Bubble Monsters

Here are a couple of fun demonstrations: use the gas produced from the dry ice to generate a lot of foam consisting of bubbles and then make one mega bubble. Warning: this is a bit messy so please carry out on an easy-to-clean surface!

Things you need

Safety Gloves (provided in the chilly science pack), which are suitable for picking up a few pieces of dry ice for a few seconds

10 Litre Plastic Container (provided with science pack)

Scales accurate to 1 gram (optional)

Polycarbonate Scoop (provided with science pack)

Bubble Solution (provided in the kit) or make your own by mixing these ingredients together:

- 70ml washing up liquid
- 70ml glycerol (or glycerine)
- 1 litre of hot tap water

Time

20 minutes

Instructions

Carry this demonstration out in an area where it is easy to clean up spills. Younger students love to pop the bubbles made so consider access for the class. Add ½ scoop of dry ice, (around 100g) to every 1 litre of hot tap water in the 10 litre container. You will immediately see bubbles as the dry ice sublimates and the formation of a white cloud. Immediately add a glug of bubble solution.

The fog will be replaced after a moment or two with a continuous tube of bubble foam which will quickly overflow the container – this always gets a good reaction!

Invite students to pop some of the bubbles and release the white water vapour/CO₂ fog.

Class discussion

What’s happening here?

As the dry ice sublimates in the soapy liquid, the gas becomes trapped in the bubbles and is released when it’s popped.

Why do bubbles form?

This happens when there is a balance between two competing forces: the force exerted on the inside wall of the bubble and the liquid surface tension which is trying to squeeze the bubble.
Instructions

Soak the strip of cloth in the bowl of detergent and then run it around the edge of the bowl so that there is some bubble solution wetting the entire rim - be careful not to drop any bubble solution into the bowl. Timing is essential with this demonstration, so when everything is ready add a full cup of dry ice (about 200g) to the bucket and immediately add about 1 litre of warm/hot tap water. Do not add very hot water as the fog creation will be too large and it will be hard to create the mega bubble.

Immediately drag the taught cloth over the top of the bucket making a film of detergent.

This takes a number of goes to get right and we find it easier using glycerol bubble solution, rather than just washing-up liquid. If you have problems getting the bubble film to form make sure you are pressing down firmly with the cloth as you sweep over the top of the bucket. As the dry ice continues to sublime, the bubble film fills and grows, often it bursts at which point the contained water vapour/CO₂ fog spills out and down onto the table top.

Here’s how it should look, note the bubble mixture cloth we used:

Class discussion

What do the components in the bubble solution do?

The washing-up liquid reduces the surface tension of the bubble by about 1/3 and so allows the bubble to expand. The glycerol reduces water evaporation from the bubble surface and so helps prevent the mega bubble from popping too soon.

When the mega bubble burst why did the contents fall downwards?

The fog contained in the mega bubble is water vapour and CO₂ gas, which are heavier than air.

To make a mega bubble you will need:

- White Bucket (which contains the hardware science pack)
- Strip Of Cloth (approx. 30 cm in length)
- Small Bowl [or saucer]
- Bubble Solution
- Polycarbonate plastic cup [supplied with science pack]