Medium Term Plan: Supporting Implementation of LTP/Progression Grid

Subject: DT - Shell Structures   Year: A (LKS2)
NC/PoS:

-   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.
-   Generate, develop, model and communicate their ideas through discussion, annotated sketches, computer-aided design and prototypes.
-   Select from tools and equipment to perform practical tasks [for example, cutting, shaping, joining and finishing] accurately.
-   Investigate and analyse a range of existing products.
-   Evaluate their ideas and products against their own design criteria.
-   Apply their understanding of how to strengthen, stiffen and reinforce more complex structures.

Prior Learning (what pupils already know and can do)
-   Children can name 3D shapes – cube, cuboid, triangular prism, pyramid, cone, sphere.
-   Children can name the 2D shapes used to make 3D shapes.
-   Children understand 3D shapes can be made from nets and know what these look like.
-   Children can use a laptop and track pad, can access Microsoft word and can type and insert images.
-   Children can design a structure and can explain the user and purpose. For example: an animal enclosure for people to visit.
-   Children can draw an annotated sketch of their free-standing structure and can label it with materials.
-   Children can select from PVA glue, glue sticks and scissors to cut and join materials (card and cardboard).
-   Children can name free-standing structures: Blackpool tower (local example) and The Burj Khalifa in Dubai (tallest example)
-   Children can discuss the different types of animal enclosures – penguins have to have water to swim in and land, lions need high fences so they don't jump out, giraffes need trees to eat from.
-   Children can state if their structure is suitable for the intended user and purpose. They can offer a way to improve their structure with some guidance.
-   Children can strengthen a structure using stronger materials, like card instead of paper or lolly pop sticks instead of cardboard.

End points (what pupils MUST know and remember)
-   Children can 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 can 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 can make a prototype of a shell structure using paper to practise joining techniques and strengthening solutions (laminating, ribbing, corrugating)
-   Children can 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 can name a real shell structure – The Shard, the O2 building.
-   Children can state if their structure is suitable for the intended user and purpose. They can offer a way to improve their structure.

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- Children can strengthen a structure using ribbing, corrugating or laminating and explain what this means.
Key Vocabulary
Shell structure, computer aided design, ribbing, corrugating, laminating, scoring,

Session 1:
Exploring existing products
- Carry out research into existing structures, the shard and the O2 building, using web-based resources. Look at pictures of the structures in construction and the final structure.
- Consider: Why were materials chosen? What methods of construction have been used? How has the shell been strengthened and stiffened? How does the shape of the shell effect its strength?
- Data: What does the research into existing products show is required for your structure?
- Explore opening shell structures such as packaging boxes – What is its purpose? What material is it made from? How has it been constructed? Is it appealing? Which 3D shapes are most commonly used? Why?

Vocab: shell structure

Session 2:
Practising skills
- Practise making 3d shapes using nets, practising joining techniques using glue and tape.
- Practise strengthening techniques – laminating, ribbing, corrugating.
- Practise scoring and cutting out the shapes accurately, e.g. not cutting the glue flaps off.
- Practise using Microsoft word to add images and text, revisit KS1 computing skills.

Vocab: laminating, ribbing, corrugating

Session 3:
Designing
- Through discussion with peers and adults develop a design criterion, this should consider: Who is the intended user and what is the purpose of the shell structure? What materials will you use? How will it be joined? How will it be strengthened? How will it be finished?
- Present ideas through annotated sketches and computer-aided design.
- Design: Can you design a structure ensuring it is strengthened 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 to practise the shape of the shell, joining techniques and strengthening opportunities.
- Individual liberty – children are encouraged to make their products different and unique.

Vocab: computer aided design

Session 4:
Making
- Children will select from and use appropriate tools to accurately measure, mark out, score, cut, shape, join and strengthen their shell structures using card, cardboard, paper straws, scissors, glue and tape.
- 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: laminating, ribbing, corrugating

Session 5:
Evaluating
- Evaluate their products against their design specification, intended user and purpose, identifying strengths and areas for development.
- Carry out appropriate tests – Does the structure securely hold the intended item?
- Functionality: Does the product work for the intended purpose? Is it strong enough? Is the product appealing to the eye?
- Evaluate: Did the structure maintain its strength 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: evaluate

Future learning this content supports:
LKS2 – Textiles – 2D shapes to a 3D product
UKS2 – Frame structures