

WHAT'S IN CREAM?

The decision to buy real dairy whipping cream or imitation aerosol-cream to accompany a baked treat for the class is the starting point for this activity. Children have opportunities to compare the two types of cream by recording observations and measurements over an extended period of time. They can then make their own suggestions about the similarities and differences between these natural and processed mixtures and compare types of change.

TYPE OF ENQUIRY

Observing changes over time.

OBJECTIVES

- To explore similarities and differences between natural and processed mixtures
- To investigate reversible and irreversible changes in mixtures
- To make systematic and careful observations over an extended period of time and, where appropriate, take accurate measurements using standard units

To be able to:

- To understand that air can be part of a mixture by creating a mixture using liquid and gas ingredients

SCIENCE VOCABULARY

Liquid	Gas	Air
Mixture	Natural	Processes
Observe	Measure	Volume
Change		

RESOURCES

Per class:

- Plate of mince pies (could be from Activity 3)
- Tub of dairy whipping or double cream
- Aerosol can of processed cream
- Whisk
- 2 large measuring beakers
- Disposable teaspoons
- Kitchen Chaos cartoon strip (optional)

Per group of 4 children:

- 2 small measuring beakers (or yoghurt pots, etc)
- Source of warmth (eg radiator or desk lamp) – optional

PRIOR KNOWLEDGE/EXPERIENCE

Children should have opportunities to make decisions about what observations to make, how long to make them for and the type of simple equipment that might be used. Children should also understand that air is a gas.

ACTIVITY NOTES

At any time during the nine activities in this resource, the Kitchen Chaos cartoon strip can be shared with the class on-screen.

After unveiling a tray of tasty baked mince pies, children are given the opportunity to vote on whether they would prefer to eat these with whipping cream or aerosol-cream. To help them to make their decision, children will first take part in a taste test and then create a sample of each type of cream to observe over time.

Note: Healthy eating and the option of “no cream” can be discussed.

Open a container of dairy whipping or double cream and explain that this is known as a natural mixture because it is taken from cow’s milk, which contains fats and water, and does not have other ingredients added to it. A clean measuring beaker of whipping cream is prepared, using a whisk, in front of the children so that they can see the volume of cream gradually double in size as it is turned into a foam filled with air.

Now open a container of aerosol cream and give the can a few gentle shakes before turning it so that the nozzle points down and then squirting the same amount of cream out into another clean measuring beaker. Discuss how this cream does not need whisking and looks as though it has already been whipped in the can, however, this is not the case. Air is mixed into the cream as it is sprayed and this causes it to foam out. Explain that aerosol cream is known as a processed mixture because it is an imitation of cream, not taken from cow’s milk, rather it is made up from many ingredients such as skimmed milk, vegetable oil, sugar or sweeteners mixed together.

Children then try a sample of the two creams (see Safety Guidance) and make comparisons based on smell, appearance and taste, thinking carefully about which cream they prefer and why. Please refer to the Questions for Thinking to aid and extend whole class discussion.

Some children may report that the aerosol cream seems to ‘disappear’ quickly in their mouth and this can be investigated further by children working in small groups, once they have allocated Job Roles and responsibilities within the group. They should create a measured sample of each type of cream and position these in a warm place, such as on radiators or under desk lamps, to simulate the temperature inside our mouths. Alternatively the samples of cream can simply be left to stand at room temperature, though it may take longer to observe the volume change.

Children working together should decide for themselves how often they will observe their samples of cream and how they will record their observations and measurements. This activity provides superb opportunities to link with technology whereby children might decide to use a camera or video facility on an iPad for example, including time lapse, to document change over an extended period.

ACTIVITY NOTES...continued

Children will observe that the whipped cream remains the same whilst aerosol cream will 'shrink' substantially. They should offer conclusions in terms of thinking about what has 'escaped' from the aerosol cream and why this has not happened to the whipped cream. A simplified explanation is that the air forced into the canned cream as it is sprayed out has slowly escaped, whilst the whipped cream has been permanently changed during whipping in such a way that the air is trapped and cannot escape.

Children should use the findings from their investigations to make a final decision regarding which cream they would prefer to accompany the pies, explaining reasons for their choices. A wonderful ending to this activity is the children enjoying baked treats with their chosen cream (or no cream at all) and knowing that their informed decisions have been based upon scientific research.

EXTENSION OR HOME-BASED ACTIVITIES

Dairy or Not? provides information on the two types of cream and their production, and can be used during an extended discussion of natural and processed products. It is also an excellent starting point for children who wish to carry out their own research into the health benefits of aerosol cream compared to real dairy cream. They can be challenged to recognise which additional secondary sources will be most useful to them and begin to separate opinion from fact.

Cream is a stable emulsion although emulsifiers or stabilisers have often been added to cartons of cream to increase the shelf life of this product. Extended enquiry opportunities could include children investigating stable and unstable emulsions. To demonstrate what an emulsion is, white vinegar and oil can be shaken in a transparent container and children observe how the oil forms a separate layer on the vinegar. Immediately after vigorous shaking, the oil can be seen dispersed throughout the vinegar in an emulsion. This emulsion is unstable and, when left to stand, the oil droplets gradually form larger and larger droplets, until the oil layer has reformed on the surface of the vinegar.

An alternative extended practical investigation could be the children planning and then finding the optimum spray angle for aerosol cream.

QUESTIONS FOR THINKING

- What are the differences between the two types of cream?
- Where do the two types of cream come from?
- What happens when you whip cream?
- Why do you seem to get more cream than you started with once it has been whipped?
- Which cream do you prefer? Why?
- Why do you think there are so many different types of cream available in shops?

SAFETY GUIDANCE

Please use the following health and safety information to produce your own risk assessment for this activity:

- Prior to this activity, check for individuals who may be allergic to any of the ingredients used in the two different types of cream.
- Ensure clean conditions for eating and taste testing activities. Children should taste the samples of cream using clean, disposable teaspoons. When using aerosol cream, wipe the nozzle off after use and don't lick it, as bacteria from your mouth can cause the cream in the can to spoil faster when you put it back in the fridge. For more detailed advice please follow your authority's guidelines or contact a membership advisory service such as **CLEAPSS**.

INDUSTRY LINKS AND AMBASSADORS

The production of different types of cream mostly involves separating butterfat (the natural fatty portion of milk) from whole milk. This is done by whizzing milk around at high speeds using an electric motor in a centrifugal separation tank. The force of this process causes the milk fat globules to separate from the denser liquid and this is continued until the correct type of cream is produced. Children can compare this to the way in which a washing machine spins wet laundry at high speed to remove the water or they might wish to try spinning wet lettuce leaves in a salad spinner to see what happens (www.colour-ed.org).

More information on the production of cream can be found at The Dairy Council: www.milk.co.uk and a list of approved milk and dairy product establishments can be downloaded from the Food Standards Agency at www.food.gov.uk

Children may also be interested to learn about how air is added to other food products, such as bread and cakes. Air can be added mechanically to food during whisking, sieving, creaming, beating, rubbing and rolling. Some foods can be cooked at high temperatures and the water in the recipe will turn to steam, adding air into the product (such as Yorkshire puddings) or, alternatively, raising agents such as yeast is added to bread dough or bicarbonate of soda could be added to a cake mixture to produce a gas. In addition to this, children could learn more about how carbon dioxide is pumped into bottles or cans of drink at high pressure. The gas dissolves into the liquid drink and is sealed to ensure that it remains fizzy

CROSS CURRICULAR LINKS

English: opportunities to use spoken language to develop understanding through speculating, hypothesising, imagining and exploring ideas. Also links to reading whereby pupils use secondary sources of information and begin to separate opinion from fact.

Mathematics: links to measuring volumes over time and perhaps plotting results in a line graph.

Design and Technology: exploring cream production and taking part in taste tests links well with pupils learning to apply principles of nutrition and healthy eating.

Computing: this activity provides superb opportunities to link with technology whereby children might decide to use camera or video recording equipment, including time lapse, to document change over an extended period.