

Design and Technology Progression of Skills and Knowledge - St. Anthony's Primary School



Through a variety of creative and practical activities, pupils at St Anthony's are taught the knowledge, understanding and skills needed to engage in an iterative process of designing and making.

Design Research, criteria, idea generation, idea development, models/ prototypes, diagrams,	Make Select and use appropriate tools and equipment, select materials and components, health and safety	Evaluate Explore existing products, evaluate against design criteria, evaluate own & others ideas, understand how events & individuals have shaped world of DT, feedback for improvements	Technical Knowledge (encompasses the contextual, historical and technical understanding needed for each unit)
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National Curriculum Key Area: Structures

		<u>EYFS – Junk Modelling</u>	<u>KS1 Unit - Constructing a Windmill</u>
<u>Skills</u>	Design	Making verbal plans and material choices Developing a junk model	Learning the importance of a clear design criteria. Including individual preferences and requirements in a design.
	Make	Improving fine motor/ scissor skills with a variety of materials Joining materials in a variety of ways Joining different materials together Describing their junk model, and how they intend to put it together	Making stable structures from card. 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. Finding the middle of an object. Puncturing holes. Adding weight to structures. Creating supporting structures. Cutting evenly and carefully
	Evaluate	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	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.
<u>Knowledge</u>	Technical	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.	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.

			<p>To know that a structure is something that has been made and put together.</p> <p>To know that the sails or blades of a windmill are moved by the wind.</p> <p>To know that a structure is something built for a reason.</p> <p>To know that stable structures do not topple.</p> <p>To know that adding weight to the base of a structure can make it more stable.</p>
	Additional		<p>To know that a windmill harnesses the power of wind for a purpose like grinding grain, pumping water or generating electricity.</p> <p>To know that windmill turbines use wind to turn and make the machines inside work.</p> <p>To know that a windmill is a structure with sails that are moved by the wind.</p> <p>To know the three main parts of a windmill are the turbine, axle and structure.</p> <p>To know that windmills are used to generate power and were used for grinding flour</p>

		<u>Lower Key Stage 2 – Pavillions</u>	<u>Upper Key Stage 2 – Playgrounds</u>
<u>Skills</u>	Design	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 playground featuring a variety of different structures, giving careful consideration to how the structures will be used, considering effective and ineffective designs.
	Make	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.	Building a range of play apparatus structures drawing upon new and prior knowledge of structures. Measuring, marking and cutting wood to create a range of structures. Using a range of materials to reinforce and add decoration to structures.
	Evaluate	Evaluating structures made by the class. Describing what characteristics of a design and construction made it the most effective. Considering effective and ineffective designs.	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.
<u>Knowledge</u>	Technical	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 structures can be strengthened by manipulating materials and shapes.

	Additional	<p>To know that a pavilion is a a decorative building or structure for leisure activities.</p> <p>To know that cladding can be applied to structures for different effects.</p> <p>To know that aesthetics are how a product looks.</p> <p>To know that a product's function means its purpose.</p> <p>To understand that the target audience means the person or group of people a product is designed for.</p> <p>To know that architects consider light, shadow and patterns when designing.</p>	<p>To understand what a 'footprint plan' is.</p> <p>To understand that in the real world, design , can impact users in positive and negative ways.</p> <p>To know that a prototype is a cheap model to test a design idea.</p>
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National Curriculum Key Area: Mechanisms/ Mechanical Systems

		<u>Year 1: Making a moving Story Book</u>	<u>Year 2: Making a Moving Monster</u>
<u>Skills</u>	Design	<p>Explaining how to adapt mechanisms, using bridges or guides to control the movement.</p> <p>Designing a moving story book for a given audience.</p>	<p>Creating a class design criteria for a moving monster.</p> <p>Designing a moving monster for a specific audience in accordance with a design criteria.</p>
	Make	<p>Following a design to create moving models that use levers and sliders</p>	<p>Making linkages using card for levers and split pins for pivots.</p> <p>Experimenting with linkages adjusting the widths, lengths and thicknesses of card used.</p> <p>Cutting and assembling components neatly.</p>
	Evaluate	<p>Testing a finished product, seeing whether it moves as planned and if not, explaining why and how it can be fixed.</p> <p>Reviewing the success of a product by testing it with its intended audience</p>	<p>Evaluating own designs against design criteria.</p> <p>Using peer feedback to modify a final design.</p>
<u>Knowledge</u>	Technical	<p>To know that a mechanism is the parts of an object that move together.</p> <p>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 bits of card that purposefully restrict the movement of the slider.</p>	<p>To know that mechanisms are a collection of moving parts that work together as a machine to produce movement.</p> <p>To know that there is always an input and output in a mechanism.</p> <p>To know that an input is the energy that is used to start something working.</p> <p>To know that an output is the movement that happens as a result of the input.</p> <p>To know that a lever is something that turns on a pivot.</p> <p>To know that a linkage mechanism is made up of a series of levers</p>
	Additional	<p>To know that in Design and technology we call a plan a 'design'.</p>	<p>To know some real-life objects that contain mechanisms.</p>

		<u>Lower KS2: Year 3: Pneumatic Toys</u>	<u>Lower KS2 Year 4: Making a Sling shot car</u>
<u>Skills</u>	Design	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.	Designing a shape that reduces air resistance. Drawing a net to create a structure from. Choosing shapes that increase or decrease speed as a result of air resistance. Personalising a design.
	Make	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.	Measuring, marking, cutting and assembling with increasing accuracy. Making a model based on a chosen design
	Evaluate	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.	Evaluating the speed of a final product based on: the effect of shape on speed and the accuracy of workmanship on performance.
<u>Knowledge</u>	Technical	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 that all moving things have kinetic energy. To understand that kinetic energy is the energy that something (object/person) has by being in motion. To know that air resistance is the level of drag on an object as it is forced through the air. To understand that the shape of a moving object will affect how it moves due to air resistance.
	Additional	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.	To understand that products change and evolve over time. To know that aesthetics means how an object or product looks in design and technology. To know that a template is a stencil you can use to help you draw the same shape accurately. To know that a birds-eye view means a view from a high angle (as if a bird in flight). To know that graphics are images which are designed to explain or advertise something. To know that it is important to assess and evaluate design ideas and models against a list of design criteria.

<u>Upper KS2: Year 5: Pop Up Book</u>		
<u>Skills</u>	Design	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.
	Make	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.
	Evaluate	Evaluating the work of others and receiving feedback on own work. Suggesting points for improvement
<u>Knowledge</u>	Technical	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.
	Additional	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 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

National Curriculum Key Area: Electrical Systems (only Key Stage 2)

<u>Lower KS2: Year 4: Torches</u>		
<u>Skills</u>	Design	Designing a torch, giving consideration to the target audience and creating both design and success criteria focusing on features of individual design ideas.
	Make	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	Evaluating electrical products. Testing and evaluating the success of a final product.
<u>Knowledge</u>	Technical	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	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

National Curriculum Key Area: Cooking and Nutrition

		<u>EYFS: Soup</u>	<u>Year 1: Smoothies</u>
<u>Skills</u>	Design	Designing a soup recipe as a class. Designing soup packaging	Designing smoothie carton packaging by-hand.
	Make	Chopping plasticine safely. Chopping vegetables with support.	Chopping fruit and vegetables safely to make a smoothie. Juicing fruits safely to make a smoothie.
	Evaluate	Tasting the soup and giving opinions. Describing some of the following when tasting food: look, feel, smell and taste. Choosing their favourite packaging design and explaining why.	Tasting and evaluating different food combinations. Describing appearance, smell and taste. Suggesting information to be included on packaging. Comparing their own smoothie with someone else's.
<u>Knowledge</u>	Technical	To know that soup is ingredients (usually vegetables and liquid) blended together. To know that vegetables are grown. To recognise and name some common vegetables. To know that different vegetables taste different. To know that eating vegetables is good for us. To discuss why different packages might be used for different foods	To know that a blender is a machine which mixes ingredients together into a smooth liquid. To know that a fruit has seeds. To know that fruits grow on trees or vines. To know that vegetables can grow either above or below ground. To know that vegetables is any edible part of a plant (e.g. roots: potatoes, leaves: lettuce, fruit: cucumber).

		<u>Year 2: Balanced Diet</u>	<u>Year 3: Eating Seasonally</u>
<u>Skills</u>	Design	Designing three wrap ideas based on a food combination which work well together.	Designing a recipe for a savoury tart.
	Make	Chopping foods safely to make a wrap. Constructing a wrap that meets a design brief. Grating foods to make a wrap. Snipping smaller foods instead of cutting.	Following the instructions within a recipe. Tasting seasonal ingredients. Selecting seasonal ingredients. Peeling ingredients safely. Cutting safely with a vegetable knife.
	Evaluate	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 food by giving a score.	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.
<u>Knowledge</u>	Technical	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 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.

		<p>To know that the five main food groups are: Carbohydrates, fruits and vegetables, protein, dairy and foods high in fat and sugar.</p> <p>To understand that I should eat a range of different foods from each food group, and roughly how much of each food group.</p> <p>To know that 'ingredients' means the items in a mixture or recipe.</p>	<p>To know that cooking instructions are known as a 'recipe'.</p> <p>To know that imported food is food which has been brought into the country.</p> <p>To know that exported food is food which has been sent to another country..</p> <p>To know that eating seasonal foods can have a positive impact on the environment.</p> <p>To know that similar coloured fruits and vegetables often have similar nutritional benefits.</p> <p>To know that the appearance of food is as important as taste.</p>
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		<u>Year 4: Adapting a Recipe</u>	<u>Year 5: Developing a Recipe</u>
<u>Skills</u>	Design	<p>Designing a biscuit within a given budget, drawing upon previous taste testing judgements.</p> <p>Designing packaging for a biscuit that targets a specific group.</p>	<p>Adapting a traditional recipe, understanding that the nutritional value of a recipe alters if you remove, substitute or add additional ingredients.</p> <p>Writing an amended method for a recipe to incorporate the relevant changes to ingredients.</p> <p>Designing appealing packaging to reflect a recipe.</p> <p>Researching existing recipes to inform ingredient choices</p>
	Make	<p>Following a baking recipe, including the preparation of ingredients.</p> <p>Cooking safely, following basic hygiene rules.</p> <p>Adapting a recipe to meet the requirements of a target audience.</p> <p>Using a cuboid net to create packaging.</p>	<p>Cutting and preparing vegetables safely.</p> <p>Using equipment safely, including knives, hot pans and hobs.</p> <p>Knowing how to avoid cross-contamination.</p> <p>Following a step by step method carefully to make a recipe</p>
	Evaluate	<p>Evaluating a recipe, considering: taste, smell, texture and appearance.</p> <p>Describing the impact of the budget on the selection of ingredients.</p> <p>Evaluating and comparing a range of food products.</p> <p>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>	<p>Identifying the nutritional differences between different products and recipes.</p> <p>Identifying and describing healthy benefits of food groups.</p>
<u>Knowledge</u>	Technical	<p>To know that the amount of an ingredient in a recipe is known as the 'quantity.'</p> <p>To know that safety and hygiene are important when cooking.</p> <p>To know the following cooking techniques: sieving, measuring, stirring, cutting out and shaping.</p>	<p>To understand where meat comes from - learning that beef is from cattle and how beef is reared and processed.</p> <p>To know that recipes can be adapted to suit nutritional needs and dietary requirements.</p> <p>To know that I can use a nutritional calculator to see how healthy a food option is.</p>

		To understand the importance of budgeting while planning ingredients for biscuits. To know that products often have a target audience.	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 coloured chopping boards can prevent cross-contamination. To know that nutritional information is found on food packaging. To know that food packaging serves many purposes.
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		<u>Year 6: Come Dine with Me</u>	
<u>Skills</u>	Design	Writing a recipe, explaining the key steps, method and ingredients. Including facts and drawings from research undertaken.	
	Make	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	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.	
<u>Knowledge</u>	Technical	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).	

National Curriculum Key Area: Textiles

		<u>Key Stage 1: Year 2: Pouches</u>	<u>Lower Key Stage 2: Year 3: Egyptian Collars</u>
<u>Skills</u>	Design	Designing a pouch.	Designing and making a template from an existing collar and applying individual design criteria.
	Make	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.	Following design criteria to create an 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.

		Neatly pinning and cutting fabric using a template.	Decorating fabric using appliqué. Completing design ideas and embellishing the collars based on design ideas (Egyptian collars).
	Evaluate	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.	Evaluating an end product and thinking of other ways in which to create similar items.
Knowledge	Technical	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.	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.

		Lower Key Stage 2: Year 5: Stuffed Toys	
Skills	Design	Designing a stuffed toy, considering the main component shapes required and creating an appropriate template. Considering the proportions of individual components.	
	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	Technical	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.	

National Curriculum Key Area: Digital World

		<u>Year 6: Navigating the World</u>
Skills	Design	<p>Writing a design brief from information submitted by a client.</p> <p>Developing design criteria to fulfil the client's request.</p> <p>Considering and suggesting additional functions for my navigation tool.</p> <p>Developing a product idea through annotated sketches.</p> <p>Placing and manoeuvring 3D objects, using CAD.</p> <p>Changing the properties of, or combining one or more 3D objects, using CAD.</p>
	Make	<p>Considering materials and their functional properties, especially those that are sustainable and recyclable (for example, cork and bamboo).</p> <p>Explaining material choices and why they were chosen as part of a product concept.</p> <p>Programming an N,E, S, W cardinal compass.</p>
	Evaluate	<p>Explaining how my program fits the design criteria and how it would be useful as part of a navigation tool.</p> <p>Developing an awareness of sustainable design.</p> <p>Identifying key industries that utilise 3D CAD modelling and explaining why.</p> <p>Describing how the product concept fits the client's request and how it will benefit the customers.</p> <p>Explaining the key functions in my program, including any additions.</p> <p>Explaining how my program fits the design criteria and how it would be useful as part of a navigation tool.</p> <p>Explaining the key functions and features of my navigation tool to the client as part of a product concept pitch.</p> <p>Demonstrating a functional program as part of a product concept pitch</p>
Knowledge	Technical	<p>To know that accelerometers can detect movement.</p> <p>To understand that sensors can be useful in products as they mean the product can function without human input.</p>
	Additional	<p>To know that designers write design briefs and develop design criteria to enable them to fulfil a client's request.</p> <p>To know that 'multifunctional' means an object or product has more than one function.</p> <p>To know that magnetometers are devices that measure the Earth's magnetic field to determine which direction you are facing.</p>