

Design and Technology Skills and Knowledge progression

Year 1	COOKING AND NUTRITION: Fruit and vegetables	TEXTILES: Puppets	SRUCTURE: Constructing windmills
Design	<ul style="list-style-type: none"> • Designing smoothie carton packaging by-hand or on ICT software 	<ul style="list-style-type: none"> • Using a template to create a design for a puppet 	<ul style="list-style-type: none"> • Learning the importance of a clear design criteria • Including individual preferences and requirements in a design
Make	<ul style="list-style-type: none"> • Chopping fruit and vegetables safely to make a smoothie • Identifying if a food is a fruit or a vegetable • Learning where and how fruits and vegetables grow 	<ul style="list-style-type: none"> • Cutting fabric neatly with scissors • Using joining methods to decorate a puppet • Sequencing steps for construction 	<ul style="list-style-type: none"> • Making stable structures from card, tape and glue • 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
Evaluation	<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"> • Reflecting on a finished product, explaining likes and dislikes 	<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
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 'joining technique' means connecting two pieces of material together. • To know that there are various temporary methods of joining fabric by using staples, glue or pins. • To understand that different techniques for joining materials can be used for different purposes. • To understand that a template (or fabric pattern) is used to cut out the same shape multiple times. • To know that drawing a design idea is useful to see how an idea will look. 	<ul style="list-style-type: none"> • Describing the purpose of structures, including windmills • Learning how to turn 2D nets into 3D structures • Learning that the shape of materials can be changed to improve the strength and stiffness of structures • Understanding that cylinders are a strong type of structure that are often used for windmills and lighthouses • Understanding that windmill turbines use wind to turn and make the machines inside work • Understanding that axles are used in structures and mechanisms to make parts turn in a circle • Developing awareness of different structures for different purposes

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YEAR 2	TEXTILES: Pouches	STRUCTURE: Stability	MECHANISMS: Making a monster
Design	<ul style="list-style-type: none"> • Designing a pouch Using Caribbean colours and patterns 	<ul style="list-style-type: none"> • Generating and communicating ideas using sketching and modelling. • Learning about different types of structures, found in the natural world and in everyday objects. 	<ul style="list-style-type: none"> • Creating a class design criteria for a moving monster. • Designing a moving monster for a specific audience in accordance with a design criteria.
Make	<ul style="list-style-type: none"> • 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. 	<ul style="list-style-type: none"> • Making a structure according to design criteria. • Creating joints and structures from paper/card and tape. • Building a strong and stiff structure by folding paper. 	<ul style="list-style-type: none"> • Making linkages using card for levers and split pins for pivots. • Experimenting with linkages adjusting the widths, lengths and thicknesses of card used. • Cutting and assembling components neatly.
Evaluation	<ul style="list-style-type: none"> • 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 	<ul style="list-style-type: none"> • Exploring the features of structures. • Comparing the stability of different shapes. • Testing the strength of own structures. • Identifying the weakest part of a structure. • Evaluating the strength, stiffness and stability of own structure 	<ul style="list-style-type: none"> • Evaluating own designs against design criteria. • Using peer feedback to modify a final design.
Knowledge	<ul style="list-style-type: none"> • 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. 	<ul style="list-style-type: none"> • To know that shapes and structures with wide, flat bases or legs are the most stable. • To understand that the shape of a structure affects its strength. • To know that materials can be manipulated to improve strength and stiffness. • To know that a structure is something which has been formed or made from parts. • To know that a 'stable' structure is one which is firmly fixed and unlikely to change or move. • To know that a 'strong' structure is one which does not break easily. • To know that a 'stiff' structure or material is one which does not bend easily • To know that natural structures are those found in nature. • To know that man-made structures are those made by people. 	<ul style="list-style-type: none"> • To know that mechanisms are a collection of moving parts that work together as a machine to produce movement. • To know that there is always an input and output in a mechanism. • To know that an input is the energy that is used to start something working. • To know that an output is the movement that happens as a result of the input. • To know that a lever is something that turns on a pivot. • To know that a linkage mechanism is made up of a series of levers. • To know some real-life objects that contain mechanisms.

YEAR 3	MECANICAL SYTEMS: Pneumatic toys	TEXTILES: Cushions	COOKING AND NUTRITION: Eating seasonally
Design	<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 	<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"> • Creating a healthy and nutritious recipe for a savoury tart using seasonal ingredients, considering the taste, texture, smell and appearance of the dish
Make	<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 <ul style="list-style-type: none"> • Manipulating materials to create different effects by cutting, creasing, folding, weaving 	<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"> • 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
Evaluation	<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 	<p>Evaluating an end product and thinking of other ways in which to create similar items</p>	<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.).

<p>Knowledge</p>	<ul style="list-style-type: none">• Understanding how pneumatic systems work<ul style="list-style-type: none">• Learning that mechanisms are a system of parts that work together to create motion• Understanding that pneumatic systems can be used as part of a mechanism• Learning that pneumatic systems force air over a distance to create movement• 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	<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 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.
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YEAR 4	ELECTRICAL SYSTEMS: Torches	COOKING AND NUTRITION: Adapting a recipe	STRUCTURES: Pavilions
Design	<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 	<ul style="list-style-type: none"> • Designing a biscuit within a given budget, drawing upon previous taste testing 	<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
Make	<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 	<ul style="list-style-type: none"> • Following a baking recipe • Cooking safely, following basic hygiene rules • Adapting a recipe 	<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 for the cladding • Reinforcing corners to strengthen a structure • Creating a design in accordance with a plan • Learning to create different textural effects with materials
Evaluation	<ul style="list-style-type: none"> • Evaluating electrical products • Testing and evaluating the success of a final product and taking inspiration from the work of peers 	<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.). 	<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

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<p>Knowledge</p>	<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.• 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.	<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.	<ul style="list-style-type: none">• Learning what pavilions are and their purpose• Building on prior knowledge of net structures and broadening knowledge of frame structures• Learning that architects consider light, shadow and patterns when designing• Implementing frame and shell structure knowledge• Considering effective and ineffective designs
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YEAR 5	TEXTILES: Stuffed toys - making a mascot	MECHANICAL SYSTEMS: Making a pop-up book	COOKING & NUTRITION: What could be healthier?	DIGITAL WORLD: Monitoring Devices
Design	<ul style="list-style-type: none"> • Designing a stuffed toy considering the main component shapes required and creating an appropriate template • Considering the proportions of individual components 	<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"> • 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"> • 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.
Make	<ul style="list-style-type: none"> • 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. 	<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"> • 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"> • 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.
Evaluate	<ul style="list-style-type: none"> • Testing and evaluating an end product and giving point for further improvements 	<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"> • Identifying the nutritional differences between different products and recipes. 	<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.

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			<ul style="list-style-type: none"> Identifying and describing healthy benefits of food groups. 	<ul style="list-style-type: none"> Explaining key functions in my program (audible alert, visuals). Explaining how my product would be useful for an animal carer including programmed features.
Knowledge	<ul style="list-style-type: none"> 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. 	<ul style="list-style-type: none"> Knowing that an input is the motion used to start a mechanism Knowing that mechanisms control movement Describing mechanisms that 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. 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 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 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. 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.
Year 6	STRUCTURES: Bridges	ELECTRICAL SYSTEMS: Steady hand game	COOKING AND NUTRITION: Come dine with me	DIGITAL WORLD: Navigating the world
Design	<ul style="list-style-type: none"> Designing a stable structure that is able to support weight Creating frame structure with focus on triangulation 	<ul style="list-style-type: none"> Designing a steady hand game - identifying and naming the components required Drawing a design from three different perspectives 	<ul style="list-style-type: none"> Writing a recipe, explaining the key steps, method and ingredients Including facts and drawings from research undertaken 	<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.

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		<ul style="list-style-type: none"> • 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' 		<ul style="list-style-type: none"> • 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.
<p>Make</p>	<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. 	<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. 	<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 	<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.

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<p>Evaluate</p>	<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 	<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 	<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 in productions • Evaluating health and safety in production to minimise cross contamination 	<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. • 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.
<p>Knowledge</p>	<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. 	<ul style="list-style-type: none"> • Learning 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 • 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 	<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 	<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. • Describing how the product concept fits the client’s request and how it will benefit the customers. • 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

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	<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.	<p>product looks good but does not work very well.</p> <ul style="list-style-type: none">• 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'.	<p>before it appears on the supermarket shelf (Farm to Fork).</p>	<p>field to determine which direction you are facing.</p>
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