



# Design and Technology knowledge progression



<b>Design and Technology understanding, knowledge and skills objectives.</b>	
<b>Intent</b>	At Camblesforth Primary Academy we use Kapow Primary's Design and technology scheme of work which aims to inspire pupils to be innovative and creative thinkers who have an appreciation for the product design cycle through ideation, creation, and evaluation. We want pupils to develop the confidence to take risks, through drafting design concepts, modelling, and testing and to be reflective learners who evaluate their work and the work of others. Through our scheme of work, we aim to build an awareness of the impact of design and technology on our lives and encourage pupils to become resourceful, enterprising citizens who will have the skills to contribute to future design advancements. Kapow Primary's Design and technology scheme of work enables pupils to meet the end of key stage attainment targets in the national curriculum and the aims.
<b>Substantive knowledge in Design and Technology</b>	By the end of Key Stage Two, children at Camblesforth will be able to: prepare ingredients safely and hygienically and cook nutritious food. They will be able to design their own products using a range of materials and evaluate their product against success criteria. The children will generate their own product ideas by reflecting upon existing products and then developing prototypes. Finally, in order to make successful products, the children will have a secure understanding of mechanical structures, such as: gears, pulley systems and levers.
<b>Disciplinary knowledge in Design and Technology</b>	Children from Camblesforth will be able to participate fully in an increasingly technological world and have an understanding of how to be critical and reflective consumers. They will be able to use their practical, creative and reflective skills to become consumers and innovators who are well informed and can use their own skills to develop products for the future.

	Nursery	Reception	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
<p><b>Structures</b></p> 	<p>*Uses a range of language "I want to make"</p>	<p>*To know there are a range to different materials that can be used to make a model and that they are all slightly different.</p> <p>*Making simple suggestions to fix their junk model.</p> <p>*To know that 'waterproof' materials are those which do not absorb water.</p>	<p>*To understand that the shape of materials can be changed to improve the strength and stiffness of structures.</p> <p>*To understand that cylinders are a strong type of structure (e.g. the main shape used for windmills and lighthouses).</p> <p>*To understand that axles are used in structures and mechanisms to make parts turn in a circle.</p> <p>*To begin to understand that different structures are used for different purposes.</p> <p>*To know that a structure is something that has been made and put together.</p>	<p>*To understand that wide and flat based objects are more stable. • To understand the importance of strength and stiffness in structures.</p> <p>*To understand what a frame structure is</p> <p>*To know that a 'free-standing' structure is one which can stand on its own</p>	<p>*To understand some different ways to reinforce structures.</p> <p>*To understand how triangles can be used to reinforce bridges.</p> <p>*To know that properties are words that describe the form and function of materials.</p> <p>*To understand why material selection is important based on properties.</p> <p>*To understand the material (functional and aesthetic) properties of wood.</p> <p>*To know that structures can be strengthened by manipulating materials and shapes.</p>			
<p><b>Mechanisms / Mechanical systems</b></p> 	<p>*Construct with a purpose and safely</p> <p>*Create recognisable representations of objects</p> <p>*Joins construction pieces together to build and balance</p>	<p>*Use resources to create own props</p> <p>*Manipulate materials to achieve a planned effect</p>	<p>*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.</p> <p>*To know that a slider mechanism has a slider, slots, guides and an object.</p> <p>*To know that bridges and guides are</p> <p>*To know that wheels need to be round to rotate and move.</p> <p>*To understand that for a wheel to move it must be attached to a rotating axle.</p> <p>*To know that an axle moves within an axle holder which is fixed to the vehicle or toy.</p> <p>*To know that the frame of a vehicle (chassis) needs to be balanced. bits of card that purposefully restrict the movement of the slider</p>	<p>*To understand how pneumatic systems work.</p> <p>*To understand that pneumatic systems can be used as part of a mechanism.</p> <p>*To know that pneumatic systems operate by drawing in, releasing and compressing air.</p> <p>*To understand that all moving things have kinetic energy.</p> <p>*To understand that kinetic energy is the energy that something (object/person) has by being in motion.</p> <p>*To know that air resistance is the level of drag on an object as it is forced through the air.</p> <p>*To understand that the shape of a moving object will affect how it moves due to air resistance..</p>	<p>*To know that mechanisms control movement.</p> <p>*To understand that mechanisms can be used to change one kind of motion into another.</p> <p>*To understand how to use sliders, pivots and folds to create paper-based mechanisms.</p> <p>*To understand that the mechanism in an automata uses a system of cams, axles and followers.</p> <p>*To understand that different shaped cams produce different outputs.</p>			

			<ul style="list-style-type: none"> <li>*To know that different materials have different properties and are therefore suitable for different uses.</li> <li>• To know that mechanisms are a collection of moving parts that work together as a machine to produce movement.</li> <li>• To know that there is always an input and output in a mechanism.</li> <li>• To know that an input is the energy that is used to start something working.</li> <li>• To know that an output is the movement that happens as a result of the input.</li> <li>*To know that a lever is something that turns on a pivot.</li> <li>*To know that a linkage mechanism is made up of a series of levers.</li> </ul>		
<p><b>Electrical systems</b></p> 	<p>*Talk about what they have made</p>	<p>*Safely construct with a purpose and evaluate their designs</p> <p>*Selects appropriate resources and adapts work where necessary</p>		<ul style="list-style-type: none"> <li>*To understand that an electrical system is a group of parts (components) that work together to transport electricity around a circuit.</li> <li>*To understand common features of an electric product (switch, battery or plug, dials, buttons etc.).</li> <li>*To list examples of common electric products (kettle, remote control etc.).</li> <li>*To understand that an electric product uses an electrical system to work (function).</li> <li>*To know the name and appearance of a bulb, battery, battery holder and crocodile wire to build simple circuits.</li> <li>*To understand that electrical conductors are materials which electricity can pass through.</li> <li>*To understand that electrical</li> </ul>	<ul style="list-style-type: none"> <li>*To know that series circuits only have one direction for the electricity to flow.</li> <li>*To know when there is a break in a series circuit, all components turn off.</li> <li>*To know that an electric motor converts electrical energy into rotational movement, causing the motor's axle to spin.</li> <li>*To know a motorised product is one which uses a motor to function.</li> <li>*To know that batteries contain acid, which can be dangerous if they leak.</li> <li>*To know the names of the components in a basic series circuit, including a buzzer</li> </ul>

				<p>insulators are materials which electricity cannot pass through.</p> <ul style="list-style-type: none"> <li>*To know that a battery contains stored electricity that can be used to power products.</li> <li>*To know that an electrical circuit must be complete for electricity to flow.</li> <li>*To know that a switch can be used to complete and break an electrical circuit.</li> </ul>	
<p><b>Textiles</b></p> 	<p>*Know that different construction toys can be used to make new things that can be used in pretend play</p>	<p>*To know that a design is a way of planning our idea before we start.</p> <p>*To know that threading is putting one material through an object.</p>	<p>*To know that 'joining technique' means connecting two pieces of material together.</p> <ul style="list-style-type: none"> <li>• To know that there are various temporary methods of joining fabric by using staples, glue or pins.</li> <li>*To understand that different techniques for joining materials can be used for different purposes.</li> <li>*To understand that a template (or fabric pattern) is used to cut out the same shape multiple times.</li> <li>*To know that drawing a design idea is useful to see how an idea will look.</li> <li>*To know that sewing is a method of joining fabric.</li> <li>*To know that different stitches can be used when sewing.</li> <li>*To understand the importance of tying a knot after sewing the final stitch.</li> <li>*To know that a thimble can be used to protect my fingers when sewing.</li> </ul>	<ul style="list-style-type: none"> <li>•To know that applique is a way of mending or decorating a textile by applying smaller pieces of fabric to larger pieces.</li> <li>*To know that when two edges of fabric have been joined together it is called a seam.</li> <li>*To know that it is important to leave space on the fabric for the seam.</li> <li>*To understand that some products are turned inside out after sewing so the stitching is hidden</li> <li>*To know that a fastening is something which holds two pieces of material together for example a zipper, toggle, button, press stud and velcro.</li> <li>*To know that different fastening types are useful for different purposes.</li> <li>*To know that creating a mock up (prototype) of their design is useful for checking ideas and proportions.</li> </ul>	<ul style="list-style-type: none"> <li>*To know that blanket stitch is useful to reinforce the edges of a fabric material or join two pieces of fabric.</li> <li>*To understand that it is easier to finish simpler designs to a high standard.</li> <li>*To know that soft toys are often made by creating appendages separately and then attaching them to the main body.</li> <li>*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.</li> <li>*To understand that it is important to design clothing with the client/ target customer in mind.</li> <li>*To know that using a template (or clothing pattern) helps to accurately mark out a design on fabric.</li> <li>*To understand the importance of consistently sized stitches.</li> </ul>
<p><b>Cooking and nutrition</b></p>	<p>*Interested in trying new experiences</p>	<p>*Explore a variety of materials, tools and techniques, experimenting with colour, design, texture,</p>	<p>*Understanding the difference between fruits and vegetables.</p> <ul style="list-style-type: none"> <li>*To understand that some foods typically known as vegetables are actually fruits (e.g. cucumber).</li> <li>*To know that a blender is a machine</li> </ul>	<ul style="list-style-type: none"> <li>*To know that not all fruits and vegetables can be grown in the UK.</li> <li>*To know that climate affects food growth.</li> <li>*To know that vegetables and fruit grow in certain seasons.</li> </ul>	<ul style="list-style-type: none"> <li>*To understand where meat comes from – learning that beef is from cattle and how beef is reared and processed, including key welfare issues.</li> <li>*To know that I can adapt a recipe to make it healthier by substituting</li> </ul>



form and function.

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).
- \*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'.

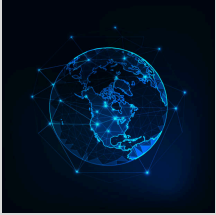
\*To know that cooking instructions are known as a 'recipe'.

- \*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.
- \*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.

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.
- \*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).

## Digital world



- \*To understand that, in programming, a 'loop' is code that repeats something again and again until stopped.
- \*To know that a Micro:bit is a pocket-sized, codeable computer.
- \*To understand what variables are in programming.
- \*To know some of the features of a Micro:bit.
- \*To know that an algorithm is a set of instructions to be followed by the computer.
- \*To know that it is important to check my code for errors (bugs).
- \*To know that a simulator can be used as a way of checking your code works before installing it onto an electronic device.

- \*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 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.