



Salty roads and homemade ice cream

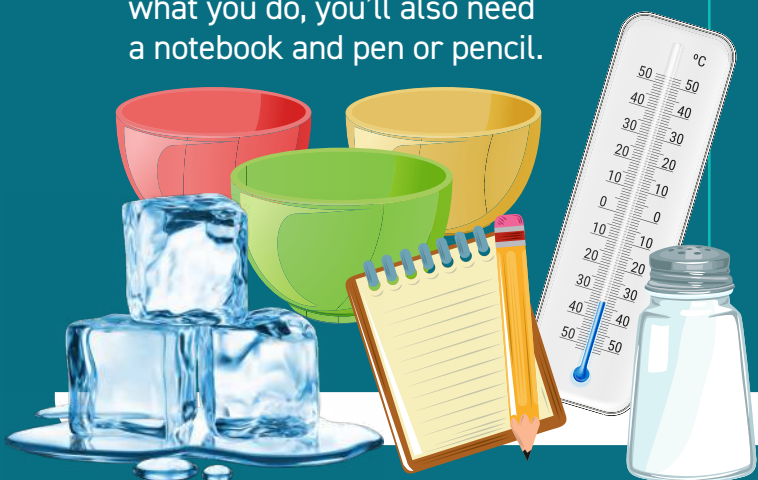
We add salty 'grit' to icy surfaces - like roads and pavements - to make them less slippery. Let's explore how we can use this idea to make some tasty ice cream!



Experiment: what does salt do to ice?

You'll need:

Ice, a thermometer, a few containers (small bowls are perfect), and some salt. If you want to keep a record of what you do, you'll also need a notebook and pen or pencil.



To do:

- Put some water in a small bowl and measure the temperature. Take a note of it.
- In a different bowl, put some ice cubes, or crushed ice. Take a note of the temperature. Which is coldest?
- Add a big spoonful of salt to the bowl of ice and stir it well. Measure the temperature and take a note of it.
- Add another big spoonful of salt to the bowl. Has the temperature changed?

What is happening to the ice?

Adding salt melts the ice, but it also has a surprising effect on the temperature.

We expect ice to melt as it gets warmer, so it can be surprising to see the temperature getting colder!

And the best part? You can use this to make homemade ice cream!

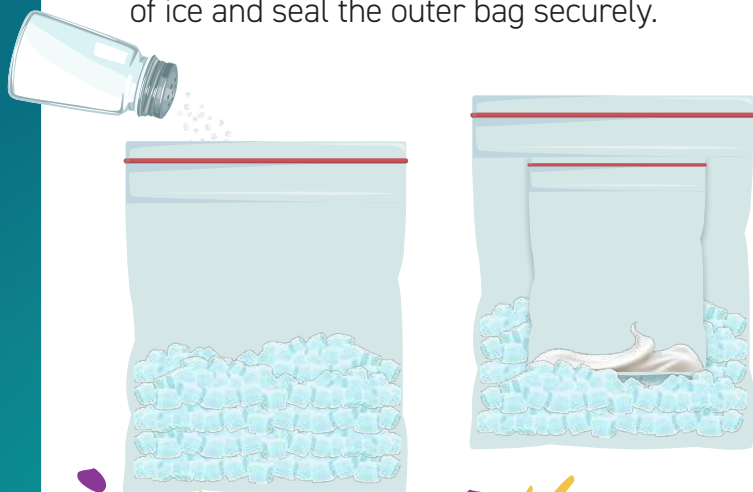
Make homemade ice cream

You'll need: salt, ice, two zip-top freezer bags, 240ml single cream, vanilla essence, a tablespoon of sugar, a measuring jug and a tea towel.

- 1 Pour the cream into a zip-top freezer bag. Add the sugar and a drop of vanilla essence for flavour. Seal up your bag, making sure it is tightly secured and there isn't much air in the top of your bag.



- 2 In another zip-top freezer bag, add crushed ice and several tablespoonfuls of salt. Mix it well. Place the bag of cream inside the bag of ice and seal the outer bag securely.



- 3 Shake the bags together. Wrap a tea towel around to protect your hands as it gets cold!



Keep shaking until your ice cream has frozen.



What's going on?

When water freezes into ice, the water molecules line up to form crystals. Bonds form between these molecules to hold them together as a solid.

Ice has a thin layer of water around it where the bonds are breaking and re-forming all the time. Breaking the bonds and melting the ice takes heat energy from the surrounding area, which makes the ice colder. Forming the bonds releases heat energy, so it warms up a bit. This means that when some bonds are breaking and others are forming at the same time, the temperature of the ice stays roughly the same.

Adding salt makes it harder for the bonds needed to make ice to form. This means that bonds are still breaking and making the ice cooler, but none are being formed and releasing heat energy to warm it up. This is why, when you add salt to ice, it melts but it gets colder.

The salty water can still freeze, but it needs to be much colder to do it.



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