**Ice Cream Lab**

Course: Fundamentals of Agriculture, Food, and Natural Resource Systems

Standard: 03.06 Create a dairy product

Content area: Food science, dairy production

Instructions: Follow the instructions to make ice cream in a bag, and take a picture of yourself making the ice cream. Take a picture of the finished ice cream as well, as the picture of you making the ice cream will count as your participation grade, and the finished ice cream picture along with the answered questions will count as the assignment grade. After you complete the original assignment, feel free to experiment and make this same recipe with different types of milk, added flavoring, or different substances instead of rock salt!

**Ice Cream in a Bag**

Have you ever made ice cream? It can be a lot of fun, and you end up with a tasty frozen treat! There is actually a lot of interesting chemistry that goes on behind making ice cream. For example, think about how you start out with refrigerated (or room-temperature) ingredients and then need to cool them down to turn them turn into ice cream. How do the ingredients change during this process? How important do you think it is that they are cooled to a certain temperature? In this science activity, you will make your own ice cream in a bag and explore the best way to chill the ingredients to make them become a creamy delicious treat!

Materials Needed

* Measuring spoons
* Measuring cup
* ½ cup Sugar
* 1 cup Half-and-half milk
* ½ teaspoon Vanilla extract
* 1 cup rock salt (or normal table salt works)
* Ice cubes
* ¾ cup water
* Quart-size Ziploc bags
* Gallon-size Ziploc bags
* Oven mitts or a small towel
* Timer or clock
* Wide tape

Procedure

1. Mix the milk, half and half, vanilla, and sugar together in a large measuring cup
2. Pour the ice cream mixture into the quart Ziploc bag, remove most of the air from the bag, and seal the bag. Use tape to double seal the opening-end of the bag.
3. Place the quart bag inside the gallon bag. Add ice around the quart bag. Add rock salt and ¾ cup water
4. Seal the gallon Ziploc bag (again removing air from the bag). Use tape to seal the Ziploc end of the gallon bag
5. Wrap the bag in dish towels or hold with oven mitts
6. Gently shift the bag from one hand to another, trying (softly) mix the ice cream mixture inside. Try to keep the ice water mixture in good contact with the bag containing the ice cream mixture
7. After about 10 minutes, you should have ice cream! Carefully cut the gallon bag open and remove the quart bag. Wipe off the quart bag with a towel, and cut it open. Spoon out the ice cream and top with your favorite toppings.

Questions

1. Why do you think the ice cream mix freezes?
2. Why is rock salt added to the ice? How does the rock salt affect the freezing process?
3. What would you estimate to be the temperature of the ice water when the ice cream mix is reaching a frozen stage?
4. Why is water added to the ice?