Year 12 Design and Technology Cycle 1

Week/ Topic	Knowledge to Master and Format of Mastery	Location of Key Knowledge	Knowledge Application Tasks for Mastery
1 **Design and Innovation.** • **Product analysis** • **Above and below the line features** **Materials sources and forms (Natural timber and manufactured boards)**	• Define the important factors which embody product design tasks – Aesthetics, form, function, performance, maintenance, disposal, moral issues, costs and target market. • Define what makes a product fit for purpose. (Price, performance, aesthetic appeal and reliability). • Analyse and identify above and below the line features. • Identify different type of wood, their application and their form (Softwood, hardwood and manufactured) • Identify working and physical properties of timbers • Methods of processing freshly sawn timber (Seasoned) • Different methods of producing timber and their benefits (Plain, quarter, rift and live) • How manufactured boards are produced. Physical and environmental advantages and disadvantages.	https://resources.eduqas.co.uk/Pages/ResourceSingle.aspx?rlid=1077 All support materials can be also found in your hard copy given to you at the start of the course.	• Produce a product analysis of two different products which perform the same task. • Produce a report which identifies above and below the line features • Produce a report detailing the process of timber preparation and manufacture. Include environmental concerns and advantages.
2 **Design and Innovation.** • **Technology push and market pull.** • **Design strategies** • **Disassembly** **Material sources and forms (Ferrous, non ferrous and alloys)**	• Identify how technology push and market pull has influence on product design. • Understand different design strategies of inversion, brainwriting, lateral thinking and disassembly. • Identify different categories of metal, their form and their application. (Ferrous, Non ferrous and alloy) • Identify working and physical properties of metals • The steps required to manufacture metals • Impact of metals on the environment and how it influences product design.	https://resource.download.wjec.co.uk/vtc/2022-23/wjec22-23_6-1/pdf/2a-materials.pdf https://resource.download.wjec.co.uk/vtc/2022-23/wjec22-23_6-1/pdf/1d-problem-solving-strategies.pdf	• Disassemble a product and write a report outlining areas of technology push, market pull and design factors from week 1. • Produce a report detailing the process of metals preparation and manufacture. Include environmental concerns and advantages.
3 **Design and innovation.** • **Primary and secondary research** • **Target markets** • **Venn diagrams** **Material sources and forms (Thermoforming, thermosetting and elastomers)**	• Understand the difference between primary and secondary research and their application in the process of design. • Understand how quantitative and qualitative research is used. • How to identify target market and the use of charts to define and communicate data. • Define all types of plastics, their properties, manufacture of, environmental impact of and application. (thermoforming, thermosetting, elastomer)	https://resource.download.wjec.co.uk/vtc/2022-23/wjec22-23_6-1/pdf/2a-materials.pdf	• Produce primary and secondary research for an office chair. • Produce a report detailing the process of plastics manufacture. Include environmental concerns and advantages.
4 **Communicating intentions.** • **3 Dimensional drawing.** • **CAD** • **Rendering techniques** **Detailing materials, dimensions and assembly.** **Material sources and forms (Textiles - synthetic and natural)**	• Different types of 3 dimensional drawing (Perspective, isometric, oblique) • The use of orthographic drawing. • Communicating detail through exploded drawings • The use of pastels and coloured pencils to achieve a presentation drawing. • Define the different types of textile fibres and how they are manufactured into cloth. • The working and physical properties of different types of textiles. (Natural and Synthetic) • Impact of textiles on the environment and how it influences product design	https://resources.eduqas.co.uk/Pages/ResourceSingle.aspx?rlid=1103 https://resource.download.wjec.co.uk/vtc/2022-23/wjec22-23_6-1/pdf/2a-materials.pdf	• Produce a two point perspective drawing of a chosen item. The drawing must be rendered and presented using techniques demonstrated. • Produce a report detailing the process of textiles preparation and manufacture. Include environmental concerns and advantages.
5 **Design and Innovation.** • **Ergonomics** • **Anthropometrics** **Reacting to a design brief and product specification. (Office chair design task)** **Material sources and forms (Paper and boards)**	• Define ergonomics and how they are applied to product design. • Define anthropometrics and how they are applied to product design. • Understand a design brief and the part it plays in the design process. • Understand a design specification and the part it plays in the design process. • Define different types of paper and boards, their properties and their application. • Understand the process of paper production from source .	https://resource.download.wjec.co.uk/vtc/2022-23/wjec22-23_6-1/pdf/2a-materials.pdf	• Write a product specification for an office chair using your research from week 3. • Produce a report detailing the process of paper and boards manufacture. Include environmental concerns and advantages.

Year 12 [subject] Cycle 1

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6 **The role of CAD/CAM in product design.** **Applying design strategies (Office chair design task)**	• Understand different types of CAD (2D/3D modelling) • Applications of CAD for communicating intentions and providing information for CNC machines. • CAD advantages/disadvantages and limitations during the design process. • Different types of CAM and CNC machines. • CIM – Computer Integrated Manufacture. • The impact of CAD/CAM on product design and the consumer.	https://resources.eduqas.co.uk/Pages/ResourceSingle.aspx?rlid=1077	• Produce a range of ideas for an office chair which meet a client's specifications. • Write a written report on CAD/CAM and its impact on product design and manufacture – include social and moral issues.
7 **Working and physical properties of materials.** **Analysing initial ideas against client feedback and the design specification. (Office chair design task)**	• Physical properties are the traits a material has before it is used. • Physical properties are absorbency, density, melting point, thermal conductivity, electrical conductivity (resistivity), thermal expansion and corrosion resistance. • Working properties are how a material behaves when it is manipulated • Working properties are malleability, toughness, strength, ductility, hardness, durability, elasticity, compressive strength and tensile strength • Understand the importance of client feedback in the design process.	https://resources.eduqas.co.uk/Pages/ResourceSingle.aspx?rlid=1077	• Using client feedback analyse your office chair designs and select one for development. • Develop all aspects of your chosen chair solution. • Select two different products and analyse the working and physical properties of the materials and how they enhance the products aesthetics and performance.
8 **Testing materials** **Communicating manufacturing details. (Office chair design task)**	• The importance of product testing to gain insights, improve products, save time and achieve goals. • Qualitative and quantitative testing • Feasibility studies to clarify the investment in the development of a product. • Performance and function testing (physical and virtual) • Understand and use a range of communication standards which meet the BSI.	https://resource.download.wjec.co.uk/vtc/2022-23/wjec22-23_6-1/pdf/1e-quantitative-and-qualitative-testing.pdf	• Produce a scaled working drawing of your chair design that includes all material, sizes and assembly information. • Answer exam question on material testing
9 **Modelling and prototyping (Office chair design task)**	• The important part that modelling plays in the design process to allow designers to visualise and test how a product looks and performs. • Understand 2D, 3D and rapid prototyping using 3D printers. • Understand 3D modelling using CAD packages.	https://resources.eduqas.co.uk/Pages/ResourceSingle.aspx?rlid=1077	• Produce a scaled 3D model of your office chair.
10 **Testing and evaluating. (Office chair design task)**	• Understand formal report writing - Terms of reference, methodology, findings, conclusion and recommendations. • Understand environmental impact in the design process when evaluating a product. • Understand the social and moral impact in the design process when evaluating a product	https://resource.download.wjec.co.uk/vtc/2022-23/wjec22-23_6-1/pdf/1e-quantitative-and-qualitative-testing.pdf	• Produce an evaluation report for the model you produced. • The report must include client feedback and use quantitative and qualitative data.
11	Assessment week		
12	Super teaching week		