The Ellesmere Port C of E College

Design Technology

Part of the Frank Field Education Trust

KS4 Curriculum Plan 2022-23

Year 10

	LP1	LP2	LP3	LP4	LP5
TOPIC	***1. Identifying requirements. 2) Learning from existing products & practice. 4) Design thinking & communication NEA preparation: Strand 1 Explore (AO1); Strand 2 Create: Design Thinking (AO2)***	***2) Learning from existing products & practice; 3) Implications of wider issues; 4) Design thinking & communication; 7) Processes to create models/ digital design tools NEA preparation: Strand 2 Create: Design Thinking (AO2); Strand 3 Create: Design Communication (AO2)***	***Area of study: 5) Material considerations; 6) Technical understanding NEA preparation: Strand 1 Explore (AO1); Strand 3 Create: Design Communication (AO2)***	***Area of study: 6) Technical understanding; 7) Manufacturing processes and techniques NEA preparation: Strand 4 Create: Final Prototype(s) (AO2)***	***Area of study: 7) Manufacturing processes and techniques NEA: Introduction to the Externally Set Contexts by OCR - Strand 1 Explore (AO1)***
Knowledge	To know how to explore contexts using 5Ws strategy. To know how to identify design requirements, needs of different primary users. To define the term 'stakeholders' and 'primary users'. To know the factors of 'usability'. To know the difference between products, services and systems. To know the factors to consider when exploring existing products. To know the benefits and negatives of user-centred design and iterative design approaches. To know the functional properties of modelling materials and types of models. Know how to gain structural integrity in prototypes.	To know the types and applications of new and emerging technologies – Nano-technology, virtual & augmented reality, robotics & AI, 3D printing; to understand the impact of technology on society, environment and ethics. To know what planned obsolescence is and its impact on environment and society. To know the benefits of a circular economy; to know the difference between renewable and non-renewable sources of energy. To know how energy is transferred and stored. To know the digital design tools used by professionals – CAD 3D sketch Up.	To know the factors that affect material selection. To understanding and defining material properties. To know timber types, their properties and uses. To know polymer types, properties and uses. To know the categories and types of papers and boards, textiles and metals. To know the name and uses of smart, modern and composite materials. To know motion types and the different mechanical systems, levers, linkages, gears. To know electronic systems include input, process and output components and the function and application of programmable components.	To understand that templates and jigs are used to manufacture accurately. To know the small-scale timber wastage processes. To know the tools/ equipment and processes used to manufacture polymer products in a workshop and commercially. To know timber and polymer addition and finishing processes. To know timber and polymer deforming and reforming processes. To know the 4 scales of production.	To know the type and application of the digital design tools used by designers (CAD/CAM/CAE), To understand the rapid prototyping process. To know the themes of the externally released NEA contexts. To know how to explore the NEA contexts using the 5Ws strategy. To know how to write a design brief.
Skills	• Explore contexts using 5Ws strategy • Research and evaluate existing products • Use craft knife and hot wire sculptor safety • Communicate ideas in a variety of views. • Apply the iterative design approach • Develop one aspect of a prototype at a time • Record developments and evaluate the strength/weaknesses of iterations • Develop ideas using CAD 3D Sketchup • Mark out manufactured board accurately using a template • Change drill bits on the pillar drill • Use workshop equipment safely and correctly to shape and form materials • Create formers to vacuum form • Apply finishes • Investigate 3 design contexts • Write a design brief with focused identification of a primary user and other stakeholders • Investigate user and stakeholder needs and wants. • Analyse existing products.				
Key Vocab	Context, primary users, stakeholders, considering factors, usability, anthropometrics, ergonomics, user centred design, iterative design, oblique and isometric projection, sketch modelling, corrugated card, expanded polystyrene.	Emerging technologies, obsolescence, renewable, non-renewable, circular economy, computer aided design, mathematical modelling, simulation, evaluation.	Properties, conversion, seasoning, hardwood, softwood, deciduous, coniferous, stock forms, fossil fuels, synthetic polymers, finite, infinite, renewable, non-renewable, thermoplastics, thermosetting plastics, load, effort, fulcrum, Input, process, output.	Accuracy, wastage, finishing, deforming, reforming, processing, thermoforming, jigs and manufacturing aids, scales of production.	Digital design tools, CAD, CAM, CAE, contexts, primary user, stakeholders, design brief, usability, inclusive/exclusive, ergonomics, anthropometrics, existing product analysis.

Year 11

	LP1	LP2	LP3	LP4	LP5
TOPIC	***1. Identifying requirements; 2. Learning from existing products & practice; 4. Design thinking & communication NEA: Iterative Design Challenge release (OCR). Strand 1 – Explore (AO1) and Strand 2 – Create: Design Thinking (AO2).***	***4. Design thinking & communication; 5. Material considerations NEA Strand 2 – Create: Design Thinking (AO2); Strand 3 – Create: Design Communication (AO2).***	***6. Technical understanding; 7. Manufacturing processes and techniques. NEA Strand 4 – Create: Final Prototype(s) (AO2); Strand 5: Evaluate (AO3).***	***7. Manufacturing processes and techniques. NEA Strand 4 – Create: Final Prototype(s) (AO2) Strand 5: Evaluate (AO3)***	
Knowledge	To know the benefits of UCD, user centred design. To know how to gather primary user and stakeholder needs and wants. To know why and how we explore relevant existing products. To know how usability influences the design of products. To know how to avoid design fixation.	To know how designers use digital design tools as part of the iterative design approach. To know how to initiate physical modelling using appropriate modelling materials. To know the categories, types and uses of different materials. To know the manufacturing processes used with timbers and polymers.	To know how processes vary when manufacturing products to different scales of production. To know how accuracy is ensured when making prototypes and products. To know motion types and the different mechanical systems, levers, linkages, gears. To know electronic systems include input, process and output components and the function and application of programmable components.	To know how to manufacture an individual final prototype. To know how and why we test the feasibility of a final prototype. To know how to evaluate a final prototype. To know how to use exam revision techniques to fill gaps in knowledge.	
Skills	•Investigate 3 design contexts. •Write a design brief with focused identification of a primary user and other stakeholders. •Investigate user and stakeholder needs and wants. •Analyse existing products. •Present initial ideas using 2D and 3D sketching. •Apply the iterative design process - design development using card, foam, craft knives, hot wire sculptor. •Iterative design development using card, foam. •Testing, iterating, evaluating prototypes to identify next steps. •On-going evaluation from primary user feedback. •Present a final solution and CAD exploded view in 3D. •Present an orthographic projection in 2D Design. •Finalise the manufacture of the final porotype. •Test and evaluate final prototype. Justify improvements.				
Key Vocab	Contexts, primary user, stakeholders, design brief, usability, inclusive/exclusive, ergonomics, anthropometrics, existing product analysis, new and emerging technologies.	Digital design tools, CAD, CAM, CAE, properties, synthetic, development, iteration, ferrous, non-ferrous, alloys, thermo and thermosetting polymers.	Structural integrity, reinforcement, triangulation, load, effort, fulcrum, Input, process, output, accuracy, one-off, batch, mass, continuous, high volume, large scale production.	Feasibility, viability, testing, evaluation, continuous improvement. Command words and vocabulary to support with the completion of examination questions.	