

What Makes Ice Melt Faster?

By Beatrice Cedro
7th grader
TBA Middle School

Background Research

Do you live somewhere that's always cold? Well if you do, do you see the ice melt whenever it snows and when the cars start to freeze? Well this project is related to it because I will be showing you which material melts ice the fastest. This project is about testing out salt, sugar, and baking soda to see which one of them will melt the ice faster. Based on the research I did about this project I am supposed to put 3 ice in one container and put one of the ingredients which is salt, baking soda, and sugar and after we do that were supposed to leave it in the fridge for 4 hours and wait what's supposed to happen while there inside the fridge there supposed to melt and there we will see which container of ingredients is gonna melt faster. Water freezes when the temperature is 0 degrees celsius. When the molecules of a liquid get so cold that they slow down enough to hook onto each other, forming a solid crystal. water expands as it freezes, and ice floats on top of water. This property is crucial to life as we know it. When water freezes, the water molecules arrange themselves in a special way to form ice crystals. The crystals repeat themselves over and over again to form a nice hard piece of ice. In 1842, the British physicist Michael Faraday observed that ice is always wet and forms a thin layer of liquid water. Today, it is known that not only water ice but also other crystals. As energy is transferred to the water molecules in the ice, the motion of the molecules increases. The motion of the molecules increases enough that it overcomes the attractions the water molecules have for each other causing the ice to melt.

Question

Which material will melt the ice faster?

Materials

Salt, Sugar, Baking soda,
Ice, 4 Containers, and a
fridge

Hypothesis

If we put salt on the top of the ice then it will melt faster.

Variables

Independent variable: factors influence the rate at which ice melts.

Dependent variable: The amount of water that melted.

Constant variable: Ice numbers, Ice size, ice shape, duration, and temperature of the Fridge.

Procedure

I will ...

1. Collect the materials
2. Put 3 ice cubes into separate bowls
3. Put the salt, sugar, and baking soda in the bowl
4. Put the bowls inside a refrigerator and wait for 4 hours.
5. After the ice is done being in the refrigerator, take it out.
6. Pour the water/liquid into a separate cup and keep the ice
7. Now let the ice cubes completely melt in their bowl
8. Calculate the amount of water from the ice cubes
9. Now collect all the datas and notes and now you are done.

Trial 3

Substance	Amount Melted	Amount remaining	Total Amount
Salt	5.1 ML	2.5 ML	7.6 ML
Sugar	4.6 ML	3.2 ML	7.8 ML
Baking powder	3.9 ML	4.1 ML	8 ML
Nothing	Stayed the same	8.1 ML	8.1 ML

Trial 1

Substance	Amount Melted	Amount remaining	Total Amount
Salt	5.3 ML	2.4 ML	7.4 ML
sugar	4.6 ML	3.1 ML	7.7 ML
Baking powder	3.2 ML	4.5 ML	7.7 ML
Nothing	Stayed the same	7.8 ML	7.8 ML

Trial 2

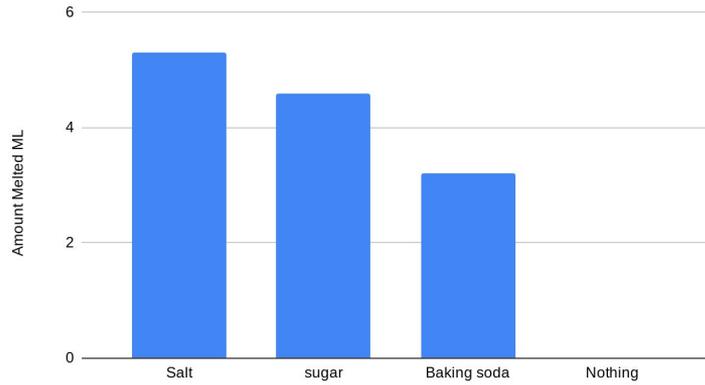
Substance	Amount Melted	Amount remaining	Total Amount
Salt	5.4 ML	2.1 ML	7.4 ML
sugar	4.2 ML	2.9 ML	7.1 ML
Baking powder	2.9 ML	4.3 ML	7.3 ML
Nothing	Stayed the same	7.5 ML	7.5 ML

Result

Charts

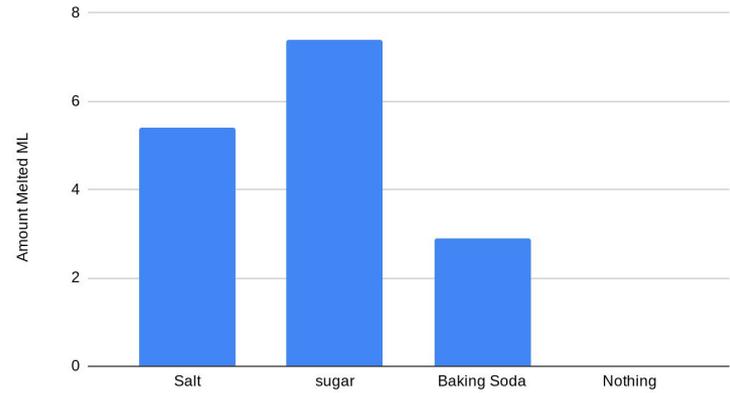
Trial 1

Salt VS Sugar VS Baking Soda VS Nothing



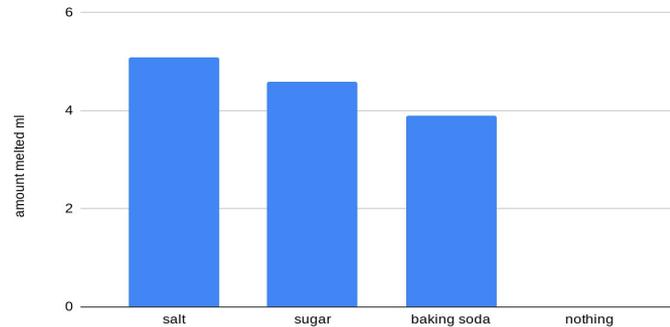
Trial 2

Salt VS Sugar VS Baking Soda VS Nothing



Trial 3

Salt vs Sugar VS Baking Soda VS Nothing



Picture taken by me

Reference

<https://www.wearegreenbay.com › beyondtheforecast › w...>

<https://sciencing.com/different-ways-melt-ice-cubes-8217122.html>

Sofekun, Gabriel O.; Evoy, Erin; Lesage, Kevin L.; Chou, Nancy; Marriott, Robert A. (2018).

"The rheology of liquid elemental sulfur across the λ -transition". *Journal of Rheology*.

Society of Rheology.

Atkins, P. W. (Peter William), 1940- author. (2017). *Elements of physical chemistry*. ISBN

978-0-19-879670-1. OCLC 982685277

Pedersen, Ulf R.; Costigliola, Lorenzo; Bailey, Nicholas P.; Schrøder, Thomas B.; Dyre,

Jeppe C. (2016). "Thermodynamics of freezing and melting". *Nature Communications*

Analysis

When I was putting the ice on their containers I noticed that the ice was melting already because the temperature of the kitchen was too hot.

When I started to put the materials on top of the ice I noticed that the ice that had salt already started melting. I quickly put the 4 containers of ice inside the fridges and patiently waited for 4 hours. Ice melts faster when the air and water are both the same temperature, ice usually melts more quickly in water. This is because the molecules in water are more tightly packed than the molecules in the air, allowing more contact with the ice and a greater rate of heat transfer.

Conclusion

In conclusion my hypothesis is correct if we put salt on top of ice then it will melt the ice faster. My hypothesis is answered in my results. My hypothesis is correct because when I was doing the experiment I noticed that the ice melted a lot faster when the salt was on top of it. Also after the 3 trials I did the salt definitely melted the ice faster. Salt will always melt ice quicker than both materials. This is because in the same amount or volume, there are more molecules of salt than sugar or baking soda due to the chemical makeup. Salt, baking soda, and sugar will all act to lower the freezing point of the ice, making it melt quicker than the untouched ice cube. My project could have been better if we used more materials and if we used dry ice instead of normal ice but also it could've been more dangerous.

Abstract

I thought of doing this project because I accidentally spilled salt on ice when I was making food. The materials that will be used are salt, sugar, and baking soda and also I will do a test on another set of three ice pieces without any materials on it to see if it will melt faster or the same. The first thing I did was to go get the materials, then I began my experiment. It took me about 4 hours to do each trial because I have to wait 4 hours for the ice to melt inside the fridge. I checked the ice every hour to see if something happened and as expected the ice that has salt melted the fastest and then I tested it 2 more times to confirm my hypothesis. While I was doing the experiment I wrote down the ML's that I measured I measured the water that was already melted right after I took it out of the fridge and then waited for the rest of the solid ice to melt and then I also measured that and then I added both of my result to see the total amount of ice. After doing the procedure I started to finalize things.