

# 7B Toothpaste



Do you know what's in your toothpaste?  
It's probably a mixture of at least twelve compounds.

Every substance in toothpaste does its own job. Toothpaste companies employ scientists to decide on the best chemical for each job. The scientists work out the quantities to mix together. They make sure the toothpaste tastes and feels good so that people will buy it. They also check that the toothpaste will not harm anyone.

Not everyone in the world uses toothpaste. Many Muslims – and others – clean their teeth with *miswak* twigs. Several scientific studies show that using *miswak* is just as effective as – or even better than – using a toothbrush and toothpaste.



## What's in toothpaste?

### Fluoride

After every meal, bacteria in your mouth digest sugars to make lactic acid. The acid breaks down tooth enamel. Fluoride works with calcium and phosphate particles in your saliva to make new tooth enamel. So you're less likely to get holes in your teeth. The source of fluoride in most toothpaste brands is sodium fluoride.

### Abrasives

Abrasives scrub away sticky plaque. They help remove food stains, too. At first toothpowders – invented by the Egyptians in 5000 BCE – contained powdered eggshells and pumice as abrasives. Greek and Roman toothpowders included crushed bones and shells. Around 1000 CE, Persian Muslims warned that hard abrasives damage tooth enamel. Others realised this much later – in the 1700s, British toothpowder still contained hard abrasives like brick dust.

Modern toothpastes contain less hard abrasives, like silicon dioxide (silica) or titanium dioxide.

### Detergents and foaming agents

Detergents help to clean teeth. They also provide foam to help carry away dirt. Sodium lauryl sulfate is a common toothpaste detergent.

### Flavourings and sweeteners

Early toothpowders contained sugar. When scientists discovered that sugar causes tooth decay, they looked for other sweeteners. Now, many toothpaste brands contain the sweetener sorbitol.

### Thickeners and binding agents

Chemicals like xanthan gum and carageenan thicken toothpastes and bind all the ingredients together. Carageenan comes from red seaweed.

### Other ingredients

Some toothpastes contain substances like triclosan, to kill bacteria. Sensitive teeth toothpastes often contain substances like strontium chloride to block up tiny holes. Whitening toothpastes include compounds like hydrogen peroxide to bleach teeth.

