

Question
Which liquid makes gummy bears expand the most?

Introduction
I chose the gummy bear experiment because I thought people would want to learn about gummy bears. And in past experiences the food related experiments were always the most popular. The experiment will decide which liquid expands gummy bears the most.

Hypothesis
If I put gummy bears in various liquids then the bears in the water will expand the most. The bear will have an increase in length and width. I will have the bears in different types of liquids.

Variables
Dependant Variable: The dependant variable in this experiment is the gummy bears because it depends on the independent variable, the liquid.
Independent Variable: The liquids are the independent variable because the liquids don't rely on anything.
Control: The bear must be completely underwater, bears left in liquids for 24 hours. The liquids won't be at different temperatures.

Procedure
1. Put labels on small bowls "plain water", "no water", "fruit juice" and "salt water".
2. Measure bears before placing them in liquids.
3. Place bears in bowls.
4. Fill bowls with liquids.
5. Wait 24 hours.
6. Remove bears from liquids.
7. Measure bears and see how much their size has changed.

Results

Liquids	Before	After	% increase/decrease
Salt	21mm length	18mm length	-8% length
	10mm width	8mm width	-2% width
	10mm width	8mm width	-2% width
Sugar	23mm length	30mm length	13% length
	13mm width	13 width	0% width
	13mm width	13 width	0% width
Plain	19mm length	30mm length	16% length
	9mm width	9mm width	0% width
	9mm width	9mm width	0% width
Baking Soda	20mm length	28mm length	14% length
	8mm width	10mm width	12% width
	8mm width	10mm width	12% width

The liquids had a colour change the baking soda water had a light yellow, and the sugar water had a red colour.

Discussion
I learned that (blank) liquid expands gummy bears the most. I also learned what osmosis is and how it works. The bears expanded because of osmosis. I think that the number of tries were sufficient and if I had to do this again I would have this earlier. The bears are fragile after being put in water so it was hard to measure them with complete precision.

Conclusion
This experiment was to see which liquid makes gummy bears expand the most. The bears were placed in the liquids for 24 hours, and the effects of osmosis were seen. Osmosis is the movement of molecules of high concentration to a lower concentration. The bears after 24 hours increased in size, and became very fragile and soft. The colour of the bears faded and the bears became more translucent. The length and width increased a lot over 24 hours. I thought that the salt bear would shrink more, the plain water bear would shrink increase of 9mm. All bears increased in size but the salt water bear.

Literature Cited

- <https://www.homeschool.com/blog/2014/04/homeschool-science-gummy-bear-osmosis>
- <https://sciencing.com/osmosis-experiments-gummy-bears-10042742.html>
- <https://www.kiwico.com/diy/Science-Projects-for-Kids/3/pro>

The assignment below has had the text obscured, as several people have indicated they would like to do something similar.

SALTS AFFECT ON FREEZING WATER

PROCEDURE
1. Fill a beaker with water.
2. Add salt to the water.
3. Stir the water.
4. Place the beaker in a freezer.
5. Observe the water as it freezes.

QUESTIONS
What affect does table salt have on tap water when freezing?

HYPOTHESIS
I think that the water with salt will freeze faster than the water without salt.

INDEPENDENT VARIABLES
The amount of salt added to the water.

DEPENDENT VARIABLES
The time it takes for the water to freeze.

MATERIAL LIST
Ceramic Container
Graduated Cylinder
Scale
Freezer
Thermometer
Water
Salt
Spoon
Timer

BACKGROUND RESEARCH
<http://science.lne.ucsb.edu/getkey.php?key=3695>
<https://www.quora.com/How-does-adding-salt-to-water-make-it-freeze-faster>
<https://sciencing.com/science-projects-liquids-freeze-faster-801235.html>
<https://wonderopolis.org/wonder/does-salt-water-freeze>
<https://www.britannica.com/story/why-does-salt-melt-ice>

CONCLUSION
The water with salt froze faster than the water without salt. This is because salt lowers the freezing point of water. The salt water was able to stay liquid at a lower temperature than the plain water. The salt water was able to stay liquid at a lower temperature than the plain water. The salt water was able to stay liquid at a lower temperature than the plain water.

DATA

Time (min)	1 - Water (grams of salt)	2 - Water (grams of salt)
0	0	0
10	0	0
20	0	0
30	0	0
40	0	0
50	0	0
60	0	0
70	0	0
80	0	0
90	0	0
100	0	0
110	0	0
120	0	0

Temperature of liquid

BLUE = lighter to darker shows ice formation

GRAPH

Graph showing the freezing point of water with and without salt. The y-axis represents Temperature (°C) and the x-axis represents Time (min). The graph shows that the water with salt (red line) freezes at a lower temperature than the water without salt (blue line).