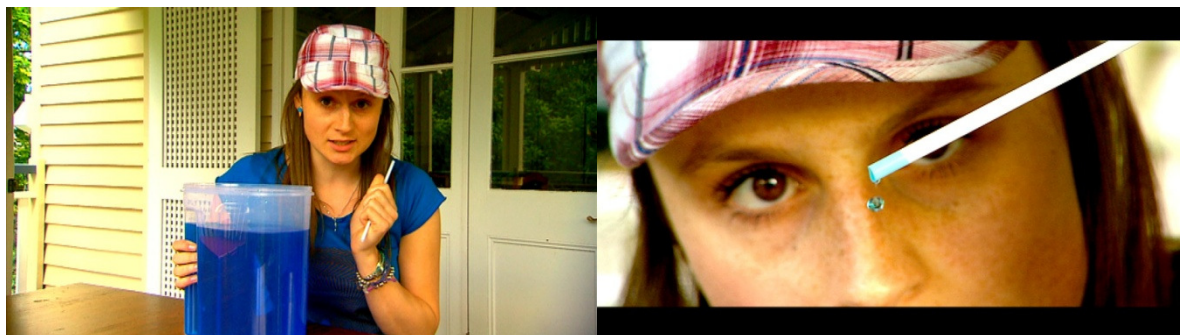


Weightless Water

On SCOPE's Gravity episode, Julia experimented with some weightless water. Here's how you can do it at home:



What you need:

Plastic container full of water
Plastic drinking straw
Coloured food dye
Foam cup
Pen

What to do:

1. Add food dye to the water so it is easier to see.
2. Place the straw in the water and cover the end with your finger.
3. Lift the straw out of the water, and then remove your finger from the end of the straw.

Watch the water droplet as it falls back into the container – what shape is it?

4. Use the pen to poke a hole in the side of the foam cup, close to the bottom.
5. Cover the hole with your finger and fill the cup with water.
6. Remove your finger.

What happens to the water?

7. Once again put your finger over the hole and fill the cup with water.
8. Drop the foam cup from a height.

What happens to the water?

What's happening?

When an object is in free fall, even if it's just for a second, like a droplet of water, the object isn't pushing against anything, and nothing is pushing back – it is weightless! So why is a weightless droplet of water spherical? It is because water molecules like to stick together (this is called cohesion), and a sphere is the shape with the smallest area for its volume.

Not surprisingly while holding the cup, water flows out the hole. But when dropped, the water stays in the cup, why? It is because gravity acts on the cup and the water equally as they drop, making them weightless. With no force acting on the water, the water can't be pushed out of the cup.

Here's something else to think about. Imagine yourself in a really big free fall – as if you just jumped out of an aeroplane. What if you were on top of a set of scales as you fell – would the scales register a weight?

Well, in one word, no! For you to have a weight, you would need to push on the scales, and they'd need to push back. But of course, thanks to gravity, you and the scale are falling to earth, so both are weightless.

