



# Salty Science

Experiment with salt and water and learn about salinity in the Chesapeake Bay.

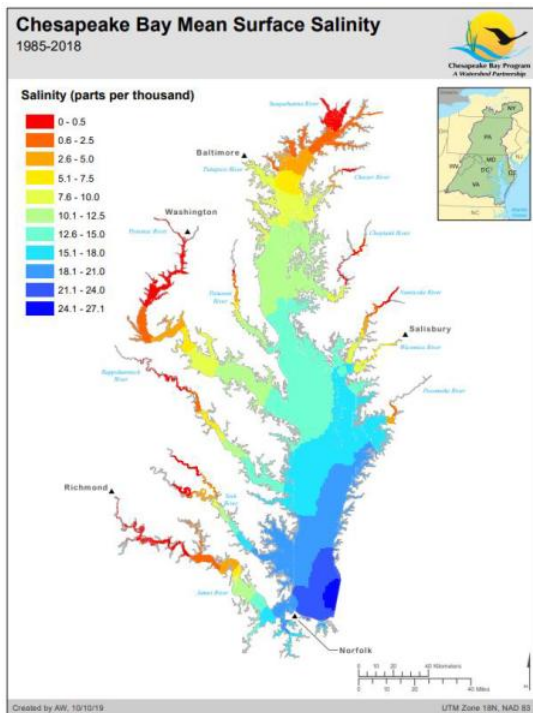


The Chesapeake Bay is an **estuary**, or body of water where salt water and fresh water mix. When salt and fresh water mix, **brackish water** is created. The Bay is more than 200 miles long and is home to more than 2,700 species of plants and animals that thrive in brackish water.

The **salinity**, or saltiness of brackish water can range anywhere from 0.5 to 30 parts per thousand (ppt). The salinity of water found in the Bay depends on many different factors, including **location**, **time of year**, and **depth of the water**.

## Location

This map shows average salinity levels *at the surface* of the Bay over a 33-year period. Salinity levels are lowest where fresh water rivers enter the Bay (red) and highest where the Bay meets the salty Atlantic Ocean (dark blue).



## Salinity Experiment Part 1

### How salty is the Chesapeake Bay?

For this activity you will need:

- 3 plastic cups
- 1 spoon for stirring
- salt
- water
- measuring cup and measuring spoons
- Chesapeake Bay Mean Surface Salinity Map



1. Measure one cup of water and pour into first plastic cup. Add **¼ teaspoon** of salt. Stir until salt dissolves. Use a spoon to taste the water.

The salinity of this sample is **4 - 5 ppt** and is like the orange portions of the Bay on the map.

2. Measure one cup of water and pour into second plastic cup. Add **1 teaspoon** of salt. Stir until salt dissolves. Use a spoon to taste the water.

The salinity of this sample is **17 - 18 ppt** and is like the light blue portions of the Bay on the map.

3. Measure one cup of water and pour into third plastic cup. Add **1 ½ teaspoons** of salt. Stir until salt dissolves. Use a spoon to taste the water.

The salinity of this sample is around **26 ppt** and is like the dark blue portions of the Bay on the map.

**Note: Keep these salinity samples for Part 2!**



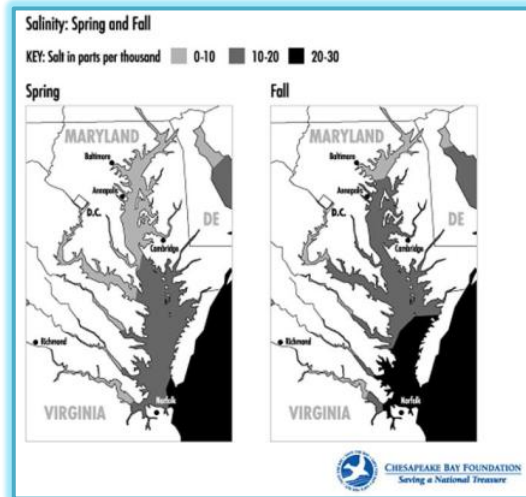
## Time of Year

These maps show how salinity levels in the Bay change between spring and fall. As the gray color darkens, the salinity level rises. In spring, melting snow and spring rains result in larger amounts of fresh water entering the Bay. In fall, there is less rain, and the salty ocean water moves up the estuary.

The habitats and migration patterns of many Bay creatures, including blue crabs, oysters, and striped bass, rely on this cycle of change.



Striped Bass



## Depth of Water

Salinity of the water in the Chesapeake Bay changes with the depth of the water. Fresh water enters the Bay from rivers and stays near the surface of the Bay. Ocean water with higher salinity is denser and sinks to the bottom of the Bay.

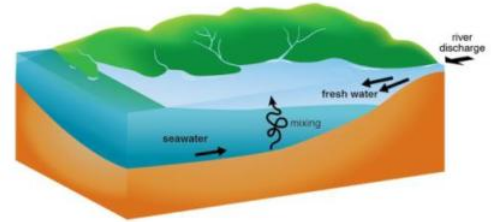


Diagram Credit: Restore the Mississippi Delta

**WARNING**  
This activity  
can get wet!



## Salinity Experiment Part 2

How can we observe fresh water rising and salt water sinking?

**You will need:** salinity samples #1 and #3 from Part 1, food coloring, 2 plastic bottles, a playing card, adult help

1. Pour salinity sample #1 (low salinity) into a plastic bottle. If the water doesn't reach the top of the bottle, add more water with the same salinity - 1/4 t salt in 1 c water. Add blue food coloring. Shake or stir if needed.



2. Pour salinity sample #3 (high salinity) into the second plastic bottle. If the water doesn't reach the top of the bottle, add more water with the same salinity - 1 1/2 t salt in 1 c water. Add yellow food coloring. Shake or stir if needed.

3. Place the playing card on top of the bottle with blue water (low salinity).



4. With one hand, press the card firmly against the blue bottle opening. With the other hand, flip the blue bottle over. Carefully balance the blue bottle on top of the yellow bottle with the card in between. Line up the bottle openings as best you can.



5. Carefully remove the card from between the two bottles. What happens?

The blue water with low salinity does not mix with the yellow water with high salinity. The blue water remains on top of the yellow water.



6. Repeat the experiment, but this time put the water with low salinity (blue) on the bottom and the water with high salinity (yellow) on top. What happens? Why does the happen?

The water with low salinity rises. The water with high salinity sinks. As the water moves, the blue and yellow coloring mixes and makes green.

