Lyppard Grange
DT Knowledge organiser

Year 2	Structures- Freestanding structures

Design, make and evaluate a _____ (product) for _____(user) for _____(purpose) – (to be completed by year group)

Examples of possible design and make tasks- **playground equipment/ bridges/ baby bear's chair/ animal enclosures/ furniture/ circus equipment**

Key Knowledge

- To know how to join materials together effectively
- To know that a range of tools can be used for different purposes e.g. cutting, sticking, bending, joining
- To understand how structures can be made stiffer, stronger and more stable

Skills

- Explore initial ideas using drawings and mock-ups
- To measure and mark out materials using safe ways of cutting
- To investigate ways to strengthen materials by folding, joining or rolling
- Evaluate their ideas and review their product against design criteria

Vocabulary

Cut, fold, join, fix

Structure, framework, weak, strong, surface, thinner, thicker, corner.

Metal, wood, plastic

Circle, triangle, square, rectangle, cube, cuboid, cylinder, curved, straight

IEAs-

• Go on a walk and/or look at photographs of the local area to explore structures such as playground equipment, street furniture, walls, towers and bridges e.g. What are the structures called and what is their purpose? Who might use them? What materials have been used? Why have these been chosen? How have the parts been joined together? How have the structures been made strong enough? How have they been made stable?

• Where possible, ask the children to draw or photograph the structures they have been exploring and label with the correct technical vocabulary in relation to the structure, materials used and shapes e.g. wall, tower, framework, base, joint, metal, wood, plastic, brick, triangle, square, rectangle, cuboid, cube.

Focused Tasks (FTs)

- ✓ Demonstrate measuring, marking out, cutting, shaping, joining and finishing techniques with a range of tools and new and reclaimed materials that children are likely to use to make their structures. Discuss the suitability of materials for their products according to their characteristics.
- ✓ Ask the children to build and explore a variety of freestanding structures using construction kits, such as wooden blocks, interconnecting plastic bricks and those that make frameworks e.g. How can you stop your structures from falling over? How they can be made stronger and stiffer in order to carry a load? Children could make models of the structures they have seen in school and the local area.
- ✓ Ask children to fold paper or card in different ways to make freestanding structures, using masking tape where necessary to make joins. Encourage them to think about how folding materials can make them stronger, stiffer, stand up and be more stable e.g. Can they support an object on top of their structures without it falling over or breaking?
- ✓ Test different shapes e.g. cylinders/ triangles/ cuboids. Which shapes are the strongest? Test these structures using weights/ weighted objects.

Design, Make and Evaluate Assignment (DMEA)

• Discuss with the children what structure they will be designing, making and evaluating e.g. Who will your product be for? What will be its purpose? What materials will you use? How will you make it strong and stable?

• Generate some simple design criteria with the children e.g. the structure should stand up on its own, it should be strong enough to carry Teddy.

• Encourage the children to develop their ideas through talking, drawing and making mock-ups of their ideas with construction kits and other materials.

• As a whole class, plan the order in which the structures will be made. Children could make their final products from construction kits, new and reclaimed materials or any combination of these, according to their characteristics.

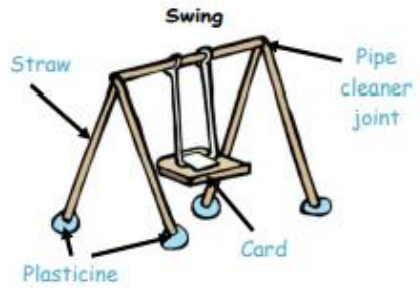
• Ask children to evaluate their developing ideas and final products against original design criteria.

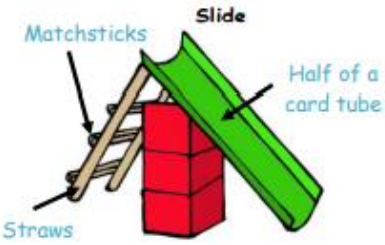
Designing, making and evaluating a strong chair for Baby Bear

An iterative process is the relationship between a pupil's ideas and how they are communicated and clarified through activity. This is one example of how the iterative design and make process *might* be experienced by an individual pupil during this project:

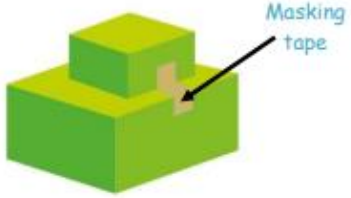
THOUGHT	ACTION
What sort of chair shall I make? Who is it for and what is it for?	Choose an appropriate soft toy Generating ideas through talking and drawing based on own experiences
How can I make sure it is strong, stiff and stable?	Developing ideas using construction kits to create mock-ups
Which joining techniques will work best for the chair?	Exploring and evaluating joining techniques
What media, materials and kits will I use?	
What shall I do first? What tools and techniques will I use? What materials shall I use?	Exploring and evaluating construction kits, new and reclaimed materials
	Selecting from a range of tools, techniques and materials Explaining choices
More thoughts… judging, planning, generating new ideas	More actions… making, testing, modifying
Will the chair meet the needs of the user and achieve its purpose?	Evaluating the chair with a soft toy and against design criteria

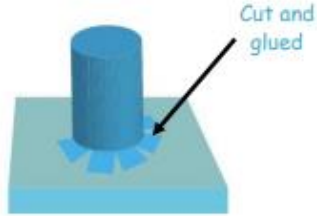
Techniques for assembling freestanding structures





Show children how to join sheet materials and reclaimed boxes together using different tapes and glues.





Health and safety-

Pupils should be taught to work safely, using tools, equipment, materials, components and techniques appropriate to the task. Risk assessments should be carried out prior to undertaking this project.

Top Tips-

- Create a PowerPoint showing a variety of freestanding structures relevant to the product the children are designing and making
- Create and display relevant technical vocabulary
- Demonstrate measuring, marking out, cutting, joining and strengthening techniques and provide help sheets showing instructions for the children to practise independently.
- Prior to producing their designs, have a range of materials available for children to access and create models.