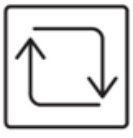
Design Technology Unit Plan – Year 5

Structures- frame structures Design, make and evaluate a _____ (product) for _____ (user) for _____ (purpose)		
Links to previous learning	Frame structures (3), knowledge of shape	
Links to future learning	Structures KS3	
Be mindful of/ misconceptions		
Key vocabulary	**triangulation**- the use of triangular shapes to strengthen a structure **frame structure**- a structure made from thin components **reinforced**- strengthen or support an object additional material **stability**- the strength an object has to stand up	
Possible resources	card, paper straws, newspaper, square sectioned wood, masking tape, PVA glue, bench hooks, clamps, junior hacksaws, sand paper, glue gun (used by adult)	
Key knowledge	You can stiffen and strengthen a frame structure by adding reinforcements You can stiffen and strengthen a frame using triangluation Frame structures are used in real life to make different buildings and objects like tents A junior hacksaw is used for sawing wood and other materials	
Investigate and evaluate  ★★★★☆	Key knowledge Frame structures are used in real life to make different buildings and objects like tents Retrieval activity Show pictures of frame structures and shell structures. Which is which? Freestanding structure – a structure that stands on its own foundation or base without attachment to anything else. Frame structure – a structure made from thin components e.g. tent frame Main lesson Children investigate and make annotated drawings of a range of portable and permanent frame structures, e.g. tents, bus shelters, umbrellas. Use photographs or web-based research. Children to research key events and individuals related to their study of frame structures. Stephen Sauvestre – a designer of the Eiffel Tower; Thomas Farnolls Pritchard – designer of the Iron Bridge and the cruck frame building in Newton http://www.pittdixon.go-plus.net/newton-hall/newton-hall.htm *How well does the frame structure meet users' needs and purposes? Why were materials chosen? What methods of construction have been used? How has the framework been strengthened, reinforced and stiffened? How does the shape of the framework affect its strength? How innovative is the design? When was it made? Who made it? Where was it made?*	
Teacher assessment	**Still need more depth of learning**	**Shows strong understanding**
Technique practice 	Key knowledge A junior hacksaw is used for sawing wood and other materials You can stiffen and strengthen a frame structure by adding reinforcements You can stiffen and strengthen a frame using triangluation Retrieval activity What is a net? (the flat or opened out shape of an object) Main lesson Use a construction kit consisting of plastic strips and paper fasteners to build 2-D frameworks (construct o straws). Compare the strength of square frameworks with triangular frameworks. Ask the children to reinforce square frameworks using diagonals to help develop an understanding of using triangulation to add strength to a structure. Demonstrate how paper tubes can be made from rolling sheets of newspaper diagonally around pieces of dowel. Ask children to use these tubes and masking tape or paper straws with pipe cleaners to build 3-D frameworks such as cubes, cuboids and pyramids. *How could each of the frameworks be reinforced and strengthened?*	

	Demonstrate the accurate use of tools and equipment. Develop skills and techniques using junior hacksaws, G-clamps, bench hooks, square section wood, card triangles and hand drills to construct wooden frames, as appropriate. Demonstrate skills and techniques for accurately joining framework materials together e.g. paper straws, square wood. Ask children to practise these, mounting their joints onto card for future reference.	
Teacher assessment	**Still need more depth of learning**	**Shows strong understanding**
Design, make and evaluate 	Key knowledge You can stiffen and strengthen a frame structure by adding reinforcements You can stiffen and strengthen a frame using triangluation Retrieval activity What is the purpose of laminating? How do we do it? (glue sheets of card or paper together to make them stronger) What is CAD? (Computer aided design) Main lesson Discuss the brief of designing and making a small-scale frame structure. *Who is the intended user and what is the purpose of the frame structure? Will it be permanent, or can it be easily dismantled? What materials will you use? How will it be joined? How will it be reinforced? How will it be finished?* Encourage children to generate innovative ideas, drawing on their research. Ask children to develop a simple design specification to guide their thinking. Children should produce a detailed, step-by-step plan, listing tools and materials. Children's sketches should be annotated with notes to help develop and communicate their ideas. Encourage children to model their ideas first using materials such as paper, card and paper straws. *How will you make it stable? How will it stand up? How could you make it stronger? Where are the weak points? How could you reinforce them? What tools and materials will you need? How can you improve the design?* Encourage children to make their products with accuracy. They should regularly evaluate their work and their completed product, drawing on their design specification, and thinking about the intended purpose and user.	
Teacher assessment	**Still need more depth of learning**	**Shows strong understanding**

Common strengths	Common weaknesses	Notes for subject leader	Pupils who still need more depth of learning	Shows strong understanding