Kitchen Concoctions
Science and technology activities for 8 - 11 year olds

A joint initiative of the University of York and the Chemical Industries Association
Kitchen Concoctions

A science activity pack for use with 8-11 year old children

This pack contains detailed teachers' notes, a photocopiable comic and activity sheets, and links with curriculum documents.

Acknowledgements

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Artwork by Martin Cottam.
Cover design by John Olive.

Joy Parvin
Primary Science Project Officer
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Department of Chemistry  
University of York  
Heslington  
York, YO10 5DD

Telephone: 01904 432523  
Facsimile: 01904 434460  
e-mail: ciec@york.ac.uk

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The pack is aimed at 8-11 year old children, though the activities can be modified for use with other age groups.

This pack consists of teachers' notes, a children's comic and supplementary activity sheets. The comic provides the stimulus for all eight science activities detailed in the teachers' notes. Children read about the mishaps of Cal and Sita, who attempt to clean the kitchen after baking mince-pies with their father. In addition to providing the context for science activities, the story can be used as a starting point for discussions on safety and hygiene.

Supplementary activity sheets provide guidance on investigations and additional information for the children.

The theme of the pack is mixtures. The mixtures which the pack focuses upon are everyday household products used in the kitchen. Although these products are familiar to children, they are not often thought of as 'mixtures', or as being processed and manufactured industrially. To put these mixtures in a suitable context, the concept is introduced by observing and discussing a 'mince-pie mixture'.

A natural and a synthetic mixture are compared. This is done by considering the cream which might be served with the mince-pies. The children compare an aerosol can of imitation cream with dairy cream.

Once the children are aware of the processed nature of some mixtures, they begin to investigate a range of cleaning products which are mixtures made by following a 'manufacturing recipe'. The children make a bar of soap and a bubble mixture, and they investigate the effectiveness of soap powders and surface cleaners.

Special attention is paid to safety as the children learn about how fire extinguishers work, and the use of warning labels on particularly hazardous products.
## Activities Summary

<table>
<thead>
<tr>
<th>Activity</th>
<th>Description</th>
<th>Duration (approx)</th>
<th>Comic (page)</th>
<th>Extra activity sheets</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Children investigate the mixtures within mince-pies. They follow a recipe to bake mince-pies and observe the changes which occur when they are baked.</td>
<td>45 minutes + 1 hour baking session</td>
<td>2, 8</td>
<td>none</td>
</tr>
<tr>
<td>2</td>
<td>A processed imitation cream is compared with dairy cream, to bridge the gap between natural and processed mixtures.</td>
<td>1 hour</td>
<td>2</td>
<td>A1</td>
</tr>
<tr>
<td>3</td>
<td>Kitchen hygiene: children make a bar of soap, following and/or modifying a recipe.</td>
<td>45 - 60 minutes</td>
<td>2, 5</td>
<td>none</td>
</tr>
<tr>
<td>4</td>
<td>Children design hazard warning labels for some household products, and compare with those used conventionally.</td>
<td>1 hour</td>
<td>4</td>
<td>A2</td>
</tr>
<tr>
<td>5</td>
<td>The children are challenged to develop 'the best' bubble mixture, using washing-up liquid, water and glycerine.</td>
<td>1-2 hours</td>
<td>4, 5</td>
<td>A3-5</td>
</tr>
<tr>
<td>6</td>
<td>Children choose an aspect of the effectiveness of soap powders and liquids to investigate.</td>
<td>$1 \frac{1}{2}$ hours</td>
<td>6</td>
<td>A4</td>
</tr>
<tr>
<td>7</td>
<td>Do 'surface cleaners' really clean without scratching? Children investigate this.</td>
<td>45 minutes</td>
<td>7</td>
<td>A6</td>
</tr>
<tr>
<td>8</td>
<td>A kitchen fire extinguisher is modelled using baking powder and vinegar to put out a candle flame.</td>
<td>30 minutes</td>
<td>3, 6, 7</td>
<td>A7</td>
</tr>
</tbody>
</table>

## Topics and Kitchen Concoctions

![Topics and Kitchen Concoctions Diagram]

- **Kitchen Concoctions**
  - Food
  - Safety
  - Health & hygiene
  - Materials
  - Ourselves
  - Changes
  - Mixtures
  - At home
Resources list

Quantities are given for one group of 4-6 children, except where stated otherwise. Water is required for all activities.

**Activity one** *(resources per class)*

- 1 mince pie
- round-edged knife
- 2 teaspoons
- tablespoon
- 300 g mincemeat (Sainsbury's brand is suitable)
- 15 paper towels
- 30 cocktail sticks or sewing pins
- hand lenses (if available)
- list of ingredients in jar of mincemeat (per pair of children)
- ingredients and utensils for baking mince-pies (optional, see separate list overleaf)

**Activity two** *(resources per class)*

- 50 ml whipping cream
- can of synthetic aerosol-cream (e.g. *Delissimo*)
- whisk
- bowl
- 2 yogurt pots
- source of warmth, e.g. radiator (optional)

**Activity three**

- 60-75g soap noodles* (5-6 dessertspoons)
- 3 pipettes (or medicine droppers) of glycerine
- 3-5 drops of essential oil (concentrated perfume, available from the Body Shop and Boots)
- 5-8 drops food colouring
- pipette or medicine dropper
- rolling pin
- plastic mixing bowl
- soap-mould (see page 13)
- sealing-stamp (optional)
- disposable or rubber gloves
- safety glasses (if available)

**Activity four**

- collection of empty containers from household products (see page 14)
- P.E. hoops (for sorting) and labels
- blu-tack

**Activity five**

- washing-up liquid (100-200 ml)
- glycerine (about 40 ml)
- modelling wire or commercial wand
- 6 film canisters or similar
- 3 pipettes or other measure
- 3 x 200ml plastic bottles (or similar)
- plastic bowl
- commercial bubble mixture (optional)

**Activity six**

- washing advertisements, cut from magazines
- 4-6 different washing products (small quantities could be brought from home); automatic powder and liquid
- hand-washing powder and liquid
- product specifically for colours
- product specifically for stains
- source of hot (up to 60 °C) and cold water
- thermometers
- stopclock or stopwatch
- teaspoon
- plastic measuring jug
- 7 x 500 ml yogurt pots with lids
- fabric (e.g. plain cotton, 1 square metre)
- foods for providing stains, e.g. 2-3 tspns of margarine, flour and mincemeat

**Activity seven**

- scouring powder
- cream cleaner (e.g. Cif)
- soap-filled pads (e.g. Brillo)
- transparent plastic, e.g. OHP transparencies or 2-litre bottles
- disposable gloves
- safety glasses (if available)
- dish-cloth
- 250g weight (optional)

**Activity eight**

- 3 dspns baking powder or bicarbonate of soda
- 25-50ml vinegar
- night light (or small candle)
- matches
- 2-litre ice-cream tub (or similar)
- coffee lid or saucer

* See appendix 1 for a supplier of vegetable-based soap noodles.
Baking mince-pies

Ingredients (for 4 children)

For home-made mincemeat:
75g cooking apples
40g shredded suet*
140g dried fruit (raisins, currants, sultanas)
40g candied mixed peel
60g soft dark brown sugar
½ orange and ½ lemon
10g chopped almonds
1 teaspoon mixed spice

or 400g jar mincemeat

300g flour
75g margarine
75g lard*
pinch of salt
cold water, to mix

* Vegetarian alternatives to suet and lard can be used if desired.

Utensils
peeler and corer
chopping board
chopping knife
weighing scales
grater
large mixing bowl
foil
sieve
tablespoon
teaspoon
rolling pin
baking trays for 24 mince-pies
oven-gloves
cooling rack
<table>
<thead>
<tr>
<th>England &amp; Wales</th>
<th>Key Ideas in Kitchen Concoctions</th>
<th>Scotland</th>
</tr>
</thead>
<tbody>
<tr>
<td>Science National Curriculum (draft) programme of study</td>
<td>The children:</td>
<td>Environmental Studies 5-14</td>
</tr>
<tr>
<td>England &amp; Wales</td>
<td>- discuss issues of safety raised in the story, practice these during the activities and design hazard symbols to compare with recognised symbols used on some household products</td>
<td>- check plans for safety &amp; hygiene</td>
</tr>
<tr>
<td>Key Ideas in Kitchen Concoctions</td>
<td>The children:</td>
<td></td>
</tr>
<tr>
<td>England &amp; Wales</td>
<td>- formulate their own question to investigate the effectiveness of soap powders and liquids</td>
<td></td>
</tr>
<tr>
<td>England &amp; Wales</td>
<td>- are guided through investigations and are encouraged to devise a fair test when investigating bubble mixtures and soap powders</td>
<td></td>
</tr>
<tr>
<td>England &amp; Wales</td>
<td>- use hand lenses and a range of measuring equipment</td>
<td></td>
</tr>
<tr>
<td>England &amp; Wales</td>
<td>- measure weight (mass), time, volume and temperature</td>
<td></td>
</tr>
<tr>
<td>England &amp; Wales</td>
<td>- are encouraged to record data in drawings, charts and tables</td>
<td></td>
</tr>
<tr>
<td>England &amp; Wales</td>
<td>- make judgements about products and recipes based on their data</td>
<td></td>
</tr>
<tr>
<td>Scotland Studies should focus on:</td>
<td>- natural and manufactured materials</td>
<td></td>
</tr>
<tr>
<td>Scotland</td>
<td>- how materials can be changed by heat, by mixing chemicals, and by a combination of both (e.g. baking a cake)</td>
<td></td>
</tr>
<tr>
<td>Scotland</td>
<td>- undertake practical tasks with attention to fair testing</td>
<td></td>
</tr>
<tr>
<td>Scotland</td>
<td>- observe events and sequence their main aspects, e.g. the process of baking a cake</td>
<td></td>
</tr>
<tr>
<td>Scotland</td>
<td>- use simple apparatus</td>
<td></td>
</tr>
<tr>
<td>Scotland</td>
<td>- measure weight, time, volume and temperature</td>
<td></td>
</tr>
<tr>
<td>Scotland</td>
<td>- record evidence in a variety of ways, including tables, bar graphs, pictures and diagrams</td>
<td></td>
</tr>
<tr>
<td>Scotland</td>
<td>- draw conclusions, giving</td>
<td></td>
</tr>
<tr>
<td>Scotland</td>
<td>- make judgements about products and recipes based on their data</td>
<td></td>
</tr>
</tbody>
</table>
Teachers' notes

Using the comic

The comic is provided in a black and white format to enable teachers to reproduce it for individuals or groups of children, who can add colour to personalise their copy. The comic can be reduced to A4 size (A5 when folded) if desired by using 71% reduction. The page order for reproduction is:

<table>
<thead>
<tr>
<th>8</th>
<th>reverse page</th>
<th>1</th>
<th>2</th>
<th>7</th>
<th>reverse page</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>3</td>
<td></td>
<td>4</td>
<td>5</td>
<td></td>
</tr>
</tbody>
</table>

The comic is provided to stimulate science activities in the classroom. Appropriate use of the comic will depend on the reading age of the children and how the teacher chooses to organise the science activities. The comic can be read individually, by groups, or by the whole class. It can be read in sections or from beginning to end. The speech bubbles in the final story picture have been left blank for children to complete. The story could also be continued by groups of children.

Some children may need to be shown how to read a comic, i.e. that speech bubbles are read from left to right and top to bottom, and before any text which appears below the cartoon box.

Before embarking on activities related to cleaning the kitchen, groups of children could brain-storm all the things in the kitchen which need cleaning before and after baking. The picture on page 3 of the comic provides a useful stimulus for this task. Children discuss the jobs to be done, the best order in which to do them, and the best materials to use for the job.

During discussion children should be constantly reminded of the safety and hygiene ideas featured in the story (see page 23 for details on free hire of a short food hygiene video). On finishing reading the story, children could be asked to make an "If only . . . " list of things that characters in the story could have done to avoid accidents that occurred. For example:

**If only . . .**
Sam had supervised in the kitchen while Dad was gone.
Sita and Cal had read the detergent packet instructions more carefully before use.
Sita and Cal had found floor cloths to wipe away the soap-suds.

Children can discuss the age of the children. The intended ages of Sam, Sita and Cal are 16, 11 and 9 years, respectively. Do they think Sam is old enough to supervise her younger brother and sister? The recommended age for supervising children (16 years) can be discussed, and how children in the class feel about this.

**Note on 'weight'**

In the primary school the terms weight and mass are often used synonymously. Scientifically speaking this is incorrect. The weight of an object is its mass multiplied by the gravitational force acting on it. Weight is measured in newtons and mass in kilograms. In these notes the term 'weight' is used, as it is not an aim of the activities to teach this concept. The teacher may choose to use the correct term 'mass' if children have some prior knowledge of the difference.
Activity 1  What's in a mince-pie?

Aims: To appreciate that a mince pie is a mixture of substances, which are in turn mixtures of substances. To realise that some mixtures are permanently changed and others can be separated.

Resources (per class)
1 mince pie*
round-edged knife
2 teaspoons
tablespoon
300 g mincemeat (Sainsbury's brand is suitable, see below)
15 paper towels
30 cocktail sticks or sewing pins
hand lenses (if available)
list of ingredients in jar of mincemeat (per pair of children)
ingredients and utensils for baking mince-pies (see resources list, page 4)
recipes (page 8 of comic)

* Mince-pies can be purchased throughout the year from Safeway, Tesco, Marks & Spencer and Sainsbury. Some local bakeries also have a regular supply.

Carrying out the activity

The concept of something being made up of a mixture of things is introduced through class discussion of a mince-pie. The teacher shows the class a mince pie and asks, "Is this pie just one thing or a mixture of things?" The mince pie can be cut in half to reveal the pastry and the filling, thus showing that the pie is made up of at least two separate things - pastry and mincemeat. The teacher asks, "Can the mixture of pastry and mincemeat be separated?" and chooses two children to try and separate the two mixtures. Given teaspoons and paper towels, the children will hopefully scoop the mincemeat on to the paper towel.

The teacher repeats the questions above, asking about the baked pastry case. This time the mixture cannot be separated, the ingredients which made the mixture have been changed (covered in more detail during the baking activity, see page 10).

Repeating the questions again for the mincemeat may lead to disagreement over whether the mixture can be separated or not. The children are then given the task of trying this separation for themselves.

Pairs of children are given a cocktail stick and a paper towel containing two teaspoons of mincemeat (brands such as Sainsbury's have ingredients that are readily separated and identified). They can make heaps of separate ingredients on the paper towel. Once completed, the children use a list of the mincemeat's ingredients to identify the separate ingredients. Hand lenses may aid the identification process.

Safety note

At the end of the activity the used mincemeat should not be eaten, but rolled in the paper towels and thrown away.

A pictorial or written record of the separated ingredients can be made before they are thrown away.

Further discussion centres on the nature of the ingredients in the mincemeat, i.e. are any of them mixtures? The children can look at the ingredients' packaging, e.g. mixed spices, mixed peel, margarine, flour, etc.
Baking mince-pies

Children make their own mincemeat as well as the mince-pies. If there are time or cost limitations, jars of mincemeat can be used in the pies. The recipes are given on page 8 of the comic and quantities are given for a group of 4 children to make a batch of 24 mince-pies. If school policy does not allow children to bring money to pay for baking to take home, perhaps the pies could be sold at break time (in the 'tuck shop' or similar).

N.B. Page 10 can be photocopied and used to provide the teacher or another adult supervising baking. It provides suitable information for focusing on the scientific aspects of the baking.

The mincemeat is made first and warmed in a low-temperature oven whilst the pastry is made. During the preparation of the pastry, discussion focuses on what the pastry looks and feels like. This description can be compared with that of the baked pastry, when the pies are taken from the oven and cooled. Some pastry should be cooked separately, so it can be handled after it has been baked.

Teachers' note

Changes that occur when things are mixed can be permanent, reversible, chemical or physical.

Physical changes are usually reversible, though for some would be very difficult to achieve.

Chemical changes can be permanent or reversible, depending on the specific chemical change.

A chemical change is one that results in the formation of a new substance, e.g. the fermentation of sugars to form alcohol.

A physical change is one in which the same substance exists, but in a different form, e.g. salt or sugar dissolved in water.

A permanent change occurs when the original substances cannot be recovered easily from the new substances, e.g. rusting or weathering.

A reversible change means that the original substances can be recovered in some way. To reverse a physically changed mixture, it is simply separated, e.g. recovering salt from solution by gently evaporating the water. To reverse a chemical change, a second chemical change is required.

Mincemeat is a reversible mixture as the ingredients can be separated from one another. Even the sugar can be separated from solution by evaporating off the water.

The unbaked pastry has been physically changed. The flour and fat are still present, but in a different form. During the baking of pastry a chemical change takes place, forming a new substance. Heating causes the fats to soften and melt and water present to evaporate. Once the water has evaporated, a complex chemical change occurs which causes the pastry to brown.

Chemical changes often occur to food when it is heated, and the changes are usually permanent. Other examples include boiling an egg or baking bread.
Baking mince-pies

Information the children have

The children have looked at what is in the mixture called 'mincemeat' during class lessons. They have discovered that they can separate most of the ingredients back out of the mixture. They have talked about pastry, and that it would be difficult to get flour or margarine back from the mixture.

What to discuss during the baking session

1. That there are mixtures within mixtures (e.g. most of the ingredients in mincemeat and pastry are themselves mixtures)

2. How unbaked pastry looks, feels and smells.

3. How they think the pastry will change with baking.

What and when to ask the children

Whilst mixing either the mincemeat or the pastry ask the children to look at the ingredients listed on the packets they are using, e.g. the 'mixture' in mixed spices, mixed peel, margarine, some flour, etc. In this way they can appreciate that there are mixtures within mixtures. Suitable questions are:

* Is flour (or margarine, mixed spice, etc.) a mixture of things? How can you find out?

Keep the left-over cuttings of pastry once the pastry cases are complete. Ask the children to roll or shape a little of the pastry and put it in the oven with the pies. While the pies are baking, give each child a ball of pastry and ask the children the following questions (try not to give them your answers):

* What does the pastry look like? (e.g. the colour, shape)

* What does the pastry smell like?

* What does the pastry feel like? (e.g. elastic, warm, soft, slippery, smooth, can change shape, etc.)

* How will the pastry be different when it comes out of the oven? (some children may be able to predict the brittle nature of the pastry, the fact that it browns and that the smells of the fat and flour are not as distinct. Do not point these things out if they are not suggested, children can discover them by handling the baked pastry later.)
Activity 2  Whip or squirt?

**Aims:** To bridge the gap between natural and synthetic mixtures by comparing dairy whipping cream with synthetic aerosol-cream. To consider the differences between natural and processed mixtures. To learn that air can be part of a mixture.

**Resources** (per class)
- 50 ml whipping cream
- can of synthetic aerosol-cream (e.g. Delissimo)
- whisk
- bowl
- 2 yogurt pots
- source of warmth (e.g. radiator or desk lamp) - optional
- activity sheet A1

**Carrying out the activity**

This activity is best carried out with the whole class, as simple observations are made and the resources are relatively expensive.

The decision to buy dairy cream instead of the aerosol-cream in the story *Surprise pies* is used as the starting point for this activity. During discussion, the following questions can be asked:

*Which cream do you prefer? Why?*

*What are the differences between the two types of cream?*

*Where do the two types of cream come from?*

*What does 'whipping' cream mean?*

*What happens when you whip cream?*

*Why do you seem to get more cream than you started with once it has been whipped?*

A bowl of whipped cream is then prepared, by either child or teacher, the volume can be measured before and after whipping. A specific volume (say 30 ml) of cream is put in a yogurt pot or 50 ml plastic measuring jug.

Another yogurt pot or measuring jug is filled with the same amount of aerosol-cream.

The teacher asks the children if they can describe, from their experience at home, eating either type of cream, and how it tastes and feels in the mouth, i.e. the aerosol-cream is sweeter and seems to 'disappear' quickly. Children can make other comparisons based on smell and colour.

The pots of cream are placed in a warm place, to simulate the temperature inside our mouths. Alternatively, the pots of cream can simply be left to stand at room temperature, though it may take longer to observe the volume change. The teacher asks:

*Will the pots of cream have changed when we look at them in half an hour's time?*

*How might they have changed? Why?*

The pots are observed 30-60 minutes later. The children should see that the whipped cream remains the same and the aerosol cream has 'shrunk' substantially. The children can be asked to think why the cream has shrunk, what has 'escaped' from the cream, and why this has not happened to the whipped cream. A simplified explanation (of that provided overleaf for teachers) is that the air forced into the canned cream has slowly escaped, whilst the whipped cream has been changed during whipping, in such a way that the air is trapped and cannot escape.
Activity sheet A1 provides the children with information on the two types of cream and their production. The information can be used during discussion of natural and processed items, whilst the cream is left to stand.

**Recording the activity**

The children can draw and/or tabulate the volume of each cream before and after the hour's standing time. This can be accompanied by a list of similarities and differences between the two types of cream, based on the observations made earlier and the information on sheet A1. Some differences are:

- Whipping cream is treated, but is not processed in the extensive way that the imitation aerosol cream is.
- Imitation cream is low in fat compared with dairy cream, so is better for people with heart disease than dairy cream.
- Imitation cream contains many additional ingredients, often listed as E-numbers (European Union, EU, numbers). Additives listed as a number without the 'E' are permissible in the UK, but not necessarily in other EU countries.

**Teachers' note**

When whipping cream is whipped it doubles its volume as the cream is turned from a liquid into a foam. This foam is shown in the diagram opposite. During whipping, air bubbles become a stable part of the cream's structure. The air bubbles become surrounded by milk protein (that has been broken down during whipping) and by clusters of fat globules and liquid fat. The foam contains air, water and fat. As the milk protein breaks down, a chemical change takes place.

In the case of the aerosol-cream, the whipped look is achieved by the addition of air to the mixture. This reversible change is demonstrated by the reduced state of the cream after being left in a warm place for a short time. The air is clearly no longer in the mixture.

**Extension activities**

Cream is a stable emulsion and, although a stable emulsion, emulsifiers or stabilisers have often been added to cartons of cream to increase the shelf-life of the product. To demonstrate what an emulsion is, white vinegar and oil can be shaken in a transparent container (e.g. a plastic pop bottle). Before shaking, the oil forms a separate layer on the vinegar. Immediately after vigorous shaking, the oil can be seen, dispersed throughout the oil, in an emulsion. The emulsion is unstable and, when left to stand, the oil droplets gradually form larger and larger droplets, until the oil layer has re-formed on the surface of the vinegar.

Children could carry out research into cream production. Appendix 1 provides addresses to which children or the teacher can write, to obtain useful information on both dairy and non-dairy cream production.
Activity 3  Make your own soap bar

**Aims:** To follow a recipe to make a bar of soap. To appreciate that things other than foods are prepared using recipes.

**Resources** (per group)
- 60-75g or 5-6 dessertspoons soap noodles (see appendix 1 for a supplier)
- 3 pipettes or medicine droppers of glycerine
- 3-5 drops of essential oil (concentrated perfume, available from the Body Shop and Boots)
- 5-8 drops food colouring
- pipette or medicine dropper
- rolling pin
- plastic mixing bowl
- transparent plastic bag, preferably with a seal
- soap-mould
- disposable or rubber gloves
- safety glasses (if available)
- page 5 of comic
- stamp (optional, to form an impression in the soap)

**Safety note**
Disposable or rubber gloves should be worn to prevent any allergic reactions which children may have to products coming into contact with the skin. As an additional precaution children could also wear safety glasses, to prevent the rubbing of soap into their eyes.

**Carrying out the activity**

Children follow the recipe on page 5 of the comic to make a bar of soap. The quantities given make one bar. Within reason, children can alter the amount of colouring and perfume used.

The soap noodles and glycerine are sealed in a plastic bag and the noodles crushed to a powder with a rolling pin. All ingredients are added to the mixing bowl and are 'mashed' with the end of a rolling pin. Children take turns to press the mixture together, as it can take 15 minutes to get an even texture and colour.

As much mixture as possible is squashed into the mould. The teacher checks the compression of the soap before it is released *gently* (to avoid crumbling) from the mould. As the compression is done by hand, the soap bar is quite fragile, so children should take care when handling or stamping the soap.

Appendix 2 gives scientific information on how detergents (e.g. soap) work.

**To record the activity**, children produce a cartoon strip of the soap-making process. They can be asked to make the cartoon relevant to a particular group, i.e. younger children or parents.

**Extension activities**

Children carry out a survey amongst other children in the class, comparing their 'home-made' soap with commercially available products. The soaps are compared for lather, appearance, fragrance, how soft the skin feels after use. **N.B.** The softness of the skin after using soap can be tested by children who do not have allergic reactions to products coming into contact with skin.

Children can design and make packaging for their soap or a poster to advertise the product.
Activity 4  Hazard warning!

**Aims:** To become aware of the symbols used on household products which alert the user to the potential hazards of the products.

**Resources** (per class)
- collection of empty containers from household products (see below for suggestions)
- blu-tack
- P.E. hoops (for sorting) and labels
- activity sheet A2 (per group - optional)

**Carrying out the activity**

<table>
<thead>
<tr>
<th>Brand name</th>
<th>Product function</th>
<th>Hazard warning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mr Muscle</td>
<td>oven cleaner</td>
<td>corrosive</td>
</tr>
<tr>
<td>Clean-off</td>
<td>oven cleaner</td>
<td>corrosive</td>
</tr>
<tr>
<td>Domestos</td>
<td>bleach</td>
<td>irritant</td>
</tr>
<tr>
<td>Stain-devil</td>
<td>stain-remover</td>
<td>irritant</td>
</tr>
<tr>
<td>Lime-to-shine</td>
<td>surface cleaner</td>
<td>irritant</td>
</tr>
<tr>
<td>Halfords</td>
<td>de-icer</td>
<td>flammable</td>
</tr>
<tr>
<td>Johnson's</td>
<td>wax polish for antiques</td>
<td>flammable</td>
</tr>
<tr>
<td>Jif Mousse</td>
<td>surface cleaner</td>
<td>flammable</td>
</tr>
<tr>
<td>Halfords</td>
<td>screen wash</td>
<td>harmful</td>
</tr>
</tbody>
</table>

Before the children use the display, the teacher introduces the children to some hazard phrases used for chemicals in a laboratory and in the home. The teacher lists these on the board:

- toxic
- highly flammable
- explosive
- irritant
- harmful
- corrosive

Each warning is discussed, determining what children understand by them, and giving them information where they are uncertain. Formal hazard warning definitions have been summarised in the following table.
<table>
<thead>
<tr>
<th>Toxic</th>
<th>A substance that, if inhaled, swallowed or if it penetrates the skin, may involve very serious health risks or even death.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Harmful</td>
<td>A lower grade of toxicity.</td>
</tr>
<tr>
<td>Corrosive</td>
<td>A substance which may destroy skin, clothes or other surfaces, when in contact with them.</td>
</tr>
<tr>
<td>Irritant</td>
<td>Non-corrosive, but may cause inflammation when in contact with skin.</td>
</tr>
<tr>
<td>Highly flammable</td>
<td>Substances which will burn readily below average room temperature.</td>
</tr>
<tr>
<td>Explosive</td>
<td>A substance which may explode if near a flame, or as a result of friction or vibrations.</td>
</tr>
</tbody>
</table>

Once the hazards are understood in simple terms, the teacher tells the children that a **simple** black and white picture accompanies each warning on the label. They are asked to design a picture to accompany one or more of the warnings. The picture must be simple, as it has to fit into a square on the label which is about 2 x 2 cm (the children could be given a limit of 6 x 6 cm).

All the drawings can be anonymous, cut out, numbered and placed on the display table, along with hazard titles for sorting. An example is given below. Once a group of children have agreed on each classification, they record the drawing numbers on a record sheet under hazard warning headings. These record sheets are used during class discussion, when all groups have completed the activity.

The same display layout can be used for sorting the empty household containers which have had their labels concealed. The containers can be sorted before and after revealing the official warning. Some written questions to accompany the display can include:

*Which/how many things have a hazard warning symbol? Why?*

*Which/how many things have only a written warning?*

*Which/how many things have no warning at all? Why?*

*Draw and/or describe the caps of the bottles which have a hazard warning.*

*How are these caps different to those without a warning?*

From this sorting activity, children should realise that:

- Many products do not carry hazard warning labels, as they are not dangerous chemicals.
- The products carrying a label are not explosive or toxic.
- Those carrying hazard warning labels have written warnings and advice about treatment, as well as safety lids to prevent young children opening them.

Hazard warning symbols are shown on sheet A2, which can be used for further activities or can provide a permanent record for children.
Activity 5  

**Bubble mixture**

**Aim:** To mix ingredients in different proportions and investigate the subsequent effectiveness of the bubble mixture.

**Resources** (per group)
- washing-up liquid (100-200 ml)
- water
- glycerine (about 40 ml)
- modelling wire or wand from commercial bubble mixture
- 6 film canisters or similar
- 3 x 200 ml plastic bottles or similar
- adhesive labels
- 3 pipettes (or 10-20ml plastic measuring cylinders, medicine droppers, 10 ml syringes)
- plastic bowl
- competition sheet (comic, page 5)
- commercial bubble mixture (optional)
- activity sheet A3
- activity sheet A4 or A5 (optional and depending on an open-ended or structured approach)

**Carrying out the activity**

Class discussion focuses on the washing up incident in the story and the competition on page 5 of the comic. This activity lends itself ideally to open-ended investigation, with children planning, carrying out and recording in their own chosen way. They are asked to develop 'the best' bubble mixture, using washing-up liquid, water and possibly glycerine. During planning, the children should be encouraged to think about:

- how to measure the quantities of ingredients they use in each test mixture;
- how to test the effectiveness of each bubble mixture;
- how to make the test fair;
- how to record each 'recipe' they test.

Measurements will range from the non-standard teaspoon to the use of pipettes or millilitres, depending on the ability of each child or group of children.

The effectiveness can be decided by the life-span of the bubbles blown, the bubble size or the number of bubbles blown.

The test can be made fair by using the same person to blow for the same length of time (though the blow cannot be controlled), using the same wand, the same measuring technique each time, blowing at the same height and in the same direction, washing the wand between each use, etc.

More able children should be encouraged to make several measurements and take an average, as the 'blow' cannot be controlled each time.

Wands can be made by wrapping modelling wire around cylindrical items and twisting the two ends together. Suitable items include jumbo felt-tip pens, small bottles (e.g. Body Shop) or film canisters.

Commercial wands can be used, their advantage being that they produce bubbles more easily than home-made wands (see teachers' note). However, this may make observations more difficult for some children, as they must scan a lot of bubbles quickly.
Recording the activity

Children can brainstorm ideas for their presentation, before and after carrying out their tests. They can be given sheet A3 to stimulate discussion. Results can be recorded pictorially, beside each written recipe. Life-size bubbles and dipping wands could be drawn alongside the relevant recipe.

The results can be tabulated. A blank table is provided on sheet A4 to aid children's recording of an open-ended investigation. Additional columns can be created on the sheet by dividing those present in two, and title boxes have been highlighted with a double line.

The tables below are intended as a teachers' guide only and show results from two bubble mixture investigations. Appendix 3 shows two sets of children's results. As previously mentioned, this activity lends itself ideally to open-ended investigation, however, if the teacher chooses a structured approach to this activity, sheet A5 provides blank tables for children to complete. The two tables allow for a differentiated approach.

<table>
<thead>
<tr>
<th>Recipe (ingredients measured in teaspoons)</th>
<th>Description of bubbles</th>
</tr>
</thead>
<tbody>
<tr>
<td>washing up liquid</td>
<td>water</td>
</tr>
<tr>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>5</td>
<td>4</td>
</tr>
<tr>
<td>6</td>
<td>4</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Ingredients (in pipettes)</th>
<th>Life span of bubbles</th>
</tr>
</thead>
<tbody>
<tr>
<td>washing up liquid</td>
<td>water</td>
</tr>
<tr>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td>2</td>
<td>5</td>
</tr>
<tr>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>5</td>
<td>4</td>
</tr>
</tbody>
</table>
Teachers' note

Glycerine can improve bubble size and increase the life-span of the bubbles, depending on the proportions of the ingredients mixed. Observing this effect will depend largely on the nature of the children's investigations. It is more important that children carry out the investigations fairly, measure accurately, and analyse their results carefully, than it is to 'fudge' results to show that glycerine is a useful ingredient.

The proportion of water in the mixture is important, as the higher the ratio of water, the cheaper the mixture is for the company to produce. This must be balanced against the effectiveness of the mixture.

Commercial bubble mixtures are made from detergents similar to washing-up liquid. They also contain chemicals to ensure that no bacteria grow in the bottle. Commercial wands have many grooves around the head of the wand to increase the surface area and allow more of the solution to 'stick' to the wand. This results in many bubbles being blown per dip.

N.B. Appendix 2 gives scientific information on how detergents work.

Extension activities

Children can investigate the effect of the wand's size and shape on the bubbles produced. Children could compare home-made and commercial wands and try to increase the surface area of their own wand by adding sticking plaster to the head. They can compare brands of washing-up liquid used to make bubbles.

More able children can decide on an optimum ratio of water : washing-up liquid : glycerine, bearing in mind that the more water there is in the mixture, the cheaper it is to produce. They can be given costs of glycerine, washing-up liquid and commercial bubble mixture. They can compare the cost of their mixtures with that commercially produced. If their mixture produces more or larger bubbles, they could survey children in the school to find out if they would be willing to pay more for the superior product.
Activity 6  The washing choice

**Aims:**
To investigate a range of washing products to find out how well they remove (baking) stains.
To compare automatic washing products with those intended for hand-washing or twin-tubs.

**Resources (per group)**
- washing advertisements, cut from magazines
- 4-6 different washing products such as: automatic powder and liquid
- (small quantities could be hand-washing powder and liquid
- brought from home) product specifically for colours
- product specifically for stains
- source of hot (up to 60 °C) and cold water
- thermometers
- stopclock or stopwatch
- teaspoon
- plastic measuring jug
- 7 x 500 ml yogurt pots with lids
- fabric (e.g. plain cotton or polyester, about 1 square metre of each)
- foods for providing stains*, e.g. margarine, flour and mincemeat
- activity sheets A3 and A4 (optional)

* Foods which stain severely, such as tomato sauce, should not be used. These stains will not be removed under the type of washing conditions which the children will use.

**N.B.** Many of the resources listed above are dependent on the investigation that groups of children plan. They may require additional or different resources.

**Carrying out the activity**

Groups of children discuss Sita and Cal's washing episode in the comic. They can also be given 3-4 washing adverts to discuss. The teacher poses the question:

*Can you plan an investigation that would solve Sita and Cal’s problem of choosing a washing product?*

Groups decide upon a specific question of their own to investigate. For example:

*Do powders or liquids produce the most lather?*
*Does the amount of lather affect how well the powder/liquid cleans the fabric?*
*Which product cleans the fabric best?*
*Does the washing temperature affect the amount of lather or how well the stains are removed?*

During the planning stages of their investigation, children should be encouraged to think about:

- a list of equipment/resources (as comprehensive as possible)
- elements of a fair-test, possibly include a 'control'
- drawings showing how the equipment will be used and/or how the test will be carried out
- the measurements (if any) they will make and their frequency
- a choice about how to record the test outcomes and/or prepared tables for data collection.
Preparing a table requires skill. The children must think about what they are *changing* and *measuring*, as these will represent columns or rows in the table. Also, the dimensions of the table will be determined by the number of measurements or observations they make. Activity sheet A4 may provide a useful starting point for children having difficulties devising a table. Other presentational ideas can be discussed, using sheet A3 as a stimulus.

**The fair test**

Children are encouraged to keep as many test conditions constant as possible, to be able to attribute any changes in the test to the one factor they are testing. Factors that can be kept constant, if they are not being tested, are:

- water temperature
- quantity of water and detergent
- containers used to hold washing solution
- fabric being washed (i.e. same size and source)
- type and amount of stains
- number of shakes or stirs given to each washing solution + fabric
- time that the fabric pieces remain in the washing solutions
- frequency of measurements (if any made)
- number and timing of rinse to each fabric piece

**Washing results**

The children should find that the detergents intended for automatic washing machines produce less lather than those intended for twin-tubs or hand-washing. Low-lather products were developed specifically for automatic machines with their increased agitation.

Testing the efficiency of a range of commercially available products will result in a range of outcomes, dependent upon the test conditions and choice of detergent brands. Teachers may find the sample data in appendix 4 useful during the planning stages of this activity.

**N.B.** See appendix 2 for scientific information on how detergents work, including washing powders and liquids.
Activity 7 Cleans without scratching?

Aims: To learn about the effect the form of a cleaning agent (e.g. powder, cream, soap in wire pads) has on a range of surfaces.

Resources (per group)
scouring powder
cream cleaner (e.g. Jif)
soup-filled pads (e.g. Brillo)
transparent plastic squares (e.g. OHP transparencies or cut-down 2-litre plastic bottles)
dish-cloth
disposable gloves (protection against potential skin allergies)
safety glasses (if available)
250 g weight (optional)
activity sheet A6 (for a structured approach)

* If the teacher obtains samples of kitchen surface materials from a DIY shop, a more realistic test can be conducted. However, the results are more easily observed using the plastic squares.

Carrying out the activity
This activity can be left open-ended, and the children asked to devise their own tests to answer the question "Do the different cleaners clean surfaces without scratching?" The children can choose their own surface(s) and methods of testing the cleaners.

Alternatively, children use activity sheet A6, which suggests a test procedure. They are asked to think about fair test conditions, including how to apply an equal force to the cloth and cleaner. The children select and carry out the best of two methods. Fair conditions can include:

• the amount of cleaner applied to the cloth (except the soap-pad)
• the area of coverage (to match that of the soap-pad)
• the number of 'rubs' of the cloth on the plastic
• the washing of the plastic squares (ensuring further scratching does not occur)
• the force applied during rubbing.

The plastic squares provide a record of their test. An 'uncleaned' square should be kept alongside the test squares. This is the control, for comparing with others for scratching.

Finally, the children analyse their results, and think about how it might have helped Cal and Sita when cleaning the kitchen. The teacher also asks how the children could improve on the test if they were devising it themselves. The children can order the plastic squares according to the amount of scratching on the surface. Magnifiers can be used to observe the plastic squares more closely, or they can be held up to a window. The order will most probably be:

control cream cleaner soap pads scouring powder

The discussion could be developed to think about the hardness of the surface, i.e. the plastic is soft in relation to the top of an oven or a metal pan. Children could decide which cleaner would be most suitable for cleaning a range of household items. These could include kitchen wall and floor tiles, pans (including non-stick), plastic or metal sinks, baths, mirrors, etc.

Children consider stains and how difficult they are to remove, i.e. burnt scrambled egg on a metal pan compared with mincemeat on the kitchen surface. Which cleaner would be best?

Extension activity
Children consider which cleaning agents are suitable for removing different stains. They can draw upon knowledge of washing powders and the soap extension activity.
Activity 8  Extinguish the flame

Aims:  To observe the effect of mixing baking powder and vinegar on a nearby candle flame. To appreciate that a flame needs air to burn.

Resources (per group)
bicarbonate of soda or baking powder (about 3 dspns)
vinegar (25-50ml)
matches
coffee lid or saucer
night light (or short candle)
2-litre ice-cream tub (or similar)
activity sheet A7

Carrying out the activity
The activity is introduced by discussing the fire extinguisher in the story. Children can be asked to find the fire extinguisher in several illustrations in the comic. Questions can include:

Why was there a fire extinguisher in the kitchen? Was it kept in a sensible place?
Does anyone have a fire extinguisher at home? If so, where is it kept?
Does anyone have anything else at home for putting out fires?
What do we have at school to put out fires? Where are they kept?

In this way, safety in the kitchen both at home and at school can be highlighted, and the importance of behaving sensibly when helping with baking, etc. Children can discuss fire buckets and blankets and how the use of these things help to extinguish fires.

The following activity is demonstrated by the teacher to the class and again with small groups of children, to ensure that children can observe closely and record observations on sheet A7.

The resources are arranged as shown opposite. As the vinegar is poured onto the powder, the children observe the mixture fizzing, as a gas, carbon dioxide, is produced. (The candle should be well away from the saucer, so the foam does not overwhelm the flame.) The children may also notice that the candle flame is extinguished from the bottom of the flame upwards.

The teacher asks the children what is happening when the mixture fizzes (a gas is produced).

The teacher explains that this gas is heavier than air, and so it sinks to the bottom of the tub. The teacher asks the children what the candle needs to keep burning (i.e. air) and why the candle goes out from the bottom of the flame upwards (i.e. the gas fills the tub from the bottom upwards, and therefore pushes the air away from the flame and prevents the candle from burning any longer.

Extension activity
Able children could be told about the 'fire triangle', and the three things a fire needs to burn (oxygen present in air, heat and fuel). They can discuss ways in which any of the three parts of the triangle can be removed.

Most fire extinguishers work by excluding air with foam or carbon dioxide or by removing heat with water. Fire blankets starve the fire of oxygen.
Appendix 1

Useful addresses

John Drury and Co. Ltd have kindly agreed to supply vegetable-based soap noodles to schools at cost price. A 1 kilo bag of soap noodles will cost £1.00 plus additional P&P. Please write to:

John Drury & Co. Ltd.
28 River Street
Brighouse
HD6 1NJ
West Yorkshire
Tel: 01484 714461
Website: www.john-drury.co.uk

For information on detergents, write to:

UK Cleaning Products Industry Association
1st Floor Suite
Century House
High Street
Tattenhall
Cheshire
CH3 9RJ
Tel: 01829 770055
e-mail: ukcpi@ukcpi.org
Website: http://www.sdia.org.uk

Procter & Gamble UK
Rusham Park
Whitehall Lane
Egham, Surrey
TW20 9NW
Tel: 01932 896000
Fax: 01784 431080
Website: http://www.pg.com

Information Services
Unilever PLC
P O Box 68
London
EC4P 4BQ
Tel: 02078 225 252
Fax: 02078 225 951
Website: http://www.unilever.com

For information on cream production (including aerosol and imitation cream), write to:

The Education Department
The Dairy Council
5-7 John Princes Street
London
W1G 0JN
Tel. 0207 499 7822
e-mail: info@dairycouncil.org.uk
Website: http://www.milk.co.uk/
Appendix 2

How detergents work

Soap was the first detergent and is still one of the commonest detergents today. It was first used in Roman times, when it was considered a medical treatment for skin trouble. Detergents other than soap are called soapless detergents. The main similarity between soaps and other detergents is the basic structure of the molecule (particle).

Each detergent molecule has a head and a tail, as shown opposite. The head of the molecule is attracted to water, and the tail of the molecule is attracted to grease and dirt.

When water mixed with detergent comes into contact with grease attached to another surface, a dish or a shirt for example, this is what happens:

The attraction forces are so great that the grease is lifted off the surface in small globules.

The shield of detergent molecules round each globule of grease repels other shields. The grease globules cannot join together to settle on the surface again. Instead they are rinsed away.
Appendix 3

Children's tabulated results of a bubbles investigation
<table>
<thead>
<tr>
<th>Name</th>
<th>Bubble size</th>
<th>Bounce number</th>
<th>Time</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sarah</td>
<td>Bubble magic 6</td>
<td>3</td>
<td>33 sec</td>
<td>Big</td>
</tr>
<tr>
<td>Alice</td>
<td>Bubble magic 6</td>
<td>3</td>
<td>45 sec</td>
<td>Big</td>
</tr>
<tr>
<td>Kelly</td>
<td>Bubble magic 6</td>
<td>13</td>
<td>19 sec</td>
<td>small</td>
</tr>
<tr>
<td>Katie</td>
<td>Bubble magic 6</td>
<td>19</td>
<td>23 sec</td>
<td>Big &amp; small</td>
</tr>
<tr>
<td>Sarah</td>
<td>Bubble magic</td>
<td>4</td>
<td>10 plus min</td>
<td>Big &amp; small</td>
</tr>
<tr>
<td>Alice</td>
<td>Bubble magic 2</td>
<td>2</td>
<td>10 plus min</td>
<td>Big</td>
</tr>
<tr>
<td>Kelly</td>
<td>Bubble magic 2</td>
<td>15</td>
<td>14 sec</td>
<td>small</td>
</tr>
<tr>
<td>Katie</td>
<td>Bubble magic 2</td>
<td>3</td>
<td>17 sec</td>
<td>big</td>
</tr>
</tbody>
</table>
Washing results

The results below are from a test carried out on nine washing powders and liquids.

10 x 10 cm squares of cream-coloured cotton fabric were stained, as evenly as possible, by rubbing margarine, flour and mincemeat into the centre of each square. The ten fabric pieces were then left to dry on a radiator for 30 minutes.

The washing solution was then prepared. Using hot and cold water, 2 litres of water was mixed to a temperature of 55 °C. 200 ml of this water was poured over 2 teaspoons of a detergent in a 250 ml measuring jug and stirred 5 times. This was repeated for eight more detergents and one control, containing no detergent. The cotton squares were added to each jug and given 30 stirs, changing the direction of stirring after every 5 stirs. This stirring was repeated every 5 minutes until 25 minutes had elapsed.

The final temperature of the water was 40 °C. Each cotton square was lifted from the solutions and rinsed under a cold tap for 10 seconds. They were laid to dry on paper towels and transferred to the radiator for half an hour before scrutiny.

The rating in the final column of the table ranges from 1 = very good to 5 = poor

<table>
<thead>
<tr>
<th></th>
<th>Is the cotton clean?</th>
<th>Bleaching?</th>
<th>Does the cotton smell fresh?</th>
<th>Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. powder</td>
<td>Some yellow stains</td>
<td>Substantial</td>
<td>Yes</td>
<td>3</td>
</tr>
<tr>
<td>2. non-biological powder</td>
<td>Substantial yellow stains</td>
<td>Substantial</td>
<td>Yes</td>
<td>4</td>
</tr>
<tr>
<td>3. biological powder (a)</td>
<td>Some yellow stains</td>
<td>Very substantial</td>
<td>Ok</td>
<td>4</td>
</tr>
<tr>
<td>4. powder</td>
<td>Totally clean</td>
<td>Some</td>
<td>No</td>
<td>2</td>
</tr>
<tr>
<td>5. biological powder (b)</td>
<td>Substantial yellow stains</td>
<td>Some</td>
<td>No</td>
<td>5</td>
</tr>
<tr>
<td>6. powder for tough stains</td>
<td>Totally clean</td>
<td>None</td>
<td>Ok</td>
<td>1</td>
</tr>
<tr>
<td>7. powder for colours</td>
<td>Totally clean</td>
<td>None</td>
<td>Yes</td>
<td>1</td>
</tr>
<tr>
<td>8. liquid for hand-washing</td>
<td>Totally clean</td>
<td>Some</td>
<td>Yes</td>
<td>2</td>
</tr>
<tr>
<td>9. non-biological liquid</td>
<td>Totally clean</td>
<td>None</td>
<td>Yes</td>
<td>1</td>
</tr>
<tr>
<td>10. control</td>
<td>Substantial yellow stains</td>
<td>None</td>
<td>No</td>
<td>N/A</td>
</tr>
</tbody>
</table>
From the dairy or not?

Cream from a dairy is found mixed in cow's milk. Cream is lighter than milk. It is taken out of milk by spinning the mixture round very quickly in a special machine.

A pot of cream is made up of lots of tiny drops of fat that are mixed evenly in water.

Whipping cream has 8 times more fat drops than milk!

Dairy cream sold in shops does not have ingredients added to it.

Imitation cream is not dairy cream. It is not taken from cow's milk. It is called a dessert topping or non-dairy cream. It is made from a mixture of many ingredients.

Any foods that have a lot of fats also have a lot of energy. Energy is measured in kilojoules (or kilocalories). When you have eaten, the food energy your body does not use (during exercise or work) stays in your body as fat!

Imitation cream has less fat and food energy than dairy cream. Fatty foods are not good for people with heart disease, so eating imitation cream is better for them than eating dairy cream. Even healthy people should not eat too much fatty food like cream.

Imitation and dairy cream can be bought in spray cans. A gas in the can pushes the cream through the pressed nozzle. The cream mixes with air as it comes out. The cream and air take up four times more space than the cream did in the can! This cream looks like whipped cream but it will shrink if left to stand.
Hazard labels

Harmful

Explosive

Toxic

Corrosive

Flammable

Irritant
Presenting ideas

Bubbles
We used several different bubble mixtures, some with glycerine and some without. We tested each bubble mix with three different sizes of bubble-blower. Our results are recorded in a table on the following pages.

Recipe (ingredients measured in teaspoons)

<table>
<thead>
<tr>
<th>Size of bubbles</th>
<th>washing up liquid</th>
<th>water</th>
<th>glycerine</th>
</tr>
</thead>
<tbody>
<tr>
<td>none</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>small</td>
<td>0</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>large</td>
<td>0</td>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td>small</td>
<td>0</td>
<td>4</td>
<td>0</td>
</tr>
<tr>
<td>medium</td>
<td>0</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>large</td>
<td>0</td>
<td>4</td>
<td>3</td>
</tr>
</tbody>
</table>

Charts

Table of results

Drawings

Water and soap powder

Cotton square with baking stains

Polystyrene cup

Writing

Charts

Computer

Poster

Photographs

Cassette
## Bubble Mixture tables

<table>
<thead>
<tr>
<th>Recipe</th>
<th>Description of bubbles</th>
</tr>
</thead>
<tbody>
<tr>
<td>washing up liquid</td>
<td>water</td>
</tr>
<tr>
<td>1</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Recipe</th>
<th>Number of bubbles</th>
<th>Size of bubbles</th>
<th>Time bubbles last</th>
</tr>
</thead>
<tbody>
<tr>
<td>washing up liquid</td>
<td>Water</td>
<td>glycerine</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td></td>
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<tr>
<td>6</td>
<td></td>
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</tr>
</tbody>
</table>
Cleans without scratching?

Safety you must wear:

You need:

1. Scour Power
2. Cream cleaner
3. Soap pads

Clear plastic squares

Number the plastic strips 1, 2 and 3.

Fill in the table. It has been started for you.

<table>
<thead>
<tr>
<th>We can change</th>
<th>We cannot change</th>
<th>We must try to keep the same</th>
</tr>
</thead>
<tbody>
<tr>
<td>amount of scouring powder</td>
<td>soap-pad</td>
<td>how the plastic is cleaned</td>
</tr>
</tbody>
</table>

How can you make sure you do not rub one strip harder than another? Here is one idea.

Wrap a weight in the cloth.

Rub the cleaner on the cloth, or put the soap-pad beneath.

Push the bundle from side to side on the plastic.

Draw your own idea:

We are going to use __________ idea because ______________________________
Extinguish the flame!

Add to each drawing and explain what changes in each picture.

1. The candle is lit.

   ![Diagram of candle lit]

2. The __________ is added.

   ![Diagram of unknown object added]

3. 

   ![Diagram for completion]
Kitchen Chaos!

Written by Joy Parvin
Illustrated by Martin Cottam.
Callum and I were bored.

Dad should have known that nothing would drag Sam from her music.

We thought this would be a great day. Dad let us get away with far more than Mum did.
Surprise Pies

While I'm gone, start tidying up.

Sam, keep an eye on those two while I'm out.

Okay.

There had to be a catch! At least Sam wouldn't bother us, but . . . .

The kitchen looked like a bomb had hit it. Where would we start?
Surprise Pies

What should we use to clean what? Washing the dishes was our safest bet, except ............

We got carried away squirting the bottle and . . . Before we knew it there were soap-suds everywhere!

The floor's soaked now, grab a cloth, quick! Oh no, Sita! Look at the tea-towels, they're black!

I didn't mean to use tea-towels, I panicked! We'd better put them in the washing machine.

We could wash our aprons at the same time.
**Kids’ Competition**

**Bubbles Company**

are looking for a good bubbles recipe.

Can you devise one?

They will add glycerine to the mixture if it can be proved worthwhile.

They want to use as much water as good bubbles will allow.

When you have discovered the ideal mixture you must convince the directors of Bubbles Company that you have the best product. They will want to know.....

1. How you carried out your tests and made the test fair.

2. How you tested each bubble mixture you made.

3. What your results were.

**Recipe**

<table>
<thead>
<tr>
<th>Ingredients</th>
<th>Utensils</th>
</tr>
</thead>
<tbody>
<tr>
<td>60-75g soap noodles</td>
<td>pipette</td>
</tr>
<tr>
<td>3 pipettes glycerine</td>
<td>rolling pin</td>
</tr>
<tr>
<td>3-5 drops perfume</td>
<td>plastic bowl</td>
</tr>
<tr>
<td>5-8 drops colouring</td>
<td>soap-mould</td>
</tr>
<tr>
<td>plastic bag</td>
<td></td>
</tr>
</tbody>
</table>

**Method**

1. Seal the noodles into a plastic bag.
2. Use the rolling pin to crush the noodles into a powder.
3. Add all the ingredients to a bowl.
4. Mash the mixture until the colour is even.
5. Spoon the soap into the mould until it is full.
6. Press the mixture down with the mould lid.
7. When no more mixture can be added, gently remove the soap bar.

**make your own soap bar**
Surprise Pies

What should we use? The writing on the bottles and boxes said 'the best' - just like on the telly. So we closed our eyes and picked one - "Clenz".

I put one of our Freddie's shirts in Clenz and one in a leading brand of soap powder. . . .

We'd seen the adverts, and Mum washed our jumpers with Clenz, so it must be okay.

We were pretty pleased with ourselves, we hadn't needed Sam's help once!

Gadzooks Batwoman!

We've no time for jokes Cal, look at this mess.

The kitchen floor looked worse than when we started, and the kitchen tops were still covered in flour.
Surprise Pies

We had to be quick, Dad wouldn't be long. Did Cal have to step back just then?

O-oh... this scouring stuff scratches the... aaaaagh!
Mincemeat

**Ingredients**
- 75g cooking apple
- 40g shredded suet*
- 140g dried fruit (raisins, currants, sultanas)
- 40g candied mixed peel
- 60g soft dark brown sugar
- \(\frac{1}{2}\) orange and \(\frac{1}{2}\) lemon
- 10g chopped almonds
- 1 teaspoon mixed spice

**Pastry**

**Ingredients**
- 300g flour
- 75g margarine
- 75g lard*
- pinch of salt
- cold water, to mix

**Method**
1. Peel, core and finely chop the apple.
2. Grate the rind of the orange and lemon and squeeze out the juice.
3. Finely chop the mixed peel.
4. Mix all the ingredients in a large bowl.
5. Loosely cover the mincemeat with foil and place in the oven (gas mark \(\frac{1}{4}\), 225 °F, 120 °C) until the pastry cases are ready.

**Pastry**

**Method**
1. Sift the flour and salt into a large mixing bowl.
2. Cut the fat into small pieces and rub them into the flour until the mixture looks like breadcrumbs.
3. Add 3-4 tablespoons of cold water and stir into the flour and fat.
4. Add 1-2 tablespoons of water and stir until the mixture forms a ball of pastry.

* Vegetarian options can replace animal products. Vegetarian suets and solid fats are available.

**Making the pies**

1. Roll out a sheet of pastry on a surface sprinkled with flour.
2. Cut out pastry cases with the large cutter, and lids with the small cutter.
3. Grease the baking tray hollows and put a pastry case in each one.
4. Take the mincemeat out of the oven and turn the oven up to gas mark 7, 400 °F, 200 °C.
5. Spoon 2-3 teaspoons of mincemeat into each case, cover with a pastry lid and dust each pie with icing sugar.
6. Bake the mince-pies in the oven for 15-20 minutes.
7. Cool for 10 minutes before taking out of the baking tray.