

Year 3—Prehistoric structures
Shell structures

Purbrook Junior School Knowledge Organiser
Design and Technology



What children should already know

Prior knowledge

- 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.

Key Vocabulary

Cuboid - a solid body with rectangular sides.

Edge - where two surfaces meet at an angle.

Face - a surface of a geometric shape.

Net - the flat or opened-out shape of an object such as a box.

Prism - a solid geometric shape with ends that are similar, equal and parallel.

coring - cutting a line or mark into sheet material to make it easier to fold.

Shell structure - a hollow structure with a thin outer covering.

Vertex - used to refer to the corners of a solid geometric shape, where edges meet.

What children will learn in the topic

YEAR 3

DESIGNING:

- Children develop ideas by investigating a collection of different shell structures including packaging. Use questions to develop children's understanding
- Children take a small package apart identifying and discussing parts of a net including the tabs.
- Evaluate existing products to determine which designs children think are the most effective for intended use and purpose.
- Ask the children to use annotated sketches and prototypes to develop, model and communicate their ideas for the product
- Develop a design brief with the children within a context which is authentic and meaningful.

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.
- Demonstrate skills and techniques of scoring, cutting out and assembling using pre-drawn nets.

EVALUATING:

- Test and evaluate their own products against design criteria and the intended user and purpose. using star diagram

TECHNICAL KNOWLEDGE:

- Apply their understanding of how to strengthen, stiffen and reinforce more complex structures
- Develop and use knowledge of nets of cubes and cuboids and, where appropriate, more complex 3D shapes

National Curriculum

DESIGNING: Understanding contexts, users and purposes

Generating, developing, modelling and communicating ideas from research

MAKING: select from and use a wider range of tools and equipment to perform practical tasks accurately

EVALUATING: Own ideas and products and existing products

TECHNICAL KNOWLEDGE: Making products that work by applying understanding

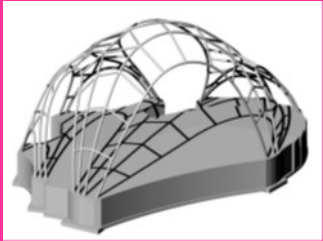
Key Useful Resources

- collection of shell structures for different purposes and users

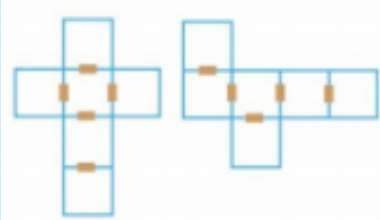


PREHISTORIC STRUCTURE

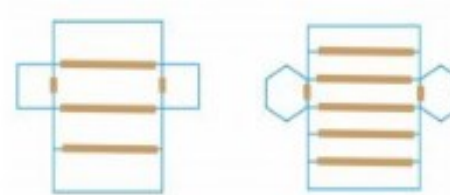
A shell structure is a hollow structure with a thin outer layer.



To assemble and evaluate 3-D shapes using standard sized card squares, rectangles, equilateral triangles, isosceles triangles and hexagons, joined with masking tape.



Nets for cubes

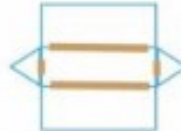


Cuboid net

Hexagonal prism net



Square based pyramid net



Triangular prism net

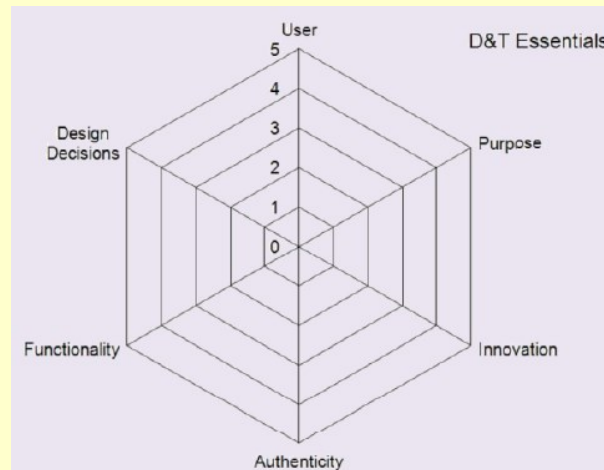


Tetrahedron net



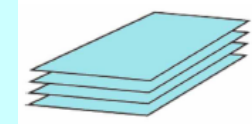
Hexagonal based pyramid net

Star diagrams for evaluation.

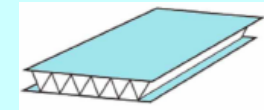


Stiffening and strengthening sheet materials:

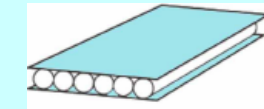
Laminating - glue together several layers of card



Corrugating - zig-zag a piece of paper or card and glue in between two layers of card



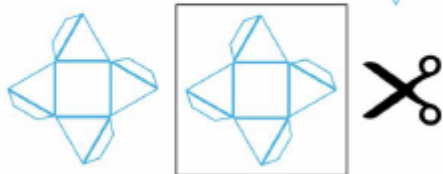
Ribbing - glue layers of straws between layers of card



Creating the net for the product you are designing and making without using computer aided design:



Draw the faces and stick them together



Add tabs, glue your paper net onto card and cut out

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.