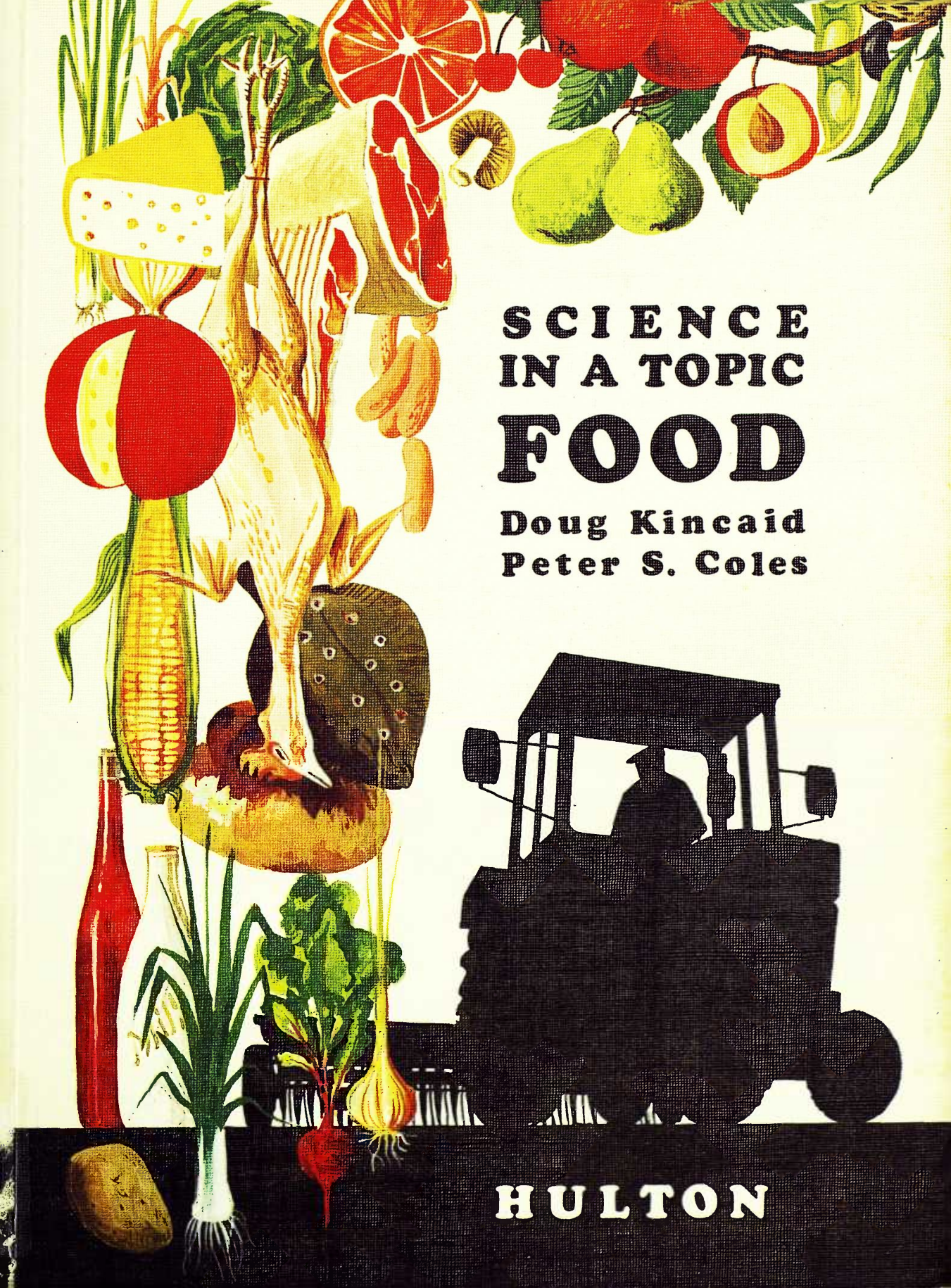


SCIENCE IN A TOPIC

FOOD

Doug Kincaid
Peter S. Coles

HULTON

Some recipes for you to try

(See also back end-paper)

BREAD OR BREAD ROLLS

1 small loaf or 8 rolls

Utensils

1 mixing bowl
1 teaspoon
1 small basin
1 measuring jug
1 flour dredger
1 bread tin or baking sheet
1 pastry brush
1 knife
1 cooling tray

Ingredients

200g plain strong flour
25g lard or white fat
1 level teaspoon salt
1 teaspoon sugar
15g fresh yeast
125–150ml warm water
milk for glazing

Method

1. Wash your hands before you begin. Put the oven on at 425° F or 220° C or Regulo 7.
2. Grease the bread tin or baking sheet.
3. Put flour, sugar and salt in mixing bowl.
4. Add the lard to the flour. Rub the lard into the flour using the fingertips.
5. Wash your hands.
6. Cream the yeast with two teaspoons of warm water.
7. Add remainder of water to creamed yeast.
8. Stir the yeast and water into the flour.
9. Beat the dough well using a wooden spoon or your hand (ONE HAND ONLY) until it is smooth (5 minutes).
10. Put the dough on to a floured board or floured table top.
11. Knead the dough until it is really smooth.
12. Shape the dough into a loaf or divide the dough into 8 equal pieces; make 8 rolls.
13. Put the loaf into the bread tin or put the rolls on to the baking sheet.
14. Leave the bread to rise in a warm place until doubled in size. Glaze the top with milk.
15. Bake in a hot oven 425° F or 220° C or Regulo 7:
    Bread 40–50 minutes
    Rolls 15–20 minutes
16. Reduce the heat to 350° F or 180° C or Regulo 4 after the first ten minutes.
17. The bread should be well-risen and golden brown, and should sound hollow when tapped lightly on the under side.
18. Remove the bread from the baking tin and put to cool.
19. Serve in a napkin-lined bread basket.

QUEEN CAKES

(All-in-one method)

Ingredients

50g plain flour
1 level teaspoon baking powder
50g caster sugar
50g soft margarine
1 standard egg
1 tablespoon water
10g icing sugar
25g dried fruit

Utensils

1 teaspoon
1 knife
1 small basin
1 wooden spoon
1 cooling tray
1 bun tray
8 paper cake cases
1 sieve
1 mixing bowl
1 tablespoon

Method

1. Wash your hands before you begin. Put the oven on at 375° F or 190° C or Regulo 5.
2. Put the paper cases in the bun tray.
3. Sieve the flour and baking powder into the mixing bowl.
4. Add the caster sugar and soft margarine (and dried fruit).
5. Break the egg into the small basin before adding it to the mixing bowl.
6. Add the cold water.
7. Using the wooden spoon, mix all the ingredients together and beat for one minute, until the mixture is smooth and creamy.
8. Put a teaspoon of mixture in each paper case and repeat this until all the mixture is used up.
9. Put to bake for 15–20 minutes, until the cakes are golden brown and firm to touch.
10. Remove from the oven and put to cool.
11. When the cakes are cool, sprinkle a little icing sugar on the top.
12. Serve on a doily on a plate.

Note: If you are unable to obtain fresh yeast you may use one teaspoon of dried yeast instead, **BUT** you must follow the directions on the packet or tin.

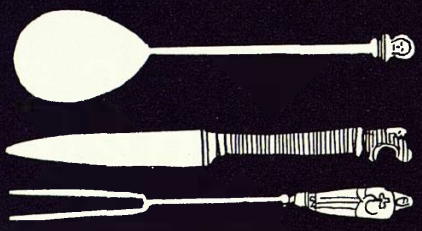
SCIENCE IN A TOPIC

FOOD

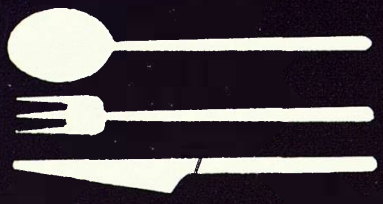
Doug Kincaid
Peter S. Coles
Illustrated by Chris Hoggett

HULTO

19th. cent. teapot



Early cutlery

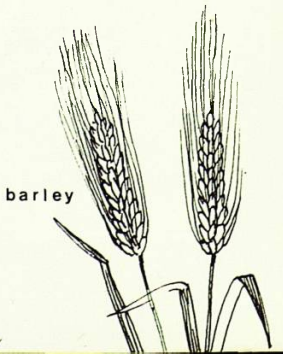


Modern cutlery

Medieval ploughman

ISBN 0 7175 0769 6
First published 1977
Hulton Educational Publications Limited

millet



barley

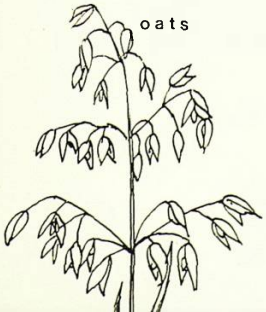
Science in a Topic

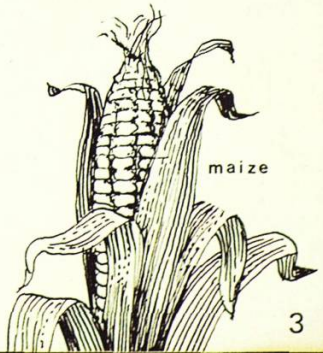
FOOD

About this book

This book is different from most others because:

1 It is not complete, but only part of a study – the science part. There will be a need to use many other books to find out about other aspects of the topic – History, Geography . . .
2 It will not tell you information but will only ask you questions and suggest ways that you might find the answers for yourself. Many of the suggestions were some children's ways of trying to find an answer – you may have better ideas.
3 It is hoped that arising from these questions other questions will occur to you – do pursue these. (Your own questions and the ways you find to answer them are really the most important.)
4 You do not need to work through the book in the order set out; the sections of work can be done in the order that you wish.
5 There is no need to complete all of one section. If the work becomes harder as you progress through a section, see how far you can go.





CONTENTS

SCIENCE IN A TOPIC SERIES

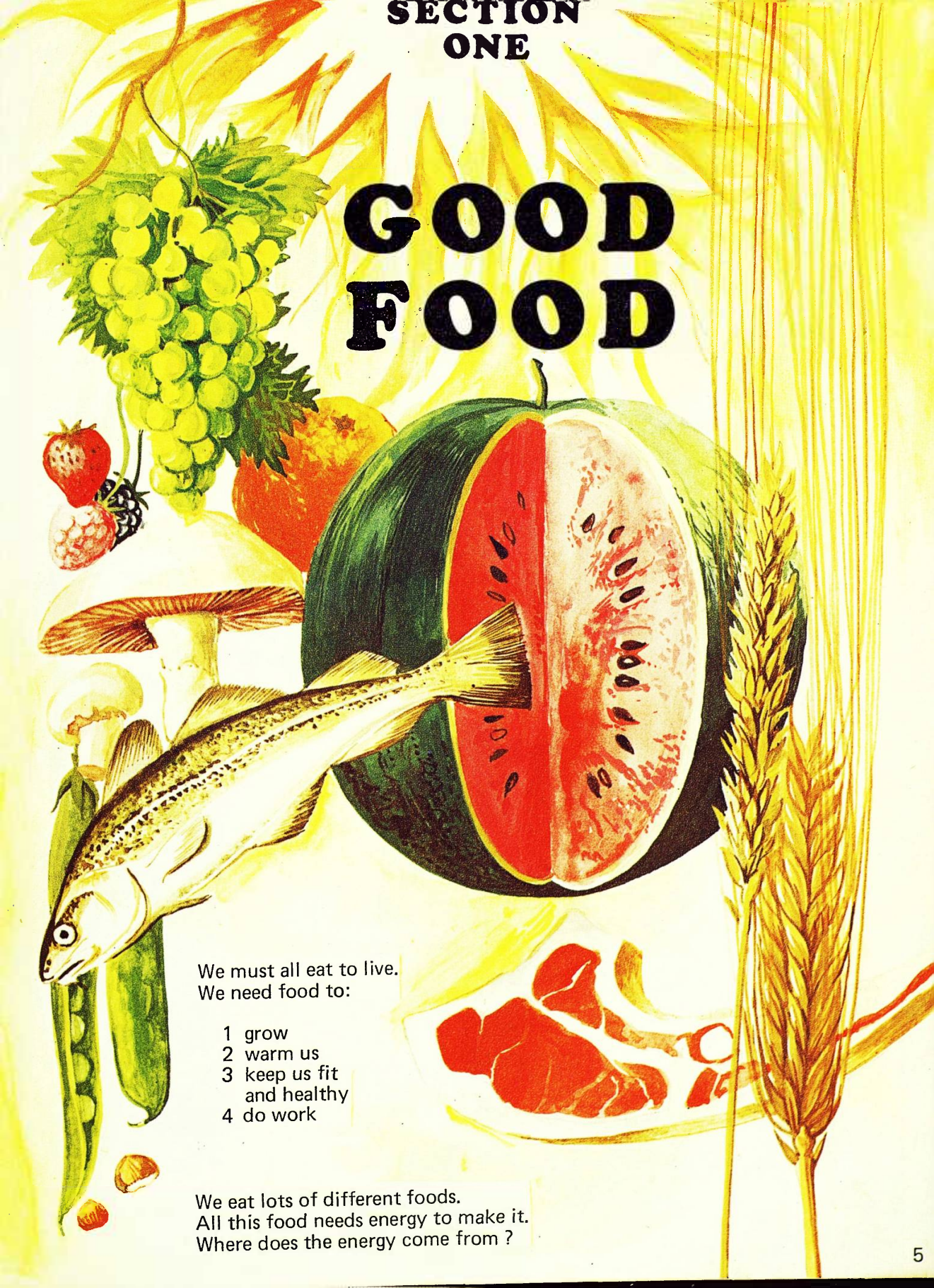
by Doug Kincaid, County Staff Advisory Teacher, Science, Buckinghamshire.
Peter S. Coles, B.Sc., Chief Adviser, Berkshire.

Other Titles:
Ships
Houses and Homes
Clothes and Costume
Communication
Land Transport (Roads, Bridges and Tunnels)

Published by Hulton Educational Publications Ltd., Raans Road, Amersham, Bucks.
Printed Offset Litho by Cox & Wyman Ltd., Fakenham, Norfolk

SECTION ONE

GOOD FOOD



We must all eat to live.
We need food to:

1 grow
2 warm us
3 keep us fit and healthy
4 do work

We eat lots of different foods.
All this food needs energy to make it.
Where does the energy come from ?

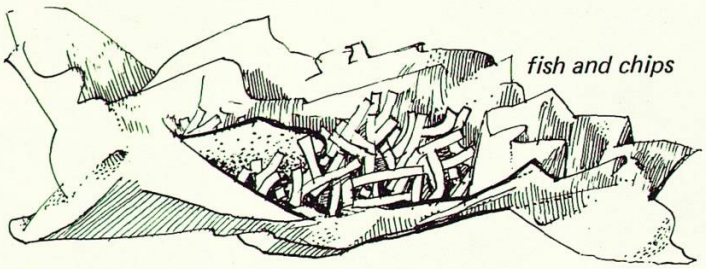
Food of other lands

Englishman Indian Italian Chinese Swede

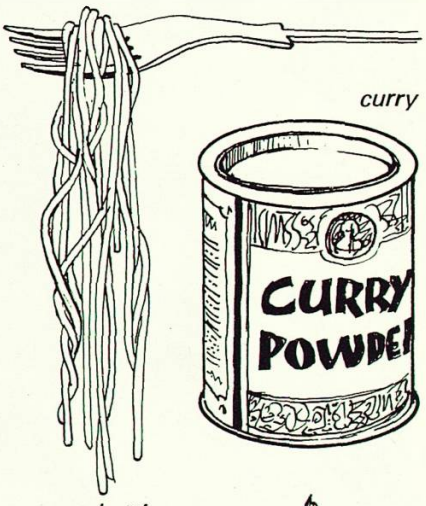
We enjoy our food. We have our favourite foods.

People of different countries enjoy different dishes. They have their national dishes which are favourite foods.

Here are some national foods. Can you match the dish to the person?



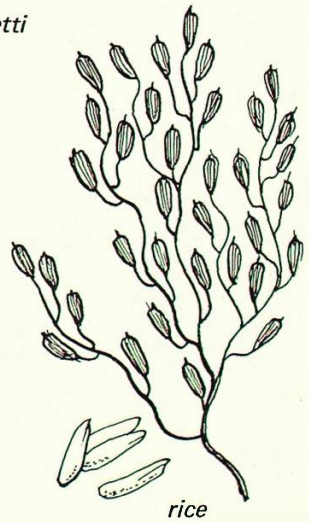
fish and chips



curry

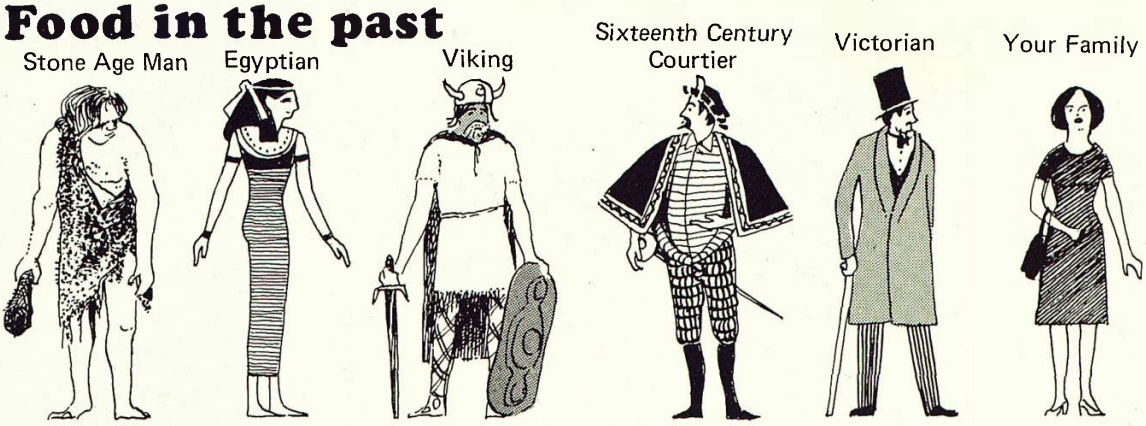
spaghetti

cold table

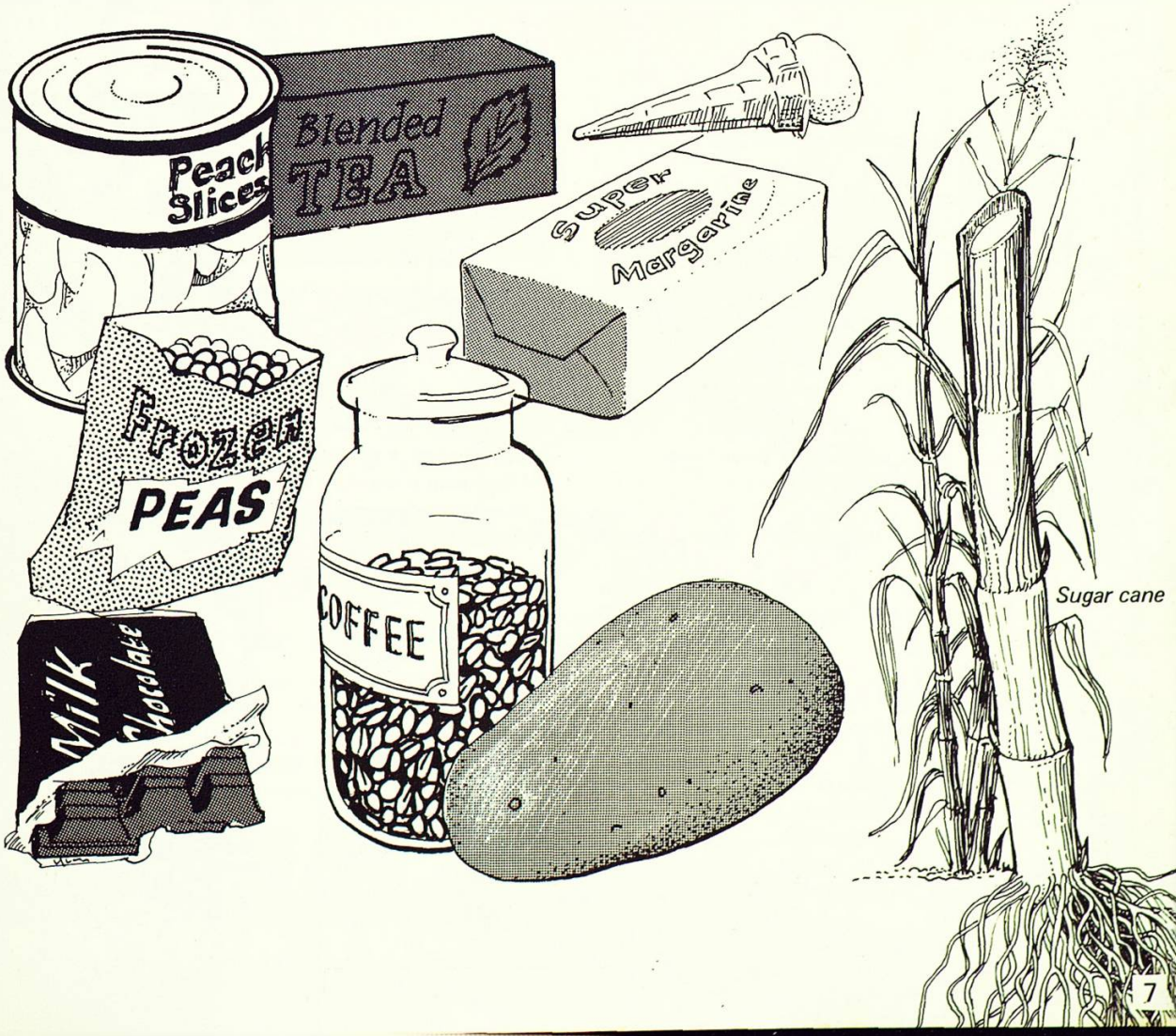


rice

Food in the past



What did these people of the past eat ? In many ways their food must have been very different from our food today. What reasons can you find for this ?
Find out when foods like these were first used and where they came from.



Tesco Supermarket at Edmonton Green

Shopping around

List all the food bought for your household during one week.
See how much you can find out about this food.

The Food	Description				Cost	Kind of shop (where bought)	Country it came from
	Fresh	Tinned	Dried	Frozen			
pepper							
coffee							
etc.							

Which of these could not have been bought one hundred years ago ?
Why ?
Find how much some of the foods cost:

1 last year ?
2 when your parents were your age ?
3 when your grandparents were your age ?

Can you find out from them how the shops have changed ?
What food has your family eaten that is not on this list ?
Perhaps it was (a) given to you
(b) grown at home
(c) eaten away from home

Find the mass of food eaten by yourself during one week.
Find the mass eaten by your family in this time.
Find how many different things you eat in : a day
a week

Now use your library to find out the same information for children of other lands :
China, India, United States of America, a central African country.

How does their food compare with your yours ?

OUR DAILY BREAD

1. Reaping and threshing the sun-ripened wheat

2. Transported by ship or lorry to the mill

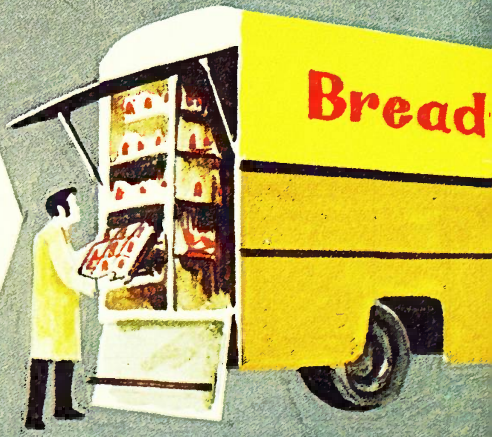
3. Mill grinding the grain into flour

4. Making the dough

Bread is one of the world's main foods. There are many kinds of bread.

5. Baked in the oven

6. Loaves delivered to you

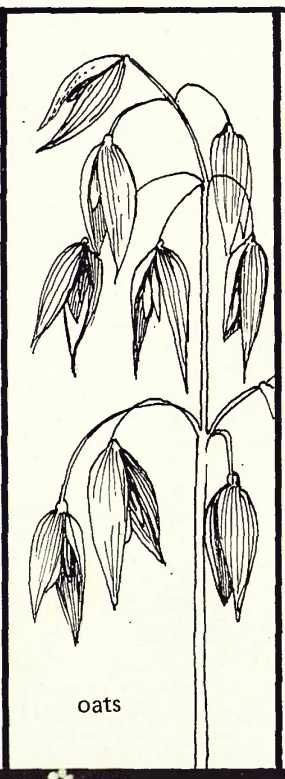


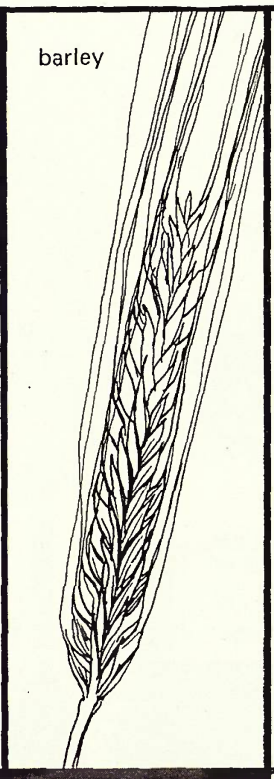
Corn and Cereals

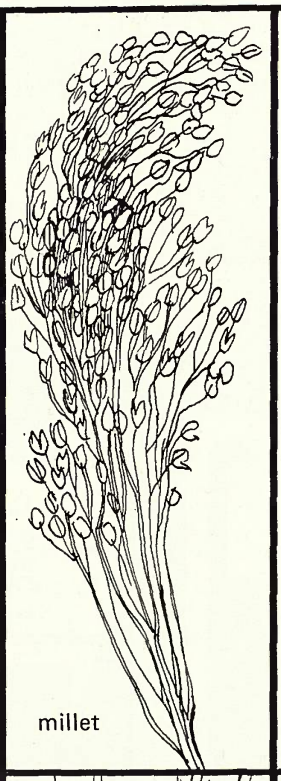
Every meal you eat will usually include some cereals.
Cereals are grasses.
They are grown for their seeds, which we eat.

Different cereals are grown in different parts of the world.
Here are some important cereals:

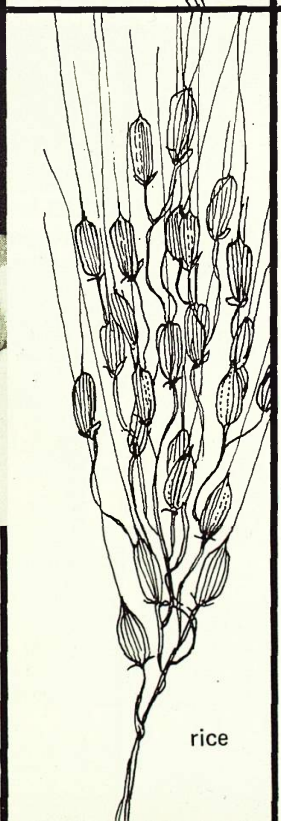

wheat


oats


barley


millet


maize


rice

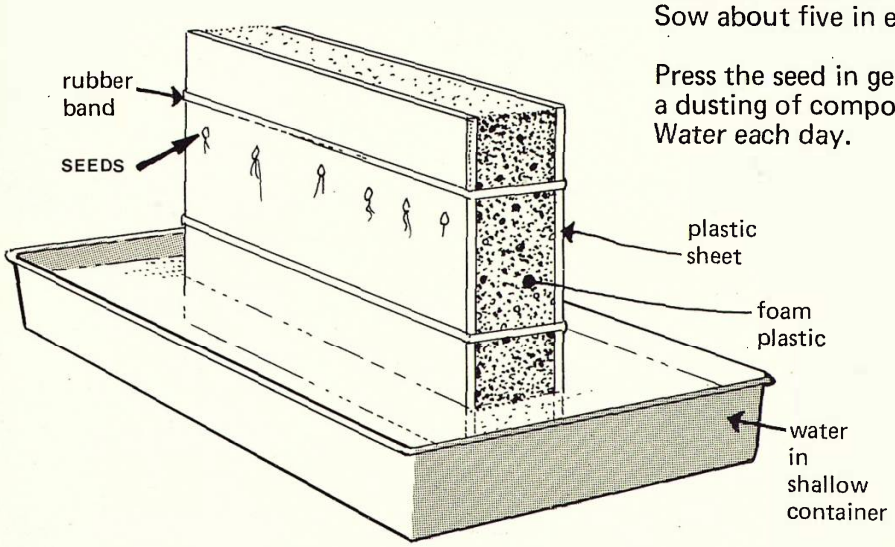

rye

Some countries use one main cereal to make bread. This is often called corn.

Collect a sample of as many of these cereals as you can. Mount and name them. Collect samples of wild grasses. Mount and name these. Compare these with your cereals.

Growing Corn

Try growing some of the cereal seeds.
One good method is shown below. This way you can see what is happening.



Grow some cereal seeds in pots.
Measure the growth.
Try: wheat, barley, maize and oats.
Use a seed-growing compost and nearly fill the pot.
Soak the seeds for twenty-four hours.
Sow about five in each pot.

Press the seed in gently and cover with a dusting of compost.
Water each day.

Record:

Kind of seed	Date of sowing	Temper-ature	Date of first sign of growth	Record of growth	
				Date	Height of seedlings

How many of your five seeds grew ?
Plot graphs for different seeds. Show how the seedlings grew taller as the days went by.
Do different seeds of the same kind show the same growth pattern ? Do seeds of a different kind have a different growth pattern ?
Repeat the sowing. Alter the watering and see if results are changed.
Another experiment could be to change the temperature.

Right: Measuring the growth of plant

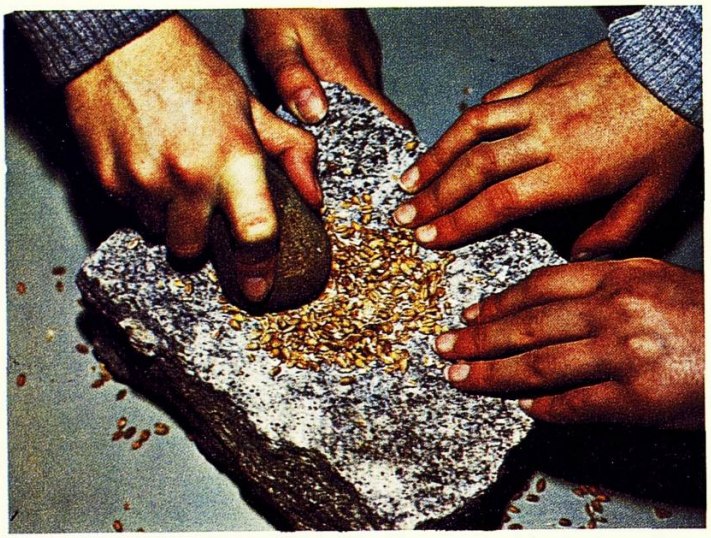
Making Flour

Corn is ground to obtain flour. Here are some methods that have been, and still are, used in some parts of the world.

Saddle quern used in the Stone Age

Saxon flail

Handmill



Above: Children trying 'Stone Age grinding'
Below: Windmill at Pitstone, Buckinghamshire

Flour and Dough

Try grinding corn for yourself.

The miller separates the corn into three main parts.
What are these ?
Can you do this ?
How was this separation done ?
How is it done in a modern mill ?

We still have reminders of past ways of grinding corn.
A visit to a local windmill will give you more ideas for your topic. If you can follow this with a visit to a modern mill you will have lots to think about.

Collect samples of as many different flours as you can.

Examine them closely; use your lens or microscope.
Try to arrange them in order of whiteness.
What other differences can you find ?

DOES FLOUR HAVE DIFFERENT PARTS ?

Take about 200g of flour. Add water and make it into a dough. Work the ball of dough with your hands in a small bowl of water. Keep squeezing the dough in the water. Save the part that is now in the water. Continue squeezing under a running tap to wash away the last little bit of this.

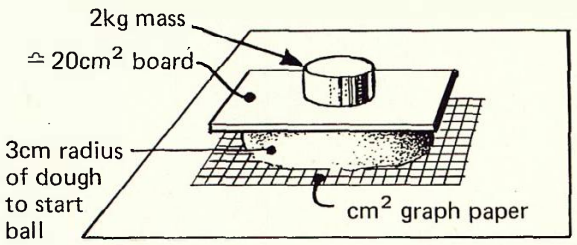
You now have two different parts of flour:
1 one in the bowl
2 one in your hand
In what ways are they different ?

Try this experiment with different flours.

Dough strength

Bakers talk about the 'strength' of flours.
Try a test to measure this.
Take 50g of one of the flours.
Add 25ml of water.
Mix and make into a dough.
Roll it into a ball.

Set up the measuring test like this:



Leave it for five minutes. Count the squares the dough has spread over.

The stronger the dough the less it will spread.
Test other flours and compare strengths.

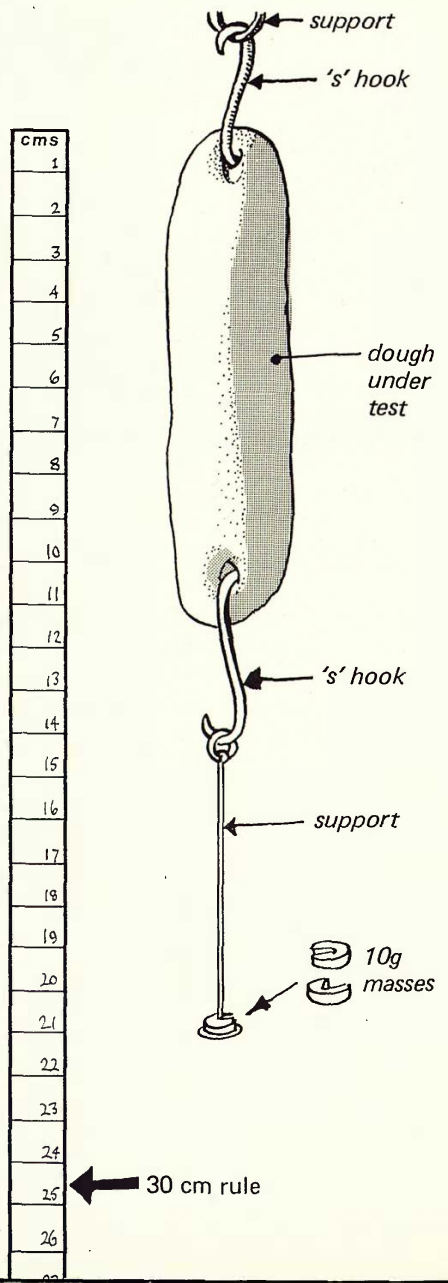
Can you find a difference between an ordinary flour and one that is sold as 'strong flour' for breadmaking ?

For this to be a fair test you will need to control several things. The only difference in these experiments should be the type of flour.
What things will you need to keep the same ?

Another way to measure the strength of a dough would be to use a stretch test. Try such a test and compare the results.

Which flour is the strongest ?
Which part of the flour gives it strength ?
Which do you think will make the best bread ?

Try baking your own bread to find out.
(There are recipes on the inside covers of the book.)



Yeast

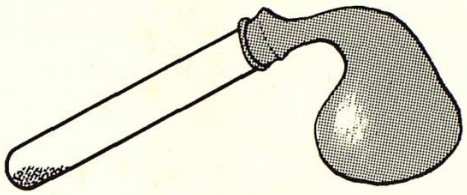
To make good bread, yeast is added to the flour and water.

WHAT IS YEAST – WHAT DOES IT DO IN BREADMAKING ?

Look closely at some yeast.

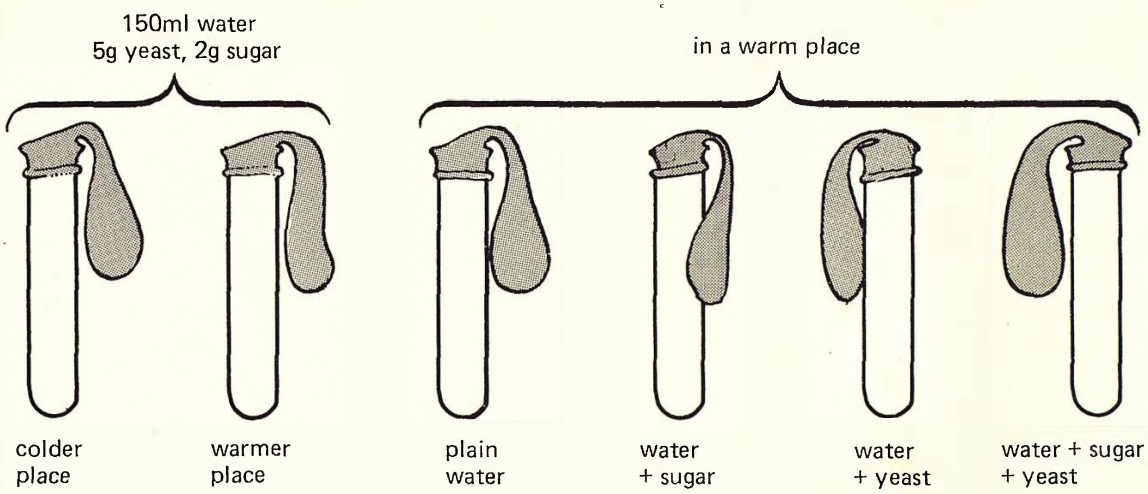
Put a teaspoon of sugar in a test tube.
Half fill the test tube with warm water.
Add a little yeast.

Stretch a balloon over the neck of the test tube.



Watch what happens, after five, ten, fifteen, thirty minutes, one hour, two hours . . .

Set up these tests. What happens in each case ?

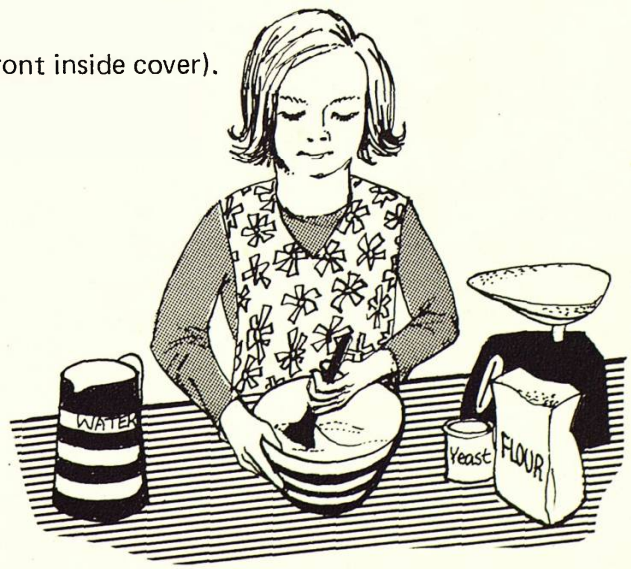


Do try some breadmaking for yourself (see front inside cover).

Experiment by changing the recipe.

Try:

1. leaving out the yeast
2. using twice as much yeast
3. leaving out the salt
4. roasting the yeast before using
5. trying to keep the dough cold before baking
6. using dry yeast instead of the live kind



A Food Test

Bread and many other foods have a lot of starch in them.
Our body can make starch into sugars. These can then be used to give us energy.
Find out about a test to see if starch is in a food.
The test uses iodine solution.

IODINE IS POISONOUS

Use a dropper to add a *little* iodine solution to each of these:
sugar, chalk, bicarbonate of soda, laundry starch, mashed potato, flour, ground rice, salt, milk, soap, baking powder, tapioca, arrowroot.
(You may need to mix some with a little water.)

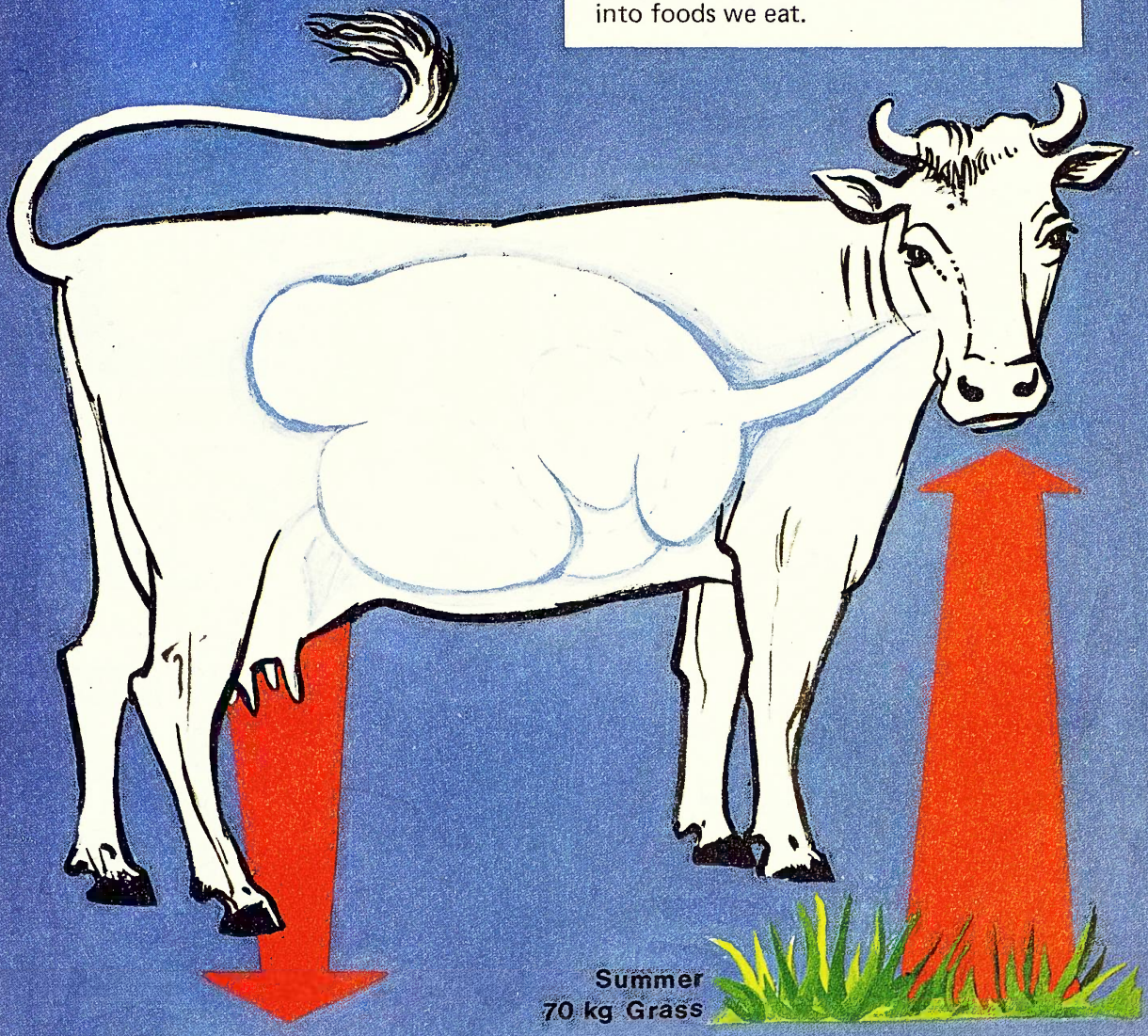
The photograph below shows what happens if starch is present.
Record those which you found to have starch in them.
Test the materials you obtained from the flour (page 13).

Children experimenting with iodine solution to find starch.
The blue-black stain shows that starch is there.

MILK

SECTION THREE

A cow eats grass. It can make this grass into foods we eat.

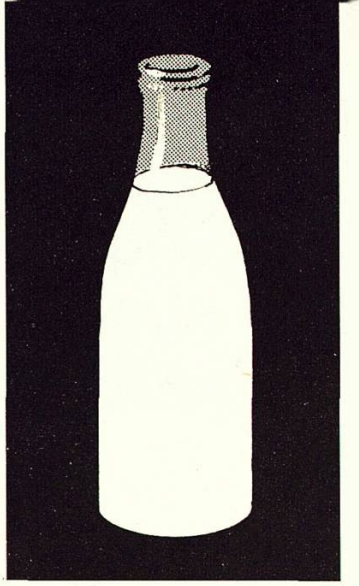


Summer
70 kg Grass

Winter 10 kg hay.....5 kg cattle cake

1 How much milk can one cow make in a day ?
2 How is the cream separated from the milk ?
3 What part of the milk becomes butter ?
4 Name as many different cheeses as you can. Make a map to show where they come from.
5 How is yoghurt made ?

What is Milk ?

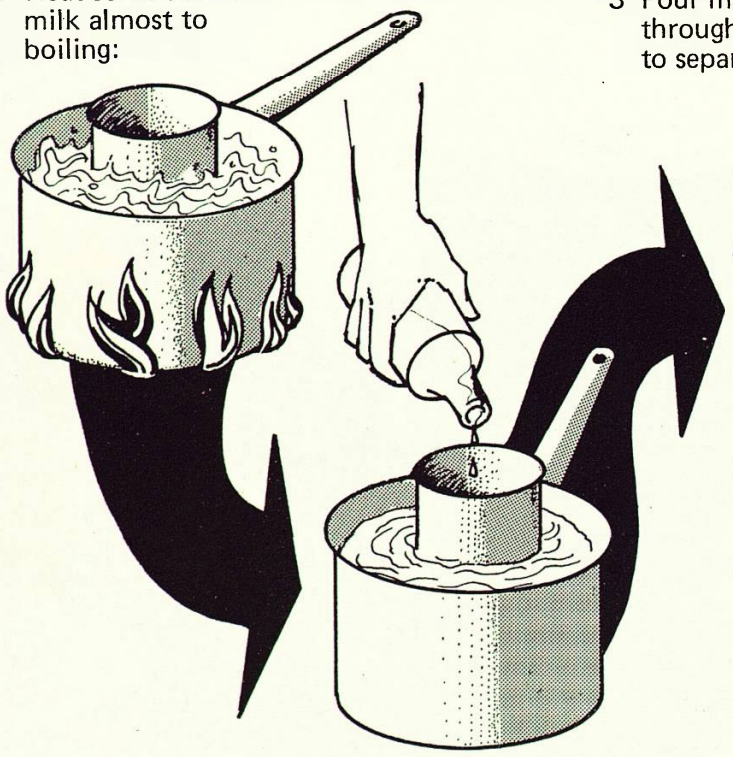


Look at a bottle of milk.

You will see the layer of cream.
Does all milk have the same amount of cream ?
Measure the cream on some of these:
'silver top', 'gold top', farm-bottled, pasteurised, homogenised, Channel Island, South Devon.

Take a glass of milk and separate the cream layer from the bottom layer.
Keep the cream for later. (See page 20 on butter-making.)
Find out more about the skimmed milk.

1 Heat some skimmed milk almost to boiling:



2 Add 75ml of white vinegar:

3 Pour mixture through muslin to separate:

4 Squeeze and rinse with a little water:

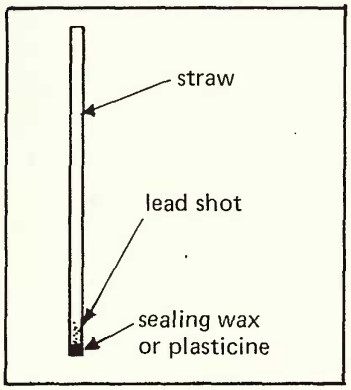
The material you have got is called casein. Casein is an important food part of the milk. It is also used to make such things as buttons, knitting needles, handles and glue.

Testing Milk

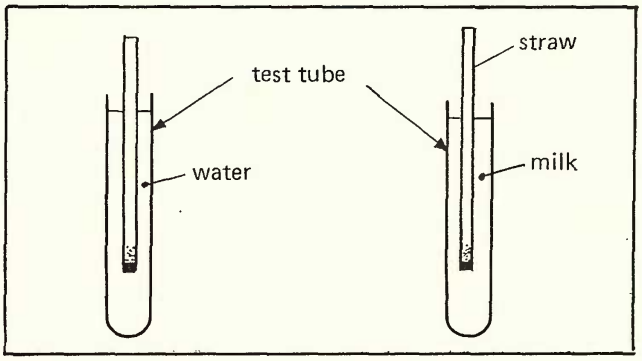
Milk is tested to make sure that it is pure and of good quality.

One test would show if the milk had been watered down. Try this test for yourself.

Make a floater.

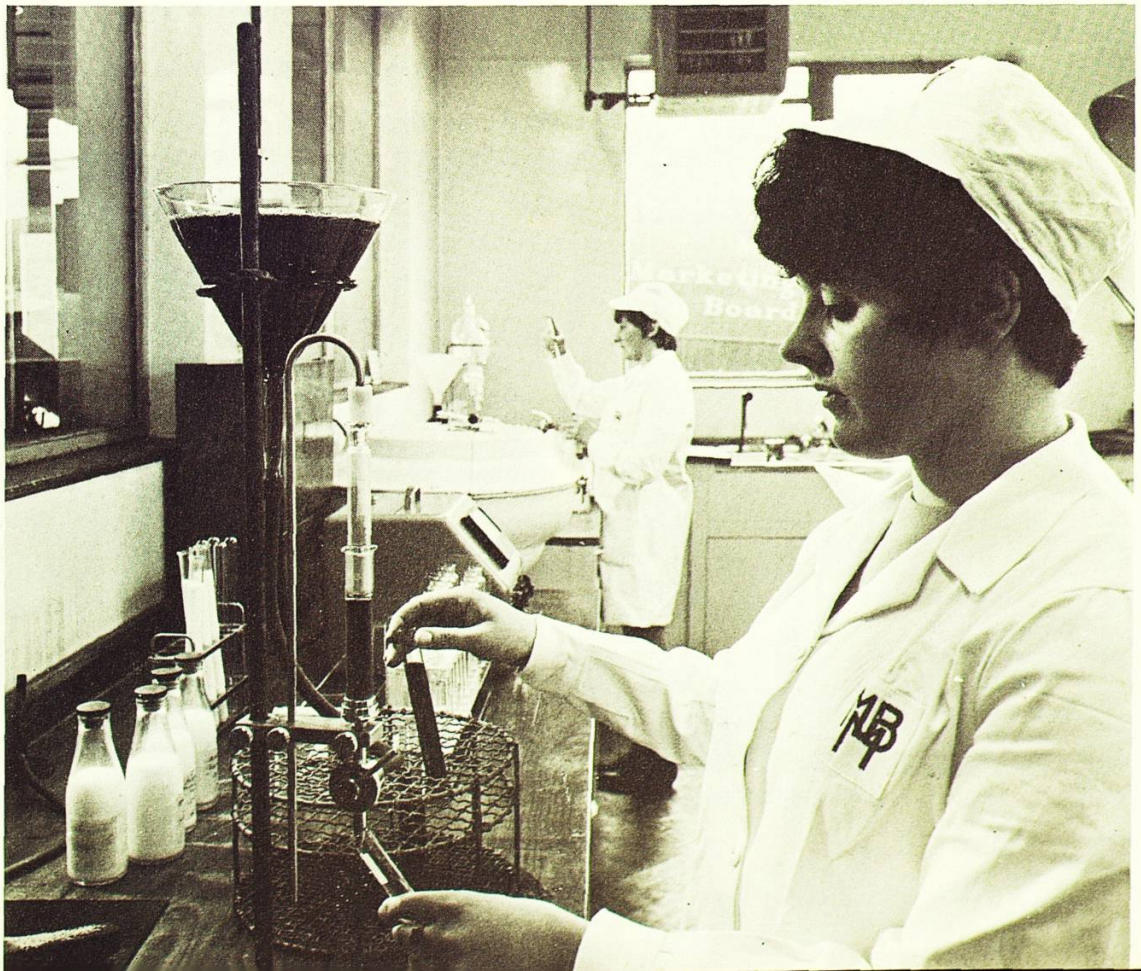


Mark how your floater sinks in water and in milk.

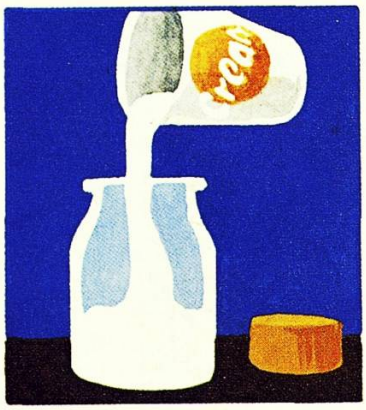


Ask a friend to prepare different samples, some watered down.
What can your floater find out about these samples ?
Test different kinds of milk with your floater.

Preparing for a bacteria test in a milk laboratory (Also see page 21.)



Butter.....



Try making some butter.
It is made from cream.
Put the cream in a jar with a tightly-fitting lid.

A good way is for each member of a group to give the jar twenty shakes.
Report on any changes.

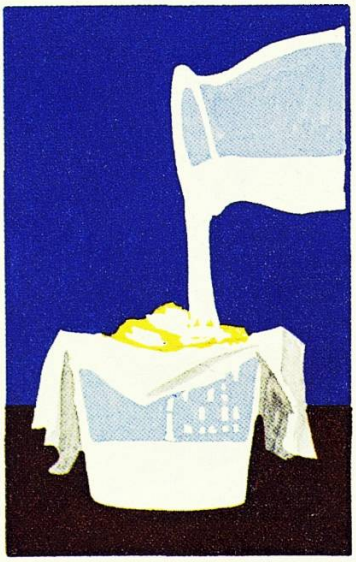
When the butter is made, strain through a clean cloth.
Butter will be left on the cloth.
Find out the name of the liquid which has strained through.

Try using the cream from different milks. Which milk is best for butter-making ?

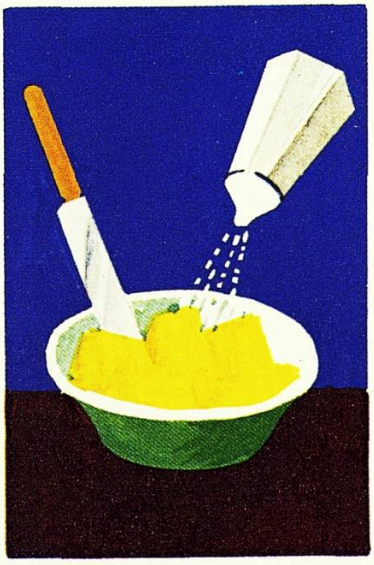
.....and Cheese

You could also try making some cheese. You need a bottle of milk.

Add the juice of half a lemon and leave in a warm place for twenty-four hours.



Strain this through muslin, leaving it to drain thoroughly.



Add a little salt and work with a knife blade.

Louis Pasteur

1 How long will milk keep ?
2 What makes milk go sour ?
3 When does it go sour more quickly ?
4 What is done to keep milk longer ?

Milk is a liquid which could grow germs and bacteria quickly.
They would grow well in this wet, warm food.

It is possible to experiment with bacteria. This is not wise unless you have the proper equipment and a skilled biologist with you, as germs and bacteria can be dangerous.

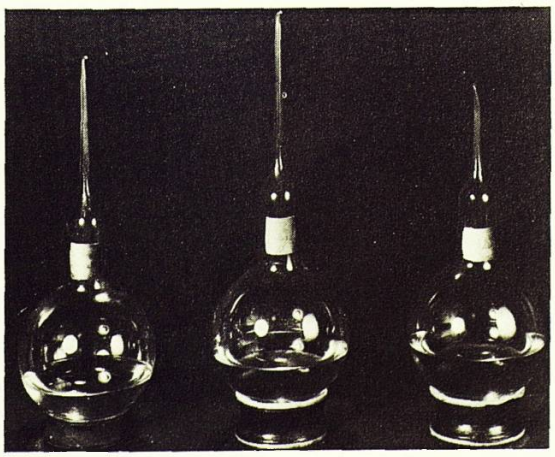
Find out about this scientist. His work showed us how germs behave and how we can control them.

His name was Louis Pasteur.

He was a Frenchman who lived over a hundred years ago.

Do some book research:

1 What did he discover about why the wine was spoiled ?
2 How did he help the silk industry ?
3 Who was Joseph Meister ?
4 What great experiment took place at a farm called Pouilly le Fort ?
5 What is special about Pasteur's flasks ?



The actual flasks that Pasteur used for the experiments

Louis Pasteur 1822–1895

A Farm Visit

Perhaps your teacher will be able to arrange a dairy farm visit as part of this study. If this is not possible you can use books.

Here are some questions to have in mind.

1 What breeds of cow and how many of each does the farmer keep ?
2 Watch the cows eating. How do they take the grass ?
3 Can you see them 'chewing the cud' ? What does this mean ?
4 What does the herd eat during the winter ?
5 How much milk would a cow give during a year ?
6 How does the milking machine work ?
7 What things affect the milk yield of a cow ?
8 What is 'an attested herd' ?
9 How does the farmer make sure the milk is kept clean and pure ?
10 What crops does the farmer grow ?

Record the day's work of a dairyman and the year's work of a dairy farm. Make charts to show these.

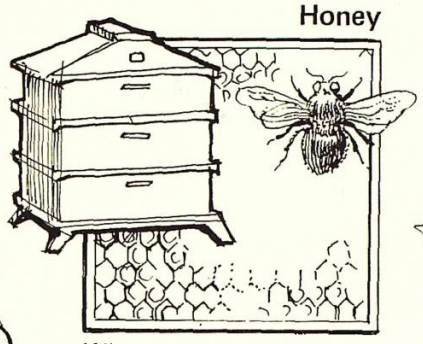
SUGAR and SWEETS

Collect as many kinds of sugars as you can.
Do different kinds have different uses ?

Sugar Cane

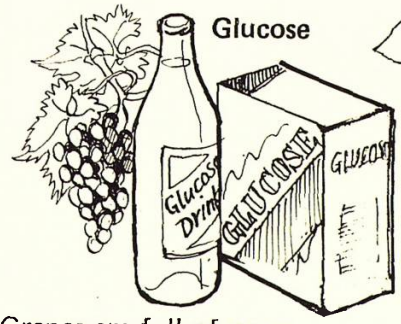
Where does this grow ?

Honey



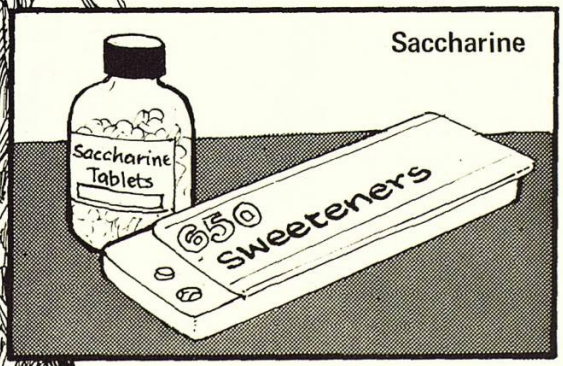
Where does the bee collect its honey sugar ?

Glucose



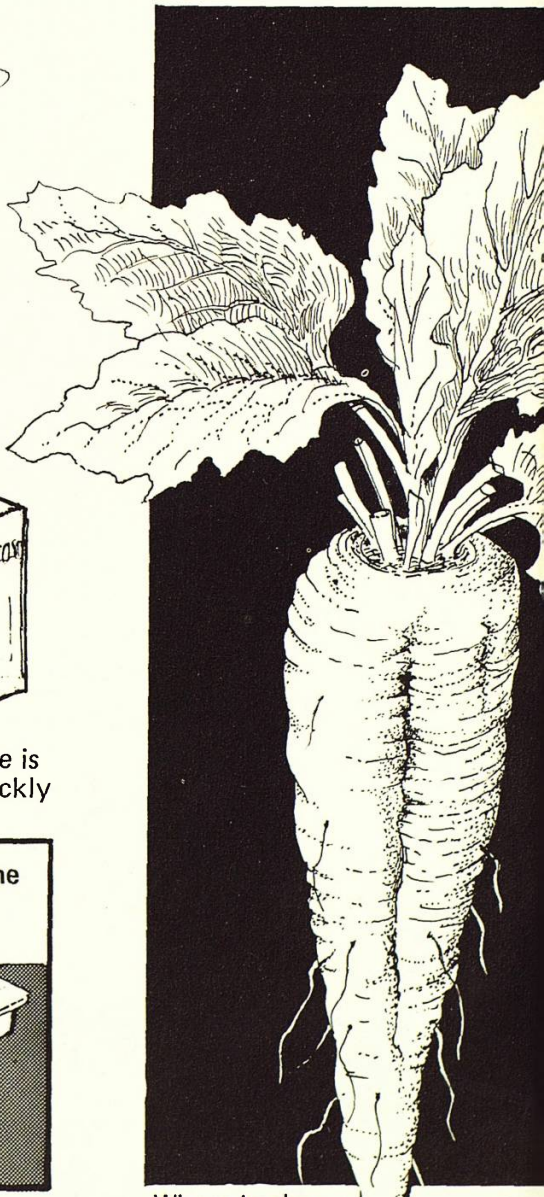
Grapes are full of sugar scientists call glucose. Glucose is a food which can be used quickly by our bodies.

Saccharine



Saccharine is another sweetener. From what is it made ?

Sugar Beet



Where in the world is sugar beet grown ?

SECTION FOUR

Sweets

How many sweets can you name ?
How did these sweets get their names ?
marzipan, nougat, praline, toffee, butterscotch, chocolate, liquorice, rock.

What are the ingredients of sweets ?

You could make some sweets.
(See recipes on inside cover.)

Which are your favourite sweets ?

What reasons do people give for choosing sweets ?

Is it because:
(a) they like the flavour ?
(b) they like the texture ?
(c) the colour appeals to them ?
(d) the sweet has a special shape ?
(e) the sweet is chewy or crunchy ?
(f) the sweet lasts a long time ?

Ask some friends their favourite colour of fruit pastille.

Can they really tell which colour is which, by taste alone ?

Make them close their eyes. Give them a sweet. Record the colour. What do they say they have had ?

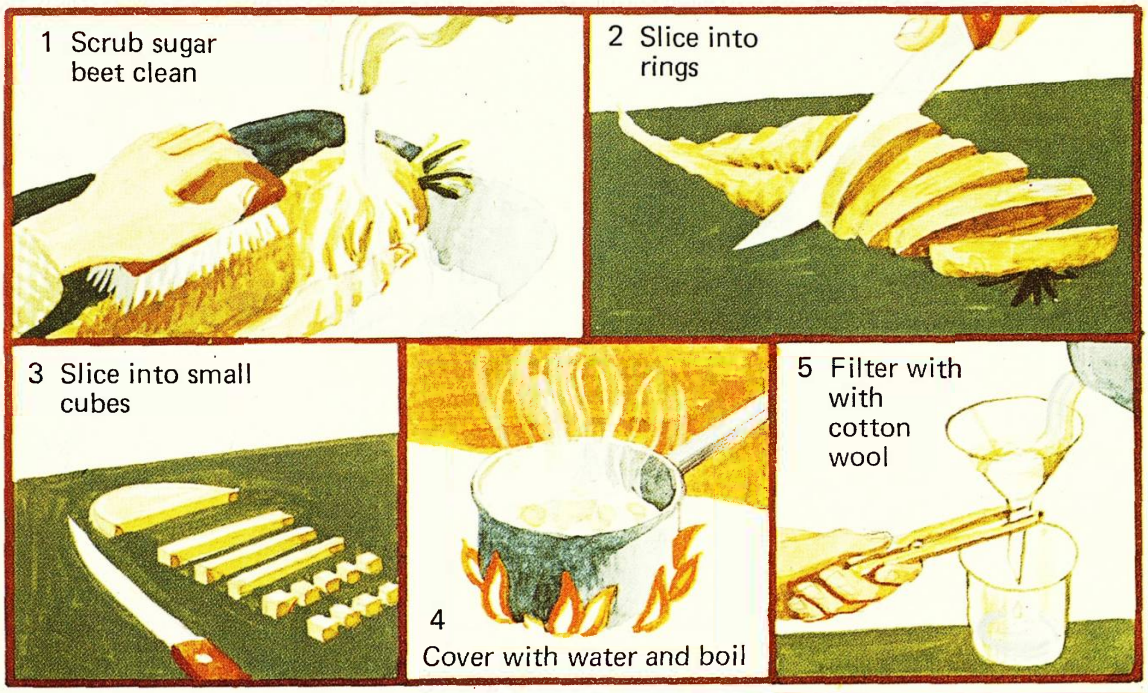
Try the test again and hold your nose.

Name	Colour given	Colour said

There are more things to do with taste on page 36.

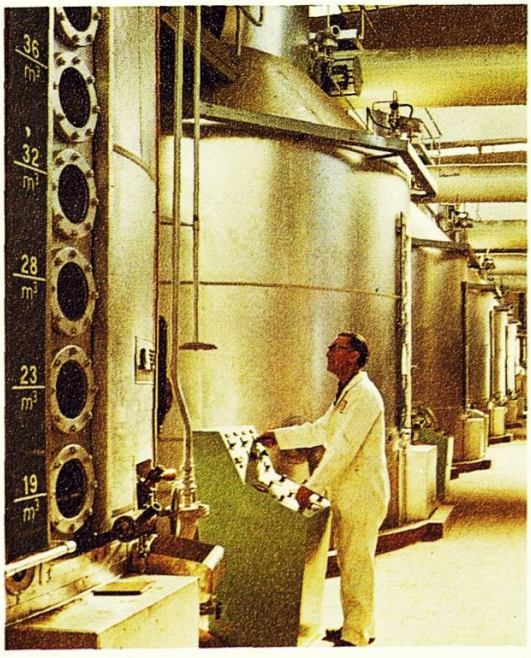
Refining Sugar

Making pure white sugar crystals from beet or cane needs special machines. Try to make some sugar from sugar beet.



(You may not manage to get pure white sugar crystals. You should manage to make a sweet syrup.)

Above: A collection of sugars



Right: This is the machinery used in a sugar factory

The refining process needs a vacuum and a centrifuge.
What do these do ?

Using Sugar

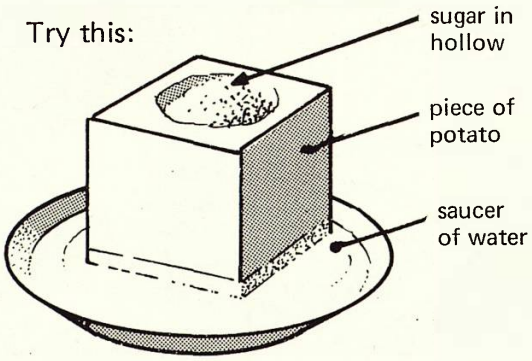
What is sugar used for in cooking ?
To sweeten, is an obvious answer.
But why was sugar added to the yeast ?
(See page 15.)
The sugar here is used to help the yeast grow. It is a good food. As the yeast grows it makes gas bubbles.
This makes bread light.

Sugar also softens parts of flour. This lets the flour swell, making lighter foods.

Make some cakes at home or school. Try beating the butter or margarine with and without sugar.
The sugar gets air in between the fat particles. This makes the mixture lighter.

Many people like grapefruit for breakfast. Most of them put sugar on the fruit.
Try this with half a grapefruit. Watch it from time to time during the day. Can you see what else the sugar does, apart from making it sweeter ?
Do other fruits and vegetables work with sugar in this way ?

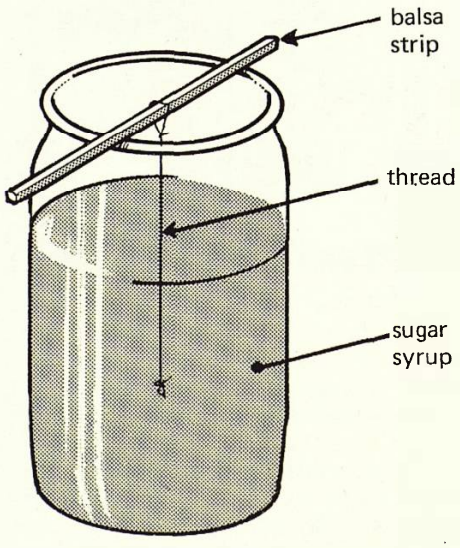
Try this:



Look at different sugars under your microscope. Draw the shapes you see.

Try to make some larger sugar crystals. Add sugar a little at a time to 250ml of hot water. Do this until no more will dissolve. (This may take two or more cupfuls of sugar.)

When this is cool pour it into a jar or glass beaker. Let a string dangle into the syrup like this. Leave the jar in a warm place for a few days. Look at it from time to time.



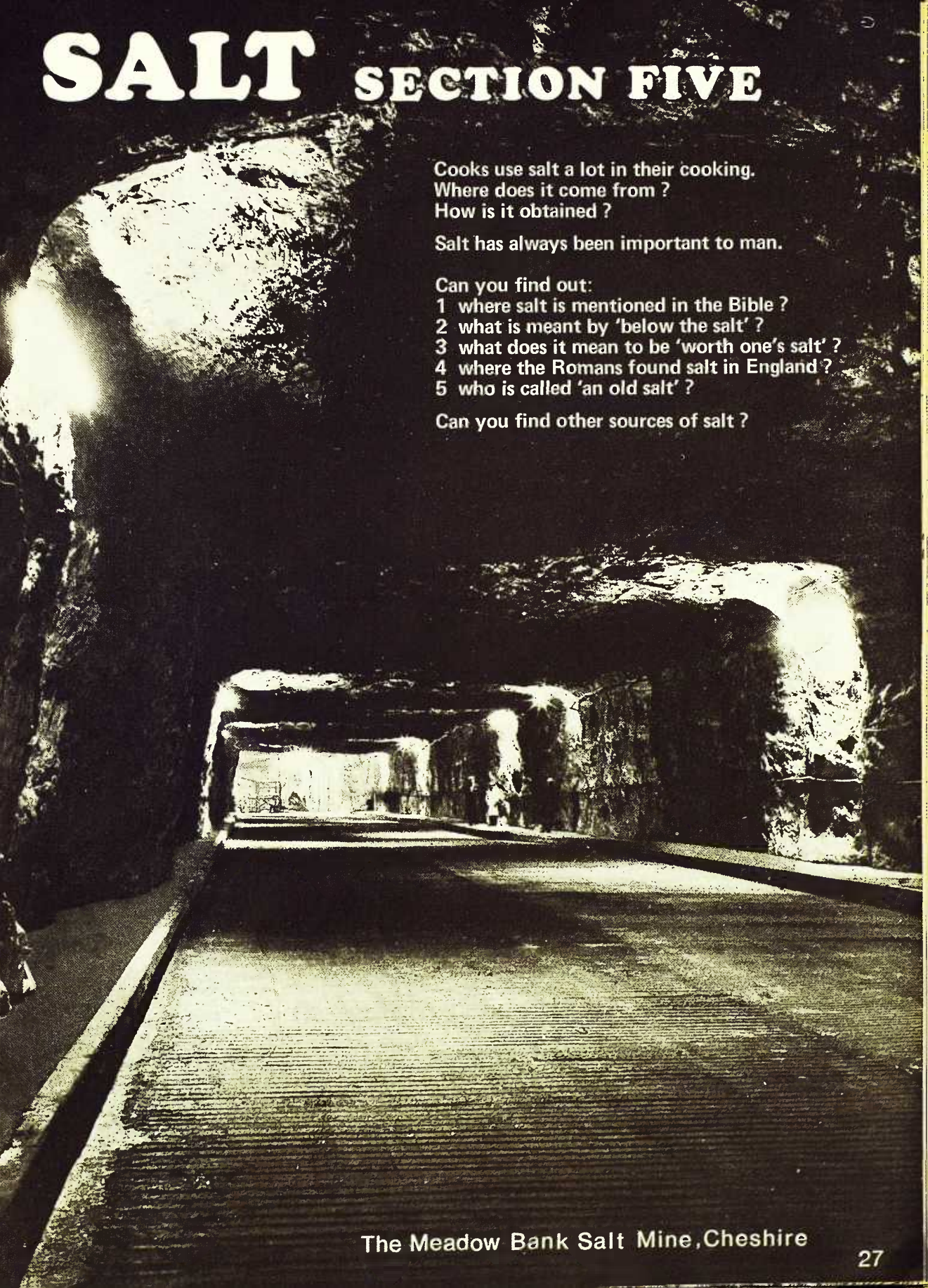
SALT SECTION FIVE

Cooks use salt a lot in their cooking.
Where does it come from ?
How is it obtained ?

Salt has always been important to man.

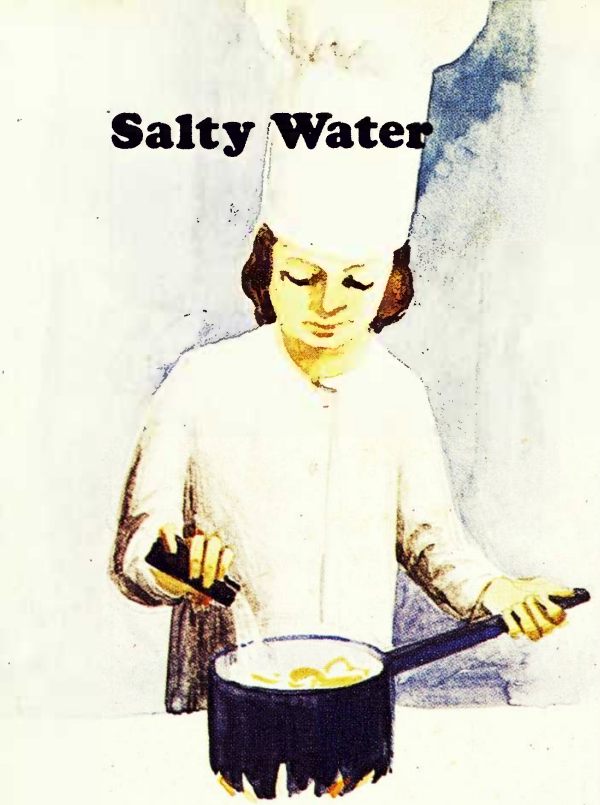
Can you find out:
1 where salt is mentioned in the Bible ?
2 what is meant by 'below the salt' ?
3 what does it mean to be 'worth one's salt' ?
4 where the Romans found salt in England ?
5 who is called 'an old salt' ?

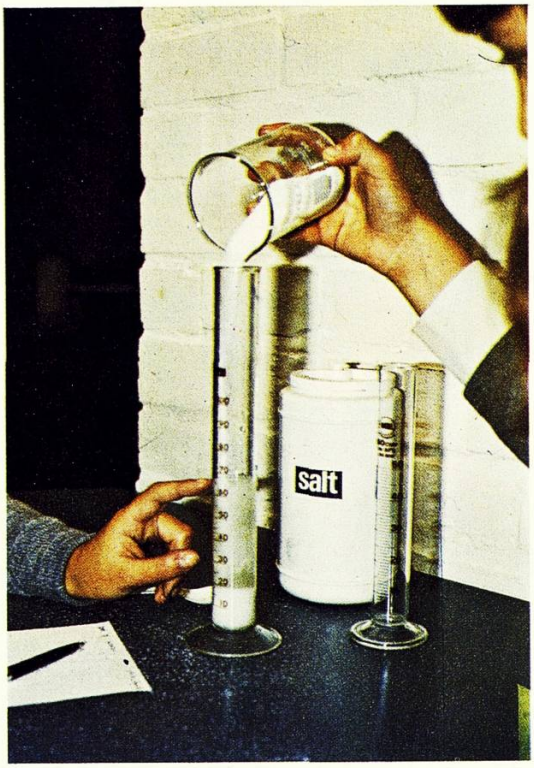
Can you find other sources of salt ?



The Meadow Bank Salt Mine, Cheshire

Salty Water





Salt is added to the water when vegetables are cooked by boiling.

You can do some interesting experiments adding salt to water.

How many teaspoons
100ml of water dissolve ?

Does 200ml of water dissolve twice as much ?

By how much does the volume change when the salt is added ?

Mark the increase in volume as the salt is dissolved.

Is this increase what you expected ?

Can you suggest what has happened to the salt ?

Try the same experiment, but this time check the increase in mass.

Top right: Marking volume changes
Bottom right: Recording mass changes

Drips and Drops

Here are some more salt experiments.
From your experiments when you put salt into water you will have found that more salt makes the liquid heavier.
You could try making different *solutions* of salt and find out more about this heaviness.
Food colour added to the solutions will help you to see exactly what is happening.

saturated salt solution	50g : 500ml solution	25g : 500ml solution	12½g : 500ml solution	plain water
blue	green	red	yellow	purple

Pour a little of one sample into a test tube or specimen tube. Carefully add drops of another sample to this.

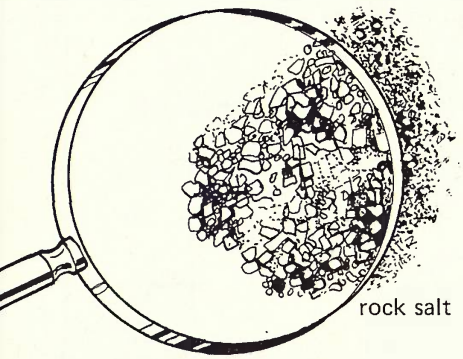
Try giving the five bottles to other children.
Let them do the experiment to see if they can find out the order of heaviness.
Ask your teacher or another friend to mix and colour an unknown salt solution.
Can you find where this belongs in the heaviness pattern ?

Where do other liquid foods fit into this heaviness pattern ?

You could try: sugar-water, vinegar, milk.

If you look through the tube as this girl is doing you will see more clearly what is happening

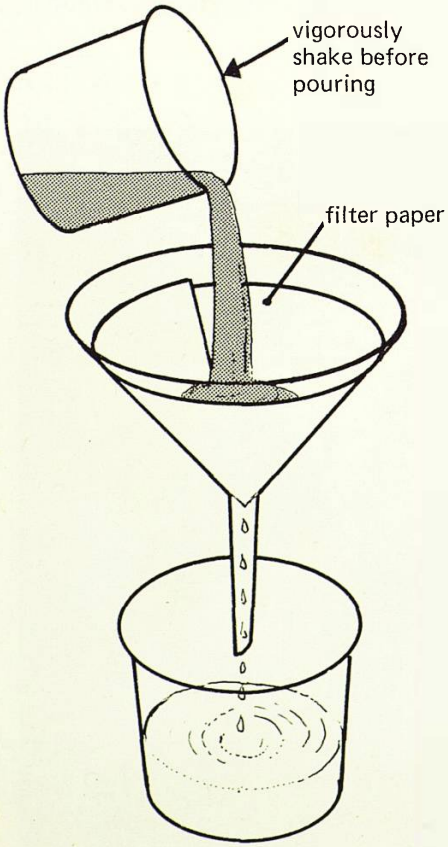
Pure Salt



Look at some rock salt with a lens or microscope.
Crush it, and look again.
This rock salt seems to have particles of dirt and sand mixed with the pure salt.
Would you eat this ?
How can the mined rock salt be made pure ?

Experiments with sand and salt will help to suggest a way.

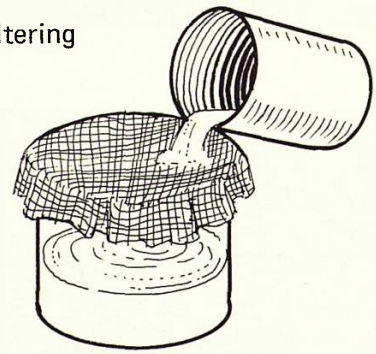
1 Separating sand
Mix some sand and water together.



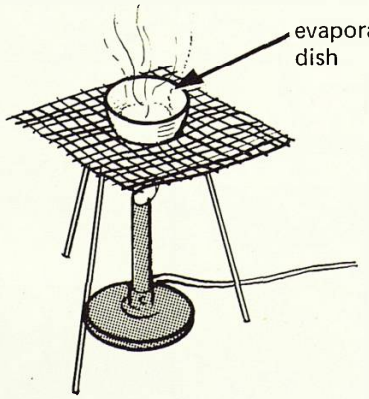
2 Separating salt
Stir some salt and water until the salt has disappeared.

Try two ways to recover the salt.
Which way works ?

(a) filtering



(b) evaporating



Now can you take your rock salt (a mixture of sand and salt) and separate pure sand and pure salt ?

Using Salt

Why is salt added to food ? It makes it tasty. (There are some tasting experiments in the next section.) There are other reasons for using salt. A wise cook dips lettuce leaves into salt water and soaks them in plain. Chips soaked in salt water before frying are crisper.

Try putting foods into salt water and plain water.

Try cubes of potato, beetroot, carrot, a dried prune, a fresh green vegetable (a bean).
A hard-boiled egg, the shell taken away by leaving in vinegar, is very interesting to try in these liquids.

Salt is also used for preserving some foods.
What foods can you find preserved this way to-day ?

Until new ways of keeping food were found (see Section Ten) salt was the main method.

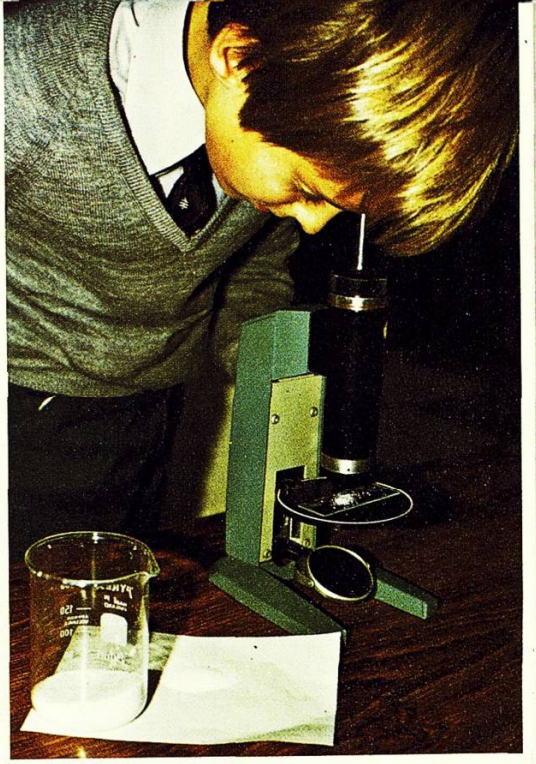
For the long winter months the only meat was salted. People went to great lengths to find herbs and spices. These made tastier meals from this salty meat.

Do some book research:
Find out about the spice voyages of Bartholomew Diaz and Vasco da Gama.

Looking at Salt

Examine some salt with your microscope.
You should be able to see that every particle has a regular shape. (Some may be broken.)

They are crystals.
Look at some other crystals and compare shapes.



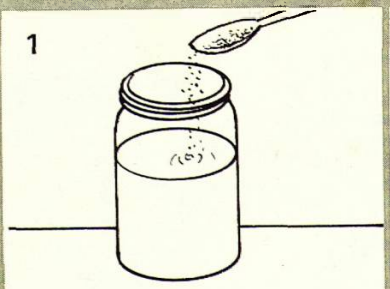
Examining salt through the microscope

These suggested substances are interesting crystals – not foods.
DO NOT DO ANY TASTING

sugar
magnesium sulphate (Epsom Salts)
copper sulphate
chrome alum
potash alum
sodium thiosulphate (Hypo)

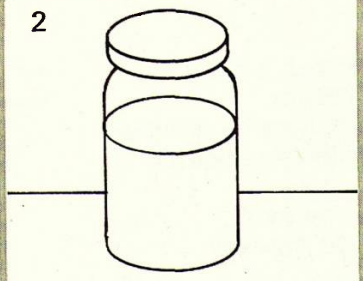
Here is how a larger crystal can be made.

1



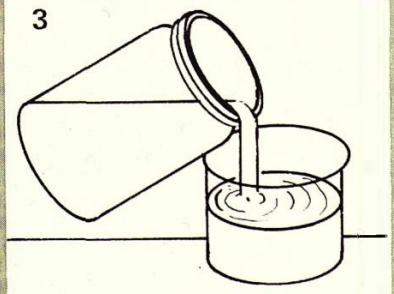
Stir one of the chemicals into warm water until no more will dissolve.

2



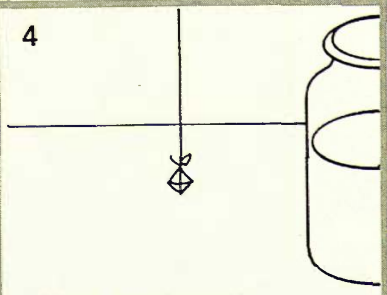
Cover the top to keep out dust.
Cool to room temperature.

3



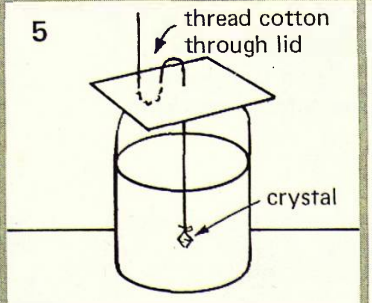
Pour off the liquid, leaving behind any small crystals.

4



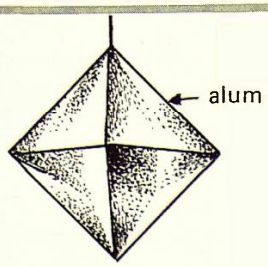
Tie a good small crystal of the chemical to a thread.

5



Dangle this in the liquid and cover the jar.

6



Here is one result of a crystal growing experiment.

TASTE AND FLAVOUR

SECTION SIX

Here are some things used to flavour food:

Can you group these into kinds of flavours ?
Can you add some more flavours of your own ?
What foods are these used to flavour ?

How do we taste?

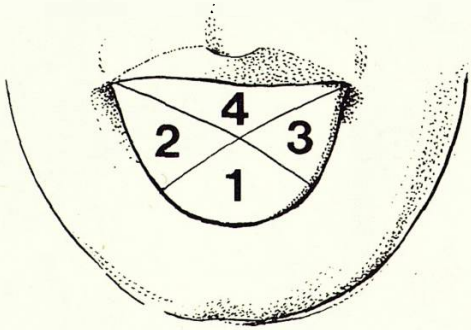
Investigate tongues and tasting.
It is said that there are only four tastes.
These are *sweet, salt, sour* and *bitter.*

Each flavour we taste is one or a mixture of these.
We shall also find that smell is important too.

Experiment to find out what we taste and what part of the mouth tastes it.

To investigate the four flavours you could use:

(a) sugar water or honey for *sweet*
(b) salt water for *salt*
(c) lemon juice for *sour*
(d) aloes in water for *bitter*



Test each flavour on each part of your tongue.
(For the tasting use a small piece of cotton wool, or a piece of filter paper to soak up a little of the liquid.
Use a fresh piece each time.)

Where can each flavour be tasted ?
Can any flavour be tasted all over the tongue ?
Can the underneath of the tongue taste ?
Can other parts of the mouth taste ?

You could now try your favourite flavours. See which part of your mouth tastes them best.

What does this tell you about the tastes that make up a flavour ?

Left: A taste experiment in progress

Tasting experiment whilst holding nose

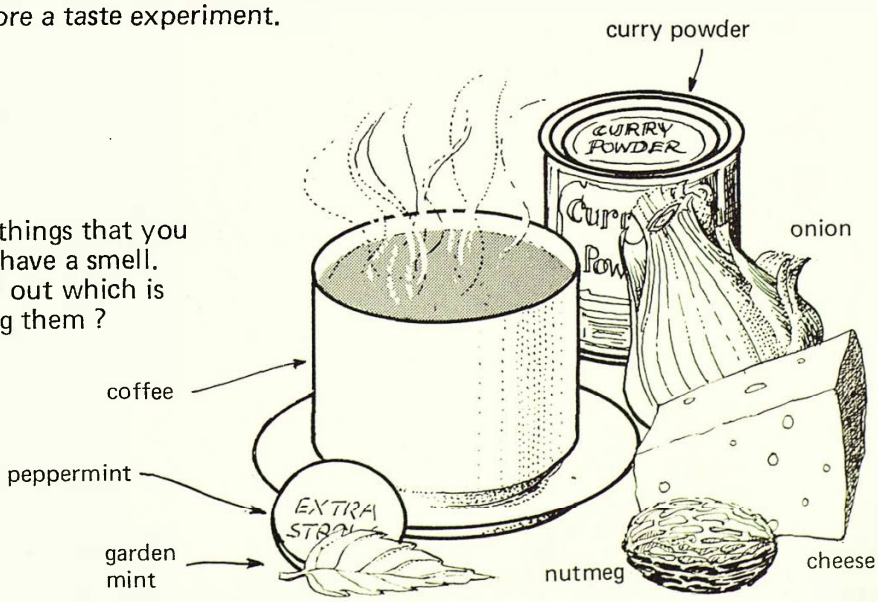
Smell and Taste

People do say that when they have a cold they cannot taste.
Did you find smell affected some of your tasting experiments ?
Do we also taste with our nose ?
Try tasting while holding your nose.
Eat a piece of raw potato, a carrot, a piece of apple, a slice of pear, a banana.
Try sipping different flavoured drinks, lemon, grapefruit, orange.
Suck a chocolate, a sugar lump, a pear drop, a mint.
Which of these things were difficult to taste when you could not smell them ?

Try tasting one thing while smelling another, for example, tasting apples while smelling curry powder.

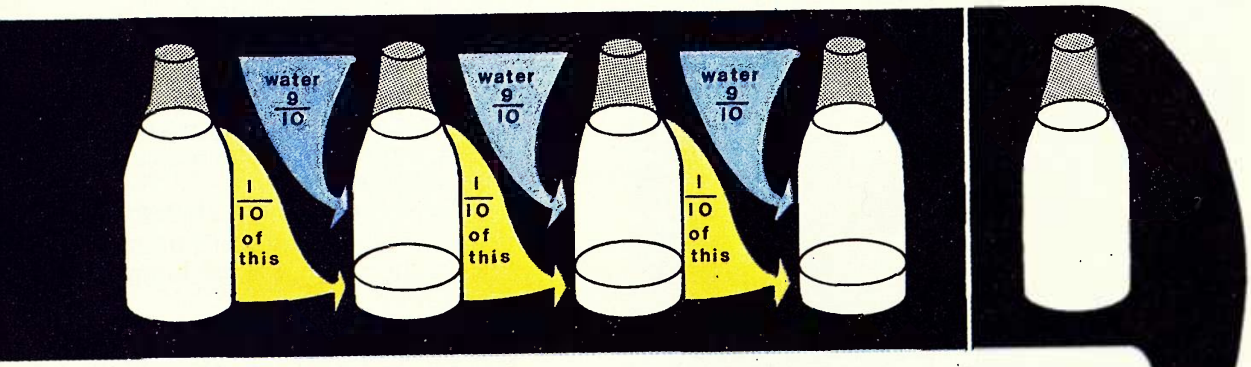
Do some research to find how cold affects taste.
Suck an ice cube before a taste experiment.

Make a collection of things that you can eat or drink that have a smell.
Can your friends find out which is which by just smelling them ?



How Tasty?

How good is your sense of taste ? Take a strong-tasting solution. This could be salt water, lime juice or lemon juice. Mix with water to make *diluted* solutions.



strong-tasting solution | 1 in 10 | 1 in 100 | 1 in 1000 | plain water

Remember the rules about taste experiments. Hygiene is important. This time use a clean plastic cup and sip your own small sample.

Can you taste which strengths are which ?
Can the solutions be put in order of strength ? Jumble up the bottles first.

To make the test fair, rinse your mouth after each tasting.

COLOURS & FOOD

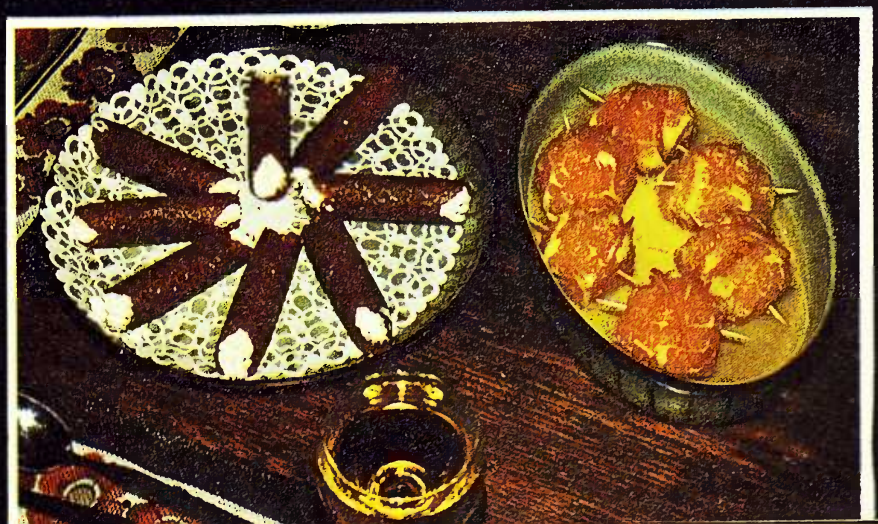

oranges

parsley


cherries


tomatoes

It is important that food looks nice. Colour is used to make food look good.
Sometimes dishes are decorated with coloured things like green parsley, red cherries and yellow lemon.
This is called garnishing.
You could collect pictures from old magazines. Use these to show how colour makes food more attractive.



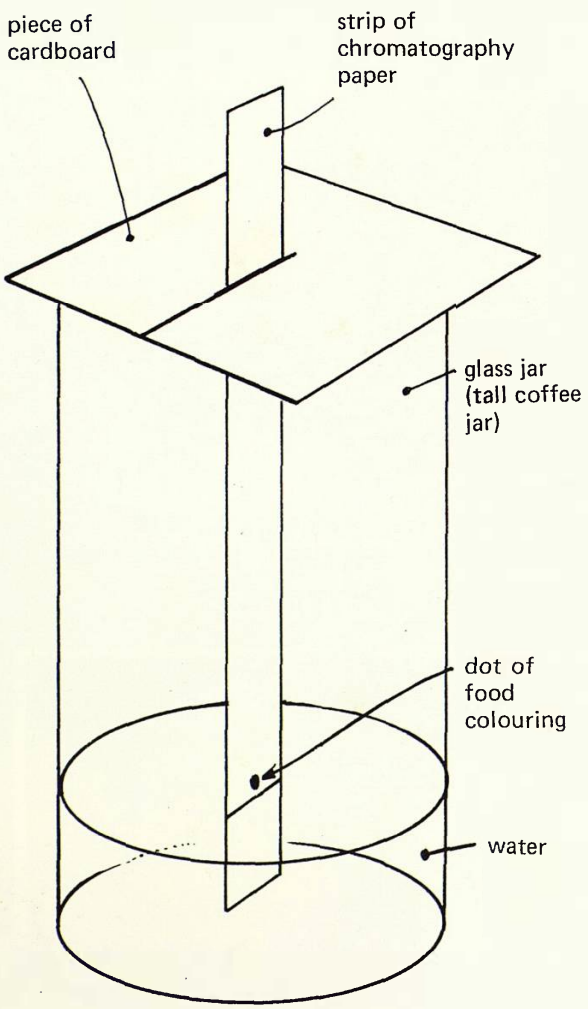
SECTION SEVEN

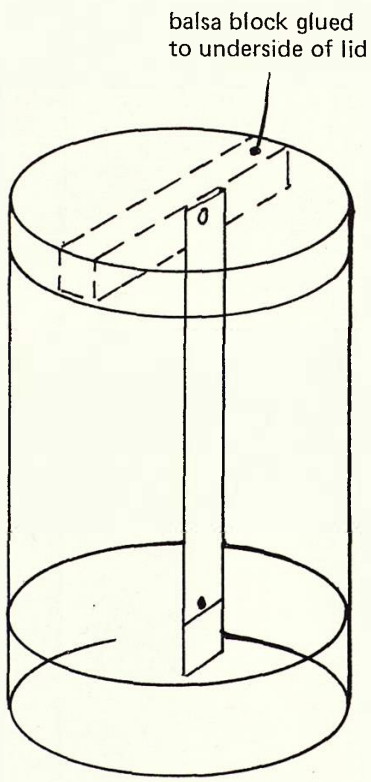
Colouring Food

Some cakes are decorated with coloured icing. Sweet manufacturers use colouring. Special food colourings can be bought.

Collect as many brands of food colouring as you can. Collect as many colours as you can.

What can you find out about these ?
Examine the bottles carefully.
How many things does the label state are present ?
What are these *ingredients* ?
This experiment will help you find out more about colourings.





Another way – using the lid to hold the paper:

Look at your separation. Are there the same number of ingredients as on the label ? If not, can you explain why ?

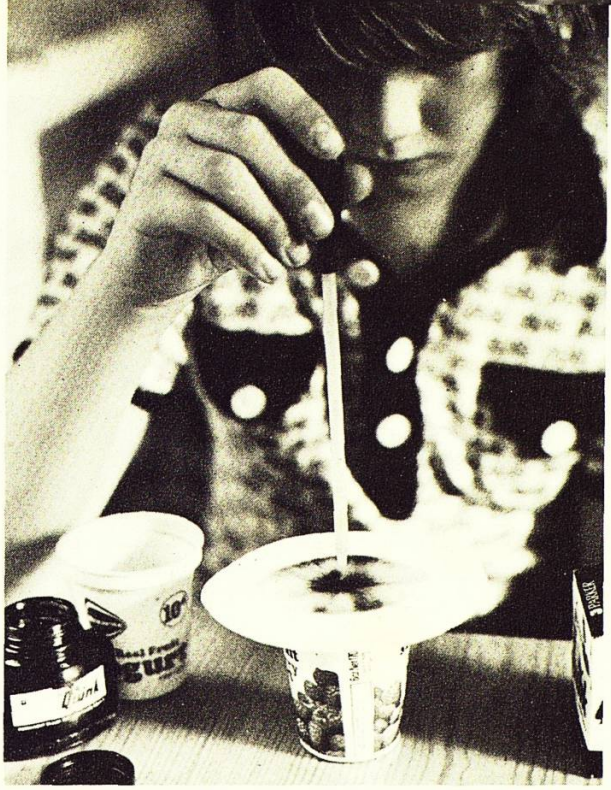
This way of separating things is called *chromatography.* (For other ways of doing and using chromatography see *Science in a Topic : Communication* Section 6.)

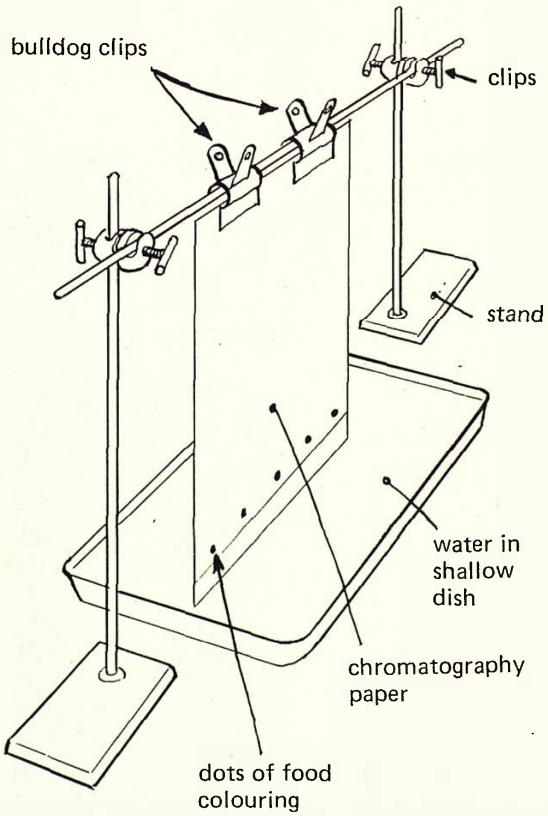
More Chromatography

You can use chromatography to do some research into food and colourings.

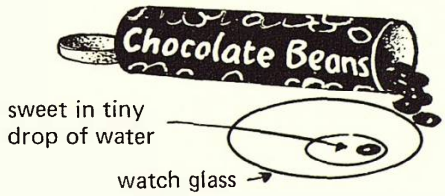
Do different manufacturers use different ingredients to make the same colour ?

Right: Here is a girl using chromatography to compare five green food colours made by five different manufacturers





What separations can you make from sweet colours ?
First try getting the colours from chocolate beans.



Use a *tiny* drop of water and dabble the sweet in it to take out the colour. It is a good idea to use three or four brown sweets to obtain a strong drop of colour. Dot your colour on to a strip of chromatography paper and carry out the separation.

Left: Apparatus for chromatography experiment to compare colours

Colour changes

Ripening, cooking and mixing can change some food colours. Colour changes are used by chemists. These colour tests help to show what kind of chemicals are present.
A good colour-change liquid to start with is red cabbage water.

Right: Slicing red cabbage for use as an indicator

It is simple to prepare. Slice up some red cabbage into small pieces. Put this in an enamel saucepan. Cover with water and boil for about five minutes. Crush and stir. When cold, drain the liquid off.

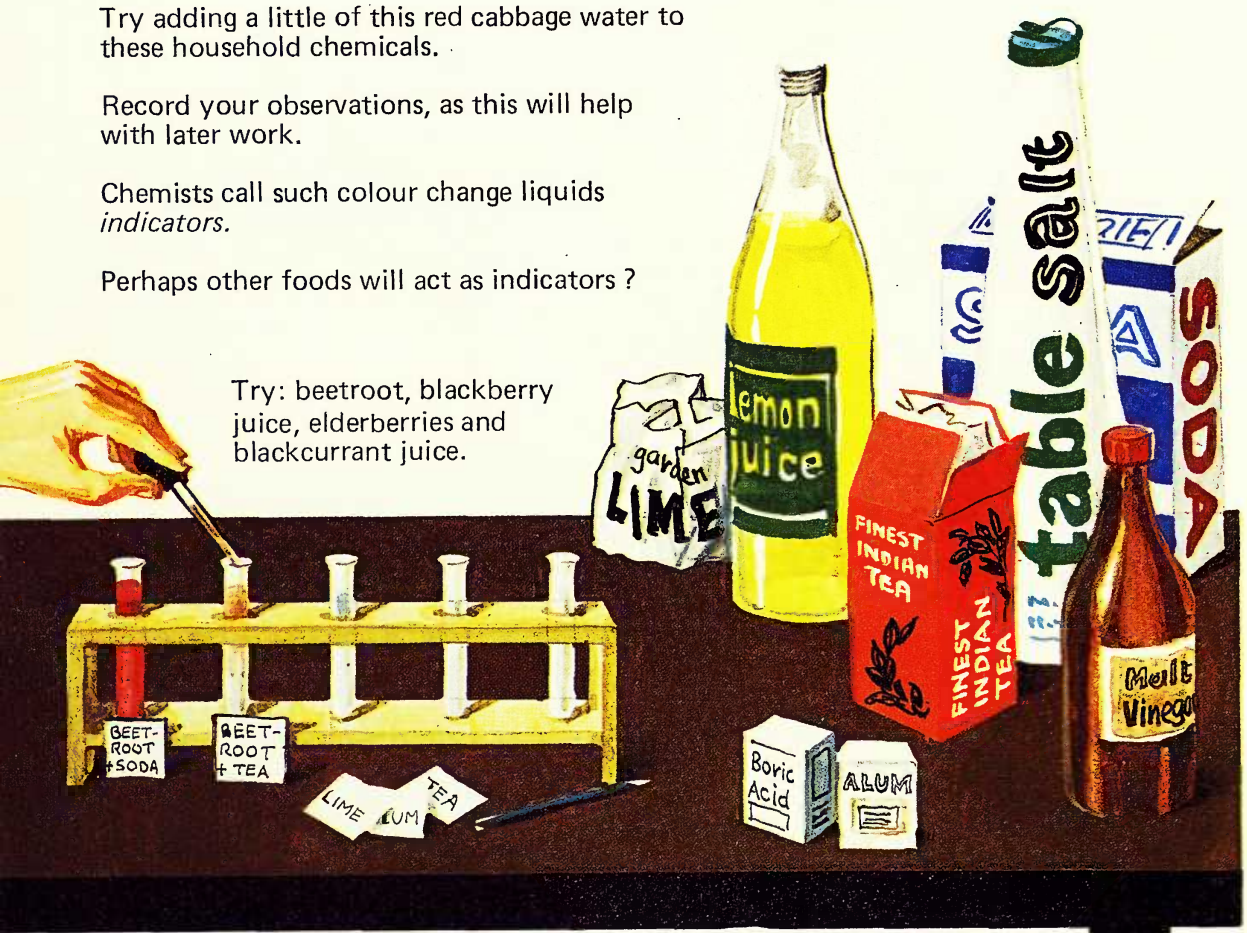
Try adding a little of this red cabbage water to these household chemicals.

Record your observations, as this will help with later work.

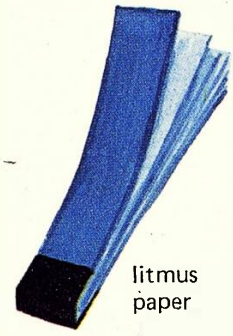
Chemists call such colour change liquids *indicators.*

Perhaps other foods will act as indicators ?

Try: beetroot, blackberry juice, elderberries and blackcurrant juice.



Colour changes and what they tell



litmus paper

A good indicator used in the laboratory is one called *litmus*. (It is a colour obtained from lichen, a small plant.)

It can show whether a chemical is an *acid* or not.

Acid turns litmus red.

If the litmus goes blue this shows an anti-acid (an *alkali*).

If the litmus goes purple (half way between red and blue) this shows the solution is neither acid nor alkali.
This is called *neutral.*

A handy way of using litmus is to have it soaked into blotting paper. It is often bought in this form as 'litmus paper'.

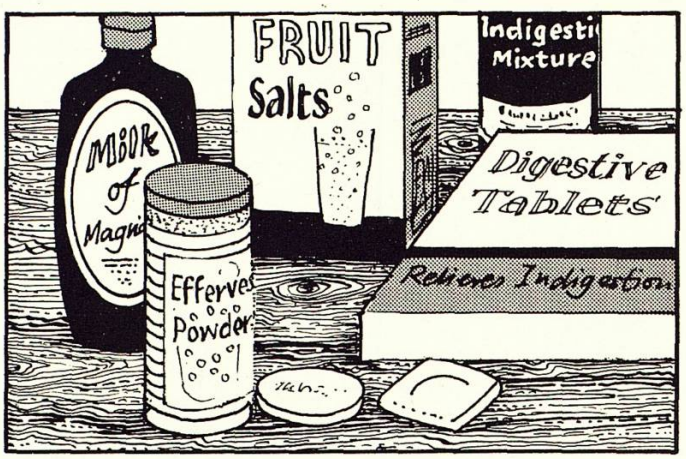
Test as many household liquids and foods as you can. See whether they are acids or alkalis.

Acids and anti-acids

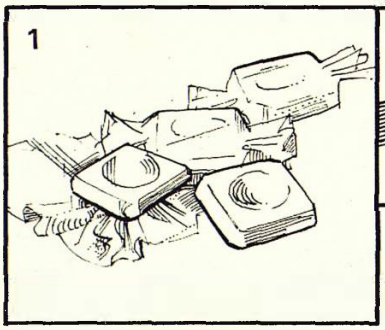
Have you heard of people suffering from stomach pains they call 'indigestion' ?

It is said this is caused by too much acid.

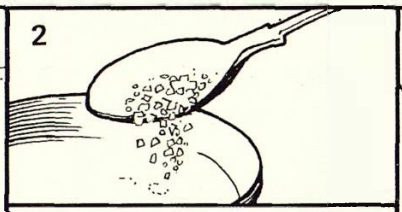
Right: There are medicines that get rid of the acidity. They 'settle' the stomach.



How well do acid cures work ?



Start with an acid you know, acid drop sweets.

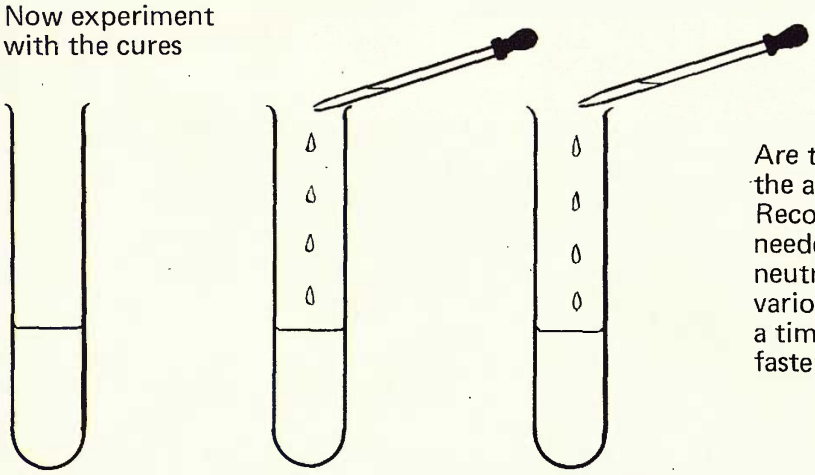


Crush them and dissolve in water.

You will have an acid solution.
(You could use lemon juice or vinegar in place of acid drop sweets.)

Check this with your litmus.

Now experiment with the cures



5ml of acid solution

add a few drops of litmus

add the cure, drop by drop – shake the tube after adding each drop

Are there colours that indicate the acid is being changed ? Record how many drops are needed to make the solution neutral. Experiment with various cures, adding a little at a time. Do some cures act faster than others ?

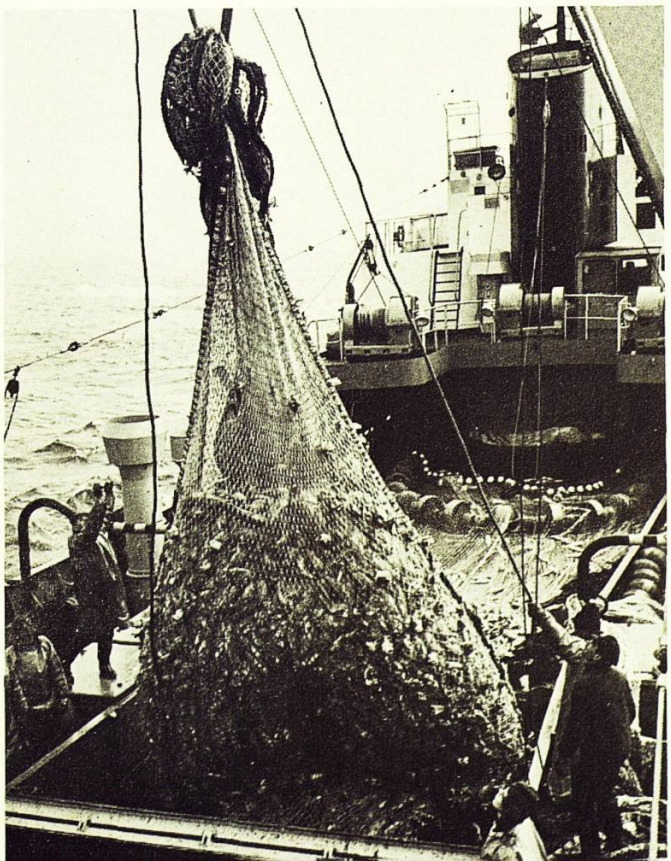
Some of the meats that would be sold in butchers' shops and meat markets like this are:
chicken, rabbit, lambs' kidneys, partridge, lamb chops, duck, goose, tripe, rump steak, streaky bacon, pork chops, quail, shoulder of mutton, capon, ox tail, York ham, hare, pheasant, turkey, saddle of lamb, gammon, ox liver, scrag end, veal, black pudding.

Group these meats into the following sets. Each set has five members. (Some you will use more than once.)

Set 1 meats from the pig
Set 2 meats from the sheep
Set 3 meats from bullocks and heifers
Set 4 meats called poultry
Set 5 meats called game
Set 6 meats called offal

A meat market – Smithfield, London

MEAT & FISH



Try grouping these foods from sea and river in different ways:
plaice, sardine, lobster, kipper, oyster, bloater, mullet, haddock, pilchard, prawn, sole, smoked salmon, eel, herring, perch, cod, trout, caviare, rollmop, crab, mussel, hake, halibut, scallop, mackerel.

Some sets you could use are:
white fish
oily fish
shellfish
freshwater fish
salt-water fish
cured fish
types of herring

A catch of fish on board a trawler

SECTION EIGHT

Animals for food

Animals can make food from other foods like grass which we do not eat. An essential part of our food is called *protein*. Meat has a lot of protein, grass has not.
Animals make grass and other plant stuffs into meat.

Here is a school that is keeping some calves

They are finding out about the food the animals take in and how they grow.

Not all schools can keep cows. You could do the same kind of experiment with any pet you keep at home or school.

CALF REARING – FEEDING CHART

A jersey calf was bought, about 1 week old. It was 26kg. The average mass it gained each day was 227gm. At 12 weeks old the calf was 45kg.

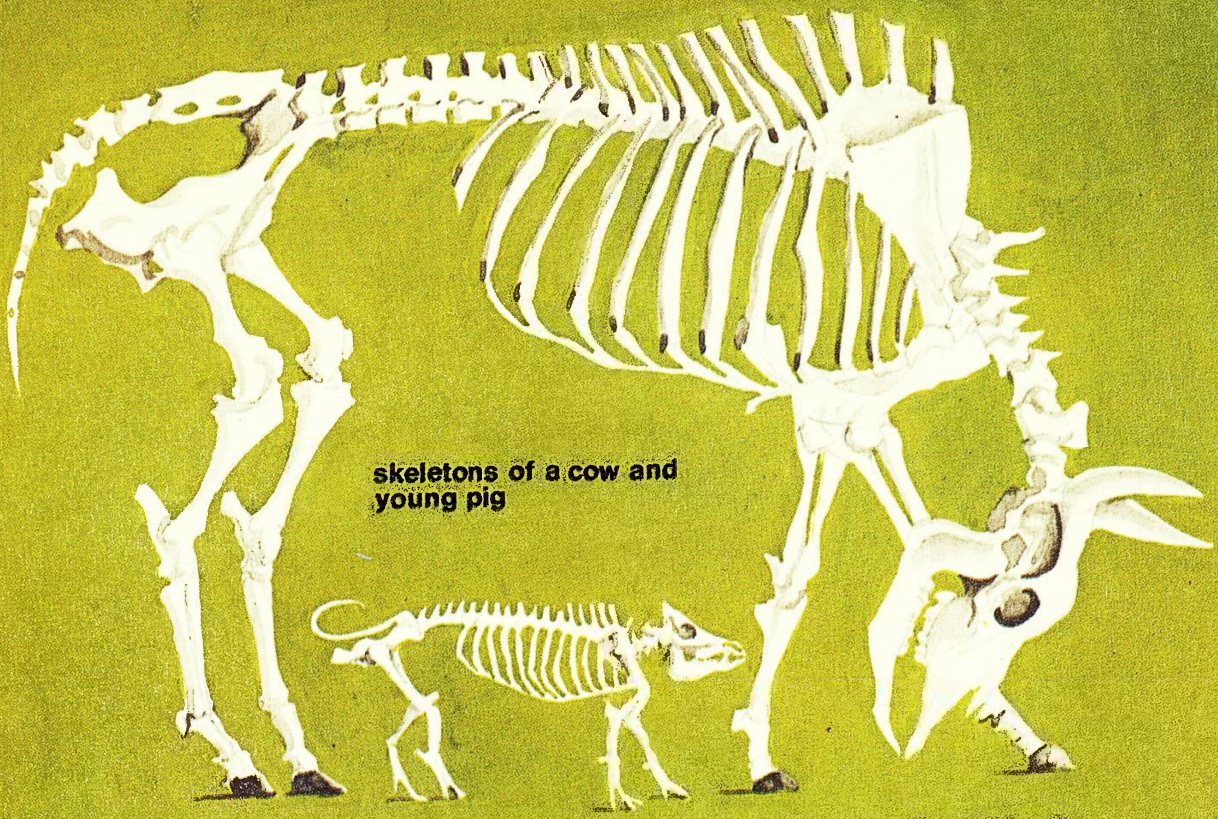
days	morning	afternoon	other food
1st	1 litre of glucose and water	1 litre of glucose and water	none
2nd – 35th	1½ litres of milk substitute	1½ litres of milk substitute	water and soft hay from 7th day
36th – 84th	milk feeding finished – the calf weaned on 35th day	———	calf pellets after feeding from 10th day; the calf eats as much as it needs – by 84th day 1480gms daily, approx.

Some people will not eat meat. They are vegetarians. Find out what special things they eat to give them the protein they need.

To give us all the meat we need, farmers often have to use special methods. Animals are kept close together in pens. This is called battery or factory farming.
You might like to have a discussion about the rights and wrongs of making food in this way.

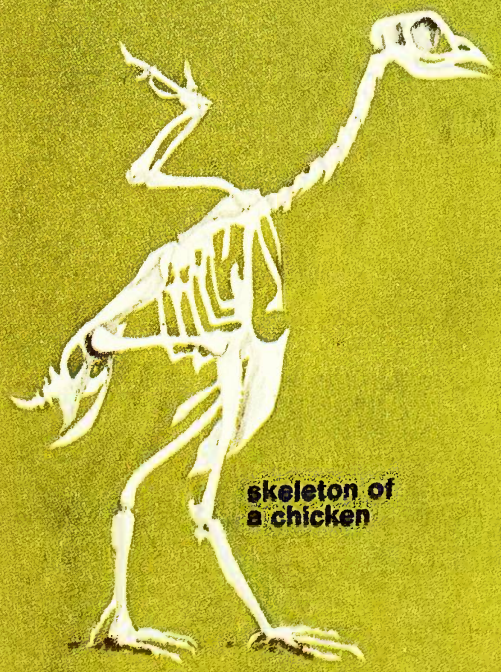
Bones

Here are some animals and their skeletons:



skeletons of a cow and young pig

Not all the food an animal eats makes meat. What else is the food used for? One use is to build its bones.



skeleton of a chicken

It would be interesting to find how heavy a chicken was when bought. How heavy is it after being cooked and how much weight was bones ?

You could collect bones from a frozen chicken you have had for dinner. It may be more interesting to ask your butcher to let you have a whole chicken. Then you will be able to use the bones from the head and feet.
Boil the bones until all the meat falls off.
How many bones are there in one chicken ?
How many different kinds of bones are there ?
Group them into different sets:

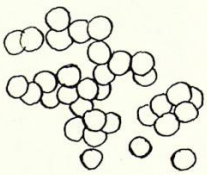
leg bones	wing bones
feet bones	head bones
neck bones	rib bones
back bones	

You could display these bones by mounting them on card.

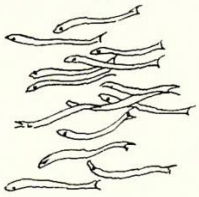
Sea food

Another rich source of protein is fish.

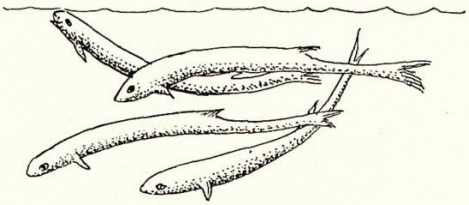
Here is the life story of one of them – the herring.



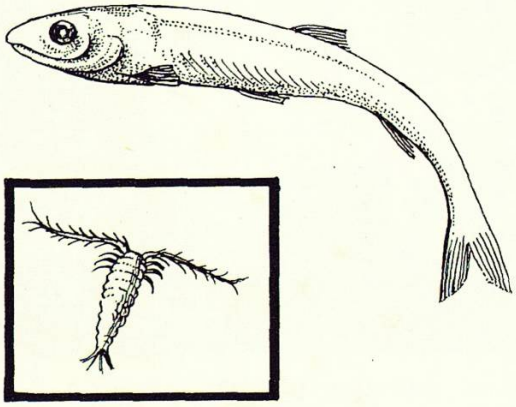
1 The eggs of the herring sink to the sea bed.



2 Newly hatched herrings are about 1cm long.

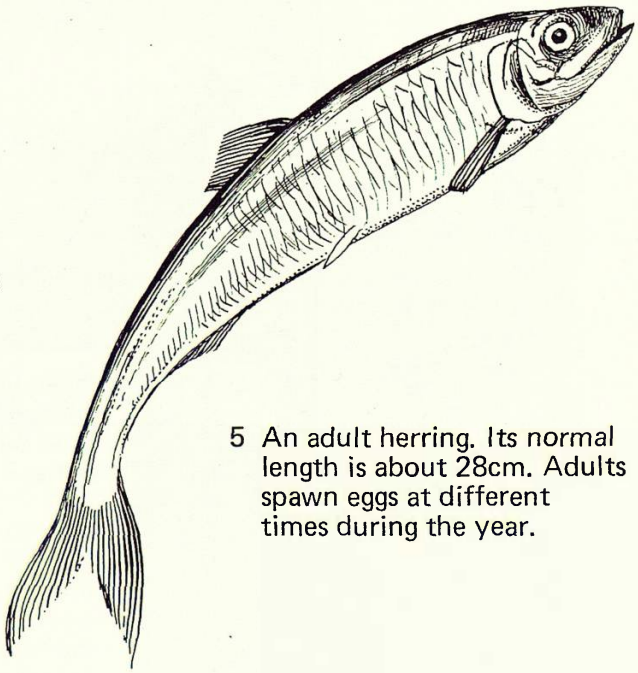


3 Once the yolk sac of egg is eaten the young herrings rise to the surface. They feed on plankton.



4 As it grows, the young herring develops scales and moves into shallow waters. If caught it is sold as 'whitebait'.

(The inset shows an enlargement of zooplankton on which the herring feeds.)



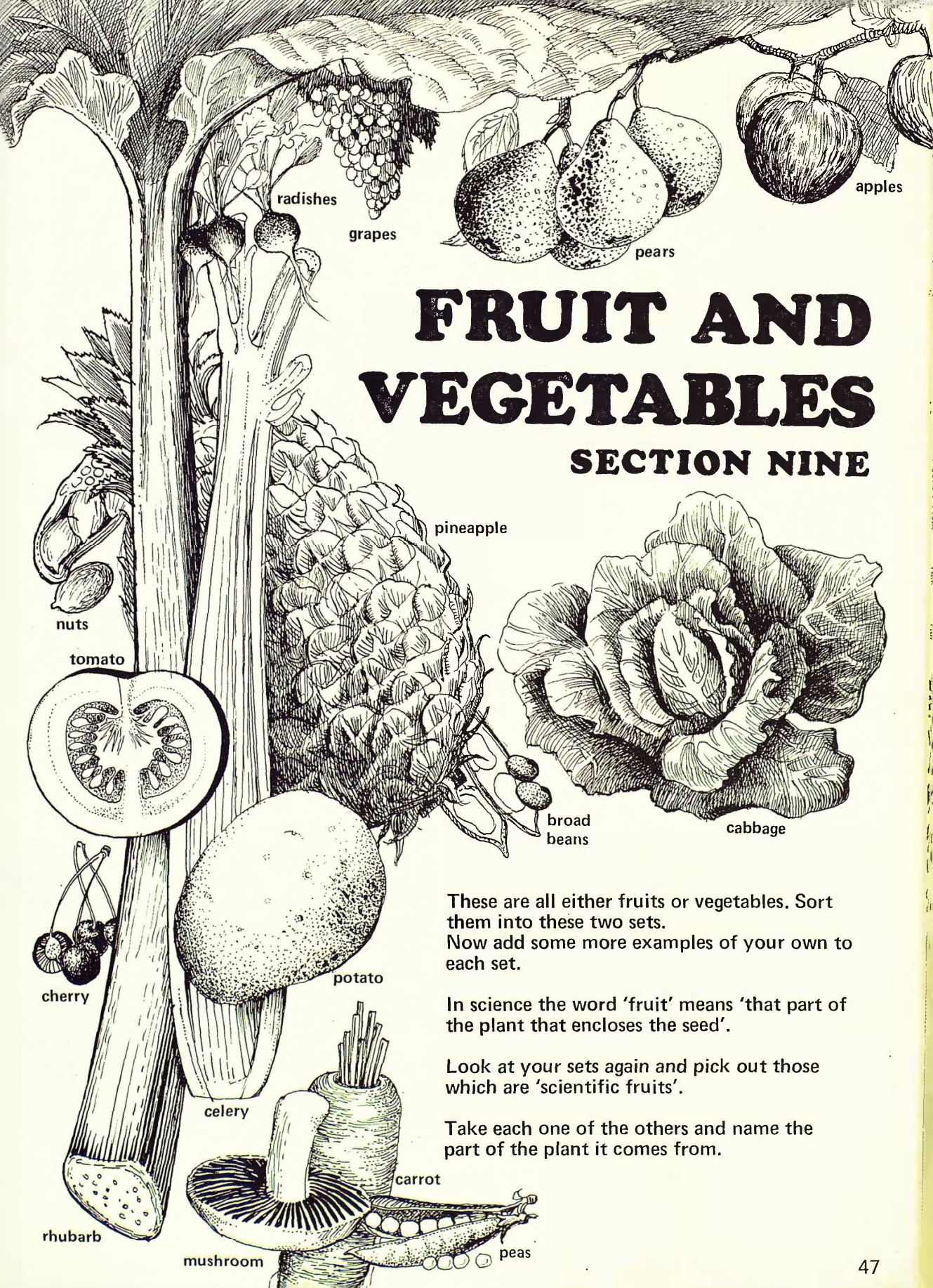
5 An adult herring. Its normal length is about 28cm. Adults spawn eggs at different times during the year.

The herring is an important food. It has the highest protein content of any fish in the sea.

The sea gives us a valuable and interesting harvest of food.

List as many different kinds of sea food as as you can.
The shelves of a supermarket, a fishmonger's slab and a fried fish shop will all help to give the information.

A special visit to a fish dock and market could provide lots to see and learn.



FRUIT AND VEGETABLES

SECTION NINE

These are all either fruits or vegetables. Sort them into these two sets.
Now add some more examples of your own to each set.

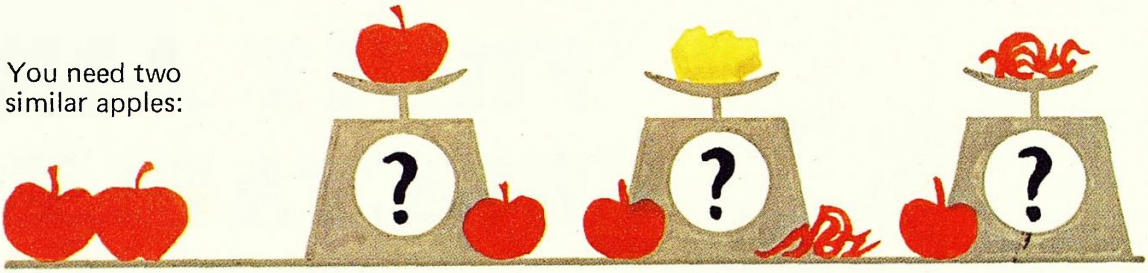
In science the word 'fruit' means 'that part of the plant that encloses the seed'.

Look at your sets again and pick out those which are 'scientific fruits'.

Take each one of the others and name the part of the plant it comes from.

Here are some observations and discoveries you can make using apples.

You need two similar apples:



Find how heavy each apple is.

Peel one, leave the other. How heavy is the peeled apple ?

How heavy is the peel ?

What fraction is wasted by not eating the peel ?

How do the two apples change as time goes by ?

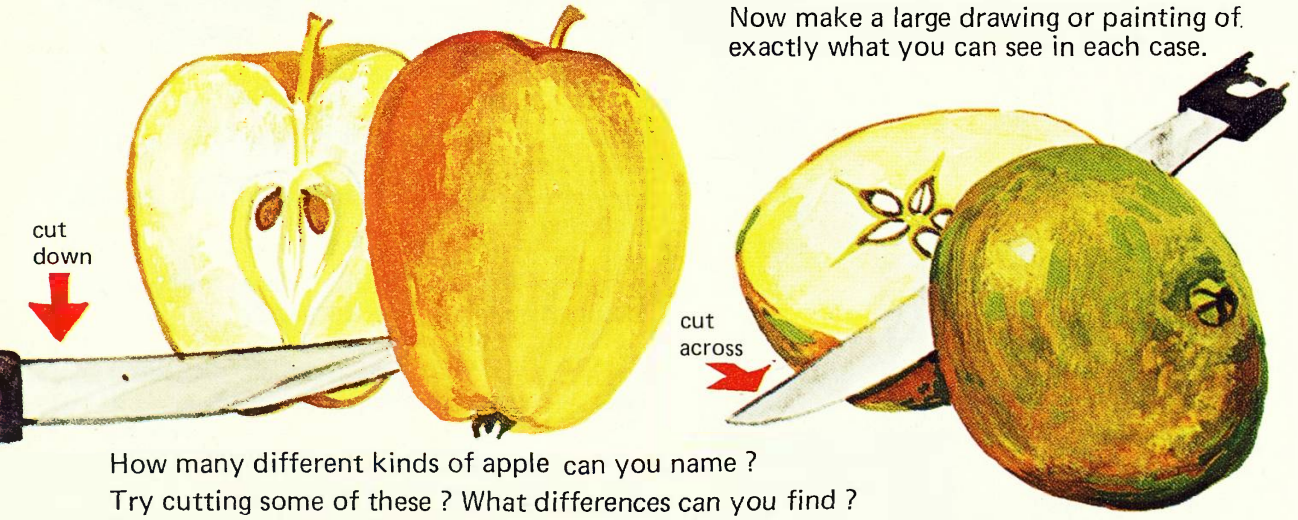
(a) in appearance
(b) in mass

Find how heavy each is at the same time for several days.

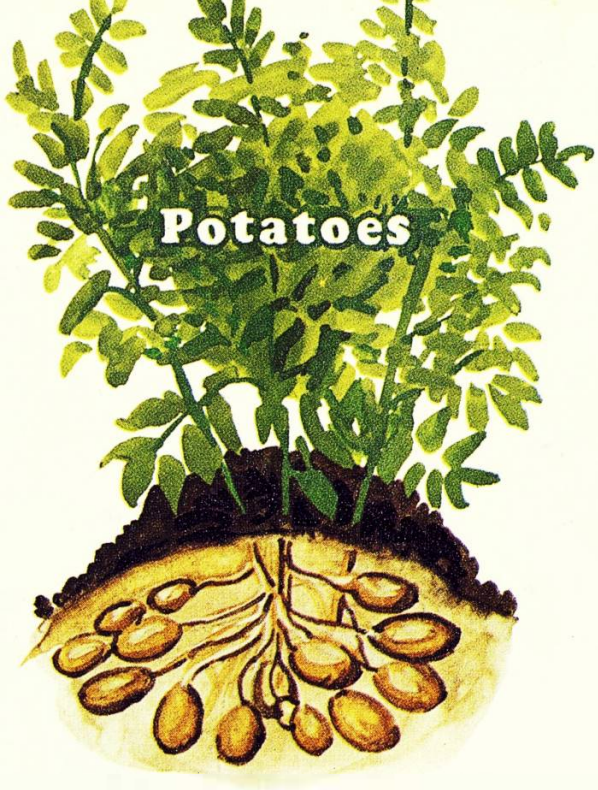
You could find out more about apples by cutting them in half in different ways.

1 Count the number of seeds.
2 How are they arranged ?
3 Look carefully at the core.
4 What is the outline shape of the cut apple ?

Now make a large drawing or painting of exactly what you can see in each case.



How many different kinds of apple can you name ?
Try cutting some of these ? What differences can you find ?
Try cutting other fruits in these ways.



The potato has an interesting story.

Find out about: Sir Walter Raleigh, the Incas, the Great Famine and the Colorado Beetle and what these have to do with potatoes.

Do you know what part of the plant we eat ? (It is not the root.)
Try growing some potatoes. Plant some small potatoes.
Cut some large potatoes into pieces and plant.
What can you discover about the pieces ? Which bits grow and why ?
Try planting in pots of different materials:
soil, peat, stones, sawdust, bulb fibre and plastic granules.
Keep watered and compare.

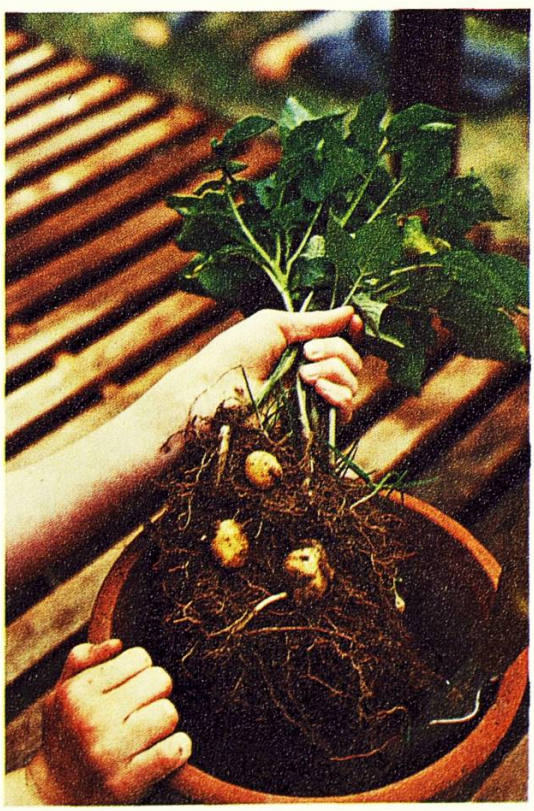
What food is there in a potato ?
Do these two tests.

1 Find the mass of a potato.
Dry it thoroughly by cutting up and heating. Check the mass again.
2 Carry out the starch test.
(See page 16.)

How much is wasted by peeling potatoes ?
Find the mass of potatoes used for a family dinner.
Find the mass of the peelings.

It would be interesting to find if the person doing the peeling makes a difference to the wastage.

Are instant potatoes less wasteful ?
Find the cost of a dinner prepared from each.
Can you tell the difference ?
It would be fun to carry out a 'Can't tell fresh from instant' test.



Right: Not much of a crop this time !

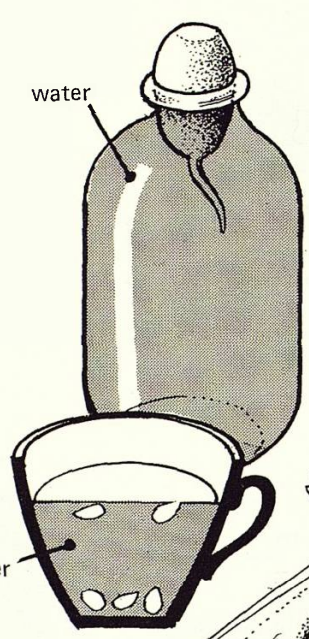
Growing fruit and vegetables

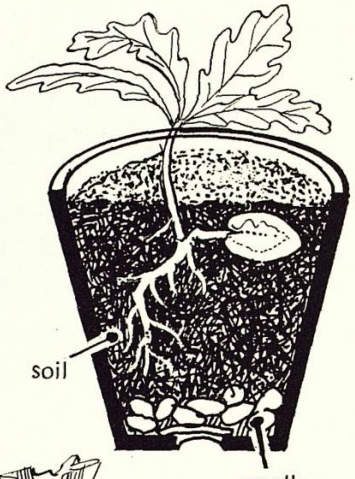
Take the list of plants you had at the beginning of this section and find out the place where each is grown. Why is each grown in this area or country ?

Try growing some fruits and vegetables for yourself.

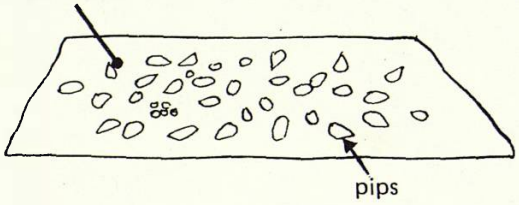
Here are some ways of planting.

It is fun to grow pips.
Some you could try are:
apple, orange, grapefruit, tomato, date, peach, grape and cherry.
Hard pips need to be gently cracked.
Most will grow better if soaked for a few days.





Raspberries and other soft fruits.
Gently wash and dry on blotting paper before planting.



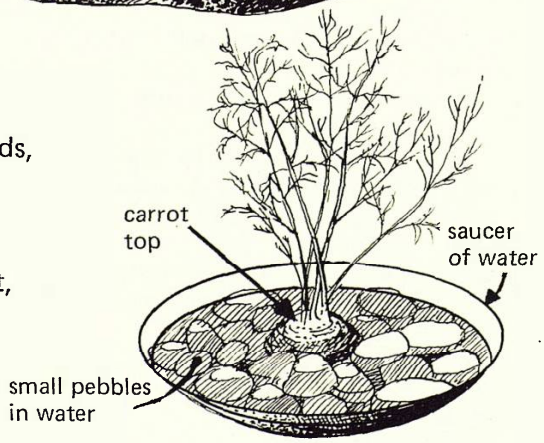
Try growing some of the more unusual fruits and vegetables:
groundnuts (peanuts), Jerusalem artichokes, gourds, sugar beet, capsicum, salsify and red cabbage.

Vegetables, too, can be grown indoors.
Cut the top from a root vegetable such as a carrot, turnip, parsnip or beetroot, and plant like this.

Record the height of each plant daily.

Make graphs to show how they grow.

Compare cutting a thick top and a thin top.



This experiment should last three or four weeks.

KEEPING FOOD

SECTION TEN

Until quite recently there were not many ways of keeping food for a long time.

We are now able to enjoy food out of season. Most of the ways we preserve them have been invented this century.

Here are some ways of keeping foods fresh. Which would be unknown to a family living a hundred and fifty years ago ?

(Note: A major reason why food goes bad is that it is attacked by moulds and bacteria. These can be a source of danger. Illness could result. We advise you to avoid such experiments until you have correct laboratory conditions and proper supervision.)

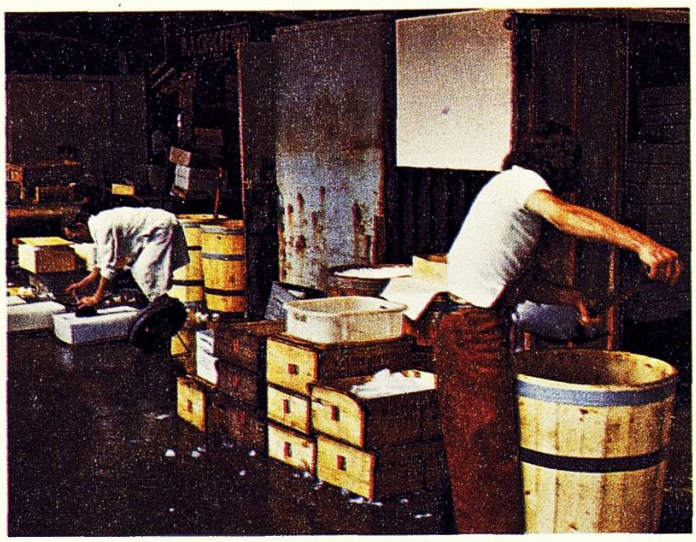
Freezing fresh

A main reason why food goes bad is that it is attacked by moulds and bacteria. These can be dangerous. Never do experiments with decaying food in your classroom.

Moulds and bacteria cannot grow in very cold food.

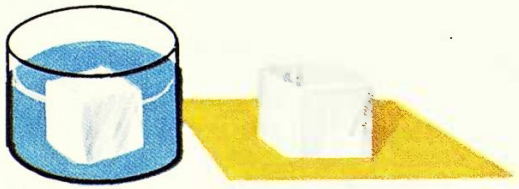
Ice, refrigerators and deep freezers are important ways of keeping food fresh.

Here is some food stored in ice. How long is it before the ice melts ?

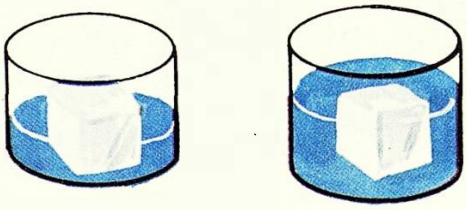


Fish being stored in ice

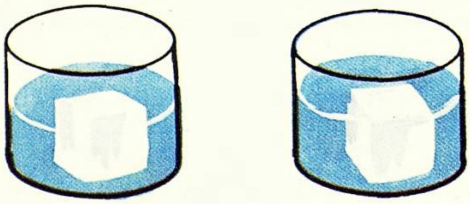
Try some experiments with ice cubes. Place an ice cube in a pot and time how long it takes to melt.



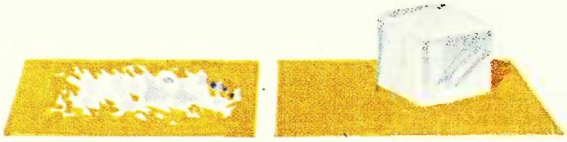
1 Does the cube last longer in a pot of water ?



2 Does the amount of water change the melting time ?



3 How does the temperature of the water change the melting time ?



4 Does crushed ice melt more quickly or more slowly ?

Think of ways of making an ice cube last longer.

Refrigerators

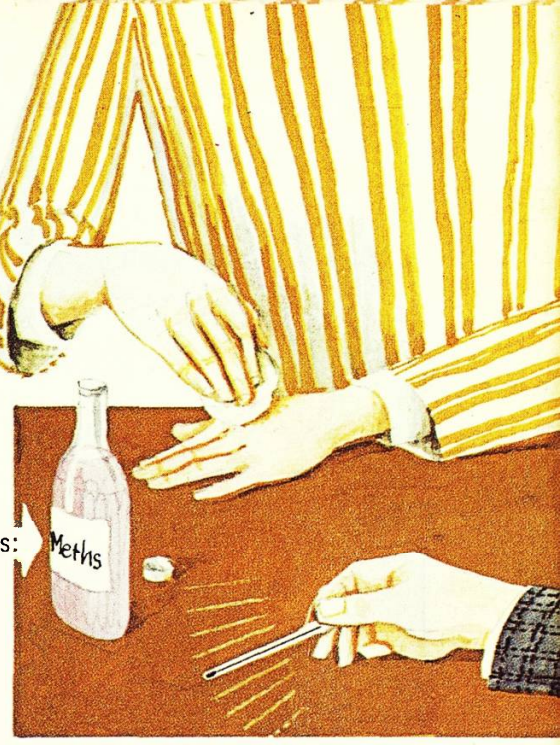
Milk can go sour.
Fruit can ripen too quickly.
Meat can go bad.
Butter can go rancid.

Food from distant countries needs to be kept fresh on the long journey.

Keeping food cold in a refrigerator can stop these changes.

How does a refrigerator work ?

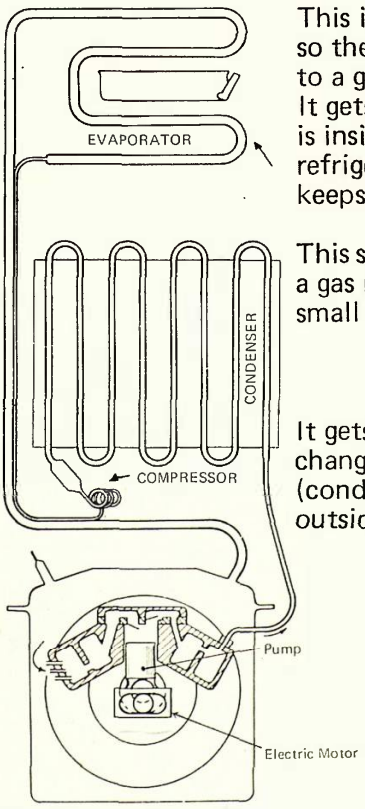
Here are two things to do which will give you some clues:



What change takes place in the methylated spirits in these experiments ?

The word for such a change is *evaporation.*

What other change do you feel and see during these evaporation experiments ?



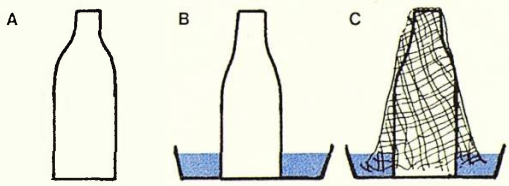
This is a bigger space, so the liquid changes to a gas (evaporates). It gets cold. This part is inside the refrigerator and so keeps it cold.

This squeezes a gas into a small space.

It gets hot and changes to a liquid (condenses). This is outside.

Here is a simple way of keeping milk cool that uses this idea.

Heat is taken from the milk to make the water evaporate.
So the temperature of the milk is lowered.
How well does this work ?



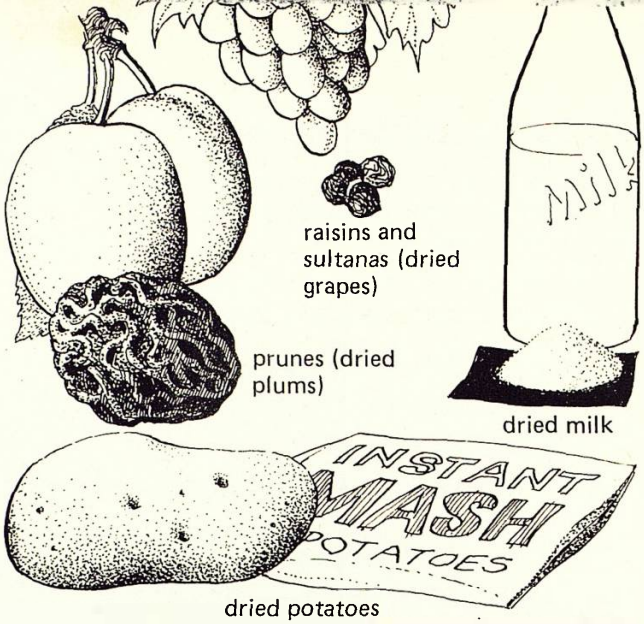
Try recording the temperature every hour in these three bottles.

You could also try changing the place.
Repeat the experiment:
(a) in a hot sunny place
(b) in a shady cool place
(c) in a draught

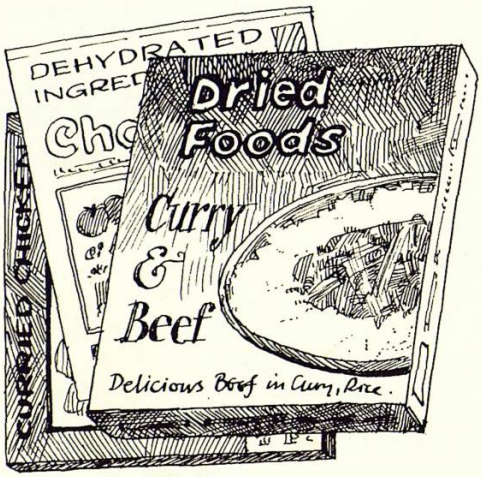
Left: Here is a diagram to show how a refrigerator works.

Dried foods

From early times foods have been preserved by drying.
Meat and fish have been dried and smoked.
Fruits and herbs have been dried in the sun.
Explore the shelves of a supermarket and your cupboards at home. Find as many foods as you can that have been dried.



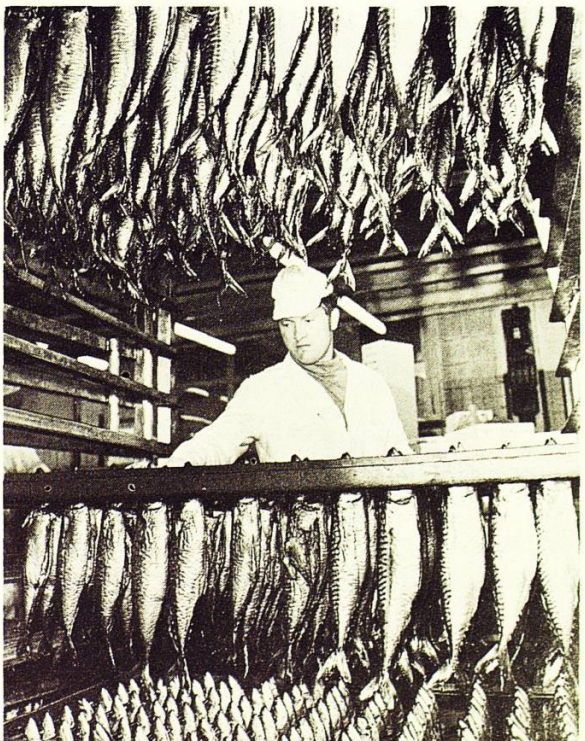
dried potatoes



On some packets you will see the word *dehydrated*. This means that water has been taken away from the food.

Collect some samples of dried and dehydrated foods:
- milk powder
- potatoes
- soup
- peas
- dried fruit

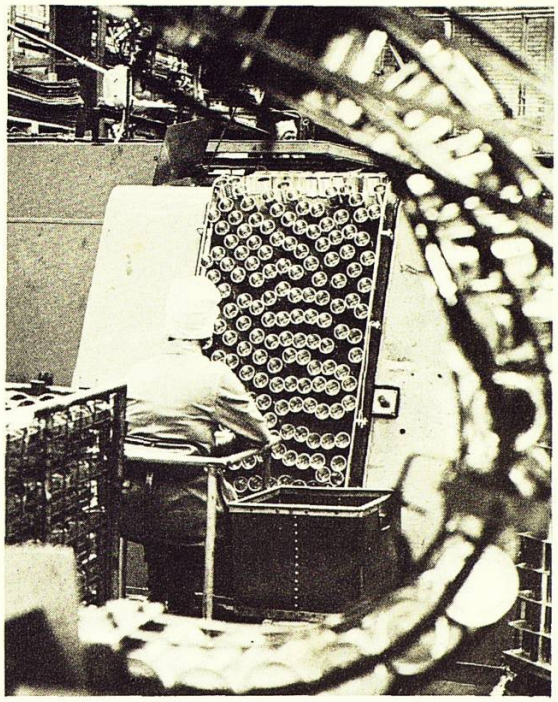
What changes are there when water is added ?
What changes can you see ?
Are there changes of taste, texture and smell ?
Is there a change in volume ?
Is there a change in mass ?
You will of course have to make measurements before and after.
Compare the effect of water on some of these foods over a period of time.



Right: Examining rows of smoked herrings

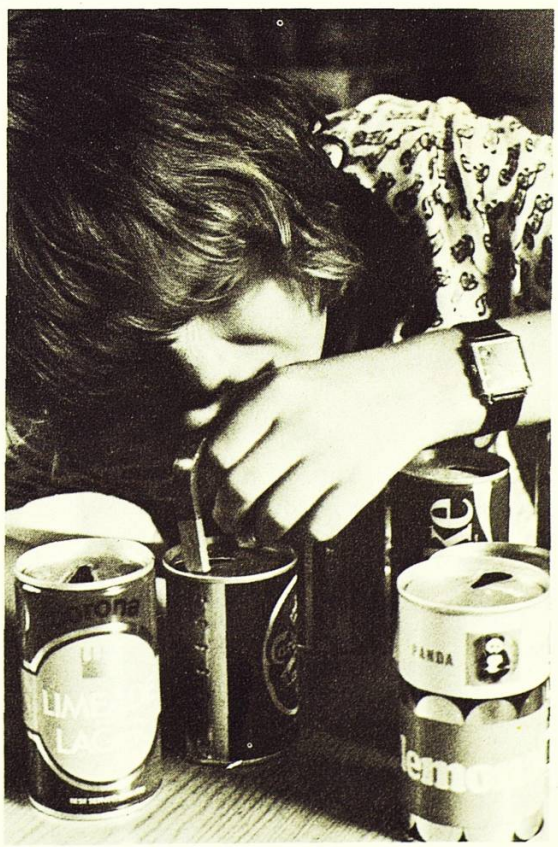
Canned foods

How many foods have you eaten this week that came from a tin can ?
Could you have enjoyed that food when you did, if the tin can had not been invented ?
If you had lived a hundred years ago your choice of foods, particularly during the winter, would have been very small.
Even more important, there were no ways of keeping foods that would save all their goodness.
The invention of the tin can helped to overcome these difficulties.



A 'tin' can is not made of tin.
Tin is a soft, expensive metal.
A tin can is made of iron plated with tin.
(To find out about plating, see *Science in a Topic : Houses and Homes*, page 16.)

Why is it plated ?
Try this experiment.
Scratch a tin can. Leave it outside for a day or two.
What happens ?
(Following this observation there is some research you could do on page 30 of *Science in a Topic : Ships*.)

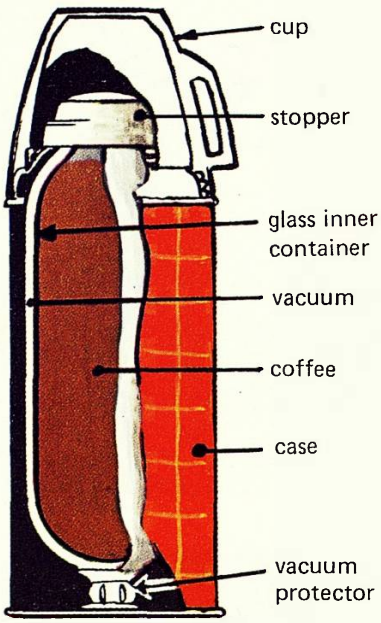


You will know that iron and steel are attracted by a magnet.
Most other metals are not.
Use this as a test to find iron.
Are all tin cans plated iron ?
Test different tins with a magnet.
Do you find any, or parts of any, that are not iron ?
Try drink tins. Why do you think other metals are used here ?

Top right: Can inspection in a canning factory
Bottom right: Testing tins with a magnet

Keeping foods hot and cold

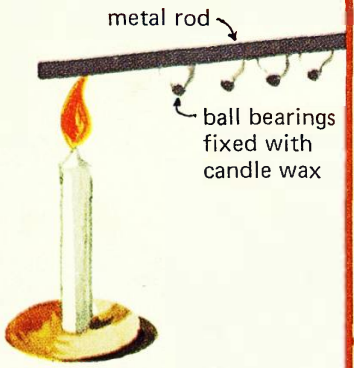
Diagram of a vacuum flask



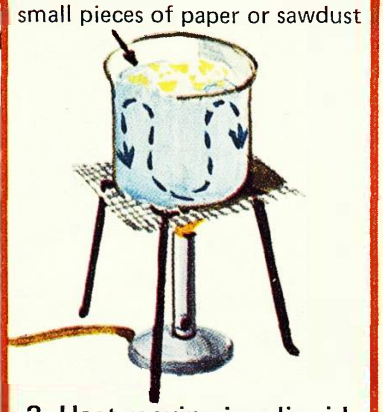
The vacuum flask keeps drink hot.
Will it keep things cold ?
Experiment with different sizes and makes of flasks to see how well they keep hot water and iced water. Temperatures taken each hour for a day should give results. (Avoid putting ice cubes into a flask, as the flask will break if shaken.)

Why is it called a vacuum flask ?
Who invented it ?
Why does it look silvery inside ?
How does it keep heat in or out ?

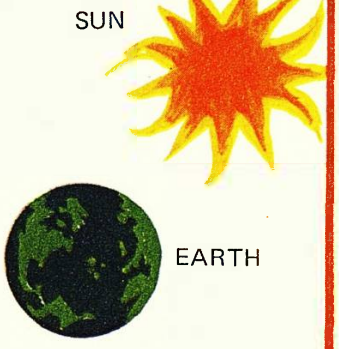
To understand you will need to know how heat travels.
There are three ways.



1 Heat passing through a material — CONDUCTION



2 Heat moving in a liquid or gas — CONVECTION



3 Heat that can travel through empty space by rays — RADIATION

Can you use this information, and other books, to find out how the vacuum flask stops heat getting in or out by conduction, convection and radiation ?

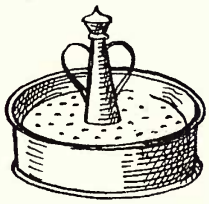
IN THE KITCHEN

EARLY KITCHEN EQUIPMENT

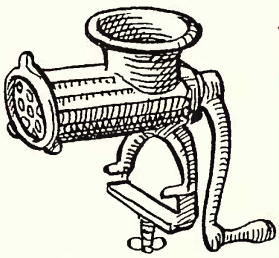
Mortar and pestle

Steak tongs

Toasting fork



Potato pasty pan

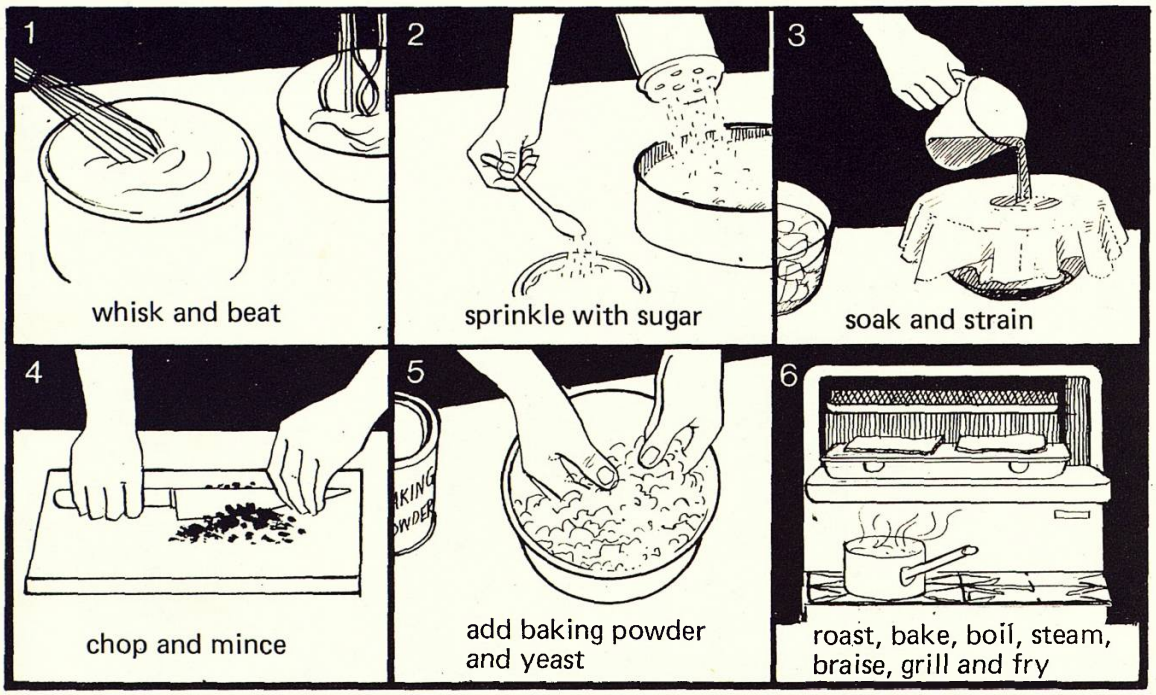


Meat chopper
(early mincer)

List some things found in the kitchen.
Divide them into sets, those for eating and those that can never be eaten.
Divide into sub-sets.
Which things are for measuring ?
Which things are for cutting and shredding ?
Which are for storing ?
Which are for mixing ?
— cleaning ?
— flavouring ?

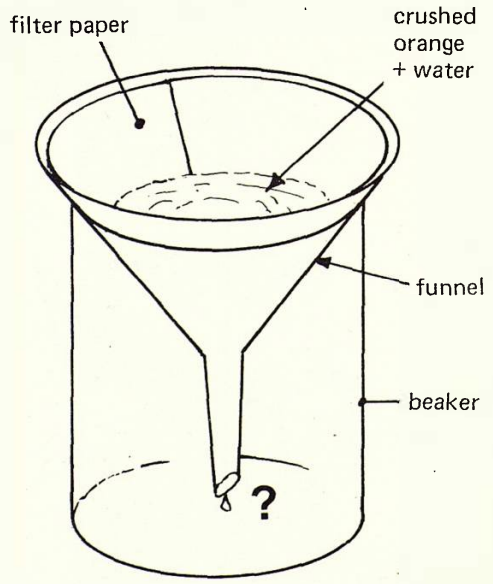
Cooks and Cooking

What do cooks do ?



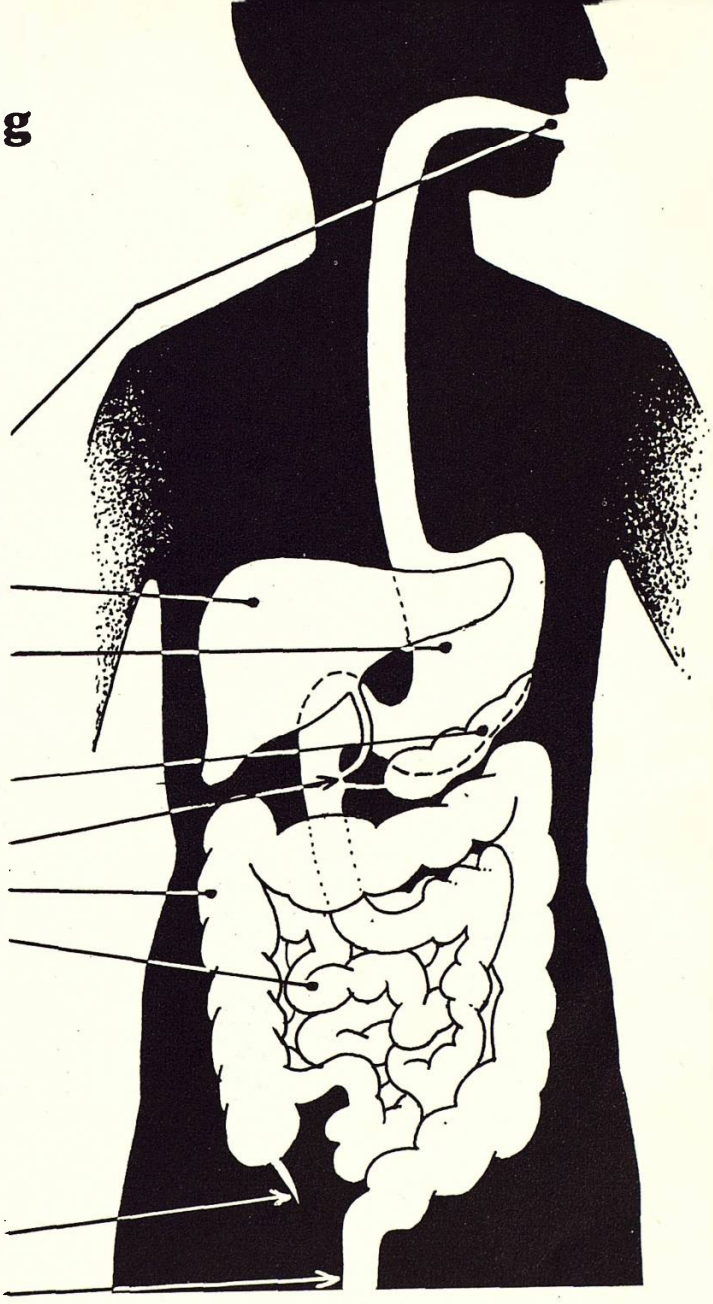
Our digestion can work better if the particles of food are pulled apart and tough coverings are broken down.
Cooks, therefore, try to separate and soften.
Plant and animal foods are made up of parts called tissues.
In an orange you can see these tissues quite clearly.

Peel an orange and pull it apart.
Look carefully at its structure with a magnifier.
Draw what you see.
If you just separated the segments and poured water over them you would not expect to get much juice.
See how much juice you can get by chopping, squeezing and grinding the tissues.
Add a little water and filter your juice. What parts pass through and what remains ?
With which other foods does the cook break down the tissues in this way ? What do cooks use to chop, squeeze and grind ?



Cooking and eating

Which foods can be eaten raw ?
Which are sometimes eaten raw and sometimes cooked ?
Which foods must be cooked ?
To understand why cooks cook, you need to know what happens to a meal when you have eaten it.



IN THE MOUTH

Food is chopped and ground.
Saliva mixes with it and starts chemical changes.

IN THE STOMACH

The food is churned about and more juices are added.

IN THE SMALL INTESTINE

Further juices are added. Now a lot of the food has been broken down into simpler things.
These are soluble.
This means that they can pass into your blood.
This food is then carried to all parts of your body.

Cooking helps digestion by breaking and softening tough tissues.

If you make popcorn you can see this happen.
Put two tablespoons of cooking oil in a saucepan and heat.
Add a tablespoon of corn and place the saucepan lid on tightly. Cook over a moderate heat.
Listen. When the noise stops and it has cooled down, look in the saucepan.
Look to find how the starch walls have exploded and broken down.
(It is nice to be able to eat an experiment. Most cookery books will tell you ways to flavour and sweeten your popcorn.)

Mystery powders

Collect some white food powders from the kitchen:

- flour
- bicarbonate of soda
- sugar
- salt
- mashed potato
- milk powder

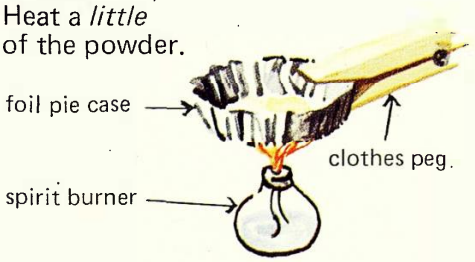
Ask your teacher to put them in jars just labelled A, B, C, D, E, F, so that you do not know which is which. These are then your mystery powders.

Children finding out about different powders

See how much you can find out about each powder.
Record each observation.
(You will need these recordings later for mystery solving.)

Smell them.
Taste them.
Feel them.
Look at each with your microscope.
Mix each with a little water.

Heat a *little* of the powder.



Add vinegar to a small sample.
Do the iodine test (page 16).

Discuss this with your teacher and friends. Which tests help most to pick out a particular powder ?

More mystery

Trying to discover the ingredients of pairs of powders

Ask your teacher or friend to mix together pairs of the powders (e.g. salt and flour). They could make several such mixes.
They should number each mixture and keep the ingredients secret.
Carry out your tests.
Record the observations.

Mixture 1 – Test	Observations
Microscope	
+ Water	
Heat	
Vinegar	
Iodine	
Using senses	

Can you discover what the two powders are ?

BUBBLES

The cook uses air to separate food particles.
Bubbles are added to make food lighter and easier to digest.
One way is to push air bubbles into sticky mixtures.
This is done when making cakes, meringues and omelettes.
What tools are used to do this ?

Another way is to add baking powder.

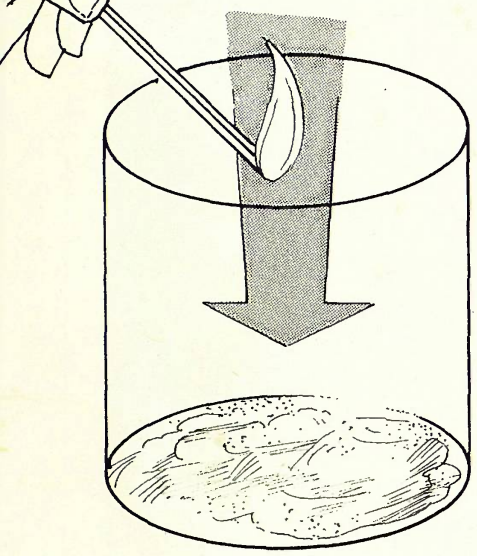
On the covers of this book you will find a recipe for cakes. Try making these without the baking powder. You could also try doubling and halving the amount of baking powder.

If using the cake recipe for experimental cooking and eating the fruit may be left out.

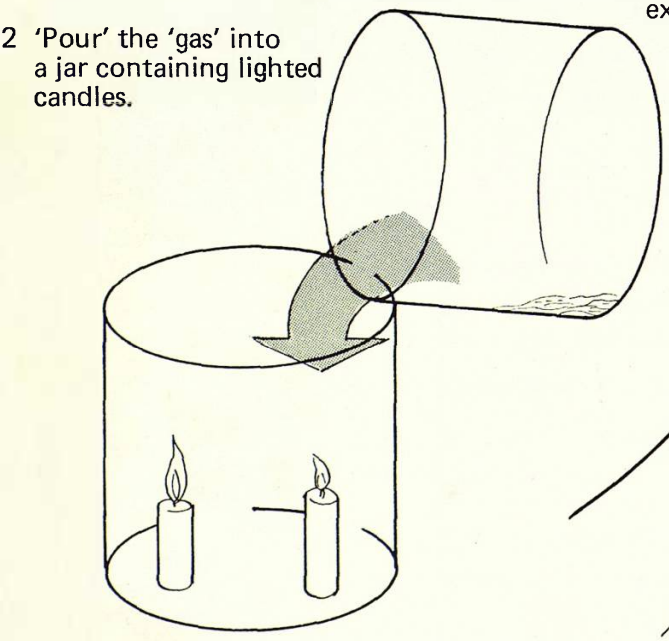
You can find out more about these baking powder bubbles by these experiments.

Add vinegar to about 50g of baking powder in a beaker or jar.
You will soon have a jar full of gas.
Experiment with this.
(You will need to make some gas for each experiment.)

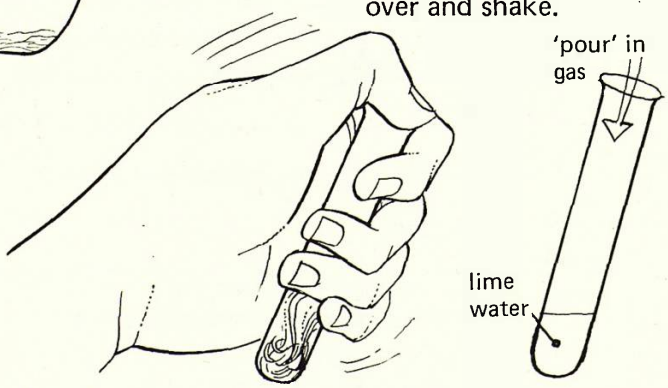
1 Plunge a lighted taper into a jar full of 'gas'.



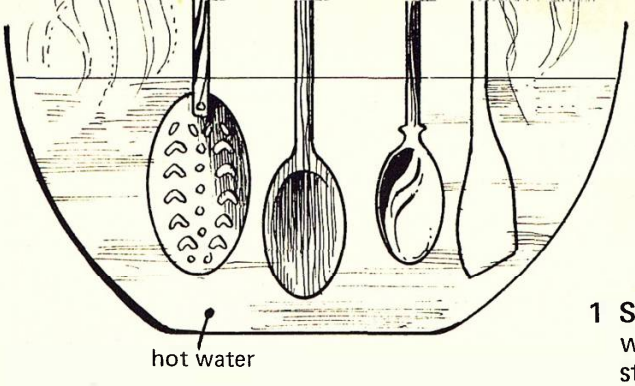
2 'Pour' the 'gas' into a jar containing lighted candles.



3 'Pour' some of the 'gas' into a test tube of lime water. Put your finger over and shake.



This gas is called carbon dioxide. See what else you can find out about it.



Kitchen utensils

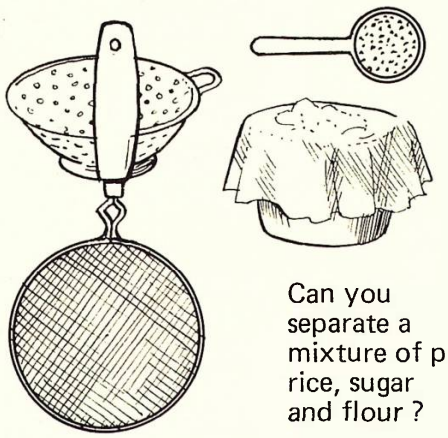
Many kitchen tools are interesting to investigate.

Here are some problems for you:

1 Spoons

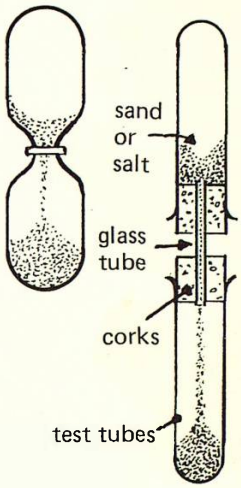
wooden, plastic, metal – which is best for stirring hot liquids ?
Why ?

2 Sieves and Strainers



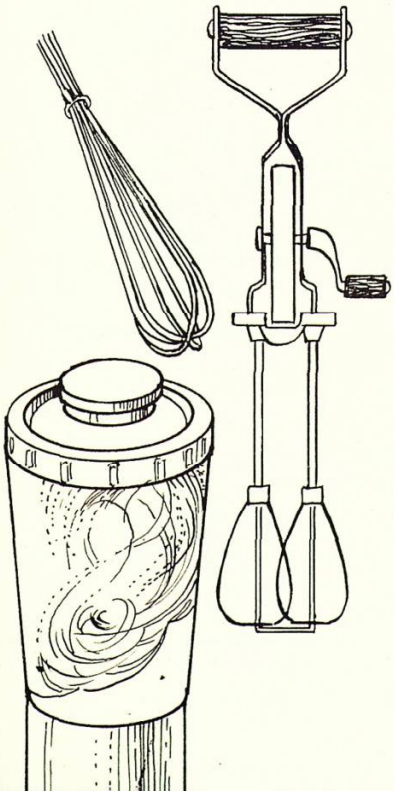
Can you separate a mixture of peas, rice, sugar and flour ?

3 Timers



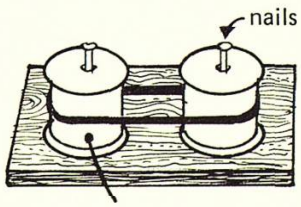
Can you use bottles with sand or salt to make an egg timer ?

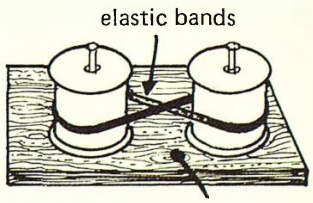
4 Whisks

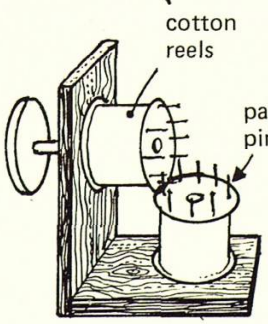


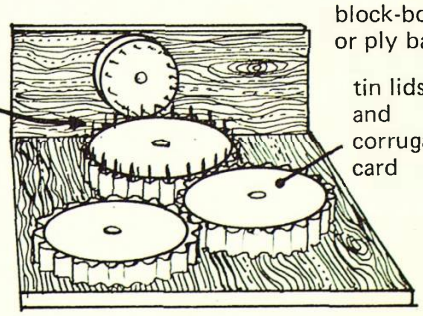
How is the hand motion changed to the stirring motion ?

Can you make models using cotton reels to show how wheels turn other wheels ?









An integrated study of food

Acknowledgements

The authors would like to express their thanks to the following for permission to reproduce copyright photographs:

The Swedish Institute; The Tesco Group of Companies; The National Dairy Council; The Milk Marketing Board; The Wellcome Institute, for the two photographs of Pasteur and his flasks (page 21) taken from the original facsimile in the Wellcome Institute, 183, Euston Road, London, N.W.1.; The British Sugar Corporation; Imperial Chemical Industries Ltd.; Smithfield Market; H. J. Heinz Company Ltd.; Unilever Ltd.

Thanks are also due to the following for information and advice:

Mr. B. L. Potter, Aylesbury College of Further Education and Agriculture; Electrolux Ltd. who supplied the refrigerator diagram; Thermos Ltd.; Mrs. J. Marsh, Home Economics Advisory Teacher, Buckinghamshire, who provided the recipes; The Flour Advisory Bureau.

Food needs for a growing healthy body

FOR BODY BUILDING AND REPAIR	PROTEIN	Meat	Fish	Eggs	Milk	Beans
FOR HEAT AND ENERGY	CARBOHYDRATES	Sugar	Bread	Potato	Rice	Pasta
	FATS	Cream	Butter	Margarine	Lard	Suet
FOR A HEALTHY BODY	MINERALS	Milk	Eggs	Salt	Liver	Fish
	VITAMINS	Cheese	Marmite (yeast extract)	Oranges and Lemons		
		Fresh vegetables	Sardines			

Make a list of the foods you eat. Find what each food gives you.

Try planning school meals for a week that will fulfil these food needs and give an interesting variety.

FRUIT AND NUT CHOCOLATES

Ingredients
50g melting chocolate
10g angelica
10g walnuts
10g stoned dates
3 glacé cherries
chocolate vermicelli
12 paper sweet-cases

Utensils
1 small china basin
1 small saucepan
1 teaspoon
1 vegetable knife
1 chopping board
a pan stand

Method
1 Wash your hands before you begin.
2 Use the vegetable knife and chopping board. Chop the angelica, dates, walnuts and cherries into small pieces.
3 Break up the chocolate and place in the china basin.
4 Put about 2.5cm depth of water in the saucepan and place the china basin on top.
5 Put the saucepan on the hot plate and heat carefully until the chocolate has melted. Meanwhile, put out six paper sweet-cases.
6 Remove the pan from the hotplate and place on the pan stand.
7 Stir in the chopped fruit and nuts. Mix well.
8 Put about one teaspoonful of the mixture into each paper sweet-case and sprinkle with chocolate vermicelli.
9 Leave the chocolate in a cold place to set.
10 When quite cold, peel off the paper cases and put the chocolates into six clean paper sweet-cases.

MARZIPAN WALNUTS

Ingredients
40g marzipan
12 walnut halves or quarters
1 level tablespoon granulated sugar
food colouring – a few drops
6 paper sweet-cases

Utensils
1 vegetable knife
1 plate
1 tablespoon
1 skewer or cocktail stick

METHOD
1 Wash your hands before you begin.
2 Place the sugar on the plate.
3 Trim the walnut pieces, if necessary, using the vegetable knife.
4 Divide the marzipan in half.
5 Leave one half natural. Colour the other half, carefully adding the colouring gradually with the skewer or cocktail stick.
6 Divide each half of marzipan into three even-sized pieces (6 pieces altogether).
7 Roll each piece to a ball, in your hands.
8 Press a piece of walnut (half or quarter) on each side.
9 Roll in the granulated sugar to coat the marzipan.
10 Place in paper sweet-cases.

SCIENCE IN A TOPIC -FOOD