

Lesson 2: Make your own toothpaste!

Prior knowledge / Work:

A knowledge of teeth and dental care.

Learning Objectives:

- To make toothpaste
- To adapt the recipe and look at the effects the changes make
- To understand what role the different ingredients have within the toothpaste
- To create an instructional text about making toothpaste

Subject Links:

- Science - materials, investigative science
- Literacy - Instructional texts, persuasive writing

Resources:

- Selection of commercially bought toothpastes
- Baking powder
- Glycerin (can be bought in most chemists)
- Salt
- Peppermint oil (or other flavourings as required)
- Toothbrush for each child to test it!
- Worksheet 1

Background Information:

The History of Toothpaste:

As long ago as 5000 BC the Egyptians were making a tooth powder consisting of powdered ashes of ox hooves, myrrh, powdered and burnt eggshells, and pumice. It is thought that it was rubbed onto the teeth using the fingers.

The Greeks, and then the Romans, improved the recipes for toothpaste by adding abrasives such as crushed bones and oyster shells, which were used to clean debris from teeth. The Romans added powdered charcoal, powdered bark and more flavouring agents to improve the breath.

There are only a few records related to toothpaste or powder then until around 1000 AD when the Persians wrote to advise their people to be wary of the possible dangers of using hard abrasives as toothpowders. It was recommended that people used burnt hartshorn, the burnt shells of snails and burnt gypsum. Other Persian recipes involved dried animal parts, herbs, honey and minerals

There is then another huge gap in the history of toothpaste until the 18th Century, when toothpowder, or dentifrice, became available in Britain. These powders were developed by doctors, dentists and chemists and included substances very abrasive to teeth, such as brick dust, crushed china, earthenware and cuttlefish. Bicarbonate of soda was used as the basis for most toothpowders, and some contained other ingredients that would not be considered appropriate today, such as sugar. Borax powder was added at the end of the 18th Century to produce a favourable foaming effect. The rich applied toothpowder with a brush. The poor cleaned their teeth with bicarbonate of soda, using their fingers.

In the early 19th Century, Glycerin was added to make the powders into a paste. It also helped to make it more palatable. Strontium was introduced at this time as well, which strengthens teeth and reduce sensitivity. A dentist called Peabody became the first person to add soap to toothpowder in 1824 and chalk was added in the 1850s by John Harris.

Toothpaste was first mass-produced in 1873. It was in a jar and it smelt good for the first time. In 1892, Dr. Washington Sheffield of Connecticut was the first to put toothpaste into a collapsible tube: *Dr Sheffield's Creme Dentifrice*. Sheffield's company was to become Colgate

After World War II there were great advances in the development of toothpaste. Synthetic detergents replaced the soap with emulsifying agents, such as sodium lauryl sulphate. This was soon followed by the discovery that the addition of fluoride and fluoride compounds to toothpaste would strengthen tooth enamel against decay.

Activity:

Explain to the children that they are going to have a go at making their own toothpaste! This will not be as effective as modern toothpastes as there is no fluoride added to protect teeth, but this recipe is very similar to early toothpastes and will certainly do a reasonable job at cleaning the teeth.

Show the children the recipe:

- 3 teaspoons baking soda
- pinch of salt
- 2 teaspoons glycerine / glycerol
- Up to 5 drops of peppermint flavouring (or another flavouring if preferred)

Discuss the ingredients with the children. Let them have a look at each ingredient as many will not be familiar with what baking soda or glycerine is. Ask them what they think the role of each ingredient is in the toothpaste? (The baking soda and the salt provide the abrasive qualities and the glycerine makes the mixture into a paste.) Toothpaste is traditionally minty, hence the peppermint oil, but different flavourings could be added.

Explain how to make the toothpaste. The salt and baking should be mixed together first of all, then blended with the glycerine. Finally, the flavouring can be added. This can be demonstrated to the children and then everyone can try a little on their toothbrush. Discuss

the children's reactions to it. What was similar / different to conventional toothpastes? Did it leave the teeth feeling clean? What did they like / dislike about the toothpaste?

Discuss with the class what changes could be made to this recipe? Some may feel it was too salty and want to remove that from the recipe. Others may want to try a different flavouring or try it without the peppermint oil.

In small groups / pairs, the children must decide on a recipe for their toothpaste. They will then need to try this out and test it. Time should be given to allow this process to happen. They may need to experiment a little. Encourage children to start with small amounts of flavouring and gradually build up - you can always add a bit, but you cannot take it out!

When the children are happy with their recipe, they can use Worksheet 1. to create an instructional text that demonstrates what needs to be done to make their version of toothpaste.

Extension Ideas:

There is massive potential within this activity regarding extending the experience:

- Think of a name for their product
- Write slogans and persuasive texts
- Design packaging for their toothpaste
- Create adverts / posters
- Evaluate promotional materials / persuasive messages on commercially bought toothpastes
- Investigate and evaluate dispensing methods used by toothpaste manufacturers - Which is best; tubes or pumps?
- Investigate toothbrushes - manual vs electric, different shapes etc.