



Structures are built for different purposes. Shell structures are built with a thin, solid outer surface, which can be flat or curved, and a hollow internal area. They are specifically designed to spread the weight loaded on them so they are strong. Shell Structures are mainly built to protect something or someone; to contain something and to present something. Examples of shell structures are: a chocolate box, a pyramid or buildings such as The Shard (London) or Royal Opera House (Sydney).

Key Vocabulary

- shell structure a hollow structure with a thin outer covering
- 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
- 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
- sustainable actions which consider future generations

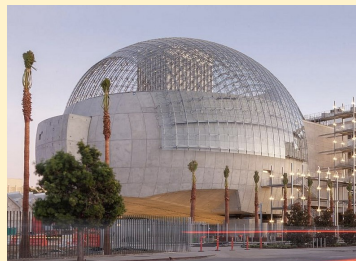
The Problem: The pens at Burwell are thrown in the bin and these are taken to landfill.

Design Brief: Create a pen recycling structure to distribute to all classes.

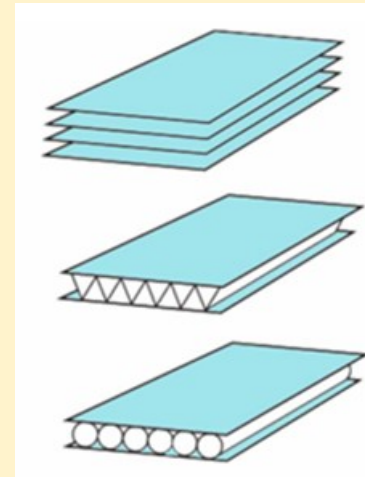
Design criteria: It has to be a shell structure. It must be strong enough to hold weight. Must be enclosed. Must be attractive to look at.

Renzo Piano

Renzo Piano is an architect that specialised in shell structure buildings that are sustainable. Piano is **one of the most sustainably-forward architects working**, using wooden facades, solar lighting, and other green details to shrink the carbon footprint of each new building.



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.

Accurately, **marking** and **cutting** a net ensures stability. Scissors can be used to **score** lines on the surface that needs to be folded.



Tabs are additional strips on the net that can be scored and folded to make a surface for sticking vertices together.

