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, including 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 can be multiple teaching groups, with different teachers, or groups that are covering more than one of the endorsed titles. It is therefore essential that the internal marking 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 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 for all of the candidates entered for that endorsed title. Also if the order of merit is deemed to be incorrect, the work will be returned, 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 each component that a centre is entered for, to ensure it is in line with an agreed standard that is 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, 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. As all submissions must be through electronic portfolios, a computer screen will be required to view the evidence provided.

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.

At A Level there is a 5th mark band reserved only for exceptional work. To support what this looks like within each assessment statement clarification is given throughout this document.

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 portfolios 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 – Word version](image1)

Identifying your evidence – Excel version

![Identifying your evidence – Excel version](image2)
KEY CONSIDERATIONS WHEN MARKING

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

1. Candidates must submit a portfolio representative of the endorsed title they have been entered for. If this is not the case, entries must be altered accordingly to avoid the risk of it being referred as suspected maladministration.

2. There must be sufficient photographic and video evidence of the final prototype. Video must be used to demonstrate any functionality and a $360^\circ$ view of the prototype must be seen. This evidence will support the marking of criteria 4.2, 4.5, 5.3 and 5.4.

   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 administration 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/as-and-a-level/design-and-technology-h004-h006-h404-h406-from-2017/assessment/

The Centre Authentication Form must be complete and retained in the centre in case of a JCQ visit. Link to Centre Authentication Form:

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 the 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:

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:
CANDIDATE EXEMPLARY

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 and feasibility study of potential products

<table>
<thead>
<tr>
<th>Mark Band 1 (1-6)</th>
<th>Mark Band 2 (7-11)</th>
<th>Mark Band 3 (12-16)</th>
<th>Mark Band 4 (17-21)</th>
<th>Exceptional Level Mark Band 5 (22-25)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Superficial insights 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>
<td>Exceptional investigations identify a breadth of highly challenging problems and opportunities for further consideration.</td>
</tr>
<tr>
<td>Little or no consideration of market potential through the approaches taken.</td>
<td>Some consideration of market potential through the approaches taken.</td>
<td>Informed consideration of market potential through the approaches taken.</td>
<td>Objective consideration of market potential through the approaches taken.</td>
<td>Objective and innovative consideration of market potential through the approaches taken.</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.
• The level of consideration of the feasibility and market potential of the opportunities identified for the product development.

1.1 Relevant evidence could include

• Contact with potential stakeholders and users.
• Mind maps, mood boards, visits, interviews, observations, surveys, focus groups.
• Feasibility study / SWOT analysis considering whether realistic/suitable (e.g. resources, skills, commercial potential).
• Photographic and video evidence.

1.1 Which mark band?

Lower Mark Bands

- Few "innovative" options explored
- Learner is distracted from the context and gains a limited understanding of problems and opportunities
- Limited validity
- Limited depth and clarity in investigations around the context
- Little support for thinking and decisions from secondary sources

Higher Mark Bands

- Few "innovative" options explored
- Learner is actively involved in, and forms a strong connection with, the context / situation to fully understand problems and opportunities
- An authentic approach
- Learner follows through possibilities from further investigations to clarify and confirm their thinking
- Use of relevant data, statistics and technical information to support and validate thinking

What does EXCEPTIONAL look like?

Investigations demonstrate inherently innovative thinking that identify a dynamic approach and/or authentic and original opportunities and challenges leaving the reader with no doubt of the potential and reasoning the approaches demonstrate strong market awareness.
Bike light - Three possible contexts are explored and analysed in real time; visits, interviews, observations and direct contact with key stakeholders; first hand involvement within the contexts; potential design opportunities considered; evidence present.

Dentists unit - Identification of problems and potential opportunities within the dental practice, with some of the key issues that will need attention; details of the context given; photos are included, evidencing primary contact.

Dentists unit - Video evidence of interview with primary user - dentist; further clarification of problems and issues to be addressed; consideration of market opportunities and commercial potential.
## Design brief

### 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 and considered engagement of primary users and other stakeholders

### Relevant evidence could include

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

### Which mark band?

<table>
<thead>
<tr>
<th>Lower Mark Bands</th>
<th>Higher Mark Bands</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shown a solution to the problems</td>
<td>The brief clearly states the problem to be solved</td>
</tr>
<tr>
<td>Very basic and generic tasks likely to be involved in the project</td>
<td>Significant challenges likely to be faced are mentioned, specific to chosen context and focus</td>
</tr>
<tr>
<td>Little consideration of key issues and their level of importance</td>
<td>Areas for particular attention / priority in the design, e.g. safety, usability, inclusive design, function and durability, legal and regulatory requirements are highlighted</td>
</tr>
<tr>
<td>Limited contact with, or consideration of, the context, stakeholders and users</td>
<td>Contact with, and the influence of, the context, stakeholders and users is clearly evident</td>
</tr>
<tr>
<td>Little consideration of marketing and commercial issues that will be relevant</td>
<td>Detailed attention given to the marketing and commercial aspects which are likely to be important</td>
</tr>
</tbody>
</table>

### What does EXCEPTIONAL look like?

The brief and evidence around it demonstrates the potential for an intellectually challenging project and the reader is left in no doubt as to how this can be successfully delivered. Consideration of the full spectrum of stakeholders has been covered with clear plans for their engagement.
Cycle short - All relevant information collated to form a Design Brief that includes the names and details of users and stakeholders; identified their next steps to support their iterative process.

Bike light - Brief includes clear statement of direction for the project; photographs explaining the specific areas for attention; names and details of stakeholders and primary users; the likely challenges and priorities through the project.

Tool holder for a tractor - A statement of the specific problem(s) the candidate is looking to solve; the specific improvements they are aiming to make; users and stakeholders identified; market potential considered.
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 (1-4)</th>
<th>Mark Band 2 (5-7)</th>
<th>Mark Band 3 (8-10)</th>
<th>Mark Band 4 (11-14)</th>
<th>Exceptional Level (Mark Band 5 (15-20))</th>
</tr>
</thead>
<tbody>
<tr>
<td>Limited investigations of relevance and value, with superficial or generic needs of users identified.</td>
<td>Investigations that reveal a wide range of requirements that inform the design process.</td>
<td>Full and extensive consideration of primary user and stakeholder needs and wants and consideration of other stakeholders.</td>
<td>Exceptional level of consideration of primary user and stakeholder needs and wants and consideration of other stakeholders.</td>
<td></td>
</tr>
<tr>
<td>Little or no direct contact with users and stakeholders.</td>
<td>Direct contact with users and stakeholders on specific problems identified, e.g. usability, functionality, aesthetics, ergonomics.</td>
<td>Extensive range of requirements are identified that offer scope to support the design process.</td>
<td>Exceptional level of consideration of primary user and stakeholder needs and wants and consideration of other stakeholders.</td>
<td></td>
</tr>
<tr>
<td>Mindless secondary sources such as the internet, recorded randomly and lacking clarity.</td>
<td>A clear and well-structured record of investigations, primary and secondary.</td>
<td>Extensive range of requirements are identified that offer scope to support the design process.</td>
<td>Exceptional level of consideration of primary user and stakeholder needs and wants and consideration of other stakeholders.</td>
<td></td>
</tr>
<tr>
<td>Little structure and coherence.</td>
<td>Structured investigations beneficial from the use of design strategies and project management tools.</td>
<td>Extensive range of requirements are identified that offer scope to support the design process.</td>
<td>Exceptional level of consideration of primary user and stakeholder needs and wants and consideration of other stakeholders.</td>
<td></td>
</tr>
</tbody>
</table>

Which mark band?

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
Tea tidy - Relevant legislation for an item storing food products; appropriate anthropometric, ergonomic and safety data selected, highlighted and illustrated; direct contact with users / stakeholders.

Tea tidy - Important quantitative data to be added to master list of requirements; user and stakeholder requirements; strong photo and video evidence of primary contact.

Master list of requirements - The completion of this master list is a focus of the investigations. Ongoing reference to, and updating of, this list through the iterative design process is central and crucial to meeting the needs of stakeholders and users.
1.4 Investigations of existing products and design practices

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

Relevant evidence could include

- Tests and observations of products in use and/or over time, comparisons between products, reference to product reviews and forums
- Disassembly or ‘reverse engineering’
- Exploring products and systems that are different, as well as similar, to the focus of the project
- Consideration of design theory and practices such as Design Optimisation, DFMA, and trend forecasts as applied to products
- Photographs, audio, video, diagrams and text

Which mark band?

<table>
<thead>
<tr>
<th>Lower Mark Bands</th>
<th>Higher Mark Bands</th>
</tr>
</thead>
<tbody>
<tr>
<td>Little or no information or sources of inspiration available, suggesting little or no support to design decisions and thinking.</td>
<td>Relevant technical detail, quantitative information 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 with little value to the project</td>
<td>Direct personal contact with the products being investigated, or a ‘hands-on’ approach, including contact with users of those existing products.</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 and evaluation against a wide range of criteria.</td>
</tr>
</tbody>
</table>

What does EXCEPTIONAL look like?

Investigations consider the most obvious features of existing products and do not relate to the marketing and commercial aspects. Identification of marketing and commercial aspects and features in existing products, considering the product as a whole as pedagogical and offered for sale.

Little or no consideration of other design influences or significant designers

Relevant, wider design influences considered that could stimulate their own design thinking, including that of other designers and/or engineers.

What does EXCEPTIONAL look like?

Investigations of existing products and appropriate design practices are purposeful, responsive to iterative developments and, open up original considerations, offering fully informed support to direct the development of the project in a purposeful and fully coherent manner.

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.
Sleep suit for the homeless - Mostly secondary investigations of a range of existing products.

Buoyancy aid - Disassembly to identify areas for improvement.

Dinghy trolley - Primary investigation of existing products to understand the different components and mechanisms; gain an insight into the technical details, such as the dimensions of a common dinghy, which will have a direct impact on iterative designing.
1.5 **Exploration of materials and possible technical requirements**

### 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.

### Relevant evidence could include

- Trials, experiments and comparisons of the properties of different materials, finishes, components and processes that may be suitable for the chosen product or system (prior to final design solution).
- A variety of processes and methods to investigate and identify technical information such as performance data 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.

### Which mark band?

<table>
<thead>
<tr>
<th>Lower Mark Bands</th>
<th>Higher Mark Bands</th>
</tr>
</thead>
<tbody>
<tr>
<td>Secondary information on materials, with generic information rather than specific to the context. Stakeholder and user opinions not sought.</td>
<td>First-hand trials and tools of different materials, finishes, components, etc., in the intended context with intended users or as part of a prototype to compare performance and obtain stakeholder opinions.</td>
</tr>
<tr>
<td>Little consideration of broader implications of material choice and technical decisions.</td>
<td>Includes relevant consideration of commercial, social, ethical, sustainability and other issues.</td>
</tr>
<tr>
<td>General consideration of properties of materials.</td>
<td>Consideration of different physical properties (e.g. weight, durability) of materials that are relevant to the design.</td>
</tr>
<tr>
<td>Limited consideration of performance requirements.</td>
<td>Consideration of different performance requirements (e.g. energy requirements, accuracy, speed of operation, with allowances/tolerances that are relevant to the design).</td>
</tr>
</tbody>
</table>

---

**What does EXCEPTIONAL look like**

Investigations of materials and possible technical requirements are thorough and leave the reader in no doubt that full consideration has been made to their appropriate use within design solutions. They take into consideration any related wider issues to help inform their appropriate selection, perhaps offering original approaches that demonstrate innovation.

---

### 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.
Cheese grater - Testing of different materials to ascertain how they will react when in contact with potentially corrosive foods/ingredients; summaries of the findings on video for future reference within the design process.

Foldable seat/stool - Investigation of material properties; reference to performance requirements of the foldable seat; materials mapping charts used effectively.

Sleep suit for the homeless - Detailed investigations into the suitability of materials, construction and design features.
1.6 Technical specification

<table>
<thead>
<tr>
<th>Mark Band 1</th>
<th>Mark Band 2</th>
<th>Mark Band 3 (12-18)</th>
<th>Mark Band 4 (17-23)</th>
<th>Exceptional Level (22-25)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inaccurate, outline (basic detail is and for it difficult for a third party to understand)</td>
<td>Inaccurate, outline details that do not communicate</td>
<td>Good levels of accuracy, outlines that clearly communicate</td>
<td>High levels of accuracy, outlines that clearly communicate</td>
<td>Exceptional levels of accuracy, outlines that clearly communicate</td>
</tr>
<tr>
<td></td>
<td></td>
<td>technical requirements to a third party.</td>
<td>technical requirements to a third party.</td>
<td>technical requirements to a third party.</td>
</tr>
</tbody>
</table>

1.6 What is being assessed?

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

1.6 Relevant evidence could include

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

1.6 Which mark band?

**Lower Mark Bands**

A low level of skill using different methods/tools, including CAD, to ensure accuracy and clarity in communicating full details of the final design

Limited understanding of commercial practice or industrial methods relating to their design

Limited attempt to record how well their design meets the requirements

**Higher Mark Bands**

A high level of skill using different methods/tools, including CAD, to ensure accuracy and clarity in communicating full details of the final design

Reflects standard industrial/commercial practice (CAD drawing etc.) in relation to the end product, the project focus, and the materials and manufacturing processes that will be used

Explanation of how the design meets the requirements identified on the ‘Master list of requirements’

**What does EXCEPTIONAL look like?**

The Technical Specification briefly outlines all of the intentions and details of the design solution, leaving nothing to doubt. The presentation is seen to be of a professional standard, mirroring commercial practice and drawing conventions.

1.6 Comparison to related marking criteria

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

2.3 assesses the level of design thinking skills in the progression to the 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.
Dentist's unit - Dimensioned CAD assembly drawings.

Trench coat - One part of the lay plans of a new uniform; clear presentation of details and the inclusion of manufacturing information; reference to Quality Control; demonstration of grain direction and sizes.

Gulf putter - A cutting list of their components and bought in items for a golf putter; labelling of parts links directly to the working drawings.
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 1 (1-5)</th>
<th>Mark Band 2 (6-9)</th>
<th>Mark Band 3 (10-13)</th>
<th>Mark Band 4 (14-16)</th>
<th>Exceptional Level (Mark Band 5 (17-19))</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 some ideas that avoid design fixation and generally reflect the requirements.</td>
<td>Different and relevant design approaches that lead to ideas that mostly 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 and meet requirements.</td>
<td>Different, relevant and innovative design approaches that lead to non-stereotypical ideas offering outstanding scope for challenge and fully reflect and meet 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 Relevant evidence could include

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

2.1 Which mark band?

<table>
<thead>
<tr>
<th>Lower Mark Bands</th>
<th>Higher Mark Bands</th>
</tr>
</thead>
<tbody>
<tr>
<td>A small number of ideas which are very similar.</td>
<td>A breadth of conceptual design thinking is evident. Six or more ideas, either different to each other or showing variations of a more complete idea.</td>
</tr>
<tr>
<td>Users and stakeholders not consulted or involved and/or little review and reflection.</td>
<td>Stakeholders and users are engaged with generation and feedback of initial ideas as appropriate and their views are reflected upon.</td>
</tr>
<tr>
<td>Limited annotation where this would have been beneficial to explain and justify ideas.</td>
<td>Sketches and diagrams are supported by commentary and a justification of why design thinking has been used.</td>
</tr>
<tr>
<td>Ideas tend to be based on a single concept or based on existing designs.</td>
<td>Use of appropriate strategies to avoid fixation and generate innovative ideas and concepts.</td>
</tr>
</tbody>
</table>

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.
Storage for personal possessions that fits to a user's arm - First sketches with explanations and next steps; first sketch models (videos show mechanism movement).

Folding seat - Initial sketches (including some simple CAD); feedback from users/stakeholder and their requirements.

Cycle shirt - Ideas are formulated quickly for various aspects of the shirt; pocket has been quickly added on to an existing product to give a realistic impression.
2.2 Design developments

<table>
<thead>
<tr>
<th>Mark Band 1 (1–5)</th>
<th>Mark Band 2 (6–9)</th>
<th>Mark Band 3 (10–13)</th>
<th>Mark Band 4 (14–16)</th>
<th>Exceptional Mark Band 5 (17–19)</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>
<td>Iterative developments are exceptional, incorporating all technical requirements and fully respond and meet identified next-steps of development.</td>
</tr>
</tbody>
</table>

2.2 What is being assessed?

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

2.2 Relevant evidence could include

- Improvements and iterative developments to a number of the candidate’s initial design ideas (more than two), through sketches, models, trials, digital tools - CAD, CAM, visualisation and simulation software, etc.
- An incremental ‘step-by-step’ approach, with some iterations in the form of very small improvements, tweaks or additions to overcome an 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
- Application of the principles of project management and planning, such as CPA, Scrum, Six Sigma and Gantt
- Application of the principles of Design Optimisation and DFMA (e.g. use of standard components, simplification of design......)
- Consideration of size and cost; materials and manufacturing; ergonomics, commercial viability, inclusive design and wider issues
- Consultations and collaboration with others

2.2 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 iterative design refinement and progression towards a design solution</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 devising innovative iterations</td>
</tr>
<tr>
<td>Limited evaluation and experimentation. Materials, components, and processes receive only cursory recognition</td>
<td>Evaluating, experimenting, modelling, and testing throughout to determine the suitability of designs, materials, components and manufacturing processes / construction techniques</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>
</tbody>
</table>

What does EXCEPTIONAL look like?

Iterative developments are both thought provoking and cleverly working towards well considered possibilities for solving the needs, problems and opportunities that have been identified. They are attentive to detail and thorough in iteratively confirming or rejecting possibilities as designs are refined.

2.2 Comparison to related marking criteria

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

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

5.2 assesses the candidate’s ongoing evaluation, reviews and reflection, and management of the design progression
Tea tidy - Collaboration; reviewing the design idea for focus and iterative development; iterative development; video evidence of investigations; existing products analysed relevant to this aspect of the designing.

Wheelchair Aid - Design iterations developed progressively, responding to previous iterations; advantages/disadvantages highlighted; requirements considered to inform next stages of design process; sketches, CAD, video, modelling.

Quayside mooring device - Investigations undertaken to inform understanding and next steps; learner incorporates the bearings into the product being developed; CAD, sketches, modelling and experiments aid progression and refinement.
2.3 Development of final design solution(s)

<table>
<thead>
<tr>
<th>Mark Band 1 (1–5)</th>
<th>Mark Band 2 (6–9)</th>
<th>Mark Band 3 (10–13)</th>
<th>Mark Band 4 (14–16)</th>
<th>Exceptional Level Mark Band 5 (17–19)</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>
<td>Exceptional 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 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
- Demonstration of how the final design solution meets the user and stakeholder requirements and the technical requirements
- Confirmation with stakeholders of details for commercial manufacture
- Consideration of marketing aspects – USP, labelling, packaging, branding, point of sale, etc.

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, successive and progressive developments result in the best, 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, revealing and detailing compression, strategies and approaches</td>
</tr>
<tr>
<td>Stakeholders not consulted or involved</td>
<td>Final design solution fully scrutinised and approved 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 content 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.
Sports scorebook holder - Commercial / industrial consideration as design progresses towards a final design solution; 3D printing simulates injection moulded components; refinement of components; record of candidate's journey and thinking; shows timeline / main stages of iterative development leading to final design.

Junior school desk - marketing at the forefront of the candidate's design thinking throughout the iterative process; branding - the whole concept and corporate image is inherent in the actual shape and formation of the product; branding trialled on other products that are directly linked to the context.
2.4 Critical thinking

**What is being assessed?**

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

**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

**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 devising 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 design process</td>
</tr>
<tr>
<td>Limited questioning so as to have missed 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>

**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

5.5 assesses the candidate’s skills in the critical evaluation of the strengths and weaknesses of their final prototype
Dentists Unit - The candidate records the problems that arise during the design development; solutions, with supporting video evidence.

Tea tidy - Ongoing resolution of identified issues; a perceptive approach to likely problems; innovative thinking through alternatives.

Candidate bag - Critically thinking through and testing different materials and fasteners; video real time support; feedback from user; problem solving and identifying next steps in the iterative design process.
**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 (1-3)</th>
<th>Mark Band 2 (4-6)</th>
<th>Mark Band 3 (7-9)</th>
<th>Mark Band 4 (10-11)</th>
<th>Exceptional Level (12-15)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Design iterations are not always clear and/or chronological, with little or no support from real-time evidence.</td>
<td>Design iterations are sometimes clear and predominantly chronological, some support from real-time evidence.</td>
<td>Design iterations are clear and chronological, mostly supported by real-time evidence.</td>
<td>Design iterations are clear, systematic and chronological, fully supported by real-time evidence.</td>
<td>Design iterations are highly professional, systematic and chronological, fully supported by exceptional 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?**

**Lower Mark Bands**: The portfolio tells an incomplete and/or incoherent story that does not support the design journey. Thinking and progression is difficult to follow. Design iterations are not always clear with little or no support from real-time evidence.

**Higher Mark Bands**: The portfolio tells an authentic, coherent and concise but complete story, as it happens, of design development from conception to final prototype(s). A third party is able to fully understand the candidate’s thinking and progression throughout. The real-time chronological recording of the iterative designing is supported and verified by convincing evidence.

**What does EXCEPTIONAL look like?**

The entire portfolio leaves the reader in no doubt that every aspect of development has been carefully considered through clear and professional communication that carries them through the story of development.
Wheelbarrow - Front wheel design iterations; clear communication; feedback from stakeholders / users; chronological progression; real time evidence of iterative design process.
3.2 Quality of initial ideas

<table>
<thead>
<tr>
<th>Mark Band 1 (1–3)</th>
<th>Mark Band 2 (4–6)</th>
<th>Mark Band 3 (7–9)</th>
<th>Mark Band 4 (10–11)</th>
<th>Exceptional Level Mark Band 5 (12–13)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Informal graphical and modelling skills are limited and not clear enough to appropriately communicate initial thinking.</td>
<td>Informal graphical and modelling skills are limited and not consistent in appropriately communicating initial thinking.</td>
<td>Informal graphical and modelling skills are limited and not consistent in appropriately communicating initial thinking.</td>
<td>Informal graphical and modelling skills are excellent and are highly effective and convincing in appropriately communicating initial thinking.</td>
<td></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

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 clarifies, records, and explains the candidate’s thinking, so that stakeholders and users 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>

What does EXCEPTIONAL look like

Initial ideas are competently and/or thoughtfully delivered through appropriate methods to present those first thoughts confidently yet informally to the reader.

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
Tea tidy - A clear and coherent record of the design progression in real time. Video evidence.

Paintballing mask - A higher-level sketching approach with brief annotations to aid understanding of progress; simple modelling in real time to test theories and requirements - in this case ergonomics.

Hair straighteners - Interactive approach with simplistic but effective 2D sketching being presented to the user; following feedback plasticine and rigid foam is used to mock up several very quick 3D models, allowing direct interaction for the user to comment further.
### 3.3 Quality of design developments

<table>
<thead>
<tr>
<th>Mark Band 1</th>
<th>Mark Band 2</th>
<th>Mark Band 3</th>
<th>Mark Band 4</th>
<th>Exceptional Band 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1-2)</td>
<td>(3-5)</td>
<td>(6-8)</td>
<td>(9-10)</td>
<td>(11-13)</td>
</tr>
</tbody>
</table>

*Refer to Strand 4 when assessing digital design and manufacture.

#### 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

#### 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 economics, dimensional, and functional suitability

#### Which mark band?

**Lower Mark Bands**
- The range of communication techniques used is limited and rarely clear enough to appropriately develop or communicate design concepts
- Lack’s detailed communication of the design progression, and the journey taken, to gain useful feedback
- Superficial modelling that does not fully engage at component and assembly level
- Use of CAD is limited

**Higher Mark Bands**
- Designs developed presented in a way that fully clarifies, records, and explains the candidate’s thinking, so that stakeholders and users fully understand the design decisions taken
- Highly effective and detailed communication of the progression from one stage of a design, concept or part of a design/component to the next, and the journey taken, as appropriate, to gain feedback
- Sophisticated models and early prototypes on a component and assembly level
- Complete CAD drawings, visualisations, simulations, and virtual testing

**What does EXCEPTIONAL look like**
- 2D and 3D graphical and practical techniques are flawlessly delivered with clear and informative annotations, detailed sections, modelling, prototyping, and both test ideas and present iterative design developments appropriately to the reader

#### 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
A Level Design Technology

Ice pack - A range of methods from basic 2D sketching and quick modelling techniques to more complex 3D sketching, CAD and working models; work on single components and issues as opposed to the whole product - isolating; Reflecting and responding to the problems as they arise; clear communication and presentation that is honest as things happen - successes and failures; overviews/decisions and the next steps towards a solution.

Bike light - Clear presentation of the work being undertaken; use of CAD and 3D printed models; easy for 3rd party to follow the iterations, developments and decisions.
3.4 Quality of final design solution(s)

<table>
<thead>
<tr>
<th>Mark Band 1 (1-3)</th>
<th>Mark Band 2 (4-6)</th>
<th>Mark Band 3 (7-9)</th>
<th>Mark Band 4 (10-11)</th>
<th>Exceptional Level Mark Band 5 (12-13)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Formal presentation of the final design solution(s) is limited making it difficult for a third party to understand.</td>
<td>Formal presentation of the final design solution(s) is sufficient and provides some clarity to a third party.</td>
<td>Formal presentation of the final design solution(s) is good and provides appropriate clarity to a third party.</td>
<td>Formal presentation of the final design solution(s) is excellent and provides strong impact and appropriate clarity to a third party.</td>
<td></td>
</tr>
</tbody>
</table>

3.4 What is being assessed?

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

3.4 Relevant evidence could include

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

3.4 Which mark band?

<table>
<thead>
<tr>
<th>Lower Mark Bands</th>
<th>Higher Mark Bands</th>
</tr>
</thead>
<tbody>
<tr>
<td>Formal presentation of the final design solution(s) is limited. The viability is not evident and it is difficult for a third party to understand.</td>
<td>The visibility of the final design solution is evident to a third party, covering the feasibility, practicality, capability, sustainability, usability, marketability and market potential of the product.</td>
</tr>
<tr>
<td>A limited, inappropriate or basic techniques used in the presentation, which lacks impact and detail.</td>
<td>A high level of impact, detail and clarity in the presentation, achieved through appropriate advanced and sophisticated techniques.</td>
</tr>
</tbody>
</table>

What does EXCEPTIONAL look like?
The quality of delivery of the final design solution is highly professional and engaging in its presentation, leaving the user in no doubt as to what the design solution is intended to look like and what it is intended to do.

3.4 Comparison to related marking criteria

3.4 (this marking criterion) assesses the candidate’s formal presentation / communication of the final design solution, e.g. formal illustrations, formal models, rendered drawings etc., to give clarity and impact
1.6 assesses the technical specification, working drawings, and level of technical detail and clarity for the final design solution
2.3 assesses the level of the candidate’s design thinking skills in the progression to their final design solution, with refinement to meet all requirements
Folding museum seat - Final design including the commercial package - logo and branding; wall bracket for the museum to store, plus possible alternative such as a trolley: All important marketing aspects stakeholders will want to see.

Top with headscarf - Final design visualised; various elements explained in terms of aesthetics, sizing, materials and manufacturing; the reaction of the target market is included.

Dentist’s Unit - Demonstrates a 3D CAD representation; exploded video allows further understanding of the various components: video of the working mechanisms adds to the presentation for the audience.
**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 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.
- Explanation of how QA and QC measures influence the decision making and how they support accuracy and quality in the final prototype(s). Use of jigs, templates, patterns, tolerance checking etc.
- Reference to Risk Assessments (which are assessed in Strand 5).
- Estimations on timings and sequencing, and particulars of any expert assistance to be arranged. Details of how these will be managed through the making process.
- Commercial methods and approaches such as Project Management Tools, Critical Path Analysis, Scrum, Six Sigma, Gantt, and flowcharts.
- Appreciation of how efficiencies can be achieved through minimising waste, experimenting with layouts etc.
- Recording in real time of any variations to the planned events, with reasoning and details of any modifications to the design.

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

<table>
<thead>
<tr>
<th>Mark Band 1</th>
<th>Mark Band 2</th>
<th>Mark Band 3</th>
<th>Mark Band 4</th>
<th>Exceptional Level Mark Band 5</th>
</tr>
</thead>
</table>

Offers little or no support to the making process with little or no consideration of safety.

Generally supports the making process with some relevant requirements and safety considerations identified from the technical specification.

Good level of detail and relevant, covering all requirements and safety considerations identified from the technical specification to manage the making process.

Comprehensive and detailed, covering all requirements and safety considerations identified from the technical specification to effectively manage the making process.

Exceptional and fully integrated, covering all requirements and safety considerations identified from the technical specification to commendably manage the making process.

**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.
- The candidate’s coverage of the requirements and safety considerations identified from the technical specification.

**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 with little or no consideration of safety.</td>
<td>A thorough and logical approach to planning with all important aspects covered, including quality control and safety.</td>
</tr>
<tr>
<td>Planning does not utilise recognised commercial and industrial practice.</td>
<td>Planning reflects commercial and industrial practice through the use of project management tools and strategies.</td>
</tr>
<tr>
<td>Little or no evidence of the plan being used in real time. Modifications are rarely 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>

---

**What does EXCEPTIONAL look like?**

Practical activities are meticulously planned to ensure all aspects are covered when modifying the technical specification to make the final prototypes. Limitations for testing are considered and streamlined through careful selection of materials and / or multiple prototypes.
Archery Storage - Critical Path Analysis for the making of the final prototype; tasks completed at the right time and in the right order to ensure completion on time.

Candidate Bag - A log of progress during the actual making; safety assessments included in the formal Risk Assessments required at A Level.

Elderly person’s car seat - Plan for making shows the components and their respective interaction with the product as a whole.
4.2 Quality of final prototype(s)

<table>
<thead>
<tr>
<th>Mark Band 1 (1-5)</th>
<th>Mark Band 2 (6-9)</th>
<th>Mark Band 3 (10-15)</th>
<th>Mark Band 4 (16-20)</th>
<th>Exceptional Level (Mark Band 5 (11-15))</th>
</tr>
</thead>
<tbody>
<tr>
<td>Insufficient and/or basic standards demonstrated.</td>
<td>Quality standards demonstrated and levels of accuracy achieved.</td>
<td>Excellent standard, demonstrating high levels of accuracy.</td>
<td>Exceptional standard, demonstrating increasing levels of accuracy.</td>
<td></td>
</tr>
<tr>
<td>Finishing may not be appropriate and/or the outcome would not present well to a stakeholder.</td>
<td>Finishing is appropriate and the outcome will present well to a stakeholder.</td>
<td>Finishing is appropriate and the outcome will present well to a stakeholder and provide impact to a stakeholder.</td>
<td>Finishing is appropriate and the outcome will present well to a stakeholder and provide strong impact when presented to a stakeholder.</td>
<td></td>
</tr>
</tbody>
</table>

4.2 What is being assessed?

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

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

4.2 Evidence must include

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

4.2 Relevant evidence could include

- Photos and/or videos of the final prototype(s) in the intended context, being used (where possible) as intended, to demonstrate the accuracy and suitability
- Candidate’s use of jigs, templates and other means to control quality and accuracy
- The incorporation of marketing and branding aspects (styling, colour, packaging, labels, logo, etc.) in the final prototype(s) to reflect commercial practice and represent as fully as possible the actual product as it will be presented to the target market

4.2 Which mark band?

**Lower Mark Bands**
- Insufficient and/or basic standards of practical skills demonstrated, with little attention to detail.
- The correct use of tools, equipment, processes, materials and finishes are used to accurately produce the final prototype(s). A high level of attention to detail is evident.
- The prototype(s) fully reflect the final design solution, which fully engages users and stakeholders, enabling detailed feedback and high quality, sharp and clear photos and videos are produced, with creativity, showing the final solution at its best.

**Higher Mark Bands**
- The correct use of tools, equipment, processes, materials and finishes are used to accurately produce the final prototype(s). A high level of attention to detail is evident.
- The final prototype(s) fully reflect the final design solution, which fully engages users and stakeholders, enabling detailed feedback and high quality, sharp and clear photos and videos are produced, with creativity, showing the final solution at its best.

**What does EXCEPTIONAL look like**
- The final prototype leaves the reader in no doubt on the intentions of the design solution and offers a high quality physical representation of the Technical Specification that is flawless in its delivery.
Sports Score Card Holder - Photos of prototype assembled and disassembled; the mandatory requirement for video evidence of moving parts/mechanisms.

Top and Headscarf - Photos (including close-up details) and videos show all aspects of the final prototype.

Camping light - The completed final prototype effectively displays branding integrated with the making of the prototype, adding to the overall impact; videos showing the impact of the light in different levels of darkness.
4.3 Use of specialist techniques and processes

<table>
<thead>
<tr>
<th>Mark Band 1 (1–5)</th>
<th>Mark Band 2 (6–9)</th>
<th>Mark Band 3 (10–13)</th>
<th>Mark Band 4 (14–16)</th>
<th>Exceptional Level Mark Band 5 (17–18)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Limited and rarely appropriate to materials / components being used.</td>
<td>Sufficient, but are not fully and are consistently appropriate to materials / components being used.</td>
<td>Excellent and are effective and consistently appropriate to materials / components being used.</td>
<td>Exceptional, highly effective and consistently appropriate to materials / components being used.</td>
<td></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 but appropriate techniques and processes to shape, fabricate, construct and assemble components and complete prototypes, such as shaping by subtraction or wasting techniques, the addition of similar and dissimilar materials and components, deforming and reforming, as deemed appropriate and effective for the final prototype(s) and the materials and/or components being used
- Candidate’s use of jigs, templates and other means to control quality and accuracy
- Reflection of industrial / commercial practice including the use of the same materials, processes and techniques (or those that best represent them) that would be used if it was the actual manufactured product or system
- Reference to the planning that is in place for the making of the final prototype(s)

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 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>

What does EXCEPTIONAL look like

Levels of technical skills and selection of appropriate processes, not only demonstrate outstanding competency and talent, but are also undertaken totally independently.
Making of prototype

Sports Score Card Holder - Evidence of the use of a range of specialist techniques and processes; detailed diary of making demonstrates interaction with these processes.

Making of Final Prototype:

Cycling shirt - Pictures demonstrates the learner has used a number of specialist techniques; annotated diary of progress.

Folding seat - Evidence of appropriate specialist processes used to make the prototype; pressing, welding and the use of a jig.
4.4 **Use of specialist tools and equipment**

<table>
<thead>
<tr>
<th>Mark Band 1</th>
<th>Mark Band 2</th>
<th>Mark Band 3</th>
<th>Mark Band 4</th>
<th>Exceptional Level Mark Band 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1-5)</td>
<td>(6-9)</td>
<td>(10-13)</td>
<td>(14-16)</td>
<td>(17-18)</td>
</tr>
<tr>
<td>Use and selection of hand tools and/or machinery are limited and rarely appropriate</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 highly effective and consistently appropriate</td>
<td>Use and selection of hand tools and machinery are highly effective and consistently appropriate.</td>
</tr>
<tr>
<td>Digital design and/or manufacture* is limited and demonstrate little or no skills or knowledge.</td>
<td>Digital design and manufacture* is not always used appropriately, but demonstrate sufficient skills and knowledge.</td>
<td>Digital design and manufacture* are used appropriately to demonstrate good skills and knowledge.</td>
<td>Digital design and manufacture* are used effectively &amp; appropriately to demonstrate excellent skills and knowledge.</td>
<td>Digital design and manufacture* are used highly effectively and appropriately to demonstrate exceptional 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 upcoming slide

4.4 Relevant evidence could include

- 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 appropriate to the endorsed title
- Reference to the planning that is in place for the making of the final prototype(s), including reference to safety procedures needed
- Explanation of how problems and issues that arise during making are resolved and decisions on any further iterative design developments that may be needed

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

- **Acknowledgement** 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 Which mark band?

**Lower Mark Bands**

- Limited evidence of mandatory elements
- Evidence of consistently appropriate and effective use of all mandatory elements at a high skill level

**Higher Mark Bands**

- A high level of skill and knowledge is demonstrated using advanced software features and tools (such as analysis and simulation tools within CAD and CAM)

**What does EXCEPTIONAL look like?**

Skills in all four of the required areas are appropriately demonstrated, to a standard that would be seen in a professional environment repeatedly throughout the practical work in the project.
A junior school desk - Record of making demonstrates the candidate’s use of different specialist hand tools and equipment; all 4 requirements covered; annotations support understanding of processes and equipment used.

Candidate bag - Evidence of appropriate use of hand tools and machinery; further evidence in portfolio required to evidence digital design and digital manufacture.

Archery storage - Includes evidence of using digital design and manufacture; screen shot shows the design ready for 3D printing, then printing of the final components; evidence of hand tools also seen; further evidence would be required to demonstrate use of machinery.
4.5 Viability of the final prototype(s)

<table>
<thead>
<tr>
<th>Mark Band 1 (1–5)</th>
<th>Mark Band 2 (6–9)</th>
<th>Mark Band 3 (10–13)</th>
<th>Mark Band 4 (14–16)</th>
<th>Exceptional Level Mark Band 5 (17–18)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Little or no links to the technical specification and demonstrates limited potential to become a marketable / industrial product.</td>
<td>Meets some of the technical specification and demonstrates some potential to become a marketable / industrial product.</td>
<td>Meets most of the technical specification and demonstrates good potential to become a marketable / industrial product.</td>
<td>Meets all of the technical specification and demonstrates excellent potential to become a marketable / industrial product.</td>
<td>Meets all of the technical specification and demonstrates exceptional potential to become a marketable / industrial product.</td>
</tr>
</tbody>
</table>

4.5 What is being assessed?

- How well the candidate's final prototype(s) meets and fulfils the requirements of the technical specification
- The potential for the actual product to be marketable as a commercial / industrial 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)

4.5 Relevant evidence could include

- Photographs and videos in the candidate's making diary (4.4), and those of the completed final prototype (4.2)
- Evaluative and analytical comments from the candidate, users and stakeholders relating to the viability and feasibility of the candidate's final design solution and the final prototype (Strand 5)
- The candidate's comparison of the final prototype(s) against their working drawings, lay plans, and other technical details, and explanation of how it meets each of the technical requirements

4.5 Which mark band?

<table>
<thead>
<tr>
<th>Lower Mark Bands</th>
<th>Higher Mark Bands</th>
</tr>
</thead>
<tbody>
<tr>
<td>The final prototype arises with very little awareness of the technical specification or the inherent requirements</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 product would be successfully marketed</td>
<td>The widespread evidence in the portfolio, indicating detail and completeness considered by the candidate, indicate a high probability of success if the product was marketed commercially</td>
</tr>
</tbody>
</table>

What does EXCEPTIONAL look like?

There is absolutely no doubt in the success of the final prototype(s) fully representing the intentions of the technical specification in all aspects, or that the prototype(s) would ensure the design solution be desired by the intended market or industry.

4.5 Comparison to related marking criteria

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

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

5.5 assesses the candidate's skills in the critical evaluation of your final prototype and in suggesting modifications and design optimisation
Camping light - Testing final prototype ‘in situ’ gives a clear understanding of the likelihood of success and viability; reviewing the effectiveness against the technical specification reveals the viability of the design.

Folding Seat - The candidate’s assessment of how well the final prototype meets the user and stakeholder requirements; successes and failures help to demonstrate its viability.
A Level Design Technology

Internal marking guide

**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

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

<table>
<thead>
<tr>
<th>Mark Band 1 (1–4)</th>
<th>Mark Band 2 (7–11)</th>
<th>Mark Band 3 (12–16)</th>
<th>Mark Band 4 (17–21)</th>
<th>Exceptional Level Mark Band 5 (22–25)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Limited analysis and evaluation of information from stakeholders, existing products and wider issues, offering little or no support to inform the design process.</td>
<td>Sufficient analysis and evaluation 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 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 information from stakeholders, existing products and wider issues, offering clear and focused support to inform the design process.</td>
<td>Exceptional analysis and evaluation of information from stakeholders, existing products and wider issues, offering clear and convincing support to inform the design process.</td>
</tr>
</tbody>
</table>

### 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?

### Relevant evidence could include

- Analysis of sourced data to draw conclusions, which might use mathematical (statistical, graphical, etc.), SWOT, Life Cycle Analysis or other techniques. Evident in charts, tables, text, diagrams, audio or video
- Drawing of conclusions from information/data obtained from any ‘external’ source at any stage of the project
- Links between information/data obtained and the creation or progression of design iterations
- Focus on user(s), e.g. aesthetics, ergonomics and anthropometrics, with analysis of respective data informing the design process

### Which mark band?

**Lower Mark Bands**

- Information gained from external sources is simply quoted with little consideration from the candidate
- Analysis of wider issues such as social, moral, and environmental are not readily linked to decisions taken
- Little relevance to data that might influence designing

**Higher Mark Bands**

- In-depth analysis and evaluation of all information gained, using different techniques and presentation methods appropriate to the data
- Consideration of different wider issues when analyzing and evaluating, such as social, moral, environmental, ecological and ethical as they affect design decisions
- Analysis of data from all sources influencing designing, e.g. the user interface, maintenance aspects, and features to incorporate

**What does EXCEPTIONAL look like?**

- Highly effective critical analysis of relevant existing products, with in-depth consideration of a wide range of factors, including UCD, pertinent to the designing

### 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
- **5.4** assesses the candidate’s ability to analyse and test the feasibility and fitness for purpose of their final design solution
- **5.5** assesses the candidate’s skills in the critical evaluation of their final prototype and in suggesting modifications and design optimisation

---

A Level Design Technology

Internal marking guide

Version 2

© OCR 2019
### Elderly person’s car seat - Potential mechanical ways to lift elderly person in and out of car; reflects on advantages and disadvantages from the user’s perspective – a user-centered approach (UCD).

### Tea Tidy - Videos support the primary analysis and evaluation of existing products.

### Dentist’s Unit - Analysis and evaluation of existing products; strengths and weaknesses identified and the implications thereof; videos support the assessment.
5.2 Ongoing evaluation to manage design progression

<table>
<thead>
<tr>
<th>Mark Band 1</th>
<th>Mark Band 2</th>
<th>Mark Band 3</th>
<th>Mark Band 4</th>
<th>Exceptional Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1–6)</td>
<td>(7–11)</td>
<td>(12–16)</td>
<td>(17–21)</td>
<td>(22–25)</td>
</tr>
<tr>
<td>Superficial evaluations with little or no reflection on requirements or feedback. Little or no reviews to identify any problems and/or next steps for future iterations resulting in limited support to design progression.</td>
<td>Some critical evaluations with sufficient reflection on requirements and feedback. In frequent reviews to identify some problems and/or next steps for future iterations that are not always consistent in supporting design progression.</td>
<td>Mostly critical evaluations with good reflection on requirements and feedback. Ongoing and clear reviews to identify problems and next steps for future iterations to consistently support design progression.</td>
<td>Full and critical evaluations with focused reflection on requirements and feedback. Ongoing, clear and comprehensive reviews to identify problems and next steps for future iterations to effectively and consistently support design progression.</td>
<td>Exceptional critical evaluations with focused reflection on requirements and feedback. Ongoing, perceptive and comprehensive reviews to identify problems and next steps for future iterations and convincingly supports progression.</td>
</tr>
</tbody>
</table>

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
- Continuous improvements in the design, progressing towards the best and most refined and complete solution possible
- Evaluation of iterations to stakeholder/user feedback and requirements, considering aspects such as materials, processes, fasteners, mechanisms, construction, commercial and marketing aspects, aesthetics, ergonomics and anthropometrics
- 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 providing data for analysis and evaluation
- Evaluation by stakeholders and users by them handling, using, and testing models and prototypes
- Quality assurance procedures and quality control checks utilised throughout and as part of the ongoing evaluation against the stakeholder requirements

5.2 Which mark band?

<table>
<thead>
<tr>
<th>Lower Mark Bands</th>
<th>Higher Mark Bands</th>
</tr>
</thead>
<tbody>
<tr>
<td>A subjective and biased approach to ongoing evaluation. Little or no reviews to identify any problems and/or next steps for future iterations resulting in limited support to design progression.</td>
<td>An objective, unbiased and consistent approach to ongoing evaluation. Critical evaluation directs the next steps, and gives a strong steer to future decision making.</td>
</tr>
<tr>
<td>Problems are not clearly identified. Little or no evaluation of solutions which restricts the success of future iterations.</td>
<td>Where necessary, some requirements are changed, new ones added, and others prioritised, to reflect feedback received and confirmed by other users and stakeholders.</td>
</tr>
<tr>
<td>Superficial evaluations with little or no reflection on requirements or feedback.</td>
<td>Design optimisation and EMMA principles are not understood or utilised as tools to support evaluation.</td>
</tr>
</tbody>
</table>

5.2 Comparison to related marking criteria

- Lower Mark Bands: Little or no reference or consideration of applicable standards or regulations when testing, analyzing and evaluating. Little or no detail or clarity on the level to which the requirements need to be met.
- Higher Mark Bands: Reference to appropriate standards and regulations when testing, analysing and evaluating. Clear criteria established to define the level to which the design requirements must be fulfilled to allow the design to be considered complete.
- Lower Mark Bands: Design optimisation and EMMA principles are not understood or utilised as tools to support evaluation.
- Higher Mark Bands: The use of design optimisation/EMMA principles when evaluating and reviewing, to achieve optimum use of materials, parts, processes, components, quality, performance, size, weight, sustainability, etc.

**What does EXCEPTIONAL look like?**

Critical evaluations are objective and perceptively demonstrating advanced levels of thinking and an open mind. The reader is left in no doubt that the progressions of the project is consistently focused on the correct brief and requirements at all times.
Dentists Unit - Critical review and evaluation during the iterative design process, incorporating feedback from the primary user.

Folding seat - Ongoing evaluation with feedback from stakeholders and users; progression - iterative improvements following evaluation of earlier designs and feedback from users and stakeholders; narrative shows perceptive reviews, a focus on users and their requirements (User-Centred Design - UCD).
5.3 What is being assessed?

- The depth, detail and clarity of the candidate's analysis and evaluation of the appropriate facets of health and safety when planning and carrying out practical tasks, tests and experiments, and when making models, prototypes and their final prototype(s).

- The ability of the candidate to identify and consider relevant health and safety hazards and risks, and to apply safe working practices appropriately to activities throughout their project.

- The candidate's creation of formal risk assessments to identify hazards, assess risks, and state control measures where appropriate.

Relevant evidence could include:

- The application of knowledge and understanding of tools, processes and equipment, and materials under specific working conditions.

- The application of knowledge relevant to the product or system being designed, including sub-assemblies and components.

- An understanding of health and safety principles, legislation, regulations and other authoritative guidance relevant to the product or system being designed.

- A review of safety documentation relevant to the product or system.

- Relevant safety hazards and risks identified in the planning for making (4.1).

- Application of control measures identified in formal risk assessments.

- Safe working practices in the candidate's practical tasks and activities, as demonstrated in photos and videos in the record of making.

Evidence of unsafe working practices will have a negative influence on the marks in this assessment category.

5.3 Which mark band?

**Mark Band 1 (1-6)**
- Little or no analysis and evaluation resulting in poor consideration of health and safety risks.

**Mark Band 2 (7-11)**
- Sufficient analysis and evaluation resulting in some consideration of health and safety risks.

**Mark Band 3 (12-16)**
- Good level of detail in analysis and evaluation that result in clear consideration of health and safety risks.

**Mark Band 4 (17-21)**
- Comprehensive analysis and evaluation that result in effective and appropriate consideration of health and safety risks.

**Exceptional Level (Mark Band 5 22-24)**
- Exceptional analysis and evaluation that result in perceptive and appropriate consideration of health and safety risks.

What does EXCEPTIONAL look like?
- Analysis and evaluations undertaken are well evidenced and consistent in questioning and reflecting on health and safety risks. Where analysis highlights concerns, resulting solutions and recommendations are appropriately evaluated.
Underwater Hockey Training Aid - Required safety elements analysed with control measures in clear and easy to follow format.

Hazard assessment and control measures clearly identified in advance of, and during, the making of the folding seat for a museum.

Tea Tidy - Required safety elements analysed with control measures in clear and easy to follow format; Control measures applied and PPE in evidence during making of the final prototype.
### 5.4 Feasibility of the design solution

#### What is being assessed?

- The real time analysis and testing of the final prototype(s) against the technical and non-technical 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

#### Relevant evidence could include

- The planning and carrying out of a feasibility study of the final prototype through experiments, trials, mock-ups, testing, modelling and simulations (may be physical and/or digital)
- User and stakeholder involvement in tests, trials, questionnaires, interviews, group discussions
- Testing by independent third parties, forums and focus groups
- Testing or simulations in as many potential 'real-life' situations /environments of the product as possible, such as intended places of use, storage, transport, different conditions or locations, point of sale, etc.
- 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, 5.5)
- 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
- Testing of materials specified in the final design to confirm suitability, especially where the prototype is constructed from different materials to those that will be used in the actual manufactured product
- Use of test rigs or standardised tests where appropriate to analyse and test specific features and characteristics of the final design, in terms of physical properties, performance, functionality, durability of applied finishes, and so on.

#### Which mark band?

<table>
<thead>
<tr>
<th>Mark Band 1 (1-6)</th>
<th>Mark Band 2 (7-11)</th>
<th>Mark Band 3 (12-16)</th>
<th>Mark Band 4 (17-21)</th>
<th>Exceptional Level Mark Band 5 (22-25)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Limited 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 most 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>
<td>Exceptional, with fully appropriate methods used to analyse and test whether the design solution is fit for purpose.</td>
</tr>
</tbody>
</table>

#### Which mark band?

<table>
<thead>
<tr>
<th>Lower Mark Band</th>
<th>Higher Mark Band</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unplanned and lacking a structured approach</td>
<td>A planned and structured approach - systematic and analytical - what? why? how?</td>
</tr>
<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>Differing appropriate and rigorous methods used to test the fitness for purpose of the design solutions, with a focus on the technical and non-technical requirements</td>
</tr>
<tr>
<td>Stakeholders not consulted or involved, design not tested in real-life situations</td>
<td>Different opportunities for users and stakeholders, plus independent others, to evaluate and test the design in several real-life situations</td>
</tr>
<tr>
<td>Subjective evaluation with little appreciation of the need for both qualitative and quantitative approaches</td>
<td>Both qualitative and quantitative data from evaluation and testing enables a balanced and detailed analysis</td>
</tr>
</tbody>
</table>

#### What does EXCEPTIONAL look like

- Sufficient use of test rigs or standardised tests where appropriate to analyse and test specific features and characteristics of the final design, which demonstrate the candidate’s ability to analyse and test the feasibility and fitness for purpose of their final design solution
- High level of technical analysis and testing of the final prototype(s) in terms of performance, functionality, durability and suitability of applied finishes, and so on.

#### Comparison to related marking criteria

5.4 (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
- 5.5 assesses the candidate’s skills in the critical evaluation of their final prototype and in suggesting modifications and design optimisation
### Testing of the Final Design

**Tasks:**
- **Weight Test:**
  I did a test to ensure the product was as near as possible to the weight stated at the beginning of the process.
  To find out the weight of the product; pull it into a weighing machine and as you can see I came out to weigh at 250g which is below my initial test.
- **Mechanical Strength Test:**
  I did this test to make sure both of these fins require the same amount of force to slide from out of their residing positions on the machine before being released.
  I did it at the end to see if the thing that was holding it out but it was still easily clicked into the two positions.
  I wanted this by changing design of the holder and my mechanism had failed and the design is not a very strong mechanism.
  I got a reading of 47g to make the holder pull out of position and it doesn’t meet my requirements before it starts moving at all.

<table>
<thead>
<tr>
<th>Requirements</th>
<th>How well have the requirements been met?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Height: 81/10</td>
<td>Product weights 350g which is about third of my shoulder width and in line with my back magnet making it a good weight to hold for any period of time.</td>
</tr>
<tr>
<td>Size: 6/10</td>
<td>The adjustment by the specification point perfectly if it’s upon the themed range of 250 ± 2cm in 201 ± 2cm.</td>
</tr>
<tr>
<td>Cent: 7/10</td>
<td>Yes this is above before which is why this is an easy right.</td>
</tr>
<tr>
<td>Material Properties: 4/10</td>
<td>I added in some more absorbent material to add the product more in the users view line.</td>
</tr>
<tr>
<td>Resistance: 3/5</td>
<td>It makes sliding across and coping a nice way of a proportion correct.</td>
</tr>
<tr>
<td>Product Design: 6/10</td>
<td>Benefits nothing much more can be achieved and can be easily adaptable to hold more area for the users.</td>
</tr>
<tr>
<td>Overall: 7/10</td>
<td>The product is completely passable.</td>
</tr>
</tbody>
</table>

### Feasibility of the Final Design

**Product in Use & Adoption:**
- In a small group, we have seen the bag in operation and performed to test different aspects of the design in particular. It has been tested in terms of the product and final prototype.
- **Product:**
  - **INTRODUCTION WITH PRACTICAL OBJECTIVE — FIG 1 (VIDEO):**
    I decided to get an interview with a selector which was going to be my final model in one hand as well as having the interview with the bag itself. (Interview) **PRACTICALITY:**
    In terms of the bag, it’s a great way to have the final prototype in various aspects of the design. It’s a great way to have an interview with the selector in terms of the product.
  - **POSTER AND PRACTICAL OBJECTIVE — FIG 2 (VIDEO):**
    This is a great way to have the bag in the interview with the selector in terms of the design. It’s a great way to have a conversation with the selector in terms of the product.
  - **PRACTICAL OBJECTIVE — FIG 3 (VIDEO):**
    In terms of the bag, it’s a great way to have the final prototype in various aspects of the design. It’s a great way to have an interview with the selector in terms of the product.
  - **INTRODUCTION WITH PRACTICAL OBJECTIVE — FIG 4 (VIDEO):**
    I decided to get an interview with a selector which was going to be my final model in one hand as well as having the interview with the bag itself. (Interview) **PRACTICALITY:**
    In terms of the bag, it’s a great way to have the final prototype in various aspects of the design. It’s a great way to have an interview with the selector in terms of the product.

- **Testing:**
  - **Testing: the dental instrument holders (VIDEO):**
    In this video, it shows that at the end of the test there are a number of tests that are used to create the dental tool holders. It’s a good way to have the final prototype in various aspects of the design. It’s a great way to have an interview with the selector in terms of the product.
  - **Testing: UV lights in the side cabinet (VIDEO):**
    In this video, it shows that at the end of the test there are a number of tests that are used to create the dental tool holders. It’s a good way to have the final prototype in various aspects of the design. It’s a great way to have an interview with the selector in terms of the product.
  - **Testing: Portability of the product (VIDEO):**
    In this video, it shows that at the end of the test there are a number of tests that are used to create the dental tool holders. It’s a good way to have the final prototype in various aspects of the design. It’s a great way to have an interview with the selector in terms of the product.
  - **Testing: Portability of the product (VIDEO):**
    In this video, it shows that at the end of the test there are a number of tests that are used to create the dental tool holders. It’s a good way to have the final prototype in various aspects of the design. It’s a great way to have an interview with the selector in terms of the product.

**Candidate Bag — Videos of interviews with stakeholders and users alongside the candidate’s summary analysis.**

**Dentist’s Unit — Testing various elements of the final prototype in the intended situation; Positive benefits / potential USP's identified; video evidence.**

---

Sports Score Card Holder — Testing the requirements with assessment of how well they were met.
5.5 Evaluation of the final prototype(s)

<table>
<thead>
<tr>
<th>Mark Band 1</th>
<th>Mark Band 2</th>
<th>Mark Band 3</th>
<th>Mark Band 4</th>
<th>Exceptional Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1-6)</td>
<td>(7-11)</td>
<td>(12-16)</td>
<td>(17-21)</td>
<td>(22-25)</td>
</tr>
</tbody>
</table>

Superficial evaluation of strengths and/or weaknesses with little or no suggestions for modification and/or consideration of possible design optimisation presented.

Sufficient critical evaluation of strengths and/or weaknesses with some suggestions for modification and/or consideration of possible design optimisation presented.

Good critical evaluation of strengths and weaknesses with detailed suggestions for modification and consideration of possible design optimisation presented.

Full and critical evaluation of strengths and weaknesses with comprehensive suggestions for modification and consideration of possible design optimisation presented.

Exceptional critical evaluation of strengths and weaknesses with perceptive and comprehensive suggestions for modification and consideration of clearly defined design optimisation presented.

5.5 What is being assessed?

- From the critical evaluation of the design solution (5.4), 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

5.5 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 – numerical and quantitative detail
- Sketches, drawings, models and annotation / text to describe and explain modifications and refinements to the design
- Strengths, weaknesses and modifications, relating to commercial aspects, e.g. QA/QC, manufacturing methods and marketing

5.5 Suggested modifications to optimise* the design

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

- Possible considerations
  - reducing the number of component parts
  - substituting different materials or components
  - standardising fasteners or fittings used
  - simplifying the design of a component(s)

5.5 Which mark band?

**Lower Mark Bands**
- The assessment of the final prototype(s) lacks integrity and value
- Superficial and simplistic evaluation of strengths and weaknesses with little or no suggestions for modification
- Low value suggestions such as simply changing the colour
- Improvements are not communicated clearly

**Which mark band?**

**Higher Mark Bands**
- An honest, objective and critical assessment of the final prototype(s) and what could be improved / modified further
- A broad and mature view on further iterations, considering the impact that improving a perceived weakness might have on the rest of the design
- Realistic and creative suggestions for modifications and improvements
- Appropriate high quality images, diagrams, sketches and/or models communicate improvements clearly

**What does EXCEPTIONAL look like**

Critical evaluations are objective, perceptive and comprehensive. The student demonstrates advanced levels of thinking and an open mind. The work is exceptional and demonstrates significant improvements.

5.5 Comparison to related marking criteria

5.5 (this marking criterion) assesses the candidate’s skills in the **critical evaluation** of their final prototype and in suggesting modifications and design optimisation.

5.4 assesses the candidate’s ability to **analyse and test** the feasibility and fitness for purpose of their final design solution.
Sleep suit for the homeless - Assessment categories 5.4 and 5.5 both here. Charts/graphs used to show results of testing; review of testing; video evidence; strengths and weaknesses identified with modifications / possible improvements.

Dentist's Unit - Detailed strengths and weaknesses; drawn modifications; optimisation of components.

Folding seat - Strengths and weaknesses identified; modifications / possible improvements; reference to quality control, marketing, production and further developments.
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.