

Danson Primary School- Design and Technology – Structures

		EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
		Junk Modelling	Constructing a Windmill	Pussy Cat's Chair	Constructing a Roman Villa	Pavilions - Viking Longhouses	Bridges	Playgrounds
Skills	Design	- I can make verbal plans and material choices. - I can develop a junk model. - I can design a junk model boat. - I can use knowledge from exploration to inform my design.	I can understand the importance of a clear design criteria including individual preferences and requirements in a design.	I can generate and communicating ideas using sketching and modelling	- I can design a structure with key features to appeal to a specific person/purpose. - I can draw and label a structure design using 2D shapes, labelling the 3D shapes that will create the features and include materials needed and colours. - I can design and/or decorate a structure on CAD software.	- I can design a stable structure that is aesthetically pleasing and select materials to create a desired effect. - I can build frame structures designed to support weight.	- I can design a stable structure that is able to support weight. - I can create a frame structure with a focus on triangulation.	I can design a playground featuring a variety of different structures, considering how the structures will be used, considering effective and ineffective designs.
	Make	- I can improve my fine motor/scissor skills with a variety of materials. - I can join materials in a variety of ways (temporary and permanent). - I can join different materials together. - I can describe my junk model, and how I intend to put it together. - I can make a boat that floats and is waterproof, considering material choices.	- I can make stable structures from card, tape and glue. - I can make functioning turbines and axles which are assembled into a main supporting structure. - I can understand how to turn 2D nets into 3D structures. - I can follow instructions to cut and assemble the supporting structure.	- I can make a structure according to design criteria. - I can build a strong and stiff structure by folding paper. - I can create joints and structures from paper/card and tape.	- I can construct a range of 3D geometric shapes using nets. - I can make facades from a range of recycled materials. - I can create special features for individual designs.	- I can select appropriate materials to build a strong structure and cladding. - I can create a design in accordance with a plan. - I can create a range of different shaped frame structures. - I can make a variety of free-standing frame structures of different shapes and sizes. - I can reinforce corners to strengthen a structure. - I can understand how to create different textural effects with materials.	- I can independently measure and mark wood accurately. - I can select appropriate tools and equipment for particular tasks. - I can use the correct techniques to saws safely. - I can make a range of different shaped beam bridges. - I can build a wooden bridge structure. - I can explain why selecting appropriate materials is an important part of the design process. - I can understand basic wood functional properties. - I can use triangles to create truss bridges that span a given distance and support a load. - I can identify where a structure needs reinforcement and using card corners for support.	- I can measure, marking and cutting wood to create a range of structures. - I can build a range of play apparatus structures drawing upon new and prior knowledge of structures. - I can use a range of materials to reinforce and add decoration to structures.

	Evaluate	- I can give a verbal evaluation of my own and others' junk models with adult support. - I can check to see if their model matches my plan. - I can consider what I would do differently if I was to do it again. - I can describe my favourite and least favourite part of my model. - I can make predictions about, and evaluate different materials to see if they are waterproof. - I can make predictions about, and evaluate existing boats to see which floats best. - I can test my design and reflect on what could have been done differently. - I can investigate how the shapes and structure of a boat affect the way it moves	N/A	- I can test the strength of my own structure. - I can identify the weakest part of a structure. - I can evaluate the strength, stiffness and stability of own structure	- I can evaluate my own work and the work of others based on the aesthetic of the finished product and in comparison, to the original design. - I can suggest points for modification of the individual designs.	- I can evaluate structures made by the class. - I can describe what characteristics of a design and construction made it the most effective. - I can consider effective and ineffective designs.	- I can adapt and improve my own structure by identifying points of weakness and reinforcing them as necessary. - I can suggest points for improvements for my own structure and those designed by others.	- I can improve a design plan based on peer evaluation. - I can test and adapting a design to improve it as it is developed. - I can identify what makes a successful structure.
Knowledge		- I know there are a range of different materials that can be used to make a model and that they are all slightly different. - I can make simple suggestions to fix my junk model. - I know that 'waterproof' materials are those which do not absorb water. - I know that some objects float and others sink. - I know the different parts of a boat.	- I understand that the shape of materials can be changed to improve the strength and stiffness of structures. - I understand that cylinders are a strong type of structure. - I understand that axles are used to make parts turn in a circle. - I am beginning to understand that different structures are used for different purposes. - I know that a structure is something that has been made and put together. - I know that a client is the person I am designing for. - I know that design criteria are a list of points to ensure the product meets the client's needs and wants.	- I know that materials can be manipulated to improve strength and stiffness. - I know that a structure is something which has been formed or made from parts. - I know that a 'stable' structure is one which is firmly fixed and unlikely to change or move. - I know that a 'strong' structure is one which does not break easily. - I know that a 'stiff' structure or material is one which does not bend easily.	- I understand the importance of strength and stiffness in structures. - I understand that wide and flat based objects are more stable. - I know that a paper net is a flat 2D shape that can become a 3D shape once assembled. - I know that a design specification is a list of success criteria for a product.	- I understand what a frame structure is. - I know that a 'free-standing' structure is one which can stand on its own. - I know that cladding can be applied to structures for different effects. - I know that aesthetics is how a product looks. - I know that a product's function means its purpose. - I understand that the target audience means the person or group of people a product is designed for.	- I understand some different ways to reinforce structures. - I understand how triangles can be used to reinforce bridges. - I know that properties are words that describe the form and function of materials. - I understand why material selection is important based on properties. - I understand the material (functional and aesthetic) properties of wood. - I understand the difference between arch, beam, truss and suspension bridges. - I understand how to carry and use a saw safely.	- I know that structures can be strengthened by manipulating materials and shapes. - I know what a 'footprint plan' is. - I know that in the real world, design, can impact users in positive and negative ways. - I know that a prototype is a cheap model to test a design idea.

Vocabulary	junk, model, plan, design, join, predict, float, sink, material, waterproof	axle, bridge, design, design criteria, model, net, packaging, structure, template, unstable, stable, strong weak	design criteria, man-made, natural, properties, structure, stable, shape, model, test	2D, 3D, castle, design, key features, net, scoring, shape, stable, stiff, strong, structure, tab	3D shapes, cladding design criteria, innovative, natural, reinforce, structure	beam, bridge, arch bridge, truss bridge, strength, technique, corrugation, lamination, stiffness, rigid, mark out, hardwood, softwood, wood file/rasp, sandpaper/glass paper, bench hook/vice, tenon saw/coping saw, assemble, material properties, factors, stability, visual appeal, aesthetics, joints, reinforce, wood sourcing, evaluate, quality of finish, accuracy	apparatus, design criteria, equipment, playground, landscape features, cladding
National Curriculum	Reception - Develop small motor skills so that they can use a range of tools competently, safely and confidently. - Explore, use and refine a variety of artistic effects to express ideas and feelings. - Return to and build upon their previous learning, refining ideas and developing their ability to represent them. - Create collaboratively, sharing ideas, resources and skills. Early Learning Goals - Use a range of small tools, including scissors, paint brushes and cutlery (ELG - Fine Motor Skills) - Safely use and explore a variety of materials, tools and techniques, experimenting with colour, design, texture, form and function (ELG - Creating with Materials). - Share their creations, explaining the process they have used (ELG - Creating with Materials).	- Design purposeful, functional, appealing products for themselves and other users based on design criteria - Generate, develop, model and communicate their ideas through talking, drawing, templates, mock- ups and, where appropriate, information and communication technology - Select from and use a range of tools and equipment to perform practical tasks [for example, cutting, shaping, joining and finishing] - Select from and use a wide range of materials and components, including construction materials, textiles and ingredients, according to their characteristics - Explore and evaluate a range of existing products - Evaluate their ideas and products against design criteria - Build structures, exploring how they can be made stronger, stiffer and more stable - Explore and use mechanisms [for example, levers, sliders, wheels and axles], in their products.	- Design purposeful, functional, appealing products for themselves and other users based on design criteria - Generate, develop, model and communicate their ideas through talking, drawing, templates, mock- ups and, where appropriate, information and communication technology - Select from and use a range of tools and equipment to perform practical tasks [for example, cutting, shaping, joining and finishing] - Select from and use a wide range of materials and components, including construction materials, textiles and ingredients, according to their characteristics - Evaluate their ideas and products against design criteria - Build structures, exploring how they can be made stronger, stiffer and more stable	- Use research and develop design criteria to inform the design of innovative, functional, appealing products that are fit for purpose, aimed at particular individuals or groups - Generate, develop, model and communicate their ideas through discussion, annotated sketches, cross-sectional and exploded diagrams, prototypes, pattern pieces and computer- aided design - Select from and use a wider range of tools and equipment to perform practical tasks [for example, cutting, shaping, joining and finishing], accurately - Select from and use a wide range of materials and components, including construction materials, textiles and ingredients, according to their characteristics - Investigate and analyse a range of existing products - Evaluate their ideas and products against their own design criteria and consider the views of others to improve their work - Apply their understanding of how to strengthen, stiffen and reinforce more complex structures			