University of East Anglia

NORWICH SCIENCE FESTIVAL

At home

COLOURED ICE

TIME 20 mins + time for ice cubes to freeze

You will need:

– freezer
– ice cube tray
– clear container or bowl
– food colouring
– 35g of table salt
– 2 x 1 litre of tap water at room temperature (plus a bit for the ice cubes)
– spoon

Preparation:

Pour tap water into two of the segments of your ice cube tray. Add two drops of food colouring to each of these segments. (Note: adding too much food colouring might make the experiment fail.)

Stir gently with the thin handle of a spoon to make sure the food colouring has mixed in. Place in the freezer and leave until the coloured water has frozen.

Experiment 1:
Ice cube in fresh water

Once your ice cubes are ready, add 1 litre of tap water to your container or bowl. Make sure the water is room temperature.

Place one coloured ice cube into the water. Watch what happens as it melts – this should take about 5-10 minutes.

You should see the food colouring sinking down to the bottom. The food colouring shows where the cold meltwater from the ice cube is going. Why does the coloured meltwater sink? It's because the meltwater is more dense than the tank water. The meltwater is more dense because it is colder.

Lesson: Cold water sinks, because it is more dense than warm water.

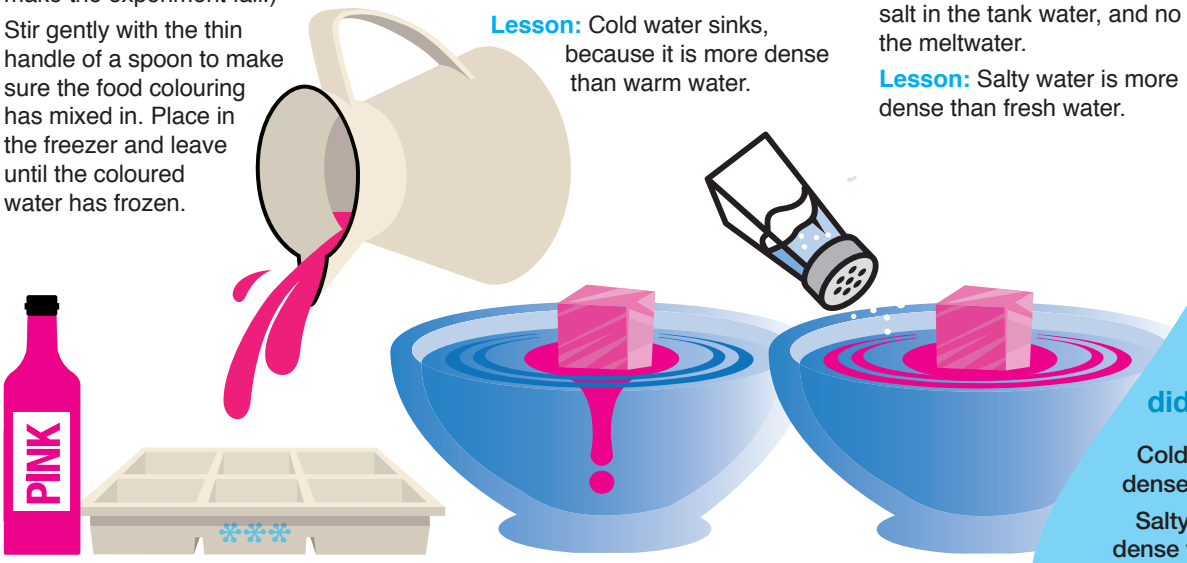
Experiment 2:
Ice cube in salty water

Empty and refill your container or bowl with 1 litre of tap water. Thoroughly mix in 35 grams of salt. Put the second coloured ice cube in the salty water. What happens this time?

This time, the food colouring should stay at the surface. (Note: if some colouring sinks, it means you added too much food colouring. Food colouring makes the water more dense!).

Why is the coloured meltwater floating this time? The meltwater is less dense than the salty tank water. This is because adding salt to water makes it more dense. There's lots of salt in the tank water, and no salt in the meltwater.

Lesson: Salty water is more dense than fresh water.



What did we learn?

Cold water is more dense than hot water.

Salty water is more dense than fresh water.

Dense things sink.

We have to think about both the temperature and amount of salt when looking at water density.

This activity sheet was written by Elizabeth Siddle and Jack Mustafa, postgraduate researchers in the School of Environmental Sciences at the University of East Anglia. The Norwich Science Festival at Home activity sheets were brought to you by the University of East Anglia and the Norwich Research Park. For more information, visit norwichsciencefestival.co.uk.

norwich research park