

Prior Learning

Early experiences of manipulating different media such as card and paper to join, construct fasten and glue. Experience of simple tools and techniques including glue, sellotape, paper fasteners, paper clips.

In Year 1-dependent on the order of topics the children will have explored mechanisms- levers and sliders and have experienced designing and drawing their ideas at a basic level.

They will have drawn diagrams of their ideas and written lists of resources they intend to use. They will understand that they need to design their product so it meets the brief.

Freestanding structures in the world

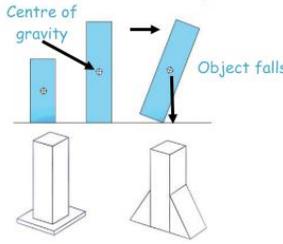
Burj Khalifa (in



A freestanding structure is a structure that stands on its own foundation or base without attachment to anything else.

As a freestanding structure becomes taller its centre of gravity rises. Stability in a structure can generally be increased by making the base wider, making the base heavier or adding buttresses.

Ask the children to build and explore a variety of freestanding structures through focused tasks. Use a range of construction kits.



Key Vocabulary

Frame structure – a structure made from thin components e.g. tent frame.

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

Stability – in relation to a freestanding structure, the extent to which it is likely to fall over if a force is applied.

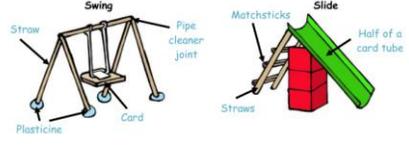
Buttress - a structure added to a wall, tower or framework to make it more stable and/or reinforce it.

Brick bonding – arranging bricks in a wall to improve the performance of the structure or improve its appearance.

Prototype-First 3-D representation of a product.

- Intended Outcomes**
1. To identify free standing structures and explain how they know they are freestanding..
 2. To identify similarities and differences in f/s structures.
 3. To know and use technical vocabulary relating to sliders and levers.
 4. To experiment with different assembly techniques for strength and stability.
 5. To create a free standing structure to meet a brief.
 6. To evaluate how effective their f/s structure was and explain why it is good and or how it can be better.

Techniques for assembling freestanding structures



Show children how to join sheet materials and reclaimed boxes together using different tapes and glues.



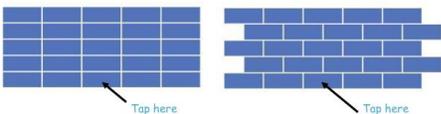
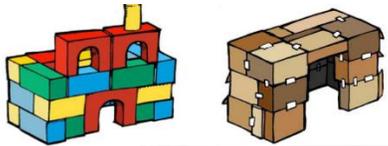
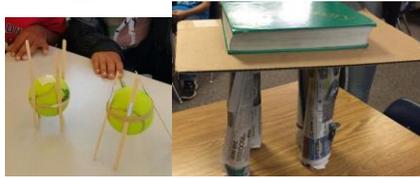

Photos: Peter Smith Associates

Now bend one piece of card and use it as an arch. How does this affect the strength of your bridge?



Technical knowledge and understanding

Build walls with these different patterns. Tap away the centre brick in the bottom row of each wall in turn. What happens? Which wall is the strongest?

Helpful Videos and Tips

https://www.teachengineering.org/activities/view/duk_tower_tech_act
(building a paper tower that is sturdy)

<https://www.youtube.com/watch?v=sXD6VQbjuUA>
(3D images of the top 30 tallest free standing buildings)

<https://www.youtube.com/watch?v=qFZGmHbjLSM>
(building a bridge from paper)



