

Incredible, Edible Ice Cream

Introduction

Milwaukee loves dairy products - from cheese curds to our favorite dessert, frozen custard. Learn about the science behind your favorite frozen treat and make some with simple ingredients from the store!

Think About This

How does milk become ice cream?

Materials

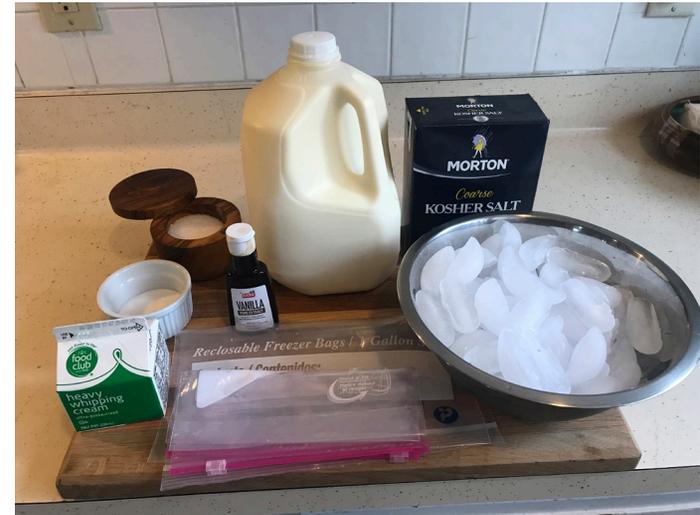
- 1 gallon-sized zipper freezer bag
- 1 quart-sized zipper freezer bag
- 5 cups of ice
- 1/2 cup salt
- 1 hand towel
- Ice cream base recipe ingredients
 - 1/2 cup milk
 - 1/2 cup cream
 - 1/2 teaspoon vanilla extract
 - 2 tablespoons white sugar
 - A pinch of salt

Do Ahead of Time

Make up enough ice for the activity. Store ice in a zipper freezer bag if ice cube trays are limited.

Directions

The nearly 1.3 million cows in Wisconsin produce enormous amounts of milk each day. Use dairy products to explore how liquids become scrumptious solids while making ice cream!



- 1 Measure out the ingredients for the ice cream base. Add the milk, cream, vanilla extract, sugar, and a pinch of salt to a quart-sized zipper freezer bag.
- 2 Seal the bag, squeezing out as much air as possible before sealing it.
- 3 Gently mix the ice cream base by squeezing the sides of the bag.



Incredible, Edible Ice Cream Continued

- 4 Fill the gallon-sized zipper freezer bag halfway with ice, then add 1/2 cup of salt. Shake the bag to mix the salt throughout the ice.
- 5 Place the quart-sized zipper bag into the gallon-sized bag filled with ice and seal it. Wrap the bag in a large towel and shake. It should take about 5-10 minutes for the mixture to solidify.
- 6 Once solid, add your favorite toppings and enjoy your incredible edible experiment.



Troubleshooting

If the ice melts too quickly...

If the ice is melting too quickly, add more ice to the gallon bag.

If the quart bag won't stay shut...

If the quart bag won't stay closed, double bag it to ensure you do not lose any ice cream mixture.

If the ice cream won't solidify...

If the ice cream is not solidifying, it hasn't been shaken long enough. Take turns with someone else to shake the bag to help it freeze faster. It will take a few minutes to solidify. Setting a timer can be helpful to track how long you have been shaking.

Questions to Ponder

- 1 How does the freezing process change the ingredients?
- 2 What is the difference in how a piece of regular ice and salted ice feel?

What's Happening?

Ice cream is an emulsion, a mixing of ingredients that normally wouldn't, but do because some of the pieces are so small. In ice cream, milk fats, air, and ice crystals get trapped as the water in the milk begins to freeze. Once this happens, the ingredients cannot easily be separated. Frozen custard contains egg yolks, which help create a stronger emulsion, keeping the parts from separating.

Shaking the bag does two things – first, shaking helps evenly spread out air bubbles and bits of milk fat in the mixture; second, keeping the mixture moving helps it cool off faster, leading to smaller ice crystals.

Adding salt to the ice lowered its freezing point. This means that ice mixed with salt can be colder than ice usually is. When the bag of ice cream base was put into the bag with salt and ice, the ice began to absorb the heat from the ice cream base. As the ice cream base got colder and colder, ice crystals began to form, causing it to solidify.

Milwaukee has a rich history of making frozen treats, and is known as the “unofficial frozen custard capital.” Although frozen custard originated in New York, it was brought to the Midwest at the 1933 World's Fair in Chicago. By 1935, frozen custard was in Milwaukee thanks to a man named Joe Clark. Paul Giles worked for Joe Clark and opened Giles Frozen Custard in 1938, which is still open and serving today. Leon Schneider worked at Giles and went on to start Leon's Frozen Custard. Elsa Kopp was trained by Leon before she went on to found Kopp's Frozen Custard.

Though likely seen as rivals, these custard stands have supported and influenced each other throughout the years in many ways.

**Can you recreate your favorite flavor at home?
Show us your ice cream! Email us at
AtHome@discoveryworld.org
and let us know about your tasty treat!**