

# Toothpaste Technology



QCA Science - Unit 5 / 6H: Enquiry in Environmental & Technological Contexts



## **Toothpaste Technology**

Undertaking this unit of work, learn about the many objects and items in our everyday lives that come from quarried products. Since toothpaste contains quarried limestone, this forms the basis of this unit. Children experiment in making their own toothpaste, investigate commercially produced toothpastes and then devise an investigation to test their own toothpaste against the common shop-bought brands. Combined with this unit are strong literacy links, as children create instructional texts and adverts to promote their new brand of toothpaste.

**Unit 5 / 6 H - Enquiry in Environmental and Technological Contexts**  
**Science Year 5 / 6**  
**Toothpaste Technology**

**Overview Teacher Introduction:**

The themes explored in 'Toothpaste Technology' are designed to be used in conjunction with the teaching of Unit 5/ 6H Enquiry in Environmental and Technological Contexts'.

Since toothpastes are one of the many everyday products that use quarried materials, this unit aims to make children aware of the vast amounts of quarried materials we use in our lives that we are not aware of. It also provides children with an investigation that is a little different and has a real-life context.

**The three lessons provided are designed to be slotted into the existing teaching within this unit. You may find that they can replace some of the lessons that you currently teach. These three lessons are not designed to teach all the objectives within this unit, only the sections highlighted in the QCA Unit document. They are designed to enhance and develop existing teaching.**

# Toothpaste Technology!

Unit 5/6H - Enquiry in environmental and technological contexts

## ABOUT THE UNIT

This unit is designed to extend children's investigative work. It focuses on finding the answer to:

- an environmental question
- a technological question.

Both investigations require children to:

- plan a suitable approach
- collect and record evidence in an appropriate manner
- explain their results using scientific knowledge and understanding
- evaluate the evidence collected and consider its limitations.

The unit could be taught at appropriate points during years 5 and 6 or as a whole at the end of year 6 to revisit or extend some types of enquiry that may not have been fully covered by children. It is not intended to replace work on scientific enquiry in other units.

This unit takes approximately 7 hours.

## WHERE THE UNIT FITS IN

The environmental investigation relates to Unit 6A 'Interdependence and adaptation', and the technological investigation to Unit 6G 'Changing circuits'. Work requiring similar approaches is found in:

- Unit 3A 'Teeth and eating' – do all toothpastes have the same cleaning power?
- Unit 3F 'Light and shadows' – how does a shadow vary during the day?
- Unit 4A 'Moving and growing' – relationship of arm length to age
- Unit 4B 'Habitats' – conditions preferred by small invertebrates
- Unit 4D 'Solids, liquids and how they can be separated' – how to separate a mixture
- Unit 4F 'Circuits and conductors' –varying circuit components.

## VOCABULARY

In this unit, children will have opportunities to use:

- words and phrases that describe and explain a sequence of ideas *eg if it had..., it might...*
- words and phrases that link cause and effect *eg so, because, since*
- analogies *eg use a sponge like a filling in a sandwich, use a sponge like a polo mint*
- words and phrases that qualify responses *eg if it had..., it might...*

## RESOURCES

- ICT data-handling package
- apparatus for measuring length of dandelion leaves
- wires, buzzers, lamps for circuit construction
- aluminium foil
- sponge, carpet or other soft insulating materials
- a range of toothpastes including homemade
- Toothbrushes

## EXPECTATIONS

### at the end of this unit

*most children will:*

make a suggestion of how to investigate a question and plan what to do; make a series of observations or measurements appropriate to the task and record these appropriately; interpret their data and relate this to scientific knowledge and understanding, using scientific language; suggest how what they did could have been improved

*some children will not have made so much progress and will:*

put forward ideas about what needs to be done to answer a question and, with help, plan what to do; make relevant observations and measurements and record these appropriately; suggest explanations for their observations and communicate these using scientific language

*some children will have progressed further and will also:*

plan what to do and how to use available resources effectively; suggest limitations of the data collected or the product made and how these could be reduced



LEARNING OBJECTIVES CHILDREN SHOULD LEARN	POSSIBLE TEACHING ACTIVITIES	LEARNING OUTCOMES CHILDREN	POINTS TO NOTE
<b>CARRYING OUT A SURVEY TO FIND OUT HOW DANDELIONS GROWING IN TWO LOCATIONS DIFFER</b>			
<ul style="list-style-type: none"> <li>• to ask scientific questions</li> <li>• to plan how to answer questions</li> <li>• to decide what kind of evidence to collect</li> </ul>	<ul style="list-style-type: none"> <li>◆ Ask children to consider each part of the dandelion in turn – leaves, stem, flower – and suggest how it might be different in long grass and short grass. Ask them to turn their suggestions into a question that could be investigated and to work in groups to plan how to investigate their ideas, helping them to decide what size sample to use.</li>   <li>◆ Ask the children to consider the cleaning power of toothpaste. Ask them which different toothpastes they can think of and get them to turn this into a question that can be investigated. They will work in groups to plan their investigation, thinking about how they are going to investigate their ideas.</li> </ul>	<ul style="list-style-type: none"> <li>• suggest ideas for investigation <i>eg the leaves in the long grass may be higher off the ground at the tip, the leaves in the long grass might be longer, the dandelions in the long grass might have thinner stems, there may be larger flowers in the short grass</i></li> <li>• plan a suitable method for collecting evidence.</li>   <li>• Suggest ideas, ie. Expensive toothpaste is better at cleaning the teeth, Different flavours affect cleaning power, toothpastes with added bicarbonate of soda are better at cleaning the teeth.</li> </ul>	<p>This investigation could be included as part of Unit 6A 'Interdependence and adaptation'. Other plants <i>eg buttercups</i> could be used instead of dandelions.</p> <p>Other environmental questions could be investigated in a similar manner <i>eg</i>:</p> <ul style="list-style-type: none"> <li>– <i>Do you find more small insects on the top or the underside of leaves?</i></li> <li>– <i>Is there any difference in the length and width of leaves on the top, middle and bottom of a shrub?</i></li> <li>– <i>Will we find different kinds of animals if we take a sample of water from the top, middle and bottom of our school pond?</i></li> <li>– <i>If we make small patches of bare earth in different locations eg under a tree, near a wall, will there be a difference in the type of plants which first grow there?</i></li> </ul> <p><b>SAFETY</b> – All off-site visits must be carried out in accordance with LEA/school guidelines.</p> <p>Children may need to be reminded about treating the plants with care.</p> <p>It may be helpful to discuss beforehand how data is to be recorded.</p>
<ul style="list-style-type: none"> <li>• to collect and record data appropriately</li> <li>• to identify and describe patterns in data</li> <li>• to look critically at data collected</li> </ul>	<ul style="list-style-type: none"> <li>◆ Ask children to collect data and make other observations where appropriate <i>eg noting difference in leaf colour and effectiveness of toothpaste cleaning</i> and to record information appropriately <i>eg in tables, on bar charts</i>. Ask children to identify and describe patterns in the data and help them to look critically at results to decide how strongly they show a trend particularly in relation to sample size.</li> </ul>	<ul style="list-style-type: none"> <li>• collect and record data carefully</li> <li>• identify how strongly the results show a trend making particular reference to sample size</li> </ul>	<p>This work could be enhanced by using ICT data-handling software <i>eg a spreadsheet to collate data and graph results</i>.</p>





LEARNING OBJECTIVES CHILDREN SHOULD LEARN	POSSIBLE TEACHING ACTIVITIES	LEARNING OUTCOMES CHILDREN	POINTS TO NOTE
<b>CARRYING OUT A SURVEY TO FIND OUT HOW DANDELIONS GROWING IN TWO LOCATIONS DIFFER (cont.)</b>			
<ul style="list-style-type: none"> <li>• to try to explain their results using their scientific knowledge and understanding</li> <li>• to describe the limitation of their own and others' evidence</li> </ul>	<ul style="list-style-type: none"> <li>◆ Help children to suggest reasons for any differences found in dandelions in the two locations, drawing on their scientific knowledge. Ask children to prepare a poster display of their question, their plans and their results, and to write one sentence, in large print, summing up their findings. Ask others in the class to consider the sentences and suggest how they might be improved, by recognising the limitations of their work. If necessary prompt by asking questions <i>eg you only looked at 10 leaves in each place so can you say leaves are longer in long grass than in short grass? How do you know it wasn't because one place was more in the shade?</i> Ask the children whether they can draw firm conclusions by combining all their results and to suggest what else they might investigate to test their conclusions further.</li> <li>◆ Help the children to suggest reasons for differences found in results. How effective was their test? How closely did it mimic tooth cleaning? What could they do to improve their results? Ask the children whether they can draw firm conclusions by combining all their results and to suggest what else they might investigate to test their conclusions further.</li> </ul>	<ul style="list-style-type: none"> <li>• suggest reasons for any differences in the plants using scientific knowledge where possible <i>eg the leaves in the long grass were higher off the ground so they can get to the light because plants need light so they can make new material for growth</i></li> <li>• draw conclusions recognising limitations in evidence <i>eg on the whole the leaves were longer in long grass; we think the leaves grow longer in long grass but we'd need to measure more to be sure</i></li> <li>• Suggest reasons for any differences in the toothpastes. Discuss whether something should have been used as a comparison, i.e. plain water.</li> </ul>	

LEARNING OBJECTIVES CHILDREN SHOULD LEARN	POSSIBLE TEACHING ACTIVITIES	LEARNING OUTCOMES CHILDREN	POINTS TO NOTE
<b>DESIGNING A BURGLAR ALARM</b>			
<ul style="list-style-type: none"> <li>to use scientific knowledge to identify significant features of an artefact to be designed</li> </ul>	<ul style="list-style-type: none"> <li>Ask children to explore how to make an electrical switch which makes contact when it is pressed. If necessary, prompt them by showing a simple folded card and foil switch and remind them how it works <i>eg by pressing the two bits of foil together, a complete circuit is made</i>. Tell them that they have to design and make a pressure pad burglar alarm and explain that the burglar alarm should work as a kind of switch, so that when someone treads on it, the circuit is completed and a light comes on or a buzzer sounds. Point out that the pressure pad will be hidden under a piece of carpet and must only be triggered when someone treads on it. Ask children to work in groups to create designs for the burglar alarm, showing the electrical components used.</li> </ul>	<ul style="list-style-type: none"> <li>recognise that a pressure pad burglar alarm works as a type of switch and show this in their designs</li> <li>create designs that show knowledge of electrical circuits and of relevant properties of materials <i>eg foil is a good electrical conductor, sponge is a poor electrical conductor, sponge springs back to original shape</i></li> </ul>	<p>This investigation could be included as part of Unit 6G 'Changing circuits' or Unit 4F 'Circuits and conductors'. Other technological problems could be investigated in a similar manner <i>eg</i>:</p> <ul style="list-style-type: none"> <li><i>Design and make a forcemeter that will measure the size of both push and pull forces.</i></li> <li><i>What is an effective way to clean dirty water?</i></li> <li><i>How can you make a weighing machine from elastic bands?</i></li> <li><i>Design and make a suitable environment for a small invertebrate.</i></li> </ul> <p>Explaining designs for a burglar alarm would be an appropriate context to reinforce how explanations are made in writing. This is identified as an objective in the National Literacy Strategy framework for teaching for year 5.</p>
<ul style="list-style-type: none"> <li>to plan a suitable approach <i>eg creating a variety of designs and selecting the best fit for the design specification</i></li> <li>to test out designs making a series of observations</li> <li>to adjust designs in a systematic way in the light of evidence collected</li> </ul>	<ul style="list-style-type: none"> <li>Provide children with a piece of carpet and access to various materials, including pieces of sponge and foam of different sizes and depths, aluminium foil and electrical equipment. If necessary, offer clues <i>eg use the sponge like the filling in a sandwich, make your sponge like a Polo mint with a hole in the middle; use the foil like bread on either side of the sponge sandwich</i>. When the children have created suitable initial designs, ask them to try out their ideas, making adjustments as necessary <i>eg by using sponge of different depth, by framing foil with strong card/hardboard for greater strength</i>, and to record their modifications by adding to their original plan <i>eg in another colour</i>, explaining the modifications in terms of scientific knowledge and understanding.</li> </ul>	<ul style="list-style-type: none"> <li>test and adjust designs systematically</li> <li>record ideas describing and explaining designs and adjustments made using scientific knowledge</li> </ul>	<p>This activity could be extended by showing children some commercial pressure switches.</p>





LEARNING OBJECTIVES CHILDREN SHOULD LEARN	POSSIBLE TEACHING ACTIVITIES	LEARNING OUTCOMES CHILDREN	POINTS TO NOTE
<b>DESIGNING A BURGLAR ALARM (cont.)</b>			
<ul style="list-style-type: none"> <li>to try to explain their designs using their scientific knowledge and understanding where possible</li> <li>to evaluate the limitations of their own and others' designs</li> </ul>	<ul style="list-style-type: none"> <li>Ask children to make large diagrams of their final burglar alarm design, with annotations explaining the reasons for each aspect of their design <i>eg we had to cut a hole in the middle of the sponge so that when the burglar trod on the carpet, the two pieces of foil would touch each other and complete the circuit.</i> Help children to evaluate their burglar alarms and suggest how their designs might be improved <i>eg which one would you buy and why?</i></li> </ul>	<ul style="list-style-type: none"> <li>evaluate the quality of the final product making suggestions for improvement <i>eg our alarm only works if someone treads in the right spot so we might try putting alternate strips of sponge and foil across the whole mat</i></li> </ul>	

## Lesson 1: 'Is it really from a quarry?'

### **Prior Knowledge / Work:**

To put this unit in context, the children should have learnt a bit about the quarrying industry and how some materials are quarried. This information can be obtained with the use of the 'Virtual Quarry'.

### **Learning Objectives:**

- To appreciate the vast amount of uses there are of quarried materials
- To carry out a simple audit of objects / products in home or school that use quarried materials
- To understand why 'rocks' are commonly used in toothpaste
- To compare the ingredients in a range of commercial toothpastes

### **Subject Links:**

- **Science** - Materials, rocks and investigational work
- **Literacy** - Instructional / informative / persuasive texts

### **Resources:**

### **Background Information:**

From the minute we wake up in the morning and carry out our normal routines of washing our face, brushing our teeth, eating our breakfast with a glass of juice, looking out of the window, we are using materials made from minerals (minerals can be defined as naturally occurring substances that are neither animal or vegetable).

Everything from the bowl you eat your cereal in, the glass your juice was in, to the radio, fridge, light bulbs and window are all there because of minerals and these minerals are extracted from the rocks that are mined from Earth.

In agriculture, construction, transportation, electronics..... in fact, just about every aspect of our lives depends in some way on the materials that we remove from the ground.

This could be seen to start from our requirement for food. Fertilisers made from potash, phosphate rock, sulphur and nitrogen are used to help crops grow. Metals used in tractors and farm equipment harvest that food. Food is transported in vehicles that are made out of metal and we even store our food in metal cans and other containers made from or with minerals. We also need mineral nutrients to keep us healthy! Our foods contain calcium, iron, magnesium,

copper and zinc to name but a few - some of us even take vitamin mineral supplements to make sure we get enough!

Just about all the materials we use for construction are made from materials from the ground - brick, stone, asphalt, concrete, pipes, wires, and glass.... The list is endless!

(based on information from U.S Bureau of Mines, Office of Public Information 1992)

In an everyday house, there are numerous examples in bathrooms in particular. Just have a look at the ingredients in shampoo, cosmetics and toothpaste and it may surprise you! Many of these products contain mineral materials;

Talc - (A magnesium silicate mineral) Obviously used in talcum powder, but also found in eye shadow, some deodorants, lotions and creams.

Kaolin - (A clay) is used to absorb moisture and is used in 'mud packs'.

Titanium dioxide - Found in make-ups, nail polish, lipstick and also in the 'M' on M&M sweets!

Other examples can be found on the site:

[www.resourcescommittee.home.gov/emr/usgsweb/examples](http://www.resourcescommittee.home.gov/emr/usgsweb/examples)

One of the most surprising is that every time we brush our teeth, we are using a substance that relies on quarried rocks!

When toothpaste was first developed, its function was just to clean the teeth and it was a pretty basic. Now, toothpastes help prevent gum disease and tooth decay. Some whiten teeth and others stop teeth feeling sensitive.

Toothpastes are made up of many different ingredients (just have a look at the ingredient list on yours!). Fluoride is one of the most important as it was found to help prevent tooth decay. One of the main sources of fluoride is fluorspar. Fluorspar is a mineral made up of calcium and fluorine. Fluorspar ore is found all over the world, but China is the world's largest producer. Also, toothpaste needs to be the right consistency and needs to remain as a 'paste', rather than drying out. Glycerin is often used to achieve this. Toothpastes need a material to act as an abrasive. These help the toothpaste to remove plaque. Many different minerals are used in different types of toothpaste. The most common are sodium bicarbonate and calcium bicarbonate. Sodium bicarbonate also has whitening properties.

(based on 'Rocks in your Mouth' by John Sznoppek, USGS)

### **Activity:**

Use the background information and the suggested website to introduce the children to the vast impact that quarried materials have on our lives. Discuss some of these materials with the children. Have a selection of everyday products such as cosmetics, vitamins, toothpaste etc. that you can look at the ingredients of and try and find those that have a mineral content.

Set the children the task of investigating this further at home. Ask them to find five products at home where they think the ingredients contain minerals. Get them to bring the product in, or copy down the ingredients.

Make a collection of several different brands of toothpaste. Allow the children to compare the different ingredients in these toothpastes. Are some appearing in all toothpastes? You may also carry out a simple survey within the class to find out which toothpaste brands are most commonly used and why? What influences their choice of toothpaste? (most will say taste!) Also discuss with the children what adverts there are around at present advertising toothpastes and what persuasive techniques do they use to try and get you to buy that product.

Reading the information on a variety of toothpaste packets can also prove interesting. Do these texts make claims, provide information, use statistics (some use graphs to show plaque build up), use diagrams, instructions, slogans..... It is amazing how much the manufacturers cram on a small packet, but how many of us actually read all of this?!

## **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.

# Make your own toothpaste!

You will need:

Instructions:



### **Lesson 3: Test that Toothpaste!**

#### **Prior knowledge / Work:**

That gained from completion of Lessons 1 and 2.

#### **Learning Objectives:**

- To ask scientific questions
- To plan how to answer those questions
- To decide what kind of evidence to collect
- To collect and record data appropriately
- To look critically at data collected

#### **Subject Links:**

- Science - Investigation technique

#### **Resources:**

- Range of toothpastes
- Homemade toothpaste
- Toothbrushes
- Surface on which to test (coins, ceramic tiles, children's choices)
- Marker pen / stains
- Worksheet 2

#### **Background Information:**

Children need to be reminded as to the way in which toothpaste works - mild abrasives, combined with the scrubbing action of the toothbrush, rub away stains and remove debris and plaque from teeth. They must think of a way of mimicking stains on teeth so they can test the toothpastes.

#### **Activity:**

Explain to the children that they are going to test their toothpaste alongside a selection of commercially produced products with a view to seeing how well they remove stains. Discuss with the children how this might be achieved (without using real teeth!). They will need to consider the following:

- What surface can be used to mimic the hard surface of the tooth?  
*The surface of an old bathroom tile (if not too glossy) or that on a coin offer suitable surfaces.*
- What can be used to create a stain on this surface?  
*The children can experiment with a range of stains - marker pen works well.*

- How can we test the toothpastes fairly?  
*The test must be designed so it can be carried out in the same way for each toothpaste.*
- How many toothpastes should we use?  
*It is recommended that the children test their toothpaste and then maybe three additional ones.*
- Should the test be repeated?  
*You should always repeat your test, to check if your results are accurate. It is recommended that each toothpaste is tested three times.*
- What factors will we keep the same?  
*The amount of stain, the surface, the amount of toothpaste, the type of toothbrush used, the number of brushes with toothbrush and the pressure applied are all factors that the children should identify as needing to be kept the same.*
- What factors will we change?  
*The type of toothpaste used.*

The way in which the investigation is then carried out will depend on the ability of the children. You may decide on a method as a class and then everyone use that method. Alternatively, small groups of children may devise their own test. The children will have to think about what they are going to measure to decide on the effectiveness of the product. They may decide to brush each stain five times and comment on, or photograph the stain left. They may decide that they will count how many scrubs it takes to remove the stain. They will have to devise a table in which these results are recorded. Class results could be combined and ICT used as a way of recording group results.

The children then carry out their investigation and Worksheet 2 can be used to write up this investigation.

Discuss the children's results. What problems did they have with the test? How did the homemade toothpaste compare with the other makes?

Discuss with the children how they think main manufacturers test the cleaning power of their products? (Some test them on cow teeth with a range of different, common stains, including tea and coffee).

How would they improve their test if they could repeat it?

# 'Test that Toothpaste!' Investigation

Write here what your investigation is trying to find out. It should be written as a question. You will find out the answer by carrying out the investigation.

Investigation Team Names:

**Title:**  
My investigation is to find out.....



**Apparatus:**

Draw a diagram to show how you are setting up your investigation. Make sure you label it clearly!

Write here what you think will happen in your investigation.

**Prediction:** I predict that....



## What we did:

1. The apparatus was set up as in the diagram.
- 2.
- 3.

Write here how you carried out your investigation.



## Results:

Now, write down your results. You may want to display them in a table.

So, what have you found out? Can you now answer the question you set yourself at the beginning?



What we found out: We found out that....

## Toothpaste Technology:

### Website Links:

- [www.colgate.com](http://www.colgate.com)  
Excellent site, full of information on oral health. Has kids page and resources for teachers
- [www.kingfisher.com](http://www.kingfisher.com)  
Site by company who make 'natural' toothpaste. Interesting facts and information.