

Secret in the sachet

When a beautiful bouquet arrives from a good florist it is usually accompanied by a sachet of cut flower preservative. Since this really does seem to work, we have often wondered what was in it, or how we could buy it to use on our humbler shop purchases. Now the Guernsey Flowers Information Bureau has let us into the secret. According to them you can make your own preservative solution by dissolving half a tablespoonful of sugar to one teaspoonful of bleach in a pint of water.

Your local florist is interested in making their own preservative solution but doesn't have the time to investigate the claims made by the Guernsey Flowers Information Bureau. As a result they have approached your school for help?

- Your task

Is this claim valid?

Based on a suggestion by K. Davies.

Time

70 minutes (students then need to compare the flowers every week, noting any differences).

Group size

2–3.

Equipment & materials

Eye protection essential for preparing the diluted bleach solution.

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

General

Measuring cylinders, measuring jug, beakers, glass droppers, glass stirring rods, teaspoons, tablespoons.

Sugar, bleach, water.

Flowers

Carnations (standard and sprays)/roses/ freesias.

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>].

It is advisable to pre-dilute the bleach solution.

Household bleach solutions (containing sodium chlorate(I) / sodium hypochlorite) sold for the domestic market is most likely to be corrosive (though it may be more dilute and irritant). Even quite dilute bleach is irritant if more than 0.15 M NaOCl.

Eye protection for the dilution is essential, and should be goggles (to BSEN 166 3) not safety spectacles if corrosive. Once prepared, the solutions are of low hazard.

Chlorine gas is released from the bleach so work should be carried out in a well-ventilated classroom. Pupils with asthma should avoid close proximity to the undiluted bleach.

Disposal: Diluted bleach solutions are of low hazard, but for anything more than very small quantities of bleach, 'neutralise' with iron II salts or sodium thiosulphate and then wash to waste.

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

Curriculum links

Chemical preservatives. (Biochemical decay.)

Possible approaches

Could be used as a 'fair test' exercise. Apparently the effect of the preservative solution is most marked on flowers such as carnations (standard and sprays), which have been kept for as long as 3 weeks, and roses. (Freesias have also lasted longer in the preservative solution.) Don't use chrysanthemums as they keep reasonably well anyway.

- Always keep flowers in a cool place.

Reason that preservative solution works:

1 Sugar is a food.

2 Bleach kills bacteria. (The flower stems have water channels. Bacteria clog up these channels - the bleach kills the bacteria.)

Suggested write-up

Students write a report for the florist.

Extension work

What sugar/bleach/water ratio is best? What is the effect of different bleach concentrations? (If this is investigated then clearly it will be necessary to make up different pre-diluted bleach solutions, including chlorine and non-chlorine bleaches.)

Credits

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Health & safety checked May 2018

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