
MY LOGBOOK
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JUST FLOAT

I chose topic JUST FLOAT because it matches the theme. My experiment is about why an object which sinks in normal water starts floating when salt is added into the water.

Testable Question

Does the different quantities of salt affect the floating levels of lime and a potato?

Background Information

https://www.toppr.com/ask/question/why-is-it-easier-for-you-to-float-in-salt-water-than-in-freshwater/

Question: Why is it easier for you to float on saltwater than freshwater?

Answer: When the salt is added to the water, the salt affects the density of water and makes the water denser than without it.

Author: Toppr.com

Background Information

https://www.uhi.ac.uk/en/t4-media/one-web/university/stem/isf/busking-22/lemon-versus-lime.pdf

Question: What makes the lime sink in water?
Answer: While both lemons and limes have densities close to water, limes are just a bit heavier, causing them to sink. Peeling a lemon slightly increases its weight, making it more likely to sink as well.

Arthur:- uhi

Background Information

https://www.tekniskmuseum.no/en/school/liquid-potato#:~:text=Whether%20the%20potato%20floats%20or,why%20the%20potato%20floats%20up
Question: Why does a potato sink in water?
Answer: The ability of a potato to float in water depends on it's density
Compared to the water's density. For example when we add salt in the water it's density increases, hence the potato starts to float in the salt
water.
Arthur:- Teknisk Museum

Sources of Information

Title	Author	Information (web link, publisher, etc)	Year
Why does salt make things float?	Toppr.com	https://www.toppr.com/ask/question/why-is-it-easier-for-you-to-float-in-salt-water-than-in-freshwater/	2024 Dec 18
What makes the lime sink in water?	Uhi	https://www.uhi.ac.uk/en/t4-media/one-web/university/stem/isf/busking-22/lemon-versus-lime.pdf	2024 Dec 18
Why does a potato sink in water?	Teknisk Museum	https://www.tekniskmuseum.no/en/school/liquid-potato#:~:text=Whether%20the%20potato%20floats%20or,why%20the%20potato%20floats%20up	2024 Dec 18

Variables

Manipulated Variable

Quantities of salt

Responding Variable

The level of float of lime and potato

How will you measure it? :
I will measure it in mm because what if the level of float will be less than cm. Aiso it can be challenging to measure in cm.

Variables

Controlled Variables

- Lime and potato
- Quantity of water (3 cups)
- The container

Hypothesis

I predict that adding salt to water will increase the water's density, making it easier for a lime and a potato to float. With enough salt, both objects will eventually float because the water will become denser than they are. However, the amount of salt needed to achieve this will likely differ for each object due to their varying densities. Essentially, this experiment will demonstrate how the density of a liquid directly influences the buoyancy of objects within it.

Materials

- Lime
- Potato
- Different quantities of salt
- Measuring spoons (to measure quantities of salt)
- Water
- Container\ Jar
- Ruler

Procedure

1. Pour water in the container .
2. Add the first quantity of salt
3. Put the potato in the salt water
4. Rinse the potato.
5. Add the different quantities of salt
6. Do the step 3 and 4
7. Check with millimeter scale three times
8. Do the same thing again but with a lime.

Experiment

1 tsp

Data: (measurements)

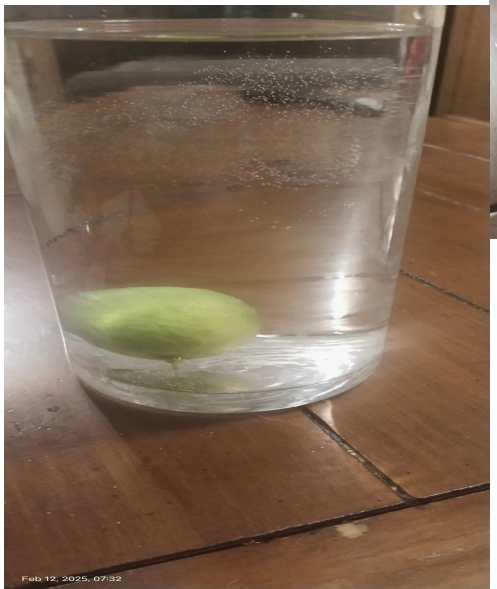
Trial 1	0 mm
Trial 2	0 mm
Trial 3	0 mm

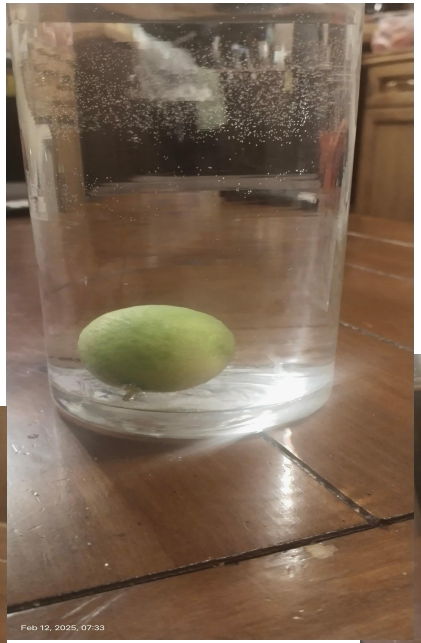
Observations:/Notes

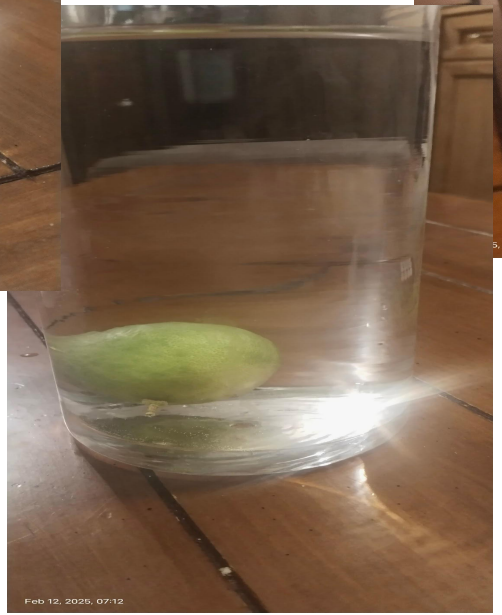
I added 1 tsp of salt and then added lime in it for a few seconds it floated but after it immediately sank. It is because the lime was denser than my solution of salt and water.

Experiment: Trial 1

Photos:







Experiment:

1/2 tbsp

Data: (measurements)

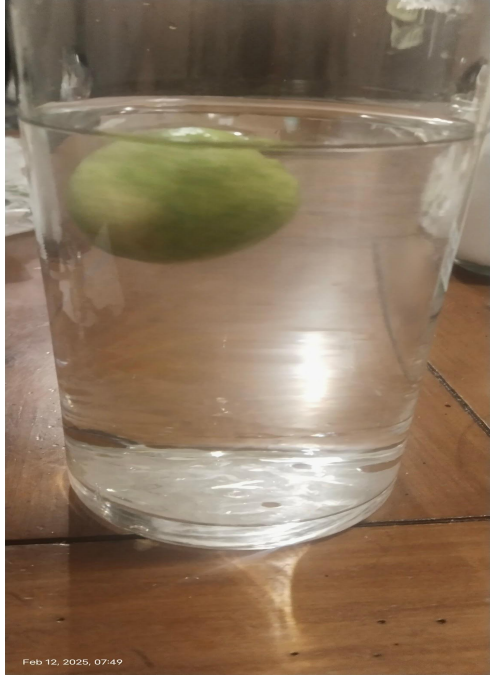
Trial 1	91mm
Trial 2	92 mm
Trial 3	90 mm

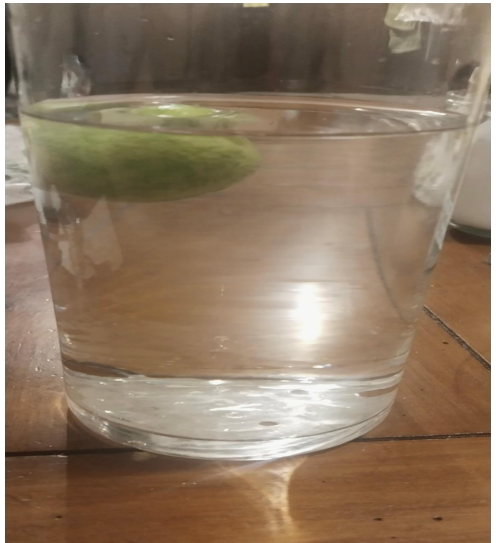
Observations/Notes:

I added ½ tbsp of salt into the water then added the lime into it. First it floated low then it slowly started to go up. It is because the density of the lime and the solution was same.

Experiment: Trial 2

Photos:





Experiment:

5 tbsp

Data: (measurements)

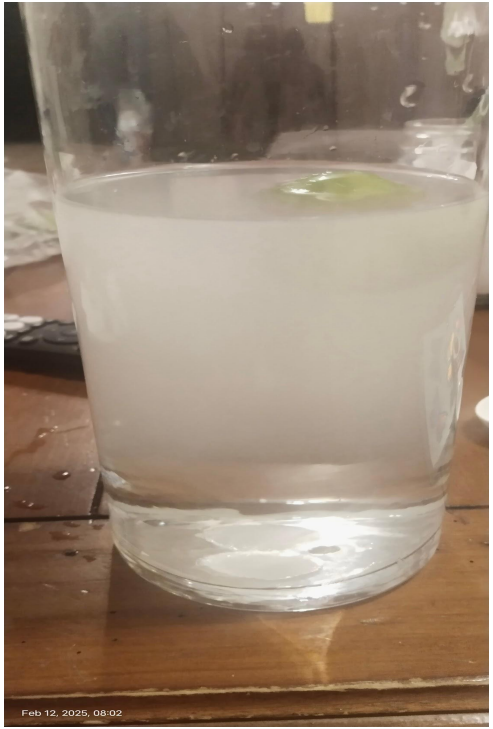
Trial 1	94 mm
Trial 2	95 mm
Trial 3	93 mm

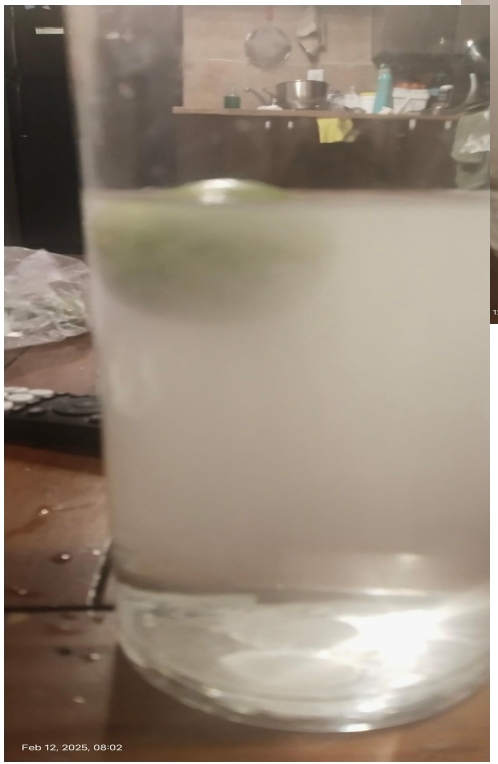
Observations/Notes:

I added 5 tbsp of salt into the water and then added the lime. When I added the lime it didn't sink, it is because the solution is more dense than the lime.

Experiment: Trial 3

Photos:





Experiment:

1 tsp

Data: (measurements)

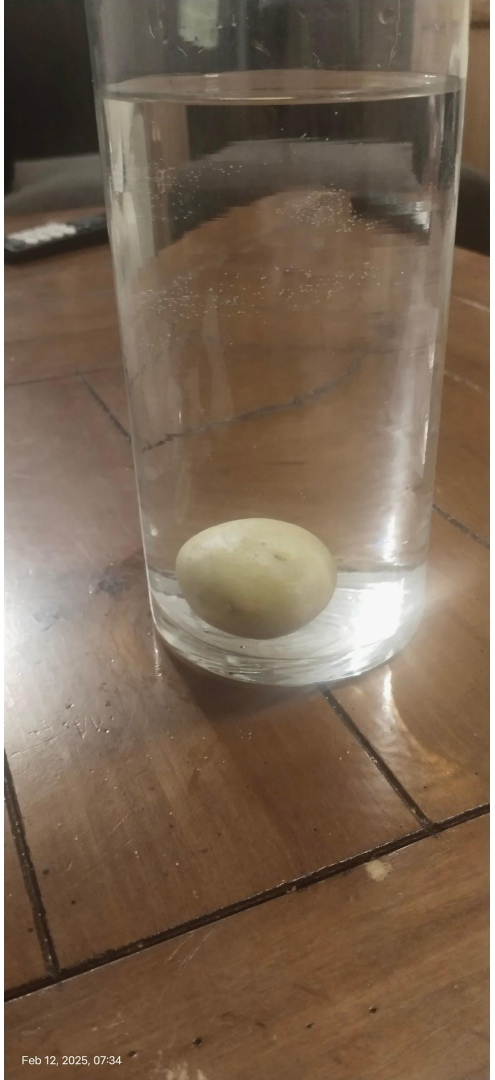
Trial 1	0 mm
Trial 2	0 mm
Trial 3	0 mm

Observations:/Notes

When I added 1 tsp of salt in the water the potato started sinking immediately . It is because the potato was much more dense than the solution.

Experiment: Trial 1

Photos:



Experiment:

½ tbsp

Data: (measurements)

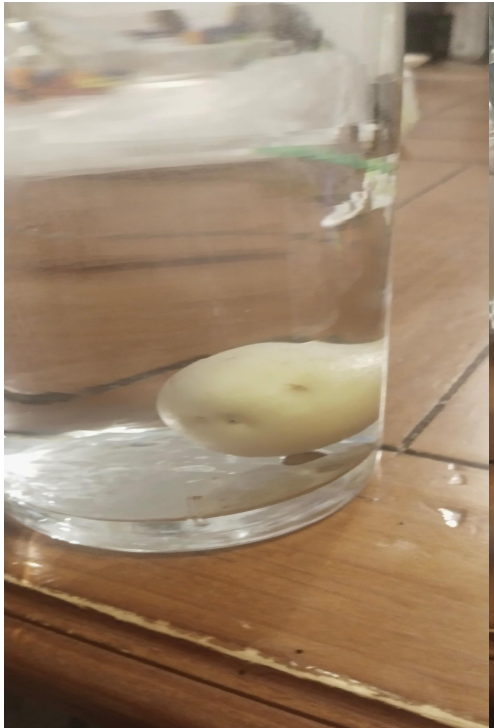
Trial 1	0 mm
Trial 2	0 mm
Trial 3	0 mm

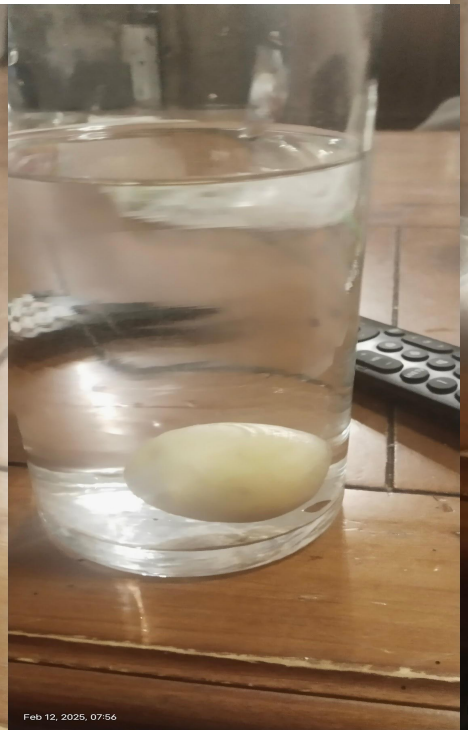
Observations/Notes:

When I added ½ tbsp of salt the potato floated low then started sinking.
This is because the potato is still more dense than the solution.

Experiment: Trial 2

Photos:





Experiment: Trial 3

5 tbsp

Data: (measurements)

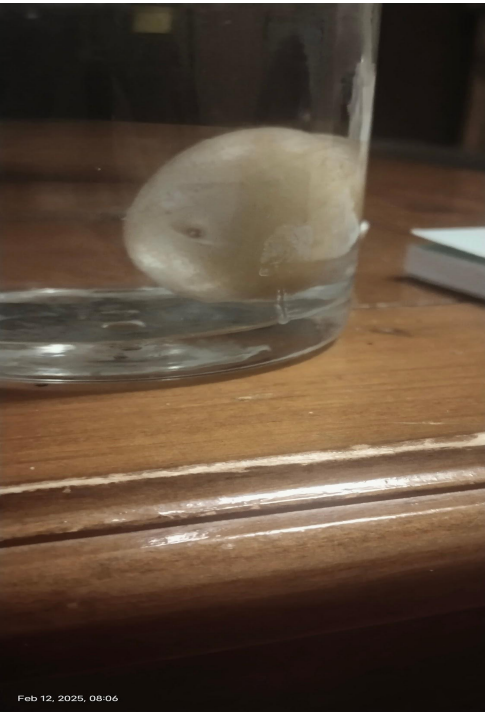
Trial 1	1 mm
Trial 2	0 mm
Trial 3	0 mm

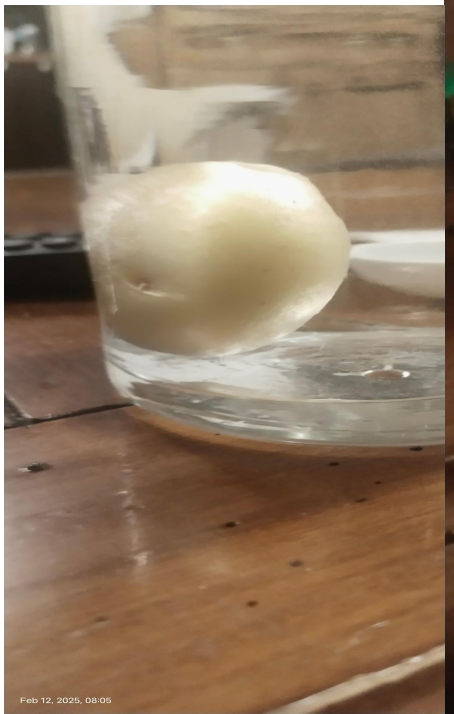
Observations/Notes:

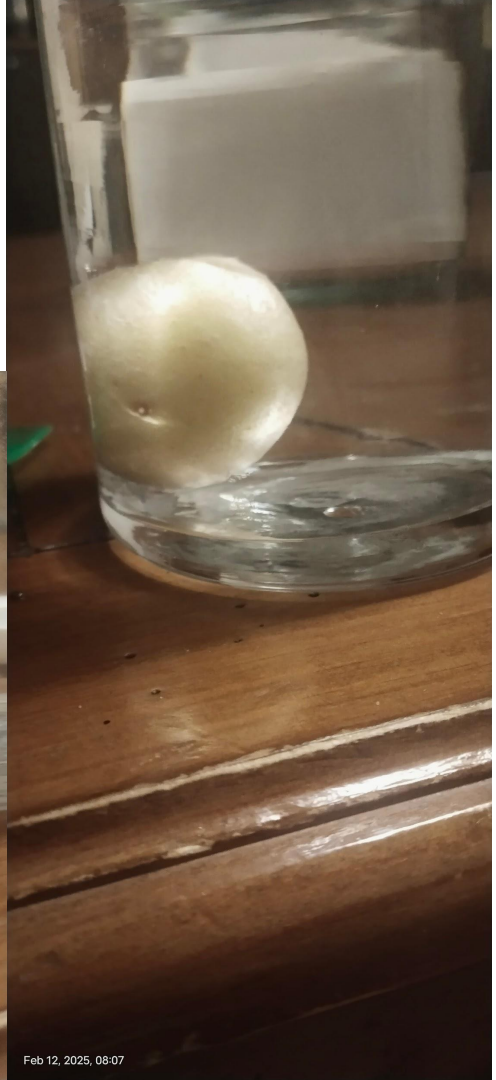
When added 5 tbsp of salt into the water the potato started floating for a few seconds but after that it started sinking.It was because potato is a little dense than our solution.

Experiment: Trial 3

Photos:



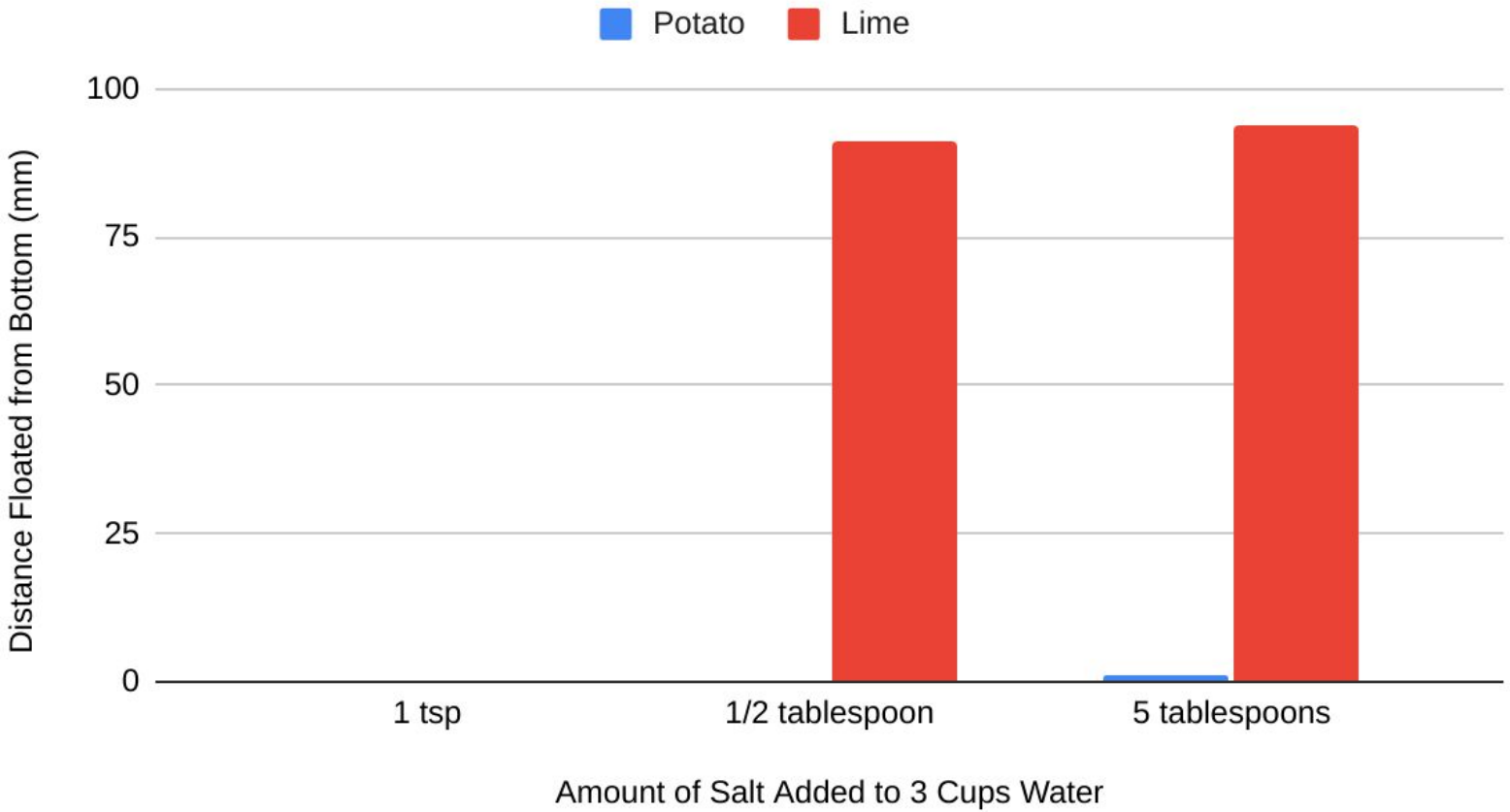




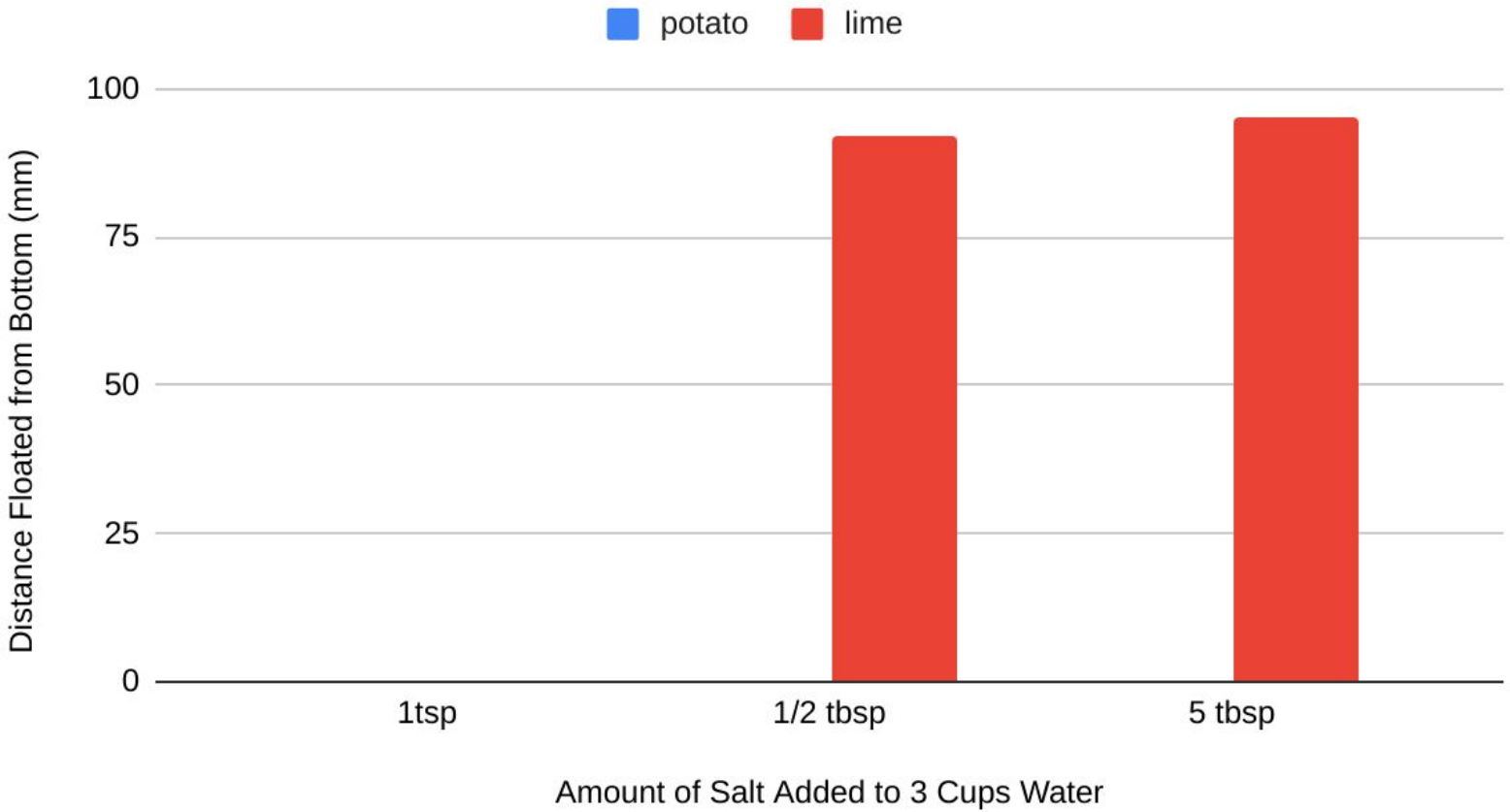
Results: Chart

Lime	1 tsp	½ tbsp	5 tbsp
Trial 1	0 mm	91 mm	94 mm
Trial 2	0 mm	92 mm	95 mm
Trial 3	0 mm	90 mm	93 mm
Potato	1 tsp	½ tbsp	5 tbsp
Trial 1	0 mm	0 mm	1 mm
Trial 2	0 mm	0 mm	0 mm
Trial 3	0 mm	0 mm	0 mm

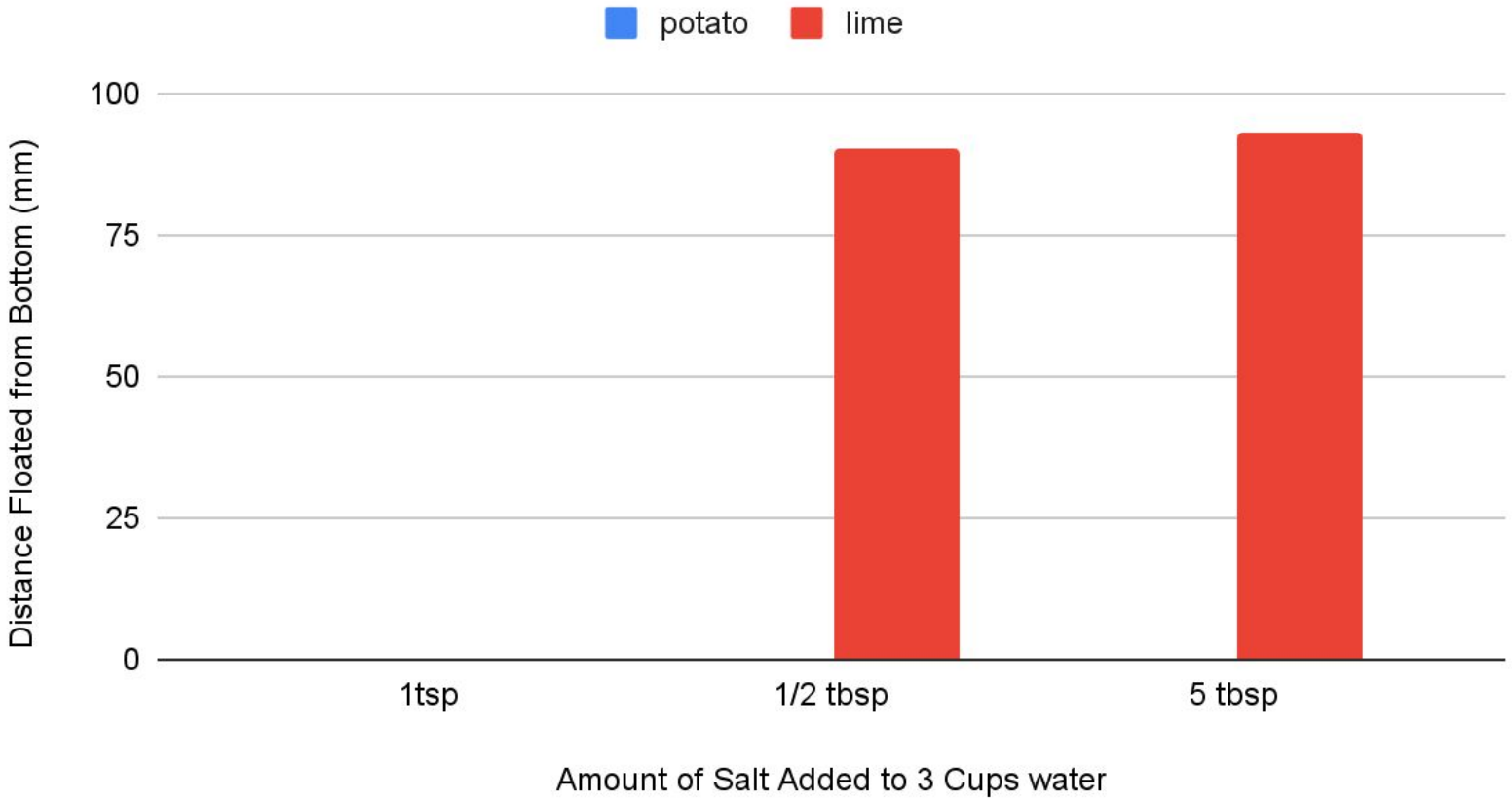
Buoyancy in Saltwater - Trial 1



Buoyancy in Saltwater Trial 2



Buoyancy in Saltwater Trial 3



Results: Analyze

In my experiment, when I was adding more salt into it, the solution was getting denser that made the lime float but, it was not happening with the potato. It was sinking because the solution was not dense enough to make the potato float.

Conclusion

My question was: Does the different quantities of salt affect the level of float of lime and a potato?

The answer to my question is: **Yes it does affect the buoyancy of lime but it doesn't affect the buoyancy of potato.**

My hypothesis was both correct and incorrect because according to my hypothesis the lime and potato they both should float. Yes, lime float in different heights but that was not the same case with the potato it didn't even float.

Applications

When you add substances like limes or potatoes to water, the water level rises because salt dissolves in it, making the water denser. As the water becomes denser than the floating objects, they float higher due to increased buoyancy. This concept is important in oceanography and food preservation. In oceanography, the salt content affects ocean life, and in food preservation, brining (adding salt to water) creates a denser solution that helps prevent bacterial growth.

Sources of Error

First I thought, to use egg instead of lime then I did some research and found out that if the egg is spoiled from inside then it will float and that would affect my experiment because I need the things that sink or else my experiment will not work.

Extensions

If I was conducting this experiment again, I would use a mandarin instead of potato because potato didn’t floated and also I would use hot water than the cold water because cold water was taking too much time to dissolve the salt.

Extensions

Why does salt make water denser than the sugar?
Why does the potato sink even if I added 5 tbsp of salt? Try doing comparison between when we add salt in water v/s when we add sugar in the water.

CONGRATULATIONS!!

You have completed your experiment!

Make sure that you enter information from this logbook into the CYSF Digital platform.

You are now ready to create your trifold display and practice your presentation.