



Sink or Swim [MS]

Adapted from University of Hawaii

Grades: 6-8

Time: 45 minutes to 1 hour

Goals: To differentiate between fresh and salt water ecosystems by investigating dissolved salt.

Objectives:

Students will be able to: understand the difference between freshwater and saltwater ecosystems; describe the density property of water; and discuss the survival of organisms in both ecosystems in relation to salinity.

Materials:

- Extra-large clear plastic cups
- Sea salt/Kosher salt
- Hard-boiled eggs
- Plastic pipettes/droppers
- Food coloring
- Spring water
- Tablespoons
- Permanent markers
- Paper towels

Procedures:

1. Pre-Activity (introduction): Begin a discussion about fresh and salt water and water density. Ask the students if they've ever tried to float in a pool vs. a lake vs. the ocean. Was it more difficult in one over the other? Explore the concept of saltwater density and how ships appear to glide effortlessly through water, even while carrying cargo. Explain that the students will be performing an experiment to demonstrate salinity and water density.
2. Activity: Divide the class into working pairs; if there is an odd number, or you prefer, you may divide them into groups of three. Pass out the materials to each group and instruct the students to label two cups "S" and "F" to designate each type of water. Fill each cup three-quarters of the way to the top with water. Have the students add 3 tablespoons of salt to the cup labeled "S" and mix thoroughly until it is dissolved (they may want to add one tablespoon at a time). Ask the students to make predictions about whether an egg placed in each cup would float or sink to the bottom and write those predictions in their notebooks. Instruct them to place the eggs in the water, careful not to spill, and observe and record their results.



Inform the students to be cautious while using the food coloring because it can stain. They will dye the freshwater only by adding five drops of coloring with their pipette or droppers. They may add one or two more if they want the color a bit darker. Have the students make predictions about what will happen when they add the colored freshwater to the clear saltwater and write those predictions down in their notebooks. Slowly add the colored freshwater along the inside edge of the “S” cup. Observe and record the results.

3. Post-Activity (review): Discuss their results for both experiments as a class. What happened to the egg in freshwater and in saltwater? Why? What happened to the freshwater when it was added to the saltwater? Why? Elaborate on how density of water affects species’ survival in terms of buoyancy and swimming ability. Discuss how salinity can affect osmoregulation in species and why some species can only survive in either fresh or salt water.

Key Words:

Freshwater
Salinity

Saltwater
Osmoregulation

Density
Buoyancy

Background Information:

Adapted from COSEE West

If you have ever had the opportunity to float, without the aid of a floatation device (boogie board, raft, noodle, or floaties), in a pool or in the ocean, you will notice that your ability to float is different. It might appear easier to float in the ocean rather than in the pool and you don’t have to try so hard to stay floating. The reason for this phenomenon is simple: salt water has a higher density than freshwater. And when you are lighter than the water you are displacing, you are considered buoyant. It is also the reason large ocean-going vessels are able to stay afloat while carrying heavy cargo. Once they empty their cargo though, they must take on “ballast water” in order to stay buoyant in the water during their return voyage.

Because of their density differences, if you placed salt water and freshwater in a container, the salt water would sink and the fresh water would appear to float on top of it. This is true in an estuarine environment. Salt water from the ocean will come in with the tides and sink as it comes in contact with freshwater being drawn down from rivers and streams. If you were to take a salinity reading, you will be able to measure the amount of salts that are dissolved in the water. In the estuary, this reading will be higher towards the bottom and lower towards the surface. Also, the amount of salts in the water will increase as you move closer to the ocean and decrease as you travel further upstream.