# Parents and carers in Primary Science

## Why involve parents and carers?

- There are valid, as well as statutory, reasons for keeping parents and carers informed about what is going on in school.
- Parents and carers who are aware of what teachers are trying to achieve are better able to support their children. This is especially so with science, an area where parents and carers often feel less confident.
- Parents and carers are aware that changes have taken place in the classroom since their school days but they are perhaps unsure of the nature of these changes.
- Parents and carers are continually bombarded with information as to the importance of statutory test results (SATs) but they are much less aware of the other (more) important aspects of science, particularly the nature of *Scientific Enquiry*.
- Literacy and numeracy have been highlighted by the government and schools in the past few years. It is important that parents and carers recognise and appreciate that science is also a core subject within the National Curriculum.
- Everyone knows that both the home and school contribute to children's education. It is not quite so easy to see how both can contribute to science education. Homes have no science apparatus, and many parents and carers will have had little or no science education.

## The benefits of involving parents and carers

- It allows parents and carers to appreciate the rate of progress of their children's learning.
- It allows science to spread into the home and give it the kind of familiarity at home which encourages children to go on speaking and speculating about it.
- It encourages parents and carers to think about the processes of science and the nature of scientific evidence, rather than consider science as a collection of facts. In essence it increases the '*Public Understanding of Science'*.

## How can parents and carers be involved?

- You could send out a science newsletter; describing to parents and carers the sorts of things that happen in science lessons and explaining the difference between science **knowledge** (Sc2, 3, and 4) and science **process** (Sc1).
- You could run a workshop; inviting parents and carers into school so that they have an opportunity to take part in problem solving/investigative activities with their children.

- Encourage parents and carers to get involved in partnership with the teacher in science clubs; in science challenges, for example competitions such as *Science Challenge* and *Health Matters* that are organised by the Association for Science Education; or even supporting in science lessons on a regular basis.
- Involve parents and carers in a science club which may lead to awards to show achievement; for example, *The British Association for Young Scientists*, BAYS (*see* page 9).
- Encourage parental support when taking part in a local science and technology fair.
- Invite parents and carers into school to say something about how their job involves science. They need not be a 'scientist' or an 'engineer', but have less obvious (to the children) links to science, for example, a gardener, a cook, a builder or a fireman.
- Get children to take some activity home to investigate with an adult, perhaps every half term. The activity could be linked with the science the children are studying in school.
- Plan a school science event for parents and carers (*see* page 7)

Six possible home activities are provided as separate pdf files. Pages three to six suggest how they link with in-school learning.

| | | |
|---|---|---|
| 1 | Beware the water roller | INFANTS [2.3_water] |
| 2 | Leaves and ribs | INFANTS [2.3_leaves] |
| 3 | Grass | LOWER JUNIORS [2.3_grass] |
| 4 | Drips and drops | TOP JUNIORS [2.3_drips] |
| 5 | Magnifying drops | TOP JUNIORS [2.3_magnify] |
| 6 | Colour in bubbles | TOP JUNIORS [2.3_bubbles] |

**School – home activities should:**

- support the teaching of science taking place in school;
- inform the parents and carers that science is not only concerned with 'learning the facts', but that there is an investigative process which is equally (if not more) important;
- show that science can take place in familiar contexts.

**Working with the parents and carers involves:**

- all colleagues in school being committed and agreeing on the purpose of the activities;
- making them aware of the purpose of the activities in general terms, either through a parents' evening or by sending a letter home (*see* page 8).

# 1 Beware the water roller! INFANTS [2.3_water]

This activity links with the work the children may have been doing on Forces. Children will have done some simple activities on forces as pushes and pulls, and forces making things move. They will probably have done some simple investigation on, for example, cars coming down slopes. This activity includes measuring in handspans and recording the numbers.

A bottle rolls down a slope and is brought to rest by 'hitting' a yoghurt pot which it moves along a surface. How far it moves the pot depends on the floor covering. A heavier object, such as the bottle with water in it, will cause the yoghurt pot to move further before it comes to a stop.

The scientific concept involved is Energy, though it is not necessary to use this term with the children. If an object, like the bottle, is raised to the top of the slope, it gains energy. The person who lifted it up has lost a little energy that has been transferred to the bottle. This sort of stored energy is call 'potential energy'. As the bottle moves down the slope, this stored energy is transferred to movement energy and it goes faster and faster. This energy is transferred to the yoghurt pot which then moves along. Eventually the energy is transferred to the floor as thermal energy and the yoghurt pot will stop. Raising heavier objects, like the bottle with water in it, takes more energy, so there is more potential energy at the start.

## Notes for parents and carers

This activity can be done on a hard floor, or on a carpet (the bottle will go further on the former). **It is important to make sure the top is firmly screwed on to the bottle!** Your child will be measuring using handspans, as is often done at this age in school. Please help with the recording. Do encourage your child to predict what will happen.

# 2 Leaves and ribs INFANTS [2.3_leaves]

This activity is linked to the properties of plants. It is about the structure of leaves and how this structure helps the plant 'find the sunlight'. Almost all leaves have ribs underneath.

The objective of this activity is to get the children to look carefully at leaves. Then they make a model leaf out of foil, with straw or spaghetti in place of the ribs. They should notice that this makes the leaf stronger so that it can be held open to receive sunlight. Without ribs the leaf would flop.

Sunlight is important for plant life. Plants use the energy from sunlight directly and use it to build up foods which animals eat later. It is important that children begin to appreciate that green leaves absorbing sunlight is where the life-web of our whole planet starts.

Follow-up work in the classroom could show what happens when plants are denied sunlight – and how they recover when sunlight is restored.

## Notes for parents and carers

You and your child will need green leaves for this activity. Evergreen leaves or flower leaves will do, but dead brown leaves are not easy to use. Your child has to think about which is the 'sunny side' of the leaf. (Usually it is shinier

than the underneath side, but your child could go back and check which is the top side if they have forgotten.)

The ribs of a leaf are usually underneath it. They make the leaf stiff so that it can be held open to receive sunlight. See if your child can talk about the ribs making the leaf strong.

## 3 Grass LOWER JUNIORS [2.3_grass]

This activity is linked to the properties of plants and, in particular, variations due to the environment. The children are likely to carry out this activity on a lawn choosing parts in the middle and parts at the edge. In this case the grasses involved will be similar. It is also possible that different grasses will be growing in different places.

The children should cut the bunch of grass stems close to the soil. The first thing to notice is that each plant is slightly different from the others. This variation in living things is important. It is something which children can notice in themselves. It is also the basis for selection both in breeding and in natural selection, which the children will learn about later. Secondly they will see what each set of grass stems has in common. Grass for lawns needs to be able to branch out and cover the land. Lawn mowing encourages this so that grass from the well-mown regions responds to treading and walking by producing rather squat tough branching plants.

In darker regions under trees plants grow faster but thinner. They respond to lack of light by growing tall. This helps them to reach light. The lack of mowing and treading at the edges of the lawn may also contribute to making thinner, taller and less branched plants here. The conditions may also favour the growth of different varieties of grass if their seeds are present.

### Notes for parents and carers

Your child should be able to do most of this activity without help. However, showing interest and talking over what has been found out is very encouraging.

Lawn grass has been developed to give strong branched plants which can withstand walking. In the darker parts the grass may be thinner but taller or there may be different kinds of grass growing there. Your child should manage to make a good display of grass plants.

## 4 Drips and drops TOP JUNIORS [2.3_drips]

This activity is linked to the properties of materials. In the activity the children examine different kinds of paper and look at the shapes that drops of water form on them and whether they are absorbed. Blotting paper, which is not common in homes nowadays, is the best for making a regular circle.

It is a good idea to send the children home with a piece of filter paper each.

Other kinds of paper may become misshapen because the fibres are not tightly bound together (e.g. paper tissues, toilet paper) or else can have rough fibres in it which tend to make the water spread one way rather than another

(e.g. newspaper). Waxy or greaseproof paper will not absorb water and the shape of the drop can be seen clearly standing up from the paper as a sphere or dome.

Droppers are easier to use than a straw but straws give good results.

When the same investigation is done with just a little detergent in the water the drops will be smaller and flatter. If the children put too much in they may just blow bubbles which will look bigger! The drops are small because water with detergent in it has a weaker 'skin' (scientific term is surface tension), but this is probably too difficult for the children to understand. However they may guess that detergent is good for washing because small drops get into dirty places in the fabric more easily.

There is also the opportunity to talk about the oiled feathers of sea birds, and the effects of petroleum oil, tar and detergent on them. Birds which have had oil from a spillage cleaned off with detergent cannot swim. Their feathers soak up water and they sink! So they need to be looked after until preening and time has allowed the feathers to become coated again with the bird's own natural oil.

### Notes for parents and carers

A medicinal dropper is better than a straw, but a straw also gives good results if it is squeezed gently. Blotting paper makes very regular round marks which are easy to measure. Paper tissues are very weak as well as being absorbent so they may go soggy! Let your child find out as much as possible.

If your child adds just a little detergent, the drops will probably be slightly smaller and slightly flatter than they were before. The important point is to let the child explore and take the measurements.

**Note**: If too much detergent is added you child may just blow bubbles which will look bigger!

## 5 Magnifying drops TOP JUNIORS [2.3_magnify]

Children will have used magnifying glasses in a range of situations. This activity gives children an idea of the excitement felt by the eighteenth century Dutch scientist Leeuwenhoek, who made the first microscopes using tiny drops of glass about a millimetre across.

A lens, like a magnifying glass or a drop of water, is thicker in the middle and thinner at the edge. This kind is called a 'converging' (or 'convex') lens. Lenses of this kind can be used to magnify if you put an object quite near and behind them. The children should be able to find out that the smaller the drop the more curved it is and the more it will magnify an object. They will also find out that the small drops distort the image, making it bulge in the middle, rather like the image you see on the back of a spoon. (In Leeuwenhoek's microscope, as in all modern ones, there are other lenses to correct some of this distortion.)

Children can look at different objects after they have observed a letter and a sugar crystal. Other objects which are interesting to look at are fabrics, threads, and the torn edge of a piece of paper.

### Notes for parents and carers

This activity calls for careful observation. The first activity does not give magnification, but the other ones do. Once your child has found out how to make good magnifying drops, (s)he can use them in different ways. It is valuable to let your child choose what they would like to look at for themselves.

## 6 Colour in bubbles TOP JUNIORS [2.3_bubbles]

Most teachers will, as part of activities on light, have shown children that white light from a torch, or from the Sun, is made up from all the colours of the rainbow. This activity produces almost the same range of colours but they are in a different order. It requires careful observation.

In the first part the cold bottle full of bubbles is placed in hot water which makes the air inside expand, so the bubbles are pushed upwards where they get bigger and then burst. The last colour seen, before the bubbles burst, is usually yellow; then all the colours disappear and it becomes black-and-white for a moment before bursting. This is not easy to see, but most children will at least begin to recognise some of the colours on the bubbles.

For the second part it is important not to have the bubble liquid very concentrated or it will take too long for the film to drain and break. As the children watch they should see the colours move downwards in sequence, swirling a little as they go. The order is roughly – green, blue, violet, orange, yellow. Once again yellow is the last colour seen, and the film then goes almost black before it bursts.

Some of the children will probably guess, quite rightly, that the colours are related to the thickness of the soap film. These colours, like those seen on petrol/oil on the road, or in pearls, are due to double reflection. Light reflects off the front and the back of the film and the two reflections interfere with each other reinforcing some colours and eliminating others. This is complicated in detail, but put simply, it is only one more beautiful effect produced by separating the colours which are mixed together in white light.

### Notes for parents and carers

This activity encourages careful observation. In the first part putting the cold bottle into hot water makes the bubbles get bigger. The colours on the bubbles change, sometimes quite quickly. In the second part it is important not to have the bubble liquid too concentrated or it will take a long time for the film to break. Your child may see the colours swirling a little as they go downwards. They are much the same colours as in a rainbow, but in a different order, and formed in a different way. Encourage your child to guess why the colours change as they watch.

# Steps in planning school science event

## Step 1 Educational rationale

- Make a list of the school's educational reasons for involving parents and carers in science
- This should be part of a whole-staff exercise, then everybody is involved in decisions, planning and execution of any ideas.

## Step 2 Programme possibilities

Are you intending to:

- ❍ give information?
- ❍ involve parents and carers in long-term projects?
- ❍ set up working groups?
- ❍ encourage parents and carers to work with teachers as well as each other?
- ❍ ask for help in resourcing science?
- ❍ illustrate good practice?

## Step 3 Format

- **Workshop evening** Since primary science is largely concerned with first-hand experience, parents and carers can best appreciate this by engaging in practical investigations. These sessions should demonstrate the philosophy behind primary science.
- **Science Fair** This would involve children continuing with their scientific investigations. Likely to be combined with an exhibition of work, and to be at a site or venue that is not the usual classroom one.
- **Talk** Could be given by curriculum leader, several members of staff, visitor to school, e.g. science adviser or advisory teacher.
- **Exhibition** Can be about science or cross-curricular themes. Can be part of larger exhibition. Can be left unattended, but will lose impact and context.
- **Drop-in session** Parents and carers visit classroom to see work in action.

## Step 4 Organisation

- ❍ Basic details
- ❍ Job allocation
- ❍ Advertising
- ❍ Replies
- ❍ Resources needed
- ❍ Detailed programme

## Step 5 What next?

Are you aiming to continue links with parents and carers after the special event?

# Possible letter to parents and carers

From time to time we will be sending your child home with instructions for a science investigation which we would like you to carry out with your child. This activity will support the work your child is doing in science in school, but we feel that there will be other benefits. It will inform you of some of the work we are doing in school and enable you to see that science is not just a collection of facts or 'too difficult'. Science is a way of finding out and trying to solve problems and sometimes there is no 'right answer'. It will also enable you to see the progress your child is making in science.

You should have no anxieties regarding your own scientific knowledge. The aim is that you work with your child, asking him/her questions, getting them to explain things to you and finding out together. It is **not** something where you have to give him/her the 'right answer'. It is something you should enjoy with your child and often leave the conclusion 'open-ended' so that this can be pursued further in the classroom. Science activities should not be exclusively a dad thing. Mum, or even gran, can be involved. The time allowed for the activity will be at least one week so that you can work with your child at your convenience, though the activity itself will usually take no more than about an hour.

# BAYS Science Activities

The *British Association for the Advancement of Science* (BA) offers support and resources to schools and science clubs through the BAYS awards scheme. This includes the **First Investigators awards** scheme for 5-8 year olds and the **Young Investigators** for 8-13 year olds.

Examples of activities are:

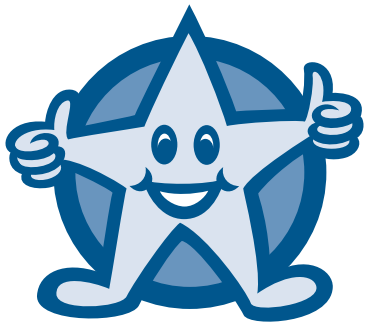
| | | |
|---|---|---|
| **First investigators** | MAKING MOONCRATERS | [fi_craters.pdf] |
| **Young investigators** | ROCKET LAUNCH | [yi_rocket.pdf] |

*See also* **SCIENCE CLUB** [7.5] for more BAYS details.

In addition, BAYS members receive the newsletter **BAckchat** three times a year. This includes news, supplementary activities and information about science events around the country. Further details on:

**http://www.britassoc.org.uk/the-ba/page.asp**

the BA bays first investigators



# Making moon craters

1. Make sure your moon surface is smooth.
2. Drop one of the balls onto the moon's surface.
3. Draw what happens.
4. Drop a different ball onto the moon's surface.
5. Does it make a bigger or a smaller crater?
6. Drop some more balls and draw your moon surface.

## Think about...

Drop one ball from different heights. How do different heights change the size of the crater.

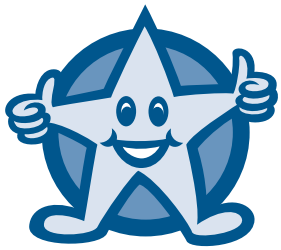
| Height of ball | Size of crater |
|---|---|
| | |
| | |
| | |
| | |

Drop different sized balls from the same height. How do different balls change the size of the crater.

| Size of ball | Size of crater |
|---|---|
| | |
| | |
| | |
| | |

What do you think has caused all the craters on the moon?

the BA bays first investigators



# Club leader's notes

## EQUIPMENT

A large tray or similar container, flour, drinking chocolate powder, a sieve, newspaper, different size balls made out of plasticene, metre stick, cm rulers

## BACKGROUND INFORMATION

The surface of the moon is covered with approximately circular depressions called craters. Most of these craters have been caused by impacts with meteorites in the distant past. This activity models how these craters were formed.

## ACTION

1. Spread the newspaper on the floor.
2. Fill the tray with about 5cm of flour and make the surface as smooth as possible.
3. Sprinkle a thin, even layer of chocolate powder over the surface using the sieve.
4. Place the tray in the middle of the newspaper.
5. Drop plasticene balls into the tray to create craters.
6. Remove the 'meteorite' carefully before measuring the diameter of the crater.

## ABOUT THE ACTIVITY

Depending on the age and ability of the children, this is an ideal activity for making comparisons, taking measurements, controlling variables (the height and the mass), drawing conclusions. At the simplest level, children can drop 'meteorites' to create a moon surface and draw the results. However, they may also be able to

- compare relative sizes; bigger than, smaller than
- measure the diameter of the meteorite and the diameter of the crater. The easiest way of measuring the diameter (or width) of a ball is to put a ruler on either side of the ball and use another ruler to measure the distance between them.
- drop meteorites of different sizes from the same height and measure the results
- drop meteorites of the same size from different heights and measure the results
- be aware of inaccurate results by repeating their tests several times
- draw conclusions about how to make craters of different sizes

## SAFETY

Dropping balls into flour may cause particles to fly into the air. Make sure children are either wearing safety goggles or standing at a safe distance to prevent flour particles getting into their eyes.

the BA bays young investigators

BRONZE
B
AWARD

# Rocket launch

EQUIPMENT: Balloons, paperclips, sellotape, tape measure, smooth thread (fishing line is ideal)

***Make and test a balloon powered rocket***

Blow up a balloon and let go. What happens?_____

_____

_____

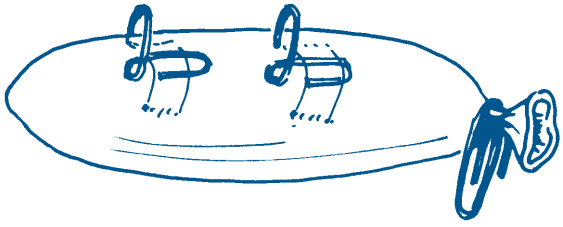
***Follow these instructions to control the direction in which your balloon travels.***

1. Bend two paper clips to make two hooks.

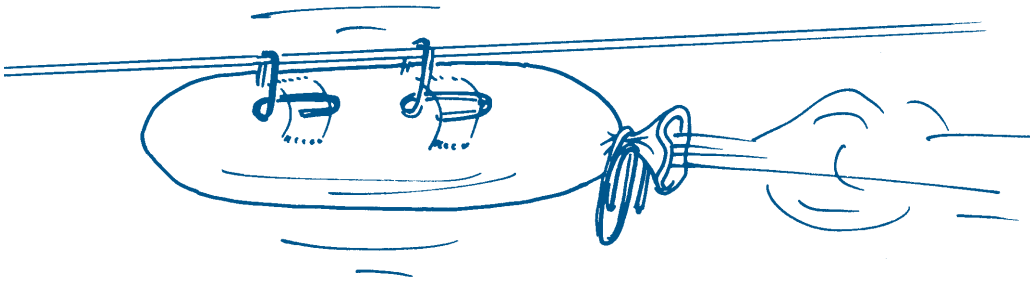
2. Blow up a balloon and sellotape the two hooks in a straight line to the 'top'.

3. Fasten the thread horizontally across the room (making sure it is somewhere where people will not walk into it!)

4. Put the end of the balloon through the gap in another paper clip. This controls the flow of air from the balloon.



5. Attach the two hooks to the thread and let go.



What happens? _____

_____

_____

What modifications do you need to make for your rocket to travel further? _____

_____

_____

***Now investigate your rocket***

Investigate how far your balloon travels with different amounts of air inside.

How will you make your investigation fair? _____

_____

How will you measure the amount of air in the balloon each time?_____

_____

_____

Record your results in a chart. What conclusions can you draw from your results?

Investigate how well your balloon travels up a sloping thread.