

What is Salinity? A Science Activity You Can Do in Your Kitchen

Salinity and Temperature

Salinity is a measure of how much salt is in water. We call water with salt in it **saltwater**. Off the coast of New York City, the Atlantic Ocean has saltwater. Upstate from New York City, the start of the Hudson River has no salt, so it's called **freshwater**. But what about the water that surrounds New York City? Look at the map below. Is the water around the city saltwater or freshwater?

The water around New York City is a mixture of freshwater and saltwater, called **brackish water**. **Tides** are the cyclical movement of water in and out of an area controlled by the gravity of the moon. Incoming tides, called **flood tides**, bring saltwater from the ocean to the water around New York City, which increases the salinity. Outgoing tides, called **ebb tides**, allow freshwater to flow into the water around New York City, decreasing the salinity.

Salinity is important for determining which animal and plant species can live in an area. Certain species prefer areas with no salt, some with ocean-level salt, and some with salt levels somewhere in between. Many animal species move through brackish water in search of saltier or fresher water. Often during the winter, some animals will **migrate**, or move, to the ocean where it is warmer and the water is less likely to freeze.

Saltier water is less likely to freeze because salt lowers the **freezing point** of the water. This is why people put salt on the roads in the winter, it prevents the snow and ice from freezing on the road!



The Experiment

Supplies Needed:

- 3 Cups
- Water
- Salt
- Measuring cup and spoon
- Tape and marker/pen

Methods:

1. Label each cup with tape and a marker: **freshwater**, **brackish water**, **saltwater**
2. Fill each cup with exactly 1 cup of water
3. In the cup labeled **brackish water**, add 1 tablespoon of salt and stir
4. In the cup labeled **saltwater**, add 3 tablespoons of salt and stir
5. Do not add any salt to the cup labeled **freshwater**
6. Place all the cups in your freezer. Write down what time you did this on the datasheet.
7. Check the cups once every hour. Record the time when you first notice ice forming in each cup, and the time when the water completely freezes in each cup.
8. Fill in Table 1 on the data sheet as you go. Follow instructions below for Table 2 and the graph.

Before Experiment Questions (Hypothesis):

Which cup of water do you think will take the longest to freeze? Why?

How long do you think it will take each up to freeze?

Datasheet (Results)

Table 1

Record your results as you observe them. Make notes about anything interesting you discover during this experiment.

Start time: _____

| Type of water | Time water started forming ice (ex. 4:00pm) | Time water completely froze (ex. 5:00pm) |
|----------------|--|---|
| Freshwater | | |
| Brackish water | | |
| Saltwater | | |

Notes:

Table 2

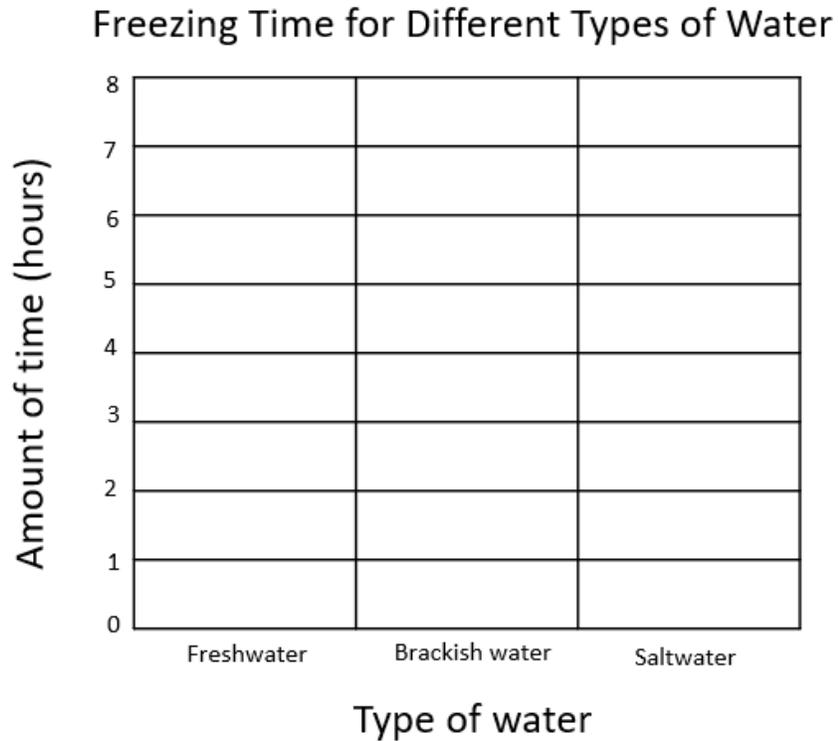
Now calculate the amount of time that passed between the start time and the time you noticed first ice forming and water freezing in each cup. Record below.

| Type of water | Amount of time until ice formed (ex. 3 hours) | Amount of time until water froze (ex. 4 hours) |
|----------------|--|---|
| Freshwater | | |
| Brackish water | | |
| Saltwater | | |

Notes:

Graph

Graph your results! Using the data collected in table 2, create a **bar graph** of your results in the graph below. Shade in the appropriate number of squares for each category based on the number of hours that passed before the water was completely frozen.



After Experiment Questions (Conclusion)

Describe your graph. What do you notice? Does anything stand out?

Which cup took longest to freeze? Why do you think that is?

Are the results what you expected? Why or why not?

What do you think would happen if you used a different amount of salt? What about other materials instead of salt? Try it!

What do you think this means for animals that live in the water around New York City?
