Fizzy drinks

Time

1 h.

Curriculum links

Hypothesis testing.

Group size

2–4.

Materials and equipment

Materials per group

- cans of fizzy drink
- anti-bumping granules
- sand or other particulate material.

Equipment per group

- −5 to +100°C thermometer
- access to water baths and a refrigerator
- safety glasses.

Safety

Eye protection may be worn.

Risk assessment

It is the responsibility of the teacher to carry out a suitable risk assessment.

This is an open-ended problem solving activity, so the guidance given here is necessarily incomplete. Teachers need to be particularly vigilant, and a higher degree of supervision is needed than in activities which have more closed outcomes. Students must be encouraged to take a responsible attitude towards safety, both their own and that of others. In planning an activity students should always include safety as a factor to be considered. Plans should be checked by the teacher before implementing them.

You must always comply with your employer's procedures and in some cases may decide that a particular activity is inappropriate in your situation. Further information on Health and Safety should be obtained from reputable sources such as CLEAPSS [*http://science.cleapss.org.uk/*] in England, Wales and Northern Ireland and, in Scotland, SSERC [*https://www.sserc.org.uk/*].

Commentary

This phenomenon is widely known and occurs with any substance that is under pressure. There are a number of variables to control and monitor: temperature, degree of shaking, size of can etc, and it is possible to build up a set of conditions that are known to maximise the degree of frothing and to minimise it.

The explanation for this phenomenon is based on nucleation. It is difficult to determine this from experimentation. When the pressurised can is shaken, small vapour bubbles of gas enter the drink and these act as a 'nucleus' for dissolved gas. When the can is opened the pressure drops and the

bubbles expand rapidly, shooting to the surface causing the drink to froth out of the can. The critical step for students is to sprinkle sand (or similar particulate material) into the fizzy drink – bubbles immediately form around these small particles and hence give a clue to the formation of bubbles when the can is shaken.

Students may be interested to link this phenomenon with (a) the principle of crystallisation and (b) how anti-bumping granules work (or glass coasters in milk saucepans).

Acknowledgement

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Credits

Health & safety checked May 2018

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