Design and Technology – Year 1

Content- Structures- Freestanding

Big Question: What makes a structure strong? Bends or joins?

NC objectives - areas of study	End point of area of study	Vocabulary		
		Basic	**Adventurous**	**Technical**
Through a variety of creative and practical activities, pupils should be taught the knowledge, understanding and skills needed to engage in an iterative process of designing and making. They should work in a range of relevant contexts. When designing and making, pupils should be taught to: -Design purposeful, functional, appealing products for themselves and other users based on design criteria. -Generate, develop, model and communicate their ideas through talking, drawing, templates, mock ups and where appropriate information and communication technology. -Select from a range of tools and equipment to perform practical tasks. -Select from and use a wide range of materials and components, including construction materials, textiles and ingredients, according to their characteristics. -Explore and evaluate a range of existing products. -Evaluate their ideas and products against design criteria.	**<u>Structures:</u>** Children will know what a freestanding structure is. Children will have explored a range of existing freestanding structures in school and the local environment. E.g. Everyday products and buildings. Children will have explored making freestanding structures using construction kits- wooden blocks, interconnecting plastic bricks and those that make frameworks. They will be able to make a freestanding structure using a range of materials. Children will understand how to make freestanding structures stronger, stiffer and more stable. Children have used a range of materials in their products to create freestanding structures- straws, matchsticks, kitchen roll, cereal boxes, plasticine, blocks, masking tape, glue etc. Children understand and use the correct vocabulary when describing their products or describing how they made it- structure, materials used and shapes. E.g. wall, tower, framework, base, metal, wood, plastic, brick, triangle, square, rectangle, cube, cuboid etc. Children understand and can explain the suitability of the materials they have chosen for their structure, linking to the material properties. Children have developed their skills of measuring, marking out, cutting, shaping and joining materials, with some supervision and support.	**Cut, fold, fix, tower, wall, side, corner, straight, point.**	**Join, weak, strong, edge, surface, thinner, thicker, curved, frame, buttress, stable.**	**Structure, framework, metal, wood, plastic, <u>3D shapes-</u> circle, triangle, square, rectangle, cuboids, cube, cylinder, mock up.**

-They should build structures, exploring how they can be made stronger, stuffer and more stable.				

Knowledge

Substantive Knowledge

Structures- Concept- Purpose

Lesson 1-

LO: To know what a free-standing structure is.

Vocabulary: structure, framework, strong, weak, metal, wood, plastic

Children to know that a free-standing structure is a structure that stands on it's own foundations or base without attachments to anything else.
Children to explore a range of free-standing structures from around the world e.g. Burj Khalifa in Dubai (skyscraper at 830m tall) and their local area e.g. St Botolph's (The Stump in Boston 82.9m tall). This can be included in a power point or children to investigate a range of free-standing structures images and describe the materials used, their appearance and their purposes.

Lesson 2-

LO: To know free-standing structures in the local environment.

Vocabulary: straight, curved, thicker, thinner, frame

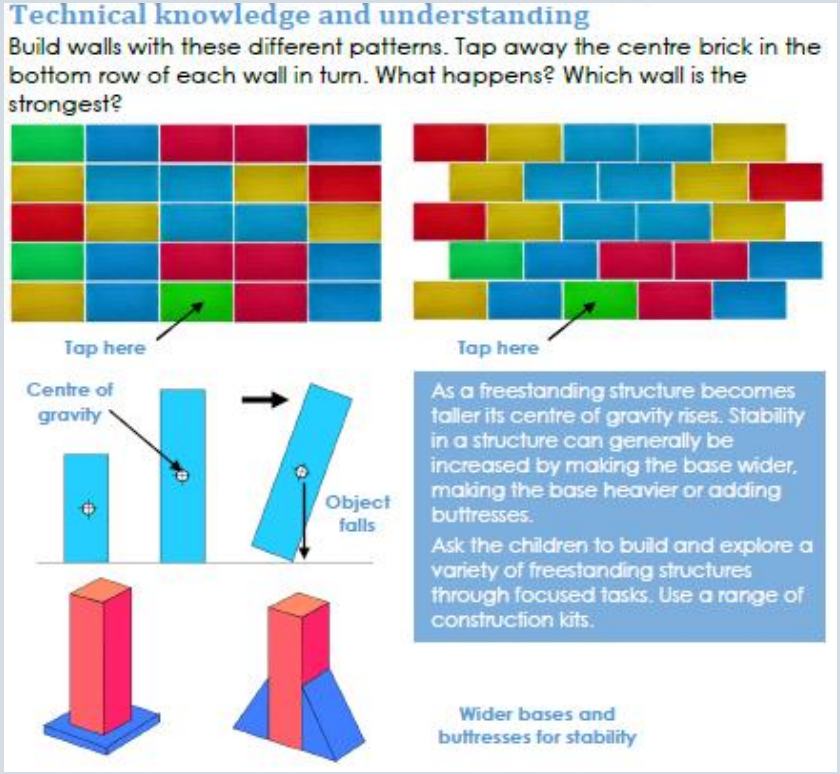
Retrieve knowledge from the previous lesson of what a free-standing structure is. Discuss famous free-standing structures from around the world and the local area. Children to use their knowledge of free-standing structures to identify structures in the school environment. E.g. playground equipment, street furniture, buildings, walls, towers and bridges.
Children to draw structures that they have seen and label. Encourage children to draw upon their knowledge of materials from their Science learning and

Disciplinary Knowledge

Each lesson: Tell chn- Today we are going to be architects and create a free-standing structure. Explain to the children that their role will be to design and plan a free-standing structure for a particular purpose. Discuss with the children the chosen purpose for their chosen user. This may include thinking about what the structure will be for and also the types of materials that will be used to ensure it meets its needs. Pupils will be able to draw upon other subject disciplines such as mathematics, art and science throughout this unit to support them with the design and making part of their product.

Children to follow the four aspects of Design and Technology- research, design, make and evaluate whilst building upon technical knowledge to make their finished product.

begin to label their drawings e.g. brick, metal, plastic etc and label using technical vocabulary- e.g. wall, tower, base, joint, triangle, framework. cuboid, cube etc. Be seen to respond to a stimulus and begin to explain in simple terms verbally or though body language. **Lesson 3-** **LO: To understand how to make a structure stiffer, stronger and more stable.** **Vocabulary: stable, strong, weak, fold** Ask children to create a variety of free-standing structures using construction kits such as wooden blocks, interconnecting plastic bricks and those that create frameworks. Ask children to think about the following questions: 1) How can you stop your structure from falling over? 2) How can the structure be made stronger and stiffer in order to carry a load? Children can be set the task of recreating structures they have seen in their school environment e.g. slides, swings, buildings, walls, towers etc.	



Ask children to fold paper or card in different ways to make a free-standing structure using masking tape to make joins where necessary. Encourage them to think about how folding materials can make them stronger, stiffer or stand up and be more stable. Can they support an object on top of their structures without it falling over or breaking?

Lesson 4-

LO: To know how to design free-standing structure using a range of materials.

Vocabulary: structure, strong, tower, wall, corner

Read the story of The Three Billy Goats Gruff. Identify free-standing structure in the story. Children to design a bridge suitable for the three goats to cross safely. Ask children the questions:

1) Who will your product be for?

2) What is its purpose?
3) What materials will you use?
4)

Generate whole class design brief – e.g. structure should stand on it's own and carry the three billy goats gruff characters.
Children to draw structure and label using technical vocabulary. Draw upon suitability of materials from their Science learning and encourage children to verbally explain why they have chosen these materials. Build upon learning from previous lesson- how will they make their structure strong and stable? What joins/bends will they use?

Lesson 5-
LO: To understand how to make a stable free-standing structure.
LO: To know how to cut and join different materials safely.
Vocabulary: cut, fold, fix, structure
Children to make their structures using a range of materials. Materials and resources could be gathered as part of a homework task that is set the week before. Can children find recycled materials that they think would be suitable for their bridge. Ask children to explain to their parents why these resources would be best.
Children to use cutting tools and a range of joining materials safely throughout the session. Ensure children are following the correct safety procedures e.g. holding scissors correctly, using masking tape independently by sticking tape to the table and cutting the amount they need.
Children to add any finishing techniques that are suitable for their finished structure.
Have a sense of enjoyment when devising new things.

Lesson 6-
LO: To understand how to evaluate a product and discuss successes and next steps.
Vocabulary: recap all
Children to test their finished product to evaluate whether it has met the purpose, linking to concept.

Children to verbally evaluate their finished structure and discuss what has worked well and what they would do next time to make their product better. Children could present evaluations to the class or in small groups.	
Concepts	
User	**Purpose**
ASSESSMENT **KNOW MORE, REMEMBER MORE, DO MORE...**	
In this unit of learning, progress has been made when a learner knows more. This 'distance travelled' from the starting point is evidenced through them remembering more and doing more: in books, low stakes quizzes, retrieval, use of mind maps, answering the big question and being able to feel more confident about this unit.	