



SUPER STRUCTURES

What you need -

- A4 Paper
- Pens or Pencils
- Stopwatch or Phone
- Spaghetti (Sticks, Pencils Paper rolls etc)
- Mini Marshmallows (Tape, BluTac, String etc)

Think about some of the biggest or tallest buildings in the world. Which ones can you name? What makes them special or interesting? Some structures to mention:

- The Eiffel Tower. Built in 1889, over 5,300 drawings were made of this 324 metre high tower in Paris. Gustave Eiffel designed the legs of the tower to stand at an angle of at 54 degrees for maximum wind resistance.
- The Great Pyramid of Giza. The oldest and largest of the pyramids in Egypt, and the oldest of the Seven Wonders of the World. It was built in 2580 BC. Pyramids have a wide base and a narrow top, creating a very sturdy and rigid shape.
- The Golden Gate Bridge. Opened in 1937, this suspension bridge over San Francisco Bay has a span of 1,300 metres and cost \$35 million to make. Suspension bridges work by transferring the weight of the bridge deck and vehicles up through the suspender rods to the main suspension cable, which then transfers the weight to the bridge towers and anchor rods which go into the ground.

Think about a time you were on a bridge, a cliff, or a roof. What was it like? Was the weather the same as it was down on the ground? How are tall buildings made to withstand extreme weather conditions? The experiment will look at the shapes and forces of buildings, and how they are all pushing and pulling against each other.

Split into small teams and draw some tall towers. Which shapes are the strongest? (Triangles). Think about the materials you will be using (spaghetti and marshmallows). Are your structures going to be possible with the materials we have? How will you make it both the tallest and strongest of all the teams?

Get building

Once you have decided on a final design for the tower, build it using only the materials you've been given. You have 10 minutes.

Think carefully about how you are using materials. It's important not to waste them, or your tower won't be as tall or as strong as it could be.

Tower power

Look at the towers others have created. Is one the tallest? Is it also the strongest, or does it have some structural problems? Look at the different construction methods used. Has one been the most successful? Why is one the best? It should be as straight as possible, so that forces of gravity cannot pull it to one side. It may have used strong triangle shapes. It may have used lots of smaller pieces of spaghetti, rather than a few long ones, which spreads the weight of the tower. It may be narrower at the top than the bottom, which provides a strong base for supporting the weight of the tower.