Squishy, Bouncing Eggs

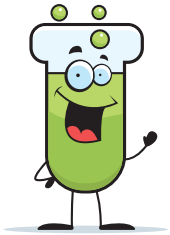
The science of osmosis

Waters™ STEM Challenge LIVE

Background

Make your very own squishy, bouncy eggs! This classic chemistry experiment uses some basic kitchen science to remove the shell from a raw egg, leaving you with a squishy egg that can bounce.

How do we do this? With a bit of osmosis magic! **Osmosis** is the movement of water from a less concentrated solution to a more concentrated solution through a semipermeable membrane that tends to equalize the concentrations of the solute on the two sides of the membrane. And thanks to this scientific phenomenon, our monster eyes will turn color, the shell transforms and we can carefully bounce them!



Safety tip!

Find an easy to clean area to test your final bouncing eggs on.

MATERIALS

- Eggs (small eggs are best)
- White vinegar (you need a good amount, depending on how many eggs you are doing and the size of your mason jar)
- Mason jars (other wide mouth jars or plastic cups work too)
- Food coloring
- Large bowl to store final egg(s)
- Paper towels

INSTRUCTIONS

- Carefully put your raw egg into the mason jar.
- Fill the jar so the egg is submerged.
- Observe what is happening... is the egg bubbling? Why?
- Add a drop or two of food coloring, carefully swirl or mix so the water turns the desired color.
- Let sit for 24 hours in a safe space. Do not disturb the egg.
- After 24 hours, look at the egg and vinegar. What does it look like? Is there foam on the top? The reaction is now completed, all of the carbon dioxide formed the foam bubbles on top and the rest is now water.
- Drain off the vinegar. Replace with fresh vinegar (no food coloring).
- Let it rest for another 24 hours.

DAY 1

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This step is very important, vinegar is an acid and you need enough acid for the chemical reaction to finish.

- After the second 24 hours, carefully remove the egg from the vinegar.
- Rinse the egg with water, how does the egg feel?
- Let it dry for a few minutes on a paper towel.
- Now you are ready to play with your bouncing egg. Be careful though, if you squeeze it too much it will "pop" like a balloon!

Note: If your egg ruptures, it is because the membrane was not thick enough. An egg with a thick, strong membrane will become super bouncy and hard to break. If you find your eggs are breaking, try a different type of egg.

DAY 2

FINAL

HOW IT WORKS

When you first poured the vinegar over the egg you saw bubbles. The bubbles are carbon dioxide. This is a chemical reaction taking place between the acidic vinegar and the calcium in the shell of the egg. This reaction turns the hard shell into a softer, semi-permeable membrane that now allows water to move into it. If you colored the water, then the colored water will move into the egg through osmosis. Why does this happen? The outside of the egg is more concentrated with water than the inside, so the water moves from the outside to the inside of the egg. This colors the egg but also "fills" it, so the egg expands and gets bigger!

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