



Key Stage 3 Design Technology Curriculum Map

Year 7 (Rotations)



Term	Substantive Knowledge (Intent) This is the specific, factual content for the topic, which should be connected into a careful sequence of learning.	Disciplinary Knowledge (Skills) (Implementation) This is the action taken within a particular topic in order to gain substantive knowledge.	Assessment opportunities (Impact) What assessments will be used to measure student progress? Evidence of how well students have learned the intended content.
Year 7 Rotation 1	<p>Intent This is an introduction of Isometric, shading skills, one point and two-point perspective. In year 7 this does not have to be to scale or exact measurements. The main objective is to create 3D object using shapes.</p> <p>Introduction CAD and Drawing Skills Introduction different types of drawing techniques and explore different examples. Introduce the crating technique. Learn the basics of <u>crating</u> and sketching. Isometric Shading Drawing Shapes in Isometric 2D Design Introduction – Basic Shapes Bookmark task in 2D Design Butterfly Room Plan Reflect on Skills</p>	<ul style="list-style-type: none">• Understand different types of drawing techniques and how to apply them.• To develop an understanding of freehand and crating sketching strategies.• To be able to use the crating method to draw an object in 3D and 2D.• To be able to make an effective drawing of an object.• Understand how to use isometric drawings to show measurements and how components fit together.• Explore different rendering and shading techniques.• To understand the basics of 2D design• To understand the advantages and disadvantages of CAD	<p>Baseline Test – Still life drawing</p> <p>Fortnightly homework</p> <p>Classwork Marked</p> <p>Peer and self-assessment</p> <p>End of project assessment (Final Piece)</p>
Year 7 Rotation 2	<p>Intent Card engineering – To be able to learn different methods of cutting and folding (different types of folds) to create a moving 3D shape once the books has opened.</p>	<ul style="list-style-type: none">• Understand what a Popup book is targeted users.• Learn how to produce an inspiration page and how it can be used.• Planning and visually organising thoughts through story boarding, to enable pupils to see a story from different perspectives.	<p>Fortnightly homework</p> <p>Classwork Marked</p> <p>Peer and self-assessment</p>

	<p>A link with literacy as the pupils has to plan and create their own story.</p> <p>POPUP Book Introduction to Pop up books and story ideas How inspiration & Storyboard creation The definition of graphics & what make a good storyboard page. Learn the basics of rendering and page layout Analysis a story book cover. Identify good & bad page layout and how this happens Introduction to Mechanisms Learn how to make Mouth Cut & Page layout Learn how to evaluate each other's work. Evaluate own work and skills in relation to GCSE. Unit test of Knowledge learnt</p>	<ul style="list-style-type: none"> • Demonstrating an understanding of the design process, critical thinking skills, research methodologies and creative ideation as a means of problem-solving and enhancing visual communication. • To be able to understand how to use innovative layout and enhance the reader's experience. • To incorporate box folds, mouth folds, sliders, lift-up flaps, rotators and paper springs in their designs • Demonstrate joining methods of paper & card for prototype manufacture. • Practice test condition and understanding Q&A. <p>To think reflectively about their work, evaluate their finished projects or prototypes in order to test whether they work well and if the design can be improved.</p>	<p>End of project assessment (Final Piece)</p>
<p>Year 7 Rotation 3</p>	<p><u>Intent</u></p> <p>This project is designed to build pupils knowledge of production when working with engineering materials (metal). The project introduces different skills sets that are required in the real world, when working with mild steel. The project will cover the Tools and Equipment, Technical Knowledge and the Skills in the Manufacture of the bottle opener.</p> <p><i>The Bottle Opener</i></p> <p>Introduction to the project What is a Background Problem/Need? Discussion To be able to use Write a Design Brief and Specification H&S Rules of the Workshop Write down what Background Problem/Need for the product Write a Design Brief & Specification Introduction the Working Drawings Risk Assessment Concise production schedule Materials and Manufacturing Techniques Mild steel and Corian</p>	<ul style="list-style-type: none"> • Designers use a brief to give them guidance and focus. • A brief help define the design problem and gives details on important considerations and constraints. • Select and use tools and equipment safely and accurately in order manufactures a high-quality prototype that demonstrated the skills taught. • To understand the importance of design briefs and specifications. • To develop qualitative criteria and constraints for briefs. • To understand how designers use a working drawing to help them build a project and why it is used in the project. • To understand the properties of mild steel • To learns about manufacturing techniques and safe working procedures in the workshop. • Test, recorded results and include modifications for improvement. • To think reflectively about their work, evaluate their finished projects or prototypes 	<p>Fortnightly homework</p> <p>Classwork Marked</p> <p>Peer and self-assessment</p> <p>End of project assessment (Final Piece)</p>

		to test whether they work well and if the design can be improved.	
Year 7 Rotation 4	<p><u>Intent</u> Learning about electronic components and how they can be used to build a circuit. This included capacitors, resistors, and LEDs. Main techniques taught are drilling PCBs and soldering in components for a circuit that they have designed. Pupils simulate the circuit-on-circuit wizard before – to check that it works. In addition, they learn about plastic forming and laser cutting in CAD.</p> <p>Message Board Assessment criteria Header sheets for PP Basic electronics: voltage (battery- Input), current, resistance, Ohms law, Resistors How to use 2D design How to vectorise an image Drawing to scale Vectorising, Offset lines, Known Ø circles, Filleting, text, fill & line colour Colour coded cutter control. Knowledge of thermoplastics & thermosets. Able to line bend acrylic How to setup and use the Laser Cutter Line Bending Test Peer evaluation Self-evaluation</p>	<ul style="list-style-type: none"> • Understanding of circuit block diagram as input, process, output • Appreciation of capacitors • To be able to explore the importance of designing an authentic product for a client, to meet their specific need. • Understanding of how electronic products are assembled. • Investigate the different types of plastics and their used in design technology. • To be able to define scale drawings and identify real life applications of scale drawings. • Consolidate theory and practical skills from unit. • To learns about manufacturing techniques and safe working procedures in the workshop. • Test, recorded results and include modifications for improvement. • To think reflectively about their work, evaluate their finished projects or prototypes to test whether they work well and if the design can be improved. 	<p>Fortnightly homework</p> <p>Classwork Marked</p> <p>Peer and self-assessment</p> <p>End of project assessment (Final Piece)</p>



Key Stage 3 Design Technology Curriculum Map

Year 8 (Rotations)



Term	Substantive Knowledge (Intent) This is the specific, factual content for the topic, which should be connected into a careful sequence of learning.	Disciplinary Knowledge (Skills) (Implementation) This is the action taken within a particular topic in order to gain substantive knowledge.	Assessment opportunities (Impact) What assessments will be used to measure student progress? Evidence of how well students have learned the intended content.
Year 8 Rotation 1	<p>Intent Students are introduced to a range of different process such a drilling, these are included on the speciation for NCFE Engineering.</p> <p>Students are given 'design freedom' and encouraged to use a variety of skills and materials in their final piece. Being able to come up with design solutions independently is an important skill required at KS4.</p> <p>Block Head Design brief, Isometric Recap: Visual communication Initial design ideas (Theme, accessories, colour theme) Rendering Techniques (Tone, shading, highlight and shadow) Surfaces and textures Design development Oblique Orthographic, Dimensioning CAD Designs NETs Project Plan Tools and equipment, tenon saw, coping saw, wood bench, lazer cutter and file. Pillar Drill RA</p>	<ul style="list-style-type: none">• Drawing scale, freehand drawing think & thin line 3D shapes.• Drawing in isometric / Oblique / Rendering .• To understand the importance of rendering surfaces and textures in the design process as a way to communicate their ideas with non-designers.• To build upon previous rendering skills learnt in year 7 and apply them to recording different surfaces and textures.• To understand the concept of orthographic projection.• Recording designs from multiple perspectives.• Test and review work / Drawing Skills Evaluate.• Select and use tools and equipment safely and accurately in order manufactures a high-quality prototype that demonstrated the skills taught.• To be able to use CAD to refine a design/ designs.• To be able to make changes which improve the product in some way.• To understand the different properties and understand why soft wood is used.• Understand how to identify units of measure and how to convert them. Label dimensions correctly on a steel rule.	<p>Baseline Test – Still life drawing</p> <p>Fortnightly homework</p> <p>Classwork Marked</p> <p>Peer and self-assessment</p> <p>End of project assessment (Final Piece)</p>

	<p>Marking out work Making Finishing Evaluation</p>	<ul style="list-style-type: none"> • Using hand tools in metal work to mark lines on workpieces prior to machining and cutting. • To recognise hazards in a Design and Technology environment. • Respond appropriately to safety rules, signs and other safety instructions. • To understand the role of making in design technology. • Explore how to convert a material in a useable product and improve it's performance through finishing. • Test, recorded results and include modifications for improvement. • To think reflectively about their work, evaluate their finished projects or prototypes to test whether they work well and if the design can be improved. 	
<p>Year 8 Rotation 2</p>	<p><u>Intent</u> <i>The focus of the project is on mechanism, leavers and linkages. Pupils plan and build a litter picker that is themed. Project is approached in two ways. The head can be laser cut or traditionally by hand Grabber/litter Picker</i></p> <p>Design and make a product using mechanism that can pick up a variety of litter or grab an object.</p> <p>Introduction to the project To be able to plan work effectively. To be able to use research to inform design. Write a Design Brief that outlines the needs of the user Write a specification that identifies key areas for design and manufacture Produce a range of ideas for the grabber head and handle Ideas evaluated against the specification Develop Idea and draw in 2D design using the template Set up and use the laser cutter Cutting using Hand tools and the Fret Saw Drilled Holes Finishing Take photos of work for Diary</p>	<ul style="list-style-type: none"> • To be able to explore the importance of designing an authentic product for a client, to meet their specific need. • To build upon drawing techniques learnt in year 7 and to incorporate more complex techniques in the work. • To explore in more depth the importance of designing an authentic product for a client, to meet their specific need. • To demonstrate a working knowledge of visual design and composition principles through the use of 2D design. • To ensure more accurate marking out when producing a product. • To understand in more depth the process of transferring a design onto a material or workpiece before manufacturing begins. • To understand levers and linkages are used and how they need to be attached in the making of a product. • Cut Mild steel and/or Aluminium modelling wire. • Using photographs to record the making process visually. • Explore how to convert a material into a useable product and improve it's performance through finishing. 	<p>Fortnightly homework</p> <p>Classwork Marked</p> <p>Peer and self-assessment</p> <p>End of project assessment (Final Piece)</p>

	<p>Testing of final product including evaluation against the design specification.</p>	<ul style="list-style-type: none"> To recognise hazards in a Design and Technology environment. Respond appropriately to safety rules, signs and other safety instructions. To identify the health and safety requirements when using a pillar drill. Show evidence of through testing of the final product against the specification. 	
<p>Year 8 Rotation 3</p>	<p><u>Intent</u></p> <p>A resistant materials workshop that builds a casing for the circuit. The materials used are acrylic tubing, pine, and plywood. They learn about different treatments for different materials.</p> <p>They then build an electronic circuit that build upon the basic (capacitors and resistors) by introducing and LDR sensor.</p> <p>Light Sensor Project [Electronics and Design Technology]</p> <p>Understand what voltage, current and resistance are, and know their units and symbols. Know what a resistor and an LED is, and why resistors are needed with LEDs. Understand what a breadboard is and how to use it to be able to build a simple circuit. Understand what a voltmeter is and how to use it. Understand that voltages around a circuit add up. Be able to recognise when components are in series or in parallel. Recognise the symbols for cells, batteries, resistors, LEDs and volt meters. Pillar drill RA Marking out work Making Finishing Evaluation</p>	<ul style="list-style-type: none"> Manufacture a Light Sensor using Circuits and main body manufactured using resistant materials in the Workshop. To develop an understanding of electronic circuits and systems. Join and combine additional materials and components accurately in temporary and permanent ways. To design, use and interconnect simple mechanical, electrical, electronic and pneumatic systems and sub systems. To use sensors in switching circuits. To understand in more depth the process of transferring a design onto a material or workpiece before manufacturing begins. Understanding electronic components, soldering, parallel/series circuits, diagrams and symbols. To refine construction of parts, marking out, cutting assembling and finishing. To be able to draw upon their own experiences in order to make decisions. To become proficient in the skilled use of hand tools and equipment. Understanding and making effective lighting units. To recall the health and safety requirements when using a pillar drill, hand tools and other equipment. Test, recorded results and include modifications for improvement. To think reflectively about their work, evaluate their finished projects or prototypes to test whether they work well and if the design can be improved. 	<p>Fortnightly homework</p> <p>Classwork Marked</p> <p>Peer and self-assessment</p> <p>End of project assessment (Final Piece)</p>

<p>Year 8 Rotation 4</p>	<p><u>Intent</u></p> <p>Design and make task in which students investigate a specific design style or movement to manufacture a clock for a specific space. This task focuses on students understanding of how design styles from the past influence current trends and products. Students will have the opportunity to be creative in their approach to design.</p> <p>Design Movement Clock</p> <p>Introduction to the project To be able to plan work effectively. To be able to use research to inform design. Design Situations Product analysis Design Movements research Write a Design Brief that outlines the needs of the user Write a specification that identifies key areas for design and manufacture. Produce a range of ideas for the clock face. Modelling and prototypes process. Intermediate use of CAD Ideas evaluated against the specification. Product making using a range of materials and techniques. Marking out work Making Finishing Evaluation</p>	<ul style="list-style-type: none"> • Use a range of sources when researching, showing selectivity and analytical skills. • Demonstrate innovation and creativity in response to a need/problem, using a range of 2D and 3D techniques. • Select and use tools and equipment safely and accurately in order manufactures a high-quality prototype that demonstrated the skills taught. • To be able to demonstrate the ability to reflect critically throughout the design process showing an understanding for modification and improvement. • Demonstrate technical knowledge of materials and mathematical knowledge through measurements. • Understand developments in Design Technology, their ecological and social footprint with an awareness of the impact on society. • Test, recorded results and include modifications for improvement. • To think reflectively about their work, evaluate their finished projects or prototypes to test whether they work well and if the design can be improved. 	<p>Fortnightly homework</p> <p>Classwork Marked</p> <p>Peer and self-assessment</p> <p>End of project assessment (Final Piece)</p>
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Key Stage 3 Design Technology Curriculum Map

Year 9 (Rotations)



Term	Substantive Knowledge (Intent) This is the specific, factual content for the topic, which should be connected into a careful sequence of learning.	Disciplinary Knowledge (Skills) (Implementation) This is the action taken within a particular topic in order to gain substantive knowledge.	Assessment opportunities (Impact) What assessments will be used to measure student progress? Evidence of how well students have learned the intended content.
Year 9 Rotation 1	<p>Intent</p> <p>Client based project. Pupils design the shell of the house as the main focus. They build upon the one point and two point perspective drawing skills. In this instance they draw to scale – they did not do this in year 7.</p> <p><i>Pupils build upon the skills learnt in the pop book. In year 7 they learnt about folding – year 9 they look at different way of joining and gluing work to a higher finish.</i></p> <p>Architectural House Design</p> <p>Introduction to the project Follow a set brief Work to a clients needs To be able to plan work effectively. Using grid squares to design floor plans. Concept sketches Site analysis Modelling to scale Modelling materials and equipment Interior spaces Final Model Presentation of model</p>	<ul style="list-style-type: none">• Site survey and interpretation, and to respond creatively to places/ relationships between the building proposition and its site context, social and cultural context.• Use a range of sources when researching, showing selectivity and analytical skills.• Demonstrate innovation and creativity in response to a need/problem, using a range of 2D and 3D techniques.• Understand the process of design, including brief, concept, and design development and final proposal.• To introduce architectural design as a creative blend of conceptual and analytical considerations.• To investigate scale, materiality, site and cultural contexts, through observations, speculations, design iterations. To develop design strategies and propositions.• To experiment with architectural ideas, and the critical and presentational skills needed to explore, develop and communicate architectural designs effectively.• To introduce a set of skills in the context of architectural design through drawing, model making, manual and digital representation techniques, portfolio presentation including the use of CAD.• Students will consider the broad human and physical factors to be taken into account in the	<p>Baseline Test – Still life drawing</p> <p>Fortnightly homework</p> <p>Classwork Marked</p> <p>Peer and self-assessment</p> <p>End of project assessment (Final Piece)</p>

		<p>design process and why a range of structures are designed as they are.</p> <ul style="list-style-type: none"> Students will explore the wider factors which need to be taken into consideration during the design process and apply knowledge and understanding of exploring alternative design solutions. Research into a range of design factors, including economic, social and aesthetics influencing the design process and how these elements have developed and changed over time and how they directly affect the spaces around us. To be able to produce a model to scale. To think reflectively about their work, evaluate their finished projects or prototypes to test whether they work well and if the design can be improved. 	
Year 9 Rotation 2	<p><u>Intent</u></p> <p>A focus on electronics – building upon your basic components by including chips that count. This time they look at how they can securely mount the PCB safely. They work from a template and have to have holes drilled in the correct position in order for components to fit.</p> <p>This is a re-cap on the techniques that they learnt in year 7.</p> <p>Steady Hand Game [Electronics with Design and Technology]</p> <p>Focus on the user requirements for the Steady Hand Game.</p> <p>Recap on CAD skills in 2D Design.</p> <p>Design an acrylic enclosure for our circuit that appeals to the user and securely mounts the PCB.</p> <p>To understand workshop health, safety and expectations.</p> <p>Why do we use PCBs, and how are they made?</p> <p>Recap on how to drill Printed Circuit Boards (PCBs).</p> <p>To create and use a drilling Risk Assessment.</p>	<ul style="list-style-type: none"> To build upon existing knowledge and understanding of electronic circuits and systems. Join and combine additional materials and components accurately in temporary and permanent ways. To design, use and interconnect simple mechanical, electrical, electronic and pneumatic systems and sub systems. To understand that a printed circuit board is an essential part of any electronical product. To understand how to use a PCB in a project. To understand in more depth the process of transferring a design onto a material or workpiece before manufacturing begins. Understanding electronic components, soldering, parallel/series circuits, diagrams and symbols. To refine construction of parts, marking out, cutting assembling and finishing. To understand the process of line bending and how it can be used to make precise folds in plastic components To become proficient in the skilled use of hand tools and equipment. Understanding and make an steady hand game. To recall the health and safety requirements when using a line bender, hand tools and other equipment. Test, recorded results and include modifications for improvement. 	<p>Fortnightly homework</p> <p>Classwork Marked</p> <p>Peer and self-assessment</p> <p>End of project assessment (Final Piece)</p>

	Pillar Drill RA Marking out work Making Finishing Evaluation	<ul style="list-style-type: none"> To think reflectively about their work, evaluate their finished projects or prototypes to test whether they work well and if the design can be improved. 	
Year 9 Rotation 3	<p>Intent</p> <p>A station is made using recycled materials not new materials. This is the first time that sustainability has been brought into their learning.</p> <p>This modelling task that builds on their knowledge of a range of resistant materials. <i>It is more specific this time as they must manufacture a clamp from mild steel that must be attached to their product.</i> [This task revisits skills taught in year 7 for the bottle opener]</p> <p>Mobile Device Holder</p> <p>Design and make a product that will hold a Mobile phone while charging. Make a Valet station that will support a range of products with the focus on Repurposing and Recycling Materials [sustainability]</p> <p>Introduction to the project Research. Understand the requirements of a Design Brief and how to write a specification [Measurable and Technical] Identify the Investigate Design Possibilities. To understand workshop health, safety and expectations. Marking out work Making Finishing Evaluation</p>	<ul style="list-style-type: none"> To explore in more depth the importance of designing an authentic product for a client, to meet their specific need. Research into a range of design factors, including economic, social and aesthetics influencing the design process and how these elements have developed and changed over time. To be able to use research to inform design. Pupils will learn that prototypes help designers learn about the manufacturing process of a product, how people will use the product, and how the product could fail or break. Identify common materials suitable for laser cutting, and their use in manufacturing of materials. Development, testing and Modelling of a product. To be able to photograph of a model and evaluate against the specification. To become proficient in the skilled use of hand tools and equipment. Understanding and make a mobile device holder To learn about the different ways in which we can join materials together and to practise these techniques. To recall the health and safety requirements when using a line bender, hand tools and other equipment. Test, record results and include modifications for improvement. To think reflectively about their work, evaluate their finished projects or prototypes to test whether they work well and if the design can be improved. 	Fortnightly homework Classwork Marked Peer and self-assessment End of project assessment (Final Piece)

<p>Year 9 Rotation 4</p>	<p><u>Intent</u></p> <p><i>Vacuum forming is introduced for the first time</i> and pupil's upcycle an everyday product (water bottle or jam jar). The Vacuum folder creates the hopper in the project.</p> <p><i>Students explore more complicate mechanism such as cams, gears, cranks, and sliders. They have previously only looked at leavers and linkages in year 8.</i></p> <p>Mechanisms [Mechanical Toy/Sweet dispenser] Create a product that will dispense sweets using different types of mechanisms. The types of movement will be Linear, Reciprocating, Rotary and Oscillation. Students will reuse bottles or jars as the main hopper as part of links with recycling and repurposing.</p> <p>The main areas of focus that are linked to GCSE Design and Technology Research Analysis Development Technical Planning Modifying Make Reflect</p>	<ul style="list-style-type: none"> • To explore the importance of designing an authentic product for a client, to meet their specific need. • Research into a range of design factors, including economic, social and aesthetics influencing the design process and how these elements have developed and changed over time. • To be able to use research to inform design. • To learn that task analysis is one of the most critical components in which learning goals, objectives, types of task and requirements to perform the specific tasks are identified. • To be able to use the specification in order to produce a first draft . • Demonstrate innovation and creativity in response to a need/problem, using a range of 2D and 3D techniques to produce fully annotated and rendered initial ideas. • To consider the characteristics of the cam mechanism when designing the moving part of their toy. • To demonstrate and build upon a range of drawing techniques learnt in year 7 and 8 (Oblique, Isometric etc.) • To recognise the movement of a mechanism within a toy or model. • To understand that a cam will change rotary motion into linear motion. • To understand that different shaped cams produce different movements. • To understand the relationship between a cam and a follower • To learn about the different ways in which we can join materials together and to practise these techniques. • To recall the health and safety requirements when using a line bender, hand tools and other equipment. • Test, recorded results and include modifications for improvement. • To think reflectively about their work, evaluate their finished projects or prototypes to test whether they work well and if the design can be improved. 	<p>Fortnightly homework</p> <p>Classwork Marked</p> <p>Peer and self-assessment</p> <p>End of project assessment (Final Piece)</p>
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