

**teachers guide**

**Soft drink science 4**

**Making soft drink**

# Components

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|  | NAME | DESCRIPTION | AUDIENCE |
|  | *Making soft drink*  teachers guide | This guide shows how experiments with soft drink can be used to explore the science of solutions. | teachers |
|  | *Investigating solutions procedure sheet* | Students use the ingredients of a soft drink to investigate dissolving a solute in a solvent, in both saturated and supersaturated solutions, then use crystallisation to get the solute out of solution. | students |
|  | *Mix your own soft drink*  *procedure sheet* | Students perform a series of procedures to make their own soft drink. | students |

Purpose

To investigate solutions using soft drink science. Before using different techniques to make a soft drink, students investigate how solutes are dissolved in solvents to form solutions.

# Activity summary

Outcomes

Students:

* understand scientific terminology relating to solutions,
* understand saturated and supersaturated solutions, and
* use crystallisation to separate a solution.

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| ACTIVITY | POSSIBLE STRATEGY |
| Students perform experiments described in the procedure sheet, *Investigating solutions.* | small groups |
| Students complete questions on the procedure sheet as they work through the experiments. | individual |
| Students choose a recipe to follow to make a soft drink then complete the activity ‘Adding the fizz’ from the procedure sheet, *Mix your own soft drink*. | small groups |
| Students discuss the different methods they have used to separate solutions. | class discussion |

# Teacher notes

## Discussion on methods of separating solutions

Remind students of different separation techniques undertaken over the last few lessons. Start a conversation about what separation techniques they have used, or could use, in making their soft drink.

**Procedure, *Investigating solutions*, Part D: Instant crystallisation**

Sodium ethanoate is also known as sodium acetate. It has a variety of uses including as a food additive (E262) and concrete sealant.

A video of the experiment is available at [http://www.](http://www/) stevespanglerscience.com/product/instant-hot-ice (select video tab).

To make sodium ethanoate you need: sodium bicarbonate, white vinegar, a microwaveable ceramic container and coffee filters.

Place 1 heaped tablespoon of sodium bicarbonate in container. Add vinegar, a little at a time, until mixture stops bubbling. Use microwave to boil down solution to about a tenth of its volume. This will take about

20 minutes, but stop when you hear popping sounds. It should still be liquid (supersaturated solution).

Caution: container will be hot!

Allow to cool to a translucent gel. Scrape gel from container and transfer to coffee filters. Allow to dry to a powder, then grind to break up powder. If it is sticky return to coffee filters to dry further.

## Mix your own soft drink

This activity must be carried out in a Home Economics area or similar. No food should be prepared or consumed in a science laboratory.

## Ways to add fizz to a drink

There are a couple of ways to add carbon dioxide to drinks to make them fizz.

* Dry ice can be used to carbonate water and other drinks. Place drink in a cup and add some dry ice, allow it to bubble. When all the dry ice is gone, the drink remaining should be slightly bubbly.
* Commercial drink makers using carbon dioxide gas cylinders can be used to create carbonated drinks. Costs range from $40–$100.
* Sodium bicarbonate can be used in drinks with an acidic substance (such as lemon). Most recipes

suggest 2 teaspoons sodium bicarbonate per litre of water.

# Technical requirements

The teachers guide and procedure sheets require Adobe Reader (version 5 or later), which is a free download from [www.adobe.com.](http://www.adobe.com/) The procedure sheets are also provided in Microsoft Word format.

# Safety notes

## Sodium ethanoate

caution: may cause irritation to skin, eyes and respiratory system

SAF-T-DATA ratings

* health rating: 1 – slight
* flammability rating: 0 – none
* reactivity rating: 0 – none
* contact rating: 1 – slight

Lab protective equipment: goggles, lab coat Storage colour code: orange (general storage)

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# Associated SPICE resources

*Soft drink science 4: Making soft drink* may be used in conjunction with related SPICE resources.

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| DESCRIPTION | LEARNING PURPOSE |
| *Soft drink science (overview)*  This learning pathway shows how a number of SPICE resources can be combined to assist with teaching the topic of states of matter and solutions. |  |
| *Soft drink science 1: Soft drink fountain*  A teacher demonstration engages students’ interest in the three states of matter, solutions and separating techniques. | **Engage** |
| *Soft drink science 2: Investigating soft drink*  Students separate and investigate the components of soft drink through practical activities. | **Explore** |
| *Soft drink science 3: States of matter*  Students use worksheets and an interactive learning object to construct an explanation of the particle model of matter. | **Explain** |
| *Soft drink science 4: Making soft drink*  Students investigate solutions and use their knowledge to make a soft drink. | **Explore** |
| *Soft drink science 5: Solutions*  Students use worksheets and an interactive learning object to construct an explanation of separation techniques, using the particle model of matter. | **Explain** |
| *Soft drink science 6: Separation techniques*  A video about a forensic food scientist illustrates the importance of different separation techniques. Students perform their own practical investigation that involves separation techniques. | Elaborate |