

# Super Quick Ice-Cream!

Teacher Notes for Years 7-10



To make ice-cream we use a whole bunch of different principles from physics and chemistry.

## Video Summary

Ollie puts all of the ingredients to make ice-cream into a small tin. Mostly this is two parts cream to one part milk, but he also includes chocolate, vanilla and sugar for flavouring and taste.

He also puts in a marble to later help mix air bubbles through the mixture.

To freeze the mixture inside the can, he sets up another container with ice mixed with a generous quantity of salt. The salt lowers the temperature of the melted water around the ice. The ice is at a temperature below  $0^{\circ}\text{C}$ , and the salt allows the water to get to a temperature below  $0^{\circ}\text{C}$  without freezing. The cold water around the ice-cream tin allows for good conduction of the heat out of the mixture.

Mitch and Ollie then play soccer with the ice container, which churns up the mixture.

The marble rattling around inside the can mixes more air bubbles through the mixture, but also breaks up any ice crystals that may form, making the texture as creamy as possible. The extra cold ice water around the can freezes the mixture very quickly, trapping the bubbles inside.

The result is delicious, homemade ice-cream!



Figure 2: Salt in icy water. Adding salt to iced water will reduce the temperature of the water.

## Science Understanding (Year 8)

### Chemical sciences

*The properties of the different states of matter can be explained in terms of the motion and arrangement of particles. (Year 8)*

The addition of salt to the iced water aids with both the melting of the ice, as well as the reduction of the water's temperature. This is because salt reduces the freezing point of water.

The salt dissolves into any of the liquid water is coating the ice. It bonds with the water molecule, making it harder for the liquid to form back into an ice crystal at  $0^{\circ}\text{C}$ . The temperature now needs to be lower for the water to form a solid. As the melting temperature lowers, it causes more ice to melt.

The water surrounding the can now has a much lower temperature to cool the ice-cream mixture.

## Science as a Human Endeavour (Year 7)

### Nature and development of science

*Science understanding influences the development of practices in areas of human activity such as industry, agriculture and marine and terrestrial resource management. (Year 7)*

Understanding the science involved in how ice-cream is made means that we can develop ways to make it on a much larger scale. Each step of this process is scaled up in order to make large amounts of ice-cream. .



Figure 1: The ice-cream making contraption.

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