

Prior Learning

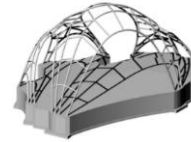
In EYFS/YR1/Yr2 the children have explored simple mechanisms including wheels, axles, levers and sliders. They have also explored free standing structures and have a basic understanding of the importance of strength and stability. They have used simple construction kets, tools and equipment to explore the design and making process.

They will have a growing understanding of how to design, make and evaluate a product for a target audience. In doing so they will have conducted simple research into products currently available, followed a simple brief, made a basic mood boards, sketched initial designs with simple annotations and undertaken some evaluation including some feedback from the target audience.

Shell structures

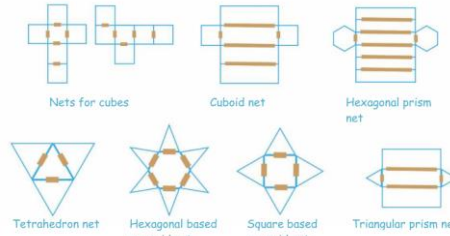


Shell Structures



A shell structure is a hollow structure made from a thin outer layer. Many buildings use a shell structure including the O2 and Shard.

Children explore and evaluate 3D shapes- they flat pack and assemble different structures including:



Key Vocabulary

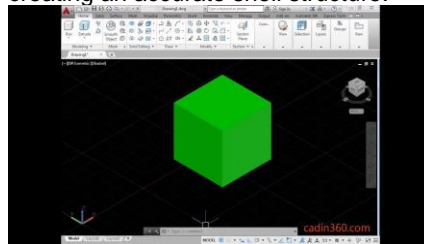
- cuboid:** a solid 3D shape with rectangular sides.
- face:** a flat surface of a geometric shape.
- edge:** where two surfaces meet at an angle.
- net:** the flat or opened-out shape of an object such as a box.
- prism:** A prism is a 3D shape with flat sides. The 2 ends are an equal shape and size. The cross-section is identical.
- scoring:** cutting a line or mark into sheet material to make it easier to fold.
- vertex:** used to refer to the corners of a solid geometric shape, where edges meet.
- CAD(Computer Aided Design):** the use of computers to help in the creation, modification, analysis, or optimization of a design.

Intended Outcomes

1. To identify shell structures.
2. To explain how a shell structure is formed and give examples of ways in which the structure can be reinforced and strengthened.
3. To know and use technical vocabulary relating to structures.
4. To create simple 3D shell structures from 2D nets and designs and explore the different ways these can be assembled.
5. To evaluate how effective their shell structures are in terms of stability/strength and structure. Evaluate the benefits of CAD in creating NETS versus hand-drawn ones.

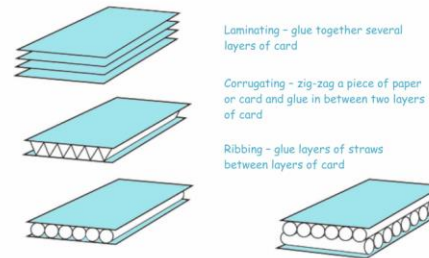
Experiment by creating 3D nets without computer aided design (CAD) by simply drawing the faces, cutting them out, using tabs and assembling them.

Explore CAD and the benefits of it in terms of creating an accurate shell structure.



Explore how to provide strength and structure:

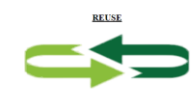
Stiffening and strengthening sheet materials:



3 Rs- Reduce, Reuse, Recycle

Within this topic the importance of sustainability in product design and manufacturing can be explored. The importance of designers to consider the impact of mass production of products on the environment and the need to consider the use of materials:





REUSE

Where possible, we should reuse products or their components / parts when they are disassembled, at the end of their life cycles.

Products should be designed, so that they can be used again or at least their parts, with minimal reprocessing. This is usually cheaper and more environmentally friendly, than using new raw materials.

A good example of reuse is glass bottles, which are washed and refilled. Also applies to some plastic bottles.

