

## Medium Term Plan: Supporting Implementation of LTP/Progression Grid

Subject: DT – Frame Structures

Year: A - Autumn (UKS2)

NC/PoS:

- To use research and develop design criteria to inform the design of innovative, functional, appealing products that are fit for purpose, aimed at particular individuals or groups.
- To generate, develop, model and communicate their ideas through discussion, annotated sketches and prototypes.
- Select from and use a wider range of tools and equipment to perform practical tasks: cutting and joining accurately.
- Investigate and analyse a range of existing products.
- Evaluate their ideas and products against their own design criteria and consider the views of others to improve their work.
- To understand how key events and individuals in design and technology have helped shape the world
- Apply their understanding of how to strengthen, stiffen and reinforce more complex structures.

Prior Learning (what pupils already know and can do)

- Children know how to design a structure using a cube or cuboid shaped shell and can explain the user and purpose. For example: a gift box for a friend, a lunch box for them self.
- Children know how to draw an annotated sketch of a shell structure and can label it with materials and strengthening solutions. Children can use a computer to design their net.
- Children know how to make a prototype of a shell structure using paper to practise joining techniques and strengthening solutions (laminating, ribbing, corrugating)
- Children know how to select from PVA glue, glue sticks and scissors to cut and join materials (card and cardboard). They can use card or paper straws to strengthen their structure.
- Children know how to name a real shell structure – The Shard, the O2 building.
- Children know if their structure is suitable for the intended user and purpose. They can offer a way to improve their structure.
- Children know how to strengthen a structure using ribbing, corrugating or laminating and explain what this means.

End points (what pupils MUST know and remember)

- Children know how to design a structure using a cube, cuboid, triangular prism or hexagonal prism shaped frame and can explain the user and purpose. For example: a house for a homeless person, a tree house for a child, a shelter for people waiting for a bus.
- Children know how to draw an annotated sketch of a frame structure and can label it with materials, dimensions and strengthening solutions.
- Children know how to make a prototype of a frame structure using paper straws to practise joining techniques and triangulation.
- Children know how to select from PVA glue, glue sticks, glue guns, scissors and saws to cut and join materials (wood, card and cardboard).
- Children name real frame structures – Eiffel tower, Empire State building, Iron bridge
- Children know if their structure is suitable for the intended user and purpose. They can offer a way to improve their structure.
- Children know how to strengthen a structure using triangulation and explain what this means.

Key Vocabulary

frame structure, triangulation, stability, compression, strut, evaluation

Session 1:

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### Evaluating existing products

- Carry out research into existing structures and their designers (Eiffel tower (Gustave Eiffel), also discuss the Empire State building and the Iron bridge) using web-based resources to identify the triangulation. Look at pictures of the structures in construction and the final structure.
- What are the pros and cons of the structures compared to other types of structures (free-standing structures (KS1) and shell structures (LKS2))
- Consider: 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 effect its strength? How innovative is the design? When was it made? Who designed it?
- Data: What does the research into existing products show is required for your structure?
- Moral/humility – discuss with the children about homelessness.

Vocab: frame structure, triangulation

### Session 2:

#### Practising skills

- Practise strengthening square frameworks with triangulation using paper straws. Identify compression and strut.
- Practise creating the 3D shapes required for the structures (cube, cuboid, triangular prism, hexagonal prism) using paper straws and trial different ways to strengthen and reinforce the shape.

Vocab: stability, compression, strut

### Session 3:

#### Designing

- Through research and discussion with peers and adults develop a design criterion, this should consider: 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?
- Present ideas through annotated sketches.
- Design: Can you design a structure ensuring it is strengthened and stiffened effectively?
- Innovation: Have you considered how to make the project different and better than others of the same kind?
- Model and communicate their ideas through prototypes using paper straws to practise the shape of the frame, joining techniques and triangulation opportunities.
- Individual liberty – children are encouraged to make their products different and unique.

Vocab: frame structure, stability

### Session 4:

Making - DT consultant to supply high quality materials and support for this session.

- Children will select from and use appropriate tools to accurately measure, mark out, cut, shape and use joining techniques to make frameworks using wood, saws and glue guns.
- Children will use finishing and decorative techniques suitable for the product they are designing and making in order to make it appealing.
- Resilience – during the entire making process, we discuss keeping on trying and never giving up even if the task gets tricky.

Vocab: frame structure, stability, compression, strut

### Session 5:

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### Evaluating

- Critically evaluate their products against their design specification, intended user and purpose, identifying strengths and areas for development.
- Carry out appropriate tests - Use weights to test strength of structure.
- Functionality: Does the product work for the intended purpose and compare well with the design specification? Is the product appealing to the eye?
- Evaluate: Did the structure maintain its stability through the testing process? What are the areas of strength and improvement?
- Honesty – during the evaluation stages discuss being honest with ourselves (self-reflection) and others to ensure we can improve ourselves and our work.

Vocab: evaluation

Future learning this content supports:

UKS2 Year A – Mechanical systems - Pulleys and gears

KS3 - Woodwork