

# Brush up on oral health! An experiment using eggs as a model to understand our oral health

An eggsperiment presented by Diana Proctor, PhD, and Ryan Blaustein, PhD



Eggshells are made of calcium carbonate, a substance that is similar to the substance that makes up our teeth. Because of this similarity, we can use eggs as a model to understand how various foods and toothpastes protect or disrupt the integrity of our teeth

This demonstration shows that acidic soft drinks can weaken our teeth. It also shows that fluoride, which can be found in toothpaste, mouth rinse and some tap waters, can protect our teeth.

## You'll need:

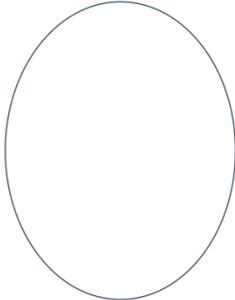
- To “prepare for the experiment” 1-2 days before the scheduled experiment (see step 1 below)
- 2 fresh eggs (make sure there aren't any cracks!)
- 1 can of cola
- Mouth rinse containing fluoride (can be found in the dental aisle)
- 1 bottle of white vinegar
- 4 small, clear plastic containers (each big enough to hold an egg)

## Instructions:

1. Step 1: Prepare for your experiment (1-2 days before the experiment)
  - a. Place one egg in each of two plastic containers.
  - b. Fill one container with cola – this is treatment 1
  - c. Fill the other with fluoride mouth rinse – this is treatment 2
  - d. Let the eggs sit in the liquids for 1-2 days
2. Step 2: Perform your experiment (on the day of the experiment)
  - a. Transfer your treated eggs from treatment 1 and treatment 2 to two new plastic containers.

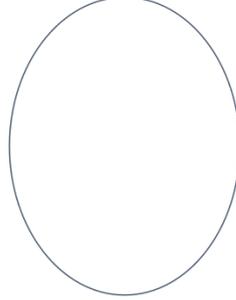
- b. Fill both containers with white vinegar and observe their reactions
- c. Record your observations in the tables here:

Egg A: from Cola Bath



Observations from egg in cola bath

Egg B: from Fluoride Bath



Observations from egg in fluoride bath

**Lesson Learned:**

The acids in the cola weakened the eggshell, permitting the acid in the vinegar to further fracture the shell. Bubbles form on the shell of the cola-soaked egg, as a result, causing air to escape the egg through the thin, weak shell.

Bubbles don't form as quickly on the shell of the egg soaked in fluoride. This is because fluoride strengthens the eggshell in the same way it strengthens teeth. Because of this, we conclude that fluoride protects against the acids in the vinegar.

Once cracks get introduced into eggshells or dental enamel, they cannot be repaired. This is why dentists "drill cavities" and extract teeth. By the time each of you reach adulthood, you will have 32 teeth! Protecting teeth begins at an early age. To help protect your teeth, go to and listen to your dentist! Brush your teeth at least twice a day with dental cleansers containing fluoride.

Take the challenge to retain all your teeth over the course of your life. Data from the National Health and Nutrition Examination Survey, 1994-2204, suggest that the average adult between the ages of 50-64 only has ~22 teeth, indicating many Americans have suffered tooth loss. Don't become one of them.

Watch: What causes cavities? - Mel Rosenberg:  
<https://www.youtube.com/watch?v=zGoBFU1q4g0>