

Design and Technology Progression Document

Kapow scheme of work used

Reception	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Structures						
<p>Junk models</p> <ul style="list-style-type: none"> • Making verbal plans and material choices. • Developing a junk model. Describing their plans. • Improving fine motor/scissor skills with a variety of materials. • Joining materials in a variety of ways. • 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. 	<p>Windmills</p> <ul style="list-style-type: none"> • Learning the importance of a clear design criteria. • Making stable structures from card, tape and glue. • To know that a structure is something that has been made and put together. • Learning how to turn 2D nets into 3D structures. • To understand that the shape of materials can be changed to improve the strength and stiffness of structures. • To understand that cylinders are a strong type of structure (e.g. the main shape used for windmills and lighthouses). • 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. • To understand that axles are used in structures and mechanisms to make parts turn in a circle. 	<p>Making a chair</p> <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. • 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. • 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. • know that shapes and structures with wide, flat bases or legs are the most stable. • understand that the shape of a structure affects its strength. 	<p>Constructing Castles</p> <ul style="list-style-type: none"> • Designing a castle with key features to appeal to a specific person/purpose. • Drawing and labelling a castle design using 2D shapes, labelling: -the 3D shapes that will create the features - materials needed and colours. • Designing and/or decorating a castle tower on CAD software. • Constructing a range of 3D geometric shapes using nets. • Creating special features for individual designs. • Making facades from a range of recycled materials. • Evaluating own work and the work of others based on the aesthetic of the finished product and in comparison, to the original design. • Suggesting points for modification of the individual designs. • understand that wide and flat based objects are more stable. 	<p>Pavilions</p> <ul style="list-style-type: none"> • Designing a stable pavilion structure that is aesthetically pleasing and selecting materials to create a desired effect. • Building frame structures designed to support weight. • Creating a range of different shaped frame structures. • Making a variety of free-standing frame structures of different shapes and sizes. • To understand what a frame structure is. • To know that a 'free-standing' structure is one which can stand on its own. • 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. 		<p>Playgrounds</p> <ul style="list-style-type: none"> • Designing a playground featuring a variety of different structures, considering how the structures will be used, considering effective and ineffective designs. • Building a range of play apparatus structures drawing upon new and prior knowledge of structures. • To know that structures can be strengthened by manipulating materials and shapes. • Measuring, marking and cutting wood to create a range of structures. • Using a range of materials to reinforce and add decoration to structures. • 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.

	<ul style="list-style-type: none"> • Evaluating a windmill according to the design criteria. • Suggest points for improvements 	<ul style="list-style-type: none"> • know that materials can be manipulated to improve strength and stiffness. • know that a structure is something which has been formed or made from parts. • know that a 'stable' structure is one which is firmly fixed and unlikely to change or move. • know that a 'strong' structure is one which does not break easily. • know that a 'stiff' structure or material is one which does not bend easily. • know that natural structures are those found in nature. • know that man-made structures are those made by people. 	<ul style="list-style-type: none"> • understand the importance of strength and stiffness in structures. 	<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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Mechanisms / mechanical systems

		<p>Possible-Fairground wheel</p> <ul style="list-style-type: none"> • Selecting a suitable linkage system to produce the desired motion. • Designing a wheel. • Selecting materials according to their characteristics. • Following a design brief • Evaluating different designs. • Testing and adapting a design. <p><u>Technical</u></p> <ul style="list-style-type: none"> • know that different materials have different properties and are therefore suitable for different uses 		<ul style="list-style-type: none"> • 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. • Measuring, marking, cutting and assembling with increasing accuracy. • Making a model based on a chosen design. • understand that all moving things have kinetic energy. <p><u>Technical</u></p> <ul style="list-style-type: none"> • understand that kinetic energy is the energy that something (object/person) has by being in motion. 	<ul style="list-style-type: none"> • Designing a pop-up book which uses a mixture of structures and mechanisms. • Following a design brief to make a pop-up book, neatly and with focus on accuracy. • Storyboarding ideas for a book. • Naming each mechanism, input and output accurately. • 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. 	
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				<ul style="list-style-type: none"> • know that air resistance is the level of drag on an object as it is forced through the air. • understand that the shape of a moving object will affect how it moves due to air resistance. 	<u>Technical</u> <ul style="list-style-type: none"> • know that mechanisms control movement. • understand that mechanisms can be used to change one kind of motion into another. • understand how to use sliders, pivots and folds to create paper-based mechanisms. 	
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Electrical systems (KS2 only)

				<ul style="list-style-type: none"> • Designing a torch, considering the target audience and creating both design and success criteria focusing on features of individual design ideas • 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. • Testing and evaluating the success of a final product. <p><u>Technical</u></p> <ul style="list-style-type: none"> • understand that electrical conductors are materials which electricity can pass through. • understand that electrical insulators are materials which electricity cannot pass through. • know that a battery contains stored electricity that can be used to power products. • know that an electrical circuit must be complete for electricity to flow. 	<ul style="list-style-type: none"> • Identifying factors that could be changed on existing products and explaining how these would alter the form and function of the product • Developing design criteria based on findings from investigating existing products. • Developing design criteria that clarifies the target user. • Altering a product's form and function by tinkering with its configuration. • Making a functional series circuit, incorporating a motor. • Constructing a product with consideration for the design criteria. • Breaking down the construction process into steps so that others can make the product. • Carry out a product analysis to look at the purpose of a product along with its strengths and weaknesses. • Determining which parts of a product affect its function and which parts affect its form. 	
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				<ul style="list-style-type: none"> • know that a switch can be used to complete and break an electrical circuit. 	<ul style="list-style-type: none"> • Analysing whether changes in configuration positively or negatively affect an existing product. • Peer evaluating a set of instructions to build a product. <p><u>Technical</u></p> <ul style="list-style-type: none"> • know that series circuits only have one direction for the electricity to flow. • know when there is a break in a series circuit, all components turn off. • know that an electric motor converts electrical energy into rotational movement, causing the motor's axle to spin. • know a motorised product is one which uses a motor to function. 	
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Cooking and nutrition

	<p><u>Fruit and vegetables</u></p> <ul style="list-style-type: none"> • Designing smoothie carton packaging by-hand • 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. • Tasting and evaluating different food combinations. • Suggesting information to be included on packaging. • Understanding the difference between fruits and vegetables. • understand that some foods typically known as vegetables are fruits (e.g. cucumber). 		<p><u>Eating seasonally</u></p> <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 • Knowing how to prepare themselves and a workspace to cook safely in, learning the basic rules to avoid food contamination. • Following the instructions within a recipe. • 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. 		<p><u>What could be healthier?</u></p> <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. • 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. • Identifying the nutritional differences between 	
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	<ul style="list-style-type: none"> • know that a blender is a machine which mixes ingredients together into a smooth liquid. • know that a fruit has seeds and a vegetable does not. • know that fruits grow on trees or vines. • know that vegetables can grow either above or below ground. • 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"> • Suggesting points for improvement when making a seasonal tart. • know that not all fruits and vegetables can be grown in the UK. • know that climate affects food growth. • know that vegetables and fruit grow in certain seasons. • know that cooking instructions are known as a 'recipe'. • 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. • understand that imported foods travel from far away and this can negatively impact the environment. • know that each fruit and vegetable give us nutritional benefits because they contain vitamins, minerals and fibre. • understand that vitamins, minerals and fibre are important for energy, growth and maintaining health. • know safety rules for using, storing and cleaning a knife safely. • know that similar coloured fruits and vegetables often have similar nutritional benefits. 		<p>different products and recipes.</p> <ul style="list-style-type: none"> • Identifying and describing healthy benefits of food groups. • understand where meat comes from - learning that beef is from cattle and how beef is reared and processed, including key welfare issues. • know how adapt a recipe to make it healthier by substituting ingredients. • know how to 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. 	
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Textiles

Bookmarks

- Discussing what a good design needs.
- know that a design is a way of planning our idea before we start
- Designing a bookmark.
- Designing a simple pattern with paper.
- Choosing from available materials.
- Developing fine motor/cutting skills with scissors.
- Exploring fine motor/threading and weaving (under, over technique) with a variety of materials.
- Using a prepared needle and wool to practise threading.
- To know that threading is putting one material through an object.

Puppets

- Using a template to create a design for a puppet.
- Cutting fabric neatly with scissors.
- Using joining methods to decorate a puppet.
- Sequencing the steps taken during construction.
- Reflecting on a finished product, explaining likes and dislikes.
- know that 'joining technique' means connecting two pieces of material together.
- know that there are various temporary methods of joining fabric by using staples, glue or pins.
- understand that different techniques for joining materials can be used for different purposes.
- understand that a template (or fabric pattern) is used to cut out the same shape multiple times.
- know that drawing a design idea is useful to see how an idea will look.

Waistcoats

- Designing a waistcoat in accordance to a specification linked to set of design criteria.
- Annotating designs, to explain their decisions.
- Using a template when cutting fabric to ensure they achieve the correct shape.
- Using pins effectively to secure a template to fabric without creases or bulges.
- Marking and cutting fabric accurately, in accordance with their design.
- Sewing a strong running stitch, making small, neat stitches and following the edge.
- Tying strong knots.
- Decorating a waistcoat, attaching features (such as appliqué) using thread.
- Finishing the waistcoat with a secure fastening (such as buttons).
- Learning different decorative stitches.
- Sewing accurately with evenly spaced, neat stitches.
- Reflecting on their work continually throughout the design, make and evaluate process.
- understand that it is important to design clothing with the client/target customer in mind.
- know that using a template (or clothing pattern) helps to accurately mark out a design on fabric.

						<ul style="list-style-type: none"> • understand the importance of consistently sized stitches.
Digital world (KS2 only)						
			<p><u>Electronic charm</u></p> <ul style="list-style-type: none"> • Analysing and evaluating an existing product • Identifying the key features of a pouch • Problem solving by suggesting potential features on a Micro: bit and justifying my ideas • To know that a Micro: bit is a pocket-sized, codeable computer • Developing design ideas for a technology pouch • Drawing and manipulating 2D shapes, using computer-aided design, to produce a point-of-sale badge • Using a template when cutting and assembling the pouch • Following a list of design requirements • Selecting and using the appropriate tools and equipment for cutting, joining, shaping and decorating a foam pouch • Applying functional features such as using foam to create soft buttons • understand that in programming a 'loop' is code that repeats something again and again until stopped • Writing a program to control (button press) and/or monitor (sense light) that will initiate a flashing LED algorithm 			<p><u>Navigating the world</u></p> <ul style="list-style-type: none"> • Writing a design brief from information submitted by a client • Developing design criteria to fulfil the client's request • Considering and suggesting additional functions for my navigation tool • Developing a product idea through annotated sketches • Placing and manoeuvring 3D objects, using CAD • Changing the properties of, or combine one or more 3D objects, using CAD • 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 • Explaining how their 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 explain why • Describing how the product concept fits the

						<p>client's request and how it will benefit the customers</p> <ul style="list-style-type: none">• Explaining the key functions in their program, including any additions• Explaining how their program fits the design criteria and how it would be useful as part of a navigation tool• Explaining the key functions and features of the navigation tool to the client as part of a product concept pitch• Demonstrating a functional program as part of a product concept
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