



Design and Technology Curriculum Learning Journey

Design and Technology at KS3 is taught in a carousel system and therefore will be delivered in a different order to that depicted below

Key: C- Core Content, SP- Specialist Papers and Boards, ST- Specialist Timbers, TP- Technical principles, DMP- Designing and Making Principles

Knowledge & Concepts increase students depth/ challenge and build on previous learning where topics are revisited throughout their learning

		Year 7	Year 8	Year 9	Year 10 (2022/23 year 10)	Year 11	Year 12	Year 13
Half Term 1	Topics	Topics organisation 1. Designing and making 2. Designing without making 3. Making without designing 4. Maths in Design and Technology 5. The Design process 6. Technical knowledge	Topics organisation 1. Designing and making 2. Designing without making 3. Making without designing 4. Maths in Design and Technology 5. The Design Process 6. Technical knowledge	Topics organisation 1. Designing and making 2. Designing without making 3. Making without designing 4. Maths in Design and Technology 5. The Design Process 6. Technical knowledge	C1. Energy generation, storage and choosing appropriate sources C2. Investigate and analyse the work of past and present professionals and companies in order to inform design	C1. Modern and smart materials, composite materials and technical textiles C2. Develop, communicate, record and justify design ideas, applying suitable techniques	1. Design methods and processes (DMP) 2. Design theory (DMP) 3. Technology and cultural changes (DMP) 4. Design processes (DMP) 5. Critical analysis and evaluation (DMP) 6. Materials and their applications (TP) 7. Performance characteristics of materials. (TP)	1. National and international standards in product design (A-level specific) (DMP) 2. Performance characteristics of materials (A-level specific) (TP) 3. Forming, redistribution and addition processes (A-level specific) (TP) 4. Digital design and manufacture (TP) 5. Selecting appropriate tools, equipment and processes (A-level specific) (DMP) 6. Non-exam assessment
	Knowledge and skills	1. Working to a given design brief 2. Modifying a given design brief 3. Understanding the needs of users through user interviews 4. Product analysis 5. Applying ACCESSFM to write a design specification 6. Materials, techniques, processes, tools and equipment	1. Writing own design brief 2. Conducting a survey /interview 3. Product disassembly 4. Understanding the outcomes of primary research to write a design specification	1. Working to a given design context 2. 3. Understanding the needs of users through user interviews 4. Product analysis 5. Applying ACCESSFM to write a design specification 6. Materials, processes, tools and equipment	C1. How the following sources of energy: coal, oil, gas, biomass, biodiesel, tidal, wind and solar are converted into energy, their advantages and disadvantages. Power systems and choosing appropriate sources for products and powers systems. C2. The work of Alessi, Apple, Heatherwick Studio, Joe-Casely Hayford, Pixar, Raymond Loewy, Tesla and Zaha Hadid – C3. Analysing a product specification criteria.	C1. Description, applications, advantages and disadvantages of SMAs, nanomaterials, photochromic glass, reactive glass, piezoelectric materials, temperature responsive polymers, conductive inks, concrete, plywood, fibre/carbon glass, reinforced polymers, robotic materials, agrotexiles, geotextiles, construction textiles, domestic, sports environmentally friendly, and protective textiles.	1. Historical design styles, design movements and influential designers Development of designs from prototype to mass produced product 2. Iterative design process User centred design 3. Design influences Designers and their work Design styles and movements Key historical design styles, Design movements Influential designers Socio economic influences 4. Major developments in technology Social,	1. Agencies –BSI/ ISO, Legislation-ROHS/WEEE, Eco labelling 2. Papers and boards and papers and boards processes - Woods and woods processes- steam bending, machining qualities, moisture resistance, toxicity - Metals and metal processes: Polymers and polymer processes. - Application and uses: Elastomers Biodegradable Polymers, suitability, composites and smart materials 3. selecting the correct tools and equipment,



							<p>Moral and ethical issues Product life cycle 5. the use of the design process in the NEA prototype development 6. Critical analysis and evaluation</p> <p>TP Component</p> <ol style="list-style-type: none"> 1. Mechanical and physical properties of materials. 2. Materials classification 3. Destructive and non-destructive Industrial and workshop materials testing processes 4. Wood seasoning <p>Toxicity of woods Stock forms Classification, properties and uses of woods, metals, polymers, biodegradable polymers, composites, smart materials and modern materials</p>	<p>Safe working practices in a workshop situation, maintaining safety in commercial manufacture, development of designs from single prototypes to mass produced products, production methods.</p> <p>4. Good and safe working practice</p>
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Half Term 2	Topics	<p>Product Design Topics – Maze game Pupils work on a design and make task enhancing: research, designing, development, evaluation, analysis, modelling, measuring and marking out accurately, wasting processes (cutting, sanding, filing, drilling), finishing processes and using CAD/CAM.</p>	<p>Product Design Topics Expand practical skills including wasting processes, cutting and shaping wood, using jointing methods, fitting a hinge, etc. Develop graphical elements for designing, making use of ICT and Techsoft2D for the board game design. Construct a wooden box to enclose the board, counters, cards, rule book, etc for their board game.</p>	<p>Product design topics- Book divider Materials – softwoods and hardwoods,</p> <p>Processes and techniques involving working with timber tools and equipment, Design process,</p>	<p>C1. The impact of new and emerging technologies C2. Mechanical devices used to produce movements- Taught as a skills project</p>	<p>C1. Electronic systems- including sensors and control devices to respond to a variety of inputs, and devices to produce a range of outputs C2. Specialist techniques used for high quality paper and board prototypes or ST3. equipment and processes used to make prototypes in timber</p>	<p>1. Responsible design (DMP) 2. Design for manufacture (DMP) 3. Enhancement of materials (TP)</p>	<p>1. The use of finishes (A-level specific) (TP) 2. Modern and industrial commercial practice (A-level specific) (TP) 3. Digital design and manufacture (A-level specific) (TP) 4. Accuracy in design and manufacture (DMP) 5. Non-exam assessment</p>



	Knowledge and skills	<ul style="list-style-type: none"> -Produce ordered sequences and schedules for manufacturing products -Follow procedures for safety and understand risk assessment - Use a complex range of materials considering their properties · Make use of specialist equipment to mark out materials · Apply a range of finishing techniques, including those from art & design, polymers and woods 	<ul style="list-style-type: none"> -Develop understanding of designing and manufacture. -Research on different -Understand user needs. -Identify and solve their own design problems and to reformulate those given to them. -Understand how products contribute to lifestyle choices. -Use specifications to inform the design of innovative, functional, appealing products that respond to needs in a variety of situations. -Use learning from mathematics to design and make products that work. Include volume, area and costings 	<p>Communication skills- rendering, 3D drawing (isometric and perspective)</p> <p>Making skills</p>	<p>C1. Industry-demographic movement</p> <p>b. Enterprise- crowd funding, privately owned businesses, government funding</p> <p>c. sustainability-</p> <p>d. People- workforce, consumers</p> <p>e. Culture-population movement within EU, social segregation</p> <p>f. Society- change in working hours, internet of things, video conference meetings</p> <p>g. Environment- pollution, waste disposal, materials separation, transportation of and packaging of goods.</p> <p>h. Production techniques and systems</p> <p>C2. types of movement, classification of levers, linkages, cams, followers, pulleys and belts, cranks and sliders, gears,</p>	<p>C1. (Revision) sensors, control devices and components, outputs.</p> <p>SP2. Paper and Board: tools and equipment- hand tools, shaping, fabricating/ assembling/ constructing and binding</p> <p>STC3. Tools and equipment, shaping, - cutting, planning, chiselling, turning, abrading, curving</p> <p>Fabricating and constructing, wasting, addition, assembling</p>	<p>1. Environmental issues</p> <p>How products are designed to conserve energy, materials and components</p> <p>The reuse of material off cuts, chemicals, heat and water</p> <p>2. Planning for accuracy and efficiency</p> <p>Quality assurance</p> <p>go/no-go gauges</p> <p>Laser scanning and measuring</p> <p>non-destructive testing.</p> <p>3. Polymer enhancement</p> <p>Wood enhancement</p> <p>Metal enhancement</p> <p>Paper and board forming processes</p> <p>4. Wood processes</p> <p>Joining methods, adhesives and fixings, coach bolts, milling.</p> <p>Polymer processes - joining methods, adhesives and fixings, Calendering</p> <p>Metal processes</p> <p>5. Paper and board finishing</p>	<p>1. Polymer finishing, Acrylic spray paints, Thermoplastic elastomer (TPE), Metal finishing-sealants, preservatives, anodising, plating, coating, cathodic protection.</p> <p>Wood finishing-colour wash, Danish oil</p> <p>2. Scales of production-unit production systems (UPS), quick response manufacturing (QRM), vertical in-house production</p> <p>3. The use of computer system: modular production, cell production, flexible manufacturing systems (FMS). DDM: Computer aided design (CAD), Computer aided manufacture (CAM)</p> <p>4. Importance of accuracy in manufacture</p>
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Half Term 3	Topics	<p><u>Graphics Topics – shop façade</u></p> <p>Architectural modelling; retail outlet design.</p> <p>Understanding the work of notable designers.</p> <p>Drawing and designing skills.</p>	<p><u>Graphics Topics- Interior design</u></p> <p>Interior modelling; bedroom designing.</p> <p>Drawing and designing skills.</p>	<p><u>Graphics topics –Game controller</u></p> <p>Product Modelling.</p> <p>Product Analysis.</p> <p>Human Factors,</p> <p>Raw Materials (manufactured boards including MDF, polymers including HIPS).</p> <p>Using templates.</p>	<p>ST1.Manufacturing processes in timber or</p> <p>SP2. Alternative manufacturing processes for different scales of production in papers and boards</p>	<p>ST1. (revision) Manufacturing processes in timber or</p> <p>SP2. (revision) alternative process in paper and boards</p> <p>ST3. Surface treatment for functional and aesthetic purposes in timber or</p> <p>SP4. Surface treatments and finishes for papers and boards</p>	<p>1. Health and safety (TP)</p> <p>2. Design for manufacturing, maintenance, repair and disposal (TP)</p> <p>3. Enterprise and marketing in the development of products (TP)</p> <p>4. Forming, redistribution and addition processes (TP)</p> <p>5. NEA</p>	<p>1.Digital design and manufacture (A-level specific) (TP)</p> <p>2. The requirements for product design and development (TP)</p> <p>3. Protecting designs and intellectual property (TP)</p> <p>4. Design for manufacturing, maintenance, repair and disposal (TP)</p> <p>5. Feasibility studies (TP)</p> <p>6. Enterprise and marketing in the development of products (TP)</p>



								7. Non-exam assessment
	Knowledge skills	<ul style="list-style-type: none"> -Range of model making tools and equipment including Craft knives, glue guns and scroll saw to process a variety of model making materials. -Learn technical drawing skills. -Learn how to create basic nets. -To critically evaluate products. -Understanding the notion of Form vs Function. - The use of colour and how colour can be used to convey a range of moods /feelings/meanings. -Importance of PPE and safe working practices when undertaking work of a practical nature. -Differences between the terms modernism and postmodernism. 	<ul style="list-style-type: none"> - Learning how basic net making principles can be applied to a range of model making tasks. - Learn about colour and colour combinations for interior design. - Learn about how a range of cultural influences can be used to generate interior designs. - Learn how to use one-point perspective drawing as a tool for generating interior designs. - Learn about a range of paper and board. - Learn about composite materials and understand drawbacks of using composites. 	<p>Learn how to evaluate existing products; Applying subject specific words to critique ideas. Develop their ability to sketch a wide range of viable design ideas. Learn how different colour combinations can give different effects to the same design. Develop their ability to sculpt shapes from MDF with the aid of templates. Learn how to make an MDF object vacuum into a formable shape (draft angles). Learn how to safely and effectively use spray paint. Learn how to use vinyl as a material for add-on graphics. Learn about a range of manufactured boards and polymers and their respective properties. Learn how to objectively evaluate project work through the use of a critique session format.</p>	<p>C1. a. Processes to cut and shape materials- routing, sawing, use of mortiser, use of a bag press b. scales of production- one-off, batch, mass and continuous c. techniques for quantity production- marking out methods, jigs, fixtures, templates, patterns, sub-assembly, CAM, quality control, working with tolerance, efficient cutting to minimise waste C2. a. Printing-digital printing, photocopying, letterpress, offset printing, lithography, gravure, screen printing, other processes b. scales of production- one-off, batch, mass, continuous c. techniques for quantity production- marking out methods, fixtures, jigs for holding, templates and patterns, stencils, CAM, quality control, working with tolerance and efficient cutting</p>	<p>SP/ST1. a. (revision) Processes to cut and shape materials b. scales of production c. techniques for quantity production SP2. a. Printing- b. scales of production- c. techniques for quantity production SP3. Paper and boards- Surface finishes and treatments – varnishing and UV varnishes, hot foil blocking, edge staining, embossing, packaging laminates and films ST4. Timbers- surface finishes and treatments- painting, staining, varnishing, wax, oil, shellac, veneering</p>	<ol style="list-style-type: none"> 1. the legislation and agencies responsible for health and safety potential hazards in a school workshop 2. Manufacture, Repair, Disposal, reduction in the number of manufacturing processes, maintenance, ease of manufacture, disassembly. 3. Marketing and brand identity global marketing costings and profit 4. Forming, redistribution and addition process Paper and board processes, Polymer processes, Metal processes- redistribution processes, Temporary fasteners and joining methods, Metal processes- wasting processes, Wood processes- addition and fabrication processes, Wood processes- wasting processes, Wood processes- forming timber, The use of adhesives and fixings and adhesives. 	<ol style="list-style-type: none"> 1. DDM: Virtual modelling, Rapid prototyping processes, How products are designed to conserve energy, materials and components, The reuse of material offcuts, chemicals, heat and water, Electronic data interchange, Production, planning and control network (PPC). 2. Product development and improvement, Fitness for purpose/accuracy of production, Aesthetics, ergonomics and anthropometrics when designing 3. Copyright, design rights, patents, registered designs, trademarks, LOGOS, 4. Manufacture – reducing the number of processes, Repair – Maintenance, Ease of manufacture – Disassembly 5. Explain the use of feasibility studies to assess the practicality for production. 6. The importance of marketing and brand identity.

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	Topics	Electronics Topics- portable desk lamp - Inputs, process and outputs - Categorisation of types of polymers - Forming polymers - Joining metal	Systems Topics – mechanical devices -Forms of movement - Levers and linkages - Relationship between input and output motion - Cams and followers - Drain train mechanisms and transmission of motion	Wood laminating -Exploring laminating using veneers and planks of timber - Product analysis - Design specification and design ideas - Design development - Manufacture - Evaluation	C1. Categorisation of the types, properties and structure of natural, synthetic, blended and mixed fibres, and woven, non-woven and knitted textiles C2. (revision) Categorisation of the types, properties and structure of natural and manufactured timbers SP3. (revision) Categorisation of the types, properties and structure of papers and boards	1. NEA assessment- Making skills 2. NEA – Evaluation against specifications, users’ views	1. Design communication (TP) 2. Technology and cultural changes (A-level specific) (DMP) 3. Design processes – prototype development (A-level specific) (DMP) 4. Design processes (A-level specific) (DMP) – iterative design in commercial context 5. The use of finishes (TP) 6. NEA	1. Modern manufacturing systems (TP) 2. Detailed product study 3. Detailed product comparison 4. Detailed product analysis 5. Exam preparation – Exam technique (DMP) 6. Exam preparation – (TP) 7. Non-exam assessment
Half Term 4	Knowledge and skills	- Toggle switches, LEDs, parallel Circuits - Thermoplastics and thermosets - Properties and uses of HIPS - Vacuum forming - Soft soldering	-understand how more advanced mechanical systems used in their products enable changes in movement and force - Recognise and name the four different forms of movement - levers and linkages work to make work easier - how an input motion can be changed to a different output motion by a mechanism - differences in different rotary cams and how they interact with different followers - different cams and followers to design mechanisms - different drive train mechanisms and understand how they transmit motion and change its magnitude and direction	- Classification of timbers and examples - Strengthening wood – wood laminating - Making a former for laminating - using workshop tools and equipment - Designing skills - Design communication skills - Evaluation skills	C1. a. Natural fibres- animal wool, plant cotton, b. Synthetic fibres- polyester, acrylic c. Woven textiles- plain weave-calico, twill weave-denim d. Non-woven textiles- felted wool fabric, bonded fibres/webs e. Knitted textiles- warp-knitted fabric, weft-knitted fabric	1.NEA Making skills 2. NEA evaluation skills	1.Communication and presentation techniques used for conveying design proposals to clients 2.socio economic influences on product design and manufacture. major developments in technology how the have shaped product design and manufacture. Social, moral and ethical responsibilities of a designer. The concept of product lifecycle. 3. The use of a design process 4. CAD in industrial applications, virtual modelling, rapid prototyping, electronic data exchange, production, planning and control networking (PPC) 5. Design processes used in the NEA: Prototype development. Discuss and implement a range of design processes 6. The use of finishes Paper and board finishing, Paper and board printing processes, Polymer finishing,	1.How computer systems are used in modern manufacturing. Develop knowledge of specific industrial examples and their use in the manufacture of given products. 2. Identification of the materials used 3.Materials •Manufacturing process •Ergonomics •Suitability for the intended environment



							Metal finishing, Wood finishing	
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Half Term 5	Topics	<p>Textiles Topics Cushion/pillows - Classification of fabric and the properties of cotton, fleece and felt - Pattern cutting for a purpose -hand embroidery as a means of decoration -machine stitch - Hat design - Mythical creature research</p>	<p>Textiles Topics Quilt block -classification of fabric - natural, synthetic and smart materials -Repeat patterns identification -designing repeat patterns with purpose -Researching existing products -discussing function VS aesthetics -Printing for purpose (stencil printing and/or polystyrene printing) -hand embroidery -machine stitch</p>	<p>Design topics- Brand identity Diverse types of logos - How papers and boards are made Equipment used to make paper and board - Design process- design context, design brief, design ideas, research, design development, making and evaluation - Typography</p>	<p>C1. The critical evaluation of new and emerging technologies 2. Non exam assessment (NEA) practice on selected sections</p>	<p>SP1. Sources of paper and boards or (revision) SP 2. Sources of papers and boards (revision) ST3. Selection of papers and boards or (revision) ST4. Selection of timbers (revision) C5. Design and technological practice take place within contexts which informs outcomes</p>	<p>1. Design theory (A-level specific) (DMP) 2. Responsible design (A-level specific) (DMP) 3. Design for manufacture and project management (A-level specific) (DMP) 4. Modern and industrial commercial practice (TP) 5. NEA</p>	<p>1. Exam preparation – (TP) 2. Exam preparation – (DMP)</p>
	Knowledge and skills	<ul style="list-style-type: none"> - Develop the understanding of formal elements in textiles through design - develop refined ideas using annotated sketches - properties of materials and where these properties can be utilised - to work within a design brief - develop their understanding of designing and making and expand practical skills using hand embroidery and machine stitch 	<ul style="list-style-type: none"> - Develop the understanding of formal elements in Textiles through design - develop ideas using annotated sketches - properties of materials and where these properties can be utilised - work within a design brief - expand practical skills using hand embroidery and machine stitch - develop understanding of different types of repeat patterns - understanding of various printing methods; students will approach stencil printing 	<ul style="list-style-type: none"> - Drawing skills - Design communication skills - Using a hot wire cutter 	<ul style="list-style-type: none"> 1. a. Examples of critical evaluation questions b. Critical evaluation examples c. Portable power source for mobile hardware d. Consideration of contemporary and potential future scenarios e. Ethical perspectives on new and emerging technologies 	<p>Revision: C1.a. Natural timbers-softwoods, hardwoods, C2. a. Paper, board and packaging laminate 3. Paper and board- Environmental factors</p>	<ul style="list-style-type: none"> 1. The effect on the manufacturing process that is brought about by the need for batch and mass manufacture 2. Conservation of energy and resources How products are designed to conserve energy, materials and components The reuse of material offcuts, chemicals, heat and water. 3. Planning for accuracy and efficiency Quality assurance, Quality control, Go/no-go gauges, laser or probe scanning and measuring Non-destructive testing such as x-rays and ultrasound 	<ul style="list-style-type: none"> 1. •Focus here on the use of finishes •Modern industrial and commercial practice •Digital design and manufacture •Product design and development •Health and safety •Manufacture maintenance repair and disposal •Enterprise and marketing •Design communication • Focus here on protecting designs and intellectual property •Manufacture maintenance repair and disposal •Enterprise and marketing •Design communication •Modern manufacturing systems



			and/or styrofoam printing in more depth					2 •Focus here on design methods and processes
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Half Term 6	Topics	Getting to Grips with Food	Exploring Food & Nutrition	Exploring food	ST1. Manufacturing processes in timber or SP2. Alternative manufacturing processes for different scales of production in papers and boards C3. Analysing a product specification criteria. C4. Write a product specification criteria 6. Non exam assessment (NEA)	Exam techniques- range of topics	1. Product design and development (TP) 2. NEA	1. Responsible Design 2. External exams (Paper 1 and 2)
	Knowledge and skills	Where bacteria can be found Personal Hygiene Food Hygiene Food Safety Knife Skills Weighing & measuring ingredients Using the cooker Heat transfer Sensory evaluation Working hygienically Use of basic equipment Reading a recipe	Temperature control Where food comes from Staple foods The Eatwell Guide Macro & micro-nutrients Energy balance What is on a label Environmental issues Working hygienically and safely with high risk foods Use of basic and electrical equipment Completing time plans		NEA related skills		1. Product development fitness for purpose, accuracy of production, consideration of aesthetics, ergonomics and anthropometrics	