

Ice Cream & Freezing Point Depression

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Purpose

Does the amount of salt added to water lower the freezing point to be sufficient enough to freeze non-dairy creamer?

Research

Freezing point is the point at which a _____ freezes. The freezing point of water is _____ degrees Celsius. The freezing point of water can be lowered by adding _____ to the water. The salt is the _____ whereas the water is the _____. This is why _____ is added to the roads in the wintertime when it snows because it lowers the _____.

Hypothesis

If the freezing point of the water is decreased then the rate at which non-dairy creamer will freeze will _____>

Experiment

Materials:

Nondairy creamer cup, containers with lids, sodium chloride, digital thermometers, graduated cylinder, ice, water & paper towels

Procedure: (Teacher-led)

- 1. Place about 1 cm from the bottom of the container into each container.*
- 2. Take the temperature of the water*
- 3. Place enough individual coffee creamers in the container (up to 4)*
- 4. Cover completely with ice and add 30g of sodium chloride.*
- 5. Seal the container and shake for 2 mins.*
- 6. Remove the lid take temperature and record.*
- 7. Seal the container and shake for another 2 minutes.*
- 8. Remove the lid take the temperature and record.*
- 9. Seal the container and shake for another 2 minutes.*
- 10. Remove the lid take the temperature and record.*
- 11. Open the coffee creamer*
- 12. Discuss what happened*
- 13. Clean up*

Analysis

Independent Variable: _____

Dependent Variable: _____

Control: _____

Constants: _____

DATA CHART

TIME/TEMPERATURE DATA TABLE

STARTING TEMPERATURE		
Amount of Solute	Time	Temperature
30g	2 min	
30g	4 min	
30g	6 min	

Conclusion

1. Was your hypothesis supported or rejected?
2. What causes the temperature of the cup to drop below the freezing point of water?
3. What is the freezing point of water on the Celsius scale?
4. How low did the 30 g of solute drop the freezing point below the normal range of the Celsius scale?
5. Was this a physical or a chemical change? Why?