

Design & Technology



Intent

Our design and technology curriculum has been designed to allow pupils to develop the creative, technical and practical expertise needed to design and make products confidently and successfully. In food, (which is a distinct strand of our D & T curriculum), we aim for pupils to understand and apply the principles of nutrition and learn how to cook simple dishes.

D & T

Pupils will explore the contributions that designers and engineers make to creativity, culture and wealth and that more opportunities exist than ever before due to technological advances. We are keen to ensure that all pupils can see themselves reflected in the design and technology curriculum, by exploring the contributions made by a wide range of designers, past and present. Opportunities to develop character by understanding the difficulties faced by those designers is important and our curriculum is designed so that pupils can see how characteristics such as resilience and risk taking contribute towards success. Our curriculum aims to ensure that all pupils build and apply a repertoire of knowledge, understanding and skill in order to understand the design, making and evaluation process. Our curriculum achieves this by breaking the knowledge and skills into three distinct areas of design and technology learning that are mapped out across units and year groups.

The taught disciplinary knowledge reinforces the iterative design process and allow pupils to build their understanding and ability to design gradually from EYFS to year 6. They are encouraged to know that they are designers and engineers, who design a solution to fit a specific user and need. Pupils are taught explicit ways of designing and ways of identifying user needs, ensuring they are given the tools they need to thrive as designers of the future.

The taught conceptual knowledge (or vertical concepts) includes the principles that designers and engineers must have a solid understanding of, before attempting to design any product. This has been sequenced so that pupils are explicitly taught these aspects in small steps, allowing pupils to gradually build their understanding and mastery of conceptual knowledge.

The taught procedural knowledge includes the skills and craftsmanship of designers and engineers. This has been sequenced so that pupils watch teachers model a small number of key procedures in each unit, and pupils carry out focused practical tasks to master the skills.

Food

'Food' is a distinct strand within our design and technology curriculum. The purpose of the food strand is not to design dishes. While this is ultimately the skill of a chef, there is a huge amount of prerequisite knowledge that needs to be mastered before new dishes can be designed. Chefs need to know about nutrition and dietary requirements; equipment and techniques; source and characteristics of ingredients; an awareness of the principles of cooking (which Ashbee in Curriculum: Theory, Culture and Subject Specialisms (2021), describes as bases, thickening, reduction, seasoning, layering, topping, balance, contrast etc.); and a growing knowledge of tried-and-tested recipes. The knowledge that pupils are taught in primary school therefore focuses more on this prerequisite knowledge – the basics of cooking and nutrition – and less on the design elements of the subject.

The aim of our curriculum for food is to ensure that all pupils leave primary school with the ability to cook a selection of healthy dishes using a variety of techniques, and to be able to make choices about what they eat based on values like source, seasonality, and nutritional value. Pupils will be taught food sources, hygiene and nutrition and will be taught to prepare food through chopping, preparing, combining and heating. These life skills are even more important in the context of rising obesity. According to the NHS, in the East of England in 2022-23, this stood at 8.1% for pupils in the EYFS rising to 20.6% for pupils in year 6 – and Peterborough has one of the highest rates of child obesity in the region (more than 9% and 24% respectively). The disciplinary, conceptual and procedural knowledge of food is also explicitly taught and mapped to ensure sufficient time is allocated to it.

Conceptual, Procedural & Disciplinary Knowledge Overview

Our curriculum’s conceptual knowledge has been sequenced so that pupils are explicitly taught these aspects in small steps, allowing pupils to gradually build their understanding and mastery. There are D&T and food ‘vertical concepts’ that run through the entirety of our design and technology curriculum. The aim is for pupils to understand what these core concepts of the subject are, how they relate to each other and to be able to master them in the context of our curriculum.

Vertical Concepts Overview	
<p>D & T The principles that designers and engineers must have a solid understanding of, before attempting to design any product.</p>	<p>Food The ideas and principles that cooks and chefs must have understanding of.</p>
<p>Structures Mechanisms Programming & Control Materials D&T Shaping the World</p>	<p>Food Sources Nutrition & Eating (including dietary requirements and restrictions) Food Safety Food Hygiene</p>

Procedural knowledge has been sequenced so that pupils watch teachers model a small number of key techniques and procedures in each unit, and then pupils carry out focused practical tasks or follow recipes that help them master the skills.

Procedural Knowledge Overview							
<p>D & T The skills and craftsmanship of designers and engineers.</p>				<p>Food Cooking skills and techniques.</p>			
Marking Out	Shaping	Joining	Finishing	Preparation	Combining & Assembling	Cooking	Working in the Kitchen

The disciplinary knowledge is explicitly taught, and gives pupils the ability to master the skills needed to become designers, engineers or aspiring chefs. In D & T, this focuses on the design process: how designers identify a need, generate ideas, make prototypes and test and iterate their ideas, communicate designs, and evaluate products based on values. In food, this focuses on food choices: how cooks make choices about food based on qualities like nutritional value; dietary requirements; cost; seasonality; food miles and carbon footprint of production; time to prepare; and quantities.

Disciplinary Knowledge Overview							
Designing in Different Contexts	Design Values	Identifying User Needs	Evaluating Products	Generating Ideas	Making, Testing, Iterating	Communicating Designs	Making Food Choices

Implementation

To ensure the successful implementation of our design and technology curriculum, we use teaching and learning strategies that ensure pupils can talk about, replicate and create amazing products.

- Lessons include many opportunities for pupils to engage in **discussions** about their products and a range of designers and engineers.
- Pupils learn how to effectively **critique** the products they are exploring and making.
- Pupils develop their sense of vision through **observation** and **experimentation**, practicing and refining their designs.
- Lessons are **practical** and allow pupils to explore a range of materials and tools.
- Pupils use a wide variety of **media** and resources.
- Pupils continually **reflect** and **evaluate** their own design and technology work.
- Lessons include **demonstrations** and **guided instructions** so pupils improve their accuracy using tools.
- Design and technology terminology and **vocabulary** are used accurately.
- Making explicit and deliberate **links** to other curriculum subjects – particularly science – to ensure that pupils use and apply scientific concepts in a design & technology or food setting at the appropriate time.

The Journey of a Design & Food Technician at Longthorpe

EYFS	<p>By the end of the EYFS, pupils will be able to safely use and explore a variety of materials, tools and techniques, experimenting with colour, design, texture, form and function. They will share their creations, explaining the process they have used. They will make use of props and materials when role playing characters in narratives and stories. They will develop their fine motor skills so that they can use a range of tools competently, safely and confidently (pencils for drawing and writing, paintbrushes, scissors, knives, forks and spoons). They will begin to show accuracy and care when drawing.</p>
KS1	<p>By the end of SK1, through a variety of creative and practical activities, pupils will understand the knowledge, understanding and skills needed to engage in an iterative process of designing and making. They will be able to design purposeful, functional, appealing products for themselves and other users based on design criteria. They will be able to generate, develop, model and communicate their ideas through talking, drawing, templates, mock-ups and, where appropriate, information and communication technology. They will be able to select from and use a range of tools and equipment to perform practical tasks. They will be able to select from and use a wide range of materials and components, including construction materials, textiles and ingredients, according to their characteristics. They will be able to explore and evaluate a range of existing products and evaluate their ideas and products against design criteria. They will be able to build structures, exploring how they can be made stronger, stiffer and more stable and explore and use mechanisms (for example, levers, sliders, wheels and axles), in their products. They will be able to use the basic principles of a healthy and varied diet to prepare dishes and will understand where some food comes from.</p>
KS2	<p>By the end of KS2, pupils will be able to 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. They will be able to generate, develop, model and communicate their ideas through discussion, annotated sketches, cross-sectional and exploded diagrams, prototypes, pattern pieces and computer-aided design. They will be able to select from and use a wider range of tools and equipment to perform practical tasks (for example, cutting, shaping, joining and finishing), accurately. They will be able to 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. They will be able to investigate and analyse a range of existing products and evaluate their ideas and products against their own design criteria and consider the views of others to improve their work. They will understand how key events and individuals in design and technology have helped shape the world. They will be able to apply their understanding of how to strengthen, stiffen and reinforce more complex structures. They will be able to understand and use mechanical systems in their products (for example, gears, pulleys, cams, levers and linkages). They will understand and use electrical systems in their products (for example, series circuits incorporating switches, bulbs, buzzers and motors). They will apply their understanding of computing to program, monitor and control their products. They will understand and apply the principles of a healthy and varied diet and prepare and cook a variety of dishes using a range of cooking techniques. They will understand seasonality, and know where and how a variety of ingredients are grown, reared, caught and processed.</p>

Units Overview



Progression of Knowledge and Skills

	Autumn			Spring		Summer	
EYFS	Me and My World	My Heroes	Standing Ovation	Castles, Knights and Dragons	Spring In Our Step	Where We Live	Science Detectives
Media & Materials	Weaved into the wider provision: Print or collage independently to create a pattern or image; Make props to use in their role-play and small world play; Combine different techniques to create a picture; Evaluate and adapt their work; Explain how they created something, talking about the materials and techniques they have used.						
		Create their own superhero vegetable using printing and collage materials.			The 'Extraordinary Gardner' pictures.		Skeleton collage. Fingerprint pictures based on Tree by Patricia Hegarty.
Manipulating Tools & Materials	Weaved into the wider provision: Join small construction such as Lego; Make more detailed models with playdough; Use tweezers to move small objects; Use scissors to cut around a shape on paper; Use a knife and fork, attempting to cut soft foods; Use scissors with developing accuracy and control; Safely use hammers; Use a knife and fork effectively.						
		Chop vegetables for vegetable soup. Hammer nails into vegetables.	Make Diwa lamps. Make decorations.	Playdough dragons. Moving dragon eggs with tweezers. Decorate crowns.	Moving beans.	Ping pong football.	
Year 1	Eat a Rainbow Preparing a colourful fruit salad and crudites.			Moving Pictures Using simple linkages (levers) to make a moving picture for someone at home.		Outdoor Space Designing an outdoor space and creating a 3D model to share the design	
VC	Food Sources: <ul style="list-style-type: none"> Fruits and vegetables come from plants (including trees). Fruits contain a plant's seeds. Vegetables are part of the plant. 			Pupils will identify someone in their home environment that they would like to send a card or message to, and will design and make a card with moving words or pictures. In focused practical tasks, pupils will make simple linkages like levers.		Pupils will interview the key stakeholder (e.g. head teacher) who is redesigning an outdoor space in the local community to understand their needs. They will then create a model to communicate their designs. In the focused practical tasks, pupils	

	<ul style="list-style-type: none"> Food can come from farms, allotments and gardens. Fruits and vegetables are usually harvested in a particular season. Different foods are in season at different times of the year. <p>Nutrition & Eating:</p> <ul style="list-style-type: none"> We should eat 5 portions of fruit or vegetables each day. 'Eating a rainbow' means to different types of fruits and vegetables, that might have lots of different colours. Fruits and vegetables both contain lots of good things for our bodies. Fruits contain more sugar, so we should eat less of them. <p>Food Safety & Hygiene:</p> <ul style="list-style-type: none"> Store dairy products in the fridge. Wash hands and tie hair back to stop the tiny living things on our hands getting onto the food and into our bodies. Wear an apron to protect our clothes and stop the tiny living things on them getting into food and into our bodies. 	<p>Mechanisms:</p> <ul style="list-style-type: none"> A mechanism makes changes movement or makes movement easier. A mechanism has an input and an output. A lever is a simple mechanism. It is a rigid beam that pivots (turns). A slider is a simple mechanism. It is a rigid beam that moves back and forth on a straight line. A linkage is a system of links that are joined together to control movement. A lever is an example of a linkage. <p>D&T Shaping the World:</p> <ul style="list-style-type: none"> Examples of levers in everyday life include see-saws, wheelbarrows, door handles and scissors. Artists often create art for its own sake. Designers create things that are useful and have a purpose. 	<p>create structures using card, paper, straws, wood and plasticine/clay.</p> <p>Structures:</p> <ul style="list-style-type: none"> 2D shapes have a length and width. 3D shapes have a length and width and height. Free-standing structures can be made stronger with stiffer materials, thicker materials, or with more layers of material (laminating). Free-standing structures can be made more stable by having a wider base or a heavier base. <p>Materials:</p> <ul style="list-style-type: none"> Materials include woods, paper, card, rubber, plastics, metals, fabrics, glass, rock, water, plasticine/clay. <p>D&T Shaping the World:</p> <ul style="list-style-type: none"> Architects are artists and designers who design buildings. Architects make models of spaces like towns to help them plan them. (Link to local area if possible).
PK	<p>Prepare:</p> <ul style="list-style-type: none"> Wash and drain fruits. Chop using the claw technique. Chop a range of foods, including bananas, grapes, strawberries, cucumber and prepared pears, pineapple, peppers and carrots. Peel bananas, satsumas. Measure dry foods and liquids using a teaspoon and tablespoon. <p>Combine & Assemble:</p> <ul style="list-style-type: none"> Stir with wooden spoon. Use fruit juice to prevent browning. <p>Work in the Kitchen:</p> <ul style="list-style-type: none"> Follow simple recipes. Wash up items by removing excess food, washing, rinsing and drying. 	<ul style="list-style-type: none"> Marking out: Use a pencil and ruler to mark out the position of holes and straight lines before shaping them. Shaping: Make holes using a hole punch, and by using a sharp pencil and adhesive putty (Blu Tack). Shaping: Shape paper, card and aluminium foil with scissors. Joining: Use a split pin, glue sticks and folding to join materials, and adhesive putty to temporarily join materials. Finishing: Finish products with decorations using colouring pencils and decorations made or sources from a computer. 	<ul style="list-style-type: none"> Shaping: Shape plasticine using rolling pins and basic craft tools. Shaping: Shape plastic sheets, pipe cleaners and art straws. Joining: Use PVA glue, sellotape and masking tape to join materials.

DK	<ul style="list-style-type: none"> Make food choices based on colour and quantity of sugar. 	<ul style="list-style-type: none"> Design Values: Use shared design criteria based on the values of Visual Appeal; Materials; Function. Identify User Needs: Make choices about the specific users and purpose of a product. Evaluate: Evaluate products according to the design criteria. Make, Test, Iterate: Designing is about trying something and seeing what works, and then trying again. Communicate Designs: Contribute to a class storyboard that shows a process for making. 	<ul style="list-style-type: none"> Design Values: Use design criteria based on the values of Inclusivity and Accessibility. Identify User Needs: Use interviews to identify user needs. Generate Ideas: Take photographs and use these as inspiration. Communicate Designs: A model is a way of showing a design idea in 3D. Communicate Designs: When designers communicate their ideas, they need to be drawn at the right size. Communicate Designs: Talk about simple design ideas with others.
Year 2	<p style="text-align: center;">Salads</p> <p>Preparing healthy, balanced salads that include proteins.</p>	<p style="text-align: center;">Wheels & Axles</p> <p>An engineering project to design a buggy that rolls straight and smoothly.</p>	<p style="text-align: center;">Glove Puppets</p> <p>Creating props to tell a story to pupils in the EYFS.</p>
VC	<p>Food Sources:</p> <ul style="list-style-type: none"> Foods come from a range of sources, including plants (fruits and vegetables) and animals (meat and dairy products). Milk comes from animals like cows, sheep, and goats. Foods made from animal milks are called dairy products. Some foods are eaten as they are (e.g. milk; fruits and vegetables). Some foods are processed in some way before we eat them (e.g. cheese is made from milk). <p>Nutrition & Eating:</p> <ul style="list-style-type: none"> Vegetarians choose not eat animal meat. Vegans do not eat any animal product. They eat milks and cheeses made from plants. Some foods are sweet, and some are salty. Texture is about how food feels in our mouths. Food textures include hard, soft, rough, smooth, crunchy, crispy, chewy, creamy. Food is more interesting to eat if it has more than one texture at a time. 	<p>In this engineering project, pupils design a buggy that will travel down a ramp and roll the furthest possible distance from its starting point. In the focused practical tasks, pupils will make and test different configurations of buggy, including fixed and free axles and wheels of different sizes and thickness.</p> <p>Mechanisms:</p> <ul style="list-style-type: none"> A moving buggy will include the body, wheels, axles, axle holders, and chassis. There are two types of axle: fixed and free. Fixed axles attach to the chassis. Free axles are not attached to the chassis and can spin within the chassis. <p>Structures:</p> <ul style="list-style-type: none"> Triangulation makes structures stronger and more stable. <p>D&T Shaping the World:</p> <ul style="list-style-type: none"> Artists often create art for its own sake. Designers create things that are useful and have a purpose. Engineers are scientists who use their knowledge to make things that work like bridges and cars. 	<p>Pupils will design and make a glove puppet, made to fit the size of their hand, which will help to tell a story to pupils in EYFS (or other people) in the school environment. In the focused practical tasks, pupils practise joining fabrics in different ways, including a running stitch with needle and thread, glue and staples.</p> <p>Materials:</p> <ul style="list-style-type: none"> Materials - including different types of fabric - have different properties and are used to make different objects.

	<p>Food Safety & Hygiene:</p> <ul style="list-style-type: none"> • Tie hair back and wash hands after sneezing, coughing and going to the toilet to stop the tiny living things on our hands getting into our bodies. 		
PK	<p>Prepare:</p> <ul style="list-style-type: none"> • Remove the outer leaves of lettuce and wash and drain them. • Use senses (sight, smell and touch) to check foods for any bits that should not be eaten. • Use a colander or sieve to drain canned foods • Chop using the claw and bridge technique. • Chop a range of foods, including the above plus tomatoes, lettuce, feta and prepared cheddar. • Peel and grate carrots. <p>Combine & Assemble:</p> <ul style="list-style-type: none"> • Dress salad using two utensils and layer food on a bed of salad. 	<ul style="list-style-type: none"> • Shaping: Shape wooden lollipop sticks. • Joining: Use pre-drilled push fit items to join them, and sticky pads to join materials. 	<ul style="list-style-type: none"> • Marking out: Temporarily fix a template or pattern to a material using pins and paperclips, and use chalk to mark out shapes before cutting them. • Marking out: Position patterns on fabrics in a way that reduces waste. • Shaping: Shape fabric using scissors, and use rubber bands to shape materials. • Joining: Use staples and fabric glue to join materials. • Joining: Thread a needle and join fabrics using a running stitch. • Joining: Use a seam allowance to make sure that the patterns keep their shape. • Joining: Hide a seam by joining 'right sides together'. • Finishing: Finish fabrics by decorating with buttons, pipe cleaners or other pieces of fabric.
DK	<ul style="list-style-type: none"> • Make food choices based on colour and quantity of sugar, plus quantities of fat and salt, and dietary requirements (vegans and vegetarians). 	<ul style="list-style-type: none"> • Generate Ideas: Use 'what if' questions to generate ideas. • Make, Test, Iterate: Designers and engineers build prototypes to test and improve their products. 	<ul style="list-style-type: none"> • Design Values: Use design criteria based on the value of the Making Process. • Identify User Needs: Contribute to design criteria by using approximate measurements (of the hand). • Generate Ideas: Use premade templates, 'draw and fold', story books and personal photographs to inspire designs and creative ideas. • Make, Test, Iterate: When using textiles, designers make a pattern from paper to test before making the final product. • Communicate Designs: Draw simple design ideas and label them.

Year 3	Picture Frames Picture frames that would be made and sold in a commercial context.	Keeping it Contained A solution for users who struggle to keep possessions safe in their bag.	Sandwiches and Packed Lunches Making sandwiches with a balance of proteins fats & carbohydrates.
VC	<p>Pupils will build knowledge of frame and shell structures by designing and creating structures that can serve as picture frames that would be sold in a commercial context. In the focused practical tasks, pupils will make and test different ways of making their structures stand (with a stand and ties) or hang on a wall.</p> <p>Structures:</p> <ul style="list-style-type: none"> • Triangulation makes structures and joints stronger and more stable. • Free-standing structures can be made more stable by adding a stand. • Ties can make structures more stable. <p>D&T Shaping the World:</p> <ul style="list-style-type: none"> • Free standing structures in the world around us have been made strong and stable with triangulation, using strong materials and having a wide base. 	<p>Pupils will design a product with a specific user and problem in mind (e.g. teacher keeps breaking sunglasses that are loose in their backpack), in a school or home context. In the focused practical tasks, pupils will practise ways of joining fabrics, and blanket stitches and other ways of finishing the container.</p>	<p>Food Sources:</p> <ul style="list-style-type: none"> • Bread is made from flour, which is ground seeds of the wheat plant. • Sources of meat include chicken, sheep (lamb), pigs (pork products), tuna and other fish. <p>Nutrition & Eating:</p> <ul style="list-style-type: none"> • Some people are allergic to certain types of food, like nuts or gluten. This means their body reacts when they eat or are in contact with these foods. Some food allergies are mild, and some can be very serious. <p>Food Safety & Hygiene:</p> <ul style="list-style-type: none"> • Food should not be eaten after the 'use by' date. Foods can be eaten after the 'best before' date, but we should check them first. • High risk foods with a 'use by' date should be kept in the fridge. • Hands should be washed after handling raw eggs to stop the tiny things living in there getting into our bodies, because they can make us unwell.
PK	<ul style="list-style-type: none"> • Marking out: Use a set square to keep right angles. • Shaping: Use a bradawl to make a hole. • Shaping: Cut hard materials like wood with a junior hacksaw and clamps. • Finishing: Finish products with decorations using paints. 	<ul style="list-style-type: none"> • Joining: Sew using a back stitch, and use press studs, hook-and-eyes, buttons and tying with ribbon to join fabrics. • Finishing: Finish fabrics using a blanket stitch. 	<p>Prepare:</p> <ul style="list-style-type: none"> • Chop a range of foods, including the above plus hard-boiled eggs and cheddar. • Peel hard-boiled eggs. <p>Combine & Assemble:</p> <ul style="list-style-type: none"> • Stir with a teaspoon or tablespoon. • Spread butter / margarine with a knife. <p>Cook:</p> <ul style="list-style-type: none"> • Use a hob to boil (an egg). <p>Work in the Kitchen:</p> <ul style="list-style-type: none"> • Independently maintain a clean and organised workspace.

DK	<ul style="list-style-type: none"> • Design Values: Use shared design criteria based on the value of Sustainability (and the whole life cycle of the product). • Generate Ideas: Disassemble different products and use these as inspiration for creating own ideas. 	<ul style="list-style-type: none"> • Design Values: Develop own, individual design criteria based on design values. • Identify User Needs: Identify a user's needs in a specific context, when they have a specific problem, through observations. • Identify User Needs: Identify a user's needs through a 'user trip' (doing the task that the user needs to do). • Generate Ideas: Use constraints (e.g. max A5 page), Zwicky tables, and inspiration from nature to generate ideas. 	<ul style="list-style-type: none"> • Make food choices based on colour; quantities of sugar, fat, and salt; dietary requirements; plus knowledge of food allergies.
Year 4	<p style="text-align: center;">Soups</p> <p style="text-align: center;">Cooking vegetables and grains and combining into healthy soups.</p>	<p style="text-align: center;">Pulleys</p> <p style="text-align: center;">Using pulleys and levers to create a video that shares a message.</p>	<p style="text-align: center;">Mood Lighting</p> <p style="text-align: center;">Using nets and circuits to programme lighting</p>
VC	<p>Food Sources:</p> <ul style="list-style-type: none"> • Beans and lentils are edible seeds from plants. • Seasoning adds to the taste of food. Seasoning can include salt, spices (like pepper), herbs, and sugar. • Spices are usually made from the seeds, roots, stem or fruits of a plant and add flavour to food. • Herbs are usually the leaves of a plant and add flavour to food. • Mushrooms are not plants nor animals. They are a type of fungus. <p>Nutrition & Eating:</p> <ul style="list-style-type: none"> • Some people are intolerant to certain types of food, like gluten or dairy products. This means their bodies cannot digest the foods. It can cause discomfort. <p>Food Safety & Hygiene:</p> <ul style="list-style-type: none"> • Hobs and hand blenders need to be used with care, keeping our fingers away. • When blending hot liquids, the blender should be on and/or it is kept well away from the user. • Food preparation sources should be wiped down before and after use to stop the tiny living things on the surfaces getting onto food. 	<p>Pupils will use a series of mechanisms like levers, pulleys and cams to create a video or scene that conveys a message to a wider environment content. In the focused practical tasks, pupils will make a range of mechanisms and test them to see which provide the most appropriate movement for their video.</p> <p>Mechanisms:</p> <ul style="list-style-type: none"> • A pulley is a simple mechanism. It is a grooved wheel that spins on an axle. • A drive belt transfers movement from one pulley to another. • A cam changes the direction of movement from rotary to reciprocal. • A spring is an energy store. It stores energy that can be transferred to a different energy store (link to Y5 Sci Aut) • Pulleys can redirect forces, or reduce the force required to lift heavy objects. <p>Structures:</p> <ul style="list-style-type: none"> • A shell structure has a continuous outer 'shell' and do not have a frame, like an egg shell or a dome in a building. 	<p>Pupils will design a lighting system that creates mood lighting for different leisure settings (e.g. bedtime, party, waking up). They will review knowledge of electrical circuits from Science and programming from Computing. In the focused practical tasks, pupils will design 3D structures from 2D nets to house the lighting system.</p> <p>Structures:</p> <ul style="list-style-type: none"> • Frame and shell structures can be made by folding 2D nets. <p>Programming (if not taught in Computing):</p> <ul style="list-style-type: none"> • Electronic control systems have inputs, outputs and a central processor. • A process flow chart drives a programmable system. • Flow charts use key words of 'if', 'then', 'stop', 'start', 'repeat' and other command words (depending on software) • Programmes can run for a given number of loops or a set amount of time, or until something is no longer true. • A variable is something that be changed.

	<ul style="list-style-type: none"> Food preparation areas should be left clean so that food pests are not attracted. 	<ul style="list-style-type: none"> A frame structure is made from separate pieces of material called members that form a frame, like climbing frames or houses. <p>D&T Shaping the World:</p> <ul style="list-style-type: none"> Prehistoric Britons, Ancient Egyptians, Ancient Greeks, Ancient Maya, Early Islamic Civilisation used knowledge of mechanisms to make levers and pulleys. (Link to History). 	
PK	<p>Prepare:</p> <ul style="list-style-type: none"> Chop a range of foods, including mushrooms, carrots, and peppers. Crush garlic. Measure volumes in millilitres and litres using a measuring jug. <p>Combine & Assemble:</p> <ul style="list-style-type: none"> Use a food processor or hand mixer. <p>Cook:</p> <ul style="list-style-type: none"> Use a hob to sauté and simmer food, and to boil (vegetables). <p>Work in the Kitchen:</p> <ul style="list-style-type: none"> Wash up items in the most appropriate order, starting with least dirty, and change washing up water as required. 	<ul style="list-style-type: none"> Shaping: Cut modelling wire with pliers and shape wooden dowel with a junior hacksaw. 	<ul style="list-style-type: none"> Shaping: Score with scissors to get a sharp crease.
DK	<ul style="list-style-type: none"> Make food choices based on colour; quantities of sugar, fat, and salt; dietary requirements; knowledge of food allergies; plus food miles. 		<ul style="list-style-type: none"> Generate Ideas: Use 'quick draw eights' to generate ideas. Make, Test, Iterate: Design process is iterative, and includes generating ideas; evaluating; testing and refining.
Year 5	<p>Interactive Display</p> <p>Interactive information display for a context decided by pupils.</p>	<p>Sauces</p> <p>Building foundational cooking skills with a range of staple sauces.</p>	<p>Flat Pack</p> <p>Designing a flat pack toy or model that can be sold for construction by users.</p>
VC	<p>In this programming project, pupil review knowledge of mechanisms from Year 4 D&T; electrical circuits from Science; and programming from Computing to design and make an interactive information display for the school or local community.</p> <p>D&T Shaping the World:</p>	<p>Food Sources:</p> <ul style="list-style-type: none"> Pasta is made from wheat flour and water (and sometimes egg). Couscous is a type of pasta. <p>Food Safety & Hygiene:</p>	<p>Pupils will design and produce 'flat pack' toys, which can be slotted together by the end user as a leisure activity. Pupils could design this to be sold in a museum shop or toy shop (enterprise). In the focused practical task, pupils will use computer-aided design to create slottable shapes and test them quickly.</p>

	<ul style="list-style-type: none"> Technology – and programmable technology – has had a huge impact on the world in living memory. <p>Also review from Y4 Spr Mechanisms:</p> <ul style="list-style-type: none"> A pulley is a simple mechanism. It is a grooved wheel that spins on an axle. A drive belt transfers movement from one pulley to another. A cam changes the direction of movement from rotary to reciprocal. A spring is an energy store. It stores energy that can be transferred to a different energy store (link to Y5 Sci Aut) Pulleys can redirect forces, or reduce the force required to lift heavy objects. 	<ul style="list-style-type: none"> High risk foods that are cooked and ready to eat should be served immediately or kept in the fridge for 2-4 days. Use a material that is a poor thermal conductor (thermal insulator) when stirring hot food or removing food from the oven. 	<p>Structures:</p> <ul style="list-style-type: none"> Structures can be made by slotting items together. <p>D&T Shaping the World:</p> <ul style="list-style-type: none"> Flat pack furniture has made it easier for people to buy and transport furniture to their home.
PK		<p>Prepare:</p> <ul style="list-style-type: none"> Use a can opener. Chop a range of foods, including the above plus onions and cauliflower. Measure mass in grams and kilograms using a balance. Knowing when to measure (estimation) <p>Combine & Assemble:</p> <ul style="list-style-type: none"> Use a blender or hand-held blender. Whisk (to make roux and Bechamel sauce). <p>Cook:</p> <ul style="list-style-type: none"> Use a hob to boil (pasta). Use an oven to roast vegetables and brown cheese. 	<ul style="list-style-type: none"> Joining: Join pieces by slotting. Finishing: File or sand to smooth edges.
DK		<ul style="list-style-type: none"> Make food choices based on colour; quantities of sugar, fat, and salt; dietary requirements; knowledge of food allergies; food miles; plus time taken to prepare. 	<ul style="list-style-type: none"> Make, Test, Iterate: Use Computed-Aided design to test models quickly and effectively. Communicate Designs: Create a flow chart for the process of making (the model/toy from the flat pack). Communicate Designs: Draw an exploded diagram.

Year 6	Head Coverings Made to measure hats and head coverings for a context decided by pupils.	Sustainable Systems Identifying a need and designing a sustainable solution at a system level.	Savoury Snacks Cooking and baking filled pastries and other balanced picnic snacks.
VC		D&T Shaping the World: <ul style="list-style-type: none"> Designers and engineers have developed sustainable systems in agriculture, waste and electricity generation 	Food Sources: <ul style="list-style-type: none"> Foods can be minimally processed (like fresh fruit and vegetables); moderately processed (like cheese and flour); significantly processed (like baked beans); or ultra-processed (like ready meals; sugary cereals and crisps). Nutrition & Eating: <ul style="list-style-type: none"> A healthy diet is made up of mostly minimally and moderately processed foods. Too many ultra-processed foods should be avoided. Food Safety & Hygiene: <ul style="list-style-type: none"> The tiny living things that we need to stop getting into food are bacteria and viruses. They can sometimes make us unwell.
PK	<ul style="list-style-type: none"> Joining: Join fabrics using an over stitch. Finishing: Release tension by snipping along a curved seam. Finishing: Make minor adjustments to ensure a good fit. 		Prepare: <ul style="list-style-type: none"> Crack eggs. Combine & Assemble: <ul style="list-style-type: none"> Rub flour into butter. Shape and cut using cutters. Cook: <ul style="list-style-type: none"> Use an oven to bake food.
DK	<ul style="list-style-type: none"> Identify User Needs: Develop design criteria with exact measurements. Evaluate: Evaluate products through secondary research and evaluate the sources of this secondary information. Communicate Designs: Draw designs with measurements in centimetres. 	<ul style="list-style-type: none"> Design Values: Develop own design criteria based on the value of Necessity: do we really <i>need</i> to design this product? Identify User Needs: Recognise the difference between user needs and user wants in an interview. Identify User Needs: Identify different users who may use a service, and how their needs may be different. Generate Ideas: Identify a problem or issue in a system, and design to help solve this problem. 	<ul style="list-style-type: none"> Make food choices based on colour; quantities of sugar, fat, and salt; dietary requirements; knowledge of food allergies; food miles; time taken to prepare; plus carbon footprint of production and transport; occasion; and cost.

Procedural Knowledge Map

Procedural Knowledge Map								
	D & T The skills and craftsmanship of designers and engineers.				Food Cooking skills and techniques.			
	Marking Out	Shaping	Joining	Finishing	Preparation	Combining & Assembling	Cooking	Working in the Kitchen
Year 1	Use a pencil or chalk to decide on the location of holes prior to making them. Use a ruler to mark out the position of a straight line.	Make a hole using a hole punch. Make a hole using a sharp pencil and blue tack. Cut materials with scissors. Shape plasticine using rolling pins and basic craft tools. Shape paper, card, aluminium foil, plastic sheets, pipe cleaners, plasticine, art straws.	Use a split pin to join materials. Use folding to secure pieces in place. Use glue sticks to join materials. Use Blu-Tac to (temporarily) join materials. Use PVA glue to join materials. Use sellotape to join materials. Use masking tape to join materials.	Finish products with decorations using colouring pencils. Finish products with decorations made or sources from a computer.	Wash and drain fruits. Chop using the claw technique. Chop a range of foods, including bananas, grapes, strawberries, cucumber and prepared pears, pineapple, peppers and carrots. Peel bananas, satsumas. Measure dry foods and liquids using a teaspoon and tablespoon.	Stir with wooden spoon. Use fruit juice to prevent browning.		Follow simple recipes. Wash up items by removing excess food, washing, rinsing and drying.
Year 2	Temporarily fix a template or pattern to a material using pins and paperclips, and mark out shapes before cutting them. Position patterns to reduce waste (link to Science and Sustainability).	Shape wooden lollipop sticks, rubber bands and fabrics.	Use pre-drilled push fit items to join them. Use sticky pads to join materials. Use a seam allowance to join fabrics. Hide a seam by joining fabrics 'right sides together'. Use staples to join fabric and other materials.	Finish fabrics by decorating with buttons, pipe cleaners or other pieces of fabric.	Remove the outer leaves of vegetables (e.g. lettuce) and wash and drain them. Use senses (sight, smell and touch) to check foods for any bits that should not be eaten. Use a colander or sieve to drain canned foods	Dress salad using two utensils. Layer food on a bed of salad.		Application of the above.

			Use pins to (temporarily) join materials. Use fabric glue to join fabrics Join fabrics using a running stitch. Thread a needle and start a stitch.		Chop using the claw and bridge technique. Chop a range of foods, including the above plus tomatoes, lettuce, feta and prepared cheddar. Peel carrots. Grate carrots.			
Year 3	Use a set square to keep right angles.	Make a hole using a bradawl. Cut hard materials using a junior hacksaw and clamps.	Join fabrics using a back stitch. Join fabrics using press studs, hooks and eyes, buttons, and tying with ribbon. Join pieces by slotting.	Finish products with decorations using paints. Finish fabrics using a blanket stitch	Chop a range of foods, including the above plus hard-boiled eggs and cheddar. Peel hard-boiled eggs.	Stir with a teaspoon or tablespoon. Spread butter / margarine with a knife.	Use a hob to boil (an egg).	Application of the above. Independently maintain a clean and organised workspace.
Year 4	Review of the above.	Score with scissors to get a sharp crease.	Review of the above.	File or sand to shape and smooth.	Chop a range of foods, including the above plus mushrooms, carrots, and peppers. Crush garlic. Mathematics: Measure volumes in millilitres and litres using a measuring jug.	Use a food processor or hand mixer.	Use a hob to sauté food. Use a hob to simmer food. Use a hob to boil (vegetables).	Application of the above. Wash up items in the most appropriate order, starting with least dirty, and change washing up water as required.
Year 5	Use a ruler to measure lengths in centimetres.	Cut very hard materials, such as modelling wire with pliers.	Review of the above.	Review of the above.	Use a can opener. Chop a range of foods, including the above plus onions and cauliflower. Mathematics: Measure mass in grams and	Use a blender or hand-held blender. Whisk (to make roux and Bechamel sauce).	Use a hob to boil (pasta). Use an oven to roast vegetables. Use an oven to brown cheese.	Application of the above.

					kilograms using a balance. Knowing when to measure (estimation)			
Year 6	Review of the above.	Review of the above.	Fasten fabrics using a toggle. Join fabrics using an over stitch.	Release tension by snipping along a curved seam.	Crack eggs.	Rub flour into butter. Shape and cut using cutters.	Use an oven to bake food.	Application of the above.

Disciplinary Knowledge Map								
	Designing in Different Contexts	Design Values	Identifying User Needs	Evaluating Products	Generating Ideas	Making, Testing, Iterating	Communicating Designs	Making Food Choices
Year 1	Design a product for users in a home environment. Design a product for users in a local community environment.	Design and evaluate based on: Visual appeal. Materials. Function. Inclusivity and accessibility.	Identify the specific users that products have been made for and the purpose they have. Make choices about user(s) to design for. Identify user needs through interviews (qualitative).	Evaluate products according to the design criteria, which grows in complexity as the list of design values grow.	Generate ideas in a range of ways, including: Taking photographs and using these as inspiration.	Designing is about trying something and seeing what works, and trying again.	Contribute to a class storyboard to show the process for making. A model is a way of showing a design idea in 3D. When we communicate our design ideas they need to be drawn at the right size. Talk about simple design ideas with others.	Make food choices based on: Colour. Quantity of sugar. Seasonality.
Year 2	Design a product for users in a school environment.	Design and evaluate based on: The above values.	Identify design criteria through approximate measurements.		Generate ideas in a range of ways, including: The above.	Designers build prototypes to test their products. When using textiles, designers	Draw simple design ideas and labelling them.	Make food choices based on: The above. Quantity of fat. Quantity of salt.

		The making process.			'What if' questions. Premade templates. 'Draw and fold'. Using story books. Using personal photographs.	make a pattern from paper to test before making the final product.		Dietary requirements (vegans and vegetarians)
Year 3	Design a product for users in a commercial environment.	Design and evaluate based on: The above values Sustainability (of the whole product life cycle).	Identify user needs through observations (qualitative). Identify user needs through a 'user trip' (doing the thing that users do). Identify a user's needs in a specific context, when they have a specific problem.		Generate ideas in a range of ways, including: The above. Disassembling existing products. Using design constraints. Using Zwicky tables. Using nature to get inspiration.			Make food choices based on: The above. Food allergies
Year 4	Design a product for users in an enterprise environment. Design a product for users in a leisure environment.		Explicit review of the above.		Generate ideas in a range of ways, including: The above. 'Quick Draw Eights'	Use CAD to test models quickly and effectively. Design process is iterative, and includes generating ideas; evaluating; testing and refining.	Create a flow chart for process for making. Draw an exploded diagram.	Make food choices based on: The above. Food miles.
Year 5	Design a product for users in a wider environment.		Explicit review of the above.		Review of the above, selecting best strategies for the given context.			
Year 6		Design and evaluate based on: The above values	Identify design criteria through exact measurements (cm).	Evaluate products through secondary research.	Review of the above, selecting best strategies for the given context.		Draw designs that show measurements.	Make food choices based on: The above Carbon footprint of production and transport.

		Necessity (do we really <i>need</i> this product?).	Recognise the difference between needs and wants in user interviews. Identify different users who may use a service, and how their needs may differ.	Evaluate sources of secondary research.				Occasion. Cost.
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