



What you'll need



- Packet of spaghetti (uncooked)
- Packet of marshmallows



What to do

Challenge a child or children to use marshmallows (whole ones or pieces) to join lengths of spaghetti together to make the tallest tower possible. You could start by building a simple cube and seeing what you need to do to make a taller structure that remains standing.



Questions to ask children

Before activity: what kind of shape do you think you want for your tower? Why?

As they build their first structure: can you predict what will happen? Why do you predict that?

If structure doesn't stay up: why is it falling down? How can we modify it so that it doesn't fall down?

What can we change about the spaghetti to make it better to use?

What can we change about the marshmallows to make them more useful?

What kinds of shape are good for building a tall structure?

What happens to the spaghetti and marshmallows at the bottom of the tower as the tower gets taller? Why?

Using these materials, how high do you think you could build a tower that doesn't collapse?

What do you think will limit the height of the tower you can build?





The science

Testing materials and structures is an important part of the process of building things like buildings and bridges.

A good structure needs to be stiff and strong - that means it takes a lot of force before it bends or collapses. A tall tower will have a lot of weight pushing down on it from above, so the base needs to be stronger than the top.

Some shapes are better for building structures than others. As Alice found out in the film, if you build a simple cube with the spaghetti and marshmallows, it only needs a little push on one corner to make it collapse. That's because the corners of the cube act as hinges. Any shape made of more than 3 straight sides can be bent out of shape just by changing the angles. Triangles cannot change shape like this because the corners are not like hinges; the third side holds the other two in place. So, if you make structures based on triangles instead of a squares, you can apply more force and it will still keep its basic shape.

Being safe

Take care using the spaghetti - avoid poking it into a body part, especially the eyes, and be careful to avoid shooting fragments into eyes when snapping it.

Going further

Instead of building a tall tower, you could try to build the strongest bridge from spaghetti and marshmallows.

You could limit the amount of spaghetti and number of marshmallows to make the task more difficult.

You could give children a budget with which to 'buy' spaghetti and marshmallows and make the 'cost' of the tower another element they have to consider.

Try out this interactive 'shapes' lab to see how forces affect different shapes: <http://bit.ly/ShapesLab>