C2.3 Acid on the teeth

The white enamel on our teeth is the hardest substance in our entire body. However, tooth enamel is nearly powerless in the presence of acids. Acids are responsible for the formation of tooth decay. When tooth decay spreads from the outside of the tooth to the inside, it can be very painful. A dentist has to remove the damaged tooth material with a drill and replace it with a plastic material, for example.
Acids in our mouths come from food and drinks, and from the bacteria living in our mouths that convert the sugar from our food into acid.

The material in an eggshell is quite similar to tooth enamel. Using an egg, find out how acids damage tooth enamel.

Write down your ideas and guesses:

You need the following for the experiment:

- ☐ 1 egg
- ☐ 5 disposable gloves
- ☐ 1 magnifying glass
- ☐ 1 plastic cup, 500 ml
- ☐ 1 large spoon
- ☐ 1 small spoon
- ☐ vinegar

Required materials.

How to set up the experiment:

Lay out all the materials as shown in the photo.

How to conduct the experiment:

1. Carefully observe the raw egg and its surface, and then again with the magnifying glass.
2. Place the egg in the cup.
3. Pour vinegar over the egg until the egg is completely covered, and then wash your hands thoroughly.
4. Write down the time: It is _____ o'clock.
5. Observe the eggshell after one minute, ten minutes, one hour, and one day. Write your observations in the table.

Write your observations in the table:

You can also draw your observations. If you can't see much, use the large spoon to carefully remove the egg from the cup and use the small spoon to scrape the egg's surface a little bit.
You can also put on a disposable glove and use that hand to touch the surface. What can you observe? How does the egg feel?

Time	Observation
After 1 minute	
After 10 minutes	
After 1 hour	
After 1 day	
After ___ days	

Evaluate your observations:

1. Describe the damage to the eggshell in one sentence.

2. Your tooth enamel reacts in a similar way to acids as the eggshell does. What can you expect if you have acids in your mouth for a long time and do not brush your teeth?

Doing further research:

If you can protect your teeth from decay using toothpaste, it should also be possible to protect the eggshell from acids using toothpaste, right? Try brushing the eggshell with toothpaste.

1. Using your fingers, spread fluoride toothpaste on the shell of a raw egg.
2. Wrap the treated egg in plastic wrap and wash your hands thoroughly.
3. Store the egg in a safe location for four days.
4. Perform the same experiment as above with this treated egg.
5. Compare your results: What does the shell look like when you treated the egg beforehand with toothpaste?