	Term 1	Term 2	Term 3
Unit of work	Monitoring and control	Textiles	Pulleys or gears
Link to Programme of study	**Design** use research and develop design criteria to inform the design of innovative, functional, appealing products that are fit for purpose, aimed at particular individuals or groups generate, develop, model and communicate their ideas through discussion, annotated sketches, cross-sectional and exploded diagrams, prototypes, pattern pieces and computer-aided design **Make** select from and use a wider range of tools and equipment to perform practical tasks [for example, cutting, shaping, joining and finishing], accurately select from and use a wider range of materials and components, including construction materials, textiles and ingredients, according to their functional properties and aesthetic qualities **Evaluate** investigate and analyse a range of existing products evaluate their ideas and products against their own design criteria and consider the views of others to improve their work understand how key events and individuals in design and technology have helped shape the world **Technical knowledge** apply their understanding of how to strengthen, stiffen and reinforce more complex structures understand and use mechanical systems in their products [for example, gears, pulleys, cams, levers and linkages] understand and use electrical systems in their products [for example, series circuits incorporating switches, bulbs, buzzers and motors] apply their understanding of computing to program, monitor and control their products.		
Composite knowledge	Why do we use computer control programs to operate products? What are the advantages of using computer control?	How can we combine different fabric shapes? What impact have different designers had on fabrics and products? How can we strengthen/stiffen a product?	How do gears help to change the speed or direction of movement of an object? What are the inputs, processes, and outputs for a particular object?
Intentional knowledge they need to understand (Component knowledge)	Explain why we use computer control programs to operate products Describe some of the advantages of using computer control	Demonstrate a variety of stitches used to join fabrics Observe and describe the impact different designers have had on fabrics and products Demonstrate different techniques we can use to strengthen/stiffen a product	Explain and demonstrate how gears help to change the speed and direction of movement of an object Demonstrate the inputs, processes and outputs for an object
Vocabulary	Raspberry PI, breadboard, LED, Buzzer, sensor, condition	Durable, joining, fasten, material, seam allowance, stitches, card wallet	pulley, gear, rotation, spindle, driver, follower, mechanical system, authentic

Links to prior knowledge	Initial experience of using computer control software and an interface box, a standalone box or microcontroller, e.g. Crumble. Some experience of writing and modifying a program to make a light turn on or flash on and off. Understanding of the essential characteristics of a series circuit and experience of creating a battery-powered, functional, electrical product.	Experience of stitching, joining and finishing techniques in textiles. Experience of making and using textiles pattern pieces. Experience of simple computer-aided design applications.	Experience of axles, axle holders and wheels that are fixed or free moving. Basic understanding of electrical circuits, simple switches and components. Experience of cutting and joining techniques with a range of materials including card, plastic and wood. An understanding of how to strengthen and stiffen structure.
Cross-curricular links	Science—apply knowledge and understanding of circuits, switches, conductors and insulator Computing—design, write and debug programs that accomplish specific goals, including controlling physical systems. Use sequence, selection, and repetition in programs. Work with variables and various forms of input and output Mathematics—apply understanding and skill to carry out accurate measuring using standard units i.e. cm/mm.	Computing—children express themselves and develop ideas using a range of information and communication technology resources. Art and design—use and apply drawing skills including art programmes on the computer. Spoken language—consider and evaluate others' viewpoints. Give a well-structured oral evaluation to include relevant technical vocabulary.	Computing—use search technologies for research purposes and be discerning when evaluating digital content. Art and design—use and apply drawing skills. Use techniques with colour, pattern, texture, line and shape. Science—apply knowledge and understanding of circuits, switches, conductors and insulators in the design of the final product. Mathematics—understand ratios. Apply understanding and skill to carry out accurate measuring using standard units i.e. cm/mm
Oracy & Outdoor Learning Links	Paired programming	How can we combine different fabric shapes? What impact have different designers had on fabrics and products? How can we strengthen/stiffen a product?	Spoken language—consider and evaluate others' viewpoints. Give a well-structured oral evaluation to include relevant technical vocabulary.