

Investigating soaps and detergents

This document includes two methods for investigating, one (the first), is simpler than the other and may be of more use with younger children.

Why do this?

Soaps and detergents are important for our lives and health. This practical offers two simple, safe methods to observe how soaps and detergents behave in water. Both provide opportunities for further investigation and independent enquiry.



Curriculum links: - *properties and uses of materials, changing materials, everyday materials,*

Suitability

All years from Y2 to Y6

Practical details

Safety points

- Ensure children do **not** taste or put any of the soap or detergent products used in this practical activity near their mouths.
- If children have cuts on their hands, cover them with waterproof plasters.
- Children who are seriously allergic or sensitive to soap or detergent products should not do these activities.
- Limit the amounts of all samples used by only providing 2-3 teaspoons of solid or 5 ml (5 cm³) liquid sample per 8 children.
- Should any soap or detergent products get in a child's eye, rinse with water by getting the pupil to lie on her/his back on a table or near a sink and gently pouring cool water from a jug, or similar, over the open eye continuously for 10 minutes. Refer to CLEAPSS Emergency card guidance.
- Ensure children wash their hands after handling products at the end of the practical.
- Do not use cleaning products such as bathroom and kitchen spray foams as they are often corrosive to skin and eyes.

On the back of many packets for example washing powder you will find the words 'Danger', 'Keep out of reach of children' or a Hazard warning label. Giving the children only minimal quantities of a sample, will reduce risks to an acceptable level, and the products can be used safely by children.

This activity has been prepared using guidance from *Be Safe!* and relevant CLEAPSS guides.

Method 1 – Water bottles

Suggested equipment (one set per table)

- 8 empty water bottles of the same sort
- Beakers/plastic cups to hold soap/detergent samples
- 1 marker pen
- Plastic spoons for solid samples
- Pipettes (1 per liquid sample)
- Food colouring
- Plenty of paper towels
- Cold water

Suggested soaps/detergents (you can explore other materials):

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| <ul style="list-style-type: none">• Bar of soap• Baby shampoo• Liquid handwash• Washing up liquid | <ul style="list-style-type: none">• Baby bubble bath• Non-biological washing powder• Toothpaste |
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Procedure

1. Mark each empty water bottle with a line at the same height (marking approx. 150-200 cm³).
2. Label the bottles and place a small amount of soap or detergent into each. Leave one bottle with no soap/detergent sample.
3. Pour enough cold water for the number of samples into a jug and add a few drops of food colouring.
4. Pour the coloured water into each sample bottle until it reaches the line and screw the lid onto each bottle tightly.
5. Children can shake the bottles for an agreed amount of time.
6. Compare the results.

Method 2

Equipment per group

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| <ul style="list-style-type: none">• Disposable shot glasses (or similar sized container, 1 per pupil)• Beakers/plastic cups to hold soap/detergent samples• 5 or 10 ml syringes (1 between 2 children)• Plastic spoons for solid samples | <ul style="list-style-type: none">• Pipettes (1 per liquid sample)• Food colouring• Plenty of paper towels/absorbent kitchen roll• Waste sample bowl/tray• Cold water |
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Use the same sort of soaps and detergents as method 1 (you can explore other materials):

NOTE: children will cross-contaminate the samples if they use the same pipettes for more than one liquid. Ensure children know how to safely use a syringe.

Preparation

1. Provide each table of children with no more than 5 ml of each liquid soap and detergent product in a plastic cups or beakers, with a plastic pipette in each. For solid samples, eg soap, use a potato peeler or knife to produce small shavings and place a few in a plastic cup. Use 1-2 teaspoons of washing powder per table.
2. On each table provide approximately 200 ml of cold water. Colour the water with a few drops of food colouring and provide 2-3 plastic pipettes to dispense the water.
3. Ensure each child has a disposable shot glass or similar-sized container.
4. Provide a bowl of non-coloured water for washing used shot glasses.
5. Carrying out the activity on absorbent kitchen roll will help to soak up spills.

This document supports teachers planning practical activities. It is not designed as a worksheet for classroom use

Procedure

- Place 1-2 drops of liquid soap/detergent or a tiny amount of solid sample into the shot glass.
- Pour or pipette some coloured water into the shot glass so it is $\frac{3}{4}$ full.
- Practise using a syringe to blow air through a liquid.
- Using the syringe, blow air into the water and observe what happens. Bubbles should appear.
- Repeat the air-blowing 3 times.
- Watch the sample for a few minutes and record the number of bubbles.
- Wash the shot glass in the waste disposal bowl/tray using plain non-coloured water.
- Repeat with a different soap/detergent.



Expected observations and results

All the suggested soap/detergent samples will produce bubbles when either the bottle is shaken or air is blown through. Depending on the sample, the number and duration of the bubbles will change.

Method 2 is ideal for introducing the use of different equipment and investigation skills to younger children, older children should obtain some good results and can investigate the nature of bubbles using this method. Method 1 will produce consistent results across all age groups and could also be used during a plenary session or as a class demonstration.

Note: It is worth waiting, leaving and returning to the samples to see if any further changes have occurred when using Method 1.

Possible further activities

There is a variety of research-based enquiries which could be undertaken, including:

- Which soap/detergent sample produces the most bubbles?
- What happens if you add warm water?
- What shape are the bubbles?
- Are the bubbles coloured or colourless?
- Do more bubbles mean the soap is a better cleaning agent?