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| **Year 10 GCSE D&T Medium Term Plans (2020-21)** | | | | | |
|  | | **Term 1-6** | **Term 1-5** | | **Term 1-6** |
| **Units** | | **Independent Skills (alongside)** | **–Multi Functional Living / Teenage Lifestyle / Nature & Environment NEA. (X4 periods per Week )** | | **EXAM PREPARATION**  **(X 2 periods per Week)** |
| **Year 10**  **Area**  **of**  **Learning** | | Task analysis  Customer profile  Design brief and specification  Product analysis  Relevant issues    Autodesk Fusion 360  Signup  Introduction  How to create a new file  Modelling basics  Refer to Create Education Resources  Use Annotation templates  Using the isotech templates  Modelling / CAD/CAM | Contextual Challenge Overview  Task Analysis  Questionnaire- types of questions  Customer profile  • make a detailed broad product specification;  • include specifications required by the client or consumer;  • develop a hierarchy of features;  • use qualitative and quantitative performance criteria;  • include the unique selling points of the product.  Generating design ideas  • produce a comprehensive range of initial ideas with mini-development;  • include material considerations and possible construction techniques;  • annotate your design ideas indicating the strengths and weaknesses of these ideas;  • use your specification to assess the strengths/weaknesses of your idea;  • identify ideas, or parts of the ideas, that can benefit from further development;  • say why you think that these ideas have potential for further development;  • explain why your other designs may not be as successful;  • make models or mock-ups as appropriate to prove and test your ideas.  **Relevant issues**  • include specifications required by the client or consumer;  • develop a hierarchy of features;  • use qualitative and quantitative performance criteria;  **Identifying a need**  Explain the following to define the design situation clearly in words and drawings/photographs:  • what are the aims of the project;  • who is the product intended for, the target audience;  • how often is the product likely to be used;  • where will the product be used;  • will the existing environment affect the design of the product?  Identify user needs  • list all the qualities that you think the intended user may demand of your product;  • undertake market research on your target audience to establish their wants/needs;  • present a comparative analysis of your results  . - Evaluating existing products  • use your specification to evaluate existing products;  • present a range of existing products;  • explain why you chose the particular products for evaluation (target audience, market sector etc.);  • annotate the important design features of the products;  • annotate the weak design features of the products;  • explain why existing products might not fulfil the wants/needs of your target audience.  • Reflect and re-visit investigation work – analyse and evaluate findings.  • Produce a design brief based upon market research and designer/company findings.  • Learners should consider their own needs, wants and interests and those of others.  • Learners consider why a designer considers alterations to a brief and modifies the brief as required.  • Peer assessment activities used to finalise the brief.  Opportunities to visit maths links – frequency tables and percentile ranges.  **Generating design ideas**  • produce a comprehensive range of initial ideas with mini-development;  • include material considerations and possible construction techniques;  • annotate your design ideas indicating the strengths and weaknesses of these ideas;  • use your specification to assess the strengths/weaknesses of your idea;  • identify ideas, or parts of the ideas, that can benefit from further development;  • say why you think that these ideas have potential for further development;  • explain why your other designs may not be as successful;  • make models or mock-ups as appropriate to prove and test your ideas.  Development of chosen idea using ICT where appropriate  • show clearly which idea you have chosen to develop; • integrate aspects of other proposals that would improve the product;  • apply anthropometric data and explain why this is essential;  • develop a detailed design proposal for prototyping;  • explain all constructional details;  • establish suitable materials and possible alternatives;  • identify components and fixings that would be needed;  • evaluate the strengths of the proposal against the specification.   * Iterative designing being understood as designs are re-visited and developed based on building knowledge.   • Freehand sketching, 2D and 3D drawings used to communicate, system and schematic drawings, annotated drawings that fully explain detailed conceptual stages.  •Learners interview their client and ask them about their design ideas.  • Freehand sketching, 2D and 3D drawings used to communicate, system and schematic drawings, annotated drawings that fully explain detailed conceptual stages.  Development of chosen idea using ICT where appropriate  • show clearly which idea you have chosen to develop;  • integrate aspects of other proposals that would improve the product;  • apply anthropometric data and explain why this is essential;  • develop a detailed design proposal for prototyping;  • explain all constructional details;  • establish suitable materials and possible alternatives;  • identify components and fixings that would be needed;  • evaluate the strengths of the proposal against the specification  •Demonstration and scaffolding techniques used to develop one or more of the methods of communication. Building on prior knowledge to enhance these skill sets.  Design solutions communicated for interpretation by the client/user.  **Model making**  • Activity used to introduce the concept of nesting – differentiation of shapes/parts and sizes.  • Application of tolerance and nesting to make template pieces/jigs/aids to begin to mark out materials for the final prototype.  • Other quality control processes considered and examples used of how quality control is done in industry.  Opportunities to visit maths links – SI units, accurate use of tolerances, decimal and standard forms, surface areas and volume, datum points and coordinates, tessellation  **Learners will be working with Paper and card, Wood, Plastic and Metal**  **Stock Forms and standard componetns**  **-screws**  **-Bolts and tempoarary components**  **- rivets**  **- hinges**  **- knock down fittings and temporary joints**  **Shaping Materials**     * **hand tools (saws, chisels, planes, files and abrasive papers)** * **Power and Machine Tools** * **Shaping Techniques** * **Moulding and joining**   **Model making Continued**   * Use of power tools to shape, cut and smooth materials * Understand the function of bandsaws, oillar drill, use of fenches to improve accuracy * Milling machines * Lathes * 3D Printing * Metal Sheet Presses * Castings * Die Casting * Bending materials * Vacuum Forming * Blow moulding * Injection moulding * Extrusion * Drape Forming * Bonding materials techniques – including PVA, Epoxy Resin, Welding   **Treatments and finishes**  **Working with Metals**  Continued detail drawings in orthographic projection as appropriate;  • produce parts drawings if required;  • provide section and/or exploded drawings as appropriate;  • pictorial rendered drawings;  • produce a cutting list including materials and other remarks;  • list any components and fixings to be used;  • provide patterns or templates as appropriate.  • Manufacture of prototype.  • Marking out material discussed and demonstrated.  • Production aids discussed where relevant and examples shown according to material area.  • Use of production aids where appropriate.  • Use a range of appropriate tools and equipment to shape, fabricate construct and assemble.  Opportunities to visit maths links – Scaling of drawings, working to datums.  • Key processes using tools and equipment discussed building on prior knowledge.  • Diary/planning activity used to ensure independent progress and learning. Assesses and re-visits processes, tools and techniques.  • Final prototype produced to a high standard – re-visiting the application of quality control to achieve this  **Evaluating proposal against product specification**  • list the specification points;  • evaluate your product against each specification point;  • use your qualitative and quantitative performance criteria;  • show a photograph of the chosen product/system.  End testing  • devise suitable methods of end testing;  • carry out tests on your product/system;  • record your findings including photographs;  • seek expert opinion on your product;  • use feedback to evaluate the product against the performance specification.  **Suggestions for modifications**  • list all aspects of the design that require modification;  • produce drawings to show the possible modifications;  • if possible carry out modifications;  • obtain feedback on suggested or actual modifications and present this in your project report.  \* record all aspects of the evaluation in your project report.  **FOCUSED TASKS LINKED TO THEORY** | | **Knowledge Maps distributed**  Establish **TEAMS** group with resources and home learning with SMH.  **PITSTOP 1 Hand-in**  **Production techniques and systems – automation**  New and emerging technologies 3.1.1  • Use the following key terms to discuss production methods in industry:  • Computer Aided Design (CAD)  • Computer Aided Manufacture (CAM)  • Flexible Manufacturing (FMS)  • Just in time (JIT)  • Lean Manufacturing.  • Give Learners examples of where these production techniques and systems may be used  Learners discuss the benefits and potential downfalls of each.  **Evaluate the work of past and present designers/ companies**  **The work of others 3.3.3**  • Independent research into a designer or company. A range of sources to strengthen research skills and deepen understanding of chosen focus.  Understanding the design style, philosophy and products of the chosen designer/company.  Investigate, analyse and evaluate the work of past and present designers/ companies  **The work of others 3.3.3**   * Presentation of research and findings.   • Note taking skills employed to broaden knowledge of a range of designers and companies.  • Questioning used to assess knowledge gained.  • Product analysis of a range of key products for that designer.  • Opportunities to visit maths links – comparative chart of performance criteria.  As for existing products to help evaluate them  **Mini test**  **PITSTOP 2 Hand-in**  **Product Sustainability and Social issues**   * Life Cycle * 6Rs * Social footprint   **Products in society**  **PITSTOP 3 Hand-in**  **Sustainability and the environment**  Critical evaluation of new and emerging technologies – planned obsolescence  Design for maintenance  **Ethics**  The environment  New and emerging technologies 3.1.1  • Annotation of designs including specific materials and processes where known.  • Learning of key terms and meanings:  • finite and non-finite resources, the disposal of waste, pollution and global warming  • continuous improvement and efficient working  • planned obsolescence, design for maintenance.  **Annotation of designs in terms of sustainability.**  Ethics  New and emerging technologies 3.1.1  • Evaluation of the ethical considerations surrounding a design/product.  • Investigation into production methods, use of labour, sourcing materials to provide us with the products we need.  Learners investigate ethical issues surrounding large companies such as Dyson, Coca Cola and Primark in relation to the responsibility of the designer/maker. Product study used to focus on these areas (Dyson, Coca cola, Primark).  **Renewable and non-renewable resources**    **Energy generation and storage 3.1.2**  • Highlight the difference between renewable and non-renewable fuels. Give advantages and assess prior knowledge.  • Discuss key terminology including renewable and non-renewable fuels, fossil fuels, wind, solar, tidal, hydro-electrical, biomass, coal, gas, oil.  • Moja island activity  Learners consider the variety of different options available to communities living on Moja Island and select the most appropriate technology. Renewable energy fact cards, a map of the island and information on the different communities and their needs are all resources designed to help them.  • Further reading and ideas are also available:  STEM learning, energy  **Sustainability and the environment**  Critical evaluation of new and emerging technologies – planned obsolescence  Design for maintenance  **Ethics**  The environment  New and emerging technologies 3.1.1  • Annotation of designs including specific materials and processes where known.  • Learning of key terms and meanings:  • finite and non-finite resources, the disposal of waste, pollution and global warming  • continuous improvement and efficient working  • planned obsolescence, design for maintenance.  **Annotation of designs in terms of sustainability.**  Ethics  New and emerging technologies 3.1.1  • Evaluation of the ethical considerations surrounding a design/product.  • Investigation into production methods, use of labour, sourcing materials to provide us with the products we need.  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| **IMPACT**  **(Evaluating what knowledge + understanding pupils’ have gained against expectations through assessment/feedback)** | **Formative Assessment** |  | PLC Checklist | | Pitstops, Homeworks, Mini Tests |
| **Summative Assessment** | Baseline | A01, A02, A03 checks | | MOCKS / Progress Checks |
| **Independent Learning tasks** | | CAD/CAM Development | Research & Investigation  Generating ideas  Design Development  Model making/ inc CAD/CAM | Manufacturing plan | Investigate design possibilities  Relevant issues |
| **IMPORTANT DATES** | |  | **AO1 Mid November (A+B)**  **AO2 C Mid December**  **A02 D + Mock End of December**  **AO3 – Section ( E+F )- END OF APRIL** |  |  |

