GCSE (9–1)

Teacher Guide

DESIGN AND TECHNOLOGY

J310
For first teaching in 2017

Internal marking guide
Version 2

www.ocr.org.uk/gcsedesignandtechnology
## CONTENTS

- Overview ............................................. 2
- Internal marking process ......................... 3
- Identifying evidence ................................ 4
- Key considerations when marking .............. 5
- Submitting an NEA sample ...................... 6
- Candidate exemplars .............................. 7
  - Strand 1 Explore .................................. 7
  - Strand 2 Create: Design Thinking .......... 19
  - Strand 3 Create: Design Communication .... 27
  - Strand 4 Create: Final Prototype(s) ........ 35
  - Strand 5 Evaluate .............................. 45
OVERVIEW

This guidance booklet is intended to provide centres with a comprehensive reference when marking and preparing non-exam assessment (NEA) for submission. The booklet will deliver reminders of the key requirements when marking, support on how to manage submissions, and deeper information to appropriately interpret the marking criteria.

The exemplars of candidate work used in this guidance may be modified intermittently in the future to ensure they reflect current methods being used to deliver the NEA.

Purpose of internal marking

Teachers are required to mark the work of the candidates within their teaching groups as they are best placed to understand the depth of the work undertaken by each candidate and any involvement and support given to individual candidates over and above the generic guidance they are entitled to. In order to mark accurately, the teacher must have a thorough understanding of the marking criteria, which this guidance booklet is designed to support.

Purpose of internally standardisation

In many centres there are often multiple teaching groups, with different teachers. It is therefore essential that the internal marking undertaken by each teacher is standardised across the centre. Usually the Head of Department will manage this process and have final responsibility for ensuring all candidates’ marks across the centre are accurate and standardised in the correct order of merit (sometimes referred to as rank order).

If one or more candidates’ are marked inaccurately, these will most likely impact on the final marks of the whole cohort from the centre. Also if the order of merit is deemed to be incorrect, the work will be returned to the centre with feedback, requiring the whole centre’s cohort to be remarked. This can impact on results being ready for result’s day. Both of these potential situations highlight the importance of internal standardisation.

Purpose of moderation

The purpose of moderation is to review the internal marking of a centre to ensure it is in line with an agreed standard to be applied to all centres entered for assessment. A moderator will be looking to agree with the internal marking when reviewing the sample of work submitted by the centre, rather than looking to remark the work.

Only if the marking is deemed to be inaccurate, will the moderator indicate any changes that need to be made to the marks of the submitted sample. Once these marks are given to OCR, the adjustments will be put through an algorithm to apply them to all candidates within that centre.

It is therefore important for everyone concerned in the marking and moderation process that the original marks submitted by each centre are accurate in the first instance.
INTERNAL MARKING PROCESS

Environment for marking
When internally marking, it is really important to view the candidates’ work as it would be reviewed by the external moderator.

All evidence should be contained within each candidate’s portfolio, including video and photographic evidence of the final prototype. Whether submitted as paper portfolios, or preferably electronic portfolios, a computer screen will be required to view the evidence of the final prototype.

Essentially the teacher will only be marking work that is evidenced in a candidates’ portfolio. An IT suite would be an ideal environment so multiple folders can be viewed at the same time.

Best fit principle
Teachers should use their professional judgement in selecting the band descriptors that best describes the work of the candidate to place them in the appropriate band.

Teachers should use the full range of marks available to them and award all the marks in any mark band for which work fully meets that descriptor.

To select the most appropriate mark in the band descriptor, teachers should use the following guidance to locate the best-fit:

- where the candidate’s work **convincingly** meets the statement, the highest marks should be awarded
- where the candidate’s work **adequately** meets the statement, the most appropriate mark in the middle of the range should be awarded
- where the candidate’s work **just** meets the statement, the lowest marks should be awarded.

The statements in each mark band are balanced in terms of their significance to support the overall ‘best-fit’ within an assessment strand. When completing the ‘Candidate Record Form’, overall marks for each strand are calculated automatically to avoid clerical errors.

It is essential that marking fully reviews and considers all material in a portfolio. It is the candidate’s responsibility to ensure all files and links function properly. If files or links do not open or function properly, this work cannot be considered in evidence. In addition, candidates can record the location of evidence in their portfolio as outlined on the following page.
IDENTIFYING EVIDENCE

Knowing the location of a candidate’s evidence within their portfolio is important for both internal marking and external moderation. When completing your observations on the ‘Candidate Record Form’ it is essential to signpost the evidence that supports your marking to ensure this is not missed through the moderation process.

This could become a very time consuming activity for you as a teacher, therefore, to support you in making this less of a burden on your time, you may want to utilise one of the two candidate facing resources, linked below.


Identifying your evidence – Word version

Identifying your evidence – Excel version
KEY CONSIDERATIONS WHEN MARKING

Though marking should remain positive, there are three key requirements that may impact on marks.

1. Marks in marking criteria 1.1 and 1.2 will depend on the quality of interpretation against the OCR set Contextual Challenges.

2. There must be sufficient photographic and video evidence of the final prototype. Video must be used to demonstrate any functionality and a 360° view of the prototype must be seen. This evidence will support the marking of criteria 4.2 and 4.5.
   NB: For work submitted in the sample double check all videos and links work on different devices.

3. In relation to 4.4, we must see evidence of the use of hand tools, machinery, digital design and digital manufacture. Evidence may be taken from earlier modelling and prototyping. If there is no evidence for one of these requirements, marks should not be awarded above MB1. Where evidence for any of the four requirements is limited, the marks awarded should reflect this.
SUBMITTING AN NEA SAMPLE

There are detailed administrative instructions on submitting an NEA sample on the OCR website https://www.ocr.org.uk/administration/stage-3-assessment/general-qualifications/orals-practicals-performances/design-and-technology-nea/.

The deadline for submission is 15th May. If you are considering submitting your marks in advance of this date it is important to be aware that you will receive your sample request within 24 hours of submitting your marks. You then have three days to submit the sample online, or to send it in the post. It is therefore important to ensure you are able to complete the administrative requirements to prepare a sample within this time.

Forms

There are three forms that need completing alongside the marking of candidates work. These are available for downloading through the qualification page https://www.ocr.org.uk/qualifications/gcse/design-and-technology-j310-from-2017/administration/.

The Centre Authentication Form must be complete and retained in the centre in case of a JCQ visit. Link to Centre Authentication Form: https://www.ocr.org.uk/Images/104528-centre-authentication-form-ccs160.doc

The remaining two forms are a mandatory requirement for submission and if not submitted with the sample of work, moderation will not continue until they have been submitted. Any delay in moderation caused by a centre not delivering the full requested sample may impact on candidates receiving their grades by results day.

Every candidate must complete a Candidate Declaration Form. For those candidates in the sample, these forms should be sent in with the sample. For other candidates, these should be retained within the centre. It is recommended to make the completion of this form a requirement of a candidate’s internal submission of their NEA. Link to Candidate Declaration Form: https://www.ocr.org.uk/Images/466197-candidate-declaration-form-interactive.pdf

A Candidate Record Form must be submitted for every candidate within the sample. This form is where teachers should record their marking, their own observations and the location of the evidence applied to each assessment statement. Link to Candidate Record Form: https://www.ocr.org.uk/Images/506046-j310-candidate-record-form.pdf
CANDIDATE EXEMPLARS

**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

### 1.1 Investigations of the context

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

**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.

**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

**1.1 Which mark band?**

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

Examples using visual mind maps, with potential possibilities identified and environment considered.

Focussed analysis of contexts and possibilities, concentrated on a particular design discipline (Fashion and Textiles).
1.2 **Design brief**

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

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

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

1.2 **Which mark band?**

<table>
<thead>
<tr>
<th>Lower Mark Bands</th>
<th>Higher Mark Bands</th>
</tr>
</thead>
<tbody>
<tr>
<td>States a product/outcome that may not be clearly linked to the chosen context</td>
<td>An open brief that clearly states the problem to be solved relating to the chosen context</td>
</tr>
<tr>
<td>Very basic and generic tasks likely to be involved in the project</td>
<td>Specific tasks that challenge the context are highlighted and discussed</td>
</tr>
<tr>
<td>Little consideration of key issues and their level of importance</td>
<td>Areas for particular attention in the designing, e.g. safety, usability, function are highlighted</td>
</tr>
<tr>
<td>Limited contact with, or consideration of stakeholders and users</td>
<td>Contact with, and the influence of stakeholders and users is explained and clearly evident</td>
</tr>
<tr>
<td>Mostly text</td>
<td>Diagrams, audio/video to clarify intentions</td>
</tr>
</tbody>
</table>
GCSE (9-1) Design Technology

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.

Potential Ideas

These were some of the possible briefs/problems I identified on my mind maps. I made a note of good/bad aspects of each.


Design Brief: A product that deters thieves from taking a bike from an outdoor area where there is no physical item to lock a bike to. It should be suitable for use by a broad range of cyclists in various scenarios such as wild camping, maintained campsites, festivals etc.

Primary User:
- Daniel Harrington
  (member of Ossett bike riders and avid bikepacker)

Stakeholders:
- Other bike users (Ossett Bike group, road cyclists, tourers etc)
- Shop Owners (bike and camping)
- Walkers/hikers (might also find it useful)
- Manufacturers (UK or abroad?)
- Event organisers (could be hired out?)
- Police (advice on security)
- Other security experts (security standards?)
- Campsite Owners (could hire/sell to customers?)
- Insurance companies (if claim is required)

Bike Security was one potential idea that immediately jumped out at me as I like mountain biking. So I did some quick initial research on a few cycling/camping forums to see if it was a problem. I am a member of a local mountain biking group so I asked them if they thought it was a good idea – they all thought it was and were happy to help with my project.

Next Step:
Carry out initial investigations into existing products, stakeholder requirements and wider issues.

Example showing development of brief with linked back to stakeholder forums with identification of main stakeholders that could be considered.

Next steps: Carry out investigations into:
- Users and stakeholder needs and requirements
- Relevant water issues and implications (e.g. sustainable, social, environmental)
- Relevant existing products
- Relevant design practices and approaches

A range of different methods and approaches will be tested in these investigations. I will need to plan/prepare research carefully to support my next steps.
1.3 Investigations of user and stakeholder needs and wants and the outlining of stakeholder requirements (non-technical specification)

<table>
<thead>
<tr>
<th>Mark Band 1 (1–5)</th>
<th>Mark Band 2 (6–10)</th>
<th>Mark Band 3 (11–15)</th>
<th>Mark Band 4 (16–20)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Superficial consideration of primary user(s) needs and wants with little or no consideration of other stakeholders.</td>
<td>Some relevant consideration of primary user(s) needs and wants and some consideration of other stakeholders.</td>
<td>Informed consideration of primary user and other stakeholders needs and wants.</td>
<td>Full and objective consideration of primary user and other stakeholders needs and wants.</td>
</tr>
<tr>
<td>Little or no requirements have been identified and are outlined with limited scope to support the future design process.</td>
<td>Some requirements are identified that offer some scope to support the design process.</td>
<td>A range of requirements with a good level of detail are identified that offer scope to support the design process.</td>
<td>A range of comprehensive requirements are identified that offer scope to support the design process.</td>
</tr>
</tbody>
</table>

1.3 What is being assessed?

- The candidate’s investigations into the needs and wants of stakeholders and users
- The identification of requirements from these investigations to guide and support the iterative design process

1.3 Relevant evidence could include

- Visits, interviews, observations, focus groups and surveys
- 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

1.3 Which mark band?

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

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
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.

Master list of requirements.

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Identified by</th>
<th>Slide</th>
<th>Explanation / justification for including this requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weigh no more than 800g</td>
<td>Candidate, confirmed by primary user</td>
<td>25</td>
<td>After weighing different lights I found the heaviest was about 800g. The cyclist should not use the product at high brightness to the speed they can go on their bike.</td>
</tr>
<tr>
<td>A minimum light intensity of 150 lumens</td>
<td>Candidate</td>
<td>25</td>
<td>Most existing bike lights have a low intensity of about 100 lumens, which illuminates the road inadequately.</td>
</tr>
<tr>
<td>All parts must be sealed or water proofed to protect the circuitry from water when cycling in the rain</td>
<td>Candidate</td>
<td>25</td>
<td>If it is not, the circuit may short circuit and potentially leave a cyclist without lighting at night.</td>
</tr>
<tr>
<td>Selling price between £40 and £80</td>
<td>Candidate</td>
<td>25</td>
<td>To fit within the price range of other similar products already on the market.</td>
</tr>
<tr>
<td>Keep packaging small, achieving this through detachable parts assembled by the user when purchasing</td>
<td>Halves (stakeholder)</td>
<td>59</td>
<td>From a marketing and distribution point of view, keeping the retail package as small as possible is crucial, especially where high volumes of products and packages are concerned.</td>
</tr>
</tbody>
</table>
## 1.4 Investigations of existing products and design practices

<table>
<thead>
<tr>
<th>Mark Band 1 (1–5)</th>
<th>Mark Band 2 (6–10)</th>
<th>Mark Band 3 (11–15)</th>
<th>Mark Band 4 (16–20)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Little or no information or sources of inspiration are identified that offer support to design iterations and thinking.</td>
<td>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.</td>
<td>Good amount of relevant information and sources of inspiration are identified to influence design iterations and thinking when required throughout the design process.</td>
<td>Comprehensive and relevant information and sources of inspiration are identified to influence design iterations and thinking when required throughout the design process.</td>
</tr>
</tbody>
</table>

### 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

### 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

### 1.4 Which mark band?

<table>
<thead>
<tr>
<th>Lower Mark Bands</th>
<th>Higher Mark Bands</th>
</tr>
</thead>
<tbody>
<tr>
<td>Little detail and data obtained</td>
<td>Relevant technical detail relating to materials, sizes and construction</td>
</tr>
<tr>
<td>Limited relevant support to the iterative design process</td>
<td>Investigating as required during the project with a specific purpose, and recorded in real time</td>
</tr>
<tr>
<td>Mainly secondary sources such as the internet</td>
<td>Direct contact with existing products - a ‘hands-on’ approach</td>
</tr>
<tr>
<td>Investigations lack the depth of approach that will guide the designing</td>
<td>Close-up investigation of all components of products to enable detailed analysis</td>
</tr>
<tr>
<td>Little or no consideration of other design influences</td>
<td>Relevant, wider design influences considered that could stimulate their own design thinking</td>
</tr>
</tbody>
</table>

### 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
A specific product autopsy alongside more general analysis of existing products.

Existing Products

**Product Autopsy of a Kettle**

- Has to be placed on base for the kettle to boil
- Plastic handle will make user less likely to burn themselves
- Inside of kettle and heating element are dirty
- Switch makes a noise when the kettle is being boiled
- Bumped pattern on buttons for better grip
- Small gap means water doesn’t pour out easily
- Plastic inclusions, making user less likely to burn themselves
- Handle is low down making it harder to pour
- Two buttons to open up, heaving lid unusual

**Existing Products**

- Kettle doesn’t drain from base so less chance of splashing hot water on person
- No clear indication when water has boiled
- Pop-up handle to help with pouring
- No indication when kettle is full of water
- Small base, which could cause product to fall over
- Not easy to pour
- Small gap, which could cause product to fall over
- Green means product could slide around surfaces
- Small hard to grip handle
- Clear red indication on user knows when water is ready to pour
- Plastic inclusions, making user less likely to burn themselves
- Spout that allows water to easily flow forwards
- Large lever, making it easier to pour kettle
- Spout to manufacture
- Cheap to manufacture
- Easy to clean
- Slightly smaller
- Plastic inclusions

**Shopping basket – investigation of an existing product to understand the different components and folding mechanism.**

1.4 Trends 1

**Theme: Food and Drink – Packaging for Sustainability**

- Unfoldable, re-usable and collapses to allow for transportation
- Environmentally friendly

**In Depth Product Analysis of Similar Products**

- **Client/Customer**
  - This product is designed for the public who are doing their daily shopping. I chose this because if you go for a walk in the street, you will see plastic bags and that there is no environment friendly alternative to this. We decided to have all the going in and out of the store to use a reusable bag.

- **Function**
  - This product is a carry bag for a daily shop. It is made from recycled plastic and it is designed to be used for at least 5 years.

- **Materials**
  - The bag is made from 100% recycled plastic, making it a more environmentally friendly option.

- **Cost**
  - The bag is made from 100% recycled plastic.

- **Size**
  - The bag is medium sized and fits inside a small shopping basket.

- **Safety**
  - The bag is made from 100% recycled plastic and is therefore environmentally friendly.
1.5 **Exploration of materials and possible technical requirements**

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

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

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

1.5 **Which mark band?**

**Lower Mark Bands**
- Secondary, generic information on materials
- Little consideration of broader implications of material choice and technical decisions
- Limited consideration of performance requirements or any other relevant data
- Little relevance and value in the investigations

**Higher Mark Bands**
- First-hand testing of different materials, finishes, components etc.
- Includes relevant consideration of commercial, social, ethical, sustainability and other issues
- Consideration of different performance requirements (e.g. speed, accuracy etc) and other data that is relevant to the design iterations
- Specific and appropriate technical requirements are identified and added to the master list

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
Testing different materials to ascertain how they will react when in contact with potentially corrosive foods/ingredients. The learner summarises the findings on video for future reference within the iterative design process (Cheese grater project).

Investigation of material properties and reference to the performance requirements of the feeding station. Overall judgements made.
## 1.6 Technical specification

### 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

### 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.

### Which mark band?

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

### 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
CAD drawings for a lamp, fully dimensioned with a cutting list and material details.

Combination of CAD and hand drawn layout plan for a sleeping bag coat.

Circuit details for an electronics project along with a parts list and check against requirements.
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

2.1 Generation of initial ideas

<table>
<thead>
<tr>
<th>Mark Band 3 (1-6)</th>
<th>Mark Band 2 (7-12)</th>
<th>Mark Band 3 (13-18)</th>
<th>Mark Band 4 (19-24)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Limited use of different design approaches that lead to ideas that do not always reflect the requirements and may appear stereotypical.</td>
<td>Some different design approaches that lead to ideas that avoid design fixation and generally reflect the requirements.</td>
<td>Different and relevant design approaches that lead to ideas that avoid design fixation, offer scope for challenge and mostly reflect requirements.</td>
<td>Different and relevant design approaches that lead to ideas that totally avoid design fixation, offer scope for challenge and fully reflect requirements.</td>
</tr>
</tbody>
</table>

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

2.1 Which mark band?

Lower Mark Bands

- A small number of ideas which are very similar
- Stakeholder feedback not considered
- Limited annotation and explanation of ideas
- Ideas tend to fixed on a single concept or based on existing designs
- Ideas / concepts are not focused on the requirements

Higher Mark Bands

- Ten or more ideas, often different to each other or showing variations of a more complex idea
- Ideas reflect stakeholder feedback
- Commentary and annotation (wherever equivalent to) and understanding / demonstrate design thinking
- Use of appropriate strategies to avoid fixation and generate innovative ideas and concepts
- Ideas / concepts clearly focused on meeting requirements

2.1 Relevant evidence could include

- Initial outline thoughts, ideas and concepts that will not necessarily be in a great deal of detail
- Freethand sketching is inherent within the ethos of iterative design, but other suitable media and methods can also be used as relevant and appropriate
- Feedback on initial ideas obtained from users and stakeholders
- Use of design strategies, techniques and approaches to avoid fixation, such as:
  - User-centred design (UCD)
  - System 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

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
Dustpan - A range of initial ideas for the handle component.

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).

Helping to introduce children to solid food. Ideas are formulated quickly with useful annotation.
## 2.2 Design developments

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

### 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

### 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

### Which mark band?

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

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

Egg Slicer - The latest iteration is tested by a user within the intended context, with feedback informing further iterative developments which are then checked against the requirements.

Cycling Jersey - Investigations being undertaken to inform understanding and possible next steps. The learner experiments with pocket size, shape and placement.
2.3 Development of final design solution(s)

<table>
<thead>
<tr>
<th>Mark Band 1 (1-6)</th>
<th>Mark Band 2 (7-12)</th>
<th>Mark Band 3 (12-16)</th>
<th>Mark Band 4 (19-24)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Little or no progression seen from earlier developments and little or none of the identified opportunities and requirements have been met.</td>
<td>Some progression seen from earlier developments and some of the identified opportunities and requirements have been met.</td>
<td>Clear progression from earlier developments and most of the identified opportunities and requirements have been met.</td>
<td>Clear and comprehensive progression from earlier developments and all of the identified opportunities and requirements have been met.</td>
</tr>
</tbody>
</table>

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

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 the technical requirements (model videos, animations, exploded views)

2.3 Which mark band?

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

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.
Robot goalkeeper - clear progression over 3 pages from initial iteration towards final design, checking against requirements as it develops.

Vegetable Peeler - progresses towards a prototype model used for final design solution.
2.4 Critical thinking

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

* 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.

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 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

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

2.4 Which mark band?

<table>
<thead>
<tr>
<th>Lower Mark Bands</th>
<th>Higher Mark Bands</th>
</tr>
</thead>
<tbody>
<tr>
<td>Superficial record of design process with little appreciation of problems</td>
<td>The real time record of the iterative design process is clear and complete, showing a systematic and effective response to all identified problems</td>
</tr>
<tr>
<td>Thinking is restricted to the obvious and iterations show little evidence of innovation</td>
<td>Critical thinking skills are evident when identifying problems and designing innovative iterations</td>
</tr>
<tr>
<td>Little or no evidence of innovation throughout the design process</td>
<td>Clear and strong evidence of innovative thinking throughout the iterative designing</td>
</tr>
<tr>
<td>Limited questioning, missing out on thoughts and opinions of others, as well as positive and negative viewpoints</td>
<td>Carefully considering the views of others, challenging preconceptions, suggesting new directions and approaches</td>
</tr>
</tbody>
</table>

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

Water bottle project - demonstrates inventive thinking during modelling that is reviewed with stakeholder.
**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.

**3.1 Quality of chronological progression**

<table>
<thead>
<tr>
<th>Mark Band 1 (1-4)</th>
<th>Mark Band 2 (5-8)</th>
<th>Mark Band 3 (9-12)</th>
<th>Mark Band 4 (13-16)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Design iterations are not always clear and supported by real-time evidence.</td>
<td>Design iterations are sometimes clear and supported by real-time evidence.</td>
<td>Design iterations are clear and supported by real-time evidence.</td>
<td>Design iterations are clear and supported by real-time evidence.</td>
</tr>
</tbody>
</table>

**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.

**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.

**3.1 Which mark band?**

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

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

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.
3.2 **Quality of initial ideas**

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

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

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

3.2 **Which mark band?**

<table>
<thead>
<tr>
<th>Lower Mark Bands</th>
<th>Higher Mark Bands</th>
</tr>
</thead>
<tbody>
<tr>
<td>Graphical and modelling skills are limited and rarely clear enough to appropriately communicate initial thinking to others</td>
<td>Ideas presented in a way that fully explains the candidate’s thinking, so that stakeholders fully understand the design decisions taken</td>
</tr>
<tr>
<td>Superficial sketches</td>
<td>Crisp and clear sketches with sufficient detail to communicate underlying thinking</td>
</tr>
<tr>
<td>Digital tools are not utilised where appropriate</td>
<td>Effective use of digital tools where appropriate</td>
</tr>
<tr>
<td>Limited methods of initial/conceptual modelling methods</td>
<td>Purposeful and effective sketch modelling using differing appropriate materials and methods</td>
</tr>
</tbody>
</table>

3.2 **Comparison to related marking criteria**

3.2 (this marking criterion) assesses the candidate’s ability to **communicate** and present their ideas and thinking effectively

2.1 assesses the candidate’s ability to **generate** many innovative and different initial ideas – the level of their design thinking

5.2 assesses the candidate’s **ongoing evaluation, reviews and reflection, and management of the design progression**
Emergency Car light - a range of techniques used to communicate initial thinking.

Food server - An interesting approach showing the sources of inspiration for each idea.

Bike Security - demonstrating a different method of generation of ideas. This example would need to demonstrate clearer analysis and next steps planning by the candidate.
### 3.3 Quality of design developments

<table>
<thead>
<tr>
<th>Mark Band 1 (1–4)</th>
<th>Mark Band 2 (5–8)</th>
<th>Mark Band 3 (9–12)</th>
<th>Mark Band 4 (13–16)</th>
</tr>
</thead>
<tbody>
<tr>
<td>The range of communication techniques used is limited and not clear enough to appropriately develop or communicate design concepts.</td>
<td>The range of communication techniques used is sufficient, but are not consistent in appropriately developing or communicating design concepts.</td>
<td>The range of communication techniques used is good and are consistent in appropriately developing or communicating design concepts.</td>
<td>The range of communication techniques used is excellent and are consistent in appropriately developing or communicating design concepts.</td>
</tr>
</tbody>
</table>

### 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

### 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

### 3.3 Which mark band?

<table>
<thead>
<tr>
<th>Lower Mark Bands</th>
<th>Higher Mark Bands</th>
</tr>
</thead>
<tbody>
<tr>
<td>The range of communication techniques used is limited and not clear enough to develop or communicate design concepts.</td>
<td>Design developments presented in a way that fully explains the candidate’s thinking, to enable stakeholders and users fully understand the design decisions taken.</td>
</tr>
<tr>
<td>Lack of detailed communication of the design progression, and the journey taken, to gain useful feedback.</td>
<td>Highly effective and detailed communication of the design 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.</td>
</tr>
<tr>
<td>Superficial modeling that does not fully engage at component and assembly level. Use of CAD is limited.</td>
<td>Sophisticated models and early prototypes on a component and assembly level – complex CAD drawings, visualisations, simulations and virtual testing.</td>
</tr>
</tbody>
</table>

### 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.
Horse jump project - clear communication of initial idea, problems and solutions using a range of sketching techniques and modelling.

Bag project - Clear sketching and detailed annotation with appropriate CAD renderings and stakeholder involvement with model testing.
3.4 **Quality of final design solution(s)**

<table>
<thead>
<tr>
<th>Mark Band 1 (1-4)</th>
<th>Mark Band 2 (5-8)</th>
<th>Mark Band 3 (9-12)</th>
<th>Mark Band 4 (13-16)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Formal presentation of the final design solution(s) is limited and it is difficult for a third party to understand.</td>
<td>Formal presentation of the final design solution(s) is sufficient and appropriate to a third party.</td>
<td>Formal presentation of the final design solution(s) is good and provides clarity to a third party.</td>
<td>Formal presentation of the final design solution(s) is excellent and provides clarity to a third party.</td>
</tr>
</tbody>
</table>

### 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

### 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
- 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

### Which mark band?

**Lower Mark Bands**
- The final design solution is unsatisfactory, presented in a way that is not clear to a third party to understand its suitability
- A limited, inappropriate or basic technique used in the presentation, which lacks impact and detail

**Higher Mark Bands**
- The final design solution is satisfactorily presented to a third party, covering the practicality, usability and market potential of the product
- A high level of impact, detail and clarity in the presentation, allowed through appropriate advanced and sophisticated techniques

### 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
Pilots organiser - High quality CAD rendering provides impact along with details on materials, construction and sustainability issues.

Playground interactive game - high quality CAD render placed in context using photoshop with details of components required.

Sleeping bag coat - Combination of annotated sketch and CAD render used to communicate design. Technical information on materials and feedback from client included.
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.

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.

### 4.1 Quality of planning for making the final prototype(s)

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

### 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.

### 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.

### 4.1 Which mark band?

<table>
<thead>
<tr>
<th>Lower Mark Bands</th>
<th>Higher Mark Bands</th>
</tr>
</thead>
<tbody>
<tr>
<td>Offers little or no support to the making process, appears to be retrospective</td>
<td>A thorough and logical approach to planning with all important aspects covered.</td>
</tr>
<tr>
<td>Little or no evidence of the plan being used in real time. Modifications are poorly recorded.</td>
<td>Clear evidence of plan being used in real time to effectively and successfully manage the making processes and to record modifications to the design.</td>
</tr>
</tbody>
</table>
Music Stand - Each stage of the making is thoroughly and methodically worked through, in order to make the prototype in a school workshop.

Bike Security - simple plan of components demonstrating clarity on process and equipment to be used when making the final prototype.

Splat game - showing the stages of development for prototyping the different components of and electronic game in a school workshop.
4.2 Quality of final prototype(s)

**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.

**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.

**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.

**Which mark band?**

<table>
<thead>
<tr>
<th>Lower Mark Bands</th>
<th>Higher Mark Bands</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inaccurate and/or basic standard of practical skills demonstrated, with little attention to detail.</td>
<td>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.</td>
</tr>
<tr>
<td>The final prototype(s) does not fully reflect the final design solution, preventing the engagement of others in giving feedback</td>
<td>The final prototype(s) fully reflect the final design solution, which fully engages users and stakeholders, enabling detailed feedback to be obtained.</td>
</tr>
<tr>
<td>The final solution is not clearly shown.</td>
<td>High quality, sharp and clear photos and videos are produced, with creativity, showing the final solution at its best.</td>
</tr>
</tbody>
</table>

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

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

Bike Security - completed Mud Plug with video to who the product being handled. The electronics are only suggested and do not function as this wasn't the main focus of the development.
4.3 Use of specialist techniques and processes

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

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

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

4.3 Which mark band?

<table>
<thead>
<tr>
<th>Lower Mark Bands</th>
<th>Higher Mark Bands</th>
</tr>
</thead>
<tbody>
<tr>
<td>Limited evidence of techniques and processes appropriate to materials / components being used</td>
<td>A detailed and clear real time record of making evidences consistently appropriate techniques and processes carried out effectively and efficiently</td>
</tr>
</tbody>
</table>
This record of making for an Irish drum skin demonstrates the digital manufacturing processes required.

Bike Security - The diary of making for the final prototype demonstrates the effective use of appropriate techniques and processes that vary.
4.4 Use of specialist tools and equipment

<table>
<thead>
<tr>
<th>Mark Band 1 (1–5)</th>
<th>Mark Band 2 (6–10)</th>
<th>Mark Band 3 (11–15)</th>
<th>Mark Band 4 (16–20)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Use and selection of hand tools and/or machinery are limited and/or inappropriate.</td>
<td>Use and selection of hand tools and machinery are sufficient, but not always consistently appropriate.</td>
<td>Use and selection of hand tools and machinery are good and consistently appropriate.</td>
<td>Use and selection of hand tools and machinery are effective and consistently appropriate.</td>
</tr>
<tr>
<td>Digital design and/or manufacture is limited and demonstrates little or no skills or knowledge.</td>
<td>Digital design and manufacture is not always used appropriately, but demonstrates sufficient skills and knowledge.</td>
<td>Digital design and manufacture are used effectively to demonstrate good skills and knowledge.</td>
<td>Digital design and manufacture are used effectively and appropriately to demonstrate excellent skills and knowledge.</td>
</tr>
</tbody>
</table>

* 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.

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.

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.

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.

4.4 Which mark band?

<table>
<thead>
<tr>
<th>Lower Mark Bands</th>
<th>Higher Mark Bands</th>
</tr>
</thead>
<tbody>
<tr>
<td>Limited evidence of mandatory elements.</td>
<td>Evidence of consistently appropriate and effective use of all mandatory elements at a high skill level.</td>
</tr>
<tr>
<td>Digital design and/or manufacture is limited and little or no skills or knowledge demonstrated.</td>
<td>A high level of skill and knowledge is demonstrated using advanced software features and tools within CAD and CAM.</td>
</tr>
<tr>
<td>Superficial record of making that does not always follow the plan.</td>
<td>A thorough record of making following the plan.</td>
</tr>
</tbody>
</table>
Drinks carrier – organised approach with clear evidence of CAD (2D design) and CAM (Laser cutter) being used.

Puzzle box - well documented account of making including changes to the original plan.
**Viability of the final prototype(s)**

<table>
<thead>
<tr>
<th>Mark Band 1 (1-5)</th>
<th>Mark Band 2 (6-10)</th>
<th>Mark Band 3 (11-15)</th>
<th>Mark Band 4 (16-20)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Little or no links to the technical specification and demonstrating limited potential to become a marketable product.</td>
<td>Meets some of the technical specification and demonstrating some potential to become a marketable product.</td>
<td>Meets most of the technical specification and demonstrating good potential to become a marketable product.</td>
<td>Meets all of the technical specification and demonstrating excellent potential to become a marketable product.</td>
</tr>
</tbody>
</table>

**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)

*(The final prototype(s) is not the commercial product. Recognising this, the final prototype(s) is the closest possible representation(s) of the design solution outlined in the final design and technical specification, using the resources and facilities available to the candidate)*

**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

**Which mark band?**

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

**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
Bike Security - A good reflection on the viability of the final prototype after is has been made, showing reflection on different considerations the relate to the success of the product.

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

Bike work stand - Testing in situ and an evaluation against requirements give an good idea of the prototypes viability.
**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.

### 5.1 Analysis and evaluation of primary and/or secondary sources

<table>
<thead>
<tr>
<th>Mark Band 1 (1–5)</th>
<th>Mark Band 2 (6–10)</th>
<th>Mark Band 3 (11–15)</th>
<th>Mark Band 4 (16–20)</th>
</tr>
</thead>
<tbody>
<tr>
<td>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.</td>
<td>Sufficient analysis and evaluation of investigated sources of information from stakeholders, existing products and wider issues, offering some support to inform the design process.</td>
<td>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.</td>
<td>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.</td>
</tr>
</tbody>
</table>

#### 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?

#### 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.

#### 5.1 Which mark band?

**Lower Mark Bands**

- 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/or environmental are not considered.
- Analysis of existing products and the factors that are pertinent to designing is ineffective and lacks detail.
- Use of charts and comparative data including the views of others is not fully recognized within the evaluative process.

**Higher Mark Bands**

- 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/or environmental are considered.
- Analysis of existing products and the factors that are pertinent to designing is effective and lacks detail.
- Use of charts and comparative data including the views of others is fully recognized within the evaluative process.

#### 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.
Playground interactive games - good analysis of stakeholder questionnaire with an evaluative conclusion.

**Key Stakeholder Questionnaire**

Who are the key stakeholders?

Young children aged 2-11 and their parents will be the key stakeholders in my chosen public space as they will use the space the most often. Parents will often take their children to, and join in or supervise them during their child’s use of a play area. Therefore the element that I develop must appeal to both parents and children. If the elements are put off by then they will not take their children to the play area. Similarly if the child does not like the element then they will not be encouraged to go to the park or interact with it. It is also important to highlight the local council as a key stakeholder as well because ultimately they will more than likely fund the installation of the element.

**Questionnaire**

I asked local parents and their children the following questions about their thoughts on the outdoor play areas they visit:

- How often do you visit outdoor play areas?
- What are the two most important factors when choosing a play area to visit?
- Do you prefer high level or ground level elements?
- What is your favourite part of a play area?

**Conclusions**

From the questionnaire I can see that outdoor play areas are generally visited at least once a week and cleanliness, safety and safety are the top factors. Similarly children like high level elements, parents favour ground level elements. Therefore I am going to concentrate on the bottom of the ground level elements, focusing on safety, safety and height in my design.

**In Depth Product Analysis of Similar Product**

**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.

**Advertising board - Critical analysis of existing similar products in order to determine what elements might support their designing.**
5.2 Ongoing evaluation to manage design progression

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

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'

5.2 Which mark band?

<table>
<thead>
<tr>
<th>Lower Mark Bands</th>
<th>Higher Mark Bands</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Mark Band 1</strong> (1–5)</td>
<td><strong>Mark Band 4</strong> (16–20)</td>
</tr>
</tbody>
</table>
| Superficial evaluations with little or no reflection on requirements or 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. | Ongoing and clear reviews to identify problems and/or next steps for future iterations to effectively support design progression.

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
**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.**

**Special event dress - Different ideas are discussed with stakeholders to inform the next stages of development.**

**Bike Security - PUN used to manage ongoing design progression with planned next steps.**
5.3 Feasibility of the design solution

<table>
<thead>
<tr>
<th>Mark Band 1 (1–5)</th>
<th>Mark Band 2 (6–10)</th>
<th>Mark Band 3 (11–15)</th>
<th>Mark Band 4 (16–20)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unfit with little or no methods used to appropriately analyse and test whether the design solution is fit for purpose.</td>
<td>Sufficient with some appropriate methods used to analyse and test whether the design solution is fit for purpose.</td>
<td>Good level of detail with mostly appropriate methods used to analyse and test whether the design solution is fit for purpose.</td>
<td>Comprehensive with fully appropriate methods used to analyse and test whether the design solution is fit for purpose.</td>
</tr>
</tbody>
</table>

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

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

5.3 Which mark band?

<table>
<thead>
<tr>
<th>Lower Mark Bands</th>
<th>Higher Mark Bands</th>
</tr>
</thead>
<tbody>
<tr>
<td>Limited evidence with few or no methods used to appropriately analyse and test whether the design solution is fit for purpose</td>
<td>Different appropriate and rigorous methods used to test the fitness for purpose of the design solution</td>
</tr>
<tr>
<td>Stakeholders not consulted or involved, design not tested in a real-life situation</td>
<td>Stakeholders, and independent others, used to evaluate/test the design in several real life situations</td>
</tr>
<tr>
<td>Subjective evaluation with little appreciation of the need for feedback and numerical data</td>
<td>Feedback and numerical data from evaluation and testing enables a balanced and detailed analysis</td>
</tr>
</tbody>
</table>

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
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.

Cycling Jersey - Primary user and stakeholder consulted.

Jewellery storage - A range of methods used to check if the design is fit for purpose.
5.4 Evaluation of the final prototype(s)

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

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.

Which mark band?

Lower Mark Bands

Higher Mark Bands

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

Comparison to related marking criteria

5.4 (this marking criterion) assesses the candidate's skills in the critical evaluation of their final prototype and in suggesting modifications and design optimisation

5.3 assesses the candidate's ability to analyse and test the feasibility and fitness for purpose of their final design solution
GCSE (9-1) Design Technology  
Internal marking guide

Pilots organiser - Full details of modifications to meet the weaknesses. Possible design optimisation discussed by looking at the implications of these modifications.

Apple corer/slicer - Modifications are presented in detail using diagrams, sketches and images to show intentions clearly. Implications are discussed.

Jewellery storage - Strengths and weaknesses explained and three very detailed modifications presented and analysed.
We'd like to know your view on the resources we produce. By clicking on the 'Like' or 'Dislike' button you can help us to ensure that our resources work for you. When the email template pops up please add additional comments if you wish and then just click 'Send'. Thank you.

Whether you already offer OCR qualifications, are new to OCR, or are considering switching from your current provider/awarding organisation, you can request more information by completing the Expression of Interest form which can be found here: www.ocr.org.uk/expression-of-interest

OCR Resources: the small print
OCR's resources are provided to support the delivery of OCR qualifications, but in no way constitute an endorsed teaching method that is required by OCR. Whilst every effort is made to ensure the accuracy of the content, OCR cannot be held responsible for any errors or omissions within these resources. We update our resources on a regular basis, so please check the OCR website to ensure you have the most up to date version.

This resource may be freely copied and distributed, as long as the OCR logo and this small print remain intact and OCR is acknowledged as the originator of this work.

Our documents are updated over time. Whilst every effort is made to check all documents, there may be contradictions between published support and the specification, therefore please use the information on the latest specification at all times. Where changes are made to specifications these will be indicated within the document, there will be a new version number indicated, and a summary of the changes. If you do notice a discrepancy between the specification and a resource please contact us at: resources.feedback@ocr.org.uk.

OCR acknowledges the use of the following content: Square down and Square up: alexwhite/Shutterstock.com

Please get in touch if you want to discuss the accessibility of resources we offer to support delivery of our qualifications: resources.feedback@ocr.org.uk.

Looking for a resource?
There is now a quick and easy search tool to help find free resources for your qualification:
www.ocr.org.uk/i-want-to/find-resources/

www.ocr.org.uk
OCR Customer Support Centre

General qualifications
Telephone 01223 553998
Facsimile 01223 552627
Email general.qualifications@ocr.org.uk

OCR is part of Cambridge Assessment, a department of the University of Cambridge. For staff training purposes and as part of our quality assurance programme your call may be recorded or monitored.

© OCR 2019 Oxford Cambridge and RSA Examinations is a Company Limited by Guarantee. Registered in England. Registered office The Triangle Building, Shaftesbury Road, Cambridge, CB2 8EA. Registered company number 3484466. OCR is an exempt charity.

Cambridge Assessment
CERTIFIED
ISO 9001
UKAS MANAGEMENT SYSTEMS