Background Information About Supercooling Water

• Water below 0°C without becoming a solid is a process called supercooling.

• It is thought that ice crystals form around impurities in the water causing it to freeze.

• When water goes through the process of changing from a liquid to a solid, the molecules have to form a crystalized formation, using the process, latent heat of fusion, which makes the molecules lose heat.

• Salt is good to use when supercooling water because, the salt dissolves causing the ice and salt create a ice bath below the freezing point, this is also known as the freezing point depression, to make the molecules lose heat slower.
Background Information About Snap Freezing

• When water is supercooled, it can be snap freeze by dropping in an ice cube or by tapping the side of the cup the water is in.
• When an ice cube is dropped in, it helps crystallize the water.
Hypothesis

• Distilled Water or boiled distilled water will supercool and snap freeze, but tap water will not.
Variables

• X = Properly Independent: Water types
• Y = Properly Dependent: 0 or 1 – Did the water supercool and snap freeze?
• Constant Variables: Water amount, ice.
Materials

- Large Bowl
- Ice
- Salt
- Water Types
- Thermometer
- Transparent plastic cups
- Piece of cardboard
- Scissors
Numbered Procedure

• 1: Cut a circle out of a piece of cardboard.
• 2: Pour a sample of water into the plastic cup and place in the center of the large bowl.
• 3: Cover the cup, and add ice to the bowl.
• 4: Sprinkle salt on top of the ice cubes.
• 5: Uncover the cup and put the thermometer inside.
• 6: Monitor the temperature over the next half hour – forty-five minutes.
• 7: When the water reaches –1 to –5 degrees, remove cup from the bowl.
• 8: Take a small piece of ice, and drop it into the cup.
• 9: Repeat steps 1-8 using different types of water.
# Data/Results - Table

<table>
<thead>
<tr>
<th>Trial</th>
<th>Water Types</th>
<th>Temperature</th>
<th>Supercooled</th>
<th>Snap Freezed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trial 1</td>
<td>Distilled</td>
<td>-6°C</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Trial 2</td>
<td>Plain Tap</td>
<td>-4°C</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Trial 3</td>
<td>Boiled Tap</td>
<td>-1 °C</td>
<td>No</td>
<td>No</td>
</tr>
</tbody>
</table>
Data Analysis

• Hypothesis was correct - Tap water did not supercool and snap freeze, but distilled did.

• If done the same way again, it may not have the same results.
Conclusion

• Hypothesis supported my experiment.
• This happened because tap has some impurities, which ice crystals form around, and distilled is pure water.
References


Further Research

• Try different types of water and test to see if they supercool and snap freeze.

• The different activity in the molecules of water.

• Try adding salt and different combinations to see if they supercool and snap freeze.