SASTA OLIPHANT SCIENCE AWARDS

SOUTH AUSTRALIAN SCIENCE TEACHERS ASSOCIATION

Highly Commended

Scientific Inquiry

Year 3-4

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Australian Government
Department of Defence

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SASTA South Australian Science Teachers Association

Candy Chemistry - scientific inquiry
By Abigail Atkinson

Aim

To make a candy crystal geode using a sugar solution. The sugar crystals grow on the fondant shell.

Prediction/Hypothesis

I think the crystals will grow better in the fridge than at room temperature.

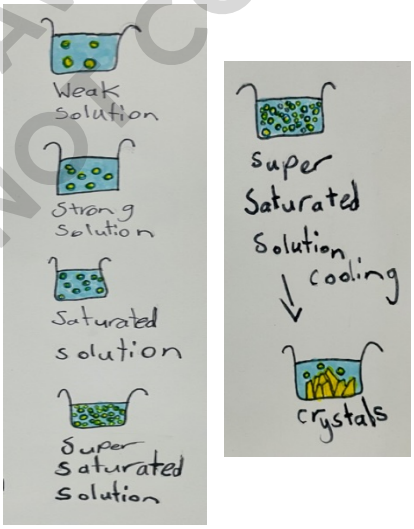
Research

To make the crystals we first need to make a super saturated solution using water and sugar. A supersaturated solution is when the water has more sugar dissolved into it than could normally be dissolved at room temperature.

We can dissolve sugar at room temperature when there is more water than sugar but if we keep adding sugar to the water it can't dissolve all of the sugar.

Much more sugar can be dissolved by adding heat, making a super saturated solution. When it cools down the extra sugar that was dissolved makes crystals.

For more info check out my video at
https://www.youtube.com/watch?v=-xwq168fK9M



Equipment

- To make candy geodes
- Stove top
- Saucepan
- Measuring cup
- Candy thermometer
- Microwave safe bowl
- Microwave
- Ingredients
- Cookware
- Mold for geode shape

Possible Risks

- I could burn myself on the stove or on the boiling sugar solution while cooking. I could also burn myself on the candy when its made because it stays hot for a while. To reduce these risks I was careful and had adult help.
- if I did get burnt and stick my finger in the hot candy (like mum did when she was my age!) I would put it under cold water and get mum to help me
- if I burnt the candy it would make a mess and smell, I would have to make more. To make sure this didn't happen and to be safe I would always pay attention and watch the saucepan.

Method:

Step 1. Found a recipe for a candy geode

Step 2. Made the candy Geode

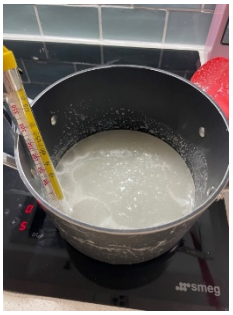
Step 3. Put one in the fridge and let one sit at room temperature to grow cyrstals

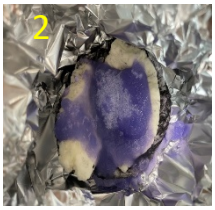
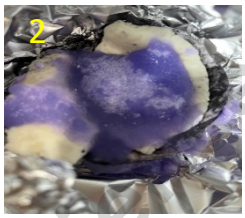
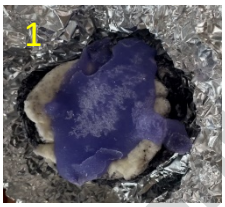
Step 4. Took photos to document the growing crystals

Step 5. Took last photos and wrote down the final result

Step 6. Ate the Geode! It was delicious!

Results

Date	Photo	Notes
10/07/21	   	I first had to make the super saturated solution by combining ½ cup of water with 2 cups of sugar. I had to heated it to 113 degrees Celsius using a candy thermometer. I added purple food colouring and poured the solution into the geode shells I made earlier out of homemade fondant. I then wrapped them in alfoil and put one in the fridge (no.1) and the other one on the window sill (no.2).

11/07/21	 	No 1 has gone hard but the crystals look the same as when I first poured it in. No 2 has grown more crystals in the middle
12/07/21	 	More crystals growing on the edges of both no 1 and 2.
13/07/21	 	I don't think there has been any change in either of the geodes
14/07/21	 	Final day, I think more crystals have grown on no 1 than no 2.

It began growing crystals when I first poured the solution in.

After each day more little dots of crystals grew on both candy geodes until there was lots.

The candy geode that was in the fridge grew more than the one at room temperature. The one from the fridge had more crystals on it.

Analysis

I was a bit disappointed because I was hoping for more crystals to grow. I think there would have been more if they both could have sat longer as five days was the very minimum but I didn't have time to let them sit any longer.

I think the crystals grew better in the fridge because it was really cold and the temperature in the fridge stays the same. Room temperature in our house changes a lot because its winter and we have our fire going so its warm at night but cold during the day when we aren't home.

Possible problems with my experiment and how to improve these

Changes in room temperature could have changed my results. I could have found somewhere else in the house where there isn't so much change in room temperature.

The fridge is dark when the door is shut so maybe the light can change it. I could put the geode in a dark box and then in the fridge or in the room so it stays the same.

Lots of people go to the fridge so it was bumped more, this might cause a problem with the growing crystals. I could put it in an outside fridge that doesn't get used much so it doesn't get bumped.

There was only one geode for each part of the experiment, so if that one was not working for some other reason it could give us the wrong idea. It would have been better to have lots of them (and I get to eat more) so you can see it wasn't just one lucky result.

What next?

Next time I could change the amount of sugar in the solution to see if there is a better combination.

In the future I would like to try making different types of candy like lollypops. They have the same super saturated solution but they have to be cooked longer and at a higher temperature.

I would also like to find out more about chemistry in food, its such a fun and yummy topic!

How could what we have learnt from this experiment be useful?

What I have learnt from this experiment is useful to me because it has taught me to understand a little bit of chemistry that I didn't know before. It's a simple way to teach and understand reactions and I think it is a good way to teach students because it is interesting and fun.

Thank you for reading my report.

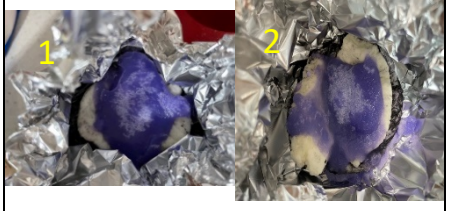
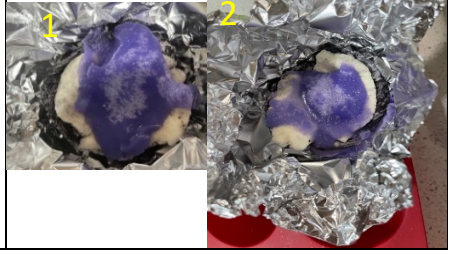
If you want to know more about my Candy Chemistry experiment, please watch my video about my experiment at

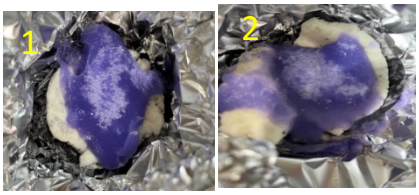
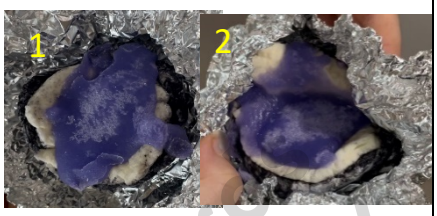
Assistance

I had help with the candy making as it was using the stove and hot water.

Mum helped me learn about saturated solutions and I found out how to make crystals

Mum took the video and photos for me and helped to upload onto the computer to put in my inquiry.

Date	Notes	Photos
30/05/2021	Decided to enter the Oliphant Science Awards again this year	
2/06/2021	I wanted to do something about the ocean but I couldn't think of anything I could test without having to go to the beach. Came up with the idea of making sugar candy because I like cooking and I can do this at home.	
4/06/2021	I started reading about making candy with mum.	
6/06/2021	I found an online article and recipe about rock candy and candy geodes. It was very interesting and sounded fun to make.	Gorgeous and Delicious Candy Geode Kitchen Science For Kids (steampoweredfamily.com)
7/06/2021	I couldn't start making it right away as we had to buy all of the ingredients and we needed to buy a candy thermometer.	
10/07/21	Tested making the candy and filmed it at the same time because time was running out of time to finish. Left one candy to sit at room temperature and one in the fridge for at least 5 days	 
11/07/2021	Candy day 1, I will take photos of candy each day. Some small crystals	
12/07/2021	Candy day 2 took photo	
13/07/2021	Candy day 3 took photos more crystals growing on it	

14/07/2021	Candy day 4 took photo	
15/07/2021	Candy day 5, it probably could sit longer to grow more but I need to finish my experiment. Took photo	
16/07/2021	Starting report I used a computer to type up my report. I used the information I found on the internet, the results I had from my experiment and photos to help me write my report. I put he results of my experiment in a table.	
21/07/2021	I am getting help to upload my entry.	