

Structures							
		Progression of Skills and Knowledge KS1		Progression of Skills and Knowledge KS2			
		Year 1 Windmills	Year 2 Chair	Year 3 Castle	Year 4 Viking Longboat	Year 5	Year 6 Playgrounds
Skills	Design	Learning the importance of a clear design criteria. Including individual preferences and requirements in a design.	Generating and communicating ideas using sketching and modelling. Learning about different types of structures, found in the natural world and in everyday objects.	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.	Designing a stable structure that is aesthetically pleasing and selecting materials to create a desired effect. Building frame structures designed to support weight of the mast.		Designing a theme park/playground. Giving careful consideration to how the structures will be used for strength , enjoyment and aesthetic appeal. Consider effective and ineffective designs. Consider a theme.
	Make	Making stable structures from card, tape and glue. Learning how to turn 2D nets into 3D structures. Following instructions to cut and assemble the	Making a structure according to design criteria. Creating joints and structures from paper/card and tape.	Constructing a range of 3D geometric shapes using nets. Creating special features for individual designs. Making facades from a	Creating a range of different shaped frame structures. Making a variety of free-standing frame structures of different		Build a range of play apparatus drawing on new and prior knowledge of structures like triangulation and balance stability. Measuring, marking and cutting of wood accurately.

		supporting structure of a windmill. Making functioning turbines and axles which are assembled into a main supporting structure.	Building a strong and stiff structure by folding paper.	range of recycled materials.	shapes and sizes. Selecting appropriate materials to build a strong structure and cladding. Reinforcing to strengthen a structure. Creating a design in accordance with a plan. Learning to create different textural effects with materials.		Using a range of materials to reinforce and add decoration to the structures.
	Evaluate	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	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.	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.	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 from peer evaluation. Testing and adapting for improvement as product is developed Identifying what makes a successful structure

Knowledge	Technical	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.	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.	To understand that wide and flat based objects are more stable. To understand the importance of strength and stiffness in structures.	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.
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	Additional	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. 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	To know that natural structures are those found in nature. To know that man-made structures are those made by people	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.	To know that decoration 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 what a 'footprint' plan is To understand that in the real world, design, can impact users in a positive and negative way.
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Mechanisms							
		Progression of Skills and Knowledge – KS1		Progression of Skills and Knowledge – KS2			
		Year 1	Year 6 Moving Monsters	Year 3	Year 4 Slingshot car	Year 5 Pop-up book	Year 6
Skills	Design		Creating a class-design-criteria for a moving monster. Designing for a specific audience		Designing a shape that reduces air resistance and choosing shapes that increase or decrease speed. Drawing a net for a 3d structure. Personalising a 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		Making linkages using card for levers and split pins for pivots. Experimenting with linkages adjusting widths, lengths and thicknesses of card used. Cutting and assembling neatly.		Measuring, marking, cutting and assembling with increasing accuracy. Making a model based on a chosen design.	Following a design brief to make a pop-up book, neatly and focusing on accuracy. Making mechanisms that use sliders, pivots and folds to produce movement. Using layers and spacers to hide the workings of mechanical parts for aesthetics.	
	Evaluate		Evaluating own designs against design criteria. Using peer feedback to modify a final design.		Evaluating speed of final product based on: the effect of shape on speed and the accuracy of workmanship on performance.	Evaluating the work of others and receiving feedback on own work. Suggesting points for improvement.	
Knowledge	Technical		To know that mechanisms are a collection of moving parts that work together. To know there is always an input		To understand that all moving things have kinetic energy and that it is the energy that something has by being in motion. Air resistance is drag on an object moving through the air. The shape of a moving object affects the drag.	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	

			(energy to start) and an output (resulting movement) in a mechanism. To know that a lever turns on a pivot and a linkage is made up of a series of levers.			mechanisms.	
	Additional		To know some real-life objects that contain mechanisms.		Products evolve and change over time. Aesthetics is how an object or products looks. A template is a stencil to help you draw the same shape accurately. Understand a birds-eye view. Graphics are images designed to explain or advertise something. It is important to assess and evaluate ideas and models against a list of design criteria.	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 and possibly safer.	

Textiles

		Progression of Skills and Knowledge – KS1			Progression of Skills and Knowledge – KS2				
		EYFS Bookmarks	Y1 Puppets	Y2	Y3	Y4	Y5	Y6 Bag/Waistcoats/Slippers	
Skills	Design	Discussing what a good design needs. Designing a simple pattern with paper. Designing a bookmark. Choosing from available materials.	Using a template to create a design for a puppet.					Designing a product in accordance with a specification linked to a set of design criteria. Annotating designs, to explain their decisions.	
	Make	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 practice threading.	Cutting fabric neatly with scissors. Using joining methods to decorate a puppet. Sequencing the steps taken during construction.					Using a template when cutting fabric to ensure the correct shape. Using pins effectively to secure a template to fabric and keep it flat. Marking and cutting fabric accurately to the design. Sewing a strong running stitch with small, neat stitches and following an edge, tying strong knots. Decorating with applique and decorative stitching, using evenly spaced neat stitching. Attaching secure fastenings like buttons.	
	Evaluate	Reflecting on a finished product and comparing to their design.	Reflecting on a finished product, explaining likes and dislikes.					Reflecting on their work continually throughout the design, make and evaluate process.	

Knowledge	To know that a design is a way of planning our ideas before we start. To know that threading is putting one material through an object.	To know that joining techniques are used to connect two pieces of material together. To know that there are various temporary methods of joining fabric using glue, staples or pins. To understand that different techniques for joining materials can be used for different purposes. To understand that a template is used to cut out the same shape multiple times. To know that drawing gives you knowledge of how an idea will look.					To understand that it is important to design with a target customer in mind. To know that using a template helps to achieve the right size and shape. To understand the importance of small, consistently sized stitches for strength and aesthetics.
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Electrical Systems

		Progression of Skills and Knowledge – KS2			
		Year 3	Year 4 Torches	Year 5 Doodlers/Buggy	Year 6
Skills	Design		Designing a torch, giving consideration to the target audience and creating both design and success criteria focusing on features of individual design.	Identifying factors that could be changed on existing products and explaining how these would alter the function of the product. Developing design criteria based on findings from investigating existing products. Developing design criteria that identifies the target user.	
	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.	Altering a product's form or function. Making a functional series circuit including a motor. Construct a product with consideration of the design criteria. Deconstructing the construction process into steps so that others can make the product.	
	Evaluate		Evaluating electrical products. Testing and evaluating the success of a final product.	Carry out a product analysis to assess purpose, strengths and weaknesses. Determining which parts of a product affect its function and which its form. Analysing whether changes in configuration affect an existing product negatively or positively. Peer evaluating a set of instructions to build a product.	
Knowledge	Technical		To understand that electrical conductors are materials which electricity can pass through, and electrical insulators prevent the flow of electricity. To know that a battery stores electricity that can be used to power devices. To know that electricity can only	To know a series circuit has only one route for the electricity to flow. To know that 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.	

			flow through a complete circuit and that a switch can be used to break the circuit, temporarily.		
	Additional		To know the features of the product. E.g. 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 Eddison.	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.	

Digital Systems					
		Progression of Skills and Knowledge – KS2			
		Year 3 Electronic charm	Year 4	Year 5	Year 6 Navigating the world
Skills	Design	Problem solving by suggesting potential features on a Micro: bit and justifying my ideas. Developing design ideas for a technology pouch. Drawing and manipulating 2D shapes, using computer-aided design, to produce a point-of-sale badge.			Writing a design brief from information submitted by a client and developing design criteria to fulfil the client's request. Considering and suggesting additional functions for navigational tool. Developing a product idea through annotated sketches. Placing and manoeuvring 3D objects using CAD Changing the properties of, or combining one or more 3D objects using CAD.

	Make	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.			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	Analysing and evaluating an existing product. Identifying the key features of a pouch.			Explaining how my program is useful as part of navigational tool. Developing awareness of sustainable design. Identifying key industries that use 3D CAD modelling and why it benefits customers. Explaining the key functions in my program and how it fits the design criteria. Explaining the key functions and features of my navigational tool to the client as part of a product concept pitch.
Knowledge	Technical	To understand that in programming a 'loop' is code that repeats something again and again until stopped. To know that a Microbit is a pocket-sized, codeable computer. Writing a program to control (button press) and/or monitor (sense light) that will initiate a flashing LED algorithm.			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	To know what the 'Digital Revolution' is and features of some of the products that have evolved as a result. To know that in Design and Technology the term 'smart' means a programmed product. To know the difference between analogue and digital technologies. To understand what is meant by 'point of sale display'. To know that CAD stands for Computer-aided design.			To know that designers write 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.

