South Kilworth
Design and Technology Curriculum Framework

Design and Technology provides the children with a real life context for learning where they can learn to think creatively and solve problems.

Our Design and Technology Curriculum aims to engage and challenge pupils as they are inspired by engineer, designers, chefs and architects to enable them to create a range of structures, mechanisms, textiles, electrical systems and food products with a real life purpose within a range of relevant contexts. Through a variety of creative and practical activities, they will be taught the knowledge, understanding and skills needed to engage in an iterative process of designing and making.

Key Concepts

Design	Make	Evaluate	Technical Knowledge	Nutrition and Cooking
• 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	• select from and use a wider range of tools and equipment to perform practical tasks (e.g. 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	• 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	• apply their understanding of how to strengthen, stiffen and reinforce more complex structures • understand and use mechanical systems in their products (e.g. gears, pulleys, cams, levers and linkages) • understand and use electrical systems in their products (e.g. series circuits incorporating switches, bulbs, buzzers, and motors) • apply their understanding of computing to program, monitor and control their products	• as part of their work with food, pupils should be taught how to cook and apply the principles of nutrition and healthy eating. • instilling a love of cooking in pupils will also open a door to one of the great expressions of human creativity. • learning how to cook is a crucial life skill that enables pupils to feed themselves and others affordably and well, now and in later life.

EYFS

EYFS Framework: Expressive Arts and Design
ELG: Creating with Materials
Children at the expected level of development will: -
- ✓ Safely use and explore a variety of materials, tools and techniques, experimenting with colour, design, texture, form and function
- ✓ Share their creations, explaining the process they have used
- ✓ Make use of props and materials when role playing characters in narratives and stories.
- ✓

EYFS Development Matters: Expressive Arts and Design
The development of children's artistic and cultural awareness supports their imagination and creativity. It is important that children have regular opportunities to engage with the arts, enabling them to explore and play with a wide range of media and materials

Key Stage One

Design	Make	Evaluate	Technical Knowledge	Nutrition and Cooking
Pupils should; • work confidently across a range of contexts such as imaginary, story-based, school, garden etc. • state what products they are designing and making • say whether the products are for themselves or other users • describe who the products are for and how they will work • say how they will make their products suitable for the intended users • use simple design criteria to help develop their ideas • generate ideas by drawing on their own experience • use knowledge of existing products to come up with their own ideas • develop and communicate ideas by drawing and talking • model ideas by exploring materials components and construction kits by making templates and mock-ups • use information and communication technology where appropriate to develop and communicate ideas	**Pupils should;** • plan by suggesting what to do next • select from a range of tools and equipment explaining their choices • select from a range of materials and components according to their characteristics • follow procedures for safety and hygiene • use a range of materials and components including textiles, construction kits, food ingredients and mechanical components • measure, mark out and cut and shape a range of materials and components • assemble, join, and combine materials and components • use finishing techniques including those from art and design	**When making their own products pupils should:** • talk about their own designs ideas and what they are making • make simple judgements about their products against design criteria • suggest how their products could be improved **When using existing products pupils should explore:** • what they are • what they are for • how they work • how they are used • what materials they are made from • what they like/dislike about the product	**Pupils should know:** • about the simple working characteristics of materials and components • about the movement of simple mechanisms such as sliders, levers, wheels, and axels • how free-standing structures can be made stronger, stiffer and more stable • that 3-D textile products can be assembled from 2 identical fabric shapes • the correct technical vocabulary for the projects they are undertaking	**Pupils should know:** • that all food comes from plants or animals • that food has to be farmed, grown elsewhere or caught • how to name and sort foods into the five groups of the 'eat well' plate • that everyone should eat at least five portions of fruit and vegetable everyday • how to prepare simple dishes without using a heat source • how to use techniques such as cutting, peeling and grating

Key Stage Two				
Design	**Make**	**Evaluate**	**Technical Knowledge**	**Nutrition and Cooking**
Across KS2, pupils should: • work confidently within a range of contexts such as the home, leisure, culture, enterprise, industry and the wider environment • describe the purpose of their products Indicate the design features of their products that will appeal to intended users • explain how parts of their product work **In Years 3 and 4, pupils should:** • gather information about the needs and wants of particular individuals/groups • develop their own criteria and use them to inform their ideas **In Years 5 and 6, pupils should:** • carry out research using surveys, interviews, questionnaires, and web-based resources • identify the needs, wans preferences and values of individuals/groups • develop a simple design speciation to guide thinking	Across KS2, pupils should: • select tools and equipment suitable for the task • explain their choice of tools and equipment in relation to the skills and techniques they are using • select materials and components suitable for the task • explain their choice of materials and components according to functional and aesthetic properties **In Years 3 and 4, pupils should:** • order the main stages of making • mark out, measure, cut and shape materials and components with some accuracy • assemble, join and combine materials and components with some accuracy • apply a range of finishing techniques including those from art and design with some accuracy **In Years 5 and 6, pupils should:** • produce appropriate lists of materials and equipment they will need • formulate step-by-step plans as a guide to making • follow procedures for safety and hygiene • use a wider range of materials and components including textiles, construction kits, food ingredients and mechanical components • accurately mark out, measure, cut and shape materials and components • accurately join and combine materials and components	When making their own products, pupils across KS2 should: • identify the strengths and areas for development in their ideas and products • consider the views of others, including intended users to improve their work **In Years 3 and 4, pupils should:** • refer to their design criteria as the design and make • use their design criteria to evaluate their completed products **In Years 5 and 6, pupils should:** • critically evaluate the quality of the design, manufacture and fitness for purpose of the products they design and make • evaluate their ideas and product in relation to the design specification **When using existing products, pupils across KS2 should investigate and analyse:** • how well products have been made • how well products have been designed • why materials have been chosen • what methods of construction have been used • how well the product works • how well the product meets the needs and wants of users **In Years 3 and 4, pupils should investigate and analyse:**	Across KS2, pupils should know: • how to use learning from science and mathematics to help design and make products that work • that materials have functional properties and aesthetic qualities • that materials can be combined to make more useful characteristics • that mechanical and electrical systems have an input, process and output • the correct technical vocabulary for the project they are undertaking **In Years 3 and 4, pupils should also know:** • how mechanical systems such as levers and linkages or pneumatic systems create movement • how simple electrical circuits and components can be used to create functional products • how to program a computer to control their products • how to make strong, stiff shell structures **In Years 5 and 6, pupils should also know:** • how mechanical systems such as cams, pulley or gears can create movement • how more complex circuits can be used to create functional products • how to program a computer to monitor changes in the environment and control their products • how to strengthen and reinforce a 3-D framework	Across KS2, pupils should know: • that food is grown, reared and caught in the UK, Europe and the world **In Years 3 and 4, pupils should also know:** • that a healthy diet is made up from a variety and balance of different food and drink as depicted in the 'eat well' plate • that to be healthy and active food and drink are needed to provide energy for the body **In Years 5 and 6, pupils should also know:** • that seasons may affect the food available • how food is processed into ingredients that can be eaten or used in cooking • how to prepare and cook a variety of predominantly savoury dishes safely and hygienically including, where appropriate, using a heat source • how to use a range of techniques including cutting, peeling, kneading, chopping, grating, mixing and baking • that different food contains different nutrients, water and fibre that are essential for good health

	• accurately apply a range of finishing techniques including those from art and design • demonstrate resourcefulness when tackling problems	• who designed and made the product • where the product was designed • when products were designed • whether they can be reused or recycled **In Years 5 and 6, pupils should investigate and analyse:** • how much the product costs to make • how innovative products are • how sustainable the products are in products • what influence products have beyond their intended purpose In KS2 pupils should know about designers, engineers, chefs, and manufacturers that have developed ground breaking products		

Cycle A

Reception and Year 1	Design Technology 1A Unit 5 Mechanisms Wheels and Axels	Design Technology 2A Unit 4 Textiles Templates and Joining Techniques	Design Technology 3A Unit 6 Mechanical Systems Levers and Linkages
Prior learning	**Prior learning** • Assembled vehicles with moving wheels using construction kits. • Explored moving vehicles through play. • Gained some experience of designing, making and evaluating products for a specified user and purpose. • Developed some cutting, joining and finishing skills with card.	**Prior learning** • Explored and used different fabrics. • Cut and joined fabrics with simple techniques. • Thought about the user and purpose of products	**Prior learning** • Explored and used mechanisms such as flaps, sliders and levers. • Gained experience of basic cutting, joining and finishing techniques with paper and card.
Key Domain Knowledge	**Designing** • Generate initial ideas and simple design criteria through talking and using own experiences. • Develop and communicate ideas through drawings and mock-ups. **Making** • Select from and use a range of tools and equipment to perform practical tasks such as cutting and joining to allow movement and finishing. • Select from and use a range of materials and components such as paper, card, plastic and wood according to their characteristics. **Evaluating** • Explore and evaluate a range of products with wheels and axles. • Evaluate their ideas throughout and their products against original criteria. **Technical knowledge and understanding** • Explore and use wheels, axles and axle holders. • Distinguish between fixed and freely moving axles. • Know and use technical vocabulary relevant to the project.	**Designing** • Design a functional and appealing product for a chosen user and purpose based on simple design criteria. • Generate, develop, model and communicate their ideas as appropriate through talking, drawing, templates, mock-ups and information and communication technology. **Making** • Select from and use a range of tools and equipment to perform practical tasks such as marking out, cutting, joining and finishing. • Select from and use textiles according to their characteristics. **Evaluating** • Explore and evaluate a range of existing textile products relevant to the project being undertaken. • Evaluate their ideas throughout and their final products against original design criteria. **Technical knowledge and understanding** • Understand how simple 3-D textile products are made, using a template to create two identical shapes. • Understand how to join fabrics using different techniques e.g. running stitch, glue, over stitch, stapling. • Explore different finishing techniques e.g. using painting, fabric crayons, stitching, sequins, buttons and ribbons. • Know and vocabulary relevant to the project.	**Designing** • Generate realistic ideas and their own design criteria through discussion, focusing on the needs of the user. • Use annotated sketches and prototypes to develop, model and communicate ideas. **Making** • Order the main stages of making. • Select from and use appropriate tools with some accuracy to cut, shape and join paper and card. • Select from and use finishing techniques suitable for the product they are creating. **Evaluating** • Investigate and analyse books and, where available, other products with lever and linkage mechanisms. • Evaluate their own products and ideas against criteria and user needs, as they design and make. **Technical knowledge and understanding** • Understand and use lever and linkage mechanisms. • Distinguish between fixed and loose pivots. • Know and use technical vocabulary relevant to the project. .
Key Vocabulary	vehicle, wheel, axle, axle holder, chassis, body, cab, assembling, cutting, joining, shaping, finishing, fixed, free, moving, mechanism names of tools, equipment and materials used design, make, evaluate, purpose, user, criteria, functional	names of existing products, joining and finishing techniques, tools, fabrics and components template, pattern pieces, mark out, join, decorate, finish features, suitable, quality mock-up, design brief, design criteria, make, evaluate, user, purpose, function	mechanism, lever, linkage, pivot, slot, bridge, guide system, input, process, output linear, rotary, oscillating, reciprocating user, purpose, function prototype, design criteria, innovative, appealing, design brief

Years 2,3 and 4	Design Technology 1A Unit 7 Mechanical systems Pneumatics	Design Technology 2A Unit 9 Electrical systems Simple Programming and Control	Design Technology 3A Unit 8 Structures Shell Structures using Computer Aided Design
Prior learning	**Prior learning** • Explored simple mechanisms, such as sliders and levers, and simple structures. • Learnt how materials can be joined to allow movement. • Joined and combined materials using simple tools and techniques.	**Prior learning** • Constructed a simple series electrical circuit, using bulbs, batteries, switches and buzzers. • Cut and joined a variety of construction materials, such as wood, card, plastic, reclaimed materials and glue.	**Prior learning** • Experience of using different joining, cutting and finishing techniques with paper and card. • A basic understanding of 2-D and 3-D shapes in mathematics and the physical properties and everyday uses of materials in science. • Familiarity with general purpose software that can be used to draw accurate shapes, such as Microsoft Word, or simple computer-aided design (CAD), such as 2D Primary by Techsoft.
Key Domain Knowledge	**Designing** • Generate realistic and appropriate ideas and their own design criteria through discussion, focusing on the needs of the user. • Use annotated sketches and prototypes to develop, model and communicate ideas. **Making** • Order the main stages of making. • Select from and use appropriate tools with some accuracy to cut and join materials and components such as tubing, syringes and balloons. • Select from and use finishing techniques suitable for the product they are creating. **Evaluating** • Investigate and analyse books, videos and products with pneumatic mechanisms. • Evaluate their own products and ideas against criteria and user needs, as they design and make. **Technical knowledge and understanding** • Understand and use pneumatic mechanisms. • Know and use technical vocabulary relevant to the project.	**Designing** • Gather information about users' needs and wants, and develop design criteria to inform the design of products that are fit for purpose. • Generate, develop, model and communicate realistic ideas through discussion and, as appropriate, annotated sketches, cross-sectional and exploded diagrams. **Making** • Order the main stages of making. • Select from and use tools and equipment to cut, shape, join and finish with some accuracy. • Connect simple electrical components and a battery in a series circuit to achieve a functional outcome. • Program a standalone control box, microcontroller or interface box to enhance the way the product works. **Evaluating** • Investigate and analyse a range of existing battery-powered products, including pre-programmed and programmable products. • Evaluate their ideas and products against their own design criteria and identify the strengths and areas for improvement in their work. **Technical knowledge and understanding** • Understand and use computing to program and control products containing electrical systems, such as series circuits incorporating switches, bulbs and buzzers. • Know and use technical vocabulary relevant to the project.	**Designing** • Generate realistic ideas and design criteria collaboratively through discussion, focusing on the needs of the user and the functional and aesthetic purposes of the product. • Develop ideas through the analysis of existing shell structures and use computer-aided design to model and communicate ideas. **Making** • Plan the order of the main stages of making. • Select and use appropriate tools and software to measure, mark out, cut, score, shape and assemble with some accuracy. • Explain their choice of materials according to functional properties and aesthetic qualities. • Use computer-generated finishing techniques suitable for the product they are creating. **Evaluating** • Investigate and evaluate a range of shell structures including the materials, components and techniques that have been used. • Test and evaluate their own products against design criteria and the intended user and purpose. **Technical knowledge and understanding** • Develop and use knowledge of nets of cubes and cuboids and, where appropriate, more complex 3D shapes. • Develop and use knowledge of how to construct strong, stiff shell structures. • Know and use technical vocabulary relevant to the project.
Key Vocabulary	components, fixing, attaching, tubing, syringe, plunger, split pin, paper fastener pneumatic system, input movement, process, output movement, control, compression, pressure, inflate, deflate, pump, seal, air-tight linear, rotary, oscillating, reciprocating	series circuit, fault, connection, toggle switch, push-to-make switch, push-to-break switch, battery, battery holder, light emitting diode (LED), bulb, bulb holder, USB cable, wire, insulator, conductor, crocodile clip control, program, system, input device, output device, process user, purpose, function, prototype, design criteria,	shell structure, three-dimensional (3-D) shape, net, cube, cuboid, prism, vertex, edge, face, length, width, breadth, capacity marking out, scoring, shaping, tabs, adhesives, joining, assemble, accuracy, material, stiff, strong, reduce, reuse, recycle, corrugating, ribbing, laminating font, lettering, text, graphics, decision, evaluating, design brief design criteria, innovative, prototype

	user, purpose, function, prototype, design criteria, innovative, appealing, design brief, research, evaluate, ideas, constraints, investigate	innovative, appealing, design brief	
Years 5 and 6	**Design Technology 1A** **Unit 18 Mechanical Systems** Pulleys or Gears	**Design Technology 2A** **Unit 15 Textiles** Combining different fabric shapes	**Design Technology 3A** **Unit 13 Electrical Systems** Simple circuits and switches
Prior learning	**Prior learning** • 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 structures.	**Prior learning** • Experience of basic stitching, joining textiles and finishing techniques. • Experience of making and using simple pattern pieces.	**Prior Learning** • Constructed a simple series electrical circuit in science, using bulbs, switches and buzzers. • Cut and joined a variety of construction materials, such as wood, card, plastic, reclaimed materials and glue.
Key Domain Knowledge	**Designing** • Generate innovative ideas by carrying out research using surveys, interviews, questionnaires and web-based resources. • Develop a simple design specification to guide their thinking. • Develop and communicate ideas through discussion, annotated drawings, exploded drawings and drawings from different views. **Making** • Produce detailed lists of tools, equipment and materials. Formulate step-by-step plans and, if appropriate, allocate tasks within a team. • Select from and use a range of tools and equipment to make products that that are accurately assembled and well finished. Work within the constraints of time, resources and cost. **Evaluating** • Compare the final product to the original design specification. • Test products with intended user and critically evaluate the quality of the design, manufacture, functionality and fitness for purpose. • Consider the views of others to improve their work. • Investigate famous manufacturing and engineering companies relevant to the project. **Technical knowledge and understanding** • Understand that mechanical and electrical systems have an input, process and an output. • Understand how gears and pulleys can be used to speed up, slow down or change the direction of movement. • Know and use technical vocabulary relevant to the project.	**Designing** • Generate innovative ideas by carrying out research including surveys, interviews and questionnaires. • Develop, model and communicate ideas through talking, drawing, templates, mock-ups and prototypes and, where appropriate, computer-aided design. • Design purposeful, functional, appealing products for the intended user that are fit for purpose based on a simple design specification. **Making** • Produce detailed lists of equipment and fabrics relevant to their tasks. • Formulate step-by-step plans and, if appropriate, allocate tasks within a team. • Select from and use a range of tools and equipment to make products that are accurately assembled and well finished. Work within the constraints of time, resources and cost. **Evaluating** • Investigate and analyse textile products linked to their final product. • Compare the final product to the original design specification. • Test products with intended user and critically evaluate the quality of the design, manufacture, functionality and fitness for purpose. • Consider the views of others to improve their work. **Technical knowledge and understanding** • A 3-D textile product can be made from a combination of accurately made pattern pieces, fabric shapes and different fabrics. • Fabrics can be strengthened, stiffened and reinforced where appropriate.	**Designing** • Gather information about needs and wants, and develop design criteria to inform the design of products that are fit for purpose, aimed at particular individuals or groups. • Generate, develop, model and communicate realistic ideas through discussion and, as appropriate, annotated sketches, cross-sectional and exploded diagrams. **Making** • Order the main stages of making. • Select from and use tools and equipment to cut, shape, join and finish with some accuracy. • Select from and use materials and components, including construction materials and electrical components according to their functional properties and aesthetic qualities. **Evaluating** • Investigate and analyse a range of existing battery-powered products. • Evaluate their ideas and products against their own design criteria and identify the strengths and areas for improvement in their work. **Technical knowledge and understanding** • Understand and use electrical systems in their products, such as series circuits incorporating switches, bulbs and buzzers. • Apply their understanding of computing to program and control their products. • Know and use technical vocabulary relevant to the project.

Key Vocabulary	pulley, drive belt, gear, rotation, spindle, driver, follower, ratio, transmit, axle, motor circuit, switch, circuit diagram annotated drawings, exploded diagrams mechanical system, electrical system, input, process, output design decisions, functionality, innovation, authentic, user, purpose, design specification, design brief	seam, seam allowance, wadding, reinforce, right side, wrong side, hem, template, pattern pieces name of textiles and fastenings used, pins, needles, thread, pinking shears, fastenings, iron transfer paper design criteria, annotate, design decisions, functionality, innovation, authentic, user, purpose, evaluate, mock-up, prototype	series circuit, fault, connection, toggle switch, push-to-make switch, push-to-break switch, battery, battery holder, bulb, bulb holder, wire, insulator, conductor, crocodile clip control, program, system, input device, output device user, purpose, function, prototype, design criteria, innovative, appealing, design brief

Cycle B

	Design Technology 1B **Unit 1 Mechanisms** Sliders and Levers	Design Technology 2B **Unit 2 Structures** Free Standing Structures	Design Technology 3B **Unit 3 Food** Preparing Fruit and Vegetables
Reception and Year 1			
Prior learning	**Prior learning** • Early experiences of working with paper and card to make simple flaps and hinges. • Experience of simple cutting, shaping and joining skills using scissors, glue, paper fasteners and masking tape.	**Prior learning** • Experience of using construction kits to build walls, towers and frameworks. • Experience of using of basic tools e.g. scissors or hole punches with construction materials e.g. plastic, card. • Experience of different methods of joining card and paper.	**Prior learning** • Experience of common fruit and vegetables, undertaking sensory activities i.e. appearance taste and smell. • Experience of cutting soft fruit and vegetables using appropriate utensils.
Key Domain Knowledge	**Designing** • Generate ideas based on simple design criteria and their own experiences, explaining what they could make. • Develop, model and communicate their ideas through drawings and mock-ups with card and paper. **Making** • Plan by suggesting what to do next. • Select and use tools, explaining their choices, to cut, shape and join paper and card. • Use simple finishing techniques suitable for the product they are creating. **Evaluating** • Explore a range of existing books and everyday products that use simple sliders and levers. • Evaluate their product by discussing how well it works in relation to the purpose and the user and whether it meets design criteria. **Technical knowledge and understanding** • Explore and use sliders and levers.	**Designing** • Generate ideas based on simple design criteria and their own experiences, explaining what they could make. • Develop, model and communicate their ideas through talking, mock-ups and drawings. **Making** • Plan by suggesting what to do next. • Select and use tools, skills and techniques, explaining their choices. • Select new and reclaimed materials and construction kits to build their structures. • Use simple finishing techniques suitable for the structure they are creating. **Evaluating** • Explore a range of existing freestanding structures in the school and local environment e.g. everyday products and buildings. • Evaluate their product by discussing how well it works in relation to the purpose, the user and whether it meets the original design criteria.	**Designing** • Design appealing products for a particular user based on simple design criteria. • Generate initial ideas and design criteria through investigating a variety of fruit and vegetables. • Communicate these ideas through talk and drawings. **Making** • Use simple utensils and equipment to e.g. peel, cut, slice, squeeze, grate and chop safely. • Select from a range of fruit and vegetables according to their characteristics e.g. colour, texture and taste to create a chosen product. **Evaluating** • Taste and evaluate a range of fruit and vegetables to determine the intended user's preferences. • Evaluate ideas and finished products against design criteria, including intended user and purpose. **Technical knowledge and understanding**

		Technical knowledge and understanding	
	• Understand that different mechanisms produce different types of movement. • Know and use technical vocabulary relevant to the project.	**Technical knowledge and understanding** • Know how to make freestanding structures stronger, stiffer and more stable. • Know and use technical vocabulary relevant to the project.	• Understand where a range of fruit and vegetables come from e.g. farmed or grown at home. • Understand and use basic principles of a healthy and varied diet to prepare dishes, including how fruit and vegetables are part of *The eatwell plate*. • Know and use technical and sensory vocabulary relevant to the project.
Key Vocabulary	slider, lever, pivot, slot, bridge/guide card, masking tape, paper fastener, join pull, push, up, down, straight, curve, forwards, backwards design, make, evaluate, user, purpose, ideas, design criteria, product, function	cut, fold, join, fix structure, wall, tower, framework, weak, strong, base, top, underneath, side, edge, surface, thinner, thicker, corner, point, straight, curved metal, wood, plastic circle, triangle, square, rectangle, cuboid, cube, cylinder design, make, evaluate, user, purpose, ideas, design criteria, product, function	fruit and vegetable names, names of equipment and utensils sensory vocabulary e.g. soft, juicy, crunchy, sweet, sticky, smooth, sharp, crisp, sour, hard flesh, skin, seed, pip, core, slicing, peeling, cutting, squeezing, healthy diet, choosing, ingredients, planning, investigating tasting, arranging, popular, design, evaluate, criteria
Years 2 and 3	**Design Technology 1B** **Unit 12 Structures** Shell Structures	**Design Technology 2B** **Unit 11 Food** Healthy and Varied Diet	**Design Technology 3B** **Unit 10 Textiles** 2-D shape to 3-D product
Prior learning	**Prior learning** • Experience of using different joining, cutting and finishing techniques with paper and card. • A basic understanding of 2-D and 3-D shapes in mathematics and the physical properties and everyday uses of materials in science.	**Prior learning** • Know some ways to prepare ingredients safely and hygienically. • Have some basic knowledge and understanding about healthy eating and *The eatwell plate*. • Have used some equipment and utensils and prepared and combined ingredients to make a product.	**Prior learning** • Have joined fabric in simple ways by gluing and stitching. • Have used simple patterns and templates for marking out. • Have evaluated a range of textile products.
Key Domain Knowledge	**Designing** • Generate realistic ideas and design criteria collaboratively through discussion, focusing on the needs of the user and purpose of the product. • Develop ideas through the analysis of existing products and use annotated sketches and prototypes to model and communicate ideas. **Making** • Order the main stages of making. • Select and use appropriate tools to measure, mark out, cut, score, shape and assemble with some accuracy. • Explain their choice of materials according to functional properties and aesthetic qualities. • Use finishing techniques suitable for the product they are creating.	**Designing** • Generate and clarify ideas through discussion with peers and adults to develop design criteria including appearance, taste, texture and aroma for an appealing product for a particular user and purpose. • Use annotated sketches and appropriate information and communication technology, such as web-based recipes, to develop and communicate ideas. **Making** • Plan the main stages of a recipe, listing ingredients, utensils and equipment. • Select and use appropriate utensils and equipment to prepare and combine ingredients. • Select from a range of ingredients to make appropriate food products, thinking about sensory characteristics. **Evaluating**	**Designing** • Generate realistic ideas through discussion and design criteria for an appealing, functional product fit for purpose and specific user/s. • Produce annotated sketches, prototypes, final product sketches and pattern pieces. **Making** • Plan the main stages of making. • Select and use a range of appropriate tools with some accuracy e.g. cutting, joining and finishing. • Select fabrics and fastenings according to their functional characteristics e.g. strength, and aesthetic qualities e.g. pattern. **Evaluating** • Investigate a range of 3-D textile products relevant to the project. • Test their product against the original design criteria and with the intended user.

	Evaluating • Investigate and evaluate a range of existing shell structures including the materials, components and techniques that have been used. • Test and evaluate their own products against design criteria and the intended user and purpose. **Technical knowledge and understanding** • Develop and use knowledge of how to construct strong, stiff shell structures. • Develop and use knowledge of nets of cubes and cuboids and, where appropriate, more complex 3D shapes. • Know and use technical vocabulary relevant to the project.	• Carry out sensory evaluations of a variety of ingredients and products. Record the evaluations using e.g. tables and simple graphs. • Evaluate the ongoing work and the final product with reference to the design criteria and the views of others. **Technical knowledge and understanding** • Know how to use appropriate equipment and utensils to prepare and combine food. • Know about a range of fresh and processed ingredients appropriate for their product, and whether they are grown, reared or caught. • Know and use relevant technical and sensory vocabulary appropriately.	• Take into account others' views. • Understand how a key event/individual has influenced the development of the chosen product and/or fabric. **Technical knowledge and understanding** • Know how to strengthen, stiffen and reinforce existing fabrics. • Understand how to securely join two pieces of fabric together. • Understand the need for patterns and seam allowances. • Know and use technical vocabulary relevant to the project.
Key Vocabulary	shell structure, three-dimensional (3-d) shape, net, cube, cuboid, prism, vertex, edge, face, length, width, breadth, capacity marking out, scoring, shaping, tabs, adhesives, joining, assemble, accuracy, material, stiff, strong, reduce, reuse, recycle, corrugating, ribbing, laminating font, lettering, text, graphics, decision, evaluating, design brief design criteria, innovative, prototype	name of products, names of equipment, utensils, techniques and ingredients texture, taste, sweet, sour, hot, spicy, appearance, smell, preference, greasy, moist, cook, fresh, savoury hygienic, edible, grown, reared, caught, frozen, tinned, processed, seasonal, harvested healthy/varied diet planning, design criteria, purpose, user, annotated sketch, sensory evaluations	fabric, names of fabrics, fastening, compartment, zip, button, structure, finishing technique, strength, weakness, stiffening, templates, stitch, seam, seam allowance user, purpose, design, model, evaluate, prototype, annotated sketch, functional, innovative, investigate, label, drawing, aesthetics, function, pattern pieces
Years 4, 5 and 6	**Design Technology 1B** **Unit 14 Food** Celebrating Culture and Seasonality	**Design Technology 2B** **Unit 17 Electrical Systems** More complex switches and circuits (including programming, monitoring and control)	**Design Technology 3B** **Unit 16 Structures** Frame structures
Prior learning	**Prior learning** • Have knowledge and understanding about food hygiene, nutrition, healthy eating and a varied diet. • Be able to use appropriate equipment and utensils, and apply a range of techniques for measuring out, preparing and combining ingredients.	**Prior learning** • Understanding of the essential characteristics of a series circuit and experience of creating a battery-powered, functional, electrical product. • Initial experience of using computer control software and an interface box or a standalone box, e.g. writing and modifying a program to make a light flash on and off.	**Prior learning** • Experience of using measuring, marking out, cutting, joining, shaping and finishing techniques with construction materials. • Basic understanding of what structures are and how they can be made stronger, stiffer and more stable.
Key Domain Knowledge	**Designing** • Generate innovative ideas through research and discussion with peers and adults to develop a design brief and criteria for a design specification. • Explore a range of initial ideas, and make design decisions to develop a final product linked to user and purpose. • Use words, annotated sketches and information and communication technology as appropriate to develop and communicate ideas. **Making**	**Designing** • Use research to develop a design specification for a functional product that responds automatically to changes in the environment. Take account of constraints including time, resources and cost. • Generate and develop innovative ideas and share and clarify these through discussion. • Communicate ideas through annotated sketches, pictorial representations of electrical circuits or circuit diagrams. **Making** • Formulate a step-by-step plan to guide making, listing tools, equipment, materials and components.	**Designing** • Carry out research into user needs and existing products, using surveys, interviews, questionnaires and web-based resources. • Develop a simple design specification to guide the development of their ideas and products, taking account of constraints including time, resources and cost. • Generate, develop and model innovative ideas, through discussion, prototypes and annotated sketches. **Making** • Formulate a clear plan, including a step-by-step list of what needs to be done and lists of resources to be used.

	• Write a step-by-step recipe, including a list of ingredients, equipment and utensils • Select and use appropriate utensils and equipment accurately to measure and combine appropriate ingredients. • Make, decorate and present the food product appropriately for the intended user and purpose. **Evaluating** • Carry out sensory evaluations of a range of relevant products and ingredients. Record the evaluations using e.g. tables/graphs/charts such as star diagrams. • Evaluate the final product with reference back to the design brief and design specification, taking into account the views of others when identifying improvements. • Understand how key chefs have influenced eating habits to promote varied and healthy diets. **Technical knowledge and understanding** • Know how to use utensils and equipment including heat sources to prepare and cook food. • Understand about seasonality in relation to food products and the source of different food products. • Know and use relevant technical and sensory vocabulary.	• Competently select and accurately assemble materials, and securely connect electrical components to produce a reliable, functional product. • Create and modify a computer control program to enable an electrical product to work automatically in response to changes in the environment. **Evaluating** • Continually evaluate and modify the working features of the product to match the initial design specification. • Test the system to demonstrate its effectiveness for the intended user and purpose. • Investigate famous inventors who developed ground-breaking electrical systems and components. **Technical knowledge and understanding** • Understand and use electrical systems in their products. • Apply their understanding of computing to program, monitor and control their products. • Know and use technical vocabulary relevant to the project.	• Competently select from and use appropriate tools to accurately measure, mark out, cut, shape and join construction materials to make frameworks. • Use finishing and decorative techniques suitable for the product they are designing and making. **Evaluating** • Investigate and evaluate a range of existing frame structures. • Critically evaluate their products against their design specification, intended user and purpose, identifying strengths and areas for development, and carrying out appropriate tests. • Research key events and individuals relevant to frame structures. **Technical knowledge and understanding** • Understand how to strengthen, stiffen and reinforce 3-D frameworks. • Know and use technical vocabulary relevant to the project.
Key Vocabulary	ingredients, yeast, dough, bran, flour, wholemeal, unleavened, baking soda, spice, herbs fat, sugar, carbohydrate, protein, vitamins, nutrients, nutrition, healthy, varied, gluten, dairy, allergy, intolerance, savoury, source, seasonality utensils, combine, fold, knead, stir, pour, mix, rubbing in, whisk, beat, roll out, shape, sprinkle, crumble design specification, innovative, research, evaluate, design brief	series circuit, parallel circuit, names of switches and components, input device, output device, system, monitor, control, program, flowchart function, innovative, design specification, design brief, user, purpose	frame structure, stiffen, strengthen, reinforce, triangulation, stability, shape, join, temporary, permanent design brief, design specification, prototype, annotated sketch, purpose, user, innovation, research, functional

Cycle C

Years 4, 5 and 6	Design Technology 1C Unit 19 Mechanical Systems Cams	Design Technology 2C Unit 20 Textiles Using Computer-Aided Design in Textiles	Design Technology 3C Unit 21 Electrical Systems Monitoring and Control
Prior learning	**Prior learning** • Experience of axles, axle holders and wheels that are fixed or free moving. • Basic understanding of different types of movement. • Experience of cutting and joining techniques with a range of materials including card, plastic and wood. • An understanding of how to strengthen and stiffen structures.	**Prior learning** • Experience of stitching, joining and finishing techniques in textiles. • Experience of making and using textiles pattern pieces. • Experience of simple computer-aided design applications.	**Prior learning** • 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.
Key unit domain knowledge	**Designing** • Generate innovative ideas by carrying out research using surveys, interviews, questionnaires and web-based resources. • Develop a simple design specification to guide their thinking. • Develop and communicate ideas through discussion, annotated drawings, exploded drawings and drawings from different views. **Making** • Produce detailed lists of tools, equipment and materials. Formulate step-by-step plans and, if appropriate, allocate tasks within a team. • Select from and use a range of tools and equipment to make products that that are accurately assembled and well finished. Work within the constraints of time, resources and cost. **Evaluating** • Compare the final product to the original design specification. • Test products with the intended user, where safe and practical, and critically evaluate the quality of the design, manufacture, functionality and fitness for purpose. • Consider the views of others to improve their work. • Investigate famous manufacturing and engineering companies relevant to the project. **Technical knowledge and understanding** • Understand that mechanical systems have an input, process and an output. • Understand how cams can be used to produce different types of movement and change the direction of movement. • Know and use technical vocabulary relevant to the project.	**Designing** • Generate innovative ideas through research including surveys, interviews and questionnaires. • Develop, model and communicate ideas through talking, drawing, templates, mock-ups and prototypes including using computer-aided design. • Design purposeful, functional, appealing products for the intended user that are fit for purpose based on a simple design specification. **Making** • Produce detailed lists of equipment and fabrics relevant to their tasks. • Formulate step-by-step plans and, if appropriate, allocate tasks within a team. • Select from and use a range of tools and equipment, including CAD, to make products that are accurately assembled and well finished. Work within the constraints of time, resources and cost. **Evaluating** • Investigate and analyse textile products linked to their final product. • Compare the final product to the original design specification. • Test products with intended user, where safe and practical, and critically evaluate the quality of the design, manufacture, functionality and fitness for purpose. • Consider the views of others to improve their work. **Technical knowledge and understanding** • A 3-D textile product can be made from a combination of accurately made pattern pieces, fabric shapes and different fabrics. • Fabrics can be strengthened, stiffened and reinforced where appropriate.	**Designing** • Develop a design specification for a functional product that responds automatically to changes in the environment. • Generate, develop and communicate ideas through discussion, annotated sketches and pictorial representations of electrical circuits or circuit diagrams. **Making** • Formulate a step-by-step plan to guide making, listing tools, equipment, materials and components. • Competently select and accurately assemble materials, and securely connect electrical components to produce a reliable, functional product. • Create and modify a computer control program to enable their electrical product to respond to changes in the environment. **Evaluating** • Continually evaluate and modify the working features of the product to match the initial design specification. • Test the system to demonstrate its effectiveness for the intended user and purpose. **Technical knowledge and understanding** • Understand and use electrical systems in their products. • Understand the use of computer control systems in products. • Apply their understanding of computing to program, monitor and control their products. • Know and use technical vocabulary relevant to the project.

Key Vocabulary	cam, snail cam, off-centre cam, peg cam, pear shaped cam	computer aided design (CAD), computer aided manufacture (CAM)	reed switch, toggle switch, push-to-make switch, push-to-break switch, light dependent resistor (LDR), tilt switch
	follower, axle, shaft, crank, handle, housing, framework	font, lettering, text, graphics, menu, scale, modify, repeat, copy, flip	light emitting diode (LED), bulb, bulb holder, battery, battery holder, USB cable, wire, insulator, conductor, crocodile clip
	rotation, rotary motion, oscillating motion, reciprocating motion	design brief, design criteria, design decisions, innovative, prototype	control, program, system, input device, output device, series circuit, parallel circuit
	annotated sketches, exploded diagrams	seam, seam allowance, wadding, reinforce, right side, wrong side, hem, template, pattern pieces	
	mechanical system, input movement, process, output movement	names of textiles and fastenings used, pins, needles, thread, pinking shears, fastenings, iron transfer paper	function, innovative, design specification, design brief, user, purpose
	design decisions, functionality, innovation, authentic, user, purpose, design specification, design brief	annotate, functionality, innovation, authentic, user, purpose, evaluate, mock-up, prototype	

Useful links:

STEM: https://www.stem.org.uk/resources/collection/2891/nuffield-primary-design-and-technology

The Design and Technology Association https://www.data.org.uk/for-education/primary/#

Additional support for planning https://www.learnatcurriculum.uk/detailed-unit-plans-dt