Ashtree Primary School and Nursery Medium Term Plan for DT

Year 3 – Structures and construction.

Key Vocabulary

shell structure, three-dimensional (3-D) shape, net, cube, cuboid, prism, vertex, edge, face, length, width, breadth, capacity

Prior learning

Experience of using different joining, cutting and finishing techniques with paper and card. A basic understanding of 2-D and 3-D shapes in mathematics and the physical properties and everyday uses of materials in science.

Designing

Generate realistic ideas and design criteria collaboratively through discussion, focusing on the needs of the user and purpose of the product. Develop ideas through the analysis of existing products and use annotated sketches and prototypes to model and communicate ideas.

Making

Order the main stages of making. Select and use appropriate tools to measure, mark out, cut, score, shape and assemble with some accuracy. Explain their choice of materials according to functional properties and aesthetic qualities. Use finishing techniques suitable for the product they are creating.

Evaluating

Investigate and evaluate a range of existing shell structures including the materials, components and techniques that have been used. Test and evaluate their own products against design criteria and the intended user and purpose.

Technical knowledge and understanding

Develop and use knowledge of how to construct strong, stiff shell structures. Develop and use knowledge of nets of cubes and cuboids and, where appropriate, more complex 3D shapes. Know and use technical vocabulary relevant to the project.

Design and Evaluate

Children can be taught key knowledge by learning the skills below:

Develop a design brief with the children within a context which is authentic and meaningful.

- Discuss with the children the uses and purposes of their shell structures e.g. *What does the product need to do? Who is it aimed at? How will the purpose and user affect your design decisions?* Agree on design criteria that can be used to guide the development and evaluation of children's products *e.g. How will we know that we have designed and made successful products?*
- Ask the children to use annotated sketches and prototypes to develop, model and communicate their ideas for the product e.g. *What will you need to include in your design? How can you improve it? What materials will you use? How will you make sure your product works well and has the right appearance?*
- Ask children to identify the main stages of making and the appropriate tools and skills they learnt through focused tasks. Encourage the children to work with accuracy, using computer-aided design (CAD) where appropriate.
- Evaluate throughout and the final products against the intended purpose and with the intended user, drawing on the design criteria previously agreed.

Curriculum Enhancements and Designers

- Explore a variety of structures in a real world setting (eg buildings, shelters, tunnels, etc). Do any of these use shell structure? What is the purpose/benefit of the structure that has been used?
- Potential to link final product to other area of the curriculum (eg, shelter for stone age family, box/packaging to transport healthy snacks safely).

Misconceptions

- Order of design sequence – eg must a design *always* come before you make anything?
- Evaluation of product – if final product does not match the initial design is that a bad thing? Can it be good? What can we learn from adapting our design?

Suggested Activities

- Children can collect and explore a collection of shell structures (eg packaging) – discuss the purpose of the shell structure, materials used etc
- Investigate and explore nets of existing products
- Evaluate existing products for effectiveness
- Use kit parts with flat faces to construct nets. Experiment with assembling nets in different ways
- Demonstrate skills and techniques of cutting scoring and assembling pre-drawn nets. Demonstrate different ways of strengthening shell structure.
- Practise using computer aided design software to design the net, text and graphics for products according to purpose.

Curriculum links

- **Science** – discuss the properties and suitability of materials for particular purposes.
- • **Mathematics** – compare and sort common 2-D and 3-D shapes in everyday objects. Recognise 3-D shapes in different orientations and describe them.
- • **Spoken language** – ask relevant questions to extend knowledge and understanding. Build their technical vocabulary.

This will lead children..

- Develop an understanding of different structure types and purposes different types will meet
- Develop an understanding of how to make an open structure stronger and more stable, and the importance of this in a real world setting
- Make appropriate choices of materials and tools to use in order to make a strong, sturdy structure.