Ashwell Primary School
Design & Technology Curriculum
Skills & Knowledge Organiser - Structures

Structures - Reception

		Reception – Boats	Reception – Junk modelling
Skills	Design	▪ Designing a junk model boat. ▪ Using knowledge from exploration to inform design.	▪ Making verbal plans and material choices. ▪ Developing a junk model.
	Make	▪ Making a boat that floats and is waterproof, considering material choices.	▪ 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.
	Evaluate	▪ 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 shapes and structure of a boat affect the way it moves.	▪ 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 part of their model.
Knowledge	Technical	▪ To know that 'waterproof' materials are those which do not absorb water.	▪ 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.
	Additional	▪ To know that some objects float and others sink. ▪ To know the different parts of a boat.	
Key vocabulary		Waterproof, material, absorb, leak, wet, dry, prediction, variable, fair test, experiment, investigation, boat, cruise ship, fishing boat, kayak, ocean liner, sail, ship, watercraft, pirate ship, anchor, hull, mast, rudder, helm, poop deck, deck, crow's nest, junk, reeds, waterproof, float, sink	Scissors, blades, handle, snip, squeeze, join, stick, cut, bend, slot, lift, open, measure, bigger, shorter, longer, taller, thicker, thinner, rough, smooth, bendy, bumpy, paper clip, rubber band, bottle top

Structures - Key Stage 1			
		Year 1 – Stable Structures	**Year 2 – Baby Bear's chair**
Skills	**Design**	▪ Thinking about what others might want from a design. ▪ Beginning to recognise how products and designs in the world around us solve certain needs. ▪ Considering who they are designing for – identifying the user. ▪ Stating what they intend to make and why – identifying the purpose. ▪ Talking about ideas, with purpose and user in mind. ▪ Talking about existing products when generating ideas. ▪ Using basic drawing skills to communicate ideas.	▪ Generating and communicating ideas using sketching and modelling ▪ Learning about different types of structures, found in the natural world and in everyday objects
	Make	▪ Choosing between a small number of materials, ingredients or components. ▪ Explaining their choices based on personal experiences. ▪ Requesting equipment appropriate to the purpose. (e.g. scissors for cutting and glue for joining) ▪ Beginning to use objects with a fixed width or length to create even spacing of markings or cuts (e.g. a lolly stick). ▪ Refining their grip to cut competently and confidently. ▪ Cutting straight lines and evenly spaced lines. ▪ Beginning to cut large shapes and thicker materials like card.	▪ 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	▪ Discussing existing products, saying what they like about them. ▪ Comparing two products and discuss which is better for a specific purpose. ▪ Saying what they like about their peers' designs and products. ▪ Accepting feedback and understanding it is meant to improve their work.	▪ 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**	▪ Recognising that different structures are used for different purposes. ▪ Exploring the features of structures. ▪ Describing structures as buildings or freestanding structures. ▪ Making stable structures from card. ▪ Creating supporting structures to aid stability. ▪ Using stable objects like cylinders to create structures.	To know that: ▪ structures with wide, flat bases or legs are most stable ▪ materials can be manipulated to improve strength & stiffness ▪ a structure is something which has been formed from parts ▪ a 'stable' structure is one which is firmly fixed and unlikely to change or move ▪ a 'strong' structure is one which does not break easily ▪ a 'stiff' structure or material is one which does not bend easily ▪ To understand that the shape of a structure affects its strength
	Additional	To know that: ▪ the 'user' is the person who will use the product. ▪ different users may want different things from a design. ▪ who they are designing for makes a difference to what they design. ▪ the purpose is what something is for. ▪ existing products can help when deciding what to design.	▪ To know that natural structures are those found in nature ▪ To know that man-made structures are those made by people

		▪ drawings are a way to explain ideas. ▪ that a plan is deciding what to do first and next. ▪ that different equipment does different things. ▪ the names of common pieces of equipment. ▪ some products will be better than others. ▪ their ideas or products can be made better. ▪ their ideas can make someone else's work better. ▪ other people's ideas can help make their work better. ▪ a structure is something that has been made and put together. ▪ stable structures do not topple. ▪ shapes and structures with wide, flat bases or legs are the most stable. ▪ adding weight to the base of a structure can make it more stable.	
Key vocabulary		Base, better, compare, design, freestanding, stable, structure, unstable, user, worse	design criteria, man-made, natural, properties, structure, stable, shape, model, test

Structures – Key Stage 2			
		Year 3 – Product packaging	**Year 4 – Pavilions**
Skills	**Design**	▪ Analysing existing product packaging by looking at its shape, branding and function. ▪ Following a simple design criteria to design packaging for a healthy snack. ▪ Using 2D CAD software (sketchpad) to design the nets for packaging. ▪ Creating accurate shapes from templates.	▪ 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	▪ Constructing a range of 3D shapes. ▪ Strengthening structures using ribbing techniques. ▪ Cutting out shapes accurately.	▪ 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	▪ Explaining why they think certain aspects of a peer's design are effective. ▪ Suggesting specific improvements to a peer's design. ▪ Reflecting on feedback to decide if and how it could be used to improve future iterations. ▪ Evaluating their ideas and products against the design criteria. ▪ Considering the views of others to improve their work.	▪ 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**	▪ Beginning to understand how different structures are built. ▪ That a shell structure is a hollow shape with a thin outer layer. ▪ That 3D shapes can form structures. ▪ That structures can be strengthened.	▪ To understand what a frame structure is. ▪ To know that a 'free-standing' structure is one which can stand on its own.
	Additional	▪ A net is a 2D design that becomes a 3D structure. ▪ The correct shape is required to suit the function of a product. ▪ Creating accurate shapes improves how they look and sometimes their function. ▪ How to construct a range of 3D shapes. ▪ Structures can be strengthened by manipulating materials and shapes. ▪ The correct shape is required to suit the function of a product. ▪ Creating accurate shapes improves how they look and sometimes their function. ▪ How to construct a range of 3D shapes. ▪ Structures can be strengthened by manipulating materials and shapes.	▪ 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.
Key vocabulary		computer-aided design (CAD), feedback, form, function, net, shell structure, tab, three-dimensional (3D)	3D shapes, Cladding, design criteria, innovative, natural, reinforce, structure, aesthetic, evaluation, frame structure, function, inspiration, pavilion, stable, target audience, target customer, texture, theme

Structures – Key Stage 2

		Year 5 – Not taught	Year 6 – Playgrounds
Skills	**Design**		▪ 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		▪ 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		▪ 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**		▪ To know that structures can be strengthened by manipulating materials and shapes ▪ 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
	Additional		▪ 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
	Key vocabulary		apparatus, design criteria, equipment, playground, landscape features, cladding, adapt, apparatus, bench hook, coping saw, design, dowel, evaluation, feedback, idea, jelutong, landscape, mark out, measure, modify, natural materials, plan view, prototype, reinforce, sketch, strong, structure, tenon saw, texture, user, vice, weak