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HC 407  
Egg osmosis

### Egg osmosis- how to make a bouncing eggs

Hi, My name is Yulin Hu, I'm a third-year kinesiology student at OSU. Today I'm going to show you a 3-5 day process to make bouncing eggs.

Materials: First you just need to get some eggs from your local grocery store. I chose a bag of grade A white shell eggs simply because they were the cheapest, and their shells seemed softer comparing with organic cage-free brown eggs. Also, you need to purchase a bottle of 5% acidity distilled vinegar, and I got this 128 ounce one for around 3 dollars. Next, you need at least 3 cups/glasses (large enough to fit the egg plus liquid). You should always have your guardians around you.

Steps:

1. Place a raw egg carefully into the cup/glass. Repeat this step to the other eggs.
2. Pour enough vinegar in the cup to completely submerge the egg. You will see bubbles forming on the surface of the egg. Leave the egg in the vinegar and put it in the refrigerator for 24 hours. You can also add water to another egg in a different cup to have a comparative experiment.
3. Take a closer view to see the bubbles forming, when adding the vinegar in.
4. You will observe a layer of form the next day, and you should carefully pour out the vinegar. Once all of the old vinegar is removed pour in new vinegar so that again, the egg is completely covered.
5. Day2: You will be able to observe that the shell is thinning and patches of yellow (the yolk) will be seen through the thinning eggshell. Think about a way to record the changes, by either drawing it, or take out an egg each day, and compare them at the end.
6. After about 48 hours the shell should be dissolved, it makes take longer depending on the thickness of the original shell. Once the shell is completely dissolved, leaving a soft, rubbery translucent raw egg. Pour out the vinegar and remove the egg from the jar. Rinse them and dry them off.
7. You should see the comparison from Day1 to Day 5.

8. Try dropping it from a few inches of the table.

The science:

What happened to the white egg shell? And why did the eggs all become larger?

Eggshells are made from calcium carbonate. Vinegar is an acid that reacts with calcium carbonate when the two come into contact with each other. The bubbles that form around the eggs over the course of a few days are actually carbon dioxide bubbles caused by the reaction between vinegar and calcium carbonate. Eventually, the eggshell fully dissolves leaving only the outer membrane which is soft and flexible.

The egg's membrane is permeable to water. A raw egg has a relatively lower water concentration inside. After adding vinegar, the water will move from the vinegar to the egg, increasing its water concentration - this is the process of osmosis.

Thanks for watching! And try to make them on your own!

References: <https://untamedscience.com/biology/cells/osmosis/>  
<https://www.instructables.com/id/Naked-Eggs-Shell-less-Eggs/>