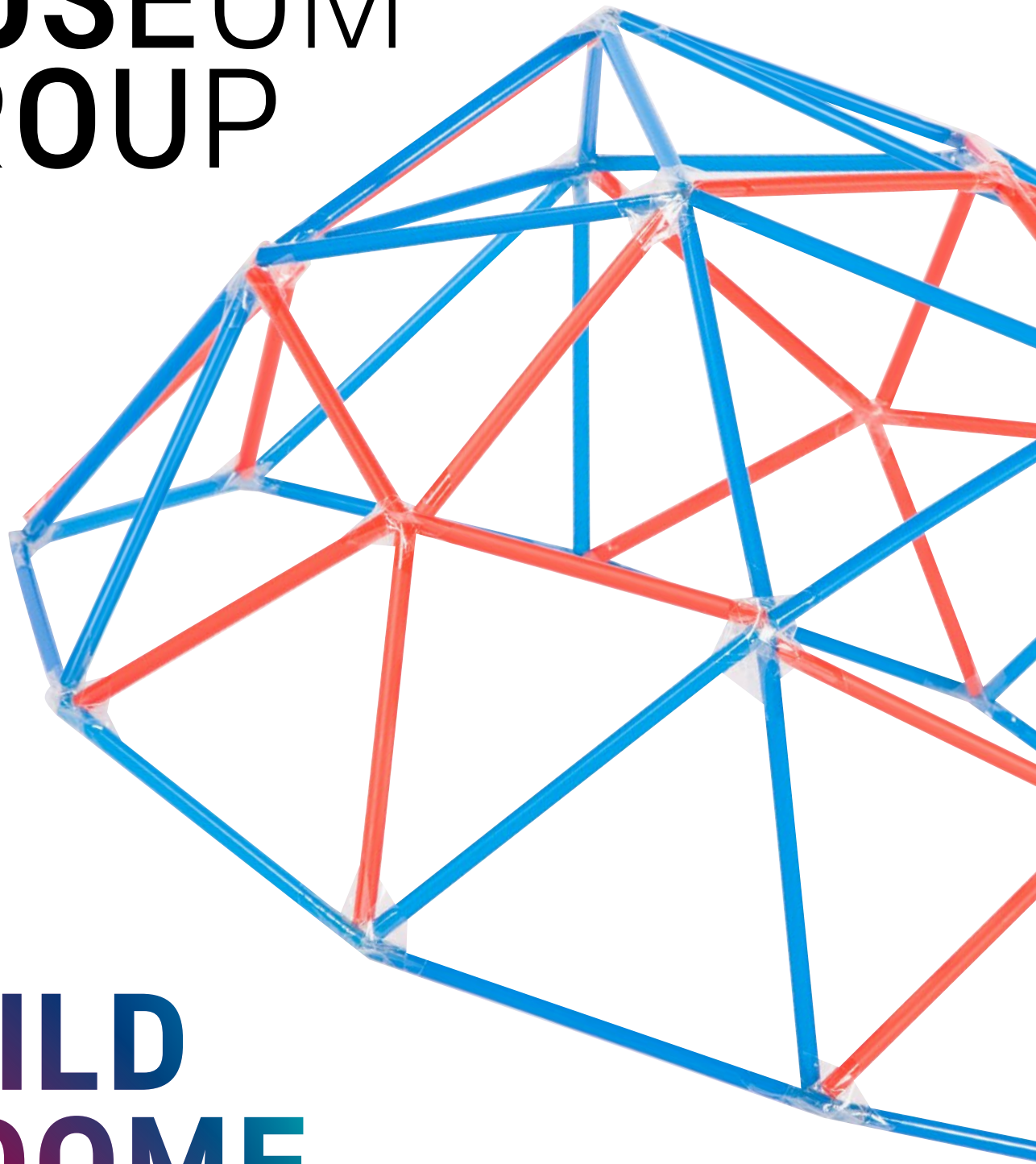




SCIENCE MUSEUM GROUP



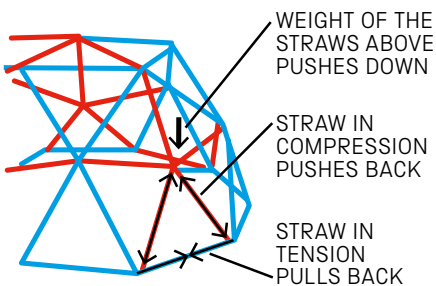
BUILD A DOME

MAKING 	Age 11-14 14-16	Topic MATHS AND FORCES	 45 MIN
	Skills used CREATIVE PROBLEM-SOLVING • TEAMWORK		

Overview for adults

Many structures are built around frameworks made of straight, rigid pieces of wood or metal, called members, connected together. Forces generated in the members support the structure. In this activity, drinking straws are used as members, to make a self-supporting dome.

What's the science?



Some of the straws in this activity are in compression: they are being squashed, and as a result they produce a force that pushes back. It is those forces that support the weight of the dome. The other straws are in tension: they are being stretched, and as a result they produce a force that pulls back. These tension forces prevent the structure from splaying apart and collapsing. It is this combination of tension and compression forces that makes a triangle a strong shape, and the interconnected triangles in this activity make the dome a stable, self-supporting structure.

Science in your world

Architects and engineers always think carefully about the combination of compression and tension forces when designing a new self-supporting structure, whether it's a simple garden chair or a huge complicated bridge or building. You can often work out which parts of a structure are generating which kind of force.

Did you know...?

Domes made of triangles are called geodesic domes – the largest, in Fukuoka, Japan, has a diameter of 216 metres.

You will need...



35 straws
of one colour



30 straws of
another colour



Sticky tape



Scissors

Top tip: Work as a team – you'll need a few pairs of hands as your structure gets bigger.

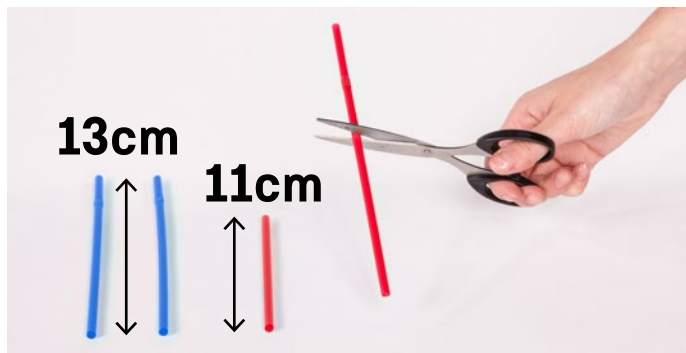
Think and talk about...

- What different shapes can you identify in the structure of your dome?
- What were the challenges you faced while working as a team to build your dome?
- Why doesn't the structure fall down?

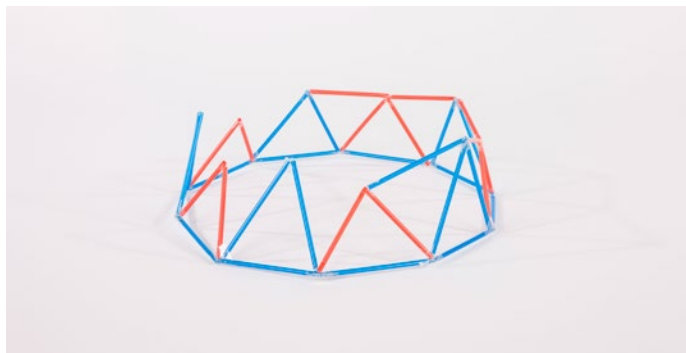
Investigate...

- Can you make your dome bigger, or scale it down?
- What other materials could you use to improve your finished product?
- Can you make a dome using shapes different to the one in the pictures?

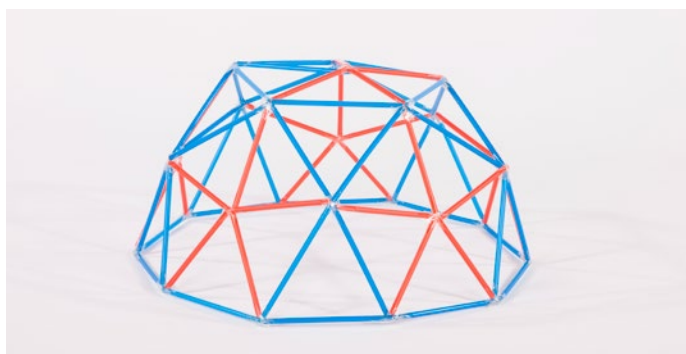
Follow these steps...



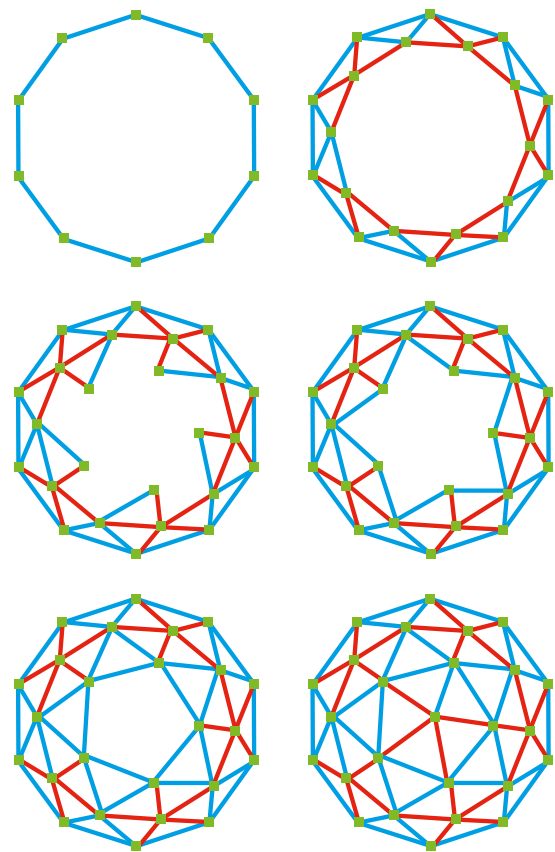
- 1** You'll need 35 long straws at 13cm and 30 short straws at 11cm. Pick a colour for your long straws and cut them to the correct length. Use the other colour for the short straws and cut those to the correct length too.



3

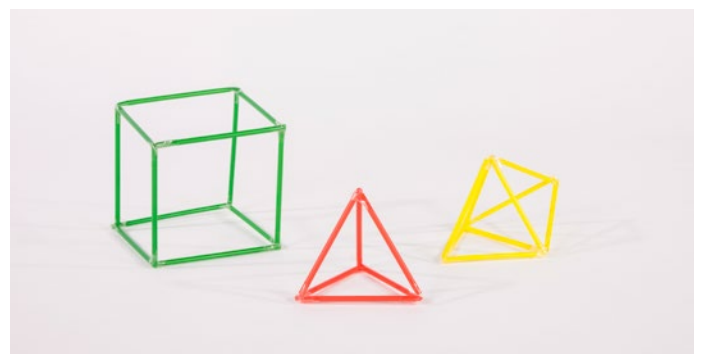


- 4** Your finished dome should look like this!



- 2** Follow the steps in the diagram and stick the straws together to start building your dome.

Blue = long straw, red = short straw,
green = sticky tape



- 5** See if you can use the straws to make some different 3D shapes.

Science in your world

Most self-supporting buildings, bridges and other structures feature 'members' arranged in triangles, just like the straw members in your dome. Forces generated inside the members support a structure.

