Design and Technology
Upper Key Stage 2 (Y5 and Y6) Long Term Plan

	Year 5			Year 6		
Themes (Number of weeks/Term)	**Autumn 2** **Space Buggies (POAP)** **6 Weeks**	**Spring 2** **Alarm light (POAP)** **5weeks**	**Summer 2** **Cooking Fruit salad using fruits related to the season.** **(POAP)** **5 weeks**	**Autumn 1** **Bomb shelters (POAP)** **5 weeks**	**Autumn 2** **Christmas cards** **6 weeks**	**Summer 2** **Great Bottesford/Bread Bake Off** **5weeks**
NC Content/Coverage	**Mechanical systems – pulleys- using a cam (Link- computing programming a motor through crumble)**	**Electrical systems – monitoring and control**	**Food – Celebrating culture and seasonality**	**Frame Structures**	**Textiles- using CAD – Cross Stitch**	**Food – Celebrating culture and seasonality**
Substantive Knowledge/skills	**Technical Knowledge** **I know** that cams are a type of mechanism that can convert rotary motion into linear or oscillating movement. **I know** that different cam shapes produce different types of movement (e.g., circular, snail, or heart-shaped cams). **I know** that motors can provide rotary motion which can be controlled electronically. **I know** that programming can control the speed, direction, and timing of motor-driven mechanisms. **I can** explain how cams can make parts of my buggy move up, down, or in a repeating motion. **I can** describe how the Crumble motor can be	**Technical Knowledge** **I know** that electrical systems can be used to monitor conditions and trigger outputs, such as lights or alarms. **I know** that switches, sensors, and circuits can be combined to control electrical devices. **I know** that safety is important when using electrical components. **I know** that programming can be used to control when and how electrical outputs operate. **I can** explain how an electrical system can monitor a condition (e.g., light, motion, or pressure) and respond automatically.	**Technical knowledge** **I know** that different fruits grow in different seasons and that seasonal foods are often fresher, tastier, and more sustainable. **I know** where different fruits come from and how food miles affect the environment. **I know** the principles of a healthy, balanced diet and the role fruits play in nutrition. **I know** how to handle and prepare food safely and hygienically. **I know** the correct techniques for cutting, slicing, peeling, and preparing fruit. **I know** that ingredients can be combined in different ways to create	**Technical Knowledge** **I know** that Anderson shelters were used in World War II to protect people during air raids. **I know** that strong structures rely on shape, reinforcement stable joins. **I know** that materials behave differently (e.g. some bend, some are flexible). **I know** that key shapes such as arches, triangles and corrugated surfaces increase strength. **I know** how to reinforce a structure using techniques such as folding, layering, bracing and adding internal supports. **I know** that shelters must withstand downward force and side pressure.	**Technical Knowledge** **I know** that Computer Aided Design (CAD) can be used to create and edit textile patterns accurately. **I know** that CAD allows designs to be saved, adjusted, and repeated precisely. **I know** how cross-stitch patterns are represented using grids and symbols. **I know** that digital designs must match the scale of the fabric (e.g. aida or binca) to ensure accurate stitching. **I know** that stitch direction, spacing, and colour choice affect the quality of the finished product. **I can** explain how CAD improves accuracy and efficiency in textile	**Technical Knowledge** **I know** the main ingredients in bread and their role (e.g., flour, yeast, water, salt, fat). **I know** how yeast works as a raising agent and how temperature and time affect fermentation. **I know** the importance of accurate measuring and mixing in baking. **I know** how kneading develops gluten to give bread structure and texture. **I know** how to use baking equipment safely and hygienically. **I know** that different shaping and scoring techniques affect the final product. **I can** explain how ingredient proportions, preparation methods,

	programmed to control the movement of the cam.		flavour, texture, and visual appeal.	**I can** explain why a structure needs strength, stability and durability to stay safe.	design compared to hand-drawn designs.	and cooking conditions affect the taste, texture, and appearance of bread.
Disciplinary Knowledge/Skills	**Focus task** **I can** explore pulleys and Cams and explain how they help movement **Design** **I can** design a space buggy showing where cams and motors will be placed. **I can** draw and label my design, showing how cams will transfer motion to other parts of the buggy. **I can** plan which materials, cams, motor(s), and tools I will use and explain why I have chosen them. **I know** that the shape and placement of a cam affects the type of motion it produces. **Make** **I can** construct a working space buggy using cams and a motor controlled by the Crumble. **I can** assemble cams and ensure they move correctly to transmit motion to other parts of the buggy.	**Focus task** **I can** compare different monitoring or control circuits and explain which would work best for my project. **Design** **I can** design an alarm light system showing where the circuit, switch, sensor, and output will go. **I can** draw and label my design to show how the electrical system will monitor a condition and trigger the alarm light. **I can** plan which materials, electrical components, and tools I will use and explain my choices. **I know** that components must be connected in the correct order and the circuit must be complete for the system to work. **Make** **I can** construct a working alarm light system using switches, sensors, and electrical components. **I can** connect the components correctly so	**Focus task** **I can** compare seasonal ingredients and choose the best ones for taste, nutrition, and sustainability. **Design** **I can** design a fruit salad that is colourful, balanced and appealing to me chosen user. **I can** select seasonal fruits based on taste, texture, colour and sustainability. **I can** plan my ingredients, quantities and tools, explaining why I have chosen them. **I can** draw or write my design to show how my fruit salad will look and how flavours will complement each other. **Make** **I can** prepare fruit safely using appropriate tools and techniques (e.g., claw grip, bridge grip, slicing, peeling). **I can** follow hygiene routines such as washing hands, cleaning	**Focus task** **I can** compare different materials to compare strength**.** **I can** test different shapes (arches, triangles, corrugation) to find out which are strongest. **I can** experiment with joining techniques (tabs, flanges, folds, bracing) to see which create the most stable structure. **Design** **I can** research Anderson shelters and include key structural features in my own design. **I can** draw and clearly label a detailed design for my shelter, showing materials, shapes, and reinforcements. **I can** choose suitable materials and explain why they are appropriate for building a strong, stable model. **I can** plan the tools, techniques, and steps I will use to complete my shelter. **Make** **I can** measure, cut, and shape materials	**Focus Task** **I can** use CAD software to create a simple cross-stitch pattern using a grid. **I can** select and edit shapes and colours digitally to represent stitches accurately. **I can** resize and adjust my design so it matches the scale of the fabric. **I can** save, modify, and improve my CAD design following feedback. **I can** explain how using CAD improves accuracy and efficiency in textile design. **Design** **I can** use CAD software to design a Christmas-themed cross-stitch pattern. **I can** select, edit, and arrange shapes and colours using CAD tools. **I can** adjust my design to ensure it fits the size and purpose of a Christmas card. **I can** annotate or label my CAD design to show colours, stitch placement, and pattern layout.	**Focus Task** **I can** explore different kneading techniques to develop dough structure. **I can** observe how yeast reacts and causes dough to rise during proving. **I can** test shaping and scoring techniques to see how they affect appearance and texture. **I can** control proving and baking times in small test batches. **I can** explain how each skill contributes to the success of the final bread product. **Design** **I can** design a bread recipe or product suitable for a specific purpose or audience. **I can** select ingredients and explain why I have chosen them, considering flavour, texture, and nutritional value. **I can** plan the shaping, scoring, and presentation of my bread. **I can** annotate my design with clear instructions and success criteria.

	I can connect the Crumble motor safely and program it to control the movement of my cams. **I can** test my buggy and adjust cams, motor position, or programming to improve movement. **I know** how to align cams and moving parts so that the motion is smooth and accurate. **Evaluate** **I can** explain how cams change rotary motion from the motor into a different type of movement in the buggy. **I can** describe how the shape, size, and position of cams affects the movement produced. **I can** evaluate how well my motor and cam mechanism works and suggest improvements. **I can** reflect on how programming the Crumble affects the speed, timing, or direction of motion.	that the system responds reliably to the monitored condition. **I can** use programming (if applicable) to control how and when the alarm light operates. **I can** test my system and make adjustments to improve reliability and safety. **I know** how to check connections, polarity, and alignment of components to ensure the circuit functions correctly **Evaluate** **I can** explain how the electrical system monitors a condition and controls the alarm light. **I can** describe what worked well and what could be improved in my design or circuit. **I can** evaluate how safely and efficiently my system works. **I can** suggest improvements to the circuit, programming, or placement of components to make it more effective.	equipment, and using separate surfaces when needed. **I can** combine ingredients carefully to create a fruit salad with balanced flavour, texture, and appearance. **I can** work neatly, safely, and hygienically throughout the making process. **Evaluate** **I can** taste and describe the flavour, texture, and appearance of my fruit salad. **I can** explain how well my fruit salad meets the design criteria (appearance, taste, nutrition, seasonality). **I can** identify what worked well and what I could improve next time. **I can** talk about how using seasonal fruits affected the quality and sustainability of my product.	accurately for my structure. **I can** join materials securely using the best techniques from my focus task. **I can** reinforce my shelter using bracing, layering, curved shapes, and folded structures. **I can** assemble a shelter that stands independently and can withstand weight or pressure. **I can** use tools safely and work carefully throughout the making process. **Evaluate** **I can** test my shelter for strength, stability, and durability. **I can** explain which reinforcements and design features helped it stay strong. **I can** identify what could be improved or made stronger next time. **I can** compare my design with real Anderson shelters and discuss how realistic and effective my model is.	**I can** adapt and refine my digital design based on feedback or testing **Make** **I can** transfer my CAD design accurately onto fabric. **I can** follow my digital pattern carefully when cross stitching. **I can** sew neat, consistent stitches that match my CAD design. **I can** solve problems independently if my stitched design does not match my digital plan. **I can** assemble my finished embroidered piece neatly onto a Christmas card. **Evaluate** **I can** evaluate how closely my final stitched design matches my CAD design. **I can** explain how CAD helped improve the accuracy and quality of my textile work. **I can** identify what worked well in my digital design and what I would change next time. **I can** compare CAD-designed textiles with traditionally designed textile products	**I can** adapt or improve my design based on research or trial baking. **Make** **I can** follow my bread recipe accurately, measuring ingredients precisely. **I can** mix, knead, and shape dough correctly to develop structure and texture. **I can** control proving and baking times to achieve a successful rise and golden crust. **I can** use equipment safely and maintain hygiene standards throughout. **I can** solve problems if the dough or baking process does not work as expected. **Evaluate** **I can** taste and assess my bread for flavour, texture, and appearance. **I can** evaluate how well my bread met my design brief and success criteria. **I can** identify strengths and areas for improvement for future baking. **I can** compare my product to professional bread and discuss differences in technique or outcome.

Key vocabulary	Cam Pulley Axle Efficiency. (recap from Year 4 oscillating, linear)	Output Input Condition System Monitor	Seasonality Sustainability Food miles Source Contamination	Force Load Tension Stability Corrugation	Composition (link to year 5 Art) Cross stitch Aida Proportional Symmetry	Elasticity Consistency Nutrition (link to year 4) Fermentation Gluten Hygiene