

# Producing a foam

## Topic

Suspension (gas in liquid).

## Timing

20 min.

## Description

Two solutions are mixed and a chemical foam is produced.

## Apparatus and equipment (per group)

- Two 250 cm<sup>3</sup> beakers
- Pestle
- Mortar.

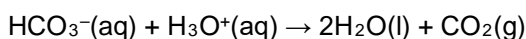
## Chemicals (per group)

- Laundry detergent – eg Persil non-biological (**Care** – may be irritant – check the packaging or safety data sheet – but use caution, many of these documents are out of date)
- Hydrated aluminium sulfate (Causes serious eye damage)
- Sodium hydrogen carbonate.

## Teaching tips

It is sometimes difficult to dissolve these reagents, but the reaction still works. The foam is produced by the action of carbon dioxide gas on a detergent solution.

Hydrogen carbonate ions from the detergent react with hydroxonium ions from the aluminium sulfate and water to produce carbon dioxide.



Teachers need to tell students that aluminium sulfate in water produces H<sub>3</sub>O<sup>+</sup> ions.

This is similar to the baking process; baking powder contains sodium hydrogen carbonate and tartaric acid.

## Background theory

This chemical foam contains carbon dioxide (CO<sub>2</sub>), while mechanical foams often contain air.

This foam is a colloidal system with a gas dispersed in a liquid. This is a suspension of gas in the liquid.

Other common foams include whipped cream and shaving cream.



## Safety

Wear goggles to eye protection standard BS EN 166 3

## Answers

1.  $\text{HCO}_3^-(\text{aq}) + \text{H}_3\text{O}^+(\text{aq}) \rightarrow 2\text{H}_2\text{O}(\text{l}) + \text{CO}_2(\text{g})$
2. Baking powder contains sodium hydrogen carbonate and tartaric acid.
3. Whipped cream and shaving cream.

## Credits

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*Health & safety checked January 2018*

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