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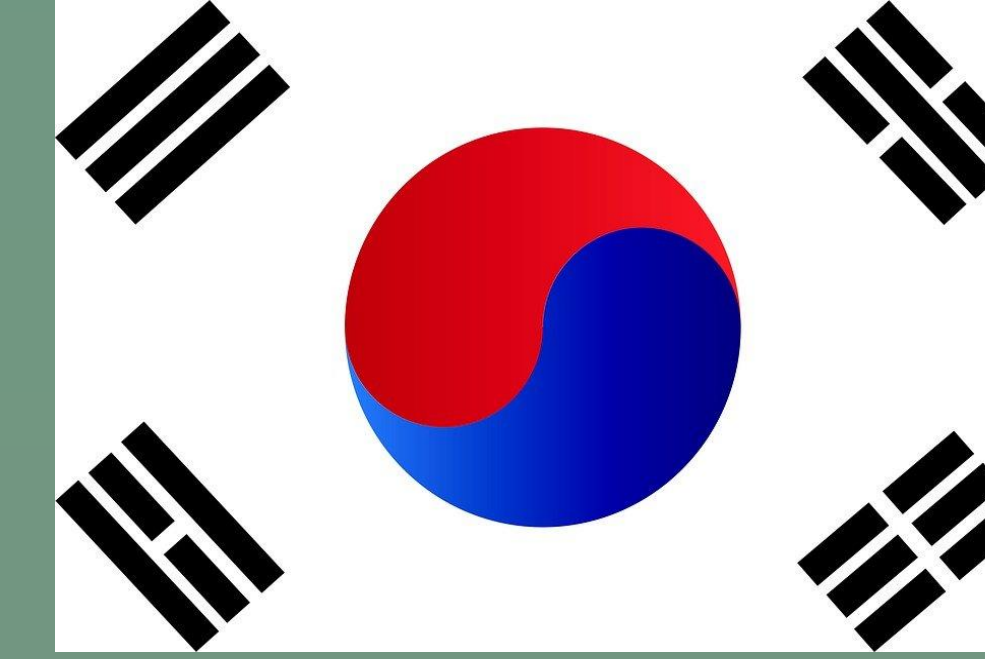
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Ice Cream Olympics

Hannah Hostetler
Tritt Elementary School

Abstract

For my science fair project, I looked at five countries' ice creams and I am trying to find out which countries' ice cream is best for a hot summer day. I tested USA, Korean, Indian, Russian, and Italian ice creams. I set up an experiment to test which countries' ice cream is best for a hot summer day. I also looked at the density of the ice cream and the ingredients of the ice cream. My hypothesis is that the ice cream with more density will not melt as fast as the others.

Procedures

Ice Cream Melt Experiment :

1. Put the ice cream in the tubes down to the sticks
2. Put the ice cream in the freezer overnight.
3. Get the room to the right temperature (at least 85 degrees)
4. Bring the ice cream into the bathroom without making the temperature drop
5. Start a stopwatch
6. Every 2 or 3 minutes, we checked to see how much ice cream had melted in the bottom of the tube.
7. We recorded how much melted until all of the ice cream was gone to the bottom.

Density Measurement:

1. Measure the tube's weight by themselves
2. Fill the tube with ice cream
3. Smush the ice cream in the tube to get it down to the bottom without any air space
4. Measured the weight
5. Record the volume in milliliters
6. We used math to calculate the density by first subtracting the mass of the tube from the ice cream and the tube to give us the mass of ice cream. We divided the mass by the volume to get the density.

Experiment



Temperature for Experiment



Experiment in Tubes



Close Up of Experiment in Tubes



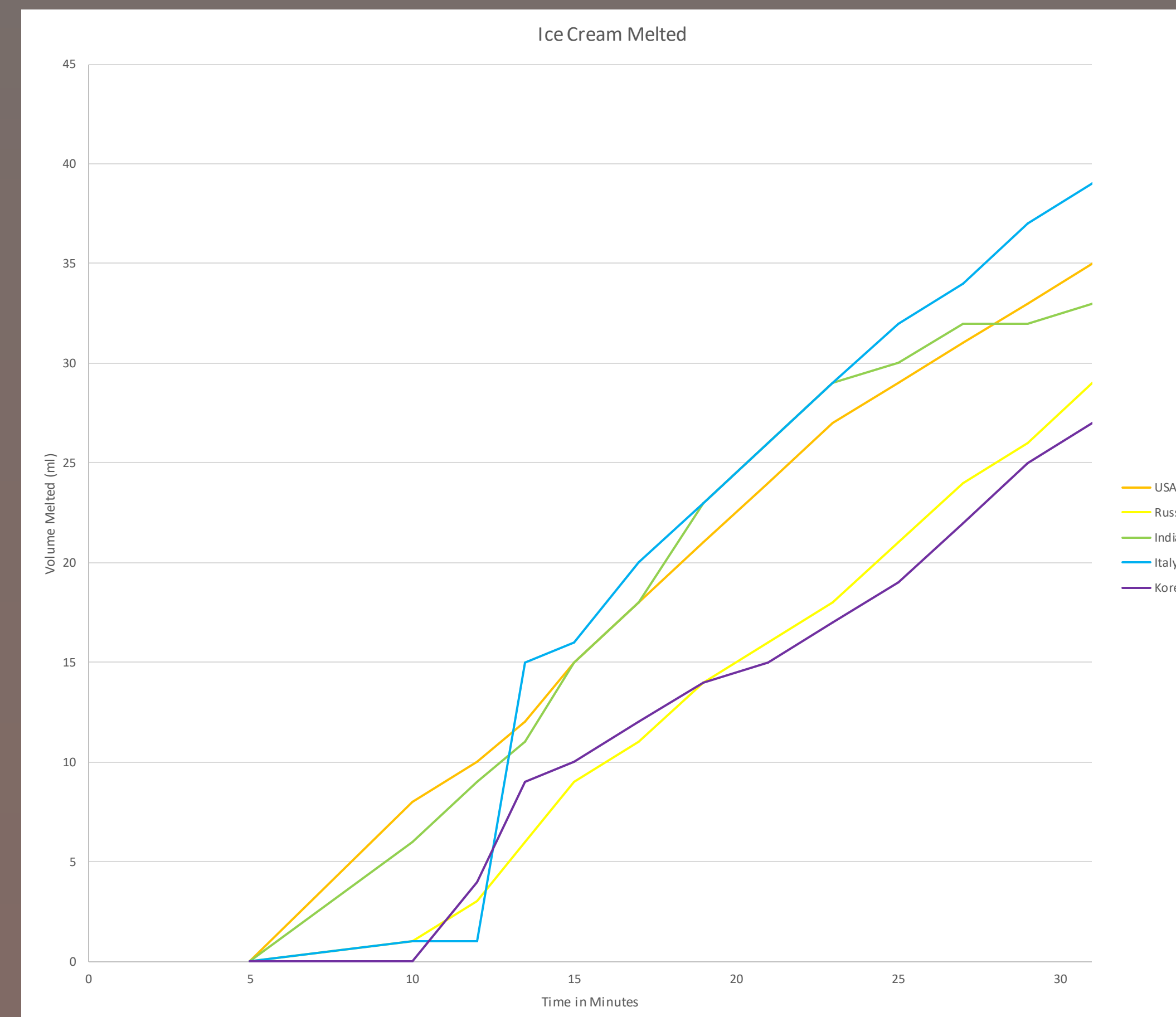
Measuring the Density of Ice Cream

I put the ice cream in a tube that had measurements on it. Then I put the ice cream in about halfway in the tube. After that I had to get the bathroom in the basement up to 80 degrees or up. When the bathroom was hot enough I put the ice cream in the hot bathroom and my dad had started a stopwatch so every 2 or 3 minutes we could see how much the ice cream had melted and recorded it on paper. We stopped measuring after all of the ice cream had stopped melting.

We had to put the ice cream back in a tube to measure the density by weighing it on my mom's kitchen scale. I measured how much the tub weighed itself before measuring the ice cream, and I had to figure out how much just the ice cream weighed, so I subtracted how much was from the tube from the total from the ice cream and the tube and wrote down the answer for how much ice cream weighed. I also measured how many milliliters of ice cream we put in the tubes. I divided the mass by the volume to get the density.

Data Tables

Minutes	USA	Russia	India	Italy	Korean
0	0	0	0	0	0
5	0	0	0	0	0
10	8	1	6	1	0
12	10	3	9	1	4
13.5	12	6	11	15	9
15	15	9	15	16	10
17	18	11	18	20	12
19	21	14	23	23	14
21	24	16	26	26	15
23	27	18	29	29	17
25	29	21	30	32	19
27	31	24	32	34	22
29	33	26	32	37	25
31	35	29	33	39	27
33	36	31	33	40	29
35	37	32	33	40	30
37	36	35	33	40	32
39	36	35	33	40	34



Country	Volume (ml)	Mass (oz.)	Density (oz/ml)
Italy	60	1.8	0.0167
India	55	1.4	0.0255
Russia	72	2.1	0.0292
Korea	52	1.6	0.0308
USA	72	2.3	0.0319

Ice Cream Ingredients	USA	Korean	Russia	Italian	Indian
water		x	x		
salt	x	x			
cream	x			x	x
milk	x	x	x	x	x
sugar	x	x	x	x	x
egg		x		x	
gum		x	x	x	x
butter			x	x	
emulsifier		x	x		

Background Research

I looked at a magazine called "Ask" that provided information about ice cream. It told me about different countries ice creams, how to make it, the history of ice cream, it included a chat with a Dr. Maya Warren – a food chemist that mostly works with ice cream. She talked about what ice cream flavors she had made, and ingredients in ice cream and the difference between ice cream, ice milk and frozen custard. I also read on the American Chemical Society's website that more air in an ice cream means that it is less dense and melts quicker.

Conclusions

I learned that my hypothesis was not correct. The USA ice cream had the highest density, but it was in fourth place for melting the slowest. The two that did the best were Russia and Korea. We also looked at the ingredients in the ice cream. Korea and Russia had water and emulsifier and the other ice creams did not. So that means that water and emulsifier must help it melt less.

References

1. Arts and Sciences for Kids (ASK). July-August 2020
2. [Ice, Cream... and Chemistry - American Chemical Society \(acs.org\)](https://www.acs.org/education/whatis/articles/ice-cream-and-chemistry.html)

Acknowledgements

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