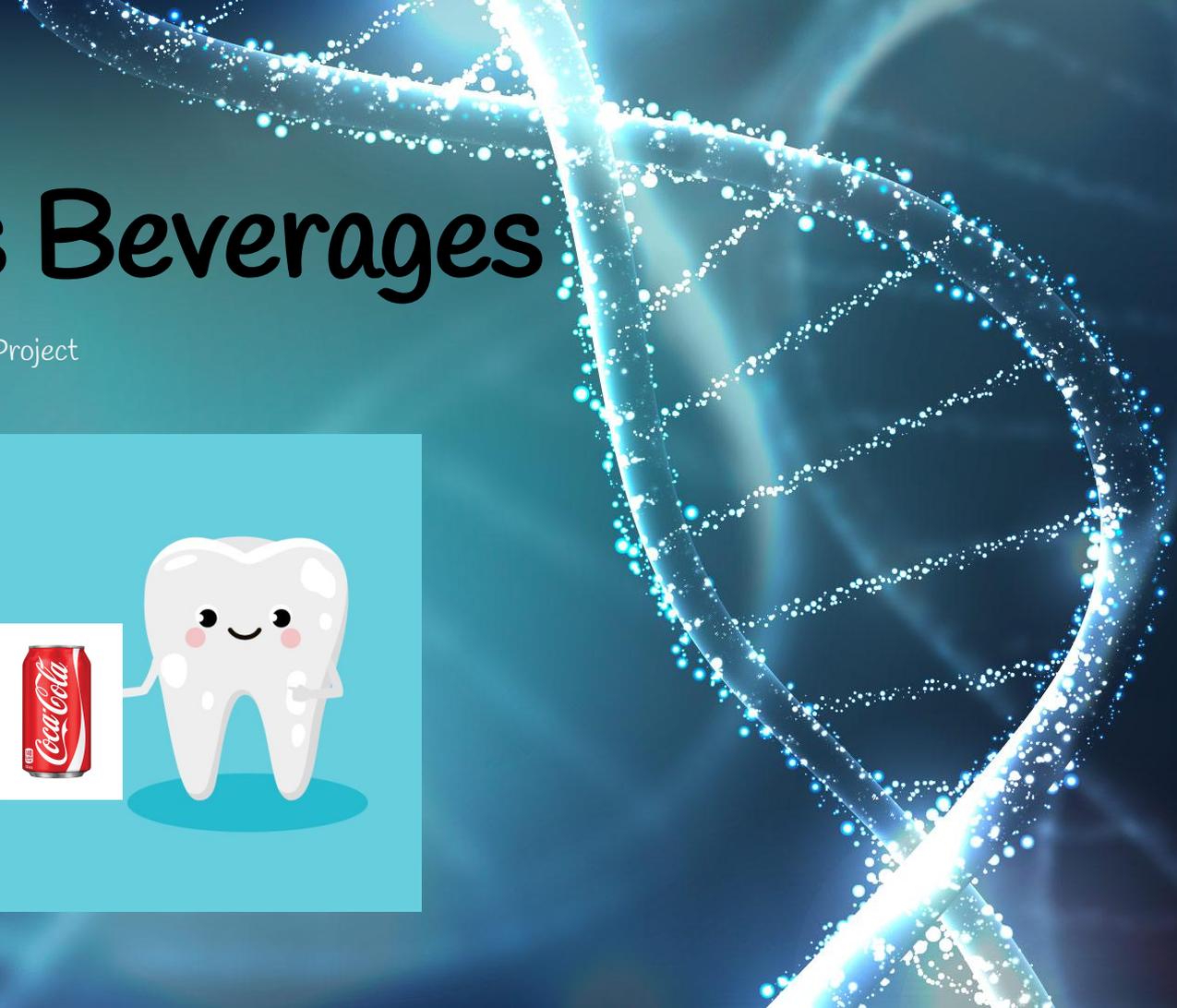
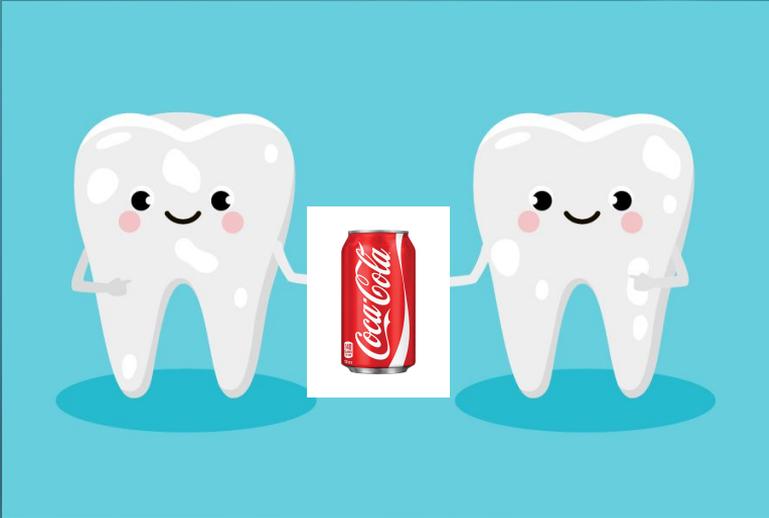


Teeth vs Beverages

Kyla MacNicol's Science Fair Project



What is my experiment?

The experiment that I did was to look at how different drinks affect egg shells. How it works is the egg shells are similar to the enamel of our teeth. So when you put the egg shells into the beverage it shows what would happen if you drank two or three things of the drink everyday and did a bad job at brushing your teeth. I used a few containers and put coffee, tea, coke and cranberry juice in them(I did not do the cranberry juice on experiment two because the results were not very clear in experiment one). I hollowed out the egg then put the shell in the container and let it soak for three days checking in on it every 24 hours.



Purpose:

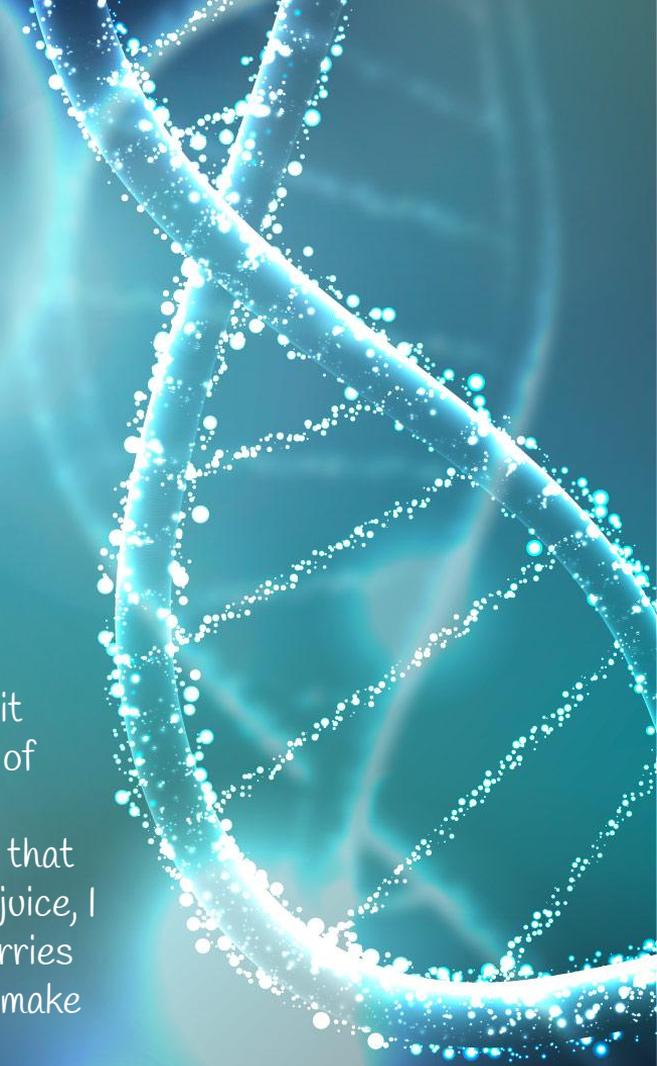
To see if different liquids stain your teeth more than others do.

Hypothesis:

I think that coffee is going to stain the egg shell the worst after that I feel like it will be coke, tea, and then I think that cranberry juice is going to stain the egg shell the least of them all.



I think this because coffee is made from dark beans that stain the water and it makes this dark and very coloured drink. Coke is a soda and sodas have lots of sugar which is something that I think is going to make it stain not as much as coffee but still quite a bit. I think tea is going to be next because tea is leaves that have been dried and this has minerals that can stain your teeth. Cranberry juice, I think is going to stain the shell the least because it is made of berries and berries don't really stain your teeth but there are also other ingredients that might make the shell coloured.



Materials:

- 4 hollowed out egg shells
- Coke Cola
- Kicking Horse Coffee – Medium Roast
- Tetley White Tea
- Ocean Spray Cranberry Juice
- Containers
- push pin
- straw



Variables:

Controlled – egg shells came from the same carton of eggs, for all experiments

Manipulated – the type of liquid I put the shells into

Responding – the final colour of the egg shells



Procedure:

- 1. Use a push pin and a straw to hollow out 4 eggs to get the shells.*
- 2. Pour the same amount of each liquid into 4 separate containers. (coke, coffee, tea and cranberry juice)*
- 3. Remove shells from the liquid after 24 hours and record observations into the observation table.*
- 4. After observations, place the shells back into the liquid.*
- 5. Repeat step 3 and 4 until the end of the 3 day trial.*
- 6. After recording final observations, clean up work space and dispose of the used shells.*



Observations:

Experiment 1

For this experiment I used coffee, tea, coke, and cranberry juice. At the beginning of the experiment it looked like coffee was going to stain the egg shell the worst out of them all but in the end coke turned out to be a little darker. At the end of the experiment the shells order from darkest to lightest was Coke, Coffee, Tea, then Cranberry juice. The cranberry juice did not do very well because it made a thin layer that seemed like skin on the outer part of the shell. One other thing about the cranberry egg is that on day two when I was putting the egg back into the liquid the shell broke. Tea did not stain the shell as bad as I thought that it would but still stained it worse than the juice did. Coffee and Coke stained the white shell the most and for the first two days coffee was darker than coke. But on the third day coke soaked up more colour and became darker.

Tracking Chart - Experiment 1

| Product | Day 1 | Day 2 | Day 3 |
|-----------------|--|---|---|
| Coke | The coke turned out to be a lot darker than I thought it would be. Got quite a lot darker but not as dark as coffee. Second darkest. | Coke was very similar to coffee. It also didn't gain lots of colour but very close to coffee and is still lighter than the coffee but not by much. Second darkest | Not much change but gave but in the end got a little darker than the coffee. Darkest of them all. |
| Coffee | The coffee was not much different than I thought it would be. Coffee was the darkest of them all. | The coffee got little dots on it and is not that much darker than yesterday. Darkest but not by much. | Didn't change a lot. Little darker but now is the second darkest. |
| Tea | The tea was a little lighter than I thought. It was the third darkest or the second lightest. | Gained a little more colour but still the second darkest. | Little darker but now is the lightest and is pretty light. |
| Cranberry Juice | The colour was similar to what I thought. It also made a layer of skin on top of the shell. Lightest of them all. | Shell broke. Gain some colour. Had a darker layer of skin. Lightest of them all. | Got darker and got even darker than tea today. Second darkest of them all. |



24 hour



48 hour



72 hour

Experiment 2

For this experiment I didn't use the cranberry juice because of the layer of skin that happened and it made it hard to tell the true colour of the shell. This time I only used Coke, Coffee, and Tea. This time the tea didn't get as dark as experiment one and it was still very light at the end. Coke was darker than coffee for the entire experiment. For the coke I would say that the shell soaked up more colour than in experiment one. Everyday it gained more colour which made it darker than the coffee for all of the days. Coffee didn't gain as much colour as in experiment one but still made it pretty close to the coke egg shell. The tea didn't gain that much colour compared to first experiment. The tea kind of looked like a type of animal egg or something.

Tracking Chart - Experiment 2

| Product | Day 1 | Day 2 | Day 3 |
|---------------|---|--|---|
| Coke | The shell got a little darker than the coffee shell but is still very close. For day one darkest of them all. | Got a little darker than day one but is still darker than coffee, still the darkest of them all. | The bottom is a little darker than the top. Overall I don't think that it changed much from yesterday and is the darkest of them all. |
| Coffee | Got darker but not quite as much as experiment one but pretty close. It is also close to coke but a little lighter. Second darkest of them all. | A little more colour was added but not all that much. Still second darkest. | The shell got a little dark but not all that much. Also still not as dark as coke. Second darkest. |
| Tea | Didn't change much in colour and didn't change much in general it got slightly darker but is the lightest by quite a lot. | Got a little colour added in comparison to yesterday but not by much. Also it got some spots on it which made it look like some kind of an animal egg. | Little colour like yesterday but it still not every dark. Lightest of all |



24 hour



48 hour



72 hour

Conclusion:

In conclusion, my hypothesis was not correct because the coke stained the darkest of them all but then coffee was pretty close to the coke. The cranberry juice was the third and the tea was the lightest of them all at the end. If you were to drink coke a few times a day for a long time without brushing your teeth it would be worse than coffee on the staining of your teeth, but not by that much. The cranberry would be the next darkest or the second lightest. Tea was the lightest of all.

Next Steps:

I think that it would be cool to see how different foods stain your teeth because if this is what happens with drinks, what would different foods do to your teeth?

Possible Sources of Error:

- The coffee in both experiments could have been slightly different in strength which could have caused it to be darker in one experiment vs the other.
- The tea in both experiments could have been slightly different in strength which could have caused it to be darker in one experiment vs the other.
- The eggs could have come from two different chicken (chickens have different diets from each other) even though they came out of the same carton.

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Why do you use eggshells in order to do this?

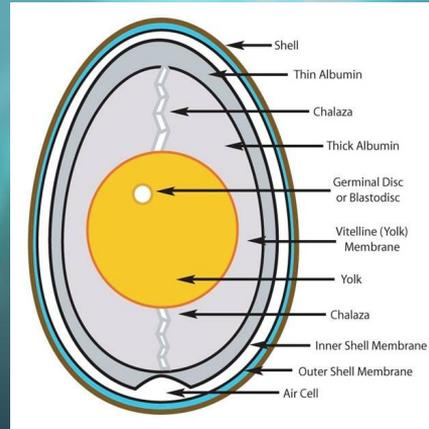


My coke result.

You would use eggshells in order to do this experiment because egg shells have a similar enamel to your teeth and you have to put in something that is similar to your teeth or this would be a totally useless experiment. Eggshells also are the same colour so they would soak up liquid the same way that teeth would. Also eggshells protect eggs from breaking like a tooth's enamel protects the tooth from decaying.

The Membrane

What is a Membrane? The Membrane is a little layer of a skin type thing on the inside of the eggshell. The membrane made it difficult to empty the egg out of the shell without the shell breaking or cracking. After the experiments were over and I was emptying the liquid out of the shells so that I could throw the shells away, I saw that the membrane was dyed as well as the shell. What I found interesting was the fact that the membrane of the lightest egg shells was actually the darkest inside and the ones that were the darkest shell had the lightest membrane.





Thanks for
listening

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