

## Making ice cream without a freezer

### Why do this?

Children love ice cream. This engaging activity demonstrates how adding salt to ice reduces its freezing point, so that they can make their own.

Curriculum links: *solids, liquids, everyday materials, food and diet, reversible change, melting, freezing*

### Suitability

Years 4-6

### Practical details

This activity has been prepared using CLEAPSS guidance. If in doubt, or for further information, contact CLEAPSS.



### Safety

- Children must wash their hands with soap and water before the activity
- Thoroughly clean the tables, each pair of children should work on a piece of kitchen towel
- Use clean cooking equipment
- Children must wear winter gloves during the shaking stage because the ice and salt mixture gets very cold; as low as -7 °C
- Ensure any spillages are cleaned up quickly

### Equipment per pair of children

- |  |  |
|--|--|
| • 1 tablespoon of full fat milk            | • 3 heaped tablespoons of salt             |
| • 1 tablespoon of double or whipping cream | • Small zip/resealable food bag            |
| • 2 level teaspoons of sugar               | • Large food bag                           |
| • ¼ teaspoon of vanilla extract            | • 1 x teaspoon for measuring               |
| • 2 x tablespoons                          | • 2 teaspoons for eating                   |
| • Kitchen towel                            | <b>Equipment per table</b>                 |
| • Winter gloves (1 pair each)              | • 4 small bowls (for ingredients and salt) |
| • 6-8 large ice cubes                      | • Tray or large bowl                       |

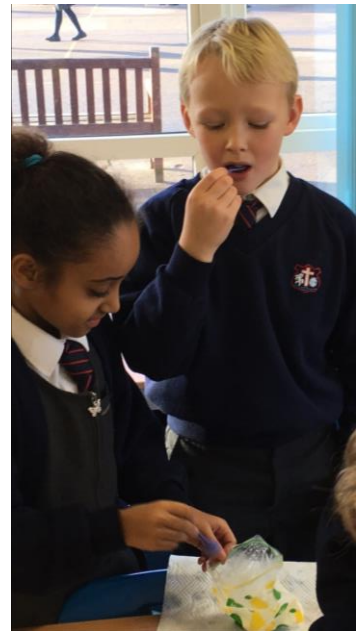
### Notes

- Use good quality food bags otherwise they split during the shaking stage
- You may need to teach the children how to measure a level tablespoon of an ingredient
- Putting the ingredients in containers per table of children to share, helps them scoop out the correct amount
- Make sure that the tablespoon used to measure the salt does not get used to measure other edible ingredients

- If the ingredients don't appear to have frozen, add more salt and ice to the ice bag and re-shake
- Having a bowl/tray on the table for the used salt ice/water bags is useful

### Procedure

1. Put 1 tablespoon of full fat milk into a small zip/re-sealable food bag
2. Put 1 tablespoon of double or whipping cream into the same food bag
3. Add 1 level teaspoon of granulated sugar and ¼ teaspoon of vanilla extract
4. Securely seal the bag and give it a little shake to mix the ingredients
5. Place the ice cubes and salt into the larger food bag and shake it
6. Place the smaller, sealed ingredients bag inside the larger bag containing the ice/salt mixture, seal/knot the larger bag
7. Put on winter gloves and shake the bags until ice cream has formed (approximately 10 minutes)
8. Remove the small bag containing the ice cream, discard the large bag, wipe off any excess salt water, open and serve



### Be aware when doing this practical:

Don't be tempted to take the smaller ingredients bag out of the salt/ice bag too soon or the ice cream will not have frozen properly.

### Expected observations and results

Gradually the liquid ingredients will freeze and change in to solid ice cream. Conversely the ice in the large bag will slowly melt.



### Possible further activities

- Observe what happens if you don't shake the ingredients
- Compare the temperature of the ice before adding the salt and then after 5 mins
- Observe how the ice cream mixture changes during the freezing time. Record the changes at different intervals eg 2, 4, 6, 8 mins
- Make ice cream without adding salt to the ice and compare the results
- Using alternatives to milk and cream eg yoghurt, lactose free dairy products, dairy free alternatives
- Use large salt crystals (used in salt grinders) instead of table salt. Compare the time taken for the ice cream to freeze and the texture of the ice cream

### Background notes

Water freezes at 0 °C. Adding salt to ice lowers the temperature at which water freezes and forces the ice to melt. The energy needed to melt the ice is taken from the surroundings and hence the temperature goes down. This means that the children will observe the ice melting even though the temperature is going down. This drop in temperature (to around -7°C) is cold enough to freeze the ice cream.

This science is used in everyday life when we salt roads on very cold days to help stop ice from forming and to melt any ice/snow already there.

Shaking the ingredients improves the texture making a smoother ice cream by adding air bubbles and by evenly distributing the tiny ice crystals.

**This document supports teachers planning practical activities. It is not designed as a worksheet for classroom use**