Curriculum Plans: Year 10 Design and Technology

School Term	Topic	**Knowledge:** By the end of the unit students will know:	**Skills**: What skills will students have developed by the end of this unit?	**Key terms**: What new key terms and vocabulary will be learnt in this unit?	**Summative Assessment:** How will pupils be assessed in this unit?
1.1	Core Technical Principles: New and Emerging Technologies	• How new technologies influence product design and manufacture. • The principles of energy generation and storage (renewable and non-renewable energy sources). • Developments in modern materials and their impact on sustainability. • Mechanical devices and their applications in products.	• Researching and analysing new technologies. • Evaluating the ecological and social impacts of technological developments. • Basic 3D sketching and CAD design principles for simple products.	Renewable energy, non-renewable energy, sustainability, modern materials, mechanical devices, systems approach, emerging technologies.	**Half-term test** covering 1.1 (new & emerging technologies), 1.2 (energy generation and storage), 1.3 (modern materials), and practical skills developed during project work.
1.2	Desk Tidy Project: Designing and Making Principles	• How to develop ideas and concepts from a design brief. • Understanding and applying design strategies (e.g. iterative design, user-centred design). • The work of other designers and companies to influence own design decisions.	• Developing 3 concept designs for a desk tidy using CAD and traditional sketching. • Creating design specifications and prototyping. • Testing and evaluating prototypes against user needs and material constraints.	Design brief, design specification, iterative design, user-centred design, prototyping, testing and evaluation, CAD (Computer-Aided Design).	End of term mini NEA assessment focusing on research, design ideas, and testing prototypes against design specifications.
2.1	Specialist Technical Principles: Material Selection and Ecological Considerations	• How to select appropriate materials based on properties and product requirements. • How different forces and stresses impact material choice (tension, compression, shear, etc.). • The ecological and social footprint of materials from sourcing to disposal.	• Conducting material tests for forces and stress (tension, compression, etc.). • Evaluating the lifecycle of materials in terms of environmental impact. • Planning for product sustainability and recyclability.	Material properties, ecological footprint, forces and stresses, lifecycle analysis, sustainability, social footprint, material testing.	Half-term test on 2.1 (material selection), 2.2 (forces & stresses), and understanding of ecological footprint and sustainability in product design.
2.2	Specialist Technical Principles: Working with Materials	• How to select, use, and manage materials (wood, metal, plastics, composites) in production. • How to work with stock forms and understand standard sizes and tolerances. • Different scales of production and their implications on material use and cost.	• Accurate measurement and marking out of stock forms. • Safely operating specialist tools and equipment. • Managing production processes from material selection to finishing (surface treatments and finishes).	Stock forms, tolerances, scales of production, surface treatments, finishes, accuracy, specialist tools and equipment, production management.	End of term practical assessment: Students will be assessed on the selection of materials, accurate measuring, and manufacturing a prototype using specialist tools and equipment.
3.1	Designing for Manufacture: CAD and Prototyping	• How to use CAD software (SketchUp, Techsoft 2D Design) to create digital prototypes.	• Producing detailed CAD models and technical drawings for a final product design.	CAD (Computer-Aided Design), technical drawings, tolerances, manufacturing specifications, quality control, prototyping, cost estimation, design for manufacture (DfM).	End of year assessment covering all technical and design principles (STP & DMP), with a focus on CAD skills and manufacturing specifications.

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		• How to produce and evaluate detailed technical drawings and manufacturing specifications. • How to design for manufacture, considering tolerances and quality control in production.	• Creating manufacturing specifications and using CAD to simulate production processes. • Evaluating designs for cost, quality, and feasibility.		
3.2	Final Prototype Development and Testing	• How to finalise design ideas through detailed prototyping and testing. • The importance of tolerances and quality control in product design. • How to evaluate prototypes against design specifications and user feedback.	• Producing final prototypes and testing them against the original design criteria. • Managing tolerances and ensuring quality control. • Using feedback to refine and improve prototypes.	Prototype, tolerances, quality control, feedback analysis, design specification, final product testing.	End of year assessment focused on final prototype development, testing, and evaluation against design criteria.