STRUCTURES

Vocabulary

base
rotate
rotor
rotor blade
sail
stable
structure

Vocabulary

apparatus
design criteria
equipment
landscape features
plan view
playground

Specific key vocabulary for each unit as well as individual lessons, are outlined and referred to on Kapow.

Specific tools and resources for each unit and individual lessons, are outlined and referred to on Kapow.

- ✓ *Presentation: Types of windmill.*
- ✓ *Presentation: A stable structure.*
- ✓ *Presentation: Design criteria checklist.*
- ✓ Flipchart (see Attention grabber).
- ✓ Completed windmill for teacher demonstration (see Main event).
- ✓ Paper cups (one each – see Main event).
- ✓ Modelling dough (a small piece each – see Main event).
- ✓ Link: *Assessment – Design and technology: Y1: Structures: Constructing a windmill* (optional – see Attention grabber).

- ✓ *Presentation: Playgrounds.*
- ✓ *Presentation: Playground design.*
- ✓ Plain paper (one each).
- ✓ Rubbers (one between two).
- ✓ Sharpeners (one between two).
- ✓ A3 card (one each).
- ✓ Link: *Assessment – D&T Y6: Structures: Playgrounds* (optional – see Attention grabber).

STRUCTURES

EYFS- Junk Modelling		
Skills	Design	• Making verbal plans and material choices. • Developing a junk model.
	Make	• 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	• 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 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	
Vocabulary	**See each lesson for key vocabulary to be taught**	

STRUCTURES

EYFS- Boats		
Skills	Design	• Designing a junk model boat. • Using knowledge from exploration to inform design.
	Make	• Making a boat that floats and is waterproof, considering material choices.
	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.
Knowledge	Technical	• To know that 'waterproof' materials are those which do not absorb water.
	Additional	• To know that some objects float and others sink. • To know the different parts of a boat.
Vocabulary	**See each lesson for key vocabulary to be taught**	

STRUCTURES

YEAR 1- Constructing Windmills		
Skills	Design	• Learning the importance of a clear design criteria. • Including individual preferences and requirements in a design.
	Make	• Making stable structures from card. • 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. • Finding the middle of an object. • Puncturing holes. • Adding weight to structures. • Creating supporting structures. • Cutting evenly and carefully.
	Evaluate	
Knowledge	Technical	• 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. • To know that the sails or blades of a windmill are moved by the wind.

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		• 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.
	Additional	• 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.
Vocabulary	**See each lesson for key vocabulary to be taught**	

STRUCTURES

YEAR 3- Constructing a Castle		
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.
	Make	• Constructing a range of 3D geometric shapes using nets . • Creating special features for individual designs. • Making facades from a range of recycled materials.
	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.
Knowledge	Technical	• To understand that wide and flat based objects are more stable. • To understand the importance of strength and stiffness in structures.
	Additional	• 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.

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		• 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.
Vocabulary	**See each lesson for key vocabulary to be taught**	

STRUCTURES

YEAR 5- Bridges		
Skills	Design	• Designing a stable structure that is able to support weight. • Creating a frame structure with a focus on triangulation.
	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 accurately. • Selecting appropriate tools and equipment for particular tasks. • Using the correct techniques to saws 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.
	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.
Knowledge	Technical	• To understand some different ways to reinforce structures.

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		• 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.
	Additional	• To understand the difference between arch, beam, truss and suspension bridges. • To understand how to carry and use a saw safely.
Vocabulary	**See each lesson for key vocabulary to be taught**	

STRUCTURES

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.
	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.
Vocabulary	**See each lesson for key vocabulary to be taught**	