

# Scisizz

## Fun with Eggs

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This is a set of experiments that can be done with just a few eggs and some basic kitchen ingredients, like vinegar and salt. They are fun to do, but there is some interesting science behind them, too.

The first two experiments take a few days, so you may consider starting them both off together so that you can observe and compare the results.

### **1. Dissolving the Shell off an Egg**

You will need a few items that are not in the Starter Kit:

- An egg, uncooked.
- About a cupful of vinegar.
- A glass jar (an empty jam jar will do) large enough to hold the egg and the vinegar.

Place the egg in the jar and pour in enough vinegar to cover it completely.



Leave it in a safe place, uncovered. The process takes a few days. Examine the egg each day and record what you see:

- Do you see bubbles forming on the egg or floating up to the top?
- Does the shell appear to change in colour?
- Do you see any other changes in the egg?

You will also need to refresh the vinegar in the jar every second day. Just pour out the vinegar carefully without damaging the egg and pour in some fresh vinegar.

If all goes well, in a few days, you will see that the egg has changed colour! The shell has disappeared leaving the slightly transparent inner membrane in tact. You should be able to see the yolk inside it too.

### **What Happened Here?**

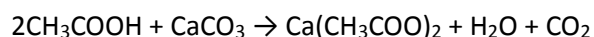
The shell of the egg is made of a substance called Calcium Carbonate. It reacts with the vinegar which contains an acid (Acetic acid) and forms Calcium Acetate, Water and Carbon Dioxide.

The bubbles you may have noted are Carbon Dioxide. They float up and escape into the air. The water remains in the jar and the acid in the vinegar gets used up. That is why you need to refresh the vinegar until the egg shell is fully dissolved.

You may also have noticed that the egg seems to have got bigger. That is because some of the liquid in the jar has got into the egg through the membrane. This is a process called Osmosis that we may investigate in other experiments.

For those of you who may be interested in the chemical reaction and the symbols, this is the reaction:

Acetic acid (Vinegar) + Calcium Carbonate (Egg shell) → Calcium Acetate + Water + Carbon dioxide



## 2. A Bouncy Egg

This experiment is similar to the first one, but you need a **boiled** egg rather than an uncooked one.

You will need:

- A boiled egg with the shell intact. (*Please get the help of an adult for this*)
- A glass jar
- Some vinegar

Now place the egg in the jar and pour the vinegar over it as before.



Keep the jar in a safe place and observe daily, changing the vinegar every second day.

Note down what you see. The process will take about one week to complete.

At the end of a week, you should see that the shell has dissolved and that the egg seems to have grown bigger.

Take the egg out of the jar and carefully dry it with a paper towel. You will notice that it feels different to a normal boiled egg. It should have a more flexible "bouncy" feel.

Try dropping it on a hard surface, like a dinner plate, from a height of about 20-30 Cm (not more, or it will split - it is not that strong!). Note down what you see.

Now try comparing it with a freshly boiled egg that has been shelled. You can even try dropping both from the same height to compare how they behave.

## What Happened Here?

Just like the first experiment, the Calcium Carbonate in the egg shell dissolved in the vinegar, leaving the membrane and the boiled egg inside.

But the liquids also got into the egg and changed the consistency of the egg inside. That is why it looks bigger and feels different. It can actually bounce!

## 3. Spinning Eggs

This is a simple experiment that can help you distinguish a raw egg from a boiled egg from a raw one, without cracking them!

You need a boiled egg and a raw egg. (*Please get an adult to help you boil the egg*)

- Using a marker pen, mark the shell of each egg so that you know which one is boiled and which is raw.

- Now place them both on a hard, flat surface.
- Spin each of them in turn, using the same amount of effort. Let them spin and come to a stop naturally. Record the time each one takes.
- Which one stopped quicker?
- Now spin them again, together, this time.
- While they are still spinning quite fast, apply a little pressure with your finger to slow them down and stop them.
- Was one of them easier to stop than the other? Which one?
- Try the experiment a few times until you get consistent results and then compare them.

### ***What Happened Here?***

A boiled egg is solid inside. So it should start spinning easier and continue to spin a little longer..

The raw egg is liquid inside. The liquid tends to move around and won't let the egg spin evenly. It is therefore likely to stop earlier as well.

But when you try to stop them, it's a bit different.

You will find the raw egg will stop under the pressure of your finger, but if you let it off, it will try to spin a little more! This is because the liquid inside is still spinning even when the egg seems to be stationary.