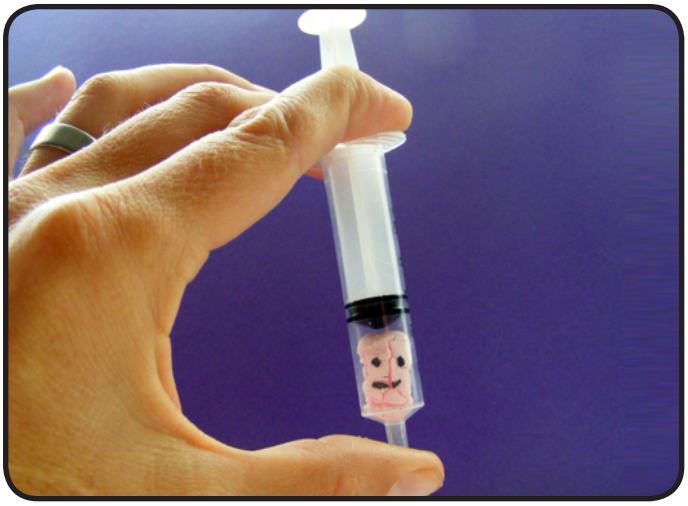
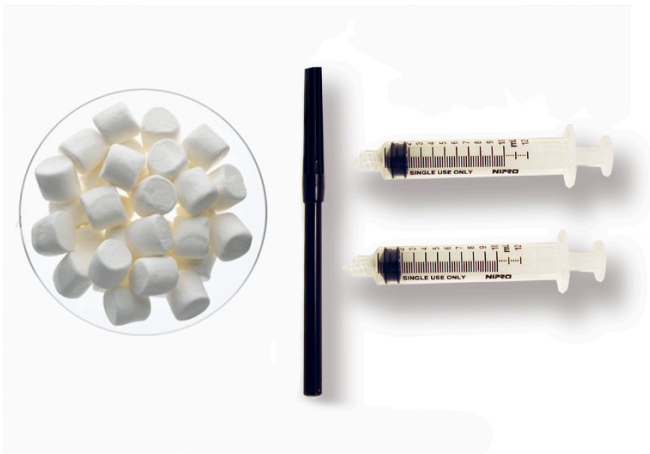
Play at Powerhouse make & do activity kit

Science with Zoe & Cogs - Experiment 9

Marshmallow Space Face

Air pressure is all around us, although we don't notice it. What happens to objects when you redude or increase the





Things you need:

Mini marshmallows
A 5 or 10 ml medical syringe with no needle (available from chemists)
A felt tip pen

What to do:

1 Draw a face on the side (the curved part, not the circular end) of a mini marshmallow. You can draw any facial expression you like – it doesn't have to be smiling!

2 Pull out the plunger and place the marshmallow inside the syringe so that it is just touching the sides – it needs to fit snugly rather than being squashed in.

3 Depress the syringe plunger until it is touching the top of your marshmallow face. Now hold your finger tightly against the bottom of the syringe to make a seal.

4 Pull the plunger up – you'll notice it's a bit difficult to pull it up with your finger pressed tightly on the other end of the syringe. Watch what happens to your marshmallow.

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500 Harris St Ultimo
PO Box K346 Haymarket NSW 1238 Australia
tel: 02 6217 0111
web: http://play.powerhousemuseum.com

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What's going on?

Holy exploding marshmallow faces! Your marshmallow should have gotten bigger, or expanded.

As you pull up on the plunger, you reduce the air pressure inside the syringe. Air pressure is all around us. It is the force exerted on something by the weight of air molecules (the tiny, invisible matter that makes up the gases which we breathe in and out).

When you pull on the plunger, air molecules inside the syringe can occupy a larger space. This has the effect of reducing the air pressure, because the molecules have more room to move about. The air pressure outside the plunger is higher than it is inside, and that's why it is difficult to pull up on the plunger.

Marshmallows contain tiny pockets of air, which expand as the air pressure drops, causing the marshmallow to expand. This relationship between pressure and volume is called Boyle's law after the famous English chemist Robert Boyle.

In space, there is no pressure because there are no air molecules. Scientists call this a vacuum. If you took off the helmet of your spacesuit in space, however, your face wouldn't blow up and explode. This is because the air inside us is protected by our circulatory system (veins and arteries) and our skin. You would probably pass out due to lack of oxygen instead.

What else do you see?

Use this space to write about, and draw anything else you noticed while doing this experiment.

Did you know?

In 1965, at NASA in Houston a technician testing a spacesuit was accidentally exposed to a near vacuum. He passed out after 14 seconds, but regained consciousness without injury when the pressure was restored about 15 seconds later.

At sea level, the air pressure or atmospheric pressure on Earth is about one atmosphere (atm), or 1 kilogram per square centimetre. It varies a bit depending on the weather. On Venus, the average air pressure is about 90 times this much! If you stood on the surface of Venus you would be squashed within seconds.

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