



national science week 2021

DIY Science – Ordinary Chemistry

Explore chemistry concepts and techniques using everyday tools and ingredients.

Safety

An adult should assist with finding safe materials to test. Do not use household cleaning products as they may be corrosive and/or cause skin irritation.

What you need

Cup, teaspoon, table salt, shallow dish, kitchen string, old or disposable plastic cup (e.g. yoghurt tub), safe (solid) materials such as: sugar, coffee grounds, flour, chalk, sand, dirt.

What to do

Dissolving: Half-fill the cup with hot water, add 1 teaspoon of table salt, and stir until the salt has dissolved. How many teaspoons of table salt do you think can be added to the water until no more will dissolve? Write the prediction here: _____

Saturated solution: Add another teaspoon of salt to the cup and stir until the salt has completely dissolved. Keep adding teaspoons of salt, counting and stirring well after each addition, until no more salt will dissolve in the water. You now have a saturated solution. Was your prediction correct? Write the number of teaspoons added here: _____

Salt crystals: Pour the saturated solution into a shallow dish, being careful to leave any undissolved salt in the cup. Leave the dish for several days and observe what happens.

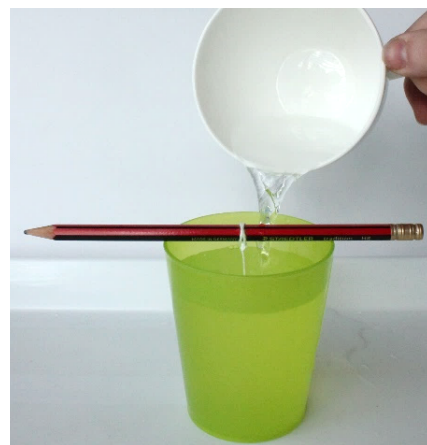
Alternatively, the saturated solution can be placed in a tall cup, with a knotted piece of kitchen string hanging down into the salt solution. After 1-3 days, salt crystals will form on the string.

What dissolves? Collect some safe, solid materials from around the kitchen and garden. Half-fill a disposable plastic cup with water, add a pinch of solid material and swirl to stir. Record your observations in the table on the next page.

What's happening?

The chemical name for table salt is 'sodium chloride' and the chemical symbol is NaCl because crystals of table salt are made up of an equal number of atoms of sodium (Na) and chlorine (Cl). When dissolved in water, the sodium chloride crystals break apart to form sodium ions, Na^+ , and chloride ions, Cl^- .

When a salt solution becomes saturated, no more salt will dissolve, and salt crystals will form readily if the water is allowed to evaporate, or if an object provides a 'nucleation centre', where crystal formation can start. Salt crystals form in cubes because the sodium and chlorine atoms are arranged in neat cubic structures. Table salt often includes anti-caking agents and iodine salts which can interfere with the formation of large crystals.





Results

Use the table to record the results of adding various solid materials to water. If a material dissolves, it will seem to disappear and may or may not change the colour of the water. If it doesn't dissolve, it might sink or float, and if a material is a mixture, only part of it may dissolve.

Solid material (e.g. sugar)	Dissolved	Partly dissolved	Did not dissolve	Observations (e.g. water changed colour, material floated or sank)

Did you know?

Kati Thanda–Lake Eyre is the largest salt lake in Australia and is about 15 metres below sea level. The lake fills with water approximately twice every hundred years. In dry periods, water evaporates from the lake and the concentration of salt in the remaining water increases. Even when the lake is full of water, the salinity is similar to that of sea water.

Find out more

- See NASA Earth Observatory images of Kati Thanda–Lake Eyre from 2019 when the lake was inundated with water that originated from abundant rainfall in Queensland:
<https://earthobservatory.nasa.gov/images/145076/rare-filling-of-kati-thanda-lake-eyre>
- Explore Aboriginal management of water and land in the Lake Eyre Basin (poster):
<https://shop.aiatsis.gov.au/products/map-a0-lake-eyre-basin-poster-large-flat>
- Discover the secrets to growing crystals and find out about the National Crystal Growing Competition: https://www.raci.org.au/Web/Schools/Crystal_Growing.aspx
- Built and test a water filter to remove impurities from dirty water (a mixture):
<https://www.jpl.nasa.gov/edu/learn/project/make-a-water-filter/>