

Progression of skills and knowledge: Structures

		Year 1	Year 2
		Constructing a windmill	Baby bear's chair
Skills	Design	<ul style="list-style-type: none"> • Learning the importance of a clear design criteria. • Including individual preferences and requirements in a design. 	<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.
	Make	<ul style="list-style-type: none"> • 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 windmill. • Making functioning turbines and axles which are assembled into a main supporting structure. 	<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.
	Evaluate	<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 	<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
Knowledge	Technical	<ul style="list-style-type: none"> • 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). • 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. • To know that a structure is something that has been made and put together 	<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.
	Additional	<ul style="list-style-type: none"> • 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 windmill harnesses the power of wind for a purpose like grinding grain, pumping water or generating electricity. 	<ul style="list-style-type: none"> 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 windmill turbines use wind to turn and make the machines inside work.• To know that a windmill is a structure with sails that are moved by the wind.• To know the three main parts of a windmill are the turbine, axle and structure.	
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		Year 3	Year 4
		Constructing a castle	Pavilions
Skills	Design	<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. 	<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.
	Make	<ul style="list-style-type: none"> • Constructing a range of 3D geometric shapes using nets. • Creating special features for individual designs. • Making facades from a range of recycled materials. 	<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 cladding. • Reinforcing corners to strengthen a structure. • Creating a design in accordance with a plan. • Learning to create different textural effects with materials
	Evaluate	<ul style="list-style-type: none"> • 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. 	<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
Knowledge	Technical	<ul style="list-style-type: none"> • To understand that wide and flat based objects are more stable. • To understand the importance of strength and stiffness in structures 	<ul style="list-style-type: none"> • To understand what a frame structure is. • To know that a ‘free-standing’ structure is one which can stand on its own.
	Additional	<ul style="list-style-type: none"> • To know the following features of a castle: flags, towers, battlements, turrets, curtain walls, moat, drawbridge and gatehouse - and their purpose. • To know that a façade is the front of a structure. • To understand that a castle needed to be strong and stable to withstand enemy attack. • To know that a paper net is a flat 2D shape that can become a 3D shape once assembled. • To know that a design specification is a list of success criteria for a product. 	<ul style="list-style-type: none"> • To know that a pavilion is a 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 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.

Year 6**Playgrounds**

Skills	Design	<ul style="list-style-type: none">• 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	<ul style="list-style-type: none">• 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	<ul style="list-style-type: none">• 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.
Knowledge	Technical	<ul style="list-style-type: none">• To know that structures can be strengthened by manipulating materials and shapes
	Additional	<ul style="list-style-type: none">• To understand what a 'footprint plan' is.• To understand that in the real world, design , can impact users in positive and negative ways.• To know that a prototype is a cheap model to test a design idea.

Progression of skills and knowledge: Mechanisms/mechanical systems

		Year 2	
		Fairground wheel	Making a moving monster
Skills	Design	<ul style="list-style-type: none"> • Selecting a suitable linkage system to produce the desired motion. • Designing a wheel. 	<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 materials according to their characteristics. • Following a design brief. 	<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.
	Evaluate	<ul style="list-style-type: none"> • Evaluating different designs. • Testing and adapting a design. 	<ul style="list-style-type: none"> • Evaluating own designs against design criteria. • Using peer feedback to modify a final design.
Knowledge	Technical	<ul style="list-style-type: none"> • To know that different materials have different properties and are therefore suitable for different uses. 	<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.
	Additional	<ul style="list-style-type: none"> • To know the features of a ferris wheel include the wheel, frame, pods, a base an axle and an axle holder. • To know that it is important to test my design as I go along so that I can solve any problems that may occur. 	<ul style="list-style-type: none"> • To know some real-life objects that contain mechanisms

		Year 4	Year 5
		Making a slingshot car	Making a pop up book
Skills	Design	<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. 	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • Measuring, marking, cutting and assembling with increasing accuracy. • Making a model based on a chosen design. 	<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
	Evaluate	<ul style="list-style-type: none"> • Evaluating the speed of a final product based on: the effect of shape on speed and the accuracy of workmanship on performance. 	<ul style="list-style-type: none"> • Evaluating the work of others and receiving feedback on own work. • Suggesting points for improvement.
Knowledge	Technical	<ul style="list-style-type: none"> • 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. 	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • 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. 	<ul style="list-style-type: none"> • 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.

Progression of skills and knowledge: Electrical systems (KS2 only)

		Year 4	Year 5
		Torches	Doodlers
Skills	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"> • 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.
	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"> • 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.
	Evaluate	<ul style="list-style-type: none"> • Evaluating electrical products. • Testing and evaluating the success of a final product. 	<ul style="list-style-type: none"> • 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. • Analysing whether changes in configuration positively or negatively affect an existing product. • Peer evaluating a set of instructions to build a product.
Knowledge	Technical	<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. 	<ul style="list-style-type: none"> • To know that series circuits only have one direction for the electricity to flow. • To know when there is a break in a series circuit, all components turn off. • To know that an electric motor converts electrical energy into rotational movement, causing the motor's axle to spin. • To know a motorised product is one which uses a motor to function.
	Additional	<ul style="list-style-type: none"> • 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 product analysis is critiquing the strengths and weaknesses of a product. • To know that 'configuration' means how the parts of a product are arranged.

Progression of skills and knowledge: Cooking and nutrition

		Year 1	Year 3
		Smoothies	Eating seasonally
Skills	Design	<ul style="list-style-type: none"> • Designing smoothie carton packaging by-hand. • Designing a recipe for a savoury tart. 	<ul style="list-style-type: none"> • Designing smoothie carton packaging by-hand. • Designing a recipe for a savoury tart.
	Make	<ul style="list-style-type: none"> • Chopping fruit and vegetables safely to make a smoothie. • Juicing fruits safely to make a smoothie. 	<ul style="list-style-type: none"> • Following the instructions within a recipe. • Tasting seasonal ingredients. • Selecting seasonal ingredients. • Peeling ingredients safely. • Cutting safely with a vegetable knife.
	Evaluate	<ul style="list-style-type: none"> • 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. 	<ul style="list-style-type: none"> • 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.
Knowledge		<ul style="list-style-type: none"> • 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). 	<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 know that eating seasonal foods can have a positive impact on the environment. • To know that similar coloured fruits and vegetables often have similar nutritional benefits. • To know that the appearance of food is as important as taste.

Year 5

Developing a recipe

Skills	Design	<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.• Researching existing recipes to inform ingredient choices
	Make	<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.
	Evaluate	<ul style="list-style-type: none">• Identifying the nutritional differences between different products and recipes.• Identifying and describing healthy benefits of food groups.
Knowledge		<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.• To know that recipes can be adapted to suit nutritional needs and dietary requirements.• 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 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.

Progression of skills and knowledge: Textiles

		EYFS: Reception	Year 1	Year 6
		Bookmarks	Puppets	Waistcoats
Skills	Design	<ul style="list-style-type: none"> • Discussing what a good design needs. • Designing a simple pattern with paper. • Designing a bookmark. • Choosing from available materials. 	<ul style="list-style-type: none"> • Using a template to create a design for a puppet. 	<ul style="list-style-type: none"> • Designing a waistcoat in accordance to a specification linked to set of design criteria. • Annotating designs, to explain their decisions.
	Make	<ul style="list-style-type: none"> • 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. 	<ul style="list-style-type: none"> • Cutting fabric neatly with scissors. • Using joining methods to decorate a puppet. • Sequencing the steps taken during construction. 	<ul style="list-style-type: none"> • 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.
	Evaluate	<ul style="list-style-type: none"> • Reflecting on a finished product and comparing to their design. 	<ul style="list-style-type: none"> • Reflecting on a finished product, explaining likes and dislikes. 	<ul style="list-style-type: none"> • Reflecting on their work continually throughout the design, make and evaluate process.
Knowledge		<ul style="list-style-type: none"> • To know that a design is a way of planning our idea before we start. • To know that threading is putting one material through an object. 	<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"> • To understand that it is important to design clothing with the client/ target customer in mind. • To know that using a template (or clothing pattern) helps to accurately mark out a design on fabric. • To understand the importance of consistently sized stitches.

Progression of skills and knowledge: Digital world (KS2 only)

		Year 3	Year 6
		Wearable technology	Navigating the world
Skills	Design	<ul style="list-style-type: none"> • Problem solving by suggesting which features on a micro:bit might be useful and justifying my ideas. • Drawing and manipulating 2D shapes, using computer-aided design, to produce a point of sale badge. • Developing design ideas through annotated sketches to create a product concept. • Developing design criteria to respond to a design brief. 	<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
	Make	<ul style="list-style-type: none"> • Following a list of design requirements. • Writing a program to control (button press) and/or monitor (sense light) that will initiate a flashing LED algorithm. 	<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
	Evaluate	<ul style="list-style-type: none"> • Analysing and evaluating wearable technology. • Using feedback from peers to improve design. 	<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 explain why • Describing how the product concept fits the client's request and how it will benefit the customers • 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
Knowledge	Technical	<ul style="list-style-type: none"> • 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 know that a simulator is able to replicate the functions of an existing piece of technology. 	<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
	Additional	<ul style="list-style-type: none"> • To know what the 'Digital Revolution' is and features of some of the products that have evolved as a result. • To understand what is meant by 'point of sale display.' • To know that CAD stands for 'Computer-aided design'. • To know what a focus group is by taking part in one. 	<ul style="list-style-type: none"> • 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 field to determine which direction you are facing