



Design and Technology Progression of skills - **Structures**

Skills	Design	EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
		Junk Models	Constructing a windmill	Make baby bears chair	Constructing a castle	Pavilions	Bridges	Playgrounds
		<ul style="list-style-type: none"> • Making verbal plans and material choices. • Developing a junk model. 	<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 	<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 frame structure with 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

					castle tower on CAD software			
	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 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 for the 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 supports 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 saw safely • Identifying where a structure needs reinforcement 	<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

							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	• 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	• Begin to explore the features of structures	• 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	• 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	• 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

		their favourite and least favourite part of their model.						
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Design and Technology Progression of Knowledge - **Structures**

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		Junk models	Constructing a windmill	Make baby bears chair	Constructing a castle	Pavilions	Bridges	Playgrounds
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 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 	<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 	<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 their 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

			has been made and put together	<ul style="list-style-type: none"> • 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 • To know that windmill turbines use wind to turn 	<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 	<ul style="list-style-type: none"> • To know that a pavilions ia 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 	<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

			<p>and make the machines inside work</p> <ul style="list-style-type: none"> • 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 		<p>2D shape that can become a 3D shape once assembled</p> <ul style="list-style-type: none"> • To know that a design specification is a list of success criteria for a product 	<p>the person or group of people a product is designed for</p> <ul style="list-style-type: none"> • To know that architects consider light, shadow and patterns when designing 		
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