

Progression of Skills- Structures

		Year R		Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
		Junk Modelling	Boats	Constructing a Windmill.	Baby Bear's Chair	Constructing a Castle	Pavilions	Bridges	Playgrounds
● Skills	Design	<ul style="list-style-type: none"> • Making verbal plans and material choices. • Developing a junk model. 	<ul style="list-style-type: none"> • Designing a junk model boat. • Using knowledge from exploration to inform 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. 	<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. 	<ul style="list-style-type: none"> • Designing a stable structure that is able to support weight. • Creating a frame structure with a focus on triangulation. 	<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"> • Improving fine motor/scissor skills with a variety of materials. • Joining materials in a variety of ways (temporary and permanent). • Joining different materials together. • Describing their junk model, and how they intend to put it together. 	<ul style="list-style-type: none"> • Making a boat that floats and is waterproof, considering material choices. 	<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. 	<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. 	<ul style="list-style-type: none"> • Making a range of different shaped beam bridges. • Using triangles to create truss bridges that span a given distance and support a load. • Building a wooden bridge structure. • Independently measuring and marking wood accurately. • Selecting appropriate tools and equipment for particular tasks. • Using the correct techniques to saws safely. 	<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.

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								<ul style="list-style-type: none"> •Identifying where a structure needs reinforcement and using card corners for support. •Explaining why selecting appropriating materials is an important part of the design process. •Understanding basic wood functional properties. 	
	Evaluate	<ul style="list-style-type: none"> •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 	<ul style="list-style-type: none"> •Making predictions about, and evaluating different materials to see if they are waterproof. •Making predictions about, and evaluating existing boats to see which floats best. •Testing their design and reflecting on what could have been done differently. •Investigating the how the 	<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. 	<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. 	<ul style="list-style-type: none"> •Adapting and improving own bridge structure by identifying points of weakness and reinforcing them as necessary. •Suggesting points for improvements for own bridges and those designed by others. 	<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.

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		part of their model.	shapes and structure of a boat affect the way it moves.						
• Knowledge	Technical	<ul style="list-style-type: none"> • 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. 	<ul style="list-style-type: none"> • To know that 'waterproof' materials are those which do not absorb water. 	<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. 	<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. 	<ul style="list-style-type: none"> • To understand some different ways to reinforce structures. • To understand how triangles can be used to reinforce bridges. • To know that properties are words that describe the form and function of materials. • To understand why material selection is important based on properties. • To understand the material (functional and aesthetic) properties of wood. 	<ul style="list-style-type: none"> • To know that structures can be strengthened by manipulating materials and shapes.

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	<ul style="list-style-type: none"> •Additional 		<ul style="list-style-type: none"> •To know that some objects float and others sink. •To know the different parts of a boat. 	<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 client's 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. 	<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 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 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. 	<ul style="list-style-type: none"> •To understand the difference between arch, beam, truss and suspension bridges. •To understand how to carry and use a saw safely. 	<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.
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