

Super Cooling Activity Sheet

Please use this sheet to record your data from the super cooling activity session.

Materials Needed:

Measuring Spoons

1 gallon sized Ziploc bag

Measuring Cup

½ cup Table/Rock salt

½ cup milk*

4 cups of ice cubes

1 Tbsp sugar

Oven mitts or small kitchen towel

¼ tsp vanilla extract

Timer

1 small Ziploc bag (sandwich or quart sized)

**Heavy whipping cream works best. If you don't have that, whole milk and 2% milk are good too. 1% and skim will work, but gives more of a slushy consistency. We haven't tested non-dairy milk for this experiment, but the higher the fat content in the milk, the better.*

Super Cooling Background

What is the Melting Temperature of water?

How does water form ice?

Referring to the "greens" video, make a hypothesis about what will happen with the greens. What happened? Where did the water on the plate come from?

What is 'Freezing Point Depression'?

How is 'Freezing Point Depression' beneficial for organ preservation?

Ice Cream Making Experiment

1. Prepare a small bag with the following ingredients:
 - ½ cup milk
 - 1 Tbsp sugar
 - ¼ tsp vanilla extract
2. Add four cups of ice cubes to the large, gallon-size bag. Then add one half cup of salt to the bag.
3. Put the small bag you prepared into the large bag with the ice cubes. Be sure both bags are sealed shut. Be careful to not squeeze the smaller bag too much or else it could be punctured by the ice.
4. Put on oven mitts or wrap the bag in a small towel and then shake the bag for five to ten minutes until you have more of a solid consistency. Feel the smaller bag every couple of minutes while you shake it and observe it.

Before you begin shaking, what do you think will happen to the ingredients in the small bag?

Did the ingredients in the small bag turn into ice cream?

Referring to the video, how are Bag A and Bag B different?

Based on the video, at the end happened to the ingredients in Bag B?

What would happen if I exchange the Ziploc bags with metal containers?

What would happen if I exchange the Ziploc bags with insulated containers?

Can you think of one example where 'Freezing Point Depression' is used? (Hint: Pittsburgh Winters)

Supercooling video

What is Supercooling?

Referring to the "super cool ice" video, make a hypothesis about what will happen with the bowls of ice. Watch the video, then answer: was your hypothesis correct?

Conclusions

Think back to the ice cream video and the ice cream making experiment, how could you alter your process to achieve different, yet still edible results?

Sources

<https://www.scientificamerican.com/article/scrumptious-science-making-ice-cream-in-a-bag/>