# [Naked Egg Experiment](http://www.stevespanglerscience.com/img/cache/bcb9b8db117ee64376aedaf7af3595ca/20110429-naked-eg)[Naked Egg Experiment](http://www.stevespanglerscience.com/experiment/naked-egg-experiment) – start the week before

# [Steve](http://www.stevespanglerscience.com/experiment/naked-egg-experiment) Spangler Youtbe link of us at camp <https://www.youtube.com/watch?v=QvgipujsuaI>

## Which came first, the rubber egg or the rubber chicken?

This experiment answers the age-old question, "Which came first, the rubber egg or the rubber chicken?" It's easy to make a rubber egg if you understand the chemistry of removing the eggshell with vinegar. What you're left with is a totally embarrassed naked egg and a cool piece of science.

### Materials

* Raw egg
* Graduated cylinder or tall glass
* Vinegar
* Patience
* Place the egg in a graduated cylinder or tall glass and cover the egg with vinegar.
* Look closely at the egg. Do you see any bubbles forming on the shell? Leave the egg in the vinegar for a full 24 hours.
* Change the vinegar on the second day. Carefully pour the old vinegar down the drain and cover the egg with fresh vinegar. Place the glass with the vinegar and egg in a safe place for a week - that's right, 7 days! Don't disturb the egg but pay close attention to the bubbles forming on the surface of the shell (or what's left of it).
* One week later, pour off the vinegar and carefully rinse the egg with water. The egg looks translucent because the outside shell is gone! The only thing that remains is the delicate membrane of the egg. You've successfully made an egg without a shell. Okay, you didn't really make the egg - the chicken made the egg - you just stripped away the chemical that gives the egg its strength.

### How does it work?

Let's start with the bubbles you saw forming on the shell. The bubbles are carbon dioxide gas. Vinegar is an acid called acetic acid - CH3COOH - and white vinegar from the grocery store is usually about 5% acetic acid and 95% water. Egg shells are made up of calcium carbonate. The vinegar reacts with the calcium carbonate by breaking the chemical into its calcium and carbonate parts (in simplest terms). The calcium part floats around in the solution while the carbonate part reacts to form the carbon dioxide bubbles that you see.

Some of the vinegar will also sneak through, or permeate, the egg's membrane and cause the egg to get a little bigger. This flow of a liquid from one solution through a semi-permeable membrane and into another less concentrated solution is called osmosis. That's why the egg is even more delicate if you handle it. If you shake the egg, you can see the yolk sloshing around in the egg white. If the membrane breaks, the egg's insides will spill out into the vinegar. Yes, you've made a pickled egg! Allowing the egg to react with the carbon dioxide in the air will cause the egg to harden again. Amazing!