

Just a can of cola?

Recipes for cola are closely guarded secrets, and soft drinks manufacturers are continually trying to find out as much as possible about their rivals cans of cola.

You have been asked by an independent laboratory to help them in their investigations.

- Your task

Find out as much as you can.

Based on a suggestion by P. Ward.

Time

Depends on investigation.

Group size

2–4.

Equipment & materials

Eye protection.

General

Assorted equipment, depending on approach.

Per group

One can of cola.

Health & Safety notes

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>].

In general, students should be reminded to consider the safety aspects of eating or drinking in the laboratory.

Depending on the activity, eye protection may be required. This will be determined by the risk assessment.

Disposal: Consult CLEAPSS/SSERC to find out if any reagents have specific disposal requirements.

It is the responsibility of the teacher to carry out a suitable risk assessment, particularly for any tests for Al^{3+} ions which generally use ammonia or sodium hydroxide.

Curriculum links

Depends on investigation.

Possible approaches

Very open-ended. A selection of the following could constitute a useful investigation.

Experiments

- 1 Volume of cola in can.
- 2 Density of cola in can.
- 3 Volume of gas released on opening under water.
- 4 Tests on gas collected – combustion/lime water.
- 5 What is can made of? Effect of magnet, acid, alkali on metal. Tests for Al^{3+} . Density of the metal.
- 6 pH of the cola.
- 7 Measure of total acidity by titration (Decolorise with activated charcoal for some of the tests.)
- 8 Evaporate down – any solid residue?
- 9 Column chromatography to separate dyestuffs in the cola. Caramel?
- 10 Distil the cola – what is the distillate? Boiling point?
- 11 Is the cola optically active? What sugar is present? How much?
- 12 What is the can painted with – resistance to solvent attack?

(Use your imagination for anything else. Caffeine, benzoic acid? – read the label.)

Suggested write-up

Open day display could be produced by students.

Extension work

Other colas, lemonade or other cans of carbonated soft drinks – what differences arise? If students compare different soft drinks – panel discussion about why they prefer one to another!

Credits

© Royal Society of Chemistry

Health & safety checked May 2018

Page last updated October 2018