

Design and Technology Curriculum



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Intent

The 2014 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.

At Rode Heath, we aim to provide opportunities for our children to create products for a range of purposes, developing a variety of relevant and adaptable skills and habits that are built upon as they progress through the years (and are life-long*). We want them to be able to apply their own ideas to create real-life solutions to needs within the current world we live in. Through this, the aim is that the children will become progressively more competent and confident with communicating their designs, increasingly dexterous with the skills necessary (from cookery to sewing to construction skills etc) and increasingly proficient in evaluating their own projects and those of others.

*Instilling our whole school ethos of Engineering Habits of Mind (EHoM) in our pupils is key to all of the above.

Furthermore, our design and technology curriculum at Rode Heath is inclusive in order for all children to achieve and develop their skills to the best of their ability with no barriers such as gender stereotypes within certain industries.

Implementation

Our design and technology curriculum, which uses Kapow planning, links closely with other subjects, especially STEM subjects, computing and art. It is informed by the expertise of real-life industry professionals, through the study of renowned specialists including engineers, designers, architects etc; excursions to relevant industries (local where possible); and visits from engineers, to inspire, consult and advise us.

At the end of each unit of study, the children have a composite assessment task to carry out - an opportunity for them to demonstrate the skills they have accumulated.

We also have specific whole school enrichment days planned, dedicated to carrying out activities relating to our particular chosen themes within design and technology.

Impact

Pupils will:

- *be familiar with the whole design and make process, valuing the importance of each aspect.
- *be willing to have a go, recognising that mistakes are part of the process.
- *develop and use Engineering Habits of Mind (EHoM) throughout the curriculum.
- *develop and refine skills within the disciplines, including inventing, cooking, sewing etc
- *build STEM capital




Curriculum Overview Key Stage 1

Reception	Junk Modelling Focused Practical Tasks - Developing scissor skills / Joining materials together	Textiles - Bookmarks Focused Practical Task – threading and weaving skills.	Structures: Boats Focused Practical Task – which shape moves best through the water?
	Composite Task To design and build a junk model	Composite Task To create a textiles product (bookmark) following their own design	Composite Task Creating and testing a boat of their own design.
Year 1	Mechanisms – Moving Story Book Focused Practical Task – to follow a design to create moving models that use levers and sliders.	Cooking and Nutrition – Fruit and Vegetables Focused Practical Task – to cut food safely.	Structures – Constructing Windmills Focused Practical Task - Learning how to turn 2D nets into 3D structures
	Composite Task To construct a page for a moving picture book related to a curriculum topic	Composite Task To design and make a smoothie	Composite Task To make a functioning turbine which is assembled into a main supporting structure.
Year 2	Textiles – Making a Pouch / Puppet Focused Practical Task – joining two pieces of fabric together using sewing skills	Cooking and Nutrition – a balanced diet Focused Practical Task – to slice food safely using the bridge or claw grip.	Structures – constructing a castle Focused Practical Task – to make 3D shapes using nets.
	Composite Task Design and make a pouch/ puppet using sewing skills	Composite Task Design and make a wrap using healthy ingredients	Composite Task Design and construct a castle using 3D shapes from nets.
	Mechanisms – Fairground Wheel Focused Practical Task - to explore and understand wheel mechanisms		
	Composite Task To build a stable structure with a rotating wheel.		

Curriculum Overview Key Stage 2

Year 3	Textiles – Cushions Focused Practical Task - To learn how to sew cross-stitch and appliqué	Cooking and Nutrition – eating seasonally Focused Practical Task – To follow the instructions within a recipe.	Mechanisms – Pneumatic Toys Focused Practical Task - to explore pneumatic systems and to understand the purpose of and use exploded-diagrams.
	Composite Task Make a cushion that includes appliqué and cross-stitch.	Composite Task Design their own tart recipe using seasonal ingredients.	Composite Task Using syringes and balloons to create different types of pneumatic systems to make a functional and appealing pneumatic toy.
	Electrical Systems – Crumble LINKS TO COMPUTING CURRICULUM		
	Composite Task Create a Crumble Sparkle creature - https://projects.raspberrypi.org/en/projects/make-crumble-sparkle-creature/6		
Year 4	Electrical Systems – torches Focused Practical Task – making a switch	Cooking and Nutrition – Adapting a biscuit recipe Focused Practical Task - To know the following cooking techniques: sieving, creaming, rubbing method, cooling.	Textiles - Fastenings Focused Practical Task - To identify and evaluate different types of fastenings
	Composite Task Design and make wearable torch.	Composite Task Adapt a recipe by adding extra ingredients to it. Plan a biscuit recipe within a budget.	Composite Task Design and make a pencil case / book jacket
	LINKS TO SCIENCE CURRICULUM Structure – pavilions Focused Practical Task - explore different frame structures to test which are the most stable		
	Composite Task Designing a stable pavilion structure that is aesthetically pleasing and selecting materials to create a desired effect		

Year 5	Cooking and Nutrition – astronaut food	<u>Mechanical Systems – make a pop up book</u> Focused Practical Tasks – Understand how to strengthen, stiffen and reinforce more complex structures - Understand and use mechanical systems in products [for example, gears, pulleys, cams, levers and linkages]	<u>Structures – Building Bridges</u> Focused Practical Tasks – to focus on how different shapes affect the strength of bridges with a focus on triangulation
	Composite Task Design and make a snack for an astronaut LINKS TO SCIENCE CURRICULUM	Composite Task Design a pop-up book which uses a mixture of structures and mechanisms.	Composite Task To build a wooden truss bridge
	<u>Digital System – Monitoring Devices</u> Focused Practical Tasks - to learn about and practise 3D CAD skills		
	Composite Task To write a program to monitor the ambient temperature including an alert and make a case for your micro:bit using CAD LINKS TO COMPUTING CURRICULUM		
Year 6	<u>Electrical Systems – Design a Steady Hand game</u> Focused Practical Task – to draw a design from three different perspectives.	<u>Cooking & Nutrition – Come Dine with Me</u> Focused Practical Task – to write a recipe, explaining the key steps, method and ingredients.	<u>Mechanical Systems – Automata Toys</u> Focused Practical Task – to understand and draw cross-sectional diagrams to show the inner-workings of a design.
	Composite Task	Composite Task To research, write and prepare a 3-course meal following a recipe.	Composite Task Create a toy for young child with moving parts that meets specified design criteria.

	<p>Design a steady hand game of their own according to their design criteria, using four different perspective drawings.</p> <p>LINKS TO SCIENCE CURRICULUM</p>		
	<p>Digital Technology – Navigating the World</p> <p>Focused Practical Task - to develop a product idea through annotated sketches.</p> <p>To combine more than one object to develop a finished 3D CAD model in Tinkercad.</p>	<p>Textiles – Stuffed Reception Toys</p> <p>Focused Practical Task – to use a template when pinning panels onto fabric.</p> <p>To mark and cut fabric accurately, in accordance with a design.</p>	
	<p>Composite Task</p> <p>To design and develop an idea for a navigational tool and explain the key functions and features to a client as part of a product concept pitch.</p> <p>LINKS TO COMPUTING CURRICULUM</p>	<p>Composite Task</p> <p>Design and make a stuffed toy based on a Reception pupil’s drawing considering the main component shapes required and creating an appropriate template.</p>	

EYFS (Reception)

Structures

Structures: Junk modelling

Structures: Boats

Skills	Design	<ul style="list-style-type: none"> • Making verbal plans and material choices. • Developing a junk model. 	<ul style="list-style-type: none"> • Designing a junk model boat. • Using knowledge from exploration to inform design.
	Make	<ul style="list-style-type: none"> • Improving fine motor/scissor skills with a variety of materials. • Joining materials in a variety of ways (temporary and permanent). • Joining different materials together. • Describing their junk model, and how they intend to put it together. 	<ul style="list-style-type: none"> • Making a boat that floats and is waterproof, considering material choices.
	Evaluate	<ul style="list-style-type: none"> • Giving a verbal evaluation of their own and others’ junk models with adult support. • Checking to see if their model matches their plan. • Considering what they would do differently if they were to do it again. • Describing their favourite and least favourite part of their model. 	<ul style="list-style-type: none"> • Making predictions about, and evaluating different materials to see if they are waterproof. • Making predictions about, and evaluating existing boats to see which floats best. • Testing their design and reflecting on what could have been done differently.

			<ul style="list-style-type: none"> Investigating the how the shapes and structure of a boat affect the way it moves.
Knowledge	Technical	<ul style="list-style-type: none"> To know there are a range to different materials that can be used to make a model and that they are all slightly different. Making simple suggestions to fix their junk model. 	<ul style="list-style-type: none"> To know that 'waterproof' materials are those which do not absorb water.
	Additional		<ul style="list-style-type: none"> To know that some objects float and others sink. To know the different parts of a boat.

Structures

		Year 1	Year 2
		Structures - <u>Constructing a windmill</u>	Structures - <u>Constructing a Castle</u>
Skills	Design	<ul style="list-style-type: none"> • Learning the importance of a clear design criteria. • Including individual preferences and requirements in a design. 	<ul style="list-style-type: none"> • Designing a castle with key features to appeal to a specific person/purpose. • Drawing and labelling a castle design using 2D shapes, labelling: -the 3D shapes that will create the features - materials needed and colours. • Designing and/or decorating a castle tower on CAD software.
	Make	<ul style="list-style-type: none"> • Making stable structures from card, tape and glue . • Learning how to turn 2D nets into 3D structures. • Following instructions to cut and assemble the supporting structure of a windmill. • Making functioning turbines and axles which are assembled into a main supporting structure. 	<ul style="list-style-type: none"> • Constructing a range of 3D geometric shapes using nets. • Creating special features for individual designs. • Making facades from a range of recycled materials.
	Evaluate	<ul style="list-style-type: none"> • Evaluating a windmill according to the design criteria, testing whether the structure is strong and stable and altering it if it isn't. • Suggest points for improvements. 	<ul style="list-style-type: none"> • Evaluating own work and the work of others based on the aesthetic of the finished product and in comparison to the original design. • Suggesting points for modification of the individual designs.
Knowledge	Technical	<ul style="list-style-type: none"> • To understand that the shape of materials can be changed to improve the strength and stiffness of structures. • To understand that cylinders are a strong type of structure (e.g. the main shape used for windmills and lighthouses). • To understand that axles are used in structures and mechanisms to make parts turn in a circle. • To begin to understand that different structures are used for different purposes. • To know that a structure is something that has been made and put together. 	<ul style="list-style-type: none"> • To understand that wide and flat based objects are more stable. • To understand the importance of strength and stiffness in structures.
	Additional	<ul style="list-style-type: none"> • To know that a client is the person I am designing for. • To know that design criteria is a list of points to ensure the product meets the clients needs and wants. • To know that a windmill harnesses the power of wind for a purpose like grinding grain, pumping water or generating electricity. • To know that windmill turbines use wind to turn and make the machines inside work. • To know that a windmill is a structure with sails that are moved by the wind. • To know the three main parts of a windmill are the turbine, axle and structure. 	<ul style="list-style-type: none"> • To know the following features of a castle: flags, towers, battlements, turrets, curtain walls, moat, drawbridge and gatehouse - and their purpose. • To know that a façade is the front of a structure. • To understand that a castle needed to be strong and stable to withstand enemy attack. • To know that a paper net is a flat 2D shape that can become a 3D shape once assembled. • To know that a design specification is a list of success criteria for a product.

Structures

		Year 4	Year 5
		Structures - <u>Pavilions</u>	Structures - <u>Bridges</u>
Skills	Design	<ul style="list-style-type: none"> Designing a stable pavilion structure that is aesthetically pleasing and selecting materials to create a desired effect. Building frame structures designed to support weight. 	<ul style="list-style-type: none"> Designing a stable structure that is able to support weight. Creating a frame structure with a focus on triangulation.
	Make	<ul style="list-style-type: none"> Creating a range of different shaped frame structures. Making a variety of free standing frame structures of different shapes and sizes. Selecting appropriate materials to build a strong structure and cladding. Reinforcing corners to strengthen a structure. Creating a design in accordance with a plan. Learning to create different textural effects with materials. 	<ul style="list-style-type: none"> Making a range of different shaped beam bridges. Using triangles to create truss bridges that span a given distance and support a load. Building a wooden bridge structure. Independently measuring and marking wood accurately. Selecting appropriate tools and equipment for particular tasks. Using the correct techniques to saws safely. Identifying where a structure needs reinforcement and using card corners for support. Explaining why selecting appropriating materials is an important part of the design process. Understanding basic wood functional properties.
	Evaluate	<ul style="list-style-type: none"> Evaluating structures made by the class. Describing what characteristics of a design and construction made it the most effective. Considering effective and ineffective designs. 	<ul style="list-style-type: none"> Adapting and improving own bridge structure by identifying points of weakness and reinforcing them as necessary. Suggesting points for improvements for own bridges and those designed by others.
Knowledge	Technical	<ul style="list-style-type: none"> To understand what a frame structure is. To know that a 'free-standing' structure is one which can stand on its own. 	<ul style="list-style-type: none"> To understand some different ways to reinforce structures. To understand how triangles can be used to reinforce bridges. To know that properties are words that describe the form and function of materials. To understand why material selection is important based on properties. To understand the material (functional and aesthetic) properties of wood.
	Additional	<ul style="list-style-type: none"> To know that a pavilion is a decorative building or structure for leisure activities. To know that cladding can be applied to structures for different effects. To know that aesthetics are how a product looks. To know that a product's function means its purpose. To understand that the target audience means the person or group of people a product is designed for. To know that architects consider light, shadow and patterns when designing. 	<ul style="list-style-type: none"> To understand the difference between arch, beam, truss and suspension bridges. To understand how to carry and use a saw safely.

Mechanisms

Year 1

Mechanisms - Making a moving storybook

Design

- Explaining how to adapt mechanisms, using bridges or guides to control the movement.
- Designing a moving story book for a given audience.

Make

- Following a design to create moving models that use levers and sliders.

Evaluate

- Testing a finished product, seeing whether it moves as planned and if not, explaining why and how it can be fixed.
- Reviewing the success of a product by testing it with its intended audience.

Technical

- To know that a mechanism is the parts of an object that move together.
- To know that a slider mechanism moves an object from side to side.
- To know that a slider mechanism has a slider, slots , guides and an object.
- To know that bridges and guides are bits of card that purposefully restrict the movement of the slider.

Additional

- To know that in Design and technology we call a plan a 'design'.

Skills

Knowledge

Mechanisms

		Year 2	Year 3
		Mechanisms - Fairground wheel	Mechanisms - <u>Pneumatic toys</u>
Skills	Design	<ul style="list-style-type: none"> • Selecting a suitable linkage system to produce the desired motion. • Designing a wheel. 	<ul style="list-style-type: none"> • Designing a toy which uses a pneumatic system. • Developing design criteria from a design brief. • Generating ideas using thumbnail sketches and exploded diagrams. • Learning that different types of drawings are used in design to explain ideas clearly.
	Make	<ul style="list-style-type: none"> • Selecting materials according to their characteristics. • Following a design brief. 	<ul style="list-style-type: none"> • Creating a pneumatic system to create a desired motion. • Building secure housing for a pneumatic system. • Using syringes and balloons to create different types of pneumatic systems to make a functional and appealing pneumatic toy. • Selecting materials due to their functional and aesthetic characteristics. • Manipulating materials to create different effects by cutting, creasing, folding and weaving.
	Evaluate	<ul style="list-style-type: none"> • Evaluating different designs. • Testing and adapting a design. 	<ul style="list-style-type: none"> • Using the views of others to improve designs. • Testing and modifying the outcome, suggesting improvements. • Understanding the purpose of exploded-diagrams through the eyes of a designer and their client.
Knowledge	Technical	<ul style="list-style-type: none"> • To know that different materials have different properties and are therefore suitable for different uses. 	<ul style="list-style-type: none"> • To understand how pneumatic systems work. • To understand that pneumatic systems can be used as part of a mechanism. • To know that pneumatic systems operate by drawing in, releasing and compressing air.
	Additional	<ul style="list-style-type: none"> • To know the features of a ferris wheel include the wheel, frame, pods, a base an axle and an axle holder. • To know that it is important to test my design as I go along so that I can solve any problems that may occur. 	<ul style="list-style-type: none"> • To understand how sketches, drawings and diagrams can be used to communicate design ideas. • To know that exploded-diagrams are used to show how different parts of a product fit together. • To know that thumbnail sketches are small drawings to get ideas down on paper quickly.

Mechanisms

		Year 5	Year 6
		Mechanisms - Pop up book	Mechanisms - Automata toys
Skills	Design	<ul style="list-style-type: none"> • Designing a pop-up book which uses a mixture of structures and mechanisms. • Naming each mechanism, input and output accurately. • Storyboarding ideas for a book. 	<ul style="list-style-type: none"> • Experimenting with a range of cams, creating a design for an automata toy based on a choice of cam to create a desired movement. • Understanding how linkages change the direction of a force. • Making things move at the same time. • Understanding and drawing cross-sectional diagrams to show the inner-workings of my design.
	Make	<ul style="list-style-type: none"> • Following a design brief to make a pop up book, neatly and with focus on accuracy. • Making mechanisms and/or structures using sliders, pivots and folds to produce movement. • Using layers and spacers to hide the workings of mechanical parts for an aesthetically pleasing result. 	<ul style="list-style-type: none"> • Measuring, marking and checking the accuracy of the jelutong and dowel pieces required. • Measuring, marking and cutting components accurately using a ruler and scissors. • Assembling components accurately to make a stable frame. • Understanding that for the frame to function effectively the components must be cut accurately and the joints of the frame secured at right angles. • Selecting appropriate materials based on the materials being joined and the speed at which the glue needs to dry/set.
	Evaluate	<ul style="list-style-type: none"> • Evaluating the work of others and receiving feedback on own work. • Suggesting points for improvement. 	<ul style="list-style-type: none"> • Evaluating the work of others and receiving feedback on own work. • Applying points of improvement to their toys. • Describing changes they would make/do if they were to do the project again.
Knowledge	Technical	<ul style="list-style-type: none"> • To know that mechanisms control movement. • To understand that mechanisms can be used to change one kind of motion into another. • To understand how to use sliders, pivots and folds to create paper-based mechanisms. 	<ul style="list-style-type: none"> • To understand that the mechanism in an automata uses a system of cams, axles and followers. • To understand that different shaped cams produce different outputs.
	Additional	<ul style="list-style-type: none"> • To know that a design brief is a description of what I am going to design and make. • To know that designers often want to hide mechanisms to make a product more aesthetically pleasing. 	<ul style="list-style-type: none"> • To know that an automata is a hand powered mechanical toy. • To know that a cross-sectional diagram shows the inner workings of a product. • To understand how to use a bench hook and saw safely. • To know that a set square can be used to help mark 90° angles.

Electrical Systems

		Year 3	Year 4
		<u>Electric poster - Using Crumble</u>	<u>Torches</u>
Skills	Design	<ul style="list-style-type: none"> Carry out research based on a given topic to develop a range of initial ideas. Generate a final design for the electric poster with consideration to the client's needs and design criteria. Design an electric poster that fits the requirements of a given brief. Plan the positioning of the bulb (circuit component) and its purpose. 	<ul style="list-style-type: none"> Designing a torch, giving consideration to the target audience and creating both design and success criteria focusing on features of individual design ideas.
	Make	<ul style="list-style-type: none"> Create a final design for the electric poster. Mount the poster onto corrugated card to improve its strength and allow it to withstand the weight of the circuit on the rear. Measure and mark materials out using a template or ruler. Fit an electrical component (bulb). Learn ways to give the final product a higher quality finish (e.g. framing to conceal a roughly cut edge). 	<ul style="list-style-type: none"> Making a torch with a working electrical circuit and switch. Using appropriate equipment to cut and attach materials. Assembling a torch according to the design and success criteria.
	Evaluate	<ul style="list-style-type: none"> Learning to give and accept constructive criticism on own work and the work of others. Testing the success of initial ideas against the design criteria and justifying opinions. Revisiting the requirements of the client to review developing design ideas and check that they fulfil their needs. 	<ul style="list-style-type: none"> Evaluating electrical products. Testing and evaluating the success of a final product.
Knowledge	Technical	<ul style="list-style-type: none"> To understand that an electrical system is a group of parts (components) that work together to transport electricity around a circuit. To understand common features of an electric product (switch, battery or plug, dials, buttons etc.). To list examples of common electric products (kettle, remote control etc.). To understand that an electric product uses an electrical system to work (function). To know the name and appearance of a bulb, battery, battery holder and crocodile wire to build simple circuits. 	<ul style="list-style-type: none"> To understand that electrical conductors are materials which electricity can pass through. To understand that electrical insulators are materials which electricity cannot pass through. To know that a battery contains stored electricity that can be used to power products. To know that an electrical circuit must be complete for electricity to flow. To know that a switch can be used to complete and break an electrical circuit.
	Additional	<ul style="list-style-type: none"> To understand the importance and purpose of information design. To understand how material choices (such as mounting paper to corrugated card) can improve a product to serve its purpose (remain rigid without bending when the electrical circuit is attached). 	<ul style="list-style-type: none"> To know the features of a torch: case, contacts, batteries, switch, reflector, lamp, lens. To know facts from the history and invention of the electric light bulb(s) - by Sir Joseph Swan and Thomas Edison.

Electrical Systems

Year 6

Electrical Systems: Steady hand game

Skills	Design	<ul style="list-style-type: none">• Designing a steady hand game - identifying and naming the components required.• Drawing a design from three different perspectives.• Generating ideas through sketching and discussion.• Modelling ideas through prototypes.• Understanding the purpose of products (toys), including what is meant by 'fit for purpose' and 'form over function'.
	Make	<ul style="list-style-type: none">• Constructing a stable base for a game.• Accurately cutting, folding and assembling a net.• Decorating the base of the game to a high quality finish.• Making and testing a circuit.• Incorporating a circuit into a base.
	Evaluate	<ul style="list-style-type: none">• Testing own and others finished games, identifying what went well and making suggestions for improvement.• Gathering images and information about existing children's toys.• Analysing a selection of existing children's toys.
Knowledge	Technical	<ul style="list-style-type: none">• 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.
	Additional	<ul style="list-style-type: none">• To know that 'form' means the shape and appearance of an object.• To know the difference between 'form' and 'function'.• To understand that 'fit for purpose' means that a product works how it should and is easy to use.• To know that form over purpose means that a product looks good but does not work very well.• To know the importance of 'form follows function' when designing: the product must be designed primarily with the function in mind.• To understand the diagram perspectives 'top view', 'side view' and 'back'.

Cooking & Nutrition		Year 1	Year 2
		Cooking and Nutrition: <u>Fruit and vegetables</u>	Cooking and Nutrition: <u>A balanced diet</u>
Skills	Design	<ul style="list-style-type: none"> Designing smoothie carton packaging by-hand or on ICT software. 	<ul style="list-style-type: none"> Designing a healthy wrap based on a food combination which work well together.
	Make	<ul style="list-style-type: none"> Chopping fruit and vegetables safely to make a smoothie. 	<ul style="list-style-type: none"> Slicing food safely using the bridge or claw grip. Constructing a wrap that meets a design brief.
	Evaluate	<ul style="list-style-type: none"> Tasting and evaluating different food combinations. Describing appearance, smell and taste. Suggesting information to be included on packaging. 	<ul style="list-style-type: none"> Describing the taste, texture and smell of fruit and vegetables. Taste testing food combinations and final products. Describing the information that should be included on a label. Evaluating which grip was most effective.
Knowledge		<ul style="list-style-type: none"> Understanding the difference between fruits and vegetables. To understand that some foods typically known as vegetables are actually fruits (e.g. cucumber). To know that a blender is a machine which mixes ingredients together into a smooth liquid. To know that a fruit has seeds and a vegetable does not. To know that fruits grow on trees or vines. To know that vegetables can grow either above or below ground. To know that vegetables can come from different parts of the plant (e.g. roots: potatoes, leaves: lettuce, fruit: cucumber). 	<ul style="list-style-type: none"> To know that 'diet' means the food and drink that a person or animal usually eats. To understand what makes a balanced diet. To know where to find the nutritional information on packaging. To know that the five main food groups are: Carbohydrates, fruits and vegetables, protein, dairy and foods high in fat and sugar. To understand that I should eat a range of different foods from each food group, and roughly how much of each food group. To know that nutrients are substances in food that all living things need to make energy, grow and develop. To know that 'ingredients' means the items in a mixture or recipe. To know that I should only have a maximum of five teaspoons of sugar a day to stay healthy. To know that many food and drinks we do not expect to contain sugar do; we call these 'hidden sugars'.

Cooking & Nutrition		Year 3	Year 4
		Cooking and Nutrition: <u>Eating seasonally</u>	Cooking and Nutrition: <u>Adapting a recipe</u>
Skills	Design	<ul style="list-style-type: none"> Creating a healthy and nutritious recipe for a savoury tart using seasonal ingredients, considering the taste, texture, smell and appearance of the dish. 	<ul style="list-style-type: none"> Designing a biscuit within a given budget, drawing upon previous taste testing judgements.
	Make	<ul style="list-style-type: none"> Knowing how to prepare themselves and a work space to cook safely in, learning the basic rules to avoid food contamination. Following the instructions within a recipe. 	<ul style="list-style-type: none"> Following a baking recipe, from start to finish, including the preparation of ingredients. Cooking safely, following basic hygiene rules. Adapting a recipe to improve it or change it to meet new criteria (e.g. from savoury to sweet).
	Evaluate	<ul style="list-style-type: none"> Establishing and using design criteria to help test and review dishes. Describing the benefits of seasonal fruits and vegetables and the impact on the environment. Suggesting points for improvement when making a seasonal tart. 	<ul style="list-style-type: none"> Evaluating a recipe, considering: taste, smell, texture and appearance. Describing the impact of the budget on the selection of ingredients. Evaluating and comparing a range of food products. Suggesting modifications to a recipe (e.g. This biscuit has too many raisins, and it is falling apart, so next time I will use less raisins).
Knowledge	<ul style="list-style-type: none"> To know that not all fruits and vegetables can be grown in the UK. To know that climate affects food growth. To know that vegetables and fruit grow in certain seasons. To know that cooking instructions are known as a 'recipe'. To know that imported food is food which has been brought into the country. To know that exported food is food which has been sent to another country.. To understand that imported foods travel from far away and this can negatively impact the environment. To know that each fruit and vegetable gives us nutritional benefits because they contain vitamins, minerals and fibre. To understand that vitamins, minerals and fibre are important for energy, growth and maintaining health. To know safety rules for using, storing and cleaning a knife safely. To know that similar coloured fruits and vegetables often have similar nutritional benefits. 	<ul style="list-style-type: none"> To know that the amount of an ingredient in a recipe is known as the 'quantity.' To know that it is important to use oven gloves when removing hot food from an oven. To know the following cooking techniques: sieving, creaming, rubbing method, cooling. To understand the importance of budgeting while planning ingredients for biscuits. 	

Cooking & Nutrition		Year 5	Year 6
		Cooking and Nutrition: Astronaut Food	<u>Cooking and Nutrition - Come dine with me</u>
Skills	Design	<ul style="list-style-type: none"> Adapting a traditional recipe, understanding that the nutritional value of a recipe alters if you remove, substitute or add additional ingredients. Writing an amended method for a recipe to incorporate the relevant changes to ingredients. Designing appealing packaging to reflect a recipe. 	<ul style="list-style-type: none"> Writing a recipe, explaining the key steps, method and ingredients. Including facts and drawings from research undertaken.
	Make	<ul style="list-style-type: none"> Cutting and preparing vegetables safely. Using equipment safely, including knives, hot pans and hobs. Knowing how to avoid cross-contamination. Following a step by step method carefully to make a recipe. 	<ul style="list-style-type: none"> Following a recipe, including using the correct quantities of each ingredient. Adapting a recipe based on research. Working to a given timescale. Working safely and hygienically with independence.
	Evaluate	<ul style="list-style-type: none"> Identifying the nutritional differences between different products and recipes. Identifying and describing healthy benefits of food groups. 	<ul style="list-style-type: none"> Evaluating a recipe, considering: taste, smell, texture and origin of the food group. Taste testing and scoring final products. Suggesting and writing up points of improvements when scoring others' dishes, and when evaluating their own throughout the planning, preparation and cooking process. Evaluating health and safety in production to minimise cross contamination.
Knowledge		<ul style="list-style-type: none"> To understand where meat comes from - learning that beef is from cattle and how beef is reared and processed, including key welfare issues. To know that I can adapt a recipe to make it healthier by substituting ingredients. To know that I can use a nutritional calculator to see how healthy a food option is. To understand that 'cross-contamination' means bacteria and germs have been passed onto ready-to-eat foods and it happens when these foods mix with raw meat or unclean objects. 	<ul style="list-style-type: none"> To know that 'flavour' is how a food or drink tastes. To know that many countries have 'national dishes' which are recipes associated with that country. To know that 'processed food' means food that has been put through multiple changes in a factory. To understand that it is important to wash fruit and vegetables before eating to remove any dirt and insecticides. To understand what happens to a certain food before it appears on the supermarket shelf (Farm to Fork).

Textiles

EYFS: Reception

Year 2

Textiles: Bookmarks

Textiles: Puppets

Design

- Discussing what a good design needs.
- Designing a simple pattern with paper.
- Designing a bookmark.
- Choosing from available materials.

- Designing a puppet.

Skills

Make

- Developing fine motor/cutting skills with scissors.
- Exploring fine motor/threading and weaving (under, over technique) with a variety of materials.
- Using a prepared needle and wool to practise threading.

- Selecting and cutting fabrics for sewing.
- Decorating a pouch using fabric glue or running stitch.
- Threading a needle.
- Sewing running stitch, with evenly spaced, neat, even stitches to join fabric.
- Neatly pinning and cutting fabric using a template.

Evaluate

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- Troubleshooting scenarios posed by teacher.
- Evaluating the quality of the stitching on others' work.
- Discussing as a class, the success of their stitching against the success criteria.
- Identifying aspects of their peers' work that they particularly like and why.

Knowledge

- To know that a design is a way of planning our idea before we start.
- To know that threading is putting one material through an object.

- To know that sewing is a method of joining fabric.
- To know that different stitches can be used when sewing.
- To understand the importance of tying a knot after sewing the final stitch.
- To know that a thimble can be used to protect my fingers when sewing.

Textiles

		Year 3	Year 4
		Textiles: Cross-stitch and appliqué <u>Cushions</u>	Textiles: Fastenings
Skills	Design	<ul style="list-style-type: none"> • Designing and making a template from an existing cushion and applying individual design criteria. 	<ul style="list-style-type: none"> • Writing design criteria for a product, articulating decisions made. • Designing a personalised pencilcase
	Make	<ul style="list-style-type: none"> • Following design criteria to create a cushion or Egyptian collar. • Selecting and cutting fabrics with ease using fabric scissors. • Threading needles with greater independence. • Tying knots with greater independence. • Sewing cross stitch to join fabric. • Decorating fabric using appliqué. • Completing design ideas with stuffing and sewing the edges (Cushions) or embellishing the collars based on design ideas (Egyptian collars). 	<ul style="list-style-type: none"> • Making and testing a paper template with accuracy and in keeping with the design criteria. • Measuring, marking and cutting fabric using a paper template. • Selecting a stitch style to join fabric. • Working neatly by sewing small, straight stitches. • Incorporating a fastening to a design.
	Evaluate	<ul style="list-style-type: none"> • Evaluating an end product and thinking of other ways in which to create similar items. 	<ul style="list-style-type: none"> • Testing and evaluating an end product against the original design criteria. • Deciding how many of the criteria should be met for the product to be considered successful. • Suggesting modifications for improvement. • Articulating the advantages and disadvantages of different fastening types.
Knowledge		<ul style="list-style-type: none"> • To know that applique is a way of mending or decorating a textile by applying smaller pieces of fabric to larger pieces. • To know that when two edges of fabric have been joined together it is called a seam. • To know that it is important to leave space on the fabric for the seam. • To understand that some products are turned inside out after sewing so the stitching is hidden. 	<ul style="list-style-type: none"> • To know that a fastening is something which holds two pieces of material together for example a zipper, toggle, button, press stud and velcro. • To know that different fastening types are useful for different purposes. • To know that creating a mock up (prototype) of their design is useful for checking ideas and proportions.

Textiles

Year 6

Textiles: Stuffed toys

Design

- Designing a stuffed toy, considering the main component shapes required and creating an appropriate template.
- Considering the proportions of individual components.

Skills

Make

- Creating a 3D stuffed toy from a 2D design.
- Measuring, marking and cutting fabric accurately and independently .
- Creating strong and secure blanket stitches when joining fabric.
- Threading needles independently.
- Using appliqué to attach pieces of fabric decoration.
- Sewing blanket stitch to join fabric.
- Applying blanket stitch so the spaces between the stitches are even and regular.

Evaluate

- Testing and evaluating an end product and giving point for further improvements.

Knowledge

- To know that blanket stitch is useful to reinforce the edges of a fabric material or join two pieces of fabric.
- To understand that it is easier to finish simpler designs to a high standard.
- To know that soft toys are often made by creating appendages separately and then attaching them to the main body.
- To know that small, neat stitches which are pulled taut are important to ensure that the soft toy is strong and holds the stuffing securely.

**Digital
World**

		Year 5	Year 6
		<u>Monitoring devices</u>	<u>Navigating the world</u>
Skills	Design	<ul style="list-style-type: none"> • Researching (books, internet) for a particular (user's) animal's needs. • Developing design criteria based on research. • Generating multiple housing ideas using building bricks. • Understanding what a virtual model is and the pros and cons of traditional and CAD modelling. • Placing and manoeuvring 3D objects, using CAD. • Changing the properties of, or combining one or more 3D objects, using CAD. 	<ul style="list-style-type: none"> • Writing a design brief from information submitted by a client. • Developing design criteria to fulfil the client's request. • Considering and suggesting additional functions for my navigation tool. • Developing a product idea through annotated sketches. • Placing and manoeuvring 3D objects, using CAD. • Changing the properties of, or combining one or more 3D objects, using CAD.
	Make	<ul style="list-style-type: none"> • Understanding the functional and aesthetic properties of plastics. • Programming to monitor the ambient temperature and coding an (audible or visual) alert when the temperature rises above or falls below a specified range. 	<ul style="list-style-type: none"> • Considering materials and their functional properties, especially those that are sustainable and recyclable (for example, cork and bamboo). • Explaining material choices and why they were chosen as part of a product concept. • Programming an N, E, S, W cardinal compass.
	Evaluate	<ul style="list-style-type: none"> • Stating an event or fact from the last 100 years of plastic history. • Explaining how plastic is affecting planet Earth and suggesting ways to make more sustainable choices. • Explaining key functions in my program (audible alert, visuals). • Explaining how my product would be useful for an animal carer including programmed features. 	<ul style="list-style-type: none"> • Explaining how my program fits the design criteria and how it would be useful as part of a navigation tool. • Developing an awareness of sustainable design. • Identifying key industries that utilise 3D CAD modelling and explaining why. • Describing how the product concept fits the client's request and how it will benefit the customers. • Explaining the key functions in my program, including any additions. • Explaining how my program fits the design criteria and how it would be useful as part of a navigation tool. • Explaining the key functions and features of my navigation tool to the client as part of a product concept pitch. • Demonstrating a functional program as part of a product concept pitch.
Knowledge	Technical	<ul style="list-style-type: none"> • To know that a 'device' means equipment created for a certain purpose or job and that monitoring devices observe and record. • To know that a sensor is a tool or device that is designed to monitor, detect and respond to changes for a purpose. • To understand that conditional statements (and, or, if booleans) in programming are a set of rules which are followed if certain conditions are met. 	<ul style="list-style-type: none"> • To know that accelerometers can detect movement. • To understand that sensors can be useful in products as they mean the product can function without human input.
	Additional	<ul style="list-style-type: none"> • To understand key developments in thermometer history. • To know events or facts that took place over the last 100 years in the history of plastic, and how this is changing our outlook on the future. • To know the 6Rs of sustainability. • To understand what a virtual model is and the pros and cons of traditional vs CAD modelling. 	<ul style="list-style-type: none"> • To know that designers write design briefs and develop design criteria to enable them to fulfil a client's request. • To know that 'multifunctional' means an object or product has more than one function. • To know that magnetometers are devices that measure the Earth's magnetic field to determine which direction you are facing.

End Points

Structures

Reception	<p>Junk Modelling</p> <p>Physical development</p> <ul style="list-style-type: none"> Develop small motor skills so that they can use a range of tools competently, safely and confidently. ELG: Fine Motor Skills: Use a range of small tools, including scissors, paint brushes and cutlery. <p>Expressive arts and design</p> <ul style="list-style-type: none"> Create collaboratively, sharing ideas, resources and skills. Return to and build on their previous learning, refining ideas and developing their ability to represent them. Explore, use and refine a variety of artistic effects to express ideas and feelings. ELG: Creating with Materials: Safely use and explore a variety of materials, tools and techniques, experimenting with colour, design, texture, form and function. ELG: Creating with Materials: Share their creations, explaining the process they have used. <p>Characteristics of effective learning</p> <ul style="list-style-type: none"> Playing and exploring. Active learning. Creating and thinking critically.
Reception	<p>Boats</p> <p>Communication and language</p> <ul style="list-style-type: none"> Articulate their ideas and thoughts in well-formed sentences. Connect one idea or action to another using a range of connectives. Use talk to help work out problems and organise thinking and activities, and to explain how things work and why they might happen. ELG: Speaking: Participate in small group, class and one-to-one discussions, offering their own ideas, using recently introduced vocabulary ELG: Speaking: Offer explanations for why things might happen. <p>Understanding the world</p> <ul style="list-style-type: none"> Explore the natural world around them. ELG: The Natural World: Explore the natural world around them, making observations and drawing pictures of animals and plants <p>Characteristics of effective learning</p> <ul style="list-style-type: none"> Playing and exploring Active learning Creating and thinking critically
Y1	<p>Constructing Windmills</p> <ul style="list-style-type: none"> Identify some features that would appeal to the client (a mouse) and create a suitable design. Explain how their design appeals to the mouse. Make stable structures, which will eventually support the turbine, out of card, tape and glue. Make functioning turbines and axles that are assembled into the main supporting structure. Say what is good about their windmill and what they could do better.

Y2	<p><u>Castles</u></p> <ul style="list-style-type: none"> • Draw and label a simple castle that includes the most common features. • Recognise that a castle is made up of multiple 3D shapes. • Design a castle with key features which satisfy a given purpose. • Score or cut along lines on the net of a 2D shape. • Use glue to securely assemble geometric shapes. • Utilise skills to build a complex structure from simple geometric shapes. • Evaluate their work by answering simple questions.
Y4	<p><u>Pavilions</u></p> <ul style="list-style-type: none"> • Produce a range of free-standing frame structures of different shapes and sizes. • Design a pavilion that is strong, stable and aesthetically pleasing. • Select appropriate materials and construction techniques to create a stable, free-standing frame structure. • Select appropriate materials and techniques to add cladding to their pavilion.
Y5	<p><u>Bridges</u></p> <ul style="list-style-type: none"> • Identify stronger and weaker shapes. • Recognise that supporting shapes can help increase the strength of a bridge, allowing it to hold more weight. • Identify beam, arch and truss bridges and describe their differences. • Use triangles to create simple truss bridges that support a load (weight). • Cut beams to the correct size, using a cutting mat. • Smooth down any rough cut edges with sandpaper. • Follow each stage of the truss bridge creation as instructed by their teacher. • Complete a bridge, with varying ranges of accuracy and finish, supported by the teacher. • Identify some areas for improvement, reinforcing their bridges as necessary.

Mechanisms

Y1	<p><u>Moving Story Book</u></p> <ul style="list-style-type: none"> • Identify whether a mechanism is a side-to-side slider or an up-and-down slider and determine what movement the mechanism will make. • Clearly label drawings to show which parts of their design will move and in which direction. • Make a picture, which meets the design criteria, with parts that move purposefully as planned. • Evaluate the main strengths and weaknesses of their design and suggest alterations.
Y2	<p><u>Fairground Wheel</u></p> <ul style="list-style-type: none"> • Design and label a wheel. • Consider the designs of others and make comments about their practicality or appeal. • Consider the materials, shape, construction and mechanisms of their wheel. • Label their designs. Build a stable structure with a rotating wheel. • Test and adapt their designs as necessary. • Follow a design plan to make a completed model of the wheel.
Y3	<p><u>Pneumatic Toys</u></p> <ul style="list-style-type: none"> • Draw accurate diagrams with correct labels, arrows and explanations.

	<ul style="list-style-type: none"> • Correctly identify definitions for key terms. Identify five appropriate design criteria. • Communicate two ideas using thumbnail sketches. Communicate and develop one idea using an exploded diagram. • Select appropriate equipment and materials to build a working pneumatic system. • Assemble their pneumatic system within the housing to create the desired motion. • Create a finished pneumatic toy that fulfills the design brief.
Y5	<p><u>Make a Pop-Up Book</u></p> <ul style="list-style-type: none"> • Produce a suitable plan for each page of their book. • Produce the structure of the book. • Assemble the components necessary for all their structures/mechanisms. • Hide the mechanical elements with more layers using spacers where needed. • Use a range of mechanisms and structures to illustrate their story and make it interactive for the users. • Use appropriate materials and captions to illustrate the story.
Y6	<p><u>Automata Toys</u></p> <ul style="list-style-type: none"> • Mark, saw and cut out the components and supports of their toy with a varying degree of accuracy to the intended measurements. • Follow health and safety rules, taking care with the equipment. • Attempt a partial assembly of their toys using an exploded-diagram, following a teacher's demonstration. • Develop a design idea with some descriptive notes. • Explore different cam profiles and choose three for their follower toppers with an explanation of their choices. • Create neat, decorated follower toppers with some accuracy. • Measure and cut panels that fit with some inaccuracies to conceal the inner workings of the automata. • Decorate and finish the automata to meet the design criteria and brief. • Evaluate their finished product, making descriptive and reflective points on function and form.

Cooking and Nutrition

Y1	<p><u>Fruits & Vegetables</u></p> <ul style="list-style-type: none"> • Describe fruits and vegetables and explain how to identify fruits. • Name a range of places that fruits and vegetables grow. • Describe basic characteristics of fruit and vegetables. • Prepare fruits and vegetables to make a smoothie
Y2	<p><u>A Balanced Diet</u></p> <ul style="list-style-type: none"> • Name the main food groups and identify foods that belong to each group. • Describe the taste, feel and smell of a given food. • Think of three different wrap ideas, considering flavour combinations. • Construct a wrap that meets the design brief and their plan.
Y3	<p><u>Eating Seasonally</u></p> <ul style="list-style-type: none"> • Explain that fruits and vegetables grow in different countries based on their climates. • Understand that seasonal fruits and vegetables grow in a given season. • Understand that eating seasonal fruit and vegetables positively affects the environment.

	<ul style="list-style-type: none"> Design a tart recipe using seasonal ingredients.
Y4	<p><u>Adapting a Recipe</u></p> <ul style="list-style-type: none"> Describe features of biscuits using taste, texture and appearance. Follow a recipe with support. Use a budget to plan a recipe. Adapt a recipe using additional ingredients.
Y5	<p><u>Astronaut Food</u></p> <ul style="list-style-type: none"> Research the challenges of eating in space. Describe different processes of food preservation Add nutritional value to a recipe by selecting ingredients. Design and make a snack for an astronaut using dehydration as a preserving method.
Y6	<p><u>Come Dine With Me</u></p> <ul style="list-style-type: none"> Find a suitable recipe for their course. Record the relevant ingredients and equipment needed. Follow a recipe, including using the correct quantities of each ingredient. Write a recipe, explaining the process taken. Explain where certain key foods come from before they appear on the supermarket shelf.

Textiles

Reception	<p><u>Bookmarks</u></p> <p>Physical development</p> <ul style="list-style-type: none"> Develop their small motor skills so that they can use a range of tools competently, safely and confidently. ELG: Fine Motor Skills: Use a range of small tools, including scissors, paint brushes and cutlery. <p>Expressive arts and design</p> <ul style="list-style-type: none"> Explore, use and refine a variety of artistic effects to express their ideas and feelings. Return to and build on their previous learning, refining ideas and developing their ability to represent them. ELG: Creating with materials: Safely use and explore a variety of materials, tools and techniques, experimenting with colour, design, texture, form and function. <p>Characteristics of effective learning</p> <ul style="list-style-type: none"> Playing and exploring Active learning Creating and thinking critically
Y2	<p><u>Making a Puppet</u></p>

	<ul style="list-style-type: none"> • Sew a running stitch with regular-sized stitches and understand that both ends must be knotted. • Prepare and cut fabric to make a pouch from a template. • Use a running stitch to join the two pieces of fabric together. • Decorate their puppet using the materials provided.
Y3	<p><u>Cross-stitch and appliqué</u></p> <ul style="list-style-type: none"> • Use a cross-stitch to join two pieces of fabric together. • Design and cut the template for a cushion. • Use cross-stitch and appliqué to decorate a cushion face. • Make a cushion that includes appliqué and cross-stitch.
Y4	<p><u>Fastenings</u></p> <ul style="list-style-type: none"> • Identify the features, benefits and disadvantages of a range of fastening types. • Write design criteria and design a case that satisfies the criteria. • Make a template for their case. • Assemble their case using any stitch they are comfortable with.
Y6	<p><u>Soft Toys</u></p> <ul style="list-style-type: none"> • Work with their 'client' to design a stuffed toy, considering the main component shapes of their toy. • Create an appropriate template for their stuffed toy. • Join two pieces of fabric using a blanket stitch. Neatly cut out their fabric. • Use appliqué or decorative stitching to decorate the front of their stuffed toy. • Use blanket stitch to assemble the stuffed toy, repairing when needed. • Evaluate their final product.

Electrical Systems

Y3	<p><u>Crumble</u></p> <ul style="list-style-type: none"> • Complete design criteria based on a client's request. • Roughly sketch four initial poster ideas, indicating where a bulb will be located for each. • Review their initial ideas against the design criteria and peer feedback, developing a final design. • Assemble an electric poster, including a functional simple circuit with a bulb, following a demonstration. • Acknowledge, with a brief explanation, the need to mount the poster using corrugated card. • Test that the simple circuit works by adding a battery. • Evaluate their electric posters in a letter to a client.
Y4	<p><u>Torches</u></p> <ul style="list-style-type: none"> • Identify electrical products and explain why they are useful. • Help to make a working switch. • Identify the features of a torch and how it works. • Describe what makes a torch successful.

	<ul style="list-style-type: none"> • Create suitable designs that fit the success criteria and their own design criteria. • Create a functioning torch with a switch according to their design criteria
Y6	<p><u>Steady Hand game</u></p> <ul style="list-style-type: none"> • Explain simply what is meant by 'form' (the shape of a product) and 'function' (how a product works). • State what they like or dislike about an existing children's toy and why. • Learn about skills developed through play and apply this knowledge in a survey of one or more children's toys. • Identify the components of a steady hand game. • Design a steady hand game of their own according to their design criteria, using four different perspective drawings. • Create a secure base for their game, with neat edges, that relates to their design. • Make and test a functioning circuit and assemble it within a case.

Digital Systems

Y5	<p><u>Monitoring Devices</u></p> <ul style="list-style-type: none"> • Describe what is meant by monitoring devices and provide an example. • Explain briefly the development of thermometers from thermoscopes to digital thermometers. • Research a chosen animal's key information to develop a list of design criteria for an animal monitoring device. • Write a program that monitors the ambient temperature and alerts someone when the temperature moves from a specified range. • Identify errors (bugs) in the code and ways to fix (debug) them. • State one or two facts about the history and development of plastic, including how it is now affecting planet Earth. • Build a variety of brick models to invent Micro:bit case, housing and stand ideas, evaluating the success of their favourite model. • Explain key pros and cons of virtual modelling vs physical modelling. • Recall and describe the name and use of key tools used in Tinkercad (CAD) software.
Y6	<p><u>Navigating the World</u></p> <ul style="list-style-type: none"> • Incorporate key information from a client's design request such as 'multifunctional' and 'compact' in their design brief. • Write a program that displays an arrow to indicate cardinal compass directions with an 'On start' loading screen. • Identify errors (bugs) in the code and suggest ways to fix (debug) them. • Self and peer evaluate a product concept against a list of design criteria with basic statements. • Identify key industries that use 3D CAD modelling and why. • Recall and describe the name and use of key tools used in Tinkercad (CAD) software. • Combine more than one object to develop a finished 3D CAD model in Tinkercad. • Complete a product pitch plan that includes key information.