

# Rubber Eggs

**Overview:** Did you ever think it would be ok to bounce an egg? In science class, anything is possible! Learn how in today's experiment. After this bouncy experiment, you'll know one way to spot a chemical reaction. You'll also see how solid calcium carbonate and stinky liquid vinegar can combine to produce carbon dioxide gas.

## Materials

- hard-boiled egg
- glass or clean jar
- distilled white vinegar
- Optional: regular egg
- Optional: chicken bones

## Experiment

1. Wear your gloves and put your goggles on. No exceptions!
2. Place a hard-boiled egg into a glass or jar. Fill with enough vinegar to cover the egg and leave alone for 24 hours.
3. If doing this experiment with regular eggs or chicken bones, put each in a separate container and cover with vinegar. Let sit for 24 hours. Check again after 48 hours.

## Rubber Egg Data Table

Item/Object	Detailed Description of Results after 24 hours <i>(for hard-boiled egg ONLY, include approximately how high it bounced)</i>	Detailed Description of Results after 48 hours <i>(for hard-boiled egg ONLY, include approximately how high it bounced)</i>
Hard Boiled Egg		
Regular Egg (optional)		
Chicken bones (optional)		

## Reading

If you soak chicken bones in acetic acid, or distilled vinegar, you'll get rubbery bones that are soft and pliable because the vinegar reacts with the calcium in the bones. This happens with older folks when they lose more calcium than they can replace in their bones, making the bones brittle and easier to break. Scientists have discovered calcium is replaced more quickly in bodies that exercise and eat calcium rich foods, like green vegetables.

Egg shells are also made up of calcium in the form of calcium carbonate ( $\text{CaCO}_3$ ). This organic compound is also found in limestone, chalk, marble, and coral. It is classified as a base, with a pH below 7.

Vinegar contains acetic acid. Acetic acid is what gives vinegar its awful taste. It's classified as an acid, with a pH above 7.

As calcium carbonate reacts with the vinegar, and the egg shell dissolves, a chemical change occurs and carbon dioxide gas is released in the form of bubbles. These can be clearly seen as the egg shell dissolves. You will also smell vinegar when the bubbles occur, but vinegar is not being given off by the chemical reaction. Vinegar has a very low surface tension which makes that stink go everywhere.

### **Exercises**

1. Describe what the eggshell looked like before the reaction.
2. Describe the acetic acid
3. The product you witnessed in this chemical reaction was carbon dioxide, a colorless, odorless gas. How can you tell there really was a chemical reaction?
4. Why did the egg turn to "rubber?"

**Answers to Exercises: Rubber Eggs**

1. Describe what the eggshell looked like before the reaction. (Answers may vary but should include details such as color, thickness of shell, what type of surface the shell has, etc.)
2. Describe the acetic acid (Answers may vary but should include details such as color, viscosity, smell.)
3. The product you witnessed in this chemical reaction was carbon dioxide, a colorless, odorless gas. How can you tell there really was a chemical reaction? (bubbles formed)
4. Why did the egg turn to “rubber?” (The vinegar dissolved the calcium of the egg.)