Yealmpton Primary School
Design Technology Progression of Knowledge and Skills

<table>
<tr><th></th><th>KEY STAGE 1</th><th>LOWER KEY STAGE 2</th><th>UPPER KEY STAGE 2</th></tr>
<tr><td>NC</td><td colspan="3">The national curriculum for design 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.</td></tr>
<tr><td>NC
by key stage</td><td colspan="2">Key stage 1
Pupils should be taught:
<u>Design</u>
design purposeful, functional, appealing products for themselves and other users based on design criteria
generate, develop, model and communicate their ideas through talking, drawing, templates, mock-ups and, where appropriate, information and communication technology
<u>Make</u>
select from and use a range of tools and equipment to perform practical tasks [for example, cutting, shaping, joining and finishing]
select from and use a wide range of materials and components, including construction materials, textiles and ingredients, according to their characteristics
<u>Evaluate</u>
explore and evaluate a range of existing products
evaluate their ideas and products against design criteria
<u>Technical knowledge</u>
build structures, exploring how they can be made stronger, stiffer and more stable
explore and use mechanisms [for example, levers, sliders, wheels and axles], in their products.</td><td>Key stage 2
Pupils should be taught:
<u>Design</u>
use research and develop design criteria to inform the design of innovative, functional, appealing products that are fit for purpose, aimed at particular individuals or groups
generate, develop, model and communicate their ideas through discussion, annotated sketches, cross-sectional and exploded diagrams, prototypes, pattern pieces and computer-aided design
<u>Make</u>
select from and use a wider range of tools and equipment to perform practical tasks [for example, cutting, shaping, joining and finishing], accurately
select from and use a wider range of materials and components, including construction materials, textiles and ingredients, according to their functional properties and aesthetic qualities
<u>Evaluate</u>
investigate and analyse a range of existing products
evaluate their ideas and products against their own design criteria and consider the views of others to improve their work
understand how key events and individuals in design and technology have helped shape the world
<u>Technical knowledge</u>
apply their understanding of how to strengthen, stiffen and reinforce more complex structures
understand and use mechanical systems in their products [for example, gears, pulleys, cams, levers and linkages]
understand and use electrical systems in their products [for example, series circuits incorporating switches, bulbs, buzzers and motors]
apply their understanding of computing to program, monitor and control their products.</td></tr>
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	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	YEAR 6
Coverage	Food Structures Mechanisms	Mechanisms Food Textiles	Structures Mechanisms Textiles	Textiles Electrical Food	Mechanisms Food Digital	Structures Electrical Mechanisms
Design	Designing packaging by-hand or on ICT software. Learning the importance of a clear design criteria. Including individual preferences and requirements in a design. Explaining how to adapt mechanisms, using bridges or guides to control the movement. Designing a moving story book for a given audience.	Designing a pouch. Designing a healthy sandwich based on a food combination which work well together. Designing a vehicle that includes wheels, axles and axle holders, which will allow the wheels to move. Creating clearly labelled drawings which illustrate movement.	Designing and making a template from an existing cushion and applying individual design criteria Designing a stable pavilion structure that is aesthetically pleasing and selecting materials to create a desired effect. Building frame structures designed to support weight. Designing a toy which uses a pneumatic system. Developing design criteria from a design brief .	Writing design criteria for a product, articulating decisions made. Designing a personalised book sleeve. Designing a biscuit within a given budget, drawing upon previous taste testing. Designing a torch, giving consideration to the target audience and creating both design and success criteria focusing on features of individual design ideas.	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. Designing a pop-up book which uses a mixture of structures and mechanisms. Naming each mechanism, input	Designing an Anderson Shelter featuring a variety of different structures, giving careful consideration to how the structures will be used, considering effective and ineffective designs. 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

			Generating ideas using thumbnail sketches and exploded diagrams. Learning that different types of drawings are used in design to explain ideas clearly.		and output accurately. Storyboarding ideas for a book. 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 maneuvering 3D objects, using CAD. Changing the properties of, or combine one or more 3D objects, using CAD.	through prototypes. Understanding the purpose of products (toys), including what is meant by 'fit for purpose' and 'form over function'. 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-working.

Make						
	Chopping fruit and vegetables safely to make a fruit kebab. Identifying if a food is a fruit or a vegetable. Learning where and how fruits and vegetables grow. 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 bridge. Making functioning axles which are assembled into a main supporting structure. Following a design to create moving models that use levers and sliders.	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. Slicing food safely using the bridge or claw grip. Constructing a sandwich that meets a design brief. Adapting mechanisms.	Following design criteria to create a cushion. 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. Creating a range of different shaped frame structures. Making a variety of free standing frame structures of different shapes and sizes.	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 sewing small neat stitches. Incorporating fastening to a design. Following a baking recipe. Cooking safely, following basic hygiene rules. Adapting a recipe. Making a torch with a working electrical circuit and switch.	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. 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	Building a range of structures drawing upon new and prior knowledge of structures. Measuring, marking and cutting materials to create a range of structures. Using a range of materials to reinforce and add decoration to structures. 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. Measuring,

			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. 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.	Using appropriate equipment to cut and attach materials. Assembling a torch according to the design and success criteria.	pleasing result. 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.	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.

			Selecting materials due to their functional and aesthetic characteristics. Manipulating materials to create different effects by cutting, creasing, folding, weaving.			
Evaluate	Tasting and evaluating different food combinations. Describing appearance, smell and taste. Suggesting information to be included on packaging. 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.	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. Describing the taste, texture and smell of fruit and vegetables. Taste testing food	Evaluating an end product and thinking of other ways in which to create similar items. Evaluating structures made by the class. Describing what characteristics of a design and construction made it the most effective. Considering effective and ineffective designs. Using the views of others to improve designs. Testing and	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. Evaluating a recipe, considering: taste, smell,	Identifying the nutritional differences between different products and recipes. Identifying and describing healthy benefits of food groups. Evaluating the work of others and receiving feedback on own work. Suggesting points for improvement. Stating an event or fact from the last 100 years of plastic history. Explaining how plastic is affecting	Improving a design plan based on peer evaluation. Testing and adapting a design to improve it as it is developed. Identifying what makes a successful structure. Testing own and others finished games, identifying what went well and making suggestions for improvement. Gathering images and information about existing children's toys.

		combinations and final products. Describing the information that should be included on a label. Evaluating which grip was most effective. Testing mechanisms, identifying what stops wheels from turning, knowing that a wheel needs an axle in order to move.	modifying the outcome, suggesting improvements. Understanding the purpose of exploded-diagrams through the eyes of a designer and their client.	texture and appearance. Describing the impact of the budget on the selection of ingredients. Evaluating and comparing a range of products. Suggesting modifications. Evaluating electrical products. Testing and evaluating the success of a final product.	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.	Analysing a selection of existing children's toys. Evaluating the work of others and receiving feedback on own work. Applying points of improvements. Describing changes they would make/do if they were to do the project again.
Technical Knowledge	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 fruit has seeds and a vegetable does not.	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 applique is a way of mending or decorating a textile by applying smaller pieces of fabric To know that when two edges of fabric have been joined together it is called a seam. To know that it is	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 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 structures can be strengthened by manipulating materials and shapes. To understand what a 'footprint plan' is. To understand that in the real world, design, can impact users in positive and

	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). 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. To understand that axles are used in structures and mechanisms to make parts turn in a circle. To begin to	To know that a thimble can be used to protect my fingers when sewing. 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	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. To understand what a frame structure is. To know that a 'free-standing' structure is one which can stand on its own. To know that a pavilions 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 creating a mock up (prototype) of their design is useful for checking ideas and proportions. 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. To understand that electrical conductors are materials which	To know that I can use a nutritional calculator to see how healthy a food option is. To understand that 'cross-contamination' means that bacteria and germs have been passed onto ready-to-eat foods and it happens when these foods mix with raw meat or unclean objects. To know that mechanisms control movement. To understand that 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.	negative ways. To know that a prototype is a cheap model to test a design idea. 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. 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.

	understand that different structures are used for different purposes. To know that a structure is something that has been made and put together. 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 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	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'. To know that wheels need to be round to rotate and move. To understand that for a wheel to move it must be attached to a	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. 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. To understand how sketches, drawings and diagrams can be	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	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. 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	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'. 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. To know that an automata is a hand powered

	bridges and guides are bits of card that purposefully restrict the movement of the slider. To know that in Design and technology we call a plan a 'design'.	rotating axle. To know that an axle moves within an axle holder which is fixed to the vehicle or toy. To know that the frame of a vehicle (chassis) needs to be balanced. To know some real-life items that use wheels such as wheelbarrows, hamster wheels and vehicles.	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.	the electric light bulb(s) - by Sir Joseph Swan and Thomas Edison.	modelling. T o 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 in programming are a set of rules which are followed if certain conditions are me.	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.