Mendell Primary School

Aspire Challenge Achieve

Medium Term Plan Design Technology

Year Group: 5	Term: Autumn #2 2021	Teacher: Jordyn Keelan	Subject lead: Catherine O'Neill Edwards	Overview: **Structures - Frame Structures** Design, make and evaluate a product for a specific user and purpose. Shell structures. Focus on strengthening the structure	Key End Points: **By the end of this unit children will be able to:** - Strengthen structures using a range of techniques such as: triangular supports and diagonal struts. Strengthening dowel with paper - To safely use bench hooks and saws

Links to other learning:	Relevant Prior Learning:	Relevant Future Learning:	High Quality Text:	Risk Assessment:	Teacher CPD:
History: significant people Science –materials on the basis of their properties. • Mathematics – 3-D shapes • Computing – use technologies for research purposes and be discerning when evaluating digital content.	Experience of using measuring, marking out, cutting, joining, shaping and finishing techniques Basic understanding of what structures are and how they can be made stronger, stiffer and more stable.	Y5: CAMS – uses a frame structure. They will need knowledge from this project next term	Exploring The World Of Foxes *Tracey C Read*	Pupils should be taught to work safely, using tools, equipment, materials, components and techniques appropriate to the task. Personalised class risk assessments should be carried out prior to undertaking this project. Use of bench hooks, g clamps and junior hacksaws – close adult supervision and explicit teaching of skills needed. Discuss fox risk assessment…. What should they do if they see the fox?	Please read the DATA project on a page sheets attached at the end of this plan prior to teaching. If unsure as to how to teach children to safely use bench hooks and saw, please ask COE for guidance. 'Y5 work process guide' document to show the process children should go through in designing and generating ideas. Do not use as a work book. Allow children freedom to express ideas in pictures, works in books. Focus on what they learn, rather than what they record.

	Learning Intention	Lesson Outline (Key Questions in colour)	Resources	Vocabulary	Lowest 20% Adaptations
1	-I can investigate and evaluate a range of existing frame structures. -I can research key events and individuals relevant to frame structures	**This is a DT lesson. In DT we design and make to solve problems. The skills we will be using this lesson are researching existing designs and designers to find out about frame structures** Investigative and Evaluative Activities (IEAs) • Children investigate and make annotated drawings of a range of portable and permanent frame structures, e.g. tents, bus shelters, umbrellas. Use photographs and web-based research to extend the range (refer to computer safety and how to get an accurate and safe search) 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? • Children research key events and individuals related to their study of frame structures e.g. Stephen Sauvestre – a designer of the Eiffel Tower; Thomas Farnolls Pritchard – designer of the Iron Bridge. They could also learn about locally important design and technology	Objects that have frame structures e.g. tents, sheds, umbrellas. Actual objects, images, photographs DT books Ipads/ laptops to research	Frame structure Stable strong permanent designer engineer significant	

		activity such as the Queensway Tunnel designed by Sir Basil Mott which although isn't a frame structure, The Liverpool entrance was dug using a hydraulic tunnelling shield running on roller, a large circular iron frame with pockets – which is a frame structure. Children record fact files in their books taking notes and adding pictures, diagrams and photographs Summarise lesson: what have I learned? Children reflect and record in their books. What do I know about frame structures now?			
2	- I understand how to strengthen, stiffen and reinforce 3-D frameworks.	**This is a DT lesson. In DT we design and make to solve problems. The skill we will be using this lesson is investigating and practising skills of building and strengthening structures** *Catherine has Paul the Fox Man's contact details, he may well come on site or link up via video call as part of this process e.g. to help with generating design criteria or evaluating work at the end.* Share videos and images of the foxes that live on school grounds (all staff folder, foxes). Explain that one of them was poorly in 2019 and had mange (can the children spot which one on the videos?) Paul the Fox Man https://www.facebook.com/thefoxmanuk/ came out to help us treat the fox. However, over lock down due to COVID 19 he has not been on our site since. He is looking for ideas for a hide that he can then build so he can come on site and assess if the fox is better. Go through PowerPoint 'Y5 Hide Information' with the children. When you get to the slide with example hides on ask the following questions: What size are the bird hides? What materials are they made from? Do they have features in common? Designers don't make full sized version straight away, the make small scale models to test out their ideas first. We are making small scales models. Introduce children to their project workbook (this can be given out as sheets weekly if preferred) What is a design brief? What are the 3 areas a design brief must cover? Product, purpose user What is our design brief? Design and make a model bird hide for Paul the Fox Man. *Product: model bird hide, purpose: for Paul the Fox Man to create a full size version to use to monitor our foxes. User: Paul the Fox Man.* Focused Tasks (FTs) • Use a construction kit consisting of plastic strips and paper fasteners to build 2-D frameworks. 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 e.g. 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 sectioned wood. Ask children to practise these, mounting their joints onto card for future reference. - Children complete the Investigating structures sheet	Y5 Bird hides Introduction Challenge' powerpoint Workbook Construction kits (these will need assembling) Plastic strips Paper fasteners Jellutong Dowelling G clamp Bench hook Junior hacksaw Triangular support Card Paper Paper straws Pipe cleaners Hand drill	frame structure stiffen strengthen reinforce triangulation, stability, shape, join, temporary, permanent design brief, annotated sketch, purpose, user, innovation, research, functional
3	- I can develop a simple design specification • I can generate, develop and model ideas	**This is a DT lesson. In DT we design and make to solve problems. The skill we will be using this lesson is designing and making prototypes** Design, Make and Evaluate Assignment (DMEA) • Discuss the brief and recap 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? Children should be encouraged to generate innovative ideas, drawing on their research. Ask children to develop a simple design specification / criteria to guide their thinking and record in book. Sketch initial ideas referring to design criteria. Encourage children to share designs so far with partner/ group of children and seek feedback as well as offering advice to others about how they could improve their design. Then, go back to designs and generate further • What is a prototype? What is the purpose of a prototype? Children create a prototype and practice modelling 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? Photograph models and prototypes to go in their book. Is there anything you will change after creating your prototype and trying things out	Workbook camera Plastic strips Paper fasteners Jellutong Dowelling G clamp Bench hook Junior hacksaw Triangular support Card Paper Paper straws Pipe cleaners Hand drill	frame structure, stiffen, strengthen, reinforce, triangulation, stability, shape, join, temporary, permanent design brief, design specification, prototype, annotated sketch, purpose, user, innovation, research, functional
4 & 5	I can formulate a	**This is a DT lesson. In DT we design and make to solve problems. The skill we will be using this lesson is planning and making** Children produce a detailed, step-by-step production plan, listing tools and materials. • Children's sketches should be annotated with notes to help develop and communicate their ideas.	book camera Plastic strips Paper fasteners Jellutong	annotated sketch, production plan accuracy	

	clear plan, including • I can select from and use appropriate tools	Make - 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. - Discuss using a range of finishing and decorative techniques suitable for the product they are designing and making ask children to explain reasons for choices throughout	Dowelling G clamp Bench hook Junior hacksaw Triangular support Card Paper Paper straws Pipe cleaners Hand drill	specification purpose user stability strength	
6	I can evaluate my product against my specification, identifying strengths and areas for development, and carrying out appropriate tests	**This is a DT lesson. In DT we design and make to solve problems. The skill we will be using this lesson is evaluating** Evaluate: Test model: How will you test your model? Which elements of the design criteria have been met? Children complete evaluation guiding using pages 7&8 of the booklet as prompts for thinking (display on board or print copies for the table) Children present their designs and work to Paul the Fox Man in person or via zoom call.	books	Evaluate Assess Improve present	