)	Mark Band 4 (19-24)
Limited use of different design approaches that lead to ideas that do not always reflect the requirements and may appear stereotypical.	Some different design approaches that lead to some ideas that avoid design fixation and generally reflect the requirements.	Different and relevant design approaches that lead to ideas that mostly avoid design fixation, offer scope for challenge and mostly reflect requirements.	Different and relevant design approaches that lead to ideas that totally avoid design fixation, offer scope for challenge and fully reflect requirements.



Strand 2 - CREATE: Design Thinking

2.1 What is being assessed?

- The candidate's ability to generate many different initial ideas and concepts that offer scope for challenging design thinking
- Use of differing but appropriate design approaches and techniques
- The avoidance of fixation on preconceived ideas or stereotypical design
- Ideas respond to and build upon technical and non-technical requirements identified by users, stakeholders, and through other relevant testing and investigations



Strand 2 - CREATE: Design Thinking

2.1 Relevant evidence could include

- Initial outline thoughts, ideas and concepts that will not necessarily be in a great deal of detail
(these initial ideas can appear anywhere in the iterative design process, to start or follow a line of conceptualising or to extend an earlier idea. They may be used at the very start of the project as a basis for investigation, if this suits your iterative process)
- Freehand sketches
(freehand sketching is inherent within the ethos of iterative design, but other suitable media and methods can also be used as relevant and appropriate)
- Diagrams, models, sketch models, simple prototypes, experiments...
- Feedback on initial ideas obtained from users and stakeholders



Strand 2 - CREATE: Design Thinking

2.1 Relevant evidence could include

- Use of design strategies, techniques and approaches to avoid fixation, such as:
 - User-centred design (UCD)
 - Systems thinking
 - Working in collaboration with others
 - Methods of idea-generation
- Summative points to indicate how ideas meet identified technical and non-technical requirements, and to suggest next steps



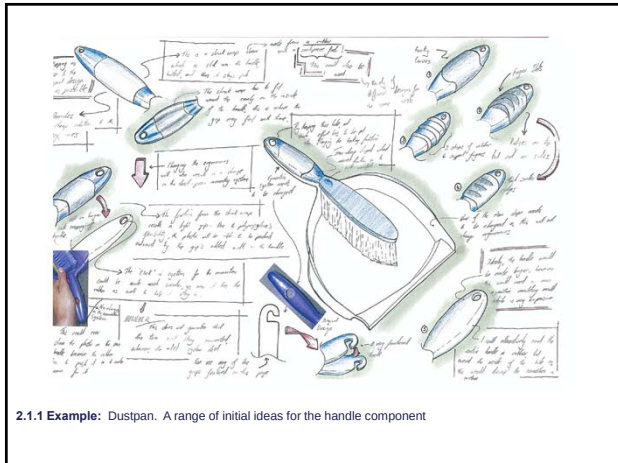
Strand 2 - CREATE: Design Thinking (Max. of 24 marks)

2.1 Which mark band?

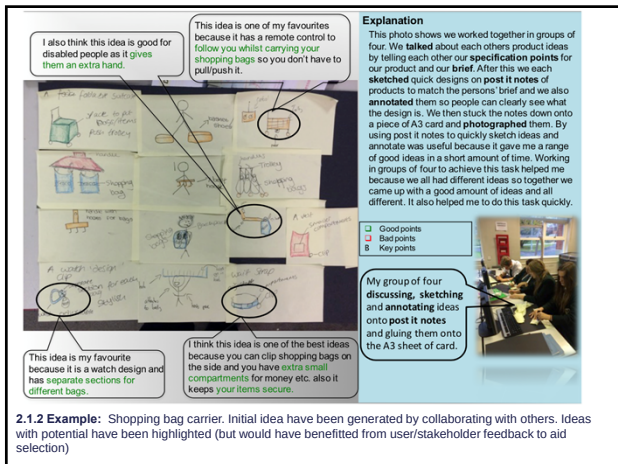
Lower Mark Bands	Higher Mark Bands
A small number of ideas which are very similar	Ten or more ideas, either different to each other or showing variations of a more complex idea.
Stakeholder feedback not considered	Ideas reflect stakeholder feedback
Limited annotation and explanation of ideas	Commentary and annotation (where required) to aid understanding / demonstrate design thinking
Ideas tend to fix on a single concept or based on existing designs	Use of appropriate strategies to avoid fixation and generate innovative ideas and concepts
Ideas / concepts are not focused on the requirements	Ideas / concepts clearly focused on meeting requirements

Discuss what **higher mark band** and **lower mark band** responses might look like for your own DT 'area'

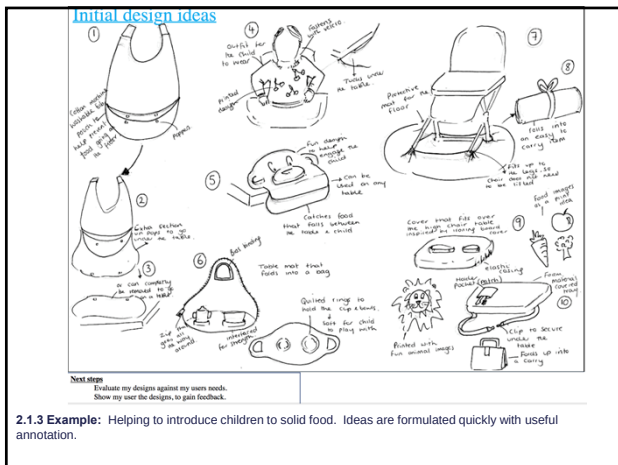




2.1.1 Example: Dustpan. A range of initial ideas for the handle component



2.1.2 Example: Shopping bag carrier. Initial idea have been generated by collaborating with others. Ideas with potential have been highlighted (but would have benefitted from user/stakeholder feedback to aid selection)



2.1.3 Example: Helping to introduce children to solid food. Ideas are formulated quickly with useful annotation.

Strand 2 - CREATE: Design Thinking

2.1 Comparison to related marking criteria

2.1 (this marking criterion) assesses the candidate's ability to **generate** many innovative and different ideas – the level of design thinking

3.2 assesses the candidate's ability to **communicate and present** ideas and thinking effectively

5.2 assesses the candidate's ongoing **evaluation, reviews and reflection, and management** of the design progression



Strand 2 - CREATE: Design Thinking (Max. of 24 marks)

2.2 Design developments

Mark Band 1 (1–6)	Mark Band 2 (7–12)	Mark Band 3 (12–18)	Mark Band 4 (19–24)
Limited developments are superficial and/or are not iterative.	Iterative developments are generally progressive and respond to some identified next-steps of development.	Iterative developments are progressive, incorporating technical requirements and respond to most identified next-steps for development.	Iterative developments are comprehensive and progressive, incorporating all technical requirements and fully respond to identified next-steps of development.



Strand 2 - CREATE: Design Thinking

2.2 What is being assessed?

- The quality and attention to detail demonstrated in progressive, iterative design developments
- The meeting of identified technical and stakeholder requirements
- How well iterations respond to identified next steps of development



Strand 2 - CREATE: Design Thinking

2.2 Relevant evidence could include

- Improvements and iterative developments to a number of the candidate's initial design ideas (more than two), through sketches, models, trials, digital tools etc.
- A 'step-by-step' approach to overcome and refine any identified problem or to meet a specific requirement
- Creating > evaluating > exploring > creating > evaluating
..... in any order, with ongoing real time testing and evaluation of designs against stakeholder and technical requirements.
- Feedback obtained from users and stakeholders to inform iterations
- Consideration of size and cost; materials and manufacturing; ergonomics, inclusive design and wider issues

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Strand 2 - CREATE: Design Thinking (Max. of 24 marks)

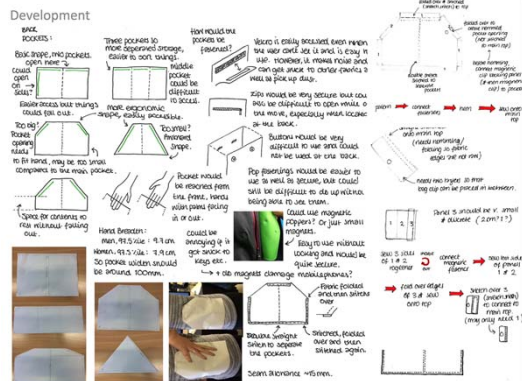
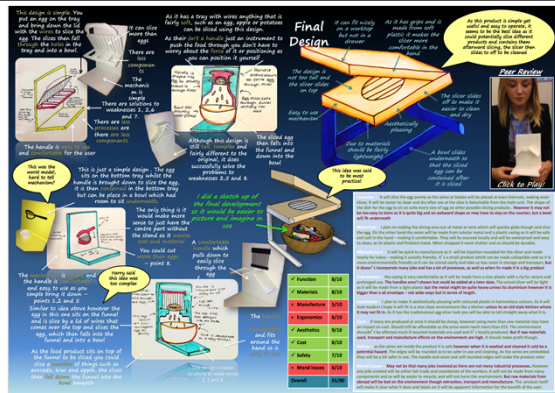
2.2 Which mark band?

Lower Mark Bands	Higher Mark Bands
Limited detail and refinement of designs	A high level of clarity and detail in the refinement and progression towards a design solution
Limited experimentation with materials, components and processes	Appropriate modelling and testing of materials, components and processes throughout
Designs do not build on what has gone before, the iterative process is not embraced	Design iterations are a consequence of what has been learnt from previous iterations
Limited appreciation of relevant requirements. The approach is not structured	All relevant requirements are considered and conflicts resolved through a structured approach
Users and stakeholders not consulted or involved	Stakeholders and users test and use models and give feedback to inform design iterations

Discuss what **higher mark band** and **lower mark band** responses might look like for your own DT 'area'

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2.2.1 Example: Guitar kit storage. Design iterations developed progressively, responding to weaknesses identified. Sketches, CAD, modelling and analysis of potential solutions.



Strand 2 - CREATE: Design Thinking

2.2 Comparison to related marking criteria

2.2 (this marking criterion) assesses the candidate's ability to **develop** a number of designs iteratively based on identified requirements and next steps – the level of design thinking

3.3 assesses the candidate's ability to **communicate / present** their iterative developments and design thinking effectively using a range of different and appropriate techniques

5.2 assesses the candidate's **ongoing evaluation, reviews and reflection, and management** of the design progression

Strand 2 - CREATE: Design Thinking (Max. of 24 marks)

2.3 Development of final design solution(s)

Mark Band 1 (1-6)	Mark Band 2 (7-12)	Mark Band 3 (12-18)	Mark Band 4 (19-24)
Little or no progression seen from earlier developments and little or none of the identified opportunities and requirements have been met.	Some progression seen from earlier developments and some of the identified opportunities and requirements have been met.	Clear progression from earlier developments and most of the identified opportunities and requirements have been met.	Clear and comprehensive progression from earlier developments and all of the identified opportunities and requirements have been met.



Strand 2 - CREATE: Design Thinking

2.3 What is being assessed?

- The clarity and completeness of the candidate's progression from earlier developments to a final design solution*
- The level to which the final design solution meets the identified problems and opportunities
- The level to which the final design solution satisfies all technical and non-technical requirements

* The final design solution considers the solution as a commercial product



Strand 2 - CREATE: Design Thinking

2.3 Relevant evidence could include

- Liaison with users and stakeholders to cover / resolve different viewpoints and needs from developments
- An explanation of how the final design solution meets the user and stakeholder requirements
- A demonstration of how the final design solution meets and the technical requirements (model videos, animations, exploded views)



Strand 2 - CREATE: Design Thinking (Max. of 24 marks)

2.3 Which mark band?

Lower Mark Bands	Higher Mark Bands
Little or no progression seen from earlier developments	Systematic and progressive iterations result in the most refined and complete solution possible
Thinking lacks depth and is not evidenced in real time	Real time evidence of design thinking throughout, detailing compromises and approaches taken
Stakeholders not consulted or involved	Final design solution fully scrutinised by stakeholders
Decision making is not clear. Very few of the identified opportunities and requirements have been met	Decisions are clearly highlighted, transparent and demonstrate that all design opportunities in the context or focus area have been covered

Discuss what **higher** mark band and **lower** mark band responses might look like for your own DT 'area'



2.3.1 Example: Robot goalkeeper – clear progression over 3 pages from initial iteration towards final design, checking against requirements as it develops

The design process for the robot goalkeeper is shown across three pages. It starts with initial ideas and sketches, followed by iterations where the design is refined. The final design proposal includes a detailed drawing of the robot and its components, along with a list of requirements and a checklist for the final design.

2.3.2 Example: Vegetable Peeler progresses towards a prototype model used for final design solution

The design process for the vegetable peeler is shown across three pages. It starts with initial ideas and sketches, followed by iterations where the design is refined. The final prototype model is shown with a detailed drawing and a list of requirements. The process includes checking against requirements and making improvements.

Strand 2 - CREATE: Design Thinking

2.3 Comparison to related marking criteria

2.3 (this marking criterion) assesses the **level of design thinking skills in the progression** to the final design solution, with refinement to meet all requirements

1.6 assesses the **technical specification, working drawings, and level of technical detail** and clarity for the final design solution

3.4 assesses the **formal presentation / communication of the final design solution**, e.g. formal illustrations, formal models, rendered drawings etc., to give clarity and impact.



Strand 2 - CREATE: Design Thinking (Max. of 24 marks)

2.4 Critical thinking

Mark Band 1 (1-6)	Mark Band 2 (7-12)	Mark Band 3 (12-18)	Mark Band 4 (19-24)
Superficial responses when problems are identified. Little or no evidence of innovation* throughout the design process.	Effective responses to some identified problems. Some evidence of innovation* throughout the design process.	Effective responses to most identified problems. Clear evidence of innovation* throughout the design process.	Systematic and effective responses to all identified problems. Clear and systematic evidence of innovation* throughout the design process.

* Innovation in this context refers to learners considering new methods or ideas to improve and refine their design solutions and meet the needs of their intended market and/or primary user.



Strand 2 - CREATE: Design Thinking

2.4 What is being assessed?

- The level of the candidate's critical thinking – which involves
 - not accepting things the way they are and being brave enough to ask difficult and challenging questions - delving deeper to understand why things are the way that they are – being mature enough to listen and accept new thoughts and opinions
 - finding both negative and positive viewpoints in the design process. What advantages does an iteration give? Does it also lead to disadvantages? Are there compromises to be made or conflicts to be resolved?
 - carefully considering the views of others, but not repeating them - challenging preconceptions, suggesting new directions and approaches, and different solutions
 - reflecting and adapting their own approach, learning from experience
 - adopting a broad and balanced view when solving problems and issues that arise



Strand 2 - CREATE: Design Thinking

2.4 Relevant evidence could include

- The candidate's record of problems and issues as they arise, and how they were addressed - may include a plan to work through specific matters
- Thoughts and thought processes recorded in real-time, could be audio, video, text or graphic
- Innovative methods, ideas and solutions to meet user, stakeholder, and technical requirements

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Strand 2 - CREATE: Design Thinking (Max. of 24 marks)

2.4 Which mark band?

Lower Mark Bands

Superficial record of design process with little appreciation of problems

Thinking is restricted to the obvious and iterations show little evidence of innovation

Little or no evidence of innovation throughout the design process

Limited questioning, missing out on thoughts and opinions of others, as well as positive and negative viewpoints

Higher Mark Bands

The real time record of the iterative design process is clear and complete, showing a systematic and effective response to all identified problems

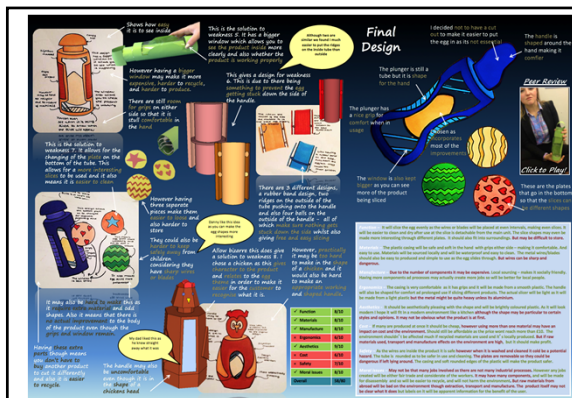
Critical thinking skills are evident when identifying problems and devising innovative iterations

Clear and strong evidence of innovative thinking throughout the iterative designing

Carefully considering the views of others, challenging preconceptions, suggesting new directions and approaches

Discuss what **higher** mark band and **lower** mark band responses might look like for your own DT 'area'

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2.4.1 Example: Egg Slicer – solutions respond to weaknesses identified against the requirements. Analysis of each innovative solution leads to a 'final' iteration

[illegible]

Strand 2 - CREATE: Design Thinking

2.4 Comparison to related marking criteria

2.4 (this marking criterion) assesses the **level of critical and innovative thinking** evident in the candidate's designing

5.2 assesses the candidate's skills when **critically evaluating their design ideas and solutions** against the requirements and stakeholder feedback

5.4 assesses the candidate's skills in the **critical evaluation of the strengths and weaknesses** of their final prototype

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Strand 3 - CREATE: Design Communication

What is assessed in Strand 3?

- The assessment of this strand relates to the appropriate quality of the graphical and practical outcomes throughout the designing, in order that a third party would be able to understand the candidate's intentions
- The teacher/assessor is responsible, as a third party, to assess the candidate's skills in recording, communicating and presenting their iterative design progression

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Strand 3 - CREATE: Design Communication (16 marks)

3.1 Quality of chronological progression

Mark Band 1 (1-4)	Mark Band 2 (5-8)	Mark Band 3 (9-12)	Mark Band 4 (13-16)
Design iterations are not always clear and/or chronological, with little or no support from real-time evidence.	Design iterations are sometimes clear and predominantly chronological, some support from real-time evidence.	Design iterations are clear and chronological, mostly supported by real-time evidence.	Design iterations are clear, systematic and chronological, fully supported by real-time evidence.

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Strand 3 - CREATE: Design Communication

3.1 What is being assessed?

- The systematic recording of the iterative designing - all activities, events or processes - as they happen, in the order they happen, in chronological order
- The clarity of the design iterations as they progress toward the final design solution
- The level of evidence verifying that it is a real time record of the iterative design development

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Strand 3 - CREATE: Design Communication

3.1 Relevant evidence could include

- Video, audio, photograph or authentic documents used to demonstrate that activities, events, or processes actually happened as stated / claimed
- Investigations into a particular existing product or material during the development of a design presented '*as it happened, at the time it happened*' in the portfolio
- Use of a chart or other means to show the design iterations of different parts of the design, subsequent feedback received, and next iterations developed from the feedback

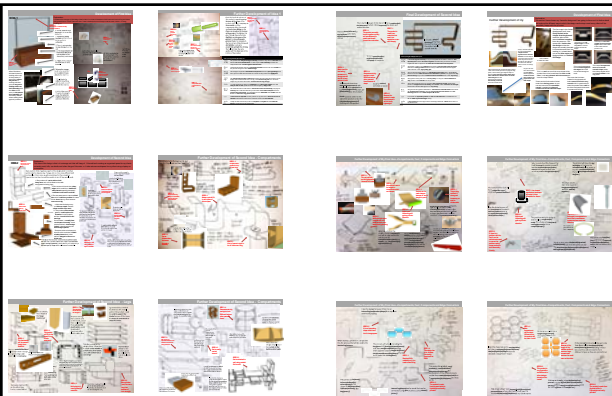
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Strand 3 - CREATE: Design Communication (16 marks)

3.1 Which mark band?

Lower Mark Bands	Higher Mark Bands
The portfolio tells an incoherent and incomplete story that does not support the design journey	The portfolio tells an authentic, coherent and concise but complete story, as it happens from conception to evaluation of the final prototype(s)
Thinking and progression is difficult to follow	A third party is able to fully understand the candidate's thinking and progression throughout
Design iterations are not always clear with little or no support from real-time evidence	The real time chronological recording of the iterative designing is supported and verified by convincing evidence

Discuss what **higher** mark band and **lower** mark band responses might look like for your own DT 'area'



3.1.1 Example: A systematic approach recording activities as they happen. Real time feedback allows decisions to be made by the learner and next steps to be identified.

Iterative Design and Design Development - an on-going log of decisions/outcomes and key moments in my journey

Date	Iteration/stage	Brief explanation of design thinking	Feedback and Summary	Actions
When did it take place?	Component / item that you are working on?	What directions are you moving in? What are you trialling/testing/experimenting with and why?	User/Stakeholder thoughts – if necessary? Does the iteration meet the requirements – if not why? Is the designing going in the right direction?	Is the idea worthy of continued development? What do you need to do next? Your next steps?

3.1.2 Example: Possible format for a real-time log of the design iterations of different components or parts of the design, feedback received against requirements, and next iterations developed from the feedback. When completed, this communicates the candidate's design thinking and progression.

Strand 3 - CREATE: Design Communication (16 marks)

3.2 Quality of initial ideas

Mark Band 1 (1–4)	Mark Band 2 (5–8)	Mark Band 3 (9–12)	Mark Band 4 (13–16)
Informal graphical and modelling skills are limited and rarely clear enough to appropriately communicate initial thinking.	Informal graphical and modelling skills are sufficient, but are not consistent in appropriately communicating initial thinking.	Informal graphical and modelling skills are good and are consistent in appropriately communicating initial thinking.	Informal graphical and modelling skills are excellent and are effective and consistent in appropriately communicating initial thinking.



Strand 3 - CREATE: Design Communication

3.2 What is being assessed?

- The clarity and effectiveness of the candidate's communication and presentation of initial ideas and concepts
- The quality and consistency of the candidate's graphical and modelling skills using different and appropriate techniques



Strand 3 - CREATE: Design Communication

3.2 Relevant evidence could include

- Basic or simple early designs / ideas / iterations / prototypes produced in order to gain some early feedback from users and stakeholders
- Communication of the candidate's thought processes through simple sketches and modelling
- Differing methods and techniques such as exploded or sectional views (freehand), sequential sketching (to show moving parts / mechanisms) and sketch modelling
- Annotation of early ideas may or may not be included as appropriate



Strand 3 - CREATE: Design Communication

3.3 What is being assessed?

- The clarity and effectiveness of the candidate's communication and presentation of their iterative design developments and design thinking
- The quality and consistency of the candidate's sketching, drawing and modelling skills using a range of different and appropriate techniques, including quality and detail in content, format and layout
- The role and effectiveness of appropriate communication techniques in the candidate's iterative design developments



Strand 3 - CREATE: Design Communication

3.3 Relevant evidence could include

- Differing media, methods and techniques such as 2D diagrams, annotated 3D sketching, rendered drawings, exploded and cut-away views, sequential sketching and CAD
- Models, testing and experimentation to communicate the development and refinement of designs, and the method of manufacture that may be used
- Real time evidence in the form of audio or video
- Use of full-scale models, toiles or samples of materials to determine / communicate ergonomic, dimensional and functional suitability



Strand 3 - CREATE: Design Communication (16 marks)

3.3 Which mark band?

Lower Mark Bands	Higher Mark Bands
The range of communication techniques used is limited and rarely clear enough to develop or communicate design concepts	Design developments presented in a way that fully explains the candidate's thinking, so that stakeholders and users fully understand the design decisions taken
Lacks detailed communication of the design progression, and the journey taken, to gain useful feedback	Highly effective and detailed communication of the progression from one stage of a design, concept or part of a design/component to the next, and the journey taken, as appropriate, to gain feedback
Superficial modelling that does not fully engage at component and assembly level. Use of CAD is limited	Sophisticated models and early prototypes on a component and assembly level, complex CAD drawings, visualisations, simulations and virtual testing

Discuss what **higher** mark band and **lower** mark band responses might look like for your own DT 'area'



IDEA 1 Here is an idea for my design. It's a jump which raises and lowers without needing to dismount your horse. It is a structure which is unique.

1) This is not clear how the jump will move up or down.

2) The width of this is too wide to enable it to be carried efficiently and easily with minimum effort. It also takes up too of storage room due to the width of the cylinder.

3) How does it stay in the ground and does not fall over?

4) Really expensive to make due to the chrome effect that has been used.

5) It will be hard to fit the mechanism if the system to move the post up and down breaks.

6) Finger joints will easily be exposed due to the chrome effect.

7) As it is made from chrome metal and covered in chrome it will be heavy.

8) Hard to clean due to mechanism will be exposed in the mechanism. It will be easy to get to.

Solution to problem 1: The sketch above has now designed a cylinder structure which has a slot which will be able to move up and down.

These images helped me to think about where the jump should be positioned when the glove will be attached to it. I will be able to move the jump up and down. The glove will be attached to the jump. The glove will be attached to the jump. The glove will be attached to the jump.

My solution to problem 2: The sketch above has now designed a cylinder structure which has a slot which will be able to move up and down. I will be able to move the jump up and down. The glove will be attached to the jump. The glove will be attached to the jump. The glove will be attached to the jump.

My solution to problem 3: The sketch above has now designed a cylinder structure which has a slot which will be able to move up and down. I will be able to move the jump up and down. The glove will be attached to the jump. The glove will be attached to the jump. The glove will be attached to the jump.

3.3.1 Example: Horse jump project 1/2 – clear communication of initial idea, problems and solutions using a range of sketching techniques and modelling

My solution to problem 3: The sketch above has now designed a cylinder structure which has a slot which will be able to move up and down. I will be able to move the jump up and down. The glove will be attached to the jump. The glove will be attached to the jump. The glove will be attached to the jump.

My solution to problem 2: The sketch above has now designed a cylinder structure which has a slot which will be able to move up and down. I will be able to move the jump up and down. The glove will be attached to the jump. The glove will be attached to the jump. The glove will be attached to the jump.

My solution to problem 1: The sketch above has now designed a cylinder structure which has a slot which will be able to move up and down. I will be able to move the jump up and down. The glove will be attached to the jump. The glove will be attached to the jump. The glove will be attached to the jump.

Final design: The sketch above has now designed a cylinder structure which has a slot which will be able to move up and down. I will be able to move the jump up and down. The glove will be attached to the jump. The glove will be attached to the jump. The glove will be attached to the jump.

3.3.2 Example: Ice pack project 2/2. Critical evaluation against requirements leads to 'final' version – but lacks stakeholder involvement.

COMMENTS:

- not attractive
- but simple and small
- would be useful for a quick eating
- doesn't look very strong

COMMENTS:

- looks like a lunch box
- too big
- cool modern design
- hard to takeout items

3.3.3 Example: Bag project. Clear sketching and detailed annotation with appropriate CAD renderings and stakeholder involvement with model testing.

Strand 3 - CREATE: Design Communication

3.3 Comparison to related marking criteria

3.3 (this marking criterion) assesses the candidate's ability to **communicate / present** their iterative developments and design thinking effectively using a range of different and appropriate techniques.

2.2 assesses the ability of the candidate to **develop a number of designs iteratively** based on identified requirements and next steps – the level of their design thinking

2.3 assesses the level of the candidate's **design thinking skills in the progression** to their final design solution, with refinement to meet all requirements



Strand 3 - CREATE: Design Communication (16 marks)

3.4 Quality of final design solution(s)

Mark Band 1 (1–4)	Mark Band 2 (5–8)	Mark Band 3 (9–12)	Mark Band 4 (13–16)
Formal presentation of the final design solution(s) is limited making it difficult for a third party to understand.	Formal presentation of the final design solution(s) is sufficient and provides some clarity to a third party.	Formal presentation of the final design solution(s) is good and provides appropriate clarity to a third party.	Formal presentation of the final design solution(s) is excellent and provides impact and appropriate clarity to a third party.



Strand 3 - CREATE: Design Communication

3.4 What is being assessed?

- The quality and clarity of the candidate's communication of their final design solution(s) and its viability to the stakeholders and users, using appropriate methods and techniques
- The impact and effectiveness of the candidate's presentation of their final design solution(s) to a third party so that all aspects can be clearly understood



Strand 3 - CREATE: Design Communication

3.4 Relevant evidence could include

- Appropriate media/methods to communicate the viability of the design, which might include
 - 3D CAD - models, visualisations, illustrations, simulations, stress analysis
 - Exploded views to show key details / how key parts fit together
 - Formal models – either constructed by hand or CAM, could be 3D printed
 - A written report and/or presentations using software
 - Video or audio, possibly of mechanisms, working models, or tests being carried out
 - Spreadsheets, data, and charts showing financial aspects and projections
 - Rendered images – digital / non-digital
 - Images created with Photoshop to show the design solution in a virtual context



Strand 3 - CREATE: Design Communication

3.4 Relevant evidence could include

- Presentation of the final design solution(s) for approval by users and stakeholders prior to the candidate producing a full technical specification for manufacture and the final working prototype
- A record of any further comments, suggestions and feedback from users and stakeholders, with modifications to be made in the technical specification
- Use of media and methods appropriate to the scale and extent of the project, and the design solution itself



Strand 3 - CREATE: Design Communication (16 marks)

3.4 Which mark band?

Lower Mark Bands	Higher Mark Bands
Formal presentation of the final design solution(s) is limited and it is difficult for a third party to understand its suitability	The final design solution is suitably presented to a third party, covering the practicality, usability and market potential of the product
A limited, inappropriate or basic techniques used in the presentation, which lacks impact and detail	A high level of impact, detail and clarity in the presentation, achieved through appropriate advanced and sophisticated techniques

Discuss what **higher mark band** and **lower mark band** responses might look like for your own DT 'area'





Strand 3 - CREATE: Design Communication

3.4 Comparison to related marking criteria

3.4 (this marking criterion) assesses the **candidate's formal presentation / communication of the final design solution**, e.g. formal illustrations, formal models, rendered drawings etc., to give clarity and impact

1.6 assesses the **technical specification, working drawings, and level of technical detail** and clarity for the final design solution

2.3 assesses the **level of the candidate's design thinking skills in the progression** to their final design solution, with refinement to meet all requirements



Strand 4 – CREATE: Final Prototype(s)

What is assessed in Strand 4?

- The assessment of this strand relates to the appropriate impact and quality of the final prototype(s), in order that a third party would be able to understand the candidate's intentions
- The teacher/assessor is responsible, as a third party, to assess the candidate's skills in the planning and making of their final prototype(s) which will show the viability and potential of their final design solution



Strand 4 – CREATE: Final Prototype(s)

The role and characteristics of the final prototype(s)

- The iterative designing results in a **Final Design Solution** (2.3, 3.4) that meets all identified problems and requirements
- The **Technical Specification** (1.6) defines through drawings and technical details how the final design solution would be manufactured in an industrial and commercial context
- The **Final Prototype** (4.1 – 4.4) is not an actual product or system – it is the nearest possible representation of a commercially manufactured product or system, but made in a school or college workshop. It should represent a complete, viable design solution, and as far as possible use the same materials and processes that would be used if it was the actual product being manufactured in industry

In some cases, more than one **Final Prototype** may be needed to demonstrate different aspects of the design such as *aesthetics, function, key components or features*. **Final Prototypes** can be scaled up or down accordingly if required.



Strand 4 – CREATE: Final Prototype(s) (Max. of 20 marks)**4.1** Quality of planning for making the final prototype(s)

Mark Band 1 (1–5)	Mark Band 2 (6–10)	Mark Band 3 (11–15)	Mark Band 4 (16–20)
Offers little or no support to the making process.	Generally supports the management of the making process with some relevant requirements identified from the technical specification.	Good level of detail and relevant, covering most requirements identified from the technical specification to manage the making process.	Comprehensive and relevant, covering all requirements identified from the technical specification to effectively manage the making process.



Strand 4 – CREATE: Final Prototype(s)**4.1** What is being assessed?

- The level of the candidate's planning in advance of their making of the final prototype in the school or college workshop
- The candidate's use of their plan to manage the methods and approaches during the making, to deliver a high quality final prototype



Strand 4 – CREATE: Final Prototype(s)**4.1** Relevant evidence could include

- Details of changes to the final design to enable your final prototype to be made as a one-off prototype in the school/college workshop
- Planning for the use of specific materials, tools, machinery and equipment.
- Details of bought in / standardised components that will need to be purchased,
- Use of jigs, templates, patterns, layouts, tolerance checking
- Estimations on timings and sequencing, including any variations to the planned events, with reasoning and details of any modifications to the design



Strand 4 – CREATE: Final Prototype(s) (Max. of 20 marks)

4.2 Quality of final prototype(s)

Mark Band 1 (1–5)	Mark Band 2 (6–10)	Mark Band 3 (11–15)	Mark Band 4 (16–20)
Inaccurate and/or basic standards demonstrated.	Sufficient standard demonstrated through a generally accurate outcome.	Good standard and levels of accuracy demonstrated.	Excellent standard, demonstrating high levels of accuracy.
Finishing may not be appropriate and/or the outcome would not present well to a stakeholder.	Finishing is appropriate but the outcome could be better presented to stakeholders.	Finishing is appropriate and the outcome will present well to a stakeholder.	Finishing is appropriate and the outcome will present well and provide impact to a stakeholder.

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Strand 4 – CREATE: Final Prototype(s)

4.2 What is being assessed?

- The quality and presentation of the candidate's final prototype(s) and the standards of accuracy and finish that are achieved
- The level to which the final prototype reflects the final design solution and communicates the details and features clearly
- The level of impact and effectiveness of the final prototype(s) for users and stakeholders to be able to evaluate it against all specified needs and requirements

NB Assessment of final prototype(s) is through the **photographic/video evidence in the portfolio** - not the actual prototype(s) that the candidate has made.

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Strand 4 – CREATE: Final Prototype(s)

4.2 Evidence must include

- Several good quality photos and videos showing different views of the final prototype(s), e.g. front, back, sides, underside, top, and inside of items, showing the quality and accuracy of making and finish. Photos and videos during the making (and also the evaluation and testing) provide evidence for assessment
- Videos to demonstrate functionality, movement and operation - features and functions such as the range of adjustment, the prototype being used in different settings or positions, the operation of controls, taking apart / assembling or adjusting components, opening and closing, and so on

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Strand 4 – CREATE: Final Prototype(s)

4.2

Relevant evidence could include

- Photos and/or videos of the final prototype(s) in the intended context, being used (where possible) as intended, to demonstrate the accuracy and suitability

OCR

United Learning and Risk

Strand 4 – CREATE: Final Prototype(s)

(Max. of 20 marks)

4.2

Which mark band?

Lower Mark Bands	Higher Mark Bands
Inaccurate and/or basic standard of practical skills demonstrated, with little attention to detail	The correct use of tools, equipment, processes, materials and finishes are used to accurately produce the final prototype(s). A high level of attention to detail is evident
The final prototype(s) does not fully reflect the final design solution, preventing the engagement of others in giving feedback	The final prototype(s) fully reflect the final design solution, which fully engages users and stakeholders, enabling detailed feedback to be obtained
The final solution is not clearly shown	High quality, sharp and clear photos and videos are produced, with creativity, showing the final solution at its best

Discuss what **higher** mark band and **lower** mark band responses might look like for your own DT 'area'

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United Learning and Risk



4.2.1 Example: Bike bag. All views are shown including in situ on bike (video needed)



4.2.2 Example:
Jewellery work tray – focus on quality of photos rather than quantity



4.2.3 Example: OOP Makeup storage. Completed final prototype effectively displays branding integrated with the making of the prototype, adding to the overall impact.

Strand 4 – CREATE: Final Prototype(s) (Max. of 20 marks)

4.3 Use of specialist techniques and processes

Mark Band 1 (1–5)	Mark Band 2 (6–10)	Mark Band 3 (11–15)	Mark Band 4 (16–20)
Limited and rarely appropriate to materials/components being used.	Sufficient, but are not consistently appropriate to materials/components being used.	Good and are consistently appropriate to materials/components being used.	Excellent and are effective and consistently appropriate to materials/components being used.

Strand 4 – CREATE: Final Prototype(s)

4.3 What is being assessed?

- The candidate's use of techniques and processes to achieve the desired outcomes
- The level of consistency in the candidate's use of techniques and processes that are appropriate and effective for the materials and components being used



Strand 4 – CREATE: Final Prototype(s)

4.3 Relevant evidence could include

- Annotated photos and video showing the candidate's chosen techniques and processes being used effectively and appropriately in real time as the making of their final prototype(s) progresses
- Differing techniques and processes to shape, fabricate, construct and assemble the final prototype(s) appropriate to materials/components being used
- Candidate's use of jigs, templates and other means to control quality and accuracy



Strand 4 – CREATE: Final Prototype(s) (Max. of 20 marks)

4.3 Which mark band?

Lower Mark Bands

Limited evidence of techniques and processes appropriate to materials / components being used

Higher Mark Bands

A detailed and clear real time record of making evidences consistently appropriate techniques and processes carried out effectively and efficiently

Discuss what **higher** mark band and **lower** mark band responses might look like for your own DT 'area'



Strand 4 – CREATE: Final Prototype(s) (Max. of 20 marks)

4.4 Use of specialist tools and equipment

Mark Band 1 (1–5)	Mark Band 2 (6–10)	Mark Band 3 (11–15)	Mark Band 4 (16–20)
Use and selection of hand tools and/or machinery are limited and rarely appropriate.	Use and selection of hand tools and machinery are sufficient, but not always consistently appropriate.	Use and selection of hand tools and machinery are good and consistently appropriate.	Use and selection of hand tools and machinery are effective and consistently appropriate.
Digital design and/or manufacture* is limited and demonstrate little or no skills or knowledge.	Digital design and manufacture* is not always used appropriately, but demonstrate sufficient skills and knowledge.	Digital design and manufacture* are used appropriately to demonstrate good skills and knowledge.	Digital design and manufacture* are used effectively & appropriately to demonstrate excellent skills and knowledge.

*It may not have been appropriate to use digital design and manufacture in the final prototype. Where this is the case, the statement should be assessed on the skill levels demonstrated when using digital design and manufacture through earlier modelling. This can equally be applied to the use of hand tools and machinery, all of which require appropriate evidence.

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Strand 4 – CREATE: Final Prototype(s)

4.4 What is being assessed?

- The candidate's appropriate selection of hand tools, machinery, digital design and digital manufacture to achieve the desired outcomes
- The candidate's demonstration of their skills and knowledge through their use of hand tools*, machinery*, digital design* and digital manufacture*
- The level of consistency in the candidate's use of hand tools, machinery and digital design and manufacture that are appropriate and effective for the materials and components concerned

* Evidence of skills in all areas highlighted are required – see next slide

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Strand 4 – CREATE: Final Prototype(s)

4.4 Evidence must include

- All four** of the following must be evident *either* during the iterative design development or during the making of the final prototype(s). They should be assessed on appropriate and effective use
 - hand tools
 - machinery
 - digital design
 - digital manufacture

If these requirements are not met, this will impact on the marks possible

- Acknowledgment and details of input and help from others during the making, with a clear demarcation to the work that has actually been completed by the candidate

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Strand 4 – CREATE: Final Prototype(s)

4.4 Relevant evidence could include

- A production diary with annotated photos, videos and screen shots showing the candidate's chosen tools and equipment being used effectively and appropriately as the making of their final prototype(s) progresses
- Use of specialist tools and equipment during tests and experiments, including specialist software

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Strand 4 – CREATE: Final Prototype(s) (Max. of 20 marks)

4.4 Which mark band?

Lower Mark Bands	Higher Mark Bands
Limited evidence of mandatory elements	Evidence of consistently appropriate and effective use of all mandatory elements at a high skill level
Digital design and/or manufacture is limited and little or no skills or knowledge demonstrated	A high level of skill and knowledge is demonstrated using advanced software features and tools within CAD and CAM
Superficial record of making that does not always follow the plan	A thorough record of making following the plan

Discuss what **higher mark band** and **lower mark band** responses might look like for your own DT 'area'

Week 1
This image shows the initial design of the drinks carrier. It includes a 2D CAD drawing of the carrier, a 3D model of the carrier, and a photograph of the carrier being made. The carrier is made of wood and has a handle. The design is simple and functional.

Week 2
This image shows the carrier being made. It includes a photograph of the carrier being made, a photograph of the carrier being made, and a photograph of the carrier being made. The carrier is made of wood and has a handle. The design is simple and functional.

Week 3
This image shows the carrier being made. It includes a photograph of the carrier being made, a photograph of the carrier being made, and a photograph of the carrier being made. The carrier is made of wood and has a handle. The design is simple and functional.

Week 4
This image shows the carrier being made. It includes a photograph of the carrier being made, a photograph of the carrier being made, and a photograph of the carrier being made. The carrier is made of wood and has a handle. The design is simple and functional.

4.4.1 Example: Drinks carrier – organised approach with clear evidence of CAD (2D design) and CAM (Laser cutter) being used

4.4.2 Example: Puzzle box – well documented account of making including changes to the original plan

MANUFACTURE PROGRESS REPORT

Step 1.1 – Making wooden base plate



CAD drawing on computer



CNC Router

I uploaded my CAD drawing to the CNC router. It cut the shape out with no problem and I was happy with the outcome. No changes had to be made to my original plan for manufacture.



CNC Wire Eroder Outside



Once again I used my CAD drawing but this time I uploaded my drawing to a CNC Wire Eroder instead of a Router. This machine erodes the metal which is not needed, giving a basic profile of what I have intended to make. This basic profile will need to be cleaned up and shaped to the desired outcome. Once again no changes had to be made to my original plan for manufacture.

Step 1.2 – Drilling holes in wooden base plate



Using pillar drill

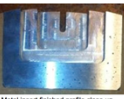


Close up of base plate

The above pictures show me using the pillar drill to drill the 16 holes for the toggle clamps and the 4 holes used to attach the support bar brackets. I also drilled 4 more holes for the metal insert. In my plan for manufacture I did not say that I also needed another 4 holes for the metal insert to be attached. Therefore this is one change to my original plan for manufacture.



Milling machine



Metal insert finished profile close up

Using a milling machine I was able to clean up the unfinished outcome from the CNC Wire Eroder. With the milling machine I took off a very small layer of the metal leaving a clean, smooth and shiny finish which has made up my finished profile. In my plan to manufacture I said that this would only take 15 minutes but it took a lot longer.

4.4.3 Example: This record of making for an Irish drum skin demonstrates the digital manufacturing processes required.

Strand 4 – CREATE: Final Prototype(s) (Max. of 20 marks)

4.5 Viability of the final prototype(s)

Mark Band 1 (1–5)	Mark Band 2 (6–10)	Mark Band 3 (11–15)	Mark Band 4 (16–20)
Little or no links to the technical specification and demonstrating limited potential to become a marketable product.	Meets some of the technical specification and demonstrating some potential to become a marketable product.	Meets most of the technical specification and demonstrating good potential to become a marketable product.	Meets all of the technical specification and demonstrating excellent potential to become a marketable product.

Strand 4 – CREATE: Final Prototype(s)

4.5 What is being assessed?

- How well the candidate's final prototype(s) reasonably meets and represents the requirements of the technical specification
- The potential for the actual product to be marketable as a commercial product, as demonstrated in the final prototype(s)



Strand 4 – CREATE: Final Prototype(s)

4.5 Relevant evidence could include

- Photographs and videos in the candidate's making diary (4.4), and those of the completed final prototype (4.2)
- Evaluative and analytical comments from the candidate, users and stakeholders relating to the viability and feasibility of the candidate's final design solution and the final prototype (Strand 5)
- The candidate's comparison of the final prototype(s) against their working drawings, lay plans, and other technical details, and explanation of how it meets each of the technical requirements
- Demonstrations of the practicality, capability, sustainability or usability of the design (Strand 5)
- A suitable marketing strategy that could include details relevant to costing



Strand 4 – CREATE: Final Prototype(s) (Max. of 20 marks)

4.5 Which mark band?

Lower Mark Bands	Higher Mark Bands
The final prototype arrives with very little awareness of the technical specification	The final prototype follows the technical specification fully and meets all its requirements
The portfolio does not contain enough evidence to suggest that the product has market potential	The widespread evidence in the portfolio indicates a high probability of success if the product were marketed commercially

Discuss what **higher mark band** and **lower mark band** responses might look like for your own DT 'area'



TESTING AND EVALUATION

I first tested the primary function of the product, whether it would effectively turn pages. I set up a stopwatch to measure time and aimed to flip the page 3 times, which would accommodate an 8 page long piece. I repeated this 10 times to record the percentage chance of the product working.

Results from my 10 attempts to turn 3 pages show that 80% of the time, the stand activates a page turn smoothly. However, the rate of success for 3 page turns is less than 50%. I found that this was due to the fact that when I came to the first page turn, the page had gotten stuck and was unable to flip over, as shown in the videos below. Because the previous 2 pages had flipped over with ease, the third page was not going to flip over.

Video shows how the page gets caught on the previously turned pages sticking out.

Video shows a successful page turn where page 2 turns to flip over.

Video shows how the page sometimes gets caught and sometimes slightly before fully turning over.

Video shows the page turn mechanism in full motion, turning the page as it only gets stuck halfway across. This is not so much an issue because landscape books are generally only used for young children's music that would not require page turns.

Video shows the page turn mechanism in full motion, turning the page as it only gets stuck halfway across. This is not so much an issue because landscape books are generally only used for young children's music that would not require page turns.

At the slower speed, the magnet picks up each page effectively and turns it a lot more effectively. However, the page turn may not be fast enough for the player.

I then tested the page turning mechanism with different sized and thicknesses of music books to see if the product was flexible with different formats of music.

I then tested it with a book that was even thicker than the original sheet music. I was aiming for reference. The thickness did not seem to affect the function of the stand and the video shows a smooth page turn.

I then tested it with a landscape music book. The video shows how the book was too wide for the mechanism to fully turn the page as it only got stuck halfway across. This is not so much an issue because landscape books are generally only used for young children's music that would not require page turns.

I then adjusted the code in the programme to change the speed of the motor to compare which one would be most effective.

At the faster speed, the page turn is a lot smoother and obviously the faster speed is an advantage to the user. However, because of the speed the accuracy is not good as the magnet does not always catch on.

Strengths and areas for improvement derived from testing and interviews

4.5.1 Example: Automated music stand. Evidence of testing the final prototype gives a clear understanding of the likelihood of success and viability of the design.

Testing

After I tested this product I found that it was very difficult to get the sides and all the bottom of the product, which is why I took the other two minutes to get the product fixed up into the compact form. When on bike stand that are out in the market today usually take second to prep up so that you can use them and take second when you need to fold them away. I have also found that the user is very quick and easy to take off which is good for in you don't want to use it because it gets in the way.

I had a lot of problems with the bike, probably a lot when I was using the sponge, I also found that the seat got in the way when I was using the bike. There was also some problems with the legs of the product because I tripped over them a few times. Also after you have cleaned the bike you would need to clean the seat because it got soaked and I need to spend a few seconds cleaning it because I needed to sit down to clean a wheel.

After that I took the product in to my work place so that I could see what bike frames it could hold and try to get it to fit if the bike was too heavy. I found that when putting the bike on it was very wobbly on a flat surface. And I also had to stretch a bit when putting the bike on the stand. And I kept hitting the roof of the work place because it couldn't raise the bike without hitting the roof.

Evaluation against my Specification

Specification	Evaluation
Function	4/10
Aesthetic Ergonomics	6/10
Materials	8/10
Safety	3/10
Manufacturing and cost	7/10
Moral and environmental issues	10/10

4.5.2 Example: Bike work stand. Testing in situ and an evaluation against requirements give an good idea of the prototypes viability.

Strand 4 – CREATE: Final Prototype(s)

4.5 Comparison to related marking criteria

4.5 (this marking criterion) assesses how well the prototype meets the **technical specification**, and its **potential** to become a viable commercial / marketable / industrial product

5.3 assesses the candidate's ability to **analyse and test** the feasibility and fitness for purpose of your final design solution

5.4 assesses the candidate's skills in the **critical evaluation** of your final prototype and in suggesting modifications and design optimisation

Strand 5 - EVALUATE

What is assessed in Strand 5?

- The work being assessed in this strand will be evidenced from the complete portfolio
- This strand focuses on the quality of the candidate's analysis and evaluation in the various stages of their project, and how well they have related it to the chosen context, brief and requirements of the iterative developments they have worked through



Strand 5 - EVALUATE (Max. of 20 marks)

5.1 Analysis and evaluation of primary and/or secondary sources

Mark Band 1 (1-5)	Mark Band 2 (6-10)	Mark Band 3 (11-15)	Mark Band 4 (16-20)
Limited analysis and evaluation of investigated sources of information from stakeholders, existing products and/or wider issues, offering little or no support to inform the design process.	Sufficient analysis and evaluation of investigated sources of information from stakeholders, existing products and wider issues, offering some support to inform the design process.	Good level of analysis and evaluation of investigated sources of information from stakeholders, existing products and wider issues, offering clear support to inform the design process.	Comprehensive and systematic analysis and evaluation of investigated sources of information from stakeholders, existing products and wider issues, offering clear and focused support to inform the design process.



Strand 5 - EVALUATE

5.1 What is being assessed?

- The quality, relevance and value of the candidate's analysis and evaluation of information concerning users, stakeholders, existing products and wider issues, at any point during the project
- The effectiveness of the candidate's analysis and evaluation of data from investigating primary and/or secondary sources
 - How perceptive, systematic, detailed, and clear is it?
 - How well does it support the design process?
 - Is there an impact on the direction of travel that the design iterations and developments will take?



Strand 5 - EVALUATE

5.1 Relevant evidence could include

- Analysis of information and data from a variety of sources – may be details of components or fasteners from a supplier, facts from stakeholders or users, or the results of tests or experiments with materials
- Analysis of sourced data to draw conclusions, which might use mathematical or other techniques. Evident in charts, tables, text, diagrams audio or video
- Drawing of conclusions from analysis undertaken, feedback or other information obtained at any stage of the project
- Links between conclusions/evaluations made and the creation or progression of design iterations
- Technical or stakeholder requirements will be identified, clarified, or changed as a result of the conclusions from the analysis and evaluation of information.

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Strand 5 - EVALUATE (Max. of 20 marks)

5.1 Which mark band?

Lower Mark Bands	Higher Mark Bands
Information gained is simply inserted with little consideration from the candidate	In-depth analysis and evaluation of all information gained, using different techniques and presentation methods appropriate to the data
Analysis of wider issues such as social, moral, and environmental are not considered	Consideration of different wider issues when analysing and evaluating as they affect design decisions
Analysis of existing products and the factors that are pertinent to designing is ineffective and lacks detail	Highly effective critical analysis of relevant existing products, with in-depth consideration of a wide range of factors, including UCD, pertinent to the designing
Use of charts and comparative data including the views of others is not fully recognised within the evaluative process	Effective use of charts to compare data and details, list advantages / disadvantages, positives / negatives, and different viewpoints, when analysing and evaluating

Discuss what **higher mark band** and **lower mark band** responses might look like for your own DT 'area'

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In Depth Product Analysis of Similar Product

Aesthetics
This product is attractive as there is the bright red metal to warn you not to step or run onto the legs and the black and white wood makes it clear where to run and aim for when running a track of hurdles. However, the negative is that the customer doesn't want to purchase a product where the paint and the danger signs wear off after a certain amount of time. But it is suitable to stand on any ground such as a running track and grass or gravel. It causes problems when it is hard to carry and move as it is so heavy and will not fit well into storage.

Cost
The cost of this product is £37.50. This is the price as the product is durable and will not break easily. Metal is often expensive so I personally think this is an achievable price compared to others I have seen which range around £70-£100.

Comfort
This hurdle is designed for hurdles or runners which can be used for both competitions and training. The customer will have no problem figuring out how to use it as it is simple. However, the customer may get frustrated due to not being able to make it smaller or fold it so it can fit in to smaller spaces or storage.

Environment
This product can be recycled once used and broken. The metal legs would be able to be melted down into something else. If this product broke I would be difficult to fix it as it is hard to fix something so sturdy. This is good for the environment as it doesn't use electricity and doesn't do any damage to the ground.

Safety
This product is **unsafe** due to the hard steel metal which would cause a lot of injury if someone were to run into it or fall over. It is heavy so if it fell on a child it could cause a lot of damage. However the hurdle has to be placed with the red legs in front so if someone hits it, it will fall down easily.

Function
This product works very well and has been used for a few years. When adjusting the heights, one of the wheels have been very hard to move. This product would work better if it possibly had wheels. This would make it easier to carry as it is heavy and hard to transport. Also being able to possibly fold the hurdle away would help with storage space.

Materials
The materials used for this hurdle was metal and wood as this is an outdoor product it needs to withstand rain and wind. The metal is heavy so it will not get blown over. However, the paint used to cover the wood has chipped away and washed away as well as the wood also chipping which could become dangerous. The metal is getting rusty and difficult to use.

Size
This hurdle ranges from a small height to a large height due to different levels of ability and heights of students/ hurdles. If the product didn't cater for a different range of people only a small audience would be interested depending on heights and abilities. This product is suitable for a large audience as it can be changed to different heights when needed.

Chipping in the wood when the wood result in splinters.

Curved red legs to help it fall over if someone runs into it.

Beginners so people can see the jump from afar.

Durable and long lasting materials.

5.1.1 Example: Horse Jump – the candidate looks at a similar product (hurdle) in depth. ACCESS FM approach used to focus analysis. Strengths and weaknesses of the product highlighted

Ergonomic

Gathering Measurements
I am designing for **abled** body sizes and females from the youngest being 13 years old up to the age of 85. I will need the following measurements:

Hand grip - because my product will need to be carried. Arm length - as they will need to carry the jump in their arms. Hand span as the user may need to pick it up in both hands in order to move it around or pick it up. Finger dials so they can pick up the product with good grip.

Other measurements that I need are the **directions of the poles** and **what the circumference of the poles** are. I need to know this so I need to know what the **surface area** needs be so that I can make sure that my product is **not too big or too small**. I will take these measurements using a **tape measure** to measure the poles diameter and I will then use **pie to calculate the total circumference**. I need to make sure that I measure a **various pole sizes** as this means that I can work out **optimum for pole widths** this will help me establish what surface area I will need for my product.

Analysis
I need to make sure that I take notice of the **width of the grip** to help me make sure that I choose the correct width of my product to make it the best width that is the most **effective for moving my product**.

Moreover I need to make sure that my product can be **used by most people**, so I am going to make my product most usable by choosing to **focus on the 50th percentile** for my product as this is the average. I also need to make sure that my product is **wide enough** to be filled up, but **not too wide that people struggle to carry it**. I need to make sure that my product is **comfortable to carry** by checking the weight and make sure that the handles or ledges are smoothly shaped.

Here I have taken some of my **own measurements on a 14 year old girl**. I found that the length of her hand measured 160mm and the width of her hand measured 110mm. I should take this into thought when designing my product. The **grip measures 430mm wide**.

Here is the length of her hand.
Here is the width of her hand.

Other Useful Measurement

I also need to be able to know the weight of poles, as this will affect my product. Different weights will affect how much weight my product needs to be able to withstand.

These poles are BSJA standard, they are 3m long and 100mm wide, they weigh 7.2kg each.

These poles are 3.65m long and 100mm wide, they weigh 7kg each.

These poles are 3m long and 80mm wide, they weigh 5.3kg each.

This gate is 3m long and is 1000mm high, the gate weighs 25kg.

Conclusions
My product needs to be able to **withstand a weight of 40kg** Without collapsing. It also needs to be able to hold poles securely and they need to be able to be balanced well.

5.1.2 Example: Analysis of anthropometrics, ergonomics and other useful measurements seat design.

Initial Investigations: Existing Products

Before my next meeting with my primary user, I really want to get an idea of what signage/advertising is used in my local area that help point consumers to local businesses and services. I found that there were a number of different types of pavement display used, each with strengths and possible weaknesses that could be taken into account when designing my own product.

Product strengths:
The main poster displayed under the transparent plastic can be changed. This would extend the product's life should the primary user want a change of content or colour scheme. Made from Aluminium the product is lightweight and easily manoeuvred inside and outside of the shop. It can be flat packed for easy storage. An Aluminium frame has been used therefore it is resistant to corrosion. Stable and wide base meaning the product won't fall over in the wind.

Product weaknesses:
The main display isn't really that eye catching and if anything there maybe too much text used on this pavement advert. Functionally the product doesn't really spark any additional interest to draw someone in to look at it. Although stable the product could act as a wind shield and eventually blow over. The hinged design could catch the user's fingers when collapsing.

Product strengths:
Used to advertise the national lottery this pavement advert has a very different shape to that used outside many shops and stores making it quite eye catching. Simple colour matches of white against blue make the logo and information stand out clearly. The display has a weighted base which makes it stable and hard to knockfall over. Made of polypropylene the product is hard wearing and already has a surface colour and finish applied during the manufacturing process.

Product weaknesses:
It is hard to change the signs in each of the three bubbles, which could limit the lifecycle of the product. Should a new promotion or a key date need to be advertised then this would be a bit to do. I assumed that the sign would rotate in the wind however it is fixed and unable to spin. Although this product has an interesting shape I am not sure if it maximises the advertising space given the floor area it takes up.

Product strengths:
Hanging from a support bar the main sign is able to swing in the wind and attract the attention of those passing by. Both designs of product are very similar with a weighted and stable base used. The main sign can be removed and changed easily. The graphics used by the printing shop has a good layout and is not over powered by text. The 'books' pavement display can be adapted for any business simply by reprinting a new A2 sheet of paper.

Product weaknesses:
The 'books' display is bold and simplistic which is good on one hand, but also looks quite bland. The main frame of the stand has been made from mild steel tubing which will require maintenance in the future should rust begin to appear.

Key findings to be carried forwards:

- Clearly need to be eye catching.
- Obvious from the signage what the shop is about.
- Must have a stable and weighted base.
- Easy to move in and out of the shop.
- Possibility of interchangeable front displays to extend the products life.
- Perhaps have moving parts using the strength of the levers.
- Require very little maintenance if at all.

5.1.3 Example: Advertising board. Critical analysis of existing similar products in order to determine what elements might support their designing.

Strand 5 - EVALUATE

5.1 Comparison to related marking criteria

5.1 (this marking criterion) assesses the candidate's ability to **analyse** and **evaluate** primary and secondary data throughout the portfolio

5.2 assesses the candidate's **ongoing evaluation** of their design ideas and solutions, reviews against the requirements and stakeholder feedback, and management of the design progression

5.3 assesses the candidate's ability to **analyse** and **test** the feasibility and fitness for purpose of their final design solution

5.4 assesses the candidate's skills in the **critical evaluation** of their final prototype and in suggesting modifications and design optimisation

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Strand 5 - EVALUATE (Max. of 20 marks)**5.2** Ongoing evaluation to manage design progression

Mark Band 1 (1–5)	Mark Band 2 (6–10)	Mark Band 3 (11–15)	Mark Band 4 (16–20)
Superficial evaluations with little or no reflection on requirements or feedback.	Some critical evaluations with sufficient reflection on requirements and feedback.	Mostly critical evaluations with good reflection on requirements and feedback.	Full and critical evaluations with focused reflection on requirements and feedback.
Little or no reviews to identify any problems and/or next-steps for future iterations resulting in limited support to design progression.	Infrequent reviews to identify some problems and/or next-steps for future iterations that are not always consistent in supporting design progression.	Ongoing and clear reviews to identify problems and next-steps for future iterations to consistently support design progression.	Ongoing, clear and comprehensive reviews to identify problems and next-steps for future iterations to effectively and consistently support design progression.

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Strand 5 - EVALUATE**5.2** What is being assessed?

- The effectiveness of the candidate's ongoing evaluation of their design ideas and developments in the progression of their design
- The quality and depth of the candidate's reflection on their level of success in meeting the technical and non-technical requirements,
- The candidate's reviews of feedback from user/stakeholder testing to identify problems and next steps for future iterations
- The candidate's management of the design process and progression to a final design solution through effective evaluation

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Strand 5 - EVALUATE**5.2** Relevant evidence could include

- Recurring 'evaluate' then 'explore' or 'create' as appropriate, supporting successive iterations based on feedback from stakeholders
- Evaluation of iterations to stakeholder feedback / user requirements
- On-going / regular testing and assessment of prototypes, models, materials, finishes, components, circuits, and so on, in the intended location (or similar) for the product or system
- Evaluation by stakeholders and users by them handling, using, and testing models and prototypes
- Clear evidence of 'next steps'

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Strand 5 - EVALUATE (Max. of 20 marks)

5.2 Which mark band?

Lower Mark Bands	Higher Mark Bands
A subjective and biased approach to ongoing evaluation	An objective, unbiased and consistent approach to ongoing evaluation
Little or no reviews to identify any problems and/or next-steps for future iterations resulting in limited support to design progression	Critical evaluation identifies problems and directs the next steps strongly steering design progression
Little or no evaluation of solutions which restricts the success of future iterations	Solutions are fully evaluated as to assess their success against the technical and stakeholder requirements
Superficial evaluations with little or no reflection on requirements or feedback	Where necessary, requirements are changed/added, to reflect feedback received from stakeholders
Little or no detail and clarity on the level to which the requirements need to be met	Clear criteria established to define the level to which the requirements must be fulfilled

Discuss what **higher mark band** and **lower mark band** responses might look like for your own DT 'area'



IDEA 1

Spice Area	Detailed Reason Why
Function	The aim of this device was to cut an apple into slices and then to slice them into smaller pieces. The device was designed to be used by hand and to be easy to use.
Materials	The device was made from rubber and plastic. The rubber was chosen because it is soft and flexible, and the plastic was chosen because it is strong and durable.
Manufacturing	The device was made using a laser cutter and a 3D printer. The laser cutter was used to cut the rubber and plastic into the required shapes, and the 3D printer was used to print the internal components.
Ergonomics	The device was designed to be held in the hand and to be easy to use. The handle was made from rubber and the buttons were made from plastic.
Aesthetics	The device was designed to be simple and functional. The colors were chosen to be neutral and the shape was chosen to be ergonomic.
Cost	The device was designed to be low cost. The materials and manufacturing process were chosen to be affordable.
Safety	The device was designed to be safe. The sharp blades were hidden inside the device and the user was protected from injury.
Metal Issues	The device was designed to be made from metal. The metal was chosen because it is strong and durable, and it was easy to work with.
OVERALL COMMENT	7.5/10

5.2.1 Example: Apple corer/slicer. Individual iterations evaluated as design develops. Stakeholder involved where necessary (audio clips) and formal critical evaluation against the requirements informs the next steps

DEVELOPMENT OF IDEAS 2

Anna said she "loved" this design, in particular the "pretty and feminine" and "beautiful" detail. The neckline is also very well suited to Anna's style, and she said that it is perfect for the day to night transition of the wedding. We discussed the length and ease of this design. Anna likes the dress that she is going into or "light formal".

Anna said she "loved" this design, in particular the "pretty and feminine" and "beautiful" detail. The neckline is also very well suited to Anna's style, and she said that it is perfect for the day to night transition of the wedding. We discussed the length and ease of this design. Anna likes the dress that she is going into or "light formal".

Anna loved the 1920s element of this design, and said it was very "elegant" and "beautiful". However this neckline was not Anna's favorite design, she said that she would "not feel comfortable" in the beading, and she said that she would not wear it. We discussed some of this detail into my final design.

5.2.2 Example: Special event dress. Different ideas are discussed with stakeholders to inform the next stages of development

Strand 5 - EVALUATE

5.2 Comparison to related marking criteria

5.2 (this marking criterion) assesses the candidate's **ongoing evaluation** of their design ideas and solutions, reviews against the requirements and stakeholder feedback, and management of the design progression

5.1 assesses the candidate's ability to **analyse** and **evaluate** primary and secondary data throughout the portfolio

5.3 assesses the candidate's ability to **analyse and test** the feasibility and fitness for purpose of their final design solution

5.4 assesses the candidate's skills in the **critical evaluation** of their final prototype and in suggesting modifications and design optimisation



Strand 5 - EVALUATE (Max. of 20 marks)

5.3 Feasibility of the design solution

Mark Band 1 (1-5)	Mark Band 2 (6-10)	Mark Band 3 (11-15)	Mark Band 4 (16-20)
Limited with little or no methods used to appropriately analyse and test whether the design solution is fit for purpose.	Sufficient with some appropriate methods used to analyse and test whether the design solution is fit for purpose.	Good level of detail with mostly appropriate methods used to analyse and test whether the design solution is fit for purpose.	Comprehensive with fully appropriate methods used to analyse and test whether the design solution is fit for purpose.



Strand 5 - EVALUATE

5.3 What is being assessed?

- The real time analysis and testing of the final prototype(s) against the technical and stakeholder requirements
- The suitability and effectiveness of the methods of testing, for the candidate, users and stakeholders to assess
 - how feasible* the design solution is
* viable, practical, realistic, capable, usable, sustainable, marketable, etc....
 - whether the design solution is fit for purpose and can be used in its intended environment
 - how successful the actual product/system, when manufactured, will be in the commercial world



Strand 5 - EVALUATE

5.3 Relevant evidence could include

- Testing or simulations in as many potential 'real-life' situations /environments of the product as possible
- User and stakeholder involvement in tests, trials, questionnaires, interviews, group discussions
- Testing by independent third parties, forums and focus groups
- Candidate's reference to both their technical specification and final prototype(s)
(The final prototype(s) is not the actual manufactured product but a representation of the design solution, therefore the analysis of the feasibility should also include consideration of the final design solution and the details for commercial manufacture in the technical specification)
- Comparative tests on similar existing products to highlight differences (and strengths/weaknesses, 5.4)
- Analysis of results to draw conclusions, which might use mathematical (statistical, graphical, etc.), SWOT, or other techniques. Evident in charts, tables, text, diagrams audio or video
- A table or chart detailing how well the requirements have been met



Strand 5 - EVALUATE (Max. of 20 marks)

5.3 Which mark band?

Lower Mark Bands	Higher Mark Bands
Unplanned and lacking a structured approach	A planned and structured approach – systematic and analytical – what? who? where? why? how?
Limited evidence with few or no methods used to appropriately analyse and test whether the design solution is fit for purpose	Differing appropriate and rigorous methods used to test the fitness for purpose of the design solution
Stakeholders not consulted or involved, design not tested in a real-life situations	Stakeholders and independent others used to evaluate/test the design in several real-life situations
Subjective evaluation with little appreciation of the need for feedback and numerical data	Feedback and numerical data from evaluation and testing enables a balanced and detailed analysis

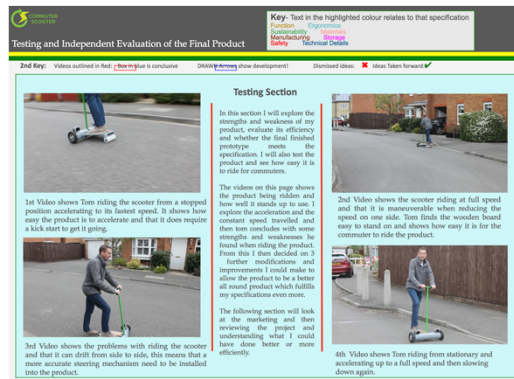
Discuss what **higher mark band** and **lower mark band** responses might look like for your own DT 'area'



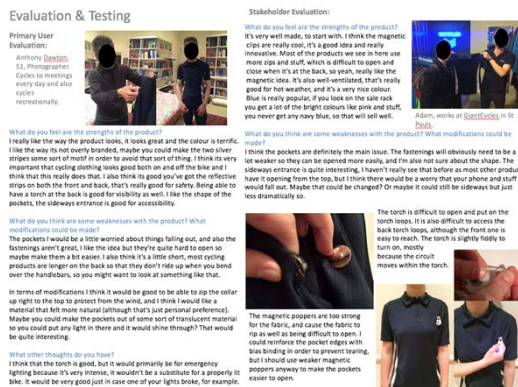
Planning the feasibility study of design solution

What?	Who?	Where?	Why?	How?
Interview with prototype and technical specification and marketing suggestions	Stakeholder – retailer Jardine Cycles	Meeting at Jardine Cycles in Coventry		
Interview with prototype and technical specification	Stakeholder – Manufacturer China Tech	Meeting at school		
Interview with prototype and technical specification and marketing suggestions	Stakeholder – Retailer / Distributor Halfords	Meeting at Halfords in Redditch		
Pictures of the prototype on cycles, the prototype in context	Users and peers to give comments	School	To put the prototype in context for comments by users and peers, to test how the final prototype fits, appears, and functions on different cycles	Use a selection of clips as required
Functionality tests Range, weight, brightness, ergonomic aspects, operation of controls, speed of fitting...	Users to assist where required but mostly the designer to undertake these tests	School	These are some of the key requirements and I need to see how well they have been met in the design solution	Set up tests to measure each aspect, record results and present in graphs / charts. Good camera needed, plus light meters, scales, etc.
Complete a table to show the requirements and whether and how well they have been met				

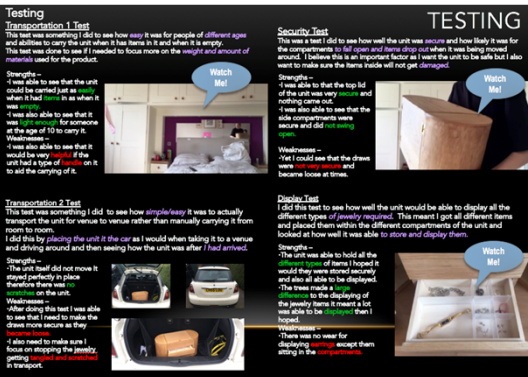
5.3.1 Example: A plan for the analysis and testing of the feasibility of the design solution. Using "What? Who? Where? Why? and How?"



5.3.2 Example: Commuter Scooter. The prototype product is tested in several situations in which it would be used as a commercial product. Testing and analysis is undertaken by third parties and the candidate. Undertaken and captured in real time.



5.3.3 Example: Cycling Jersey. Primary user and stakeholder consulted



5.3.4 Example: Jewellery storage. A range of methods used to check if the design is fit for purpose

Testing

I tested my final point-of-sale display by collecting feedback from 60 people, from various different backgrounds and living in different areas. The majority of them lived in a family and they were all above the age of 18. I asked them a few qualifying questions to fulfil my selection criteria and ensure my results were robust. The majority of feedback was positive, along with a few helpful suggestions on how to improve my product further in future.

What my POSD would look like in a real shop environment.

Questions asked to the Target Market:

- Do you like the overall appearance of the point-of-sale display?
- Do you think that this point-of-sale display is a unique shape and looks interesting?
- Do you think that the display is fitting for the Christmas decorations?
- Do you think the point-of-sale display would help to advertise the product?
- Do you think the point-of-sale display would help to advertise the company?
- Other improvements could be made further?

	Yes	Maybe	No
1. Do you like the overall appearance of the point-of-sale display?	38	1	1
2. Do you think that this point-of-sale display is a unique shape and looks interesting?	35	2	3
3. Do you think that the display is fitting for the Christmas decorations?	37	3	0
4. Do you think the point-of-sale display would help to advertise the product?	36	3	1
5. Do you think the point-of-sale display would help to advertise the company?	32	5	3

Question 6: Modifications/Improvements

From the feedback I received, some of the suggestions were:

- Make a more Christmas base with some information on it - age 10 female
- Make the background more 3D - age 16 male
- Add social media links so I can look it up at home - age 23 female
- Use more complex shape and make the base look fuller - age 17 female
- Make the sides bigger and make a more interesting shape made of strong material - age 19 male
- Add more information about the company because I had never heard of the product or company before - age 27 male

By completing the evaluation and testing, I think that the point-of-sale display could be improved with the following changes:

- Change the shape and possibly the size of the base. In addition, I think it would be better to make the specification if the whole display was slightly bigger as this would allow more information to be on it and make the background more complex if I had more time and the correct materials.

5.3.5 Example: POS Display. Questionnaire used for feedback from stakeholders/target market

Strand 5 - EVALUATE

5.3 Comparison to related marking criteria

5.3 (this marking criterion) assesses the candidate's ability to **analyse** and **test** the feasibility and fitness for purpose of their final design solution

5.1 assesses the candidate's ability to **analyse** and **evaluate** primary and secondary data throughout the portfolio

5.2 assesses the candidate's **ongoing evaluation** of their design ideas and solutions, reviews against the requirements and stakeholder feedback, and management of the design progression

5.4 assesses the candidate's skills in the **critical evaluation** of their final prototype and in suggesting modifications and design optimisation

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Strand 5 - EVALUATE (Max. of 20 marks)

5.4 Evaluation of the final prototype(s)

Mark Band 1 (1–5)	Mark Band 2 (6–10)	Mark Band 3 (11–15)	Mark Band 4 (16–20)
Superficial evaluation of strengths and/or weaknesses with little or no suggestions for modification and/or consideration of possible design optimisation presented.	Sufficient critical evaluation of strengths and/or weaknesses with some suggestions for modification and/or consideration of possible design optimisation presented.	Good critical evaluation of strengths and weaknesses with detailed suggestions for modification and consideration of possible design optimisation presented.	Full and critical evaluation of strengths and weaknesses with comprehensive suggestions for modification and consideration of possible design optimisation presented.

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Strand 5 - EVALUATE**5.4 What is being assessed?**

- From the critical evaluation of the design solution (5.3), the candidate's identification of the strengths and weaknesses of their design
- From the identified weaknesses, the candidate's suggested modifications or further iterations to improve their design
- Consideration and application of appropriate design optimisation modifications to further improve the design



Strand 5 - EVALUATE**5.4 Relevant evidence could include**

- Conclusions from the analysis and testing of the design solution highlighting positive and successful outcomes, and areas of the design which need further attention
- A list of strengths and weaknesses including technical details
- Sketches, drawings, models and annotation / text to describe and explain modifications and refinements to the design
- Suggested modifications to optimise* the design such as
 - reducing the number of component parts
 - substituting different materials or components
 - standardising fasteners or fittings used
 - simplifying the design of a component(s)

*making the overall best choices from design alternatives to identify an optimum balance of sizes, weights, design features, costs, performance, etc.



Strand 5 - EVALUATE (Max. of 20 marks)**5.4 Which mark band?**

Lower Mark Bands	Higher Mark Bands
The assessment of the final prototype(s) lacks integrity and value	An honest, objective and critical assessment of the final prototype(s) and what could be improved
Superficial and simplistic evaluation of strengths and/or weaknesses	A broad and mature view on further iterations, considering the impact that improving a perceived weakness might have on the rest of the design
Low value suggestions for improvement such as simply changing the colour	Realistic and creative suggestions for modifications and improvements
Improvements are not communicated clearly	Appropriate high quality images, diagrams, sketches and/or models communicate improvements clearly
Modifications lack detail and do not add to the existing design	A number of realistic, workable and thought-through modifications to optimise the design

Discuss what **higher** mark band and **lower** mark band responses might look like for your own DT 'area'