Design and Technology CURRICULUM MAP

Intent:
Design and Technology prepares students to participate confidently and successfully in an increasingly technological world. Students gain awareness and learn from wider influences on Design and Technology including historical, social, cultural, environmental, and economic factors. Students can work creatively when designing and making and apply technical and practical expertise.

Students learn how to explore and communicate their ideas using 2D and 3D sketching and rendering techniques as well industry standard CAD systems. They will learn key terminology to explain and justify their design decisions. Through practical tasks, they will understand the working properties of materials and learn techniques and processes to manipulate and form materials.

Key stage 3

YEAR 7	Art Deco Laser cut light	Mechanical systems	Textiles pouch	Inspired by Industry- recipe boxes	How can design and engineering make us safer	Tinkercad – Learn by Layers
Key Knowledge	History and characteristics of Art Deco Design. Simple circuits – parallel/series. Safety in the workshop. Sources and origins of materials	Classes of lever, Types of Motion. Mechanical Advantage Safety in the workshop	Styles and Characteristics of a wider range of designers. Sources and origins of textiles fibres. Use of templates and patterns.	Understanding the Design Process. Understanding Users needs and wants. Design strategies – User Centred Design Design Thinking (*Empathise, Define, Ideate, Prototype, Test*)	What is Design and Technology? How are products designed, Prototyped, and tested. Types of drawing *(2D, isometric, 2point perspective, Orthographic.)*	Introduction to 3D modelling and 3D printing. Understanding how rapid prototyping is used in design and engineering
Key Subject Skills	**Design** Researching and understanding styles Developing ideas using CAD **Make** Preparing files for CAM (Laser cutter) Electronic Soldering. Working accurately. Cutting, drilling, smoothing metals and woods **Evaluate** The work of Art Deco designers and their own work.	**Design** Understanding plans and drawings **Make** Working accurately. Measuring, **Evaluate** Testing and refining prototype	**Design** Identifying user needs. Generating and developing ideas. Using drawing skills **Make** Using sewing machines safely Hand and machine simple stitches. Applique techniques , Fasteners **Evaluate** The work of others	**Design** Gathering User Data. Using surveys and interpreting data. Identifying and defining problems. Ideation- a range of strategies **Make** Develop prototypes. **Evaluate** The work of others and their own work.	**Design** Identifying and defining problems 2D and 3D sketching. Rendering. Presenting Ideas	**Design** Working with Tinkercad modelling software **Make** Processing models with slicing software and setting up 3D printers. **Evaluate** Their own work

Personal development: • **RSE** • **Online safety** • **Enrichment**	Societal change and innovation	Understanding how the world works!	Diversity in Design	Healthy Eating and Nutrition.	Personal safety	Online safety -
Connections with careers	All units refer real world examples and application – Each year the inspired by industry units explicitly make the links between what students learn and experience in D&T and how these skills translate to real world design and engineering scenarios.					
Home support	BBC BITE SIZE TECHNOLOGY STUDENT	TECHNOLOGY STUDENT		YOU TUBE INTRODUCTION	TECHNOLOGY STUDENT	TINKERCAD Free software for home access

YEAR 8	My Stand – how can possessions be displayed and stored?	Inspired by industry – Toys that teach	Casting – retro Robots	How can design and engineering rescue people? – Programmable components
Key Knowledge	Sources and Origins of Timber products Planning and minimising waste Classification and use of adhesives	How real companies approach design and prototyping. Design Thinking (*Empathise, Define, Ideate, Prototype, Test*)	Sources and origins of metals Casting in Industry. Bitmap images vs vector graphics.	Systems approach to designing. Electronic components. Systems and programming flow charts
Key Subject Skills	**Design** Identifying and defining needs and wants. Generating ideas using a variety of graphical skills. Planning and working drawings **Make** Working safety in the workshop with a wider range of resistant materials	**Design** Identifying user's needs and wants. Develop primary research skills. Generate Ideas using more refined sketching and rendering techniques. **Make** Develop Ideas and prototypes. **Evaluate** Testing and refining their own ideas and products.	**Design** Generating and developing ideas based on source imagery. Producing CAD vector graphics ready for laser cutting **Make** Setting up and using laser cutter safely. Casting and finishing pewter **Evaluate**	**Design** Developing code. Solving problems using inputs and outputs **Make** Embedding programable components into their solutions Safely build circuits with programmable components. **Evaluate**

	Evaluate Testing and refining their own ideas and products.		Evaluate and refine their ideas and CAD work	Testing and refining circuits and programming
Personal development: • **RSE** • **Online safety** • **Enrichment**				Empathy and social issues in Design and Engineering
Connections with careers	All units refer real world examples and application – Each year the inspired by industry units explicitly make the links between what students learn and experience in D&T and how these skills translate to real world design and engineering scenarios.			
Home support	BBC BITE SIZE TECHNOLOGY STUDENT	Yoto Play BBC BITE SIZE TECHNOLOGY STUDENT		

YEAR 9	**Earthquake resistant structures**	**How can design and engineering provide shelter?**	**Aluminimal – sheet metal animals**	**Inspired by Industry – Wearable technology**
	Please Note: the dept runs a carousel system and therefore students will study these units in different sequences			
Key Knowledge	Types of structure. Triangulation, Tuned mass dampers and other methods employed by Civil Engineers and Architects	Why might people need emergency shelter. Learning about a diverse range of needs globally	Classification of metals. Sources and origins of metals Mechanical properties (hardeness, ductility etc)	How real companies approach design and prototyping. Design Thinking (*Empathise, Define, Ideate, Prototype, Test*)

Key Subject Skills	**Design** Planning for accuracy. Working to design requirements, budgeting, and planning Teamwork. **Make** Working to plans, working accurately **Evaluate** Destructive Testing	**Design** Analysing Needs and Wants Developing a brief Generate ideas working to existing specifications. **Make** Quick prototyping **Evaluate** Testing and refining their own ideas and products.	**Design** Using iterative prototyping to refine ideas **Make** Cutting folding and finishing sheet metals **Evaluate** Testing and refining their own ideas and products.	**Design** Identifying user's needs and wants. Develop primary research skills. Generate Ideas using more refined sketching and rendering techniques. **Make** Develop Ideas and prototypes. **Evaluate** Testing and refining their own ideas and products.
Personal development: • **RSE** • **Online safety** • **Enrichment**	Careers and Pathways	Global awareness of others needs and challenges		Careers and Pathways
Connections with careers	All units refer real world examples and application – Each year the inspired by industry units explicitly make the links between what students learn and experience in D&T and how these skills translate to real world design and engineering scenarios.			
Home support				YouTube Introduction

YEAR 10	**Dieter Rams**	**Box**	**Street Furniture**	**Core Technical Principles**	**Specialist Technical Principles**	**Design and Making principles**
Key Knowledge	Rams 10 principles of good design. History and impact of Rams' work. Interpreting briefs	Processing timber Environmental impact of using timber-based products. How to read and follow plans.	Designing for safety Composites and recycled materials	**New and emerging technologies.** Industry and enterprise Sustainability and environment, People cultures and society.	**Common Specialist Principles** Forces and stresses Functionality Ecological and social footprint Six R's	**Designing Principles** Investigation and Data The work of designers The work of Companies Design Stratgies Communication of ideas Prototyping

		Use of traditional wood joints		Production techniques and systems. Informing design decisions. **Energy materials systems and devices** Energy generation and storage. Modern and smart materials. Composites and technical textiles. Systems approach to design. Electronic systems. Mechanical devices. **Materials and their working properties** Papers and boards. Timbers. Metals and alloys. Polymers. Textiles.	Scales of production **Timber based materials** Sources and origins Working with Timber Commercial Manufacturing Surface treatment and finishes	**Making Principles** Selection of materials Tolerances Material management Tools and equipment Processes Surface treatment and finishes
Key Subject Skills	Extended range of sketching and rendering skills. Modelling and prototyping skills Verbal and visual presentations	Working with hardwoods Accuracy when measuring and marking out. Cutting shaping and finishing woods Pewter casting	**Design** Interpreting briefs and specifications. Gathering primary research data. Sketching and marker rendering. Designing for 3D printing **Make** Scale modelling – more advanced card/foam techniques Setting up and using 3D printers safely	Materials and their working properties Papers and boards. Timbers. Metals and alloys. Polymers. Textiles.		

			Evaluate Testing and refining ideas and prototypes			
Connections with careers	All units refer real world examples and application					
Home support				All power points, Homeworks and worksheets are available in Teams		

YEAR 11	**NEA**	**Core Technical Principles**	**Specialist Technical Principles**	**Design and Making principles**
Key Knowledge	**Substantial Design and Make project** 50% of final GCSE grade Students select from 3 possible 'contexts' issued by the exam board in June of year 10 **Timeline** June of year 10 through till the Easter of year 11.	Complete and revise theory units		
Key Subject Skills	Students will investigate a problem of their choice, and then design, prototype and test potential solutions. 20 A3 pages – approx 45 hours of work.			
Personal development: • **RSE** • **Online safety** • **Enrichment**	Developing empathy and understanding with potential users. Seeking and responding to honest feedback. Research skills – identifying reliable sources			
Connections with careers	All units refer real world examples and application			
Home support	A comprehensive range of supporting resources are available on Teams. TECHNOLOGY STUDENT There are a lot of very good videos on youtube search AQA D&T NEA	All power points, Homeworks and worksheets are available in Teams Technology Student is an amazing online resource BBC Bitesize		

Key Stage 5: A levels

YEAR 12	Formula 1 USB Stick	Lighting	Take a Seat	Technical Principles	Designing and making principles
Key Knowledge	Design for functionality Design communication development.	Working to briefs Regulations and standards Working with components	Researching skills Material knowledge and understanding of working properties. Design History	Materials and their applications Performance characteristics of materials Enhancement of materials Forming, redistribution and addition processes The use of finishes Modern industrial and commercial practice Digital design and manufacture Enterprise and marketing in the development of products Design communication Modern manufacturing systems	Design methods and processes Design theory How technology and cultural changes can impact on the work of designers Design processes
Key subjects Skills	CAD and rendering skills Prototyping skills (foam modelling)	High quality graphical communication skills Working drawings Planning manufacture High quality manufacturing and finishing skills	Investigation and modelling skills Presentation skills		Selecting appropriate tools, equipment and processes Accuracy in design and manufacture Responsible design Design for manufacture and project management National and international standards in product design National and international standards in product design
Personal development: • **RSE** • **Online safety** • **Enrichment**		Understanding regulations and safety standards	Developing communication skills		
Connections with careers	All units refer real world examples and application – projects arranged into a 'portfolio' in preparation for potential interview panels				
Home support	A comprehensive range of supporting resources are available on Teams.			All power points, Homeworks and worksheets are available in Teams Text Book Issued	

YEAR 13	NEA	Technical Principles	Designing and making principles
Key Knowledge	**Substantial Design and Make project** 50% of final A Level grade **Timeline** Term 6 of year 12 through till the Easter of year 13.	The requirements for product design and development Health and safety Protecting designs and intellectual property Design for manufacturing, maintenance, repair and disposal Feasibility studies	Design for manufacture and project management Critical analysis and evaluation
Key subjects Skills	Students will investigate a problem of their choice, and then design, prototype and test potential solutions.		
Personal development: • RSE • Online safety • Enrichment	Developing empathy and understanding with potential users. Seeking and responding to honest feedback. Research skills – identifying reliable sources		
Connections with careers	All units make explicit links to design in industry and the real world		
Home support	Extensive supporting resources available on Teams	All power points, Homeworks and worksheets are available in Teams Textbook Issued	