

The Ice Cube Experiment

Question:

Will ice melt faster at room temperature when in freshwater or saltwater?

Research:

Density:

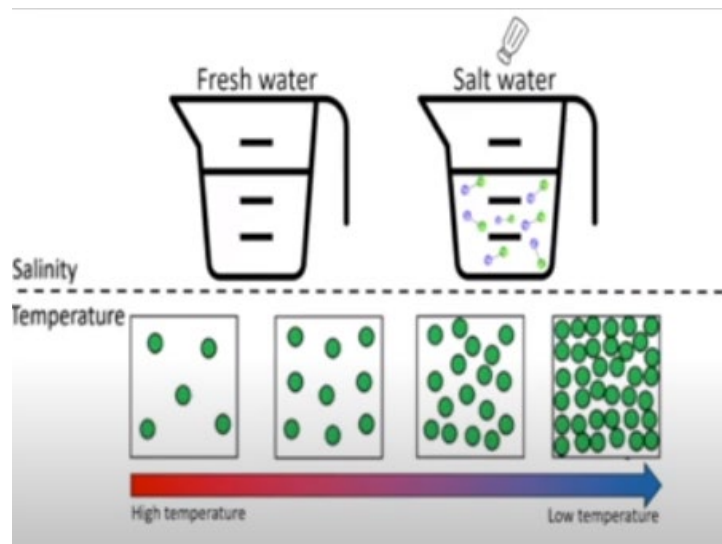
- a measure of how much matter there is in a given amount of space
- how tightly packed the tiny particles that make up any substance are
- higher density = more closely packed particles
- both temperature and salinity affect density

Salinity:

- the amount of dissolved salts that are present in water
- high salinity = more particles = packed tight = high density
- low salinity = fewer particles = spread out = less density
- saltwater is more dense than fresh water

Temperature:

- degree of hotness or coldness measured on a definite scale
- high temperature = particles spread out = low density
- low temperature = particles closer together = high density
- cold water is more dense than warm water



- Because ice is made up of fresh water, it fits into the less dense category in terms of salinity
- But because it is solid and cold, it fits into the high-density category in terms of temperature

Hypothesis:

What do you think will happen?

- Ice will melt faster in freshwater
- Ice will melt faster in saltwater
- Ice will melt at equal speed in both freshwater and saltwater

Will temperature or salinity have more of an effect on the density of the seawater?

Make a prediction!



Experiment:

Supplies:

- 2 clear cups
- Salt
- Water
- Ice
- Food dye (optional)



Instructions:

- 1) Use food coloring and water to make colored ice cubes.
- 2) Fill each of the clear cups with water.
- 3) Add salt to the first cup and mix to make saltwater.
- 4) The second cup will remain freshwater.
- 5) Drop one dyed ice cube into each cup at the same time for accurate comparison.
- 6) Let cups sit until ice cubes are fully melted (approximately 10 minutes).
- 7) Record your observations and conclusion

Observations:

Record your observations over time. Please note changes that happen to both the ice cube AND the water that the ice cubes are melting into.

	Freshwater Observations	Saltwater Observations
2 minutes		
4 minutes		
6 minutes		
8 minutes		
10 minutes		

Conclusions:

Observations:

- The cold fresh water from the melting ice is more dense than the warm water. Cold water sinks so the warm water is always touching the ice cube. This makes it melt faster.
- The saltwater is more dense than the freshwater. Even though the ice cube is colder than the saltwater, it cannot sink because the water beneath it is denser. This means that the ice cube is always touching cold freshwater making it melt much slower.
- After about 10 minutes we can see that the ice cube in freshwater has fully melted and the water has mixed so it is all the same color. However, the ice cube in the saltwater formed a thin layer of the colored water at the top that did not mix with the saltwater.

Conclusion:

Salinity is more important than temperature in determining the density of water.