STEAM LAB: HOT ICE

NAME:

DATE:

HYPOTHESIS

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SUPPLIES

- 4 cups of white vinegar {acetic acid}
- 4 tablespoons of baking soda {sodium bicarbonate}
- a medium-sized pot
- a glass measuring cup {heat safe glass}
- a dish
- a spoon

FIRST

1.Pour the vinegar into the pot.

Question: What do you think will happen if you add the baking soda to the pot of vinegar?

2. Slowly add the baking soda to the pot; if you pour it all at once, it could fizz over the sides.

3. Stir until the baking soda is fully dissolved and no longer fizzing.

NEXT

4. Boil mixture over medium-high heat for about an hour; the mixture should be reduced about 75% (you should have about 3/4 to 1 cup). You will be able to see small crystals forming on the pot near the top of the solution.

5. Pour the **concentrated sodium acetate** into a glass measuring cup and place it in the fridge to cool for about 30-45 minutes.

LAST

6. Scrape some of the sodium acetate powder off the inside of the pot and place on your dish for your crystals to grow upon.

7. Once your liquid solution has cooled, VERY CAREFULLY remove from the fridge; be careful because any bump can begin the crystallization process.

8. Slowly pour the solution on top of the crystals you collected. What is happening?

why is this happening?

THE SCIENCE BEHIND HOT ICE

Nucleation, the initial process that occurs in the formation of a crystal from a solution, a liquid, or a vapour, in which a small number of ions, atoms, or molecules become arranged in a pattern characteristic of a crystalline solid, forming a site upon which additional particles are deposited as the crystal grows.

In lakes and rivers: Nucleation of ice crystals
Before ice can form, water must supercool and ice crystals nucleate.

Homogeneous nucleation (without the influence of foreign particles)
Nucleation processes are classed as heterogeneous or homogeneous. In the former, the surface of some different substance, such as a dust particle or the wall of the container, acts as the center upon which the first atoms, ions, or molecules of the crystal become properly oriented; in the latter, a few particles come into correct juxtaposition in the course of their random movement through the bulk of the medium.

Heterogeneous nucleation is more common, but the homogeneous mechanism becomes more likely as the degree of supersaturation or supercooling increases. Substances differ widely in the likelihood that they will crystallize under conditions in which the crystalline state is the inherently stable one; glycerol is a well-known example of a compound prone to supercooling.

Experiment @ https://www.playdoughtoplato.com/kids-science-experiment-hot-ice/