KS3 Design and Technology SOL

Introduction to the Key Stage 3 Design and Technology Curriculum

Welcome to the Key Stage 3 Design and Technology Scheme of Learning. This programme has been carefully developed to provide a rich, engaging foundation in D&T, using project-based learning as the driving force behind skill development, creativity, and critical thinking. Across all three years, students are encouraged to design, make, test, and evaluate products through a series of hands-on projects that reflect real-world challenges and opportunities.
Our approach is rooted in the belief that Design and Technology should be practical, purposeful, and inspiring. Therefore, theory is not taught in isolation but embedded within practical contexts — allowing students to apply knowledge as they learn it. This "theory in action" model helps students gain a deeper understanding of materials, tools, and processes, while also fostering problem-solving, teamwork, and independent thinking.

Key Stage 3 Overview: Building Creative Confidence and Technical Skill

Throughout Key Stage 3, students engage in a carefully structured sequence of project-based learning experiences that build creative confidence, practical capability, and design thinking. Projects range from working with traditional materials like timber in Year 7, to exploring CAD/CAM, graphics, and modern manufacturing techniques in Year 8, and culminating in more complex, user-focused products in Year 9, such as electronic night lights and amplifiers. Each project is designed to integrate core theory with hands-on application, giving students meaningful opportunities to explore materials, tools, design processes, and problem-solving in real-world contexts. By the end of KS3, students will have developed a broad and balanced foundation in Design and Technology, equipping them with the skills, knowledge, and mindset to progress confidently into GCSE and beyond.

Our Vision

This Key Stage 3 curriculum lays the groundwork not only for success at GCSE, but for a lifelong appreciation of design, innovation, and problem-solving. By combining **creative freedom with technical discipline**, our programme empowers students to see themselves as designers and makers — ready to shape the world around them with curiosity, empathy, and confidence.

KS2	***National Curriculum KS2:*** Students should have been taught the knowledge, understanding and skills needed to engage in an iterative process of designing and making. Students should have worked in a range of relevant contexts, for example, the home, school, leisure, culture, enterprise, industry and the wider environment. When designing and making, students should have been taught to: Design, make, evaluate throughout and apply the technical knowledge, for example: Material properties, mechanical systems. ***Explanation of Prior Knowledge and Experience in KS2 from the local catchment area:*** ***1. Limited Exposure to Design and Technology:*** • In Key Stage 2 (KS2), D&T tends to be less emphasised compared to subjects like Maths, Science, and English. While students may have had some basic exposure to making simple models or basic crafts, they haven't often worked with materials like wood, metal, or plastics in a structured design context. • The design process in KS2 often focuses on creative, hands-on activities, but without the more technical aspects such as precision, technical drawing, or workshop safety, which are introduced more deeply in KS3. ***2. Strength in Maths and Science:*** • Many KS2 students develop a stronger understanding of Maths and Science due to the reasoning, problem-solving, and a clear, methodical approach to understanding concepts. These skills naturally transfer well to D&T, where students must apply mathematics (e.g., measurements, geometry, angles) and scientific knowledge (e.g., material properties, forces, energy) when designing and creating their products. • Problem-solving skills in Maths and Science often carry over to D&T, allowing students to approach the technical challenges of a project (like cutting materials, calculating dimensions, or understanding the forces at play in a structure). ***3. Weaker English Skills:*** • Although students in KS2 are generally developing their reading, writing, and communication skills, many may not have reached the level of fluency or confidence needed to fully express their design ideas through written evaluations, technical drawings, and detailed project reflections, which are a core part of KS3 D&T. • Language-based skills, such as how to describe processes, use technical vocabulary, or reflect critically on their work, are areas that need more attention and development in the transition from KS2 to KS3. This is not due to a lack of ability, but rather the way D&T is integrated into their primary curriculum.

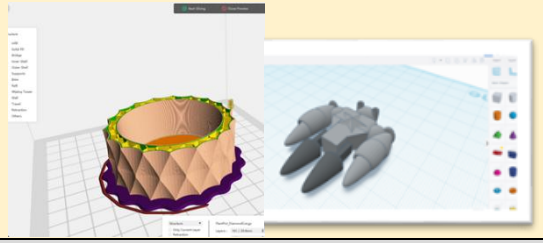
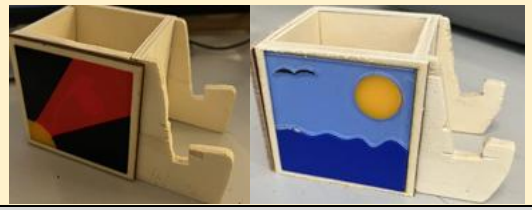
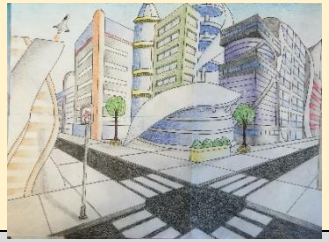
KS3 Year 7	**Design and Technology:** **Puzzle Project**  	**Design and Technology:** **Photo Frame Project**  
Students will have 4 rotations in the year, giving students the opportunities to experience all areas of Technology including: **Design and Technology**, **Food Preparation and nutrition.**	**Students will know that**	
	Design: • Isometric projection is a method for drawing and object in 3D. **Make:** • There are a wide range of hazards and precautions relating to Health and Safety in the Design and Technology workshop and how this relates to workshop rules. • There is a wider range of personal protective equipment (PPE) when working in the Design and Technology Workshop. • There are tools for marking out/measuring materials. (Specifically: Steel Rule, Try Square, Engineering Set Square) • There are tools/Machines for cutting/Drilling materials. (Specifically: Tenon Saw and Coping Saw) • There are tools/Machines for shaping and forming materials. (Specifically: Files, Abrasive Paper/Blocks, Belt Sander/ Disc Sander) • There are tools for holding materials. (Specifically: Bench Vice, G Clamp) **Evaluate:** • Quality control is essential part of the manufacturing process. • Products are evaluated against a specification. **Technical Knowledge:** • There are different types of materials: Timbers, Metals, Papers/Boards, Polymers and Textiles.	**Design:** • Exploded views are a way applying Isometric projection to show how all the parts of a product are related to each other. • 2D Design is a type of computer Aided Design (CAD) can be used for 2D and 3D drawing. **Make:** • There are a wide range of hazards and precautions relating to Health and Safety in the Design and Technology workshop and beyond. • There are a range of different types of safety signs in the workshop. • There is a wider range pf personal protective equipment (PPE) when working in the Design and Technology Workshop. • There are tools for marking out/measuring materials. (Specifically: Steel Rule, Try Square, Engineering Set Square) • There are tools for cutting materials. (Specifically: Tenon Saw) • There are tools for shaping and forming materials. (Specifically: Files, Abrasive Paper/Blocks, Belt Sander/ Disc Sander, Line Bender) • There are tools for holding materials. (Specifically: Bench Vice, G Clamp) • Adhesives can be used as a joining method for timber. (Specifically: Wood Glue and Glue Guns) **Evaluate:** • Quality control is used at different stages of the manufacturing process. • Products are tested and evaluated against a series of specification points, using ACCESS FM.

	• There are 3 main types of timbers: Hardwoods, Softwoods and Manufactured boards. • MDF stands for Medium Density Fibreboard. • There are different types of Paper and Boards.	**Technical Knowledge:** • That there are different material properties of various types of timbers (Specifically Pine is used in the photo frame project) • That there are two main types of plastic Thermoforming and Thermosetting. • There are Coniferous and Deciduous trees linking to Hardwoods and Softwoods. • Sustainability is a major factor when selecting materials. • There are different types of energy sources (Linking to product manufacture)
	Students will know how	
	Design: • To draw accurately using Isometric projection to show designs in 3D. **Make:** • To identify hazards and precautions relating to Health and Safety in the Design and Technology workshop and how they correspond to workshop rules. • To select the correct personal protective equipment (PPE) when working in the Design and Technology Workshop. • To mark out accurately using the following tools Steel Rule, Try Square, Engineering Set Square when marking out/measuring materials. • To cut accurately when using Tenon Saw and Coping Saw. • To drill accurately when using a pilar drill/ hand drills. • To remove and smoothen materials using Files, Abrasive Paper/Blocks, Belt Sander/Disc Sander. • To select the correct tools for holding materials such as Bench Vices, G-Clamps. **Evaluate:** • Check and inspect work to ensure Quality throughout the making stages. • Evaluate Products against a simple specification. **Technical Knowledge:** • Different products are made from different types of materials: Timbers, Metals, Papers/Boards, Polymers and Textiles. • Identify the main categories of timbers: Hardwoods, Softwoods and Manufactured boards.	**Design:** • To draw accurately using isometric projection to show an exploded view of the photo frame. • To use the basic features of 2D Design which is a type of CAD. **Make:** • To identify a wide range of hazards and precautions within the workshop. • To identify and understand the meaning of key signs in the workshop. • To use personal protective equipment (PPE) when working in the Design and Technology Workshop, specifically Goggles and an apron. • To mark out accurately using the following tools Steel Rule, Try Square, Engineering Set Square when marking out/measuring materials. • To use a Tenon Saw when cutting straight lines in timber. • To smoothen material using Files, Abrasive Paper/Blocks and the Belt/Disc sander. • To select the correct tools for holding materials such as the Bench Vice and G-Clamps. **Evaluate:** • Check and inspect work to ensure Quality throughout the making stages. • Evaluate Products against a more detailed specification. **Technical Knowledge:** • Different types of timbers have different uses according to their material properties. • Identify the differences between Thermoforming and Thermosetting Plastics.

	• Paper and Boards have different uses.	• To identify Coniferous and Deciduous trees linking to Hardwoods and Softwoods. • Sustainability is a key factor when selecting materials. • To identify renewable and non-renewable energy sources.
	Vocabulary and the concepts they link to	
	Tier 3: Hardwoods, Softwoods, ferrous and non-ferrous metals, thermoplastic, thermosetting, Isometric, Tolerance, PPE Personal protective equipment. **Teir 2:** Analyse, evaluate, design, function, innovation, manufacture, model, modify, resources, specification, technique, structure, concept, criteria, process, assess, solution, adapt, function, sustainability, material, solution, mechanism, structure, innovation, prototype.	**Tier 3:** Hardwoods, Softwoods, manufactured, Deciduous, Coniferous, ferrous and non-ferrous metals, thermoplastic, thermosetting, Isometric, Tolerance, PPE Personal protective equipment, adhesive, isometric projection. **Teir 2:** Analyse, evaluate, design, function, innovation, manufacture, model, modify, resources, specification, technique, structure, concept, criteria, process, assess, solution, adapt, function, sustainability, material, solution, mechanism, structure, innovation, prototype.
	Assessment	
	• **Formative assessment:** Baseline practical activity to assess where their Design and Technology skills are from KS2, due to students not being exposed to the workshop at KS2. • **Formative Assessment:** Ongoing teacher observations during practical tasks, use of assessment grids. • **Formative Assessment:** Ongoing self and peer assessment during practical tasks, use of assessment grids. • **Formative Assessment:** Use of mini-white boards, Low stake quizzes, exit tickets. • **Summative Assessment:** Final OCC Puzzle product, technical drawings in Isometric projection, and written evaluation. • **Summative Assessment:** At the midpoint of the 10-week rotation, students will complete a focused in-class assessment covering key areas of learning. The results will be used to identify misconceptions, address gaps in knowledge, and inform next steps through dedicated DIRT (Dedicated Improvement and Reflection Time) activities.	• **Formative Assessment:** Ongoing teacher observations during practical tasks, use of assessment grids. • **Formative Assessment:** Ongoing self and peer assessment during practical tasks, use of assessment grids. • **Formative Assessment:** Use of mini-white boards, Low stake quizzes, exit tickets. • **Summative Assessment:** Final Photo Frame product, technical drawings in Isometric projection to show an Exploded Projection, and written evaluation. • **Summative Assessment:** At the midpoint of the 10-week rotation, students will complete a focused in-class assessment covering key areas of learning. The results will be used to identify misconceptions, address gaps in knowledge, and inform next steps through dedicated DIRT (Dedicated Improvement and Reflection Time) activities.
	Diversity & development of cultural capital	

	• Exposure to diverse cultures when looking at design influences. Development of practical skills with a global context. • Collaborative and inclusive learning, group work, inclusivity design. • Real-world and historical context: Evolution of design and technology, how technology affects global cultures. • Development of key skills: Critical thinking, innovation. • Understanding of the importance of sustainability • Exposure to designers and innovative ideas and manufacture. • Exposure to a wider range of career options.	• Exposure to diverse cultures when looking at design influences. • Development of practical skills with a global context. • Collaborative and inclusive learning, group work, inclusivity design. • Real-world and historical context: Evolution of design and technology, how technology affects global cultures. • Development of key skills: Critical thinking, innovation. • Understanding of the importance of sustainability • Exposure to designers and innovative ideas and manufacture. • Exposure to a wider range of career options.
	Cross-curricular opportunities and enrichment	
	• Cross curricular opportunities, science: Material properties, sustainability. • Cross curricular opportunities, mathematics: Measurement and geometry. • Cross curricular opportunities art: Sketching and rendering • Cross curricular opportunities History: Design evolution, cultural. • Cross curricular opportunities geography: Global resources, global design. • Cross curricular opportunities Computing and ICT: CAD, Digital research. • Cross curricular opportunities English: Presentation and Communication of design ideas, evaluation. • Cross curricular opportunities Citizenship and PSHE: Collaboration. • Cross curricular opportunities STEM. • KS3 Design and Technology club. • Allows students to prepare for future careers, many industries require the skills and knowledge that are the foundations of DT education. Allowing students to be exposed to the various areas of DT, prepares students for a career path in engineering, design, manufacture and beyond.	• Cross curricular opportunities, science: Material properties, sustainability. • Cross curricular opportunities, mathematics: Measurement and geometry. • Cross curricular opportunities art: Sketching and rendering • Cross curricular opportunities History: Design evolution, cultural. • Cross curricular opportunities geography: Global resources, global design. • Cross curricular opportunities Computing and ICT: CAD, Digital research. • Cross curricular opportunities English: Presentation and Communication of design ideas, evaluation. • Cross curricular opportunities Citizenship and PSHE: Collaboration. • Cross curricular opportunities STEM. • KS3 Design and Technology club. • Allows students to prepare for future careers, many industries require the skills and knowledge that are the foundations of DT education. Allowing students to be exposed to the various areas of DT, prepares students for a career path in engineering, design, manufacture and beyond.
	Wider reading and enrichment	
	• DT BBC bitesize theory: KS3 Technology and Design - BBC Bitesize • DT BBC bitesize careers: Jobs that use Design and Technology – Careers – BBC Bitesize • School library various books and in school careers advisor. • What is Design and Technology? Video: https://www.youtube.com/watch?v=4lLSEDVSAp4 • How to draw in Isometric basics: https://www.youtube.com/watch?v=gpEA7qqBgRE • **Home-learning Puzzle project (Senaca):** Health and Safety, Timber and Manufactured boards, Metals, Polymers, Textiles, Papers and Boards.	

	• **Home-learning Photo-frame project (Senaca):** Material mechanical properties, Material Physical Properties, Material Typical properties, Selecting materials, Timber and Manufactured boards, Energy, Sustainability.

KS3 Year 8	**Design and Technology:** **CAD/CAM** 	**Design and Technology:** **Desk Tidy** 	**Design and Technology:** **Graphics** 
Students will have 4 rotations in the year, giving students the opportunities to experience all areas of Technology including: **Design and Technology, Food Preparation and nutrition.**	**Students will know that**		
	Design: • Tinker Cad, Autodesk inventor, 2D Design is a type of Computer Aided Design (CAD) • There are different features when using the CAD software; Placing, moving, viewing, rotating, solid and hole shapes, grouping, duplicating, copying, aligning, creating holes. **Make:** • 3D printing is a type of computer aided manufacture (CAM) • There are keys stages in the manufacturing process when using 3D printers. **Evaluate:** • There are positives and negatives to using computer Aided Design (CAD)	**Design:** • Freehand sketching is a great way to quickly get first ideas down on paper in 2D or 3D. • Orthographic projection is a way to draw 3D objects in 2D. • 2D Design is a type of computer Aided Design (CAD) can be used for 2D and 3D drawing. Make: • There are a wide range of hazards and precautions relating to Health and Safety in the Design and Technology workshop and beyond. • There are a range of different types of safety signs in the workshop. • There is a wider range pf personal protective equipment (PPE) when working in the Design and Technology Workshop.	Design: • Oblique projection is a method of drawing in 3D using 45-degree lines. • Isometric projection is a method for drawing an object in 3D and each of the sides is drawn at 30-degree lines. • Crating is a sketching method that makes use of simple 3D geometric shapes, such as squares and rectangles, as guides to create more complex freehand sketches. • One-point perspective is a method of drawing in 3D and the objects are shown heading towards a single vanishing point on the horizon line. • Two-point perspective is a method of drawing in 3D and there are two vanishing points, one on each side of the horizon line. • Rendering is a way of applying the final finish to a design, which brings it to life with realistic effects.

	• There are positives and negatives to using computer aided manufacture (CAM) **Technical Knowledge:** • Automation is using computer technology to operate equipment. • CAD stands for Computer Aided Design. • CAM stands for Computer Aided Manufacture. • There are various advantages and Disadvantages when using CAD and CAM. • Enterprise is where individuals or organisations decide to do things differently. • Crowdfunding is a way of obtaining finance for a project by getting small amounts of money from lots of people. • Co-operatives are a business owned and managed by its workers. • Fairtrade is a movement that helps people in poor countries to get fair price for their products. • Virtual marketing is advertising online.	• There are tools for marking out/measuring materials. (Specifically: Steel Rule, Try Square, Engineering Set Square) • There are tools for cutting materials. (Specifically: Tenon Saw) • There are tools for shaping and forming materials. (Specifically: Files, Abrasive Paper/Blocks, Belt Sander/ Disc Sander) • There are tools for holding materials. (Specifically: Bench Vice, G Clamp) • Adhesives can be used as a joining method for timber. (Specifically: Wood Glue) • That we use jigs/templates to make sure all the parts are the exact same size. • Getting parts cut out/ engraved by the laser cutter (CAM) is more accurate. • Creating parts that fit together must be more precise to fit into each other. Evaluate: • Check and inspect work to ensure Quality throughout the making stages. • Evaluate Products against a more detailed specification. Technical Knowledge: • CAD stands for Computer Aided Design. • CAM stands for Computer Aided Manufacture. • There are various advantages and Disadvantages when using CAD and CAM. • What Polymers are and what they are made of. • The differences of Thermosetting and Thermoset plastics and the differences between them. • Modelling, reasons why and how it is used in industry.	• The various methods of drawing can be applied to design ideas when coming up with new products and graphical ideas.
	Students will know how		

	Design: • To use the different features of Tinker Cad software; Placing, moving, viewing, rotating, solid and hole shapes, grouping, duplicating, copying, aligning, creating holes. **Make:** • The process of 3D printing works. **Evaluate:** • To identify positives and negatives of using computer Aided Design (CAD) • To identify positives and negatives to using computer aided manufacture (CAM) **Technical Knowledge:** • Automation is a way of using computer technology to operate equipment. • To identify the various advantages and Disadvantages when using CAD and CAM. • Enterprise allows individuals and organisations to find different ways to design and manufacture products. • Crowdfunding is a different way of obtaining finance for a project by getting small amounts of money from lots of people and how this can help smaller companies or individuals. • Co-operatives are a business owned and managed by its workers. • Fairtrade helps workers have better pay and working conditions. • Virtual marketing allows companies and individuals to advertise and sell to people worldwide or a larger area.	**Design:** • Freehand sketching is a great way to quickly get first ideas down on paper in 2D or 3D. • Orthographic projection is a way to draw 3D objects in 2D. • 2D Design is a type of computer Aided Design (CAD) can be used for 2D and 3D drawing. Make: • To identify a wide range of hazards and precautions within the workshop. • To identify and understand the meaning of key signs in the workshop. • To use personal protective equipment (PPE) when working in the Design and Technology Workshop, specifically Goggles and an apron. • To mark out accurately using the following tools Steel Rule, Try Square, Engineering Set Square when marking out/measuring materials. • To use a Tenon Saw when cutting straight lines in timber and to use a Coping saw for my complex shapes. • To use a Henger saw to cut more complex shapes. • To smoothen material using Files, Abrasive Paper/Blocks and the Belt/Disc sander. • To select the correct tools for holding materials such as the Bench Vice and G-Clamps. • To use jigs/templates to make sure all the parts are the exact same size. • That getting parts cut out/ engraved by the laser cutter (CAM) is more accurate. • Know how to create parts that fit together accurately. Evaluate: • Check and inspect work to ensure Quality throughout the making stages.	Design: • To draw in Oblique projection in 3D using 45-degree lines. • To draw in Isometric projection in 3D and how each of the sides is drawn at 30-degree lines. • To draw in 3D using Crating to develop geometric shapes, such as squares and rectangles, as guides to create more complex freehand sketches. • To draw in One-point perspective. • To draw in Two-point perspective. • To apply different renders to show, tone, texture and shadows.

		• Evaluate Products against a more detailed specification. Technical Knowledge: • That CAD stands for Computer Aided Design. • That CAM stands for Computer Aided Manufacture. • There are various advantages and Disadvantages when using CAD and CAM. • How Polymers are formed and what they are made of. • There are differences between Thermosetting and Thermoset plastics. • How modelling helps produce better products.	
	Vocabulary and the concepts they link to		
	Tier 3: CAD Computer aided design, CAM Computer aided design, sustainability, Thermosetting, Thermoforming, Tolerance, Vacuum forming, Injection moulding. **Teir 2:** Analyse, evaluate, design, function, innovation, manufacture, model, modify, resources, specification, technique, structure, concept, criteria, process, assess, solution, adapt, function, sustainability, material, solution, mechanism, structure, innovation, prototype.	**Tier 3:** Hardwoods, Softwoods, manufactured, deciduous, coniferous, thermoplastic, thermosetting, Orthographic, Isometric, Tolerance, PPE Personal protective equipment, adhesive, isometric projection. **Teir 2:** Analyse, evaluate, design, function, innovation, manufacture, model, modify, resources, specification, technique, structure, concept, criteria, process, assess, solution, adapt, function, sustainability, material, solution, mechanism, structure, innovation, prototype.	**Tier 3:** Orthographic, Isometric, oblique, crating, one- and two-point perspective, rendering, graphical, geometric. **Teir 2:** Analyse, evaluate, design, technique, structure, concept, criteria, adapt, solution, method.
	Assessment		
	• **Formative assessment:** Baseline practical activity to assess where their CAD skills are from KS2, due to students not being exposed to CAD in primary school, some schools have small exposure.	• **Formative Assessment:** Ongoing teacher observations during practical tasks, use of assessment grids. • **Formative Assessment:** Ongoing self and peer assessment during practical tasks, use of assessment grids.	• **Formative Assessment:** Ongoing teacher observations during practical tasks, use of assessment grids. • **Formative Assessment:** Ongoing self and peer assessment during practical tasks, use of assessment grids.

	• **Formative Assessment:** Ongoing teacher observations during CAD tasks, use of assessment grids. • **Formative Assessment:** Ongoing self and peer assessment during CAD tasks, use of assessment grids. • **Formative Assessment:** Use of mini-white boards, Low stake quizzes, exit tickets. • **Summative Assessment:** Final CAD Technical Drawing. • **Summative Assessment:** At the midpoint of the 10-week rotation, students will complete a focused in-class assessment covering key areas of learning. The results will be used to identify misconceptions, address gaps in knowledge, and inform next steps through dedicated DIRT (Dedicated Improvement and Reflection Time) activities.	• **Formative Assessment:** Use of mini-white boards, Low stake quizzes, exit tickets. • **Summative Assessment:** Final Desk Tidy product, technical drawings in orthographic projection/ Exploded Projection, and written evaluation. • **Summative Assessment:** At the midpoint of the 10-week rotation, students will complete a focused in-class assessment covering key areas of learning. The results will be used to identify misconceptions, address gaps in knowledge, and inform next steps through dedicated DIRT (Dedicated Improvement and Reflection Time) activities.	• **Formative Assessment:** Use of mini-white boards, Low stake quizzes, exit tickets. • **Summative Assessment:** At the midpoint of the 10-week rotation, students will complete a focused in-class assessment covering key areas of learning. The results will be used to identify misconceptions, address gaps in knowledge, and inform next steps through dedicated DIRT (Dedicated Improvement and Reflection Time) activities.
	Diversity & development of cultural capital		
	• Exposure to diverse cultures when looking at design influences. • Development of practical skills with a global context. • Collaborative and inclusive learning, group work, inclusivity design. • Real-world and historical context: Evolution of design and technology, how technology affects global cultures. • Development of key skills: Critical thinking, innovation. • Understanding of the importance of sustainability	• Exposure to diverse cultures when looking at design influences. • Development of practical skills with a global context. • Collaborative and inclusive learning, group work, inclusivity design. • Real-world and historical context: Evolution of design and technology, how technology affects global cultures. • Development of key skills: Critical thinking, innovation. • Understanding of the importance of sustainability • Exposure to designers and innovative ideas and manufacture.	• Exposure to diverse cultures when looking at design influences. • Development of Design skills with a global context. • Collaborative and inclusive learning, group work, inclusivity design. • Real-world and historical context: Evolution of design and technology, how technology affects global cultures. • Development of key skills: Critical thinking, innovation. • Understanding of the importance of sustainability • Exposure to designers and innovative ideas.

	• Exposure to designers and innovative ideas and manufacture. • Exposure to a wider range of career options.	• Exposure to a wider range of career options.	• Exposure to a wider range of career options.
	Cross-curricular opportunities and enrichment		
	• Cross curricular opportunities, science: Material properties, sustainability • Cross curricular opportunities, mathematics: Measurement and geometry. • Cross curricular opportunities art: Sketching and rendering • Cross curricular opportunities History: Design evolution, cultural. • Cross curricular opportunities geography: Global resources, global design. • Cross curricular opportunities Computing and ICT: CAD, Digital research. • Cross curricular opportunities English: Presentation and Communication of design ideas, evaluation. • Cross curricular opportunities Citizenship and PSHE: Collaboration. • Cross curricular opportunities STEM. • KS3 Design and Technology club. • Allows students to prepare for future careers, many industries require the skills and knowledge that are the foundations of DT education. Allowing students to be exposed to the various areas of DT, prepares students for a career path in engineering, design, manufacture and beyond.	• Cross curricular opportunities, science: Material properties, sustainability. • Cross curricular opportunities, mathematics: Measurement and geometry. • Cross curricular opportunities art: Sketching and rendering • Cross curricular opportunities History: Design evolution, cultural. • Cross curricular opportunities geography: Global resources, global design. • Cross curricular opportunities Computing and ICT: CAD, Digital research. • Cross curricular opportunities English: Presentation and Communication of design ideas, evaluation. • Cross curricular opportunities Citizenship and PSHE: Collaboration. • Cross curricular opportunities STEM. • KS3 Design and Technology club. • Allows students to prepare for future careers, many industries require the skills and knowledge that are the foundations of DT education. Allowing students to be exposed to the various areas of DT, prepares students for a career path in engineering, design, manufacture and beyond.	• Cross curricular opportunities, mathematics: Measurement and geometry. • Cross curricular opportunities art: Sketching and rendering • Cross curricular opportunities History: Design evolution, cultural. • Cross curricular opportunities English: Presentation and Communication of design ideas, evaluation. • Cross curricular opportunities Citizenship and PSHE: Collaboration. • Cross curricular opportunities STEM. • KS3 Design and Technology club/ Art Club. • Allows students to prepare for future careers, many industries require the skills and knowledge that are the foundations of DT education. Allowing students to be exposed to the various areas of DT, prepares students for a career path in engineering, design, manufacture and beyond.

	Wider reading and enrichment		
	• DT BBC bitesize theory: KS3 Technology and Design - BBC Bitesize • DT BBC bitesize careers: Jobs that use Design and Technology – Careers – BBC Bitesize • School library various books and in school careers advisor. • What is Design and Technology? Video: https://www.youtube.com/watch?v=4lLSEDVSAp4 • How to draw in 2-point perspective basics: https://www.youtube.com/watch?v=8sWa5ANwWC4 • **Home-learning CAD/CAM project (Senaca):** New and Emerging Technologies, Enterprise, New Materials, CAD Computer aided Design, CAM Computer aided design. • **Home-learning Desk project (Senaca):** Client and user's needs, Environmental challenges, social challenges, Economic challenges, Designers, Material properties. • **Home-learning Graphics:** Drawing techniques paper-based work.		

KS3 Year 9	**Design and Technology:** **Night Light (Conclusion project to KS3)** 	**Design and Technology:** **Passive Amplifier (Conclusion project to KS3)** 
Students will have 4 rotations in the year, giving students the opportunities to experience all areas of Technology including: **Design and Technology**,	**Students will know that**	
	Design: • Freehand sketching is a great way to quickly get first ideas down on paper in 2D or 3D. • Orthographic projection is a way to draw 3D objects in 2D. • 2D Design is a type of computer Aided Design (CAD) can be used for 2D and 3D drawings	Design: • Freehand sketching is a great way to quickly get first ideas down on paper in 2D or 3D. • Orthographic projection is a way to draw 3D objects in 2D. • Exploded views are a way applying Isometric projection to show how all the parts of a product are related to each other.

Food Preparation and nutrition.	Make: • There are different types of hazards and precautions depending on the type of practical equipment is being used. • There is different type of (PPE) personal protective equipment, depending on the type of practical equipment/ process is being used. • There are tools for marking out/measuring materials. (Specifically: Steel Rule, Try Square, Engineering Set Square) • There are tools for cutting materials. (Specifically: Tenon Saw) • There are tools for shaping and forming materials. (Specifically: Files, Abrasive Paper/Blocks, Belt Sander/ Disc Sander) • There are tools for holding materials. (Specifically: Bench Vice, G Clamp) • Adhesives can be used as a joining method for timber. (Specifically: Wood Glue and Glue Guns) • Soldering irons are used for joining components to (PCB) printed circuit boards. • Side cutters are used to remove the excess material from components on the circuit boards. • There are two main colours to consider when laser cutting, red for cutting and black for etching. Evaluate: • Quality control is used at different stages of the manufacturing process. • Products are tested and evaluated against a series of specification points, using ACCESS FM. **Technical Knowledge:** • There are three main categories of timbers, but students will know different specific properties for MDF and Pine. • That there are two main types of plastic Thermoforming/ Thermosetting and how thermoforming is more sustainable. • Biomimicry is a way of coming up ideas based on nature. • CAD/CAM can be used in different scales of production. • Are key stages within the laser cutting process. • Are different types of electrical devices, input devices, output devices and passive components. • Flow charts are a way of presenting processes.	Make: • There are different types of hazards and precautions depending on the type of practical equipment is being used. • There is different type of (PPE) personal protective equipment, depending on the type of practical equipment/ process is being used. • There are tools for marking out/measuring materials. (Specifically: Steel Rule, Try Square, Engineering Set Square) • There are tools for cutting materials. (Specifically: Tenon Saw) • There are tools for shaping and forming materials. (Specifically: Files, Abrasive Paper/Blocks, Disc Sander/ Disc Sander) • There are tools for holding materials. (Specifically: Bench Vice, G Clamp) • Adhesives can be used as a joining method for timber. (Specifically: Wood Glue) • That we use cardboard for quick models, can also use these as templates. • Laser cutter (CAM) is a really accurate way of manufacturing. • There are two main colours to consider when laser cutting, red for cutting and black for etching. Evaluate: • Quality control is used at different stages of the manufacturing process. • Products are tested and evaluated against a series of specification points, using ACCESS FM. **Technical Knowledge:** • Prototyping is a way of modelling and testing different idea. • There are three main categories of timbers, but students will know different specific properties for Plywood and MDF for this project) • You can layer sheet material to produce 3D products. • Are modern and smart material categories and some of their properties/uses. • The 6R’s is a way of making products more sustainable. • The use of Softwoods, Hardwoods and manufactured boards can have an impact on the cost and quality of the final product.

	Students will know how	
	Design: • To freehand sketch in 2D. • To draw in Orthographic projection. • To use various aspects of 2D Design to produce 2D and 3D elements of the project. Make: • To identify and apply the correct precautions from the hazards identified depending on the type of practical equipment is being used. • To apply (PPE) personal protective equipment, depending on the type of practical equipment/ process is being used. • To mark out accurately using the following tools Steel Rule, Try Square, Engineering Set Square when marking out/measuring materials. • To cut accurately when using Tenon Saw. • To drill accurately when using a hand drill. • To remove and smoothen materials using Files, Abrasive Paper/Blocks, Belt Sander/Disc Sander. • To select the correct tools for holding materials such as Bench Vices, G-Clamps. • Adhesives can be used as a joining method for timber. (Specifically: Wood Glue and Glue Guns for the circuit board) • To solder components to the PCB using a soldering iron. • To use side cutters to remove the excess material from components on the circuit boards. **Evaluate:** • Check and inspect work to ensure Quality throughout the making stages. • Evaluate Products against a simple specification. **Technical Knowledge:** • Materials have been selected due to their properties (specific properties for MDF and Pine) • Thermoforming plastics are more sustainable, and they can be reshaped multiple times.	Design: • To freehand sketch in 2D. • To draw in Orthographic projection. • To draw accurately using isometric projection to show an exploded view of the passive amplifier. Make: • To identify and apply the correct precautions from the hazards identified depending on the type of practical equipment is being used. • To apply (PPE) personal protective equipment, depending on the type of practical equipment/ process is being used. • To mark out accurately using the following tools Steel Rule, Try Square, Engineering Set Square when marking out/measuring materials. • To cut accurately when using Tenon Saw and coping saws. • To drill accurately when using a hand drill/ pillar drill. • To remove and smoothen materials using Files, Abrasive Paper/Blocks, Belt Sander/Disc Sander. • To select the correct tools for holding materials such as Bench Vices, G-Clamps. • Adhesives can be used as a joining method for timber. (Specifically: Wood Glue) • To use cardboard for quick models and use these as templates. • To use sheet material in layers to create a 3D product. Evaluate: • Quality control is used at different stages of the manufacturing process. • Products are tested and evaluated against a series of specification points, using ACCESS FM. **Technical Knowledge:** • To use prototyping to model and test different idea. • The three main categories of timbers are used depending on their properties (specifically the properties for Plywood and MDF for this project) • Modern and smart material categories have different uses depending on their properties.

	• To apply Biomimicry to come up with unique design ideas. • To identify and apply the benefits of using Computer Aided Design. • To set up the key stages of the laser cutting process. • Different electrical devices are input devices, output devices or passive components. • To use flow charts to present a process.	• The 6R's can be used to make products more sustainable. • The use of Softwoods, Hardwoods and manufactured boards can have an impact on the cost and quality of the final product.
	Vocabulary and the concepts they link to	
	Tier 3: Hardwoods, Softwoods, manufactured, deciduous, coniferous, thermoplastic, thermosetting, Orthographic, Isometric, Tolerance, PPE Personal protective equipment, adhesive, CAD Computer aided design, CAM Computer aided design, sustainability, Thermosetting, Thermoforming, Tolerance, resistor, circuit. **Teir 2:** Analyse, evaluate, design, function, innovation, manufacture, model, modify, resources, specification, technique, structure, concept, criteria, process, assess, solution, adapt, function, sustainability, material, solution, mechanism, structure, innovation, prototype.	**Tier 3:** Hardwoods, Softwoods, manufactured, deciduous, coniferous, thermoplastic, thermosetting, Orthographic, Isometric, Tolerance, PPE Personal protective equipment, adhesive, isometric projection, CAD Computer aided design, CAM Computer aided design, sustainability, Tolerance. **Teir 2:** Analyse, evaluate, design, function, innovation, manufacture, model, modify, resources, specification, technique, structure, concept, criteria, process, assess, solution, adapt, function, sustainability, material, solution, mechanism, structure, innovation, prototype.
	Assessment	
	• **Formative Assessment:** Ongoing teacher observations during practical tasks, use of assessment grids. • **Formative Assessment:** Ongoing self and peer assessment during practical tasks, use of assessment grids. • **Formative Assessment:** Use of mini-white boards, Low stake quizzes, exit tickets. • **Summative Assessment:** Final Night Light product, technical drawings in orthographic projection, and written evaluation. • **Summative Assessment:** At the midpoint of the 10-week rotation, students will complete a focused in-class assessment covering key areas of learning. The results will be used to identify misconceptions, address gaps in knowledge, and inform next steps through dedicated DIRT (Dedicated Improvement and Reflection Time) activities.	• **Formative Assessment:** Ongoing teacher observations during practical tasks, use of assessment grids. • **Formative Assessment:** Ongoing self and peer assessment during practical tasks, use of assessment grids. • **Formative Assessment:** Use of mini-white boards, Low stake quizzes, exit tickets. • **Summative Assessment:** Final Passive Amplifier product, technical drawings in orthographic projection, and written evaluation.

	Diversity & development of cultural capital	
	• Exposure to diverse cultures when looking at design influences. • Development of practical skills with a global context. • Collaborative and inclusive learning, group work, inclusivity design. • Real-world and historical context: Evolution of design and technology, how technology affects global cultures. • Development of key skills: Critical thinking, innovation. • Understanding of the importance of sustainability • Exposure to designers and innovative ideas and manufacture. • Exposure to a wider range of career options.	• Exposure to diverse cultures when looking at design influences. • Development of practical skills with a global context. • Collaborative and inclusive learning, group work, inclusivity design. • Real-world and historical context: Evolution of design and technology, how technology affects global cultures. • Development of key skills: Critical thinking, innovation. • Understanding of the importance of sustainability • Exposure to designers and innovative ideas and manufacture. • Exposure to a wider range of career options.
	Cross-curricular opportunities and enrichment	
	• Cross curricular opportunities, science: Material properties, sustainability. Cross curricular opportunities, mathematics: Measurement and geometry. • Cross curricular opportunities art: Sketching and rendering • Cross curricular opportunities History: Design evolution, cultural. • Cross curricular opportunities geography: Global resources, global design. • Cross curricular opportunities Computing and ICT: CAD, Digital research. • Cross curricular opportunities English: Presentation and Communication of design ideas, evaluation. • Cross curricular opportunities Citizenship and PSHE: Collaboration. • Cross curricular opportunities STEM. • KS3 Design and Technology club. • Allows students to prepare for future careers, many industries require the skills and knowledge that are the foundations of DT education. Allowing students to be exposed to the various areas of DT, prepares students for a career path in engineering, design, manufacture and beyond.	• Cross curricular opportunities, science: Material properties, sustainability. • Cross curricular opportunities, mathematics: Measurement and geometry. • Cross curricular opportunities art: Sketching and rendering • Cross curricular opportunities History: Design evolution, cultural. • Cross curricular opportunities geography: Global resources, global design. • Cross curricular opportunities Computing and ICT: CAD, Digital research. • Cross curricular opportunities English: Presentation and Communication of design ideas, evaluation. • Cross curricular opportunities Citizenship and PSHE: Collaboration. • Cross curricular opportunities STEM. • KS3 Design and Technology club. • Allows students to prepare for future careers, many industries require the skills and knowledge that are the foundations of DT education. Allowing students to be exposed to the various areas of DT, prepares students for a career path in engineering, design, manufacture and beyond.
	Wider reading and enrichment	
	• DT BBC bitesize theory: KS3 Technology and Design - BBC Bitesize • DT BBC bitesize careers: Jobs that use Design and Technology – Careers – BBC Bitesize • School library various books and in school careers advisor. • What is Design and Technology? Video: https://www.youtube.com/watch?v=4lLSEDVSAp4	

	• How to draw in Orthographic basics: https://www.youtube.com/watch?v=SdLegfoMXNA • **Home-learning Night Light project (Senaca):** Systems Thinking, Electronic Systems, Programmable Components, Health and Safety, Material mechanical properties, Material Physical Properties, Material Typical properties, Selecting materials. • **Home-learning Amplifier project (Senaca):** Mechanical Devices, Timber and Manufactured boards, Metals, Polymers, Textiles, Energy, Sustainability.