Salty Eggs

Overview: Have you ever noticed how much easier it is to float in the ocean than a swimming pool? Why is this? You will discover the answer using an egg, a glass of water, and some salt.

What to Learn: After today you'll know how salt changes the density of water, which affects your ability (and your egg's ability!) to swim in it.

Materials

- hard-boiled egg
- glass
- water
- salt

Experiment

1. Place a hard-boiled egg in a glass of water (it should sink!)
2. Add a spoonful of salt and stir.
3. Repeat until the egg rises up from the bottom. You may need to wait for the cloudy saltwater to settle in order to see clearly.
4. Complete the data table.
5. Experiment further by adding a little water until the egg sinks again. It is possible to make the egg hover in the middle of the cup. This is called the equilibrium point!

Salty Eggs Data Table

Amount of Salt	Amount of Water	Observation	Conclusion

Reading

Did you know that most people can't crack an egg with only one hand without whacking it on something? The shell of an egg is quite strong! Challenge your students to try this at home over a sink and see if they can figure out the secret to cracking an egg in the palm of their hand.

How can you tell if an egg is cooked or raw? Simply spin it on the counter and you'll get a quick physics lesson in inertia…although you might not know it. A raw egg is slushy inside, and will spin slow and wobbly. A cooked egg is all one solid chunk, so it spins quickly.

This experiment is all about density. Density is basically how tightly packed atoms are. Mathematically, density is mass divided by volume. In other words, it is how heavy something is,

divided by how much space it takes up. If you think about atoms as marbles, then something is denser if its marbles are jammed close together.

For example, take a golf ball and a ping pong ball. Both are about the same size or, in other words, take up the same volume. However, one is much heavier, has more mass, than the other. The golf ball has its atoms much more closely packed together than the ping pong ball and as such the golf ball is denser.

Here's a riddle: Which is heavier, a pound of bricks or a pound of feathers? Well, they both weigh a pound so neither one is heavier! Now, take a look at it this way: Which is denser, a pound of bricks or a pound of feathers? Aha! The pound of bricks is much denser since it takes up much less space. The bricks and the feathers weigh the same but the bricks take up a much smaller volume. The atoms in a brick are much more squished together than the atoms in the feathers.

Have you ever noticed how it is easier to float in the ocean than the lake? If so, then you already know how salt can affect the density of the water. Saltwater is more dense that regular water, and body tissues contains plenty of water, among other things.

Did you know that thinner people are denser than heavier people? For example, championship swimmers will sink and have to work harder to stay afloat, but the couch potato next door will float more easily in the water.

Exercises

1. Density measures how tightly packed atoms and molecules are. If you add two substances together, will the denser substance stay on top or sink to the bottom?

2. When the egg was placed in the fresh water, what happened? What was denser, the water or the egg? What was less dense?

3. When the water got salty enough, what did you observe? What was denser, the salty water or the egg? What was less dense?

4. Based on your observations, which is denser: salt water or regular water? How do you know?

Answers to Exercises

1. Density measures how tightly packed atoms and molecules are. If you add two substances together, will the denser substance stay on top or sink to the bottom? (sink to the bottom)
2. When the egg was placed in the fresh water, what happened? What was denser, the water or the egg? What was less dense? (The egg sank. The egg was more dense and the water less dense.)
3. When the water got salty enough, what did you observe? What was denser, the salty water or the egg? What was less dense? (The egg floated. The salt water was more dense, and the egg less dense.)
4. Based on your observations, which is denser: salt water or regular water? How do you know? (Since the egg floated only when salt was added, it means the denser salt water must have sunk to the bottom of the container, allowing the egg to float.)