Extreme Structures

Discover the engineering design behind structural marvels of the world! We study the architecture of bridges, skyscrapers, domes, tunnels, dams, gliders levees, and dams while experimenting to see how different materials respond to stress and strain. Each week, we create our own extreme structures and use the engineering cycle (Design, Build, Test, Modify) to discover the best, most efficient design! Weekly projects will introduce engineering concepts such as strongest shapes, tension vs compression, forces and bending, water pressure, and airfoil and lift.

Week 1 - Foundations

- We are introduced to Engineering Design and study some 'extreme' structures - the tallest, biggest, widest and longest structures in the world!
- We learn the difference between forces and loads
- We experiment to find the strongest shapes using straws and paperclips
- We learn the engineering cycle (Design, Build, Test, Modify) and use it to build the tallest newspaper tower.

Week 2 - Bridges

- We study some famous bridges (e.g. Tacoma Narrows, Golden Gate)
- We experiment with forces and bending
- We use the engineering cycle to complete a bridge building challenge

Week 3 - Domes

- We study some famous domes (e.g. The Capitol, St Paul's Cathedral)
- We experiment with different materials to see how they respond to tension, compression and torsion
- We use the engineering cycle to complete a geodesic dome building challenge

Week 4 - Skyscrapers

- We study some famous skyscrapers (e.g. Empire State Building, Space Needle)
- We experiment with columns and find out how they are used in structures
- We use the engineering cycle to complete a skyscraper building challenge

Week 5 - Dams

- We study some famous dams (e.g. Hoover Dam, Three Gorges Dam)
- We experiment with water pressure
- We use the engineering cycle to complete a Dam building challenge

Week 6 - Levees

- We study some famous levees (e.g. along the Mississippi and Sacramento Rivers)
- We experiment to find the best shape for a levee
- We use the engineering cycle to complete a levee building challenge

Week 7 - Tunnels

- We study some famous tunnels (e.g. Delaware Aqueduct, Channel Tunnel)
- We practice using precise measurements so that tunnels 'meet in the middle'
- We use the engineering cycle to complete a tunnel building challenge