

SHELL SHOCKED!

TOOTHPASTE TO THE RESCUE!

BIG QUESTION

Will the Crest
toothpaste barrier
help protect the
eggs from turning
colors and from
getting softer?

RESEARCH

Resource 1: The eggs represent teeth and the acidic liquids represent the acids created by the plaque bacteria. This causes cavities and tooth decay. Acid weakens eggshells and teeth. Shows how important it is to brush your teeth to keep your teeth healthy and strong from an acid attack.

Resource 2: This project shows how the flouride in the toothpaste protects calcium that is in the eggshells from the acid in the acidic liquids. What the Coca Cola and the lemon juice do to the eggshells mirrors the acid-forming bacteria and sugars on the teeth enamel that is unprotected.

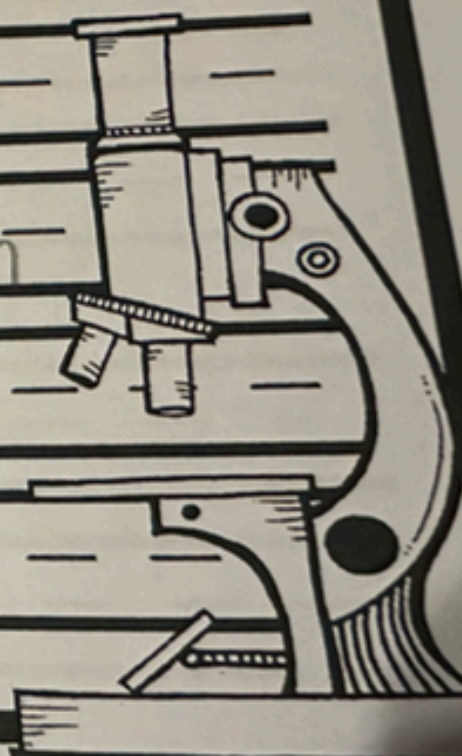
Resource 3: The teeth enamel or outer coating are represented by eggshells. Toothpaste is meant to prevent stains on your teeth and to clean them. Teeth can be easily stained similar to the eggshells that did not have a protective coating in the acidic liquids. Toothpaste also protects teeth from breaking down or decaying. The acids break down the shell or teeth enamel and cavities can form more easily. The flouride in the toothpaste works with the saliva in the mouth to create protective coatings around the tooth enamel. This helps create stronger teeth.

HYPOTHESIS

We think that the eggs covered with Crest toothpaste will be less colored and harder than the eggs without toothpaste.

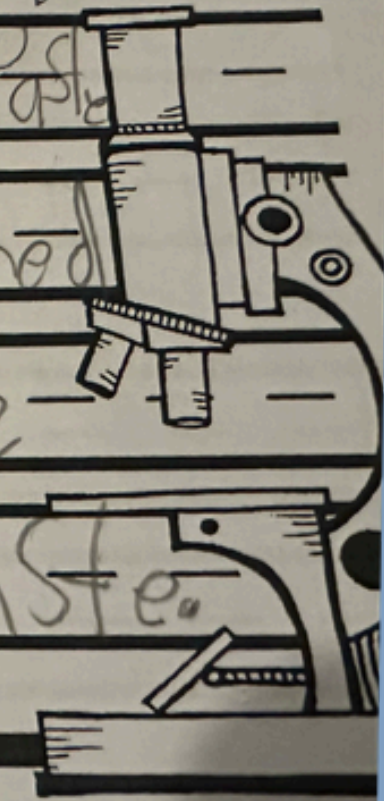
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ABSTRACT

Our project tested the durability of eggshells when placed in highly acidic liquids with or without toothpaste as a barrier against the acid. Eggshells are similar to teeth with enamel and this project can show young students how acidic drinks and foods can negatively effect their teeth over time.

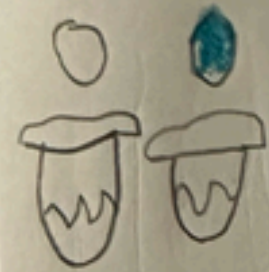
Our class thought that the eggs that were covered with Crest toothpaste would be more durable, be less colored and stronger when taken out of the acidic liquids than the eggs that did not have Crest toothpaste on them. Our hypothesis was correct. The eggs that were covered with Crest toothpaste were lighter colored and a little bit stonger when you touched them compared to the eggs that were not covered in a toothpaste barrier and placed in the acidic liquids.

MATERIALS

- Two cups of Coca Cola
- Two cups of lemon juice
- Crest Sparkle Toothpaste with flouride for kids
- Four or more napkins
- Four spoons
- Four sticky notes and a Sharpie marker

PROCEDURES

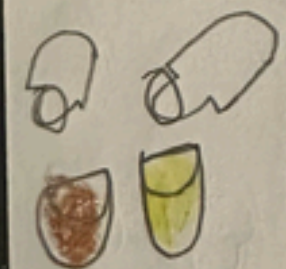
- First, we poured Coca Cola in soda cup 1 and soda cup 2 and filled them half way. We poured lemon juice in lemon juice cup 1 and lemon juice cup 2 and also filled them up half way. We labeled them with sticky notes as soda 1, soda 2, juice 1 and juice 2.
- Next, we put 1 regular egg that was rinsed and dried in soda cup 1 and another rinsed and dried egg in lemon juice 1.
- Then, we put 1 egg that had been rinsed, dried and covered with a teaspoon of toothpaste in soda cup 2 and another egg that had been rinsed, dried and also covered in one teaspoon of toothpaste in lemon juice cup 2.
- Finally, after sitting for 24 hours we took the eggs out and observed the results. We set each egg on a napkin in front of each cup to observe them. Students walked up in small groups to observe the eggs. They also got to touch them gently so they could feel the textures of each of the eggs.
- Students went back to their desks and worked on writing and drawing their results/observations.



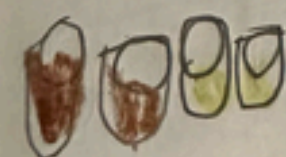
First - we put soda
in cups and lemon juice
in the other 2 cups.



Next, we put 1 regular
egg in soda 1 and 1
regular egg in juice 1.

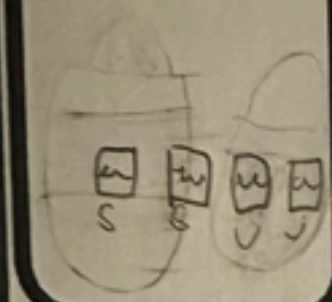


Then, we put 1
toothpaste egg in
soda 2 and one in juice 2.



Finally, after sitting for
24 hours we took
the eggs out and
observed the results.

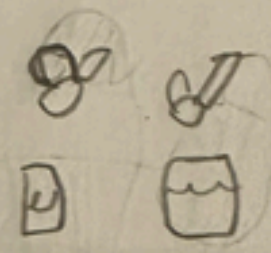
Procedure (What will I do?)



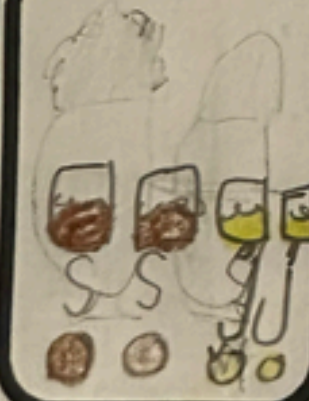
First - we put soda
in 2 cups and
lemon juice in



Next - the other 2
cups - we put 1
regular egg in soda
1 and 1 regular ^{egg} juice 1.



Then we put 1 tooth
paste egg in soda 2
and one in juice 2.



Finally after sitting for
24 hours we took
the egg out and observed

Procedure (What will I do?)

CHART

Liquid Type and Cup Number	With or Without Toothpaste	How The Egg Looked When Pulled From The Liquid After 24 Hours	How The Egg Felt When Pulled From The Liquid After 24 Hours
Soda Cup 1	Egg without toothpaste	Had the darkest brown stain color out of all the eggs.	Softer than the egg in Soda Cup 2 but still slightly squish able.
Soda Cup 2	Egg with toothpaste	Still lots of white color with some light brown staining color. Not nearly as dark as the egg from Soda Cup 1.	A bit harder that the egg in Soda Cup 1. Not as squish able.
Juice Cup 1	Egg without toothpaste	Crystallization and decay on the egg. Slightly see through under the texture.	Created a bumpy texture on the egg. Squish able even with the texture.
Juice Cup 2	Egg with toothpaste	Egg was very thin and seemed to be see through. Could see the yolk inside. Visible white outer layer still visible but thin.	Egg was very soft and squishy when touched.

RESULTS

The egg in Soda Cup 1 with no toothpaste barrier was the darkest and most stained of all the eggs. It was a bit softer to the touch than the egg in Soda Cup 2 as well. The egg in Soda Cup 2 that had a toothpaste barrier was stained less than the egg in Soda Cup 1. The color was darker than a regular egg but not as dark as the egg in Soda Cup 1 that had no toothpaste barrier. The egg in Soda Cup 2 was also a bit stronger to the touch than the egg in Soda Cup 1.

The egg in Juice Cup 1 with no toothpaste barrier had formed crystals all around it and showed decay from the acid in the lemon juice. When squeezed slightly it was very squishy and not strong like a regular egg. The egg in Juice Cup 2 that had a toothpaste barrier was very soft to the touch and very clear. You could see the yolk inside of it. There was no staining of the egg in Juice Cup 2 since it seemed the acid ate through the lining of the egg. This egg also did not have the crystals that formed and the decay looked different than that on the first egg in Juice Cup 1. There was still a little bit of a white coating on the egg in Juice Cup 2.

CONCLUSION

Our hypothesis was correct. The toothpaste helped the eggs stay more intact and not change so much with color or texture. The eggs that did not have toothpaste on them changed more with their color, texture and became softer than the other eggs.

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