

Football Ice Cream

Student Worksheet

Name _____

Overview Ice cream, anyone? Who knew that even making this frozen treat involved chemistry? Wow...and yum!

What to Learn You need to know that ice cream is basically fluffy milk, with air that has been trapped into the fat of the milk product. Extremely cold conditions are needed in order to make the ice cream form, and this is accomplished by adding salt to ice, which lowers its freezing point.

Materials

- 1 cup cold whole milk (do not substitute, unless your student has a milk allergy, then use soy or almond milk)
- $\frac{1}{2}$ cup heavy cream (do not substitute, unless your student has a milk allergy, then skip)
- $\frac{1}{4}$ cup sugar (or other sweetener)
- 1 tsp vanilla (use non-alcohol kind)
- rock salt (use table salt if you can't find it)
- lots of ice
- freezer-grade zipper-style bags (both quart and gallon sizes)

Lab Time

1. In a quart size freezer Ziploc bag, add the following: 1 cup whole milk, $\frac{1}{2}$ cup heavy cream, $\frac{1}{4}$ cup sugar, and 1 teaspoon vanilla. Allow air to stay in the bag, and seal tightly.
2. Place quart bag into a gallon Ziploc freezer bag. Add ice and plenty of rock salt. Try to get the air out of the gallon Ziploc before sealing it tightly.
3. Shake for 5-10 minutes. If the ice cream doesn't begin to form, put the inner bag in the freezer for 20-30 minutes. Enjoy!

Football Ice Cream Data Table

Item/Object	Temperature (include units)
Ice before salt was added	
Ice after salt was added	

Exercises Answer the questions below:

1. How do milk ingredients and sugar become ice cream?
2. Would nonfat milk work as well for this experiment? Why or why not?
3. Why is the salt important?

Exercises

1. How do milk ingredients and sugar become ice cream? (When you get them very cold and shake them, air gets fluffed into the fat of the milk, causing the ice cream to form)
2. Would nonfat milk work as well for this experiment? Why or why not? (No, because the air needs to be shaken up so it gets trapped in the fat. No fat means not enough air and a less than satisfying ice cream experience)
3. Why is the salt important? (It lowers the freezing point of ice so that it can get colder. Cold ingredients are very important for making ice cream).

Closure Before moving on, ask your students if they have any recommendations or unanswered questions that they can work out on their own. Brainstorming extension ideas is a great way to add more science studies to your class time.