**Section A: Identifying and investigating design possibilities**

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| **Criteria** | **Current**  **Mark** | **Available**  **Mark** | **Content & RAG**  **R:** No evidence **A:** Some evidence **G:** Good evidence | | **Page** |
| * Excellent rationale provided for the context selected, with continuous reference throughout the project to the end user and the constraints that need to be considered in formulating a final solution. * Student employs a comprehensive range of strategies and techniques, including both primary and secondary methods of investigation, practical experimentation and disassembly, to thoroughly explore design opportunities. All sources have been fully referenced. * First concepts are both fully relevant to the context and feasible for further development and are clearly communicated through a fully appropriate variety of methods and techniques. * All investigations relate directly to the design context, issues are identified and fully addressed, and the student demonstrates a detailed and perceptive understanding of the information gathered. |  | 20 | Identification of Problems |  |  |
| Project Ideas |  |  |
| Task Analysis |  |  |
| Time plan - Gant chart |  |  |
| Research Plan – specific to your project. |  |  |
| Questionnaire to find out customer needs and wants.  Environment Snapshot. |  |  |
| Existing Product Analysis (in depth)  with Practical experiment |  |  |
| **Specific Research to your project:** |  |  |
| Primary research investigations |  |  |
| Secondary research investigations. |  |  |
| Specific Measurements - sizes of products, anthropometrics. |  |  |
| Reflections – Analysis, feedback and summaries. |  |  |
| First ideas concept sketches (x4) + feedback from customer / client. |  |  |
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| **How do I improve my work?** | | | | | |

**Section B: Producing a design brief and specification**

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| * A comprehensive, clearly stated and challenging design brief resulting from a thorough consideration of investigations undertaken, that fully addresses both the context and the needs and wants of the intended user(s). * The student has produced a comprehensive, detailed and well explained design specification which will fully guide the student's design thinking. * A detailed project management approach to prototype development, including time management and determining quantities and costs of materials, has been fully integrated into the specification. |  | 10 | Design Situation - Explain the problem you are trying to solve. Who your customer is. What your customer wants from the product. |  |  |
| Design Brief – The focus of your project. What you are trying to solve / achieve. |  |  |
| Design Specification  Detailed list of requirements for product gathered from research and investigations.  Must be specific and measurable.  Explain why each requirement is important. |  |  |
| Time plan – plan the pieces of work you need to carry out and the timeframe / dates for them.  Final and in – February. |  |  |
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| **How do I improve my work?** | | | | | |

**Section C: Development of design proposals**

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| **Criteria** | **Current**  **Mark** | **Available**  **Mark** | **Content & RAG**  **R:** No evidence **A:** Some evidence **G:** Good evidence | | **Page** |
| * The rationale for design decisions is clearly documented and fully justified with constant reference being made to the design brief, specification and investigations throughout the development of their design proposal. * In the development of innovative design proposals, the student will demonstrate clear evidence of originality, creativity and a willingness to take design risks. * Excellent use of a variety of modelling techniques to support ongoing development work throughout. This is supported by the use of drawings, sketches, annotations and notes showing clear evidence of design thinking. * Excellent ongoing development of design proposals, achieved through exploration of and experimentation with different materials, techniques and processes leading to an excellent quality design of a prototype for manufacture. * Comprehensive and fully detailed manufacturing specification produced which makes specific reference to relevant quality control checks and allows fully accurate interpretation by a third party. * Project management for manufacturing allows for further development of design proposals in response to ongoing evaluation, testing and full consideration of contingency planning as prototype development takes place. |  | 25 | Detail Design Ideas – at least 6 initial ideas |  |  |
| Evidence of ongoing development sketches and annotation. |  |  |
| Supported by CAD Development and Engineering Drawings. |  |  |
| Models and test pieces created to test ideas. |  |  |
| Aesthetics and features options identified and experimentation. |  |  |
| Materials options identified and experimentation |  |  |
| Manufacturing options Identified and experimentation. |  |  |
| Quality control checks identified.  Templates / jigs. |  |  |
| Customer / client feedback and comments at various stages in development of design. |  |  |
| CAD Final Render(s)  Fully annotated to explain design. |  |  |
| Orthographic – Dimensions of all components in design. |  |  |
| Exploded view/assembly view. |  |  |
| Parts list / cutting list. |  |  |
| Planning for manufacture – step by step plan with quality control |  |  |
| Specification check – feedback and analysis of design work. |  |  |
| **How do I improve my work?** | | | | | |

**Section D: Development of design prototypes**

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| **Criteria** | **Current**  **Mark** | **Available**  **Mark** | **Content & RAG**  **R:** No evidence **A:** Some evidence **G:** Good evidence | | **Page** |
| * Excellent justification provided for selection of appropriate materials and components and proposed techniques and processes, demonstrating an excellent understanding of material properties to ensure excellent quality prototype(s) that are fit for purpose. * Significant complexity or challenge is involved throughout the production of prototype(s). The student demonstrates excellent manufacturing skills combined with an excellent understanding of the need for dimensional accuracy and precision. * The student has selected and used appropriate tools, machinery and equipment, including CAM where required, and worked with a high level of skill, precision and accuracy to produce their prototype(s). * Prototype(s) fully address the design brief, satisfying all major points of the specification and take into account all amendments/ modifications to their original design proposals as necessary. * Student makes all required modifications to the prototype in a fully considered manner in light of feedback from user trials and third-party feedback and as a result of testing and evaluation carried out against earlier iterations of the prototype. * Quality assurance is evident throughout and it is clear where planned quality control checks have been applied throughout the process to ensure consistency and safety.   Clear evidence throughout the manufacturing process that appropriate health and safety processes have been both considered and employed. |  | 25 | Prototype addresses brief and satisfies all important specification points and customer requirements. |  |  |
| Material, components and finish choices are suitable for product and justified.  Selection of tools and CAM used appropriately and evenly. |  |  |
| **Significantly complexed or challenging manufactured prototype.** |  |  |
| Evidence that dimension and tolerances have been applied. |  |  |
| Quality assurance evident and QC checks identified. |  |  |
| Health & Safety addressed throughout |  |  |
| Environmental considerations addressed throughout. |  |  |
| Evidence of ongoing evaluation or 3rd party intervention . |  |  |
| All parts of manufacture and testing recorded in a diary.  Photographic evidence of stages of manufacture / testing.  Print screens of any CAD / CAM modelling / testing. |  |  |
| **How do I improve my work?** | | | | | |

**Section E: Analysing and evaluation**

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| * Comprehensive evidence of analysis and evaluation throughout the process, which has clearly informed the chosen context, client or user and the subsequent development and manufacture of the prototype. * Testing is carried out in a focused and comprehensive way with clear evidence of how the results have been used to inform the design and any modifications to the prototype. * Student has provided a well-reasoned critical analysis of their final outcome which links clearly to their design brief and specification and provides full justification for the extent to which the prototype is both fit for purpose and meets the needs of the client/user. * A comprehensive critical evaluation of their final prototype, clearly identifying how modifications could be made to improve the outcome, together with a full justification for these modifications and full consideration provided for how the prototype could be developed for different production methods. |  | 20 | Compare your final prototype against your specification requirements and Customer / User Needs.  Rating – Green, Amber, Red. |  |  |
| Testing parts of design where possible:  Customer Feedback.  Test prototype and test pieces of work.  Tests from CAD Drawings.  Tests from Models. |  |  |
| Suggested improvements and modifications with justifications.  Use sketches and annotations to explain what these modifications would look like. |  |  |
| Commercial Manufacture:  If you had to make 100 of your design, what processes and tools could you use to ensure accuracy and quality control? |  |  |
| Product Lifecycle assessment. What impact does your product have at various stages of its lifecycle? Cradle to the grave?  How could this be minimised or improved? |  |  |
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| **How do I improve my work?** | | | | | |