



# HOW TO MAKE ICE CREAM

This mouth-watering activity is straightforward but it can get a little messy, so it's best to do it outside. First of all, before handling the ingredients, you'll need to wash your hands. And remember to check that all of the bags are securely sealed before shaking and throwing, so that none of your ice cream mixture or salty ice escapes.



**Time**  
40 minutes



**Difficulty**  
Medium

## WHAT YOU NEED



**1** Hold open one of the small Kitchen bags and pour the double cream into it. Cream is made of water, with droplets, or globules, of fat mixed in.



**2** Pour the milk into the same bag. Like cream, milk is mostly water, but it has fewer globules of fat.



**3** To make your ice cream taste sweet, add the sugar. The sugar helps stop the ice crystals that form in the mixture from getting too big.



Seal part of the bag, then squeeze the air out the gap.

Make sure both bags are sealed securely. You can add tape if you need to.



**5** Place the bag containing the ingredients in the second small bag. Protecting the ice cream mixture inside an extra bag ensures that it won't mix with any of the ice and salt you'll use next.



Carefully pour the ice into the large empty bag.

**6** Fill the large Kitchen bag with ice, then put your bag of ice cream ingredients inside. The ice will start to draw heat from the milk and cream immediately, but on its own, it won't take enough heat away to freeze the ice cream.

**7** When your ice cream mixture is nestled in among the ice, pour in the salt and seal the bag. Putting salt into the bag causes the ice to draw much more heat away from the milk and cream. In fact, the temperature of the ice can drop to a chilly  $-21^{\circ}\text{C}$  ( $-6^{\circ}\text{F}$ ), so be careful not to touch it.



Tip the salt into the large Kitchen bag, over the ice.



Add fruit, chocolate chips or sweets to make your own flavours!

Suitable for 7-9 years

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Inside, the ice and salt mixture is already drawing heat from the milk and cream.



A thick plastic carrier bag is best.

**8** Wrap the bag in a double layer of tea towels like a parcel. This will protect your hands from getting too cold and make your ice cream mixture easier to throw and catch, too.

**9** Place the parcel into a plastic carrier bag. Keeping the tea towels tightly wrapped around the sealed bag of ice.



Ice cream is a mixture of solids, liquids, and gases.

**10** Tie a knot in the open end of the carrier bag, and then shake, massage, whirl, and throw the bag around for about 15 minutes. Keep the mixture moving while it cools, otherwise the ice crystals in the milk and cream will grow too large, and the ice cream won't be smooth and creamy.

**11** Wash your hands, then untie the carrier bag and unwrap the tea towels. Carefully unseal the large Kitchen bag to avoid spilling any melted ice. Finally, take out the smaller bags and open them to reveal your very own homemade ice cream!

If the ice cream is too soft, seal everything back up and shake it for a few more minutes.



## TAKE IT FURTHER

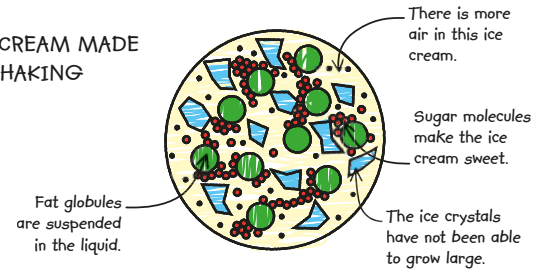
The steps in this experiment will make enough vanilla ice cream to share with three friends, but if you want to make more, just double the amounts of the ingredients, and use bigger Kitchen bags. For a bit of variety, and to make your vanilla ice cream taste even better, try introducing different flavours by putting little pieces of fresh fruit or chocolate chips into the mixture before freezing it. Once it's ready to eat, serve up your scoops of ice cream with a wafer, or in a cone if you fancy one.



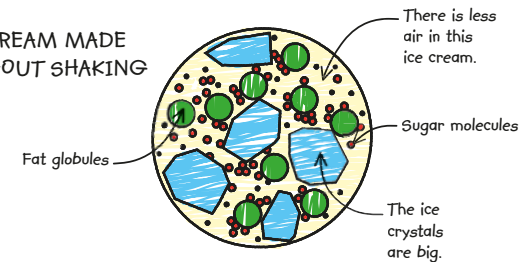
## HOW IT WORKS

There are three states of matter: solid, liquid, and gas. Even though its temperature is below freezing, ice cream is actually not a solid. It's a type of substance called a colloid: a mixture in which small bits of one substance are mixed evenly into another. Ice cream is made of ice crystals (solid), fats (liquid), and tiny bubbles of air (gas). Shaking it about while it cools down means the ice crystals don't grow too big, ensuring your ice cream is smooth and creamy.

### ICE CREAM MADE BY SHAKING



### ICE CREAM MADE WITHOUT SHAKING



## REAL WORLD SCIENCE TYPES OF COLLOID



Many of the substances we use every day are different types of colloid. Whipped cream is a type of colloid called a foam: a mixture of tiny gas bubbles in liquid. Mayonnaise is a mixture of tiny droplets of oil in water; a colloid known as an emulsion. Mist and fog are made of tiny water droplets suspended in the air. This type of colloid is called an aerosol.

