



The Egg\$periment



What You Will Need:

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| <ul style="list-style-type: none"> • Glass measuring cup • 4.6 oz tube of regular toothpaste (active ingredient –Sodium Fluoride) • Fresh egg(s) without cracks • Table vinegar | <ul style="list-style-type: none"> • Plastic wrap • Marker • Clear nail polish • Paper towel • Teaspoon |
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What You Will Learn:

- Egg shells and teeth have something in common; both can be weakened by acid. When you put an egg in vinegar (a weak acid similar to what causes cavities), it attacks the shell, making it soft and weak. When teeth are exposed to acids in your mouth, your teeth become vulnerable to cavities.
- This experiment shows how you can help lock in the calcium in an eggshell — and your teeth — by protecting them with a fluoride toothpaste.

(You will need five to six days. If you're doing this experiment at school, start on a Thursday or Friday afternoon.)

Experiment:

1	Warm the egg to room temperature. With clean hands, wash the egg with warm water and then dry it with the paper towel.	7	Pour enough vinegar into the clean measuring cup to cover the egg and then carefully place the egg into the vinegar with the spoon. Rest the spoon on top of the egg to keep it under the vinegar. Cover the cup with plastic wrap. Watch as bubbles form on the unprotected side of the egg.
2	Empty the tube of toothpaste into the glass measuring cup. Pat the toothpaste down with a teaspoon to level it and remove any air bubbles.	8	Leave the egg in the vinegar until the unprotected side (the unmarked side) of the egg softens. This will take 7-13 hours.
3	Mark one side of the egg with a marker and cover this mark with clear nail polish to protect it from the vinegar.	9	After 7 hours in the vinegar remove the egg and check if the unprotected side has softened by tapping it very lightly with your finger or a pencil. If it is soft, go on to step 11.
4	Place the egg into the measuring cup, marked side down, so that the toothpaste covers half the egg. Make sure that the egg doesn't touch the bottom of the cup.	10	If the unprotected side of the egg is still hard, put the egg back into the vinegar. Check the egg every couple of hours until the unprotected shell has softened.
5	Cover the cup tightly with plastic wrap and leave it in a safe place at room temperature for at least four full days (96 hours).	11	When the unprotected egg side is soft, remove the egg and gently wash it with warm water. The egg is very fragile now so be careful!
6	With clean hands, rinse all the toothpaste off the egg with warm tap water and let the egg dry overnight.		

Conclusion:

- Acids, like vinegar, weaken the protective shell of the egg. This weakening is very similar to the damage caused to the outer layer of your teeth by plaque.
- The fluoride in the toothpaste protected the side of the egg with the x. This same protection is given to your teeth by toothpaste with fluoride when you brush regularly.

Compliments of Dr. Mark V. Muncy and Dr. Kathleen W. Monn

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