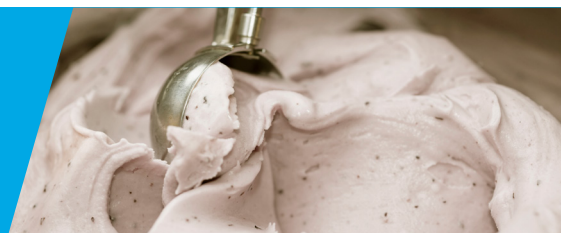


CURIOSITY AT HOME

ICE CREAM IN A BAG



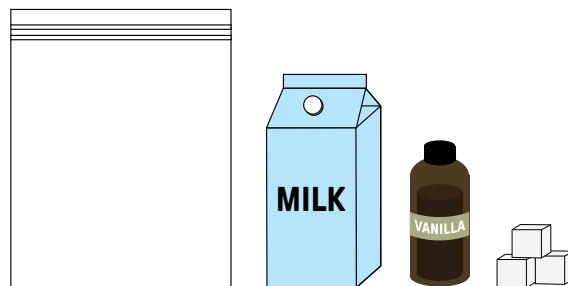
Grab some plastic bags, combine some ingredients, and shake it up! Try out a little chemistry in the kitchen and turn liquids into solids in a tasty experiment.

MATERIALS

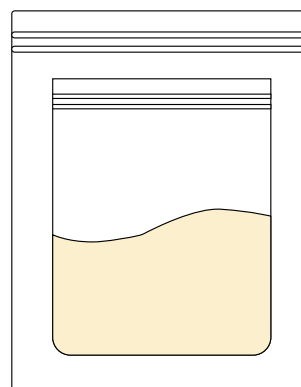
- ½ Cup Milk (Can be dairy or dairy-free. Higher fat milks work better.)
- ½ Teaspoon Vanilla extract
- 1 Tablespoon Sugar
- 4 Cups Ice
- 4 Tablespoons Rock salt
- 3 Ziploc bags (2-quart size bags and 1-gallon size bag)
- Gloves or a towel (If desired, to keep hands warm)
- Bowls and spoon to eat ice cream with when finished!
- Science notebook or paper
- Something to write with

PROCEDURE

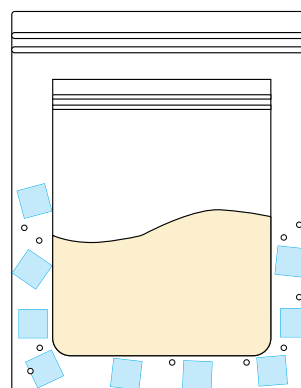
- Start by gathering your ingredients.
- Mix the milk, vanilla, and sugar together in one of the quart size bags. Seal tightly! Allow as little air to remain in the bag as possible. Too much air in the bag may cause the bag to open while shaking, which could create a big mess.
- Place the filled Ziploc bag into the other quart size bag. This extra bag is used just in case the other leaks or comes open.
- Then place your double-bagged mixture into the gallon sized bag.
- Fill the gallon bag with ice and sprinkle the rock salt on top.
- Squeeze out as much of the air as you can. Seal the gallon bag.
- Make sure the ice surrounds the ice cream mixture and shake for 5-8 minutes.



Mix the milk, vanilla and sugar together in bag.



Put doubled-up quart bags into gallon sized bag.



Fill gallon bag with ice and sprinkle the rock salt on top.



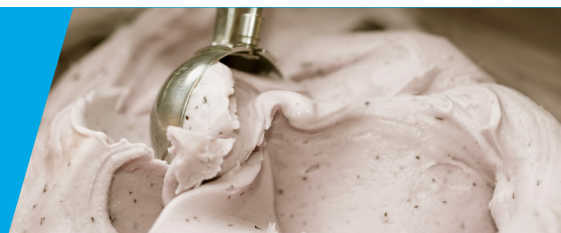
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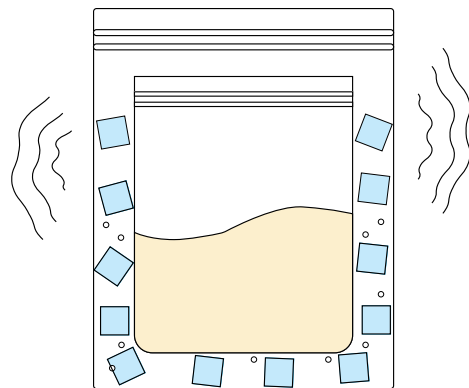


CURIOSITY AT HOME

ICE CREAM IN A BAG



- If your hands are cold, use gloves or a towel. Alternatively, you can roll your bag across a kitchen countertop or table.
- After you've shaken the mixture for 5-8 minutes, you should notice that the ice cream has started to firm up. If not, feel free to keep shaking it for a bit.
- When you're ready, open up the bags, scoop the ice cream into your bowls, and enjoy!



Make sure ice surrounds the ice cream mixture and shake for 5-8 minutes

WHAT'S HAPPENING?

To create the creamy texture of ice cream, ingredients need to be quickly cooled. Adding ice helps, but salt and chemistry can make things even colder - faster! Liquids have a freezing point or temperature that when reached causes molecules to join together, phase changing into a solid. Pure liquid water has a freezing point of 32 degrees Fahrenheit, this is when solid ice forms. When salt is dissolved into water, the added particles get in the way of water molecules trying to combine. This lowers the freezing point, allowing the salt-water solution to get even colder than pure water ice cubes.



Adding salt to icy roads helps the ice melt.



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ICE CREAM IN A BAG



K-2 GRADE EXPLORATION

- Record the states of matter you observed during this experiment. Describe some of the physical properties of these types of matter. For example, what was the color or texture like? Did it have a fixed shape?
- Which types of matter in this experiment were solid, and which were liquid? Did any change from solid to liquid or from liquid to solid?
- What are some other ingredients you'd like to try in ice cream?
- Make another batch of ice cream, but make a recipe modification. For example, change the amount of milk or amount of sugar. Keep track of the changes you made to the recipe in your science notebook and which one tastes best and has the best texture.



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ICE CREAM IN A BAG



3–5 GRADE EXPLORATION

Explore the following questions and write your observations in your science notebook.

- Describe the physical properties of your ice cream mixture before shaking. Describe the physical properties after shaking.
- Draw a diagram showing how heat moved from one place to another when you made ice cream.
- What happens to the sugar when you mix it in to the milk? Why can we no longer see it? How can we know if it's still there?
- What are some other ingredients you'd like to try in ice cream?
- Make another batch of ice cream, but make a recipe modification. For example, change the amount of milk or amount of sugar, or try using another type of milk. Keep track of the changes you made to the recipe in your science notebook and which one tastes best and has the best texture.



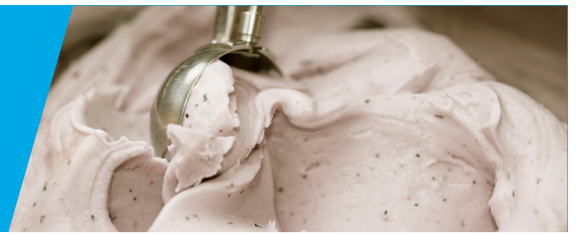
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6–8 GRADE EXPLORATION

Explore the following questions and write your observations in your science notebook.

- Draw a diagram showing how heat moved from one place to another when you made ice cream.
- We added salt to melt the ice because cold water is better at conducting heat than ice of the same temperature is. Can you think of any other times when you might want a material that's good at conducting heat?
- Temperature is a measure of the thermal energy in a system. In other words, how fast the molecules are moving around. Are the molecules of milk and sugar in the ice cream moving faster at the beginning or end of the experiment?
- Cookies are very different from ice cream. How do you think salt could assist a cookie recipe?
- What are some other ingredients you'd like to try in ice cream?
- Make another batch of ice cream, but make a recipe modification. For example, change the amount of milk or amount of sugar, or try using another type of milk. Keep track of the changes you made to the recipe in your science notebook and which one tastes best and has the best texture.
- Food chemists have to consider what interactions different ingredients have when mixed or cooked together. How do you think chemistry played a role in the ice cream recipe you made? Take a look at the ingredients list on some packaged food. What purpose do you think each of those ingredients has in this food item? Are there any you're unfamiliar with?



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