Design & Technology (Structure), Progression of Skills: Hockering Primary Academy

Discoverers: Year R/1/2

		2026/2027	2024/2025	2025/2026
		Boats	**Windmills**	**Baby bear's chair**
Skills	Design	Designing a junk model boat. Using knowledge from exploration to inform 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.
	Make	Making a boat that floats and is waterproof, considering material choices. Improving fine motor skills but cutting a variety of materials. Cutting evenly and carefully. Following a design brief. Making a boat according to design criteria. Creating joints from paper/card and tape.	Making stable structures from card. Following instructions to cut and assemble the supporting structure of a windmill (YR – with support). Making functioning turbines and axles which are assembled into a main supporting structure. Finding the middle of an object. Puncturing holes. Adding weight to structures. Creating supporting structures. Cutting evenly and carefully. Making a windmill according to design criteria.	Building a chair. 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	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. Suggest points for improvements. Comparing the ability to float from different shapes. Testing the strength of own boat. Identifying the weakest part of a boat.	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. Testing the strength of own structures. Identifying the weakest part of a structure. Evaluating the strength, stiffness and stability of own structure.	Evaluating a chair according to the design criteria, testing whether the structure is strong and stable and altering it if it isn't. Exploring the features of structures. Comparing the stability of different shapes. Suggest points for improvements. Testing the strength of own structures. Identifying the weakest part of a structure. Evaluating the strength, stiffness and stability of own structure.
Knowledge		To know that 'waterproof' materials are those which do not absorb water. To know that some objects float and others sink. To know the different parts of a boat. To understand that the shape of a boat affects its ability to float.	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 good chair needs to be stable, stiff and strong. 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 materials can be manipulated to improve strength and stiffness.	To know that a structure is something that has been made and put together. To know that the sails or blades of a windmill are moved by the wind. To know that a structure is something built for a reason. To know that stable structures do not topple. To know that adding weight to the base of a structure can make it more stable. 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 windmills are used to generate power and were used for grinding flour. To know that man-made structures are those made by people. To understand that the shape of a structure affects its strength.	To know that a structure is something that has been made and put together. 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 know that natural structures are those found in nature. To know that man-made structures are those made by people.

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Pioneers: Year 3/4/5/6

		2027/2028	2024/2025
		Constructing a castle	**Pavilions**
Skills	Design	• 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, if it is available. • Building frame structures designed to support weight. • Considering effective and ineffective designs.	• Designing a stable pavilion structure that is aesthetically pleasing and selecting materials to create a desired effect. • Building frame structures designed to support weight. • Considering effective and ineffective designs.
	Make	• Constructing a range of 3D geometric shapes using nets. • Creating special features for individual designs. • Making facades from a range of recycled materials. • Selecting appropriate materials to build a strong structure and cladding. • Reinforcing corners to strengthen a structure. • Identifying where a structure needs reinforcement	• Creating a range of different shaped frame structures. • Making various freestanding frame structures (different shapes/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. • Identifying where a structure needs reinforcement
	Evaluate	• 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. • Describing what characteristics of a design and construction made it the most effective. • Testing and adapting a design to improve it as it is developed.	• Evaluating structures made by the class. • Describing what characteristics of a design and construction made it the most effective. • Considering effective and ineffective designs. • Testing and adapting a design to improve it as it is developed.
Knowledge		• To understand that wide and flat based objects are more stable. • To understand the importance of strength and stiffness in structures. • 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 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 understand the properties (functional and aesthetic) of different materials. • To understand that in the real world, design, can impact users in positive and negative ways.	• 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 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. • To understand the properties (functional and aesthetic) of different materials. • 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.

*Year 4/5/6 only *Year 5/6 only *Year 6 only

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		2025/2026	2026/2027
		Bridges	**Playgrounds**
Skills	Design	• Designing a stable structure that is able to support weight. • Creating a frame structure with a focus on triangulation, considering effective and ineffective designs.	• 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	• 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. • Independently measuring, marking and cutting wood accurately to create a range of structures. • Selecting appropriate tools and equipment for particular tasks. • Using the correct techniques to saw safely. • 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.	• Building a range of play apparatus structures drawing upon new and prior knowledge of structures. • Independently measuring, marking and cutting wood accurately to create a range of structures. • Using a range of materials to reinforce and add decoration to structures. • Using the correct techniques to saw safely. • Identifying where a structure needs reinforcement and using card corners for support. • Understanding basic wood functional properties.
	Evaluate	• 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. • Identifying what makes a successful structure. • Testing and adapting a design to improve it as it is developed.	• 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. • Suggesting points for improvements for own bridges and those designed by others.
Knowledge		• 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. • To understand the difference between arch, beam, truss and suspension bridges. • To understand how to carry and use a saw safely • To understand that in the real world, design, can impact users in positive and negative ways.	• To know that structures can be strengthened by manipulating materials and shapes. • To understand what a 'footprint plan' is. • To understand how to carry and use a saw safely • 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 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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