Heatherside Junior School - Design Technology

INTENT

Design and technology prepares children to take part in the development of tomorrow's rapidly changing world. Therefore, we want the pupils at Heatherside Junior School to develop their imagination, their critical thinking and their understanding of the world around them through their love of Design and Technology. We aim to enable children to become autonomous and keen problem-solvers, both as individuals and as part of a team. By engaging in design and technology, children will learn how to think and plan in a logical sequence to overcome problems and find possible solutions. Our broad curriculum allows pupils to use their ideas and imagination to design and make products that solve real and relevant problems within a variety of contexts, considering their own and others needs and values; making links and connections between subjects including S.T.E.M. (Science, Technology, Engineering and Maths). We evaluate past and present design technology and the ways these have influenced modern society. The pupils are taught to combine their designing and making skills with knowledge and understanding in order to design and make a product. Our Growth Mindset approach at Heatherside is especially relevant to the DT curriculum, where mistakes and failures are sometimes necessary aspects of a design process.

The national curriculum for design and technology aims to ensure that all pupils:

- develop the creative, technical and practical expertise needed to perform everyday tasks confidently and to participate successfully in an increasingly technological world
- build and apply a repertoire of knowledge, understanding and skills in order to design and make high-quality prototypes and products for a wide range of users
- critique, evaluate and test their ideas and products and the work of others
- understand and apply the principles of nutrition and learn how to cook

IMPLEMENTATION

Through a variety of creative and practical activities, we teach the knowledge, understanding and skills needed to engage in the process of designing and making in the five main domains: textiles, cooking and nutrition, mechanisms, electrical control and structures. Pupils design and make innovative, high-quality products with a clear purpose in mind and an intended user of the products. Design and Technology is planned as a discrete subject but, wherever possible, we make links with other topics being taught. Sometimes we may deliver design and technology in longer blocked sessions or in a condensed two or three-day timeframe to give greater coherence to pupils' learning and enable ongoing modifications and improvements to be made.

Using the National Curriculum as a basis for our planning, our DT units across the school provide children with opportunities to learn and develop a range of skills through the Design, Make and Evaluate approach. Our progression of skills is used to help children acquire, use and then apply practical knowledge and skills to projects which include electrical components, moving mechanisms, computer aided design and textiles. They will also learn about the importance of a healthy diet, where food comes from and how to prepare it.

Design and Technology also embeds our Heatherside Junior School learning values. It is an inspiring, rigorous and practical subject, requiring collaboration, independence, thinking, creativity, reflection, curiosity as well as collaboration. Pupils design and make products that solve real and relevant problems within a variety of contexts. It is cross - curricular and draws upon subject knowledge and skills in other subjects. Children learn to take risks, be reflective, be innovative and resilient. Through the evaluation of past and present technology, they can reflect upon the impact of Design Technology on everyday life and the wider world.

In addition to our DT curriculum, we provide a range of additional opportunities for children to develop and use their DT skills. These include Mix-Up Mornings where children take part in a challenge task, theme Weeks/Days, family Afternoons and homework activities. The school also has a Children's Kitchen and through the support of parent helpers, offers all children the chance to cook three times a year additional to the National Curriculum expectations.

IMPACT

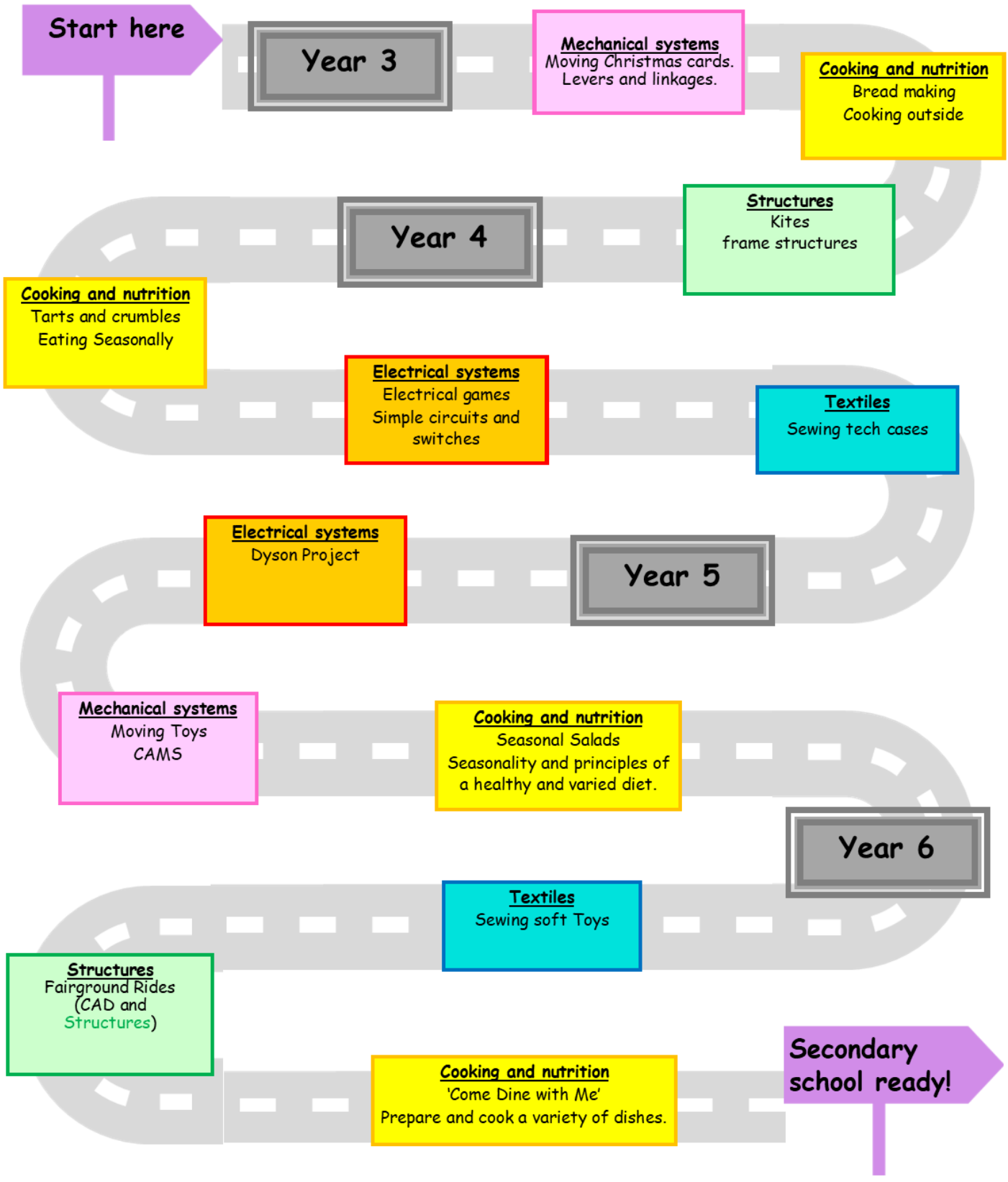
By the time pupils leave Heatherside Junior School, they will have:

- An excellent attitude towards learning and independent working.
- The ability to use time efficiently and work constructively and productively with others.
- The ability to carry out thorough research, show initiative and ask questions to develop a detailed knowledge of users' needs.
- The ability to act as responsible designers and makers, working ethically, using a range of materials carefully and working safely.
- A thorough knowledge of which tools, equipment and materials to use to make their products.
- The ability to apply mathematical knowledge and skills accurately.
- The ability to manage risks, be resourceful, innovative and enterprising to manufacture products safely and hygienically.
- A passion for the subject

Assessment of pupil's learning in Design and Technology takes the form of ongoing monitoring of pupil's understanding, knowledge and skills built into lessons by the class teacher. Summative assessment is conducted termly by class teachers across each year group using Design and Technology objectives set out in the National Curriculum and key skills highlighted in our Heatherside Junior School Assessment document. The children collate all their DT work in their DT project files which go through the school with them.

Also, the assessment process is aimed at targeting next steps in learning as well as informing the subject leader of progress and knowledge still to be embedded as well as future training requirements for staff. Design and Technology is also monitored by the subject leader throughout the year in the form of collection of evidence (photos and scans), book monitoring, looking at outcomes measured against age-based progression and pupil conferencing. This tangible evidence aids understanding and establishes the impact of the teaching taking place. The impact of using the full range of tools and resources, will be seen across the school with an increase in the profile of Design and Technology.

Design and Technology journey through Heatherside Junior School



Key strands:

Design	Make	Evaluate	Technical knowledge	Cooking and Nutrition

Additional Cooking Across the School

Parents come in and support all children across the term to cook the recipes below. Children work in small groups and use the Children's Kitchen.

Term	Year 3	Year 4	Year 5	Year 6
Autumn	Scones	Cheese straws	Rock drops	Carrot cake muffins
Spring	Oatmeal and raison cookies	Pizza	Easter biscuits	
Summer				Children plan, prepare, cook and then eat a 2-course meal with an invited guest.

Recipes Year 6 can choose for their meal choices:

Mini toad in the hole	Apple crumble	Chicken curry	Chicken fajitas
Beef burger	Shepherd's pie	Meringue	Potato wedges
Spaghetti Bolognese	Strawberry cheesecake	Stir Fry	

Heatherside Junior School
Key Stage Two Design and Technology Overview

National Curriculum

Purpose of study

Design and technology is an inspiring, rigorous and practical subject. Using creativity and imagination, pupils design and make products that solve real and relevant problems within a variety of contexts, considering their own and others' needs, wants and values. They acquire a broad range of subject knowledge and draw on disciplines such as mathematics, science, engineering, computing and art. Pupils learn how to take risks, becoming resourceful, innovative, enterprising and capable citizens. Through the evaluation of past and present design and technology, they develop a critical understanding of its impact on daily life and the wider world. High-quality design and technology education makes an essential contribution to the creativity, culture, wealth and well-being of the nation.

Aims

The national curriculum for design and technology aims to ensure that all pupils:

- develop the creative, technical and practical expertise needed to perform everyday tasks confidently and to participate successfully in an increasingly technological world
- build and apply a repertoire of knowledge, understanding and skills in order to design and make high-quality prototypes and products for a wide range of users
- critique, evaluate and test their ideas and products and the work of others
- understand and apply the principles of nutrition and learn how to cook.

Attainment targets

By the end of each key stage, pupils are expected to know, apply and understand the matters, skills and processes specified in the relevant programme of study.

Key stage 2

Through a variety of creative and practical activities, pupils should be taught the knowledge, understanding and skills needed to engage in an iterative process of designing and making. They should work in a range of relevant contexts [for example, the home, school, leisure, culture, enterprise, industry and the wider environment].

When designing and making, pupils should be taught to:

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.

Cooking and nutrition

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.

Pupils should be taught to:

Key stage 2

- understand and apply the principles of a healthy and varied diet
- prepare and cook a variety of predominantly savoury dishes using a range of cooking techniques
- understand seasonality, and know where and how a variety of ingredients are grown, reared, caught and processed.

Design and Technology Skills and Knowledge				
National Curriculum	**Y3**	**Y4**	**Y5**	**Y6**
	Moving Christmas cards (autumn 2) **Bread making (spring 2)** **Kites (summer 2)**	**Eating Seasonally (autumn 1)** **Electrical games (spring 1)** **Sewing tech cases (summer 2)**	**Dyson Project (autumn 2)** **Moving toys** **Seasonal Salads (summer 2)**	**Sewing soft toys (autumn 1)** **Fairground rides (spring 1)** **Come dine with me (summer 2)**
Mechanical Systems	**Moving Christmas cards – levers and linkages**		**Moving toys - CAMS**	
Design	Use research to aid their design of a functional product by exploring mechanisms in books and cards Generate realistic ideas to meet the design criteria by creating an annotated sketch of a moving mechanism design bearing in mind the purpose and audience.		Use research to aid their design of a functional product by exploring existing moving toys and how they work. Generate a broader range of ideas and deeper innovation, thinking critically about their ideas' practicality and originality. Begin to use more complex annotated sketches.	
Make	Create prototypes of different levers and linkages. Cut accurately with scissors. Measure accurately with a ruler eg to the nearest cm. Select the correct tools to cut and shape card. Eg scissors Use appropriate ways to join card based on research in design stage. Select and use finishing techniques suitable for their product.		Select materials, based on research or user needs. Cut with a saw - in a back-and-forth sawing motion. Measure accurately with a ruler to the nearest cm and mm where appropriate. Choose from the known range of equipment available to them with little guidance. Explain their choices, referring to their research. Cut and join with accuracy to ensure a high-quality finish making adjustments where necessary.	
Evaluate	Investigate and analyse a range of existing mechanisms in books and cards. Evaluate their levers and linkages prototypes they made to influence their final product.		Investigate and analyse a range of existing moving toys. Assess their designs against a more complex set of design criteria that includes functionality, aesthetics, user experience, sustainability and cost.	

	Assess whether their product meets the needs of the user and has achieved its purpose. Assess whether their product meets the different design criteria.		Provide feedback that is helpful, specific and encouraging. Incorporate feedback from peers or users to improve their product further, explaining the changes they made and the impact they had.	
Technical knowledge	Can explain what a lever and linkage is Describe the type of movement a particular mechanical system makes Understand and make fixed and free pivots, reverse motion linkage, parallel linkage and bell crank linkage.		To understand that different shaped cams produce different movements. To understand how different toys move. To know that the mechanism in an automatic toy uses a system of cams, axles and followers. To know which mechanisms are working together to make a mechanical system. To know that there are different directions of movement.	
Key Vocabulary	Mechanism, lever, linkage, loose pivot, fixed pivot, oscillating, rotating, linear, reciprocating, motion, annotate, evaluate, finishing, prototype, engineer, fulcrum		designing eg sequence, annotated diagram, sketch, decision, choice, prototype, model, communicate making eg shape, assemble, accurate, saw, mark out knowledge and understanding eg cam, mechanism, movement, linear motion, rotary motion, pivot, off-centre, axle, force, framework, follower, guide, offset, shaft	
Structures	**Kites – Frame structures**			**Fairground rides (CAD and structures)**
Design	Explain how key events and individuals in design and technology have helped shape the world. Use research to create ideas and refine them to develop design criteria. Create their own design criteria for a kite based on knowledge gained about kite parts and shapes. Decide upon the shape of their kite based on their research. Communicate ideas about materials, measurements and decoration.			Use surveys, interviews, questionnaires and web-based resources to research products. Investigate how fairground rides work using the 'focus on fairground rides' programme on the computers and construction kits. Create a detailed technical drawing (with labels) of their ride design. Create a 3-D drawing of their intended frame.

Make	Create prototypes for diamond, rokaku and sled kites. Select different materials to make their kite out of. Build and join strong frame structures and stiffen materials. (Stiffen the body and frame of the kite.) Use a ruler/ tape measure to mark out the measurements their design. Make the structure of the kite and accurately cut it out. Use more complex tools and equipment, such as hacksaws and bench hooks, to make the structure of the kite. Select appropriate methods of joining to add strength to the structure of the kite.			Make a 3D Jinx frame, reinforcing the corners to hold the weight of a fairground ride. Measure and label pieces of wood for their jinx frame. Use efficient measuring and cutting techniques and strategies to ensure best results for a straight, sturdy frame. Discuss joins and strengthening techniques such as straight cuts and paper triangles. Make a prototype (temporary model) of the mechanism they will use. Make the permanent rotating part of their model (shaft and cotton reel) and ensure it can be rotated freely by hand. They then add the electric motor and drive belt and ensure it can be driven by a power block.
Evaluate	Investigate and analyse a range of existing products in the context of investigating the different parts of a kite and their functions. Test the kite identifying the strengths and weaknesses of their final product against the original design criteria. Use the design criteria to say whether their kite was successful. Comment on the overall process of the kite making project.			Improve a design plan based on peer evaluation and collaboration – considering the advantages and disadvantages of their ride at the design stage. Test and adapt their mechanism to improve it as it is developed – improving their mechanism by aligning components and considering speed and direction. Identify what makes a successful structure. Consider the views of others to improve their work.

Technical knowledge	Name and explain the function of the different parts of a kite Name and recognise at least 3 different kite shapes. Explain the strengths of different kite shapes. Apply their understanding of how to strengthen, stiffen and reinforce more complex structures. Understand what a frame structure is. Understand the importance of strength and stiffness in structures.			Know how to use pulleys and gears to control the speed of a fairground ride. (Gear up, Gear down) – building on prior knowledge from year 3 moving Christmas cards. Apply their knowledge of more complex electrical circuits and components to create a functional product. Understand that materials can be combined and mixed to create more useful characteristics. Understand that a 3D product can be made from a combination of fabric shapes. Understand how to use learning from mathematics to help design and make products work.
Key Vocabulary	Kite, shape, delta, diamond, rokkaku, sled, tow point, line, bridle, spars, keel, sail, Structure, frame, strength, stiffen, tail, design criteria, test, evaluate.			model, mock-up, select, modify, improvements, design proposal, criteria; framework, construct, temporary joins, permanent joins; rotation, spindle, axle, drive belt, pulley, electric motor, speed, horizontal, vertical, electric circuit, switch, gearing up or down, computer control, mechanism. clockwise, anti-clockwise, force, friction, input, energy, output, parallel, stationary, axle, chassis, anchor, crank, platform, rotary motion, shaft

Electrical Systems		**Electrical games**	**Dyson Project**	
Design		Use research to develop a design criteria. Develop design ideas through annotated sketches to create a product concept. Create rough sketches of their game and a simple flow chart of what they need to do to make their game. Create a prototype of their game.	Develop design criteria to inform the design of a functional product that is fit for purpose and aimed at particular individuals or groups. Generate, develop, model and communicated their ideas through discussion, annotated sketches and prototyping. Create a short list of success criteria to suit the brief. What materials will the product be made from? Who would be the target audience? Draw an annotated diagram of their design. Choose one section that will need to be drawn in more detail and draw and exploded annotated diagram'	
Make		select from and use a wider range of tools and equipment to perform practical tasks [for example, cutting, shaping, joining and finishing], accurately. Construct a stable base for a game. Decorate the base of the game to a high quality finish. Make and test a circuit. Incorporate a circuit into a base.	Select from and use a wider range of materials and components, including construction materials, according to their functional properties and aesthetic qualities Use the given tools safely and accurately	
Evaluate		Investigate and evaluate an existing range of games. Evaluate and refine their design as they go along. Evaluate their ideas and products against their own design criteria and consider the views of others to improve their work.	Evaluate the effectiveness of a product for purpose -Disassemble, explore and reassemble the tangle free turbine tool (2024) linking this to how engineers are constantly trying to improve products and this is a newer iteration of the tangle tool.	

		Test their own and others finished games, identifying what went well and making suggestions for improvement.		
Technical Knowledge		Understand and use electrical systems in their products [for example, series circuits incorporating bulbs, buzzers] To know that batteries contain acid, which can be dangerous if they leak. To know the names of the components in a basic series circuit, including a buzzer.	Understand how key events and individuals in design and technology have helped shape the world The design process involves three stages: design, build, test. These stages are not in order. A design engineer will go back between these stages to develop an idea. Understand that design engineers will keep working at a problem until it is solved The design brief explains the problem that the new product must solve. A product will always have an intended end user.	
Key Vocabulary		circuit, bulb, battery, component, conductor, insulator, electricity, join, prototype, design criteria, electricity, materials, metal, plastic, paper, tweezers, wand…	Design, engineer, evaluate, technology, design feature, function, product, brief	
Textiles		**Sewing Tech Cases**		**Sewing Soft Toys**
Design		To know that products are designed for different purposes and different users To evaluate products and identify criteria that can be used for their own designs - of different types of cases (top opening, side opening, drawstring) To make labelled drawings from different views showing specific features To draw up simple design specifications indicating fabric and fastenings to be used, simple measurements and techniques. Incorporating fastening to a design		To investigate and analyse a range of existing products. To produce an annotated sketch of a product can design a product in accordance to a specification linked to set of design criteria. Can annotate their designs, to explain their decisions To develop their own design criteria to inform their design for a product

				aimed at a particular individual or group. To generate and communicate their ideas through annotated sketches.
Make		Sew using a range of different stitches, - running stitch and back stitch Model ideas with paper by creating a pocket for a card To make a paper pattern/template that uses a seam allowance Measure, tape or pin, cut and join fabric with some accuracy		Create a 3D product from a 2D design Can make products using stages of prototypes, making continual refinements Can make and use a template in accordance with their design. Develop their ideas by designing a paper proto-type and pattern pieces. Measure, mark and cut fabric accurately and independently, using the appropriate tools Select and apply appropriate joining techniques, sewing accurately with evenly spaced, neat stitches and securing with strong knots Ensure their product has a high-quality finish, deploying artistic skills where appropriate Cut and join fabrics neatly and securely. To choose suitable materials and techniques for the audience and purpose. Consider safety issues. Join textiles with a combination of stitching techniques (such as back stitch for seams and running stitch to attach decoration and blanket stitch to stitch any gaps).

Evaluate		Test and evaluating an end product against the original design criteria. Decide how many of the criteria should be met for the product to be considered successful. Suggest modifications for improvement. Articulate the advantages and disadvantages of different fastening types.		To investigate and analyse a range of existing products. To produce an annotated sketch of a product Testing and evaluating an end product and giving point for further improvements.
Technical Knowledge		Know that fabrics have different properties Know that some joining techniques are stronger/weaker than others Know that fabric can be joined in temporary and permanent ways Know that a fastening is something which holds two pieces of material together for example a zipper, toggle, button, press stud and velcro. Know that different fastening types are useful for different purposes. Know that creating a mock up (prototype) of their design is useful for checking ideas and proportions.		Know that blanket stitch is useful to reinforce the edges of a fabric material or join two pieces of fabric. Understand that it is easier to finish simpler designs to a high standard. Know that soft toys are often made by creating appendages separately and then attaching them to the main body. Know that small, neat stitches which are pulled taut are important to ensure that the soft toy is strong and holds the stuffing securely.
Key Vocabulary		Pattern, seam allowance, back stitch, running stitch, cross stitch, fastening		specification, flow chart, prototype, accurate, users, fabric swatches, working drawings pattern / template, working properties seam, seam allowance, right side / wrong side, stitch, running stitch, blanket stitch, back stitch, embroidery, appliqué, tacking, wadding evaluate, compare, contrast, disassemble, appearance, function, suitability, purpose, explore, examine

Cooking and nutrition	**Bread Making**	**Eating Seasonally**	**Seasonal Salads**	**'Come Dine With Me'**
Design	Decide which ingredients they want to include in their own bread and be able to justify these choices.	Research tart or quiche recipes using seasonal produce. Plan and design a tart or quiche containing seasonal produce		Write a recipe, explaining the key steps, method and ingredients. Include facts and drawings from research undertaken.
Make	Children learn how to prepare and keep food hygienically. (See making section for cooking skills) Follow a recipe, broken down into manageable steps to make bread and cook on camp fire	Prepare and cook a variety of predominantly savoury dishes using a range of cooking techniques. Know how to prepare themselves and a workspace to cook safely in, learning the basic rules to avoid food contamination. Follow the instructions within a recipe. Peel, core and slice apples using the bridge hold and claw grip for cutting. Use a knife safely to core and cut an apple.		Follow a recipe, including using the correct quantities of each ingredient. Adapt a recipe based on research. Work to a given timescale. Work safely and hygienically with independence.
Evaluate	Investigate different bread types by tasting a range of different breads and evaluating the ingredients used by taste – appearance flavour texture Evaluate their own bread against the design criteria - based on looks and taste	Describe the benefits of seasonal fruits and vegetables and the impact on the environment. Suggest points for improvement when making a seasonal tart.		Evaluate a recipe, considering: taste, smell, texture and origin of the food group. Taste test and score final products. Suggest improvements when scoring others' dishes, and when evaluating their own throughout the planning, preparation and cooking process. Evaluate health and safety in production to minimise cross contamination.
Technical Knowledge	Understand how bread is made 'from field to fork' Sequence the method to make bread	Explain what seasonality means and know when different fruit and vegetables are in season in the United Kingdom. Explain that fruit and vegetables are in season when they are naturally ripe.		Know that 'flavour' is how a food or drink tastes. Know that many countries have 'national dishes' which are recipes associated with that country.

		Name the seasons when cherries, Brussels sprouts, pumpkin, blackberries, peas and parsnips are in season. Know that vegetables and fruit grow in certain seasons. Know that cooking instructions are known as a 'recipe'. Know that imported food is food which has been brought into the country. Know that exported food is food which has been sent to another country Know that eating seasonal foods can have a positive impact on the environment.		Know that 'processed food' means food that has been put through multiple changes in a factory. Understand that it is important to wash fruit and vegetables before eating to remove any dirt and insecticides. Understand what happens to a certain food before it appears on the supermarket shelf (Farm to Fork).
Key Vocabulary	Flour, grain, yeast, knead, mix, prove, bake, allergy, hygiene, evaluate	Climate, Diet, Imported, Ingredients, Natural, Processed, Reared, Recipe, Seasonal, Seasons, Sugar		