Design Technology Curriculum Overview

	Project 1	Project 2	Project 3
Year 7 & 8 Product design Such a mess – design and create a desk tidy.	***Design process stages****:* • ***Research****: Understanding what users need in a desk tidy (e.g., space for stationery, ease of access, compartments for different items).* • ***Analysing***- Analysing existing desk tidies to understand what works well (size, storage capacity, user convenience, material choices). • ***Ideation****: Brainstorming and sketching ideas, exploring different shapes, sizes, and styles.* • ***Prototyping****: Creating rough models (e.g., paper, card, or CAD software) to test ideas.* **Communicating design -** Presenting design ideas **Communicating design:** freehand sketches **Critical thinking –** Problem solving **Modelling techniques:** Cardboard Disassembly and reverse engineering	**Introduction to CAD and the laser cutter** By learning CAD and laser cutting, students gain critical **digital fabrication** skills, **design thinking**, and hands-on experience with modern manufacturing processes. This prepares them for more advanced engineering and design challenges. • **Understanding CAD software**: Students learn how to use CAD tools- 2D design to create precise digital models of their designs. • **2D and 3D modelling**: They learn how to create accurate 2D shapes that can be extruded into 3D models, or design directly in 3D space, depending on the software**.** • **Vector and raster cutting**: Learning the difference between vector cuts (for cutting through material) and raster engraving (for etching surface details). **Modelling techniques:** CAD assisted modelling **Communicating Design -** Computer aided design (CAD) **Communicating design:** freehand sketches	**Practical skills**: • **Cutting and shaping materials**: Using saws to accurately cut wood or plastic. • **Joining techniques**: Learning methods such as gluing, screwing, or slotting parts together securely. • **Finishing techniques**: Sanding, painting, or varnishing the desk tidy to achieve a smooth, visually appealing surface. **Modelling techniques:** Wood - **Critical thinking –** Problem solving
	Autumn Term	**Spring Term**	**Summer Term**
Year 9 Foundation to Engineering Design	Students explore the stages of the design process and look at different types of design strategies. **Communicating designs –** sketching, drawing and CAD Students will be able to develop a deeper understanding of the design process through analysing a provided design specification, generating design ideas through sketching. Through practice they will become confident at generating and presenting design ideas, which will prepare them for the NEA assessment in R039 **Disassembly and reverse engineering**: Taking apart existing DYSON products to understand how they are made and how they function, providing insights into improving future designs. **Physical modelling –** • **Cutting and Shaping**: Using tools and techniques such as saws, laser cutters, CNC machines, or 3D printers to create precise parts. • **Joining Techniques**: Understanding how to join different materials together securely, using adhesives, fasteners, or slotting techniques in both prototypes and final models. • **Assembly and Construction**: Assembling the physical components accurately to ensure the product works as intended. **Communicating design -** Presenting design ideas **Modelling techniques:** Wood – plastic- metal **Critical thinking –** Problem solving **Communicating design:** freehand sketches Disassembly and reverse engineering	**Communicating designs -** Students explore engineering drawings and standard conventions and understand their purpose in the design process. Producing 3rd angle orthographic drawings, British Standard 8888, different types of lines, dimensions, scale, tolerances. **Drawing techniques explored-** • Freehand drawing techniques, • crating, • one-point and two-point perspective, • oblique, isometric, • use of tone, • rendering. **Communicating design:** freehand sketches **Modelling techniques:** Wood – plastic- metal **Communicating design -** Annotations and design details: **Communicating Design -** Computer aided design (CAD) **Modelling techniques:** CAD assisted modelling	Students learn about CAD software, how they are used in the design process and what are the advantages and disadvantages of it. Learning to use main tools and functions in 2D and 3D CAD software (2D Design and Fusion 360). How manufacturing considerations affect design. Virtual modelling and evaluation of the design idea **Modelling techniques:** CAD assisted modelling **Critical thinking –** Problem solving **Communicating Design -** Computer aided design (CAD)

Year 10 Cambridge National Engineering Design (J822)	**R038:** Design requirements; user needs and manufacturing considerations Communicating design outcomes; Types of drawings, working drawings & using CAD software **R040**: **Disassembly and reverse engineering**: Taking apart existing products to understand how they are made and how they function, providing insights into improving future designs. **Virtual CAD modelling** **Communicating Design -** Computer aided design (CAD) **Modelling techniques:** CAD assisted modelling Disassembly and reverse engineering **Communicating design:** Technical drawing skills Critical thinking - Product evaluation	**R038** Communicating design outcomes; evaluating design ideas **R040:** Virtual CAD Model Creation of physical models, or high-fidelity prototypes • **Cutting and Shaping**: Using tools and techniques such as saws, laser cutters, CNC machines, or 3D printers to create precise parts. • **Joining Techniques**: Understanding how to join different materials together securely, using adhesives, fasteners, or slotting techniques in both prototypes and final models. • **Assembly and Construction**: Assembling the physical components accurately to ensure the product works as intended. **Communicating Design -** Computer aided design (CAD) **Modelling techniques:** Wood – plastic- metal Critical thinking – Problem solving **Modelling techniques:** CAD assisted modelling	**RO40: Iterative design**: Learning to refine designs based on testing and feedback, making adjustments to improve performance and meet project goals. **R038**: Designing processes; stages and strategies, cyclic approach **R039**: **Technical drawing skills**: Using 2D and 3D drawing techniques to communicate designs, such as orthographic and isometric drawings. **Communicating design -** Annotations and design details: **Communicating Design -** Manual production of engineering drawing
Year 11	**R038**: Designing processes; stages and strategies, cyclic approach **R039**: **Hand Sketching**: Students should be able to create **quick concept sketches** that communicate ideas. This includes: • **Orthographic and isometric drawings**: Drawing from different angles to show all views of a product (front, side, top). • **Annotated sketches**: Adding important details, dimensions, and notes about materials or functionality. **Communicating design:** freehand sketches **Communicating design -** Annotations and design details: **Communicating design:** Technical drawing skills	**RO39 – CAD 3D Modelling**: Students should be able to create complex 3D models of their products using CAD software. This involves skills such as: • **Extrusion and Revolve**: Converting 2D sketches into 3D objects by extending or rotating shapes. • **Assemblies**: Combining different parts of a design into a complete product and ensuring all components fit together as intended. • **Parametric design**: Understanding how to set parameters (dimensions, constraints) that allow for flexibility and easy modification of designs. **Modelling techniques:** CAD assisted modelling **Communicating design -** Annotations and design details: **Communicating Design -** Computer aided design (CAD)	RO38 – Knowledge retrieval for exam