



Design and technology Composites and components

Unit:	Composite: (unit objective/objectives)	Components
Structures - constructing a windmill KSI Cycle A	Construct a windmill	<ul style="list-style-type: none">• Know that clear design criteria is important.• Know how to include individual preferences and requirements in a design.• Know how to make structures from card, tape and glue.• Know how to turn 2D nets into 3D structures.• Know how to follow instructions to cut and assemble the supporting structure of a windmill.• Know how to make functioning turbines and axles which are assembled into a main supporting structure. • Know that the shape of materials can be changed to improve the strength and stiffness of structures.• Know that cylinders are a strong type of structure.• Know that axles are used in structures and mechanisms to make parts turn in a circle.• Know that different structures are used for different purposes.• Know that a structure is something that has been made and put together.



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Structures - Baby Bear's chair KSI	Produce a model chair that is strong, stiff and stable.	<ul style="list-style-type: none">• Know how to generate and communicate ideas using sketching and modelling.• Know about different types of structures, found in the natural world and in everyday objects.• Know how to make a structure according to design criteria.• Know how to create joints and structures from paper/card and tape.• Know how to build a strong and stiff structure by folding paper.• Know how to explore the features of structures.• Know how to compare the stability of different shapes.• Know how to test the strength of their own structures.• Know how to identify the weakest part of a structure.• Know how to evaluate the strength, stiffness and stability of their own structure.• Know that shapes and structures with wide, flat bases or legs are the most stable.• Know that the shape of a structure affects its strength.• Know that materials can be manipulated to improve strength and stiffness.• Know that a structure is something which has been formed or made from parts.• Know that a 'stable' structure is one which is firmly fixed and unlikely to change or move.• Know that a 'strong' structure is one which does not break easily.• Know that a 'stiff' structure or material is one which does not bend easily.



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Structures: constructing a castle LKS2 Cycle A	Design, construct and evaluate a castle.	<ul style="list-style-type: none">• Know the key features of a castle.• Know how to design a castle that will appeal to a specific person/purpose.• Know how to draw and label a castle design using 2D shapes.• Know how to design and decorate a castle tower on CAD software.• Know how to construct a range of 3D geometric shapes using nets.• Know how to create special features for individual designs.• Know how to make facades from a range of recycled materials.• Know how to evaluate work based on the aesthetic of the finished product and in comparison to the original design.• Be able to suggest points for modifications.• Know that wide and flat based objects are more stable.• Know that strength and stiffness are important in structures.• Know that flags, towers, battlements, turrets, curtain walls and moats, drawbridges and gatehouses are all features of castles.• Know the purpose of the above features.• Know that a façade *is the front of a structure.• Know that a castle needed to be strong and stable to withstand enemy attack.



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Structures - pavilions LKS2 Cycle B	<ul style="list-style-type: none">• Design a pavilion that is strong, stable and aesthetically pleasing.• Select appropriate materials and construction techniques to create a stable, free-standing frame structure.• Select appropriate materials and techniques to add cladding to their pavilion.	<ul style="list-style-type: none">• Know how to design a stable pavilion structure that is aesthetically pleasing and selecting materials to create a desired effect.• Know how to build frame structures designed to support weight.• Know how to create a range of different shaped frame structures.• Know how to make a variety of free-standing frame structures of different shapes and sizes.• Know how to select appropriate materials to build a strong structure and for the cladding.• Know how to reinforce corners to strengthen a structure.• Know how to create a design in accordance with a plan.• Know how to create a different textural effect with materials.• Know that a free-standing structure is one that can stand on its own.• Know that a pavilion is a decorative building or structure for leisure activities.• Know that cladding can be applied to structures for different effects.• Know that aesthetics are how a product looks.



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Structures: Bridges UKS2 Cycle A	<ul style="list-style-type: none">• Complete a bridge, with varying ranges of accuracy and finish, supported by the teacher.	<ul style="list-style-type: none">• Know how to design a stable structure that is able to support weight.• Know how to create a frame structure with focus on triangulation.• Know how to make a range of different shaped beam bridges.• Know how to use triangles to create truss bridges that span a given distance and support a load.• Know how to build a wooden bridge structure.• Know how to independently measure and mark wood accurately.• Know how to select appropriate tools and equipment for particular tasks.• Know how to use the correct techniques to saw safely.• Know how to identify where a structure needs reinforcement and using card corners for support.• Be able to explain why selecting appropriate materials is an important part of the design process.• Know basic wood functional properties.• Know how to adapt and improve own bridge structure by identifying points of weakness and reinforcing them as necessary.• Know how to suggest points for improvements for own bridges and those designed by others.• Know that there are different ways to reinforce structures.• Know that triangles can be used to reinforce bridges.• Know that properties are words that describe the form and function of materials.• Know why material selection is important based on their properties.• Know the material properties of wood (functional and aesthetic).



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Structures - Playground UKS2 Cycle B	<ul style="list-style-type: none">• Make roughly three different structures from their plans using the materials available.• Complete their structures, improving the quality of their rough versions and applying some cladding to a few areas.• Secure their apparatus to a base.• Make a range of landscape features using a variety of materials which will enhance their apparatus.	<ul style="list-style-type: none">• Know how to design a playground featuring a variety of different structures, giving consideration to how the structures will be used.• Know how to consider effective and ineffective designs.• Know how to build a range of play apparatus structures drawing upon new and prior knowledge of structures.• Know how to measure, mark and cut wood to create a range of structures.• Know how to use a range of materials to reinforce and add decoration to structures.• Know how to improve a design plan based on peer evaluation.• Know how to test and apply a design to improve it as it is developed.• Know how to identify what makes a successful structure.• Know that structures can be strengthened by manipulating materials and shapes.• Know what a 'footprint plan' is.• Know that in the real world, design can impact users in positive and negative ways.• Know that a prototype is a cheap model to test a design idea.