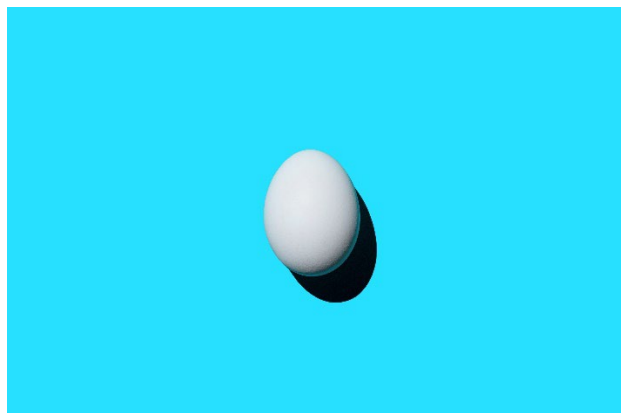




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# World Oceans Day

## Summary

How salty does the sea have to be for an egg to float?

Some objects float on top of the ocean, and other objects sink to the bottom. Why? Try this *egg experiment* to find out!

## Objective

Determine what salt concentration will float an egg.

## Introduction

Did you know that if you put an egg in a cup of tap water, it will sink to the bottom? But, if you add enough salt, the egg will float back up to the surface! Why? Because the density of the egg is higher than the density of tap water, it sinks. Adding salt to the water increases the density of the water because the salt increases the mass without changing the volume very much. With enough added salt, the saltwater solution density is higher than the eggs, and the egg will then float. The ability of something, like an egg, to float in water or some other liquid is known as *buoyancy*.

## Terms and Concepts

- Density
- Mass
- Volume



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- Buoyancy
- Serial dilution
- Stock
- Mass concentration
- Relative concentration
- Absolute concentration

## Questions

- Why would an egg float in water with a lot of salt in it, but not in plain tap water?
- What happens to salt (sodium chloride or NaCl) molecules when dissolved in water?
- Why does adding salt to water increase its density?

## Experimental Procedure

1. Take five eggs out of the refrigerator, use a permanent marker to label them 1-5, and allow them to warm to room temperature.
2. Make a stock solution of 1 cup of salt dissolved in 5 cups of water, as follows:
  - a. Pour 3 cups of water into your large container.
  - b. Add 1 cup of salt.
  - c. Stir to dissolve some of the salt. It will not all dissolve yet.
  - d. Add 2 more cups of water.
  - e. Stir to dissolve the rest of the salt. The salt should be completely dissolved before you go on to the next step.
    - i. This may take several (5 to 10) minutes of stirring, so you may need to be patient.
3. Make a two-fold serial dilution of the stock solution, as follows:
  - a. Label five of the plastic cups 1-5. Cup 1 will be for the stock solution, cups 2-4 will be for the dilutions, and Cup 5 will be plain tap water.
  - b. Add 3/4 cup of your stock salt solution to Cup 1.
  - c. Add 3/4 cup plain tap water to cups 2-5.
  - d. Measure out 3/4 cup stock solution and add it to Cup 2. Mix.
  - e. Measure out 3/4 cup of the solution from Cup 2 and add it to Cup 3. Mix.
  - f. Measure out 3/4 cup of the solution from Cup 3 and add it to Cup 4. Mix.
4. Now, starting with Cup 5 and working your way up, test an egg in each solution to see if it will float. Use a soup spoon to lift the egg in and out of the cups.
5. In which cup did the egg first float? (Save this solution for step 7.) If the egg floated in more than one cup, did you notice any difference in *how* it floated?



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- a. Be sure to record your results and observations in your lab notebook, including the egg's number.
6. Repeat steps 5-6 with four other eggs.
7. When you are done handling the eggs, wash your hands with soap and warm water.