Carmel College Curriculum Implementation – KS 5 Long term plan Subject: Design Technology –A level Product Design

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|  | Year 12 A level Product Design  | Y13 A level Product Design  |
| Autumn half term 1Sequential knowledge and skills | **Timber Joint LED Picture Frame** Develop subject knowledge of Materials:Timber & Manufactured Boards, Types, Properties and suitability, stock forms and finishesDevelop skills & understanding of construction techniques; Timber Joining methods, Knock Down Fittings \*methods used in industry to ensure quality control for consistency, accuracy (jigs & templates).Develop skills & understanding (practical skills); Timber (Marking out; Try Square, Cutting; Tenon, Hegner, Coping Saw) drilling, Sanding; disc sander, filing, Oiling) Adhesives (PVA Glue) & relevant Health & Safety. Develop subject knowledge of Electronics; components and joining methods (Circuit board, LED, resistor, Capacitor, switch)  Develop skills & understanding; producing circuits (soldering)  Develop skills & understanding (practical skills) of electronic tools & equipment (helping hands, soldering iron, snips) & relevant Health & Safety  Develop CAD skills using 2D design, laser cutterDevelop subject knowledge of Presentation techniques; Drawing methods, use of CAD & CAM | **Non Exam Assessment:** Section C –Development of Design Proposals (25 marks)NEA Folder pages:* Explore alternative materials for each part & finishes (\*tested)
* Explore alternative construction method for each part (including components & any mechanisms where appropriate) (\*tested)
* Final design (Artist impression of chosen idea or use CAD or marker rendered drawing)
* Produce Orthographic drawings of final design - use of CAD or traditional methods as available
* Produce test pieces to prove making methods selected for project (for each part). Photos of joints etc
* Use of step by step table or flow chart to show manufacturing plan. You should show estimated times, health and safety and quality assurance checks throughout the making process to ensure consistency
* Produce cutting lists/material order lists
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| Assessment Content and methods used to judge learning | On going assessment of Subject knowledge work.  | On going assessment of Subject knowledge work.  |

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| Autumn half term 2Sequential knowledge and skills | **Mild Steel Toolbox**Develop subject knowledge of Materials: Types of metals, Properties and suitability, stock forms and finishesDevelop skills & understanding of construction techniques; Metal Joining methods, \*methods used in industry to ensure quality control for consistency, accuracy (jigs & templates). Industrial processes( spot welding, Spray paintingDevelop skills & understanding (practical skills); Sheet metalwork (Marking out; Try Square, Cutting; Guillotine, folding machine Centre lathe) drilling, Sanding; filing, & relevant Health & Safety.   Develop CAD skills; using 2D design, vinyll cutter. Develop subject knowledge of Presentation techniques; Drawing methods, use of CAD & CAM to add graphics to the toolboxDevelop subject knowledge3.1.1 Materials and their applications3.1.2 Performance characteristics of materials3.1.4 Forming, redistribution and addition processes | **Non Exam Assessment:** Section D –Development of Design Prototype (25 marks)* All Practical Work to create a final working Prototype

NEA Folder pages:* Justify your choice of materials, components referring to their material properties
* Justify your choice of manufacturing techniques and processes **you would** **use**
* Compare final design against the specification
* Modifications made to Final model after **initial model testing**
* Modifications made to Final model after **user feedback**
* Final Specification
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| Assessment Content and methods used to judge learning | On going assessment of Subject knowledge work. Practice exam questions Subject Knowledge Assessment | On going assessment of Subject knowledge work. Subject Knowledge Assessment |
| Spring half term 3Sequential knowledge and skills | **LED Steam Bent light**Develop subject knowledge of Materials: Types of composites, Casting Process, Properties and suitability & stock formDevelop skills & understanding of construction techniques; Forming timber(steam bending) \*methods used in industry to ensure quality control for consistency, accuracy (jigs & templates). making composites. Develop skills & understanding (practical skills); Practical steam bending, use of bending jigs, Mould design, vacuum forming, Practical concreting & relevant Health & Safety. Casting Process; using Aluminum & Concrete.  Develop drawing skills. Develop Presentation techniques; Drawing methods, rendering to show surface textureDevelop subject knowledge3.1.1 Materials and their applications3.1.2 Performance characteristics of materials3.1.4 Forming, redistribution and addition processes | **Non Exam Assessment:** Section E –Analyzing and Evaluating (20 marks)* Test and evaluate final designs/ models against the specification
* Test and evaluate with the client/user. Evaluate the extent to which it meets the needs of the user and its fitness for purpose.
* Notes and drawings to explain **changes** that could be made to the product in the light of testing and user feedback to improve your product
* Explain how your product would be made for a mass market. Explain any changes you need to make
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| Assessment Content and methods used to judge learning | On going assessment of Subject knowledge work. Practice exam questionsMock Exam | On going assessment of Subject knowledge work & NEA. Mock Exam |
| Spring half term 4 Sequential knowledge and skills | **Slot together desk top organiser.** Develop skills in designing, testing, development, testing and evaluation with mini NEA project to design a desk top organiser, cut on the laser cutter & assembled using a slot together joining method. Develop skills & understanding of construction techniques; Slot together and line bendingForming polymers (line bending) \*methods used in industry to ensure accuracy (moulds)Develop skills & understanding (practical skills); Shaping & finishing flexible plywood, Spray painting, screen printing & relevant Health & Safety. Develop CAD skills; using 2D design, Laser cutter. Develop subject knowledge3.1.1 Materials and their applications3.1.2 Performance characteristics of materials3.1.4 Forming, redistribution and addition processes | Develop subject knowledge and Exam prep3.1.1 Materials and their applications3.1.2 Performance characteristics of materials3.1.3 Enhancement of materials3.1.4 Forming, redistribution and addition processes3.1.5 The use of finishes3.1.6 Modern industrial and commercial practice3.1.7 Digital design and manufacture3.1.8 The requirements for product design and development3.1.9 Health and safety3.1.10 Protecting designs and intellectual property |
| Assessment Content and methods used to judge learning | On going assessment of Subject knowledge work. Practice exam questions Subject Knowledge Assessment | On going assessment of Subject knowledge work.  |
| Summer half term 5 Sequential knowledge and skills | **Non Exam Assessment:** Section A –Identifying and investigating Design Possibilities (20 marks)NEA Folder pages:* Ideas for project, mood board
* Identification of the Problem
* Task Analysis
* Product Analysis –to see what other products are on the market, to look at materials, construction, cost, user, style etc.
* Disassembly of existing products to explore design possibilities
* Practical experiments/ models to try out designs
* Consumer Identification –to identify who you will be designing the product for and by carrying out short questionnaire identify what they would expect/need from the product.
* Research plan, indicating the key information you need and how useful it was.
* Detailed analysis of gathered information
* Initial design ideas
 | Develop subject knowledge and Exam prep3.1.11 Design for manufacturing, maintenance, repair and disposal3.1.12 Feasibility studies3.1.13 Enterprise and marketing in the development of products3.1.14 Design communication3.2.2 Design theory3.2.3 How technology and cultural changes can impact on the work ofDesigners3.2.3.4 Product life cycle3.2.8 Responsible design3.2.9 Design for manufacture and project management3.2.10 National and international standards in product design |
| Assessment Content and methods used to judge learning | On going assessment of Subject knowledge work & NEA. |  |
| Summer half term 6Sequential knowledge and skills | **Non Exam Assessment:** Section B –Producing a Design Brief and Specification (10 marks)NEA Folder pages:* Design Brief
* Initial Specification

**Non Exam Assessment:** Section C –Development of Design Proposals (25 marks)NEA Folder pages:* Plan of Development
* Refine design ideas with annotation
* Selection of idea to develop and comparison of idea against specification
* "Client testing" to review ideas and assist in design selection.
* Basic card/Styrofoam, wire, CAD modelling. Add critical & evaluative notes.
* Produce full size mock-ups of designs e.g. chairs to test ergonomics with full size drawing of ergonome.
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| Assessment Content and methods used to judge learningAssessment | On going assessment of Subject knowledge work & NEA. |  |