Eco-friendly water bottle instructions (teacher)

Safety note

While these alginate bubbles are technically edible, we do not recommend eating the ones created in your classroom, as we cannot guarantee safe storage of chemicals to maintain food grade certification once they are delivered to you. Please refer to the Material Safety Data Sheets for sodium alginate and calcium lactate to help you conduct a risk assessment and COSHH (Control of Substances Hazardous to Health) assessment prior to the activity.

Prepare the sodium alginate solution and the calcium lactate solution for your pupils in advance of the lesson. The sodium alginate solution can be prepared up to 4 days in advance of the lesson, and stored in the fridge.

Equipment

Prepare equipment (apart from solutions) in a box for pupils before the lesson.

For the sodium alginate solution (make two large bowls, and then divide into 8 smaller bowls – each group of pupils will have one cup of solution)

- 1 large bowls (for preparing solution)
- 8 small bowls (for pupils to receive one cup of solution per group)
- 8g sodium alginate (4g sodium alginate per large bowl)
- 1.9L of water (per large bowl)
- Blue food colouring
- Hand blender

For the calcium lactate solution (make 8 bowls, one for each group of pupils)

- 40g calcium lactate (5g calcium lactate per large bowl)
- 8 large bowls (one per group of pupils)
- 950ml water (per bowl)
- Mixing spoon

Other equipment

- Kitchen scales
- Clock OR timer
- Latex-free disposable gloves
- One cup measuring spoon OR measuring jug
- Marker pen and stickers
- Sieve OR colander
- Additional 8 bowls containing 960ml of water (for water bath)

ECO-FRIENDLY WATER BOTTLE

Method

Sodium alginate solution (“alginate”)

1. Put 8g sodium alginate and 1.9L of tap water per bowl into two large bowls.
2. Blend ingredients together in each bowl, using the hand blender, until no lumps remain.
3. Leave solution to rest for at least 15 mins to remove air bubbles.
4. Add sufficient blue food colouring to give the alginate solution a blue colour once gently stirred to mix.
5. Label bowl “alginate”. The bowl can be covered over and stored in the fridge prior to the lesson for up to 4 days, if required.
6. Divide solution equally into 8 small bowls and label each as “alginate” to prepare the pupil bowls.

Calcium lactate solution (“calcium bath”)

1. Put 5g calcium lactate and 950ml of water into each of the 8 bowls.
2. Mix solutions in bowls until calcium lactate is dissolved.
3. Label bowls “calcium bath”.

Water bath

1. Put 950ml of water into each of the 8 bowls.
2. Label bowls “water bath”.

What is happening?

The alginate is mixed with water, forming a solution which is then immersed in small quantities into a bath containing calcium lactate. The calcium lactate reacts with the alginate, to form a skin of gel around the bubble of water. This bubble of water can then be carried like a water bottle.

Safe disposal of chemicals

The calcium lactate solution can be disposed of down the sink drain, and flushed away with plenty of tap water. The eco-friendly water bottles (alginate bubbles) should be sieved and burst to allow the liquid to drain down the sink. The remaining alginate in the sieve should be disposed of in the general waste bin.