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| **GCSE D&T Long Term Plans (2020-21)** |
|  | **Term 1-5** | **Term 1-6** |
| **Units** | **–Multi Functional Living / Teenage Lifestyle / Nature & Environment NEA. (X4 periods per Week )** | **EXAM PREPARATION****(X 2 periods per Week)** |
| **Year 11****Area****of****Learning** |  | Contextual Challenge Overview Task AnalysisQuestionnaire- types of questionsCustomer 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.  | **Knowledge Maps distributed** Establish **TEAMS** group with resources and home learning with SMH. |
| **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. | **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 usedLearners discuss the benefits and potential downfalls of each. |
| **10** | • 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. | **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 2-3 Hand-in****Product Sustainability and Social issues** * Life Cycle
* 6Rs
* Social footprint

**Products in society** |
| • 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. | **Sustainability and the environment**Critical evaluation of new and emerging technologies – planned obsolescenceDesign 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  |
| **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**  | **PITSTOP 4-5 Hand-in** |
| **Systems** Systems approach to designing 3.1.4 • Whiteboards used to define the terms input, process and output in a system.• A systems diagram or product given to groups to identify each of these parts of the system.In groups, scenarios given and a systems solution to be designed. The identification of input, process and output in their idea/product to be explained and presented to peers**Types of motion** Mechanical devices 3.1.5 • Define the term mechanism.• Give an example of a mechanism and assess students’ knowledge of why mechanisms are used.• Demonstrate the 4 main types of motion – in pairs think of as many examples of products that use these motions.Produce a visual revision aid showing movement and mechanisms• Discuss ways of changing one type of motion into another.• Identify specific mechanisms such as levers, linkages and rotary systems.• In smalls groups Learners model examples of these mechanisms and understand how they work (using card, split pins etc...) worksheets and instructions could be used to assist this activity.• Identify where these mechanisms can be found in products/machines we use.• Learn how to create and understand diagrams that show motion. This may include calculations and measurement. • Opportunities to visit maths links – use of ratios, measuring of degrees etc.• Introduction to the four key developments in materials (modern, smart, composite and technical textiles). Match the correct definition to the term to assess prior knowledge.• Examples of materials and/or products made from modern materials – identify and briefly analyse these, considering the properties and reason for their use.• Demonstration of smart materials found in everyday products.Revision cards made for both material areas. |
|  | **Week 26-32 approx** | **PITSTOP 4 Hand-in****Composite materials**Technical Textiles Developments in new materials 3.1.3 • Cards showing images of products made from composite materials to be matched to cards labelled with the constituent materials.• Definition of composites re-visited and questioning used to understand the importance of each constituent material.• Understanding of this term and examples shown in real life context. • Learners look at technical specifications and match the correct material with the correct specification. **Material properties** Materials and their working properties 3.1.6 • Definitions for key properties (strength, toughness, hardness etc) given and Learners use note-taking skills to understand these.• Worksheet/revision cards – headings of paper, board, hardwood, softwood, manufactured board given and Learners to list as many examples under each (assessing prior knowledge).• Pre-prepared research packs used for Learners to read, sift and note- take information for each of the categories outlined.• Examples of each material (as a swatch for Learners to look through) given to Learners in groups. The named example material needs to be matched with the properties of that material.• Learners then have to justify the matches they have made.• Possible game of ‘Top Trumps’.Discussion about in what product each material might be used.**Properties of materials** Using and working with materials 3.2.5 • Explanation of key terms – working properties, physical properties.• Match up activity of three categories. Cards showing product image to be matched with card stating material name to be matched with card listing properties.Existing MP3 docking station/storage product analysed and properties identified.Modifying properties for a purpose Using and working with materials 3.2.5 • Assessing prior knowledge of ways to change properties.Material sampling/testing to understand the benefits of modifying properties.**Revision cards made for both material areas.** |
|  | 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. | **PITSTOP 6 Hand in** Forces and Stresses **Mini Test**  |
|  | • 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. | **Commercially available types and sizes of materials** Sources and origins 3.2.4Stock forms types and sizes 3.2.6 • Understanding how primary sources are converted into workable forms.• Match-up of primary source of material, conversion process and workable material. Key terms may be filed in as a revisit exercise from Year 9.• Stock sizes and availability investigated in main material area. Advantages for purchasing in stock form considered.Opportunities to visit maths links – calculating area, volume, nesting and minimising waste. |
|  | • 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 | **PITSTOP 7-8 Hand-in** |
|  | 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. | **Learners will study :****Scales of Production** **Quality Control** **Production Aids and Production of Materials** **Past Papers and mini Mocks**  |
| **IMPACT****(Evaluating what knowledge + understanding pupils’ have gained against expectations through assessment/feedback)** | **Formative Assessment** | PLC Checklist  | Pitstops, Homeworks, Mini Tests  |
| **Summative Assessment** | A01, A02, A03 checks  | MOCKS / Progress Checks  |
| **Independent Learning tasks** | Research & InvestigationGenerating ideasDesign DevelopmentModel making/ inc CAD/CAM | Manufacturing plan | Investigate design possibilitiesRelevant issues |
| **IMPORTANT DATES** | **AO1 Mid October (A+B)****AO2 C Mid November****A02 D + Mock End of December****AO3 – Section ( E+F )- END OF FEB** | *Cross Moderation at each Assessment completion date* |  |