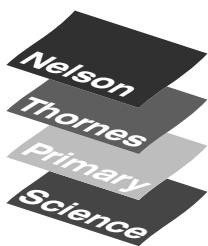


# Primary Science

***for the Caribbean:***  
an integrated approach



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## Teacher's Guide Books 1–3

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# Introduction

This Teacher's Book is designed to support the use of the Pupils' Books in Grades 1 to 3 of the *Primary Science for the Caribbean* series. The content of the curriculum covered in those books is taken from the Revised Primary Curriculum – Grades 1–3, published by the Ministry of Education and Culture, Jamaica. That curriculum adopts an integrated approach to teaching young children, as explained in its rationale:

*The revised curriculum is designed to be delivered in such a way that children will be able to make connections between what they learn in all subjects, and between school and the world outside. Education at this level should be a process through which children construct meaning for themselves, begin to understand the world and to make wise choices.*

*The integrated curriculum is therefore designed to facilitate a more child-centred approach to teaching and learning, in an effort to empower the child to face the challenges of the new millennium.*

The authors expand on the application of these principles:

- base the curriculum on the needs of the child and the society, not on the requirements of a particular subject
- let the focus be on learning rather than teaching
- give children opportunities to work together and to discuss their work
- recognise that there are many different ways of being intelligent and provide opportunities for the development of all the intelligences
- children need to be educated about many important social, cultural and health issues. The curriculum should cater to these needs.

The Pupils' Books 1–3 have been written with those principles in mind. Every Unit is learned through activities of various kinds, which are designed for individuals, groups or the whole class to carry out. There are frequent opportunities for pupils to discuss what they will do and to talk about what they have done, with particular emphasis on what they have found out through their activities. At the same time as they are learning useful scientific ideas and facts, they are also developing practical skills. These are useful in everyday life and are not confined to science lessons, e.g. estimating, observing, comparing. The content

and the skills are set within the limited world of the young child, drawing on their experiences at home and in the local community. At the same time, the units begin to make links with the wider world and expand the mental horizons of the children.

## Structure of the Teacher's Book

The Teacher's Book is made up of **units** which correspond to those units in the syllabus for Grades 1–3 which contain elements of science concepts and skills. Where a unit in the Curriculum contains no science, the Pupils' Books and the Teacher's Book have no material on that unit. So, units covered in this series vary in length, as the curriculum units contain unequal amounts of science.

Where there are links with **other subjects** in the curriculum, these are made explicit, through the use of symbols alongside the pupil activities and references to text in the Pupils' Books. The symbols are as follows:



art



drama



geography



language



maths



music



physical  
education



religious  
education



social  
studies



technology

The units in the Teacher's Book begin with the **objectives** for the unit, taken from the curriculum document. They are expressed as the outcomes which pupils should achieve at the end of the unit.

*E.g. At the end of this unit, pupils will: talk about the changes which occur over time.*

Each unit is then introduced with a brief discussion of the **concepts and skills** which it contains and a

suggestion for the number of **weeks** to spend on teaching the unit. (It should be noted that this number is drawn from the Curriculum document, but you may wish to vary the number of weeks to suit your own programme of teaching.)

The **content** of the Pupils' Book is then dealt with, topic by topic, under the headings set out below:

- **The general concepts** of the topic are briefly stated and the **materials** needed for the activities are listed, so that you can see easily what you need to prepare for the classroom.
- **Background information** to help you understand the scientific ideas and facts is then provided. This is not intended to be passed on to the pupils, as it is not suitable for their level of understanding.
- **Using the Pupils' Book** provides a **page by page** commentary, with advice and suggestions about how the Pupils' Book can be used. Each **Activity** in the Pupils' Book is explained, with points to emphasise, things to prepare beforehand and how to make use of the outcome of the activity. There are also some **additional activities**, which are not found in the Pupils' Books. These do not have to be carried out by your pupils, but you may choose to use some of them when appropriate.

The approach to learning outlined in the Curriculum document places great emphasis on pupils being active and science provides many such opportunities, as it deals with the natural world. The raw materials of science are all around you and so it is going to be very rare that you cannot use the activity approach adopted by these books. As pupils do things, they learn **skills**, of hand and eye and mind. Such skills are generally useful, but they are essential in science.

For instance, **drawing graphs** is one example of how results can be presented. This is a convention which mathematicians have developed to convert numbers into pictures, of one kind or another. A graph is a picture, rather than just a list of numbers. Children need to be taught the skills of drawing and reading (interpreting) graphs. This is obviously a skill which is common in maths and science, with applications in other subjects too. **Pictograms**, using small drawings to represent the items being counted, through to **bar charts**, where the length of the column is directly related to the number of items it represents, to **pie charts**, where the size of the sector in the circle reflects the size of the particular factor represented – these are the introductory versions of graphs which children in Grades 1 to 3 should begin to learn.

Other **process skills** which the books introduce are:

- **Observing** – using all the senses to collect

information. It is used when pupils are describing objects or events. Observation makes use of prior knowledge.

- **Comparing** – is a particular type of observation, where similarities and differences are observed.
- **Sorting** – using observations to put things into sets, based on various criteria, e.g. colour, shape, material. Observation must come first. Simple sorting should be developed into the more complex process skill of classifying, using scientific labels for the sets, e.g. proteins, plants.
- **Measuring** – is a particular kind of observation, which involves quantities. The first type of measuring done by young children is in the form of comparisons (e.g. this is longer than that.) Then real measuring, using non-standard units, such as hand-spans and foot length, can be developed. These are gradually replaced with standard units, like centimetres, kilograms, etc.
- **Estimating** – is a part of the skill of measuring. As children learn the sizes of the standard units through practice, they can use their knowledge to estimate the sizes of objects, etc. This is a very useful skill in everyday life.
- **Recording** – can be done in various ways and should normally follow every activity. Drawing pictures is often suitable for young children, but as they progress, writing, collecting figures in tables and drawing graphs become more often used.
- **Investigating** – includes testing, experimenting and collecting evidence. It includes the skills of planning and carrying out investigations. Investigations arise from questions, so it is important to encourage children to ask questions and then carry out activities to find the answers.
- **Predicting** – is part of planning and carrying out investigations. Children should be encouraged to think about what they have observed previously and use that knowledge to “foretell” what they think will happen in an investigation.
- **Interpreting** – is essential, if the results of investigations and observations are to be used to answer questions. Pupils should look at the results and ask “What do they tell us? What do they mean?” This includes looking for patterns in the results. Interpretation leads to conclusions, which lead to explanations or reasons.

The whole Curriculum is based on the concerns about **the environment** which the authors have. These are shared by individuals, communities and governments around the world. This series of books lays great emphasis on caring for the environment and attempts to help the children to be aware of its importance and to suggest ways in which they can begin to play their part.

The three **Word Lists**, from the Pupils' Books, are included in this Teacher's Book, along with a list of **key words for Teachers** which appear in this book. These words are underlined in the text where they appear for the first time.

### Structure of the Pupils' Books

The three Pupils' Books have the same structure and this will help pupils to become familiar with how they are to be used.

The **text** "addresses" them directly, in a conversational style. The **language level** changes across the three books, matching the development of the children's language skills. In Book 1, the sentences are very short and the vocabulary carefully controlled. It is necessary to teach new words, especially those with a particular, scientific meaning and these are highlighted in **red** and listed in the **Word List** at the back of each Pupils' Book. You will need to teach the pupils how to use the word list and to recognise that words in red can be found in it.

Every **Activity** which requires pupils to use equipment or materials of some kind is headed with a red box containing the activity number. This is followed by a coloured strip containing the list of what "**You will need:**" Generally these items are common, everyday things which the school can provide. Occasionally, you and the pupils could bring items from home, or they can be found in the environment around the school.

The **steps** for the pupils to follow are then set out in a numbered sequence. These frequently include **questions**, addressed to the pupils. The intention is that you should use these to focus the attention of pupils on what they are doing and what the results are. Often, the answers will be oral, but as the children get older, there are more which require a written answer. This habit of recording things as they carry out activities is a good one to develop and it makes the task of writing more connected to experience.

These activities are not "extra" to the teaching,

**they are the main vehicle for the teaching** – it is through the **doing** that pupils will understand and learn the content of the lessons and develop the skills. The books do not supply all the information which the pupils should learn – much of it will have to come from the practical activities. This is the intention behind the form and content of the Curriculum and the Primary Science for the Caribbean series is written to match that intention.

Some activities are based on the **books**, rather than on the use of equipment. They usually involve looking at pictures, graphs or tables to find the answers to questions set out in the text.

The books are very well illustrated with **drawings** and **photographs**. These are not for decoration. They are a vital part of the teaching and learning process. You should make use of them wherever they occur, as they have been included for a particular purpose. There are suggestions for their use throughout this book.

There are a number of **writing exercises**, which involve copying and completing words or sentences. The convention used is that each **missing letter** is represented by a dash. You will have to teach the pupils this, so that they understand the tasks correctly.

Shaded boxes, in a variety of colours, are used to highlight the text which gives the **scientific facts and concepts**. They occur wherever a section of the topic is completed and are always used at the end of a topic, where the ideas covered in the topic are **summarised**. You can use these to check that you have covered all the points in the topic and as the basis for assessing what the pupils have remembered and understood.

These books cannot be used correctly or effectively if you stay the whole time in the classroom – they are written with the intention of pupils going outside, into the immediate **environment** of the school and further afield on occasions. The environment *is* the classroom to a large extent. It is where the children spend most of their time and it is the place where they can best make sense of the natural world and their place in it.

# Using Pupils' Book 1 / Year 1

## Term 1 Unit 1 Who am I?

### Objectives

Pupils will:

- Talk about changes in themselves which occur over time
- Identify groups to which they belong (class, school, religious group, club, race, family, country)
- Display and analyse data using attribute, e.g. materials, shape, size, colour and patterns

**Time allocation: 6 weeks**

### Discussion of concepts and skills

The main points in this unit are basic to all of science. They are introduced in this first unit in Year 1 and they will occur again and again throughout the rest of the pupils' science education. The first is the skill of **sorting** things, by comparing them and finding differences and similarities. This process leads to the formation of **groups** of various kinds, e.g. plants/animals, living/non-living things, girls/boys, children/adults. Pupils are expected to develop the skill of being able to sort things and group them and eventually to give correct scientific names to the groups. This unit introduces them to this important scientific activity.

The second is the concept of **change**. This unit focuses on the changes which are happening to the

pupils themselves. Some are physical, like growth in height, but others are intellectual, such as learning to speak or read. This concept of change is fundamental to science and it will be applied in numerous different topics as the children progress through their schooling. So, this introduction to the idea is very important, even though it might seem simple and not very "new" for them.

The third point is the process of **collecting data** (measurements, counts) and representing it in some way. The skills of collecting and displaying data, which can then be *interpreted* (looked at to provide answers to questions), are also vital at all levels of science. They are amongst the basic skills which all scientists use.

## CHANGING AND BELONGING pages 1 to 8

### General concepts

People and things all belong to groups. We can sort them by looking for similarities and differences. As we get older we change. Information can be collected and shown in various ways.

### Materials needed

1. string, scissors, pins, paper, pencils, books
2. child-size sheets of paper
3. a wall sized number line
4. small pieces of card

5. a variety of small objects from inside and outside the classroom

### Background

Scientists try to understand the natural world. They make **observations** of objects, processes and events and use these to **classify** everything around them. Even small children can carry out these processes; they already have the skills of observation and classification. They are used in everyday life – without them we would not survive long (e.g. when crossing the road we look and listen for danger and we can sort out what is happening – we know the difference between cars and bicycles.) Science makes use of these skills all the time, so it is important to start developing them in school from the very beginning.

Pupils of the same age will not all be exactly the same physically, intellectually or temperamentally. This is quite normal and the comparisons pupils make in this unit will reveal the wide range of heights, birthdates, foot sizes, etc. Our basic humanity is the only thing we all share; apart from that, we are very varied. The **groups** we belong to are of two kinds – those we have chosen (such as teams, clubs) and those given to us (such as gender, ethnic group). Consequently there are different ways of sorting people, just as there are different ways of sorting objects. It depends on the *criteria* (features, attributes) chosen as the basis of the sorting.

**Change** is a fundamental feature of living things. Growth and development are the two types of change and they affect the body, mind and spirit. Because the processes are slow, they cannot be observed directly, so a number of measurements made across time have to be used to reveal what has happened. In this unit, the first attempts to collect measurements, using *non-standard measures*, form part of several activities. It is very important that pupils do these activities, rather than just look at the pictures and read the text.

### Using the Pupils' Book

Use the pictures on **Page 1** to get the children talking. Encourage them to compare the children shown in the pictures and to identify differences. This is the start of observation and sorting. Let them do this activity in groups, sharing their ideas. Then get them to tell the class what they think.

#### Activity 1



Let the children work in pairs. The outcome should be a piece of string (or thread or

paper) for each pupil, cut to match their height and displayed on the wall. This display is important as it will allow the strings to be compared and conclusions made about children's heights, i.e. children of the same age are not all the same height – variation is normal. Make sure that the bottoms of the strings are all at the same level, otherwise the comparison will not be possible. This activity gives practice at measuring, displaying data, comparing and making conclusions. It is an important introduction to these skills.

#### Activity 2



The groups should choose for themselves what they will measure. Just make sure that they measure in a consistent way, i.e. they always put the string in the same place on the hand, foot, waist, etc. The process is the same as Activity 1 and the result should be a display of strings (threads, papers) which pupils can then compare to find differences. The conclusion will also be the same: children have different sized body parts, because each one is an individual. We are not all exactly the same.

#### Activity 3



It may not be possible for every pupil to do this, so if necessary you should choose one girl and one boy to have their life-sized shape drawn and cut out. If all pupils can do it, then this is ideal. Again, the result will be comparisons and the identification of differences between the individuals. Help the children to focus on the details of the differences, not just the height, e.g. the length of limbs, the size of head.

#### Activity 4

Put the wall sized number strip up on the wall at a height which will allow pupils to put their names on it. Make it big enough for names to be written on it (3 cm or 1 inch apart should be enough) and make sure it covers the age range of pupils in your class. The second purpose of the activity is to give pupils the chance to handle (*manipulate*) data. The questions "how many. . ." are supposed to focus their attention on the sub-sets of data (i.e. the names), which are arranged at different points along the line. This will

involve them in adding names to answer the questions. Other questions can be asked "of the data", such as comparisons of boys and girls, the months which have the most or the least birthdays, etc. Relating back to the previous activity will reveal that age does not control such things as height, leg length, etc. There is great variation amongst children of the same age.



The picture on **Page 6** is meant to provoke discussion and focus on the issue of how we all belong to various groups. Let the pupils talk to one another in groups before you bring the whole class together to share what they think. Encourage the use of the group names which are on the page. You should use them yourself as you talk to the children and ask them to use them in their discussions and sharing.

### Activity 5



Make enough small cards/pieces of paper for each pupil to have at least 4. You should provide cards with the names of the groups for each group of pupils so that they can put their own name cards into the various groups.

The pupils should notice that some groups have all the names in them (e.g. humanity, family, class) and others have only some names (e.g. team, church).

### Activity 6

Let the pupils collect their own objects from inside and outside the room. Do not try to decide for them. They should be allowed to sort them into groups using their own criteria/ attributes/features. This means there is no "right or wrong" basis for sorting – it will depend on what they choose to focus on. It might be colour, or shape, or material, or use, or texture, etc. It is important to let the pupils see how others have done their sorting so that they can question and challenge one another. Pupils should be asked to work out the basis of the groups and also to defend why they have made their own particular groups. You can help them to think by moving objects from one group to another or by introducing new objects and asking pupils to choose where to put them. This will reveal to you how much they have understood of the sorting process.

## Term 1 Unit 2

# My body

### Objectives

Pupils will:

- Identify and name some external parts of the body: a) head and its parts, b) upper limbs and parts, c) lower limbs and parts, d) trunk
- Identify themselves as boy/girl, male/female and human
- Relate the uses of some special body parts: hands, feet, eyes, mouth, nose and ears
- Name the senses, associating them with specific body parts
- Use the senses to explore and recognise the similarities and differences between materials
- Talk about changes which occur over time

- Demonstrate an understanding that the basic needs are essential for healthy growth
- Use all the senses to detect information on how to keep the body safe
- Describe ways in which we take care of our bodies
- Conduct simple surveys to determine safe/unsafe areas around them
- Identify possible reasons for safe/unsafe areas
- Take safety precautions during investigations
- Tell ways in which they can take care of themselves
- Use, move and store equipment safely

**Time allocation: 6 weeks**

### Discussion of concepts and skills

This is a very big unit and it contains many different concepts and skills. It begins with the **naming of body parts**, starting with the very familiar and moving on to less commonly used names. This is largely a language activity and should be developed in terms of recognition of the written names, as well as the correct pronunciation of the words. Science makes great use of naming and words have very specific meanings for scientists. This unit helps to develop this skill. As well as being able to name parts of the body, pupils will be expected to know the **functions** (the uses) of many of the parts. You will not have to teach all of these, as pupils will already know some. You will need to extend their understanding of what each part is used for, e.g. the various uses of the tongue.

The skills of **counting** and **recording** information in a block graph are also practised. The numbers involved are very small, so all pupils should be able to cope with the maths involved in counting body parts. If you do not have squared paper, you can use a ruler to create equal distances between lines for pupils to use as a guide when drawing the blocks, or just use lined paper.

It is important that there is a practical application of **the senses**, so that pupils can focus on the information which comes to them through their sense organs. Talking about them is not a good way to teach this information, or to develop understanding. Their functions are vital to all science – they are the only

way we can find out about the natural world.

Pupils are familiar with various **foods**, but they do not think about their **origins** or their **functions** in the body. This unit begins to introduce the concepts of classifying foods in various ways and, in particular, the way the body makes use of the different food types. Much of this will be quite new for such young children, especially if they generally see food coming from a shop in containers, rather than taken from the garden or farm.

Physical **growth** is one outcome of proper eating and this can be measured and recorded, providing more skills practice. The units of measurement should be **non-standard** to begin with (hand-spans, stones, etc.), before going on to use **standard units** such as centimetres, grams and kilograms.

As the children get older, they need to develop their independence and learn to care more and more for themselves. Two aspects of this are to keep themselves **clean** and **safe**. The overall issue is one of **good health**, a rather vague concept which is hard to measure in any way. At this stage, children only need to know that we can do some things which are good for our bodies and others which do our bodies harm. This has strong links with social and religious education and could be dealt with in this wider context.

## BODY PARTS pages 9 to 16

### General concepts

Each part of the body has a name. Each part has a particular function. We have more of some parts than of others. People are of two genders, female and male.

### Materials needed

1. Paper and pencils
2. Rulers
3. Squared paper

## Background

Much of the early part of this unit deals with familiar vocabulary, but some children will not be secure in their naming of parts such as elbow, wrist, ankle, as they are with eye, hand, back, for example. This means that there are really two sets of words – some to be confirmed and others to be taught and practised.

The more scientific aspect is the focus on the functions of the parts. This is a basic activity of biology – the study of living things. It always looks at the shape, size, position and other physical aspects of living things and asks “What is it used for? What is its function?” So, your pupils must begin in this unit to ask such questions about the most familiar living thing – their own bodies. It should lead to a lot of discussion if you handle it properly.

The question of the gender differences between girls and boys is best dealt with when pupils are young and they are able to accept and absorb information without any emotional disturbance, such as embarrassment. Such information about the physical differences should be treated as just more factual knowledge, nothing special or unusual. Using the scientifically correct vocabulary is one way of reducing any reluctance there might otherwise be in talking about these body parts.

## Using the Pupils' Book



language

Use the picture on **Page 9** to start the pupils thinking about the unit and to check that they know the names of the features of their faces. They should use the question marks on the picture to locate and name out loud the various parts of the face. Then you can touch each part in turn on your own face and ask them to name the parts. Then the pupils can touch parts of their own faces and name them, or they can touch a part and ask the class to name it. The final part of the naming is to write out the names as a way of learning to read them. Use this page to play games with the names – the fun element will help the pupils to remember.

## Activity 1



language

You must make a set of cards, each one with the name of part of the face on it. Make them small so that they can fit on the face on **Page 9**.

Once individuals are secure in their reading and naming, let them draw their own picture of a face and write the names in the correct places.

Pupils should share what they have done,

then display the pictures on the wall if possible. The sentences are for reinforcement of the written names. Each dash in the missing words stands for a letter. You should tell the pupils, as this will help them.

Let pupils tell one another what the other face parts are used for. Let them correct one another if any ideas are wrong.

## Activity 2



maths



language

**Page 11** should be used in the same way as **Page 9**. Some of these names will be less well known, so give pupils time to hear, speak, then write and read them before moving on to the next activity.

The table on **Page 12** should be copied onto lined paper, in their exercise books or loose sheets. This will make it easier and quicker for them. This is a simple counting, numeral writing and data recording activity. Several skills are being used, maths as well as science and language, so do not hurry it. The special meaning of the word **table** will need to be taught.

Once the table is complete, the final stage is to use the data to draw a block graph. The term **block graph** will also need to be taught, as this will probably be the first time the pupils will have heard it. Use the figure on **Page 13** to show them what it means. Each pupil should be left to choose for themselves how they colour or shade their blocks on the graph, so that they are easier to see.

Ask pupils questions, such as: “Which is the largest number on the graph?” or “Name a part which has only one on the graph.”

The sentences for copying will help pupils to read and remember the names.



language

**Page 14** should be used in the same way as **Page 9**. Again, some words will be less familiar, so let pupils have plenty of practice naming the parts correctly, e.g. thigh, shin.

## Activity 3



music



language

Allow pupils to choose which body parts they draw. Encourage them to make them large drawings, so that the details can be seen clearly. The names should be put on as labels, in the same way as in the picture of the leg. Let pupils look at one another's pictures and talk about them.

**Page 15** gives pupils a challenge – to make sounds using various body parts. Percussion will probably be a new word, so use the glossary to find the meaning. This is a habit which you should teach, as it is a skill needed in language as well as science. Let each child show the class what they can do and encourage everyone to think of another way – not just hands or feet. When everyone has at least one way of making a percussion sound, let them choose a rhyme and “play” the sounds to accompany the singing or saying of the rhyme. Obviously, the idea is to keep the sounds in time with the beat/rhythm of the rhyme – a skill which is vital to music.

The pictures of the girl and boy are used to introduce two things – the scientific names for certain body parts and the basic division of people into two sets, called female and male. Some of the names, such as scrotum and vulva, may be new for the pupils, so you may have to label those parts. It would be helpful if you made large copies of the pictures and a set of name cards so that the pupils and you can put the names in the correct places. The children will have their own, common names for their genitals (reproductive organs) and you should not be shocked or embarrassed if these words are added to the discussion which should follow the naming of the parts. The

identification of the girl and boy depend on the presence of the vulva or the penis, so this is how the pupils can tell.

### Activity 4



drama

This is the follow-up of the previous page and so pupils should be left to choose which gender of child they draw. Give them sheets of paper for the pictures so that they can be used as characters in the play which should follow. Pupils can choose how many body parts they label, but the sexual organs should be included, so that it is clear which gender they are. Check and correct the spelling of names. Get pupils to refer to the book for the spelling of the names.

The plays can be devised by groups of pupils who want to create little stories together. The pictures should be used like “puppets” in the action of the story. Pupils should perform their plays for the class to watch.



language

The pictures on Page 16 are for revision and checking on the names learned in the unit so far. Ask individuals to point to the parts and name them. If some pupils are able, ask them to spell the names too. It also serves as the introduction to the section on the senses.

## SENSES pages 16 to 19

### General concepts

Special parts of the body – the sense organs – gather information about the world around us. We use our senses to stay safe.

### Materials needed

1. Five different objects
2. A blindfold
3. A mirror
4. Paint, paint tray or plate, paper

### Background

We use our brains to think, to control our bodies, to store information and to process information which comes from the outside world, beyond our bodies. To collect this information, we have special organs – the skin, the eyes, the nose, the ears and the tongue.

Each organ collects particular kinds of information: light, sound, chemical, pressure and temperature.

When materials are put in contact with the tongue, chemicals dissolve into the saliva and we “taste” them. Similarly, when chemicals in the form of gases, fumes and vapours are breathed in through the nose, we “smell” them. It is the brain which recognises the chemicals on our tongue or in our nose – not the organs themselves. The organs are only collecting the information – they do not process it. In the same way, the eyes do not recognise the images which enter through the holes in their front and the ears do not recognise the sounds which enter down the holes on either side of the head. The skin is sensitive to touch (pressure) and temperature (heat), but it does not recognise them. Only the brain can make any kind of sense of all these messages from the sense organs. The information collected by the sense organs is sent to the brain along special “pathways” – the nerves. If these are damaged in any way, the person may lose their sense: they may become blind, or deaf for instance.

## Using the Pupils' Book

The picture on **Page 16** introduces the concept of sense organs, locating and naming them. It shows a whole child because the whole skin is the sense organ of touch – not just the hands. We all know that we can “feel” things anywhere on our bodies, but we often talk about our hands as if they are the only part which is sensitive. This needs to be corrected as you teach this section on the senses.

The two lists on **Page 17**, the sense organs and the senses, should be copied by pupils into their exercise books. Then they should draw a line from each organ to its sense. This will show you how much they know about this topic. You should read the words out if pupils cannot read for themselves.

### Activity 5 – a nature walk

Before taking the class out, choose the best place to walk so that they will have the best opportunities to use their senses – things to see, hear, smell and touch. It is **not** a good idea to encourage such young pupils to taste things as they walk.

When the pupils are ready to go on the walk, emphasise that they must try to use the four senses as much as they can and to remember what they experienced so that they can share with the others when they return. The picture on **Page 17** can be used to focus their attention on what they can do when they go out walking. When the class returns, let them tell one another what they saw, heard, etc. You should list their answers on the blackboard. Put the names of the sense organs on the board and ask the pupils which one to use as each child tells about their walk. This will help you to assess what they have understood about the sense organs and what they are used for.

### Activity 6



language

Choose the objects for each pupil group, if you want the activity to start quickly, or if you think it unwise to allow pupils to choose for themselves. The groups should not be too big – 6 is the maximum for the best levels of pupil interest and concentration. Pupils should take it in turns to be blindfolded and use their sense of touch to answer the questions. Ask the class why they cannot tell the colour: only the eyes can detect colour and so when we are blindfolded we cannot tell the colour of

something. It is the same in the dark – our eyes still work, but without light our eyes cannot collect information – we see nothing.

This activity provides a good opportunity to develop the descriptive language (adjectives) of your pupils, as they try to tell what their fingers are feeling when holding the objects. You could list the words used on the blackboard and return to them in language activities, e.g. rough, smooth, cold, sticky, wet, heavy, soft, flexible, hard, long, short, flat, thin, round, square, spiky, sharp, pointed, oval, cylindrical, wood, stone, paper, fur, leaf, water, sand, metal, plastic, fabric. They should be listed under the headings: shape, material, *texture*. The last two words will be less familiar and you will have to teach the correct meanings. Get pupils to use the glossary.

Removing our sense of sight with the blindfold reminds us that normally all our senses can work together in pairs or bigger sets. For instance, when we are eating, we see the food, touch it, smell and taste it and even tell its texture and temperature as it is handled in the mouth. It is very unusual for us to use only one sense at a time.

### Activity 7



drama

If possible, give a mirror to each group of pupils. Let pupils take it in turn to look inside their mouths and identify the named parts. With mouth closed, they will see only their lips. The use of the face to show various tastes should be practised first and then shown to the class. The mirrors will help pupils to check on their facial gestures before sharing them with the class.

### Activity 8



art

This is a fun activity, which will focus attention on the skin and the feeling of paint on it. You can develop the art potential of the activity by providing various colours and guiding pupils into making patterns or “pictures” with their prints. Display the prints.

### Additional Activity



language

Make a set or sets of word cards. Each one has the name of a body part which has been part of this unit. If the set is on large cards, they can be used in a class activity. Display them

on the floor or the board, in random order. Ask pupils to arrange them in alphabetical order, based on the initial letters. If you have several sets of smaller cards, the pupils can do

the activity in groups. Less able pupils could be grouped and given a smaller set of words and more able pupils could have a larger and more difficult set to sort out.

## FOOD pages 19 to 21

### General concepts

Foods come from two sources – plants or animals. Our bodies need foods for three reasons: for growth, for energy to move and keep warm, and for health and strength.

### Materials needed

1. Paint, paint tray or plate, paper
2. Different foods or packets

### Background

Our bodies are made up of the same materials as the earth on which we live. The water, the gases, the minerals – these are the raw materials from which our bodies are made. We cannot eat soil directly, nor can we make food for ourselves. Only plants can make food, using water, carbon dioxide gas from the air and sunlight. So, we have two sources of food. We can eat plants directly – various leaves, fruits, seeds, roots and stems are all eaten by people. Or we can let animals eat the plants and then we eat the animals, or animal products, such as eggs and milk. Cows, goats, fish, chickens and sheep, for example, are farmed and then used as food. Their bodies get turned into our bodies.

The body uses foods for three main purposes.

Growth is the most obvious. We increase in height and mass as we change from babies to adults. Muscles grow in size along with our bones. When we are injured the body repairs itself. As skin is worn away, we grow new skin. Our blood cells are being replaced all the time. In fact our body is being constantly rebuilt, so that is one reason why we need to go on eating – just to maintain the body as it is.

Then there are the various ways we use the body, to do many kinds of actions. All these movements need energy. Our food has to provide it. The harder we work our muscles, the more energy we use, so the more we have to put in as food. Keeping our bodies warm all the time is another reason we need energy. Heat is released inside our bodies and this keeps us at about the same temperature all the time.

The third use of food is to defend the body from attack by various germs – bacteria and viruses – and other organisms which can live on us, or in us. The body which is healthy is able to fight off such attacks more successfully. Weak, underfed bodies are more

likely to become sick, as the defences of the body cannot kill the germs, etc.

### Using the Pupils' Book

#### Activity 9



Start by asking the children to look at the picture on **Page 19** and to name the foods shown. The choice of sets should be left to each individual. You could start it as a class, oral activity, then, after a few examples, change it to an individual sorting task. The pupils should record the numbers of the foods, so that you can see how they have sorted them. Once the sorting is finished, let some pupils share their answers with the class. This will show that different pupils have sorted the foods differently. No one way is better than another – they are just different. Some may use colour, shape, taste, favourites, or which meal – there are many possibilities.

The drawings should not try to include all the foods, just two or three sets.

**Page 20** is a simple introduction to the two concepts – the sources/origins of foods and the uses of foods. Encourage pupils to look at the pictures and talk about the foods shown.

#### Activity 10

Ask the pupils to bring in empty food cartons a week or so before this lesson, so that you will have enough for the groups to sort into the three sets. Give each group a mixture of items, so that they will all have at least one in each set. The pictures on **Page 20** will help you to check which sets they belong to. You must check and correct the pupils' sorting before allowing them to write. When the pupils write their lists of foods, you will have to give them the spellings for many of them. Write them on the blackboard so that the whole class can see them. Arrange them in the sets and make sure that every pupil has a

complete list of each set, not just the foods which they had sorted.

The list is then used every day for a week, to record which foods the pupils are eating. This should only take a moment to do and can be a short routine at the start or end of each day. The results should show that some foods are eaten much more often. These are the "foods for work" (the energy foods). Almost every food has some of the "foods for health" in them, but some are particularly rich in such

foods, e.g. fruits have vitamins, essential for good health.

The sentences can be used as a quick assessment of what the individual pupils have understood. The answers are:

1. **nuts plants**
2. **meat animals**
3. **grow healthy**
4. **good food**

## HEALTH pages 22 to 25

### General concepts

To be healthy, our bodies need water, sleep, exercise, rest and washing. When we are children, our bodies grow in mass and height, if we are healthy. A balance can be used to compare the mass of objects. Scales are used to measure our body mass. Height can be measured in non-standard and standard units. We use many things to keep our bodies clean and this helps to keep them healthy.

### Materials needed

1. Rulers or straight sticks
2. String or thread
3. Pairs of small pots or lids
4. Sand, small stones, seeds
5. Bathroom scales
6. Tape measure or metre stick
7. Bucket
8. Stones
9. A doll
10. A bowl, towel, comb, soap and a toothbrush

### Background

Apart from food for growth, energy and protection, our bodies must be treated in certain ways if they are to be healthy. Muscles and bones are stronger if we take regular exercise. This is also true of our heart and lungs. But we must not overwork the body, including the brain. Rest and sleep are also essential for good health. The secret is to have the right balance between activity and inactivity. Most of our body mass is water, so we must drink enough every day to keep it supplied. We sweat, breathe, defecate and urinate – in all these ways we lose water from the body. That is why we cannot live without taking in water. It can be in foods, such as fruits and vegetables, as well as in all kinds of drinks.

We also need to breathe fresh, clean air. All kinds of dirt is added to the air, especially in towns and cities – smoke, soot, poisonous gases all come from vehicles and factories and homes. These pollutants can damage our lungs, hearts and eyes. It is also important to let air move through our homes and other buildings to remove the germs which can build up in closed places.

Even with all these good habits, we will still get sick and suffer disease if we do not keep our bodies clean. Washing is a way of getting rid of the germs which land on our bodies all day long. They are in the air and in our food. Our hair, our skin and our teeth get covered with them. The problem is we cannot see them because they are so small. Washing with clean water and soap removes them and our skin does not stay oily, sweaty and dirty – the condition which germs find perfect for breeding. Teeth which are regularly brushed clean are also bad news for germs – they have no chance to multiply and damage the teeth.

Measuring is a basic activity in science. This section of the unit introduces pupils to the use of measuring instruments – the twin-pan balance, the bathroom scale and the metre stick or tape measure. All measuring uses the idea of comparing one thing with another. The simple activities using stones for comparison and hand-spans for measuring are examples of non-standard units (i.e. number of stones, number of hand-spans). The scales and the metre stick and tape measure are examples of ways of using standard units (i.e. kilograms, grams and centimetres). It is important that pupils start with the non-standard units, as this will show them why we all need to use the same basis for comparison in measurements: one person's hand-span will not be the same as another's and one stone will not have the same mass as another. Only standard measures allow us to make fair and accurate comparisons.

## Using the Pupils' Book

physical  
education

**Page 22** is to be used as the source of ideas about good health habits. The mime in the picture should be acted out by pupils. You could ask individuals to do first one then the other and ask the class to say which mime was which. Or, if you can find a space big enough, let the whole class mime the actions at the same time and switch from one to the other quickly as a kind of game. This could be part of a PE lesson. Ask them why the children are different: they should mention things such as tired, unhealthy, weak about one and energetic, healthy, strong about the other. Then ask them why they are like that. Their answers will reveal to you how much they know about the factors which lead to good health.



drama

### Additional Activity



maths

Sit them down to listen to a story which illustrates these ideas. You need to choose one which includes examples of good and bad health habits. When it is finished, ask the class for examples of the good and the bad habits. List their answers on the board. If they need help, read the story again and get them to look at the second picture on Page 22 as you read. They should list sleep, rest, play/exercise, washing, drinking and eating as good health habits.

**Page 22** then introduces the idea of weighing. The picture shows a variety of scales and balances. Let pupils say what they know about them. Some will be more familiar than others. If some are completely new to the class, tell them what they are (kitchen scales, bathroom scales, twin-pan balance, market scales, digital scales). They are all used for weighing – measuring the *mass* of things. There is a lot of maths involved in this part of the unit, so try to combine the science and the maths teaching at this point.

### Activity 11



language

This is a difficult activity for such young children. If they do not have the skill of tying string, then you will either have to teach it, or carry out the activity as a demonstration. If possible, it would be better if each group were able to make their own balance. If they do not, then you should let each group use the

balance in turn, so that they all have actual experience of hanging two things on either side and comparing them. This is so basic to weighing that it is essential that all the pupils have the experience. There is no actual measuring here – it is just comparing the mass of the stone with the mass of the sand or seeds and any other things which pupils choose to use. Ask them to tell you what they see. The answers should include words such as: the same as, more than, less than, heavier than, lighter than. This is a good opportunity to emphasise the use of comparatives in language.

**Page 24** has a picture which is intended to get the children talking about how it was for them when they were younger. They were not as tall as they are now and they will remember the things which they could not do. This will serve as an introduction to the section on measuring their heights.

### Activity 12



maths

As you will probably only have one set of bathroom scales, the pupils could be circulated from the height measuring (in pairs) to the mass measuring (individual). Ask them why they have to remove shoes (not an accurate measure otherwise).

The hand-span measures may produce very different results, even for pupils of the same height, because pupils' hands are not all the same size. Do not tell this to the class, let them tell you. The measurements with the tape or stick will be all based on the same standard measure – the centimetre – so they can be fairly compared.

Pupils are not expected to read very small divisions on tapes, scales and sticks, so let the mass readings be to the nearest kilogram. You will have to teach them what this means and show them how to read the dial.

The comparison of the stones with the pupil's mass is another way of showing how important it is to use standard units – kilograms – rather than non-standard units – stones, which can have very many sizes and masses. You should draw a table on the blackboard where you record the standard and non-standard measures for each pupil. Then get the class to look at them and tell you what they notice. They should see that pupils who have the same height in centimetres do not always have the same height in hand-

spans. Also, those with the same mass in kilograms do not have the same number of stones.

**Page 25** begins with a picture to get pupils thinking and talking about how we care for our bodies. You could put the class into groups for the looking and talking at first and then bring the whole class together to listen to what the groups think. The items are all used to keep the body clean and healthy. The medicines are for curing illness and the other things help to keep us well. Let pupils explain why they are needed. Their answers will tell you how much they understand about the role of the soap, toothpaste, water, toilet paper, etc. You should correct or add to what the pupils say.

### Activity 13



If you have enough dolls, etc, then each group can “take care of” one each. If not, let the groups do it in turn, whilst the rest of the class do other work. Then, when all have had their turn, bring the class together to share what they have done. Let individuals show the class particular ways of caring for the body, e.g. combing the hair, cutting the nails, brushing the teeth.

The summary at the bottom of the page is the introduction to the last section, on safety.

## SAFETY pages 26 to 28

### General concepts

Some places are dangerous. It is not safe for us to play in them, or even to be there. There are also dangers inside our homes and schools. Untidy and careless habits make our homes more dangerous. Medicines and other chemicals are good, but they can harm us if we use them wrongly.

### Materials needed

1. A fire extinguisher

### Background

Danger is a difficult idea to express simply and clearly. It is also not a good thing if we make young children over-anxious about the world around them. So, we have to try and make them aware of what to avoid and how to take care of themselves to some extent. Obviously adults will continue to be responsible for protecting the children from danger, more than they are themselves. This is especially true in the environment, where traffic and dangerous places must be avoided, and at home, where adults set the standards of behaviour so far as tidiness and safety are concerned. To adults, many dangers are obvious, but they are not so obvious to young children, so they need to be repeatedly warned and reminded.

Medicines are not always regarded as dangerous, but they can kill if used wrongly. This is a very important message to get across in this section. The same is true of other domestic chemicals, such as bleach and kerosene. These can often look like water or some other drink and so children do not realise the danger. Adults, who do know the danger, have to be responsible for the proper storage of medicines and other chemicals.

### Using the Pupils' Book

**Page 26** starts with an outside scene with many dangers. They are:

- Broken glass on the ground
- A fast flowing river
- A cliff with loose rocks
- A busy road
- A poisonous snake
- A fire
- Electric power lines.

Set the class a challenge to find as many as possible in a fixed time – say 45 seconds. Then ask for examples and list them on the board as pupils identify them one by one.

When we play outside we use sight, hearing, smell and touch, but most especially the first two.

**Page 26** also has a home scene with many dangers:

- knives/scissors on the floor
- glass on edge of table
- toys scattered about
- electrical wires trailing
- pots on stove with handles outwards
- small child crawling around kitchen
- bleach and kerosene bottles at floor level
- open bottle of tablets/medicines

Carry out the same process with this picture. You could make it a group competition to find all 8 things first.

Let groups then make up some rules about putting things away, with reasons why that would make the place safer.

**Page 27** may be harder for pupils to immediately connect with danger, because their parents sometimes

give them medicine to swallow or put on their skin. How can they also be dangerous? Let the class discuss this question before you get them to read or follow the summary at the bottom of the page. The main point is to do with the wrong medicines and/or the wrong amounts. Tops should always be put back on bottles and all medicines should be put out of reach/locked away from children.



Let groups devise scenes which show the right and the wrong ways of handling medicines. The class should watch and then say what was good or bad about the handling of the medicines.

**Page 28** deals in the same way with other dangerous chemicals found at home. The main point is to put them out of the reach of children, especially the very small ones who crawl around and open cupboards at floor level.

### Activity 14

If it will not be too disturbing for other classes, you can allow all your class to imitate the emergency vehicles at the same time – some ambulances and some fire engines. The question which follows is important for pupils to think about. The sounds act as a warning to people to clear out of the way of the emergency vehicles: this is the message in the sounds.

If possible, have a fire extinguisher in the

class, or take the pupils to look at one somewhere else in the school. It is important that they know there is a proper way to use them when trying to put out a fire.

### Additional Activities

1. Take the class on a walk for them to look for dangers, unsafe things and places. Take care not to expose them to danger as they walk. You will have to plan the walk carefully in advance, knowing exactly where you will take them. The pupils should talk about what they find as they go along. Stop the class at each point when someone finds a dangerous place and let them identify it, before suggesting how it can be avoided. Each time, ask which senses are used to detect the danger.
2. Invite someone from the community who can teach about safety rules to talk to the class and answer their questions. In particular, ask them what to do in the case of an earthquake or a fire. Let the class practise the school fire and earthquake drills, so that they are familiar with the process. Ask the pupils why it is a good idea to have a drill and to practise it (in a real emergency, everyone will know what to do, so time will not be wasted and people will escape more quickly from the dangers.)

## Term 2 Unit 1 My family

### Objectives

Pupils will:

- Trace their family history for three generations
- Be aware that everyone belongs to a family and that families differ in many ways
- Discuss size and composition of the family
- Demonstrate an understanding of the basic needs

- Discuss ways in which we depend on plants and animals

**Time allocation: 6 weeks**

## Discussion of concepts and skills

This very short unit includes the concepts of belonging to a family and having basic needs met. These include the use of plant and animal material as food and for other purposes. The concept of our basic needs is one to which pupils have already been introduced in the

previous unit. Here, the emphasis is on the family as the provider of what is needed. The skill of sorting items in a picture into sets of animal and plant products is also included. There is also the language skill of using initial letters to sort words.

## BASIC NEEDS Pages 29 to 32

### General concepts

We all belong to families, with children, parents, grandparents and others. Families take care of the children, by meeting their basic needs. These are food, shelter, water, clothes, love, rest and exercise. We can use plants and animals to meet some of our needs, such as food and clothing.

### Materials needed

1. Drawing paper, coloured pencils or crayons
2. Paper, pencils and word books

### Background

There is very little in this unit which is unfamiliar to you or the pupils. As human beings we all had two parents and even if they did not do the caring, others must have done, or we would not have survived. Human babies are totally helpless, dependent on other people to feed them, wash them, comfort them, keep them warm, etc. This period of needing care is very long in human beings – longer than for any other creature on earth. It is years, not weeks or months, before a human child can begin to take care of themselves. Part of what must happen is a vast amount of learning of knowledge and skills which equip the young human to make sense of the world and to survive.

Once again, the skill of sorting is practised. This time, it involves using their knowledge of the origins of common plant and animal products and the recognition of the initial letters of words. Help the pupils to look for, or listen for, the initial letters, even though the sounds of the letters may not be the same. For example “shoe” and “sock” both have “s” as the initial letter, but one has it combined with an “h”, so the sound is very different.

### Using the Pupils' Book

#### Activity 1



language

Give pupils large sheets of blank paper and whatever colouring materials you have. Encourage them to fill the paper by making the figures large. You should expect them to talk a lot as they draw and to look at one another's pictures as they go along. The narrative will be an extension of what they are drawing – it explains and expands on the pictures of themselves and their family members. The sentences should be easy to write if they have been allowed to talk as they drew. Help them with spelling if they want it, but do not insist on perfect spelling – it is more important to encourage expression of thoughts and feelings than to fuss about spelling with such young pupils. Display the work as it is finished. You could use it to make comparisons between the families shown. A lot of counting and naming could come from the pictures, as well as comparisons of size and age, male and female, etc. Do not waste the opportunities.



maths



art



language

The members of the family in the picture on **Page 29** are all active in some way. Get the children to talk about it in groups and then to report what they have said to the class. This also should provoke conversation about how the family compares with their own family. Again, the language potential for using comparatives is very obvious, such as “more than”, “less than”, “smaller”, “larger”, “older”, “younger”.



Let the children suggest songs about the family. Individuals may be able to teach new songs to one another. Using the body as percussion accompaniment allows them to apply what they learned in an earlier unit. Pay particular attention to the pitch of the pupils' singing and their ability to keep time. You should beat time in some way, by conducting, or clapping, or using a percussion instrument yourself.

**Page 30** has a composite picture, showing all the basic needs. Let pupils look at it and tell what they think it shows. As they identify a need, you can write it on the blackboard so that the list gradually builds up to be food, water, shelter, clothes, love, rest and exercise.

### Activity 2



This is to emphasise the twin needs of exercise and rest. Don't tell the pupils the purpose. Ask them at the end which needs they think were involved. Some may have a drink after the exercise, so this would be a third one. They should notice how their breathing changes as they take exercise and then goes back to normal when they rest. The same is true of their heart rate/pulse. These are good for the body. It means that the organs and muscles have been made to work harder than normal and this keeps them in good condition and strengthens them.

**Page 31** has the picture of plant and animal

products for the pupils to sort into two sets, completing their names and writing them down. You could put the pupils into ability groups, where the most able are left to do the whole activity without your help, the average ability group are helped to begin and then left, with the most support given to the least able group. The items divide into:

**wool, milk, egg, meat**  
**cotton, wood, banana, sweet potato, corn,**  
**sugar cane**

Once they are sorted, write the sets on the blackboard (or a set of word cards, which would be better) and then ask pupils to sort out the food items from the non-food items. Then ask what each of the non-food materials is used for.

### Activity 3



This could be done as a class using the words on the blackboard. Once the 12 words above are sorted, let individuals add words of their own to their own lists. Get them to concentrate on plants and animals and basic needs. As an extension, you could allow the more able pupils to add other words which go beyond these. After the individual task, collect examples from all the pupils and add them to the list on the board. Draw attention to the fact that the initial letter does not always have the same sound.

## Term 2 Unit 2

# Things in the home

### Objectives

Pupils will:

- Group things in the environment into natural and man-made
- Use voice/instrumental sounds to imitate sounds in the home
- Interpret specific sounds/recognise familiar sounds
- Identify the source and type of various sounds in the environment

- Interpret sounds through movement
- Use voice/sound makers to create sounds depicting those in the environment
- Listen to and identify varying sounds which are long/short, high/low, pleasant/unpleasant
- Participate in listening games
- Take turns when playing sound-makers and instruments
- Recognise and respond to differences/similarities in sound (timbre, pitch, duration, dynamics, etc.)
- Use all the senses (smell, touch, taste, hearing, sight) to detect information on how to keep the body safe
- Show by their behaviour that plants and animals should be cared for
- Talk about ways in which they can keep themselves safe at home
- Preserve the environment while studying it

**Time allocation: 4 weeks**

### Discussion of concepts and skills

There are four strands to this unit, with the common theme being the home context. The first concept concerns the sorting of things into natural and manufactured sets ("man-made"). Of course, in one sense, everything is natural, since it is made of the materials found on earth. Things are not "supernatural" - they are all made of physical matter. However, the idea of sorting things on this basis is to draw attention to the fact that we can take a natural material – such as wood – and change it into something which does not exist naturally, such as paper. This is the key idea. People create new things from the raw materials we find on earth.

The second concept concerns sound – the pitch and the loudness in particular. Sounds can be "high" pitched or "low" pitched. This is a difficult concept to explain, but all that is needed at this age is to be able to distinguish the difference in pitch, not to be able to explain it. Sound is caused by vibrating objects: the faster the vibration, the higher the pitch of the sound. Do not attempt to tell the pupils this explanation, as it is not suitable at this stage in their learning. Loudness/volume is much easier to deal with, as it features in our everyday lives. The more energy that is put into making the sound, the louder it will be. We can easily

feel this when we shout, compared with when we whisper.

The third concept is that of danger – another hard one to define, but a very common idea which will be familiar to your pupils. The focus is on behaving carefully at home to reduce and avoid dangers. This will link with the previous unit, which dealt with dangers outside and inside the home. This is taken further, into the issue of having rules which are designed to make home a safer place.

Finally, the unit introduces the concept of caring for plants and animals. As living things they have certain basic needs, just as we do, which must be met if they are to survive. If we have animals or plants to care for, we will have to provide them with what they need. This means taking responsibility for their welfare. Water, food and suitable places for them to live are just some of the things we will have to provide. It is good for young children to start caring for other creatures, as this is a skill which they can apply to people as well and it will always be useful throughout their lives.

The skills of sorting and recording in pictures and a table are further developed in this unit.

## MATERIALS, SOUNDS AND TAKING CARE pages 33 to 38

### General concepts

Everything around us is either natural, or has been made from these natural materials. Sounds can vary in

pitch and loudness. There are dangers at home and we should follow rules to keep us safe. Plants and animals at home and school need to be cared for.

## Materials needed

1. Drawing paper, pencils and coloured pencils or crayons
2. A tape recorder and tape of sounds
3. Musical instruments
4. Sound makers
5. Glue

## Background

The physical world is made up of 103 different substances, known as “the elements”. These can be combined in many different ways – rather like the ingredients of a cake – to make millions of *compounds*. Our bodies are made of such compounds. So are the rocks, the soil, the plants and animals. Everything in the natural world is built from these same few elements. The idea of our bodies coming from the soil and returning to the soil is scientifically correct.

Scientists and others have found that they can create new compounds (such as plastics) by combining natural materials or by changing them in some way. Raw materials are taken from the earth – including the atmosphere – and chemists process them to produce manufactured materials. Plastics are a good example. They do not exist naturally. The raw material from which they are made is oil, taken from the ground. The end products look nothing like the original material. This is quite common, e.g. sand is converted into glass, iron ore is used to make steel.


Sounds are the result of objects vibrating. The tiny waves which are produced in the air travel in all directions and, if they enter our ear, they make our eardrums vibrate. The nerves take the information to the brain and we say that we are hearing the sound. If the waves are very strong, with a lot of energy put into making them, we hear the sound as loud – high volume. If the waves are weak, with little energy put into making them, we hear the sound as soft or quiet – low volume. The speed of the vibrations controls the number of tiny waves in each second. The more vibrations per second, the higher the pitch of the sound. The lower the number of vibrations per second, the lower the pitch of the sound. Usually the vibrations are invisible, but some objects can be seen vibrating when they are struck – such as a drum skin or a string on a guitar, etc. Our voices are made in the voice box (larynx), which contains the *vocal cords*. These can be made to vibrate by our breathing. We change the pitch of our speaking and singing by changing the speed of their vibration. We change the volume of our voices by the muscles of our chests pushing more or less strongly to force the air out of our lungs. Compare a shout with a whisper!

The ideas of danger at home are mostly for adults


to be aware of and for them to teach the children to avoid. This means that simple safety rules are a very good idea. Tidyness and general good safety habits are essential if homes are to be kept safe for young children. We cannot expect them to know about the potential dangers for themselves: we adults must take responsibility for their safety education.


Living things depend on water for survival. This is true of plants as well as animals, including humans. So, when we keep any creature at home or at school, we must ensure a regular supply of water above all else. We humans die within a very short time if we have no water. We can survive much longer without food. This is true of other living things. This topic introduces pupils to the important concepts of caring and being responsible. Water is essential because all the processes of life, which take place in the cells of the body, depend on materials being dissolved in the liquids which fill the cells. This solution is based on water. If water stops being supplied to the living cell, the processes which keep it alive also stop and the cell dies. Ultimately, the whole body dies.

## Using the Pupils' Book

 **Page 33** starts with a picture of pupils sorting objects. Use this to focus the attention of your pupils on the idea of two sets of things – the natural and the man-made. Ask them to finish the process of sorting. You could write the set names on the board and then as pupils tell you where objects belong, you write them under the set names. Let the class check on the sorting as you go along. Allow them to challenge one another's answers. They have to give you a reason why they disagree.

### Activity 4

 Encourage pupils to draw large pictures of things which are not shown in the picture above. This will reveal to you whether or not they are clear about the two sets of materials. Let them show the finished drawings to one another for comments. Again, anyone who disagrees should be asked to give their reason.

 **Page 34** introduces the topic of sound, using a picture to set the class thinking about sounds in the home context. You could use the picture in groups, giving them the challenge to find as many examples as they can in a short time. Then collect examples from the groups and write them on the board. Once the list is complete, you can begin to sort them into loud and soft sounds. You may need to give an example of each, just to start the sorting

process. Your voice or an instrument could be used to illustrate the difference. Once this sorting is complete, you should move on to the low and high pitched sounds. Examples of each would be very helpful here, as the word "pitch" will probably be new for the class, and you want them to understand the meaning so that they can identify the different sounds. Finally the element of personal feelings, like and dislike, is introduced. This will lead to a variety of answers, which will all be "correct", because they are opinions, not facts.

### Activity 5



If you do not have a tape of sounds, try to make one. Use familiar things to make sounds which the class will recognise, e.g. water running, stirring a cup of tea, coughing, a telephone, closing a door, breathing. Try to get a variety of loud and soft, and high and low pitched sounds.

Pupils should choose their own ways of using their hands to represent the different types of sound. Let them compare their different hand movements. The class may think some are more suitable than others, but they cannot be right or wrong, as they are just the choice of the pupils.

Using their own bodies to imitate the sounds heard on the tape will allow more individual imagination and expression. Their methods must be shared with one another, for appreciation and comment.

Last of all, provide them with instruments and other objects which can be used to make sounds (empty tins and boxes, elastic bands, sticks, seeds or small stones or sand to make "shakers", bottles to hit or blow across). Let them experiment and explore these things for a short time to find out what they can do with them. Then focus their task on imitating sounds from home. Let individuals make their sounds and ask the class to identify which thing it is supposed to be.

**Page 35** moves on to the topic of dangers at home. Use the picture to start the class thinking about this new topic. It could be done as a whole class, a group or an individual activity. Once the pupils have had time to find the dangerous things, they should share their ideas. You could list the dangers on the board as they are found. They include: matches, electrical sockets, medicines, bleach, pots/kettle with boiling

water, gas cooker, plastic bags, sharp knives, kerosene.

Encourage pupils to talk about the reasons why they should not play with such things. Their answers will tell you how much they understand about the dangers at home. You may need to add to their knowledge and understanding.

**Page 36** starts with a focus on the issue of warning labels which are found on some things at home. They may not be able to read what the labels say, but they should be taught to recognise the kinds of symbols used to warn of the dangers. Ask them why such labels are useful and important. This will lead into the issue of safety rules. The school should have such simple rules to avoid accidents, caused by running, or pushing for instance. Get the class to tell you what the rules are. Add any which they have forgotten or did not know. Ask them for the reasons behind each rule, e.g. Why is running in the school not allowed? Why is a line of people walking into a room safer than a crowd?

Let the class make up a set of rules to use at home. Each child should be able to share one rule which applies in their home. Some may be common to many homes and others may be particular to certain homes. Let the class discuss which ones are most useful and important. Then you could write a complete list on a poster and get the class to read them out.

The last topic of the unit is introduced with a picture showing people caring for plants and animals. Use it to initiate the work of the class on this new topic, by getting pupils to find examples of such caring. You could do this in groups, as a whole class or as an individual task. They should share what they find, giving explanations of what they can see in the picture. So, as well as saying **what** they see, they should try to say **why** it is going on.

### Activity 6



The drawings will express what the pupils know from their own experience. Encourage them to make them big and also full of detail so that there will be a lot to see and to talk about. A sentence with each picture will make them suitable to put together and make a Big Book, for pupils to read to themselves and one another later. You should prepare a Big Book of large blank pages for the pupils' pictures to be glued in place. If possible, they should glue in their own pictures.

The picture of pupils caring for plants and animals at school introduces the final activity of the unit. After looking at it and discussing what they can see going

on, the class should turn to **Page 38** and prepare a table for recording their taking care of plants or animals at school. You may let them choose what they care for, or you could give each group or each child a particular creature to care for. It will depend on your

situation. Make sure that each day the pupils carry out whatever is necessary to look after their living things and then make a record of it immediately. It will be best if this is a routine carried out at the same time each day, for as long as the activity lasts.

## Term 3 Unit 1

# How do I know my school?

### Objectives

Pupils will:

- Recognise and respond to differences/similarities in sounds (timbre, pitch, duration, dynamics)
- Locate and perceive the direction and distance of sounds
- Identify the sources and types of various sounds in the environment

**Time allocation: 7 weeks**

### Discussion of concepts and skills

The concepts are limited to those concerning sounds in the environments of school and the wider world. Pupils' understanding of sound is extended in two ways. Firstly, the features of direction and source/origin of sounds are introduced. Secondly, the concept of duration/length of sounds, is added to those of pitch and volume.

The skills of locating and identifying the source of a sound are developed through games. Further activities focus on the characteristics of the sounds, applying the concepts learned in this unit and the previous one.

## SOUNDS ALL AROUND pages 39 to 42

### General concepts

Sounds come from different sources and different directions. If we listen carefully we can often tell where a sound comes from. Sounds can also last for a short or a long time and be fast or slow when repeated.

### Materials needed

1. A blindfold
2. Four instruments and four sound makers
3. A screen (cloth/card/paper)

## Background

Our ears are sensitive enough to be able to help us work out whether a sound is coming from one side or the other, or from in front of us or from behind. Some animals can move their ears around to locate the sound more precisely, but we cannot do that. As we build up more and more memories of the numerous sounds in the world, we are able to recognise and name more and more sources of sound. These two skills – locating and naming sounds – are very important for our survival. They help to keep us away from dangers, or prepare us to deal with events when they happen. They warn us of things we may not be able to see, but are able to hear.

The length of a sound is easy for pupils to understand. Speed is also easy, if we apply it to how quickly a sound is repeated in a given time. Percussion instruments are particularly useful to help pupils understand the concept of speed, as it is easy to speed up and slow down the beating of the instrument.

Games help to develop, apply and remember such concepts and skills.

## Using the Pupils' Book

**Page 39** introduces the sounds game with a picture. Pupils should look at it and work out how the game is played. Let them share their ideas before turning to the next page.

### Activity 1

Just follow the steps set out in the book. Stress the importance of silence whilst playing the game, so that the one with the blindfold can concentrate on the child making the sound. Let as many pupils as possible take part in one role or the other.

### Activity 2

This builds on the previous activity, but it is set up as an individual task. The whole class needs to be silent, so that they can concentrate on the sounds going on in and around the school. Emphasise that they are

trying to decide on the direction and the source of each sound they can hear. A short practice would be useful, just to make sure everyone knows what they are to do. Then, two or three short listening times should follow, with time for pupils to tell the class what they heard and where the sounds were coming from.

**Page 41** has a picture for pupils to find examples of the sounds which they heard in Activity 2.

### Activity 3



This second game concentrates on the source of the sounds and also the features of pitch, volume, duration and speed. It is a kind of summary of what the pupils have learned this year about sound. Pupils should be able to explain the differences which they name as the sound changes. This tests their understanding of the various concepts and their names. If you do not have a screen, just put the pupil behind a cloth or a piece of furniture, so that the class cannot see what they are doing.

### Additional Activities



1. Teach the pupils to use their hands in particular ways to express the features of a sound. The hand movements are for you, or you and the pupils, to decide. So long as everyone agrees on the meaning of the movements, it does not matter what they are. Things such as pitch will best be shown by the height of the hands, for instance. A short movement could stand for a short sound, a long movement for a long sound, and so on.
2. Play some music on a tape, CD or radio so that pupils can apply their listening skills to identify which instruments are playing at particular times. Choose music which has examples of separate instruments playing for some of the time.

# Using Pupils' Book 2 / Year 2

## Term 1 Unit 1 My body (Part 2)

### Objectives

Pupils will:

- Identify, name and locate some internal parts of the body
- Make objects for named purposes given material
- Display and analyse data using attributes, e.g. materials, shapes, sizes, colours and patterns

**Time allocation: 6 weeks**

### Discussion of concepts and skills

This unit extends the knowledge of the pupils, moving from the external to the internal organs, in particular the heart, the brain and the skeleton. The location and functions of these organs are dealt with in a simple way, before a more detailed investigation of pulse rate and the effects of exercise and rest. The skills of counting, time measurement, recording results and interpretation of graphs are all developed in the pulse rate investigation. The use of the body to produce sounds, make shapes and a great variety of

movements is explored. These activities provide pupils with the opportunity to express their imaginations as well as to focus on how they are using their bodies. In particular, the body's flexibility, based on the joints within the skeleton, is explored in the shapes and movements. Finally, the effects of exercise are looked at, in connection with athletes. Growth in strength and skill are focused upon and there follows activity which includes measuring mass and length. The results are recorded in tables and comparisons are made.

### THREE INTERNAL ORGANS pages 1 to 10

#### General concepts

The heart, brain and skeleton are internal organs of the body. The heart is in the chest and its work is to pump blood around the body. The brain is in the skull and it has the jobs of controlling the body, thinking and remembering. The skeleton is found throughout the body. It is composed of a series of bones, connected in joints. Its jobs are to provide support and protection and to allow movement.

#### Materials needed

1. String
2. Scissors
3. Pins
4. Paper and pencils
5. A stethoscope
6. Glue
7. Sheets of coloured paper (4 colours)
8. Graph paper
9. Rulers

10. Clock or watch with second hand
11. Music –recorded or live
12. Bones
13. Plasticine or clay
14. Newspaper or clay boards

### Background

The body contains several “systems”, each with a particular function. The systems include special parts called organs, which carry out certain tasks. The heart is one such organ. It is part of the circulatory system, which includes the arteries, veins, capillaries and various blood components. The heart is simply the pump which pushes the liquid blood, with its tiny solid cells floating in it, around all parts of the body. The heart is made of a special type of muscle, which can go on working throughout our lives, without resting. This is not the case with other muscles, which tire and must be rested. The heart pumps blood to and from the lungs, before pumping it out to every part of the body. That is why the heart beat has two parts, a softer beat followed by a more powerful beat. In the lungs, the blood picks up oxygen, which dissolves in the blood and is carried to all the cells of the body, which depend on a steady supply to keep them alive. In particular, our muscles use oxygen to release energy from our food, so that we can move, work, breathe, etc. If we work our muscles harder, they need more oxygen and so our heart has to pump harder and faster to keep up the supply. That is why our pulse rate/heart rate goes up when we exercise.

The brain is a much more mysterious organ, as it is totally hidden inside the skull and we cannot feel it working, unlike the heart. It is part of the central nervous system, which also includes the spinal cord and the nerves. The senses provide the brain with information about the world around it and the brain can use that information in various ways. It can be stored in the memory – learned. It can lead to some kind of action – movement or speech, for example. It can provoke the mind to think, to imagine, to plan, etc. The brain has these vital functions which maintain the life of the body. It controls the heart and breathing, without us having to remember, or think about them. Even when we are asleep, the brain continues to “tell” the heart and lungs to continue their work, without rest. Messages from the sense organs go to the brain along the nerves and messages from the brain to the heart, lungs, muscles and other organs also travel along the nerves. If these nerves are damaged, the brain may lose contact with, and therefore control of, parts of the body. This can lead to paralysis, when the brain can no longer send messages to the muscles to create movement. There may be nothing wrong with the muscles, but when

the link with the brain is broken, then the muscles are useless. To protect the vital brain, it is housed in a strong box of bone – the skull. We must teach children to protect their heads, as damage can be so serious.

The skeleton is composed of bones and these are linked together in the joints. These joints allow movement. The muscles are attached to the bones and they pull on them to produce movements. The two systems work together to give support to the body. Without them we would be like a jellyfish – unable to stand up or to move our limbs. Bones are alive and so they grow, especially in young children. Their mass and length increase more at certain times in a child’s growth from infant to adult and the changes are easily noted, through regular measurement. Because of the flexibility of the skeleton, it is possible to bend the body into various shapes and to move in a variety of ways. These are only possible because of the joints and the activities focus on this fact.

Exercise develops the muscles; they grow in size, strength and their capacity to go on working without rest. Athletes set out to maximise these changes so that they become stronger, fitter and have increased endurance. Everyone can benefit from exercise, especially if the heart is made to work harder and faster for a time and we have to increase our rate and depth of breathing. Joints and muscles are also kept healthy through exercise. Anyone who has been forced to stay in bed for weeks due to illness knows how weak their muscles become. They lose their “tone” – their firmness and strength.

Various parts of the body can be used to make sounds, mostly by percussion. In addition, we can use our breath to speak, sing, whistle, blow into instruments and other objects and make sighing and other windy noises.

### Using the Pupils' Book

#### Additional Activity

You could begin the unit by asking pupils for the names of all the body parts which they know. List them on the blackboard as they give them to you. Do not sort or comment on them in any way. It will focus their attention on the topic which follows.

#### Activity 1

Do this as a class activity, where each child carries out the actions for themselves and looks around at what others have done. Let them query what others do and use discussion to arrive at the correct answers.

The heart of an adult is a pear shaped organ, about the size of a fist, and it is in the centre of the chest, behind the breast bone. The lungs are on either side of it. It is dark red in colour. It is firm and strong.

The brain is in the skull, above and behind the eyes. It is grey in colour. Its surface is folded and wrinkled. It is enclosed in a thin "bag", or membrane, containing a fluid. The brain is relatively soft, like cheese.

The skeleton is located throughout the body, as it is the framework. So, pupils will be able to point to many places on their bodies. Some are more obvious than others, such as the skull, the fingers, the legs and arms. There are no bones in the ears – they are stiff because of *cartilage*, but the nose does have a bone at the top, with cartilage lower down. Gather all the answers from the class and then get the pupils to touch all the places identified. This will emphasise how big and spread out the skeleton is. The bones are white, being composed largely of minerals based on calcium. The ends are covered with shiny, smooth cartilage which allows them to move easily in the joints.

**Page 2** provides the facts about the position and functions of the heart and brain. Let pupils have time to look carefully at the pictures and to ask questions about what they see. They do not need to know any more detail than is provided by the pictures, but of course they may be curious about other features of the organs. Refer them to books, CD-ROMs or other sources of information.

On **Page 3** the same coverage is given to the skeleton on this page. Pupils are not expected to know the scientific names of the bones at this stage, so do not use them. Again, let them have time to look, question and discuss what they see in the picture. The running child illustrates the way in which the joints allow flexibility and movement, which is a point you should focus upon.

### Activity 2

Pupils should put their hands on their chests, with the fingers under the left nipple. The beat should be felt as a faint pulsing under the skin. It is not very obvious except when the person has been doing exercise. It beats because it is squeezing and relaxing as it pumps the blood around the body. If you have a stethoscope it will be much clearer. You can actually hear the beating, rather than

feeling it. If the school has no stethoscope, you may be able to borrow one from the clinic or a doctor. The pattern of beats is caused by a less powerful push which moves the blood from the two top chambers of the heart, followed by the more powerful push which moves the blood out of the heart to the lungs and the rest of the body. The gentler beat cannot be detected by touch, but it can be heard with a stethoscope.

### Activity 3



Give each child a blank sheet of paper for drawing the outline of the body. If you do not think they can draw this, you could provide a card figure for them to trace around. The four colours of paper are so that each part will stand out from the others. It does not matter what the colours are. Each pupil will need only very small amounts of the coloured papers for the heart, brain and bones. Do not waste a whole sheet for each pupil. Cut them into small pieces first. This activity gives you the chance to see if pupils are sure of the shapes and locations of the internal organs studied so far. Display the pictures for some time and then let the pupils glue them into their science books.

### Activity 4



You should illustrate the steps of this graph one by one on the blackboard before the pupils do them. Make sure they understand the new terms, such as axes; make them turn to the glossary each time. It is important that the numbers are *not* put on the vertical axis until *after* the pulse rate has been counted. The two blocks should be separated so that they are clear, one for the rate before exercise and one for after exercise. Let pupils look at the picture on Page 6 to help them check what they are doing.

The taking of the pulse is another quite difficult thing for young children to do, especially as this will be the first time for most of them. It is important not to use the thumb for this activity. It has a pulse in it and will confuse the counting. Only count for 30 seconds, so that the numbers do not get too big. Once the numbers are known, the scale can be added to the vertical axis. Depending on the size of the squares and the size of the graph paper, the scale may start at zero and go up beyond the "before" figure. If the squares are not

sufficient for this, you should tell the class what number to start the scale from. Let them fill in the block once you have checked that it is the correct height.

Choose some lively music to play, or beat out a fast rhythm with hands, or a percussion instrument, to get the class moving energetically. As soon as they stop moving, they should take their pulse the second time. Once counted, a block of the appropriate height should be added to the graph and coloured in. The scale will have to be lengthened, as everyone should have a faster pulse rate after the movement. That is what the class should notice when they compare the two blocks on every graph. If this is not the case for some, then they have not counted correctly or not drawn the graph correctly.

The explanation is that when we exercise the body, our heart has to work faster and harder to supply the muscles with blood so that they can work hard. They need more oxygen and that comes to them in the blood.

It would be a good idea to take a third pulse measure after the class have discussed the graphs and they will have rested from the exercise. This result should have returned to what it was before the exercise, showing that the heart quickly recovers.

**Page 7** shows the correct sort of result and summarises the facts.

### Activity 5



This is a simple follow-up activity which emphasises the experience of the changes in pulse rate. The quieter, slower beats for the resting contrast with the harder and faster beats when active. After practice, let individuals make their two sets of beats for the class to hear and identify. You could then get the whole class to ‘perform’ in time with your beat, changing from rest to activity as you indicate in some way. This activity has great potential for extension into musical activities.

**Page 8** has a photograph of x-rays showing bones inside the body. Let the pupils talk about the pictures so that everyone is clear about what they show. It may be that some pupils have had x-ray photos taken when they broke a bone or had a bad fall, so let them explain how the x-rays were carried out.

### Activity 6



The bones which are collected should either be completely dry and white or they will need to be boiled with bleach before pupils can



handle them. The boiling and the bleach clean the bones and kill any germs which may be on them. Use books, etc. to find the names for the bones which are collected. Shoulder blades, pieces of the backbone (vertebrae) and ribs, for example, are very easy to identify. Limb bones are harder to name as they often look very similar.

Use whatever modelling material you have to produce models of the bones. Let each pupil choose one bone to copy and help them to observe them carefully so that the copy is accurate. The skill of observation is very important and needs to be developed. Use the models in the display to stimulate conversations amongst the children. Use them to make comparisons of length, mass, hardness, shape, etc. There is a lot of potential for language development, especially comparatives and adjectives.

**Page 9** extends the idea of what the function of the skeleton is, by drawing attention to the bones which surround the vital organs – the brain, heart and lungs. Let the pupils try to see this for themselves. Only tell them if they cannot do it alone. The feeling of one another’s skulls and ribs helps to focus on the bones below the skin, which we generally never think about.

The text then raises the question about what the brain is like; all three things are like the brain in some way, but it is much more than any of them. It can do calculations – more slowly than the calculator and the computer. It can communicate with the rest of the body through the network of nerves, like the telephone and the wires of the system. Both work by using electricity; very small amounts in the brain’s case. It can store information in the memory, like the computer. This can be words, numbers and pictures, which is the same in both. However, the brain also thinks for itself and feels pain, joy, fear, etc., which the computer does not. So, the brain is only the same as these things in some ways.

### Activity 7

Let individuals do this activity. It can be used as a kind of assessment of their learning in this topic. They should write the letters A, B and C and then list the numbers which stand for the correct words under each letter.

### Additional Activities



1. Let pupils make models of the brain and heart as well as bones, using clay,



Plasticine or any other suitable materials.  
There is potential for art and technology in this activity.

- After the bones have been felt in their own and others' bodies, get the class to write

simple sentences about the functions of the skeleton, heart and brain. Individuals could then read out their writing to the class for comment.

## MAKING SOUNDS AND SHAPES pages 10 and 11

### General concepts

The body can be used to make sounds in a variety of ways. The skeleton allows the body to be bent into numerous shapes.

### Materials needed

None

### Background

There are many ways of using the body to make sounds by percussion – hitting one part with another or hitting some other object such as the floor or the desk. The head and mouth in particular, have spaces in them which means that the sounds can be amplified (made louder) and the pitch can be varied by changing the size of the mouth. Blowing air through the lips allows notes to be produced, so that tunes can be whistled. The shape and size of the hole between the lips, plus the position of the tongue, cause the differences in pitch. The voice is the most obvious sound maker we have. The vocal cords can be stretched and relaxed, changing the pitch of the sounds produced as the air is pushed over them. The sound is *amplified* by the head, which has cavities (spaces) in it. They act like the space in a drum or a guitar, increasing the volume of the sound.

The body is wonderfully flexible, in spite of being built on a framework of solid bones. The joints allow the bending to happen in specific places. The spinal column (spine or backbone) is the most flexible of the joints, as it is composed of many small bones set one on top of the other. The spine is able to bend backwards, forwards and from side to side, allowing us to turn our head or our whole body in many directions. Some joints, such as the knee, only allow movement up and down – there is no bending to the side (hinge joint). Others, such as the hip, allow rotation of the bones in many different directions (ball and socket joint). Young children's bones are not fully formed, as they have not completely hardened.

### Using the Pupils' Book

On **page 10** the incomplete phrases at the bottom of the page should be done by each pupil. The missing words are:

**finger clicking, foot stamping, whistling, hand clapping, singing, beating chest**



**Page 11** encourages pupils to use their imaginations to be creative in making sounds using their bodies. Let them experiment before asking them to share with one another. Choose a song for the pupils to add their sounds to. Let them discuss how well they think the sounds fitted the song. They may suggest ways to improve it. There is a lot of potential for music arising from this activity.



The second idea on this page deals with the flexibility of the body due to the joints. The picture serves as the introduction to the activity. Let pupils look at it carefully before they try to turn their bodies into some of the letter shapes. The challenge is then to form the letters of BRAIN and HEART. Let pupils experiment until they find ways of doing it. The important thing on which to focus their attention is the bending at the joints. This is an opportunity for you to use words such as wrist, elbow, ankle, hips, knee – words learned in Year 1.



The second shape challenge is to model the organ shapes. You could let pairs or groups do these if there is enough room. They could be done as part of a PE lesson.

### Additional Activity



Discuss the various body parts and some of the ways in which they work together, e.g. the skeleton and the muscles; the heart and the lungs; the brain and the sense organs.

Collect the words used by the pupils and make a card for each one, adding them to the class word bank. There are plenty of language skills which can be developed through this activity, e.g. alphabetical order, initial letter sounds, rhyming words, names (nouns) and 'doing words' (verbs).

## MOVEMENT AND EXERCISE pages 12 to 14

### General concepts

Animals move in various ways. Exercise helps to develop the muscles. It builds strength and skill. The bones grow in length and the mass of the body increases over time.

### Materials needed

1. Drawing paper and pencils
2. Rulers
3. Bathroom scales

### Background

Animals vary in their form, structure and habitat. Their movements reflect these features. Those with limbs can use them in a variety of ways – to walk, climb, swim, fly, run, hop and dig, for instance. Clearly, their limbs are adapted to suit the habitat and their use. For example, swimming is improved if the shape of the animal is smooth and streamlined and the limbs have flat areas which can push against the water, to move the animal forward. Some have webbed feet, like frogs and ducks. Others have fins rather than legs and feet, such as whales and fish. Strong, muscular legs are essential for speed and this is needed by many land animals which hunt or are hunted, such as rabbits and cats. Flying is improved if the limbs are lightweight and flexible. Birds are unique in having feathers, which cover the body and provide a very large surface area in the wings to support the bird in flight. Other flying animals, such as insects and bats, also have thin, lightweight wings. Some can fold them up when at rest and others cannot. Limbless animals, such as earthworms, snails, jellyfish and snakes, have to move their bodies in some way that pushes against the ground or the water and moves them forward. Often the muscles pull the body, first one way and then another. This can produce the typical side to side movement of the slithering snake, or the opening and closing of the jellyfish “bell”, or the stretching and squeezing of the earthworm.

Muscles and bones grow naturally, changing most when we are moving from infancy to childhood and then through *puberty* into adulthood. The regular measurement of mass and length reveals this change, which goes so slowly that we do not see or feel it. It is quite normal for children of the same age to be different in mass and height. Such variation continues into adulthood, as they will be well aware of. We inherit physical characteristics from our parents and so some of the variation is due to the fact that we have different parents!

The second influence on our physical growth is the

way we treat it. Our diet and our level of activity both influence how our muscles develop. A good balanced diet will provide all we need to develop normally, fit and healthy. A poor diet, which has some nutrients missing, will damage our physical development. Exercise is the other factor which affects our growth, especially our muscular strength, speed and agility. This is the justification for sports and PE being taught and encouraged at school, as well as in the wider world. It is not a question of “body-building”, which just concentrates on the growth in size and “definition” of the many muscles. Exercise is more concerned with general health, well-being and fitness. The muscles and bones will benefit from regular exercise and strength, agility and fitness will be maintained.

### Using the Pupils' Book



The picture on **page 12** should be looked at and talked about by the pupils. This can be a whole class or a group activity. Then ask individuals to move in the ways shown in the picture. If you can do this outside, then the whole class could move at the same time. Once those few examples have been done successfully and talked about, let pupils choose animals for themselves to mimic. After time to practise, stop the class and let them watch individuals move as various animals. The class should try to identify the animals being mimicked.



The writing should make use of the words provided, so that the movements are identified more specifically. There is plenty of potential for language work based on this activity, especially on verbs and adverbs describing movements.

The questions on **page 13** about the photos are of two kinds: the first asks pupils to compare the people shown and describe the differences they can see. The second asks for an explanation of the differences. You hope for answers which speak of taking exercise, training the body, building the muscles, etc. It should be obvious which people are the athletes, not just by the way they are dressed, but by their physical development.

### Activity 8



There are several parts to this activity and so you may choose to do them on different occasions. Let pupils choose which athletes

and non-athletes to draw. Do not let them copy the pictures from the book.

The mass measurement will need to be done one by one, so it could be going on whilst the class are drawing. Before weighing themselves, pupils should draw the table for the results and then enter their own mass as soon as they have measured it. They can be allowed to choose which others they put in their table. The comparison should be done by them individually and then the whole class should share what they have concluded.

Clearly, pupils in the same class, who are close in age, will not all have the same mass. This is normal and can be explained by factors such as inheritance from parents, diet, amount of



exercise and state of health.

A second table should be drawn before pupils begin to measure various lengths on their bodies. Tape measures are very suitable for the measuring, especially if the rulers are shorter than the arms and legs of the pupils. Again, let pupils choose which others to add to their tables and then compare them, before sharing their conclusions with the class. As with mass, the lengths of children's limbs will vary and this is to be expected for the same reasons.

The summary at the bottom of **Page 14** is a useful way of making sure that you have covered the main points of the unit and that pupils have learned them.

## Term 1 Unit 2

# Care and safety of self

### Objectives

Pupils will:

- Identify possible reasons for safe/unsafe areas
- Talk about ways in which they can keep themselves safe at home, on the road and at school
- List safety rules to observe in using utensils/appliances (equipment)
- Make safety rules and dramatise situations depicting these rules
- Conduct simple surveys to determine safe/unsafe areas around them

**Time allocation: 6 weeks**

### Discussion of concepts and skills

This is a vast unit, covering many topics which are all connected with the care of the body. Some concepts, such as food groups, will be new and quite abstract for such young children. Others are extensions of what has been learned in Year 1, or Unit 1.

The common concept throughout is that the body needs to be cared for in various ways if it is to be healthy, strong and develop as it should. The unit

deals with different aspects of bodily care, with an emphasis on avoiding disease and accidents by having rules and routines which protect us from harm. These include the control of germs, through good hygiene, the proper use of medicines to combat germs, the eating of balanced meals which supply all the nutrients needed by the body and the application of safety rules and procedures to keep us safe.

There are many opportunities to practise and develop science skills. These include estimating and measuring length, mass and volume and collecting

data to be presented as graphs, or in tables, followed by interpretation. Sorting and naming are once again important to the activities

## FOOD AND DIET pages 15 to 25

### General concepts

We eat a variety of foods and we can sort them in different ways. To be healthy, we have to give our bodies the full range of foods which they need. This is called a "balanced diet". Some religious groups have rules about their diets, which may prevent them from eating certain foods.

### Materials

1. Colouring pens or pencils
2. Drawing paper
3. Exercise books
4. Rulers
5. Kitchen scales
6. Foods – at least 4 different ones
7. Four more foods for measuring length
8. Measuring jug or cylinder
9. Four liquid foods
10. Modelling materials

### Background

Foods can be sorted in various ways. One way is to divide them into 6 groups, based on what their origins are, what they consist of, or how we use them. This is actually bad science, as it mixes various criteria together in an illogical way. The six "food groups", according to this approach, are:

- (i) staples (foods which form the bulk of what we eat each day, to provide us with our main supply of energy)
- (ii) legumes (foods which are from a particular type of plant, i.e. members of the pea family – the Leguminosae)
- (iii) foods from animals (meat and fish, plus eggs and milk, which may be converted into butter, yogurt or cheese)
- (iv) vegetables (a very vague term which is not used in its correct scientific sense. This everyday use distinguishes these foods from another set derived from plants – the fruits)
- (v) fruits (foods from plants which are produced by flowers and which almost always contain seeds)
- (vi) fats (foods from plants or animals which provide energy, as well as other important substances. Oils are the plant form of fats.)

The second, more scientific way of sorting foods is according to their functions in the body, i.e. what they

are used for. The three functions are introduced to Grade 2 pupils in simplified form, which is going to be replaced later in their science education by the proper terms. The terms used here are "Go" (which simplifies the concept of *energy*), "Grow" (which is true to the scientific notion of *growth/body-building*) and "Glow" (which simplifies the concept of *protective foods*, essential to good health). The correct scientific terms are "nutrients", being of five kinds:

the energy providing *fats* and *carbohydrates*  
the body-building *proteins*  
and the protective *vitamins* and *minerals*.

The concept of balanced and unbalanced meals is very abstract for such young pupils. It assumes a knowledge and understanding of food constituents which the children will not have at this age. So, the concept will have to be dealt with crudely, on a very simple level.

In fact, none of us really eats balanced meals all the time. We tend to maintain the correct balance over a day or so, with individual meals being quite unbalanced sometimes. So, it is more a question of giving our bodies the full range of food materials (*nutrients*) regularly, than trying to make every single meal a balanced one. For example, breakfast is not generally balanced so far as body-building foods are concerned (*proteins*). It mostly consists of energy foods ("Go"). The main meal of the day is more likely to be balanced, with meat, fish or eggs being part of it, along with an energy providing staple food and smaller amounts of vegetables and fruit.

It is difficult to estimate the mass of different foods, as their "size" does not give us a good guide to the mass. Some "large" foods, such as bread, may not have as much mass as "smaller" foods, such as an egg. Mass is not controlled by volume. It depends on the amount of matter which a food contains. Some, like bread, have many spaces in them, filled with air which does not contribute much to the total mass. Others, like the egg, are almost free of spaces and so the matter is more "tightly packed" into the smaller space. Science uses the word "density" to compare the amount of matter in any given volume. Pupils will explore this issue and should realise that the volume of a food is not a good indication of its mass. The important point at this age is for them to develop the skills of measurement, using various standard units,

followed by careful recording of the measurements in tables.

Food plays an important part in the religious beliefs and practices of various groups. Science has nothing to say about the beliefs, because such concepts as God are not within the province of science. So, in this science unit, the investigation of dietary rules is only a data collecting activity. It is not setting out to prove or disprove anything about the religious ideas. The only thing which science can say with authority is that vegetarian diets can be successful, but care must be taken to provide the body with the full range of proteins (body-building foods) and vitamins (protective foods), which most people obtain from animals. It is harder for vegetarians to achieve this balance.

### Using the Pupils' Book

**Page 15** introduces the topic of food types/groups, with a chart. You should allow pupils time to look at this chart and discuss it, so that they are clear about the idea behind the six divisions of the circle.

The table should be drawn with a ruler and the headings written in before the pupils try to sort out the six food types into the three new sets, "Go", "Grow" and "Glow". This can either be done as an un-aided activity, where individuals or groups guess which column to put the foods in, or you can guide their selection. The first approach will reveal to you how much they already know about the concept of food functions. It is likely to be very little. Whichever approach you choose, you will need to explain the meanings of the three functions as well as the word "functions" itself.

The foods should be sorted in the following way:

Staples: Go and Glow

Legumes: Go, Grow and Glow

Food from animals: Grow and Glow

Vegetables: Go, Grow and Glow

Fruits: Go and Glow

Fats: Go and Glow

If we do not eat foods from all groups we run the risk of being unhealthy, but vegetarians leave out animal foods and can still remain healthy. This point will be looked at later in the topic.

### Activity 1



art

This activity is to be done before any discussion of the idea of balanced meals. It is an opportunity for the pupils to show what they think "healthy" and "unhealthy" means when applied to meals. Their drawings will probably be very varied, so do not make

comments about being "right" or "wrong" at this stage. The drawings should be looked at again after the section dealing with balanced meals has been done. Pupils' explanations will reveal how much they have understood of the differences between foods.

**Page 16** then extends the concept of "healthy" into that of "balanced". Pupils should find it easy to tell which meal is which, if they recall the six food groups and the three functions of food. (A) is the balanced meal and (B) is the unbalanced meal. The latter has mostly "Go"/energy foods derived from sugars, fats and starch, whereas meal (A) has the full range of food types.

**Page 17** should be used to check on the main points which have been covered so far in the unit. It is a summary which could be used as the basis of any assessment which you have to do.

**Page 18** starts with a picture to illustrate the activity which follows. Use it to focus pupils' minds on the process of weighing, using scales.

### Activity 2



language



maths

The table should be drawn before the weighing begins. Check that pupils know how to use the scales correctly. You could ask individuals to show the class how to use them. If possible, give a set of scales to each group. If this is not possible, the class will have to circulate in turn, using the scales group by group. If this is what you do, Activity 3 could be going on at the same time, so that all groups are occupied whilst waiting to use the scales.

All items should have their mass estimated and written down, before the weighing begins. This should be done by each individual, as they all need to develop their skills of estimating. The group does not have to agree on the estimated masses. The comparison of estimated and measured masses should make frequent use of the phrases listed on Page 19. You should ask questions using these phrases and demand answers which include them too.

This activity presents many language development opportunities. Estimates will be very inaccurate, but this is to be expected, so do not make pupils feel that they were "wrong". The skill of making estimates by hand will only develop over time with lots of practice.

The groups should discover that their estimates and their measurements do not

agree, even if they have weighed exactly the same objects. Ask them for explanations. They will probably suggest various reasons. The care and skill of the pupils measuring the masses will be the source of many differences. Less skilful or careful pupils will make mistakes more often.

### Activity 3



maths

This could be started at the same time as Activity 2, if there is a shortage of scales. It doesn't matter which foods are used for this, but try to provide items which vary widely in length, so that pupils have a range of lengths to compare. The same process should be followed here as in Activity 2. First draw the table, then estimate the lengths and record them and finally use the ruler to measure the foods and record the lengths.

Comparisons will reveal differences once again, but the pupils will probably be closer in their estimates of length than they were of mass, because they have more experience of using a ruler than the scales.

### Activity 4



maths

This third activity involving measurements and estimates can follow the same procedure. Pupils are likely to be very far out in their estimates of volume, as it is not a measurement which is very familiar to them. This does not matter, as one purpose of this activity is to develop their skill at using millilitres as a unit of volume. Choose a variety of liquid foods which look different and are easy for you to obtain (e.g. milk, oil, water, soft drink). This is another activity where you may not have enough equipment to give to each group. One solution is to divide the class into at least three groups and let one measure mass, another length and the third volume, then rotate the groups until all have done the three.

The pupils should discover that liquids of the same volume do not have the same mass. This is due to them having different densities. The pupils do not need to learn this concept at this stage, so just let them note what they observe.

### Activity 5

This activity will express the pupils' knowledge



art

of which foods are fruits and which are vegetables, in the everyday sense of these words. Strictly, from the scientific point of view, anything containing seeds is a fruit, regardless of how we eat it. So, tomatoes and cucumbers are fruits, even though we generally treat them as "vegetables". Give the class the time to look at one another's drawings and display them, so that they can be referred to during the Unit.



religious education

**Page 23** introduces the information about dietary rules which some religious groups have. Have a class discussion based on the picture and then put the class into groups to prepare for Activity 6.

### Activity 6



language

Let each group decide its own questions. They should be designed to explore the rules and the reasons of only one religious group. If more than one group of pupils is going to explore the same religious group, you should help the groups to think of different questions, so that they are not repeated. You will need to arrange for the class to meet members of particular religious groups, either by inviting them to the school, or by taking the class to the places of worship belonging to the various religions. Make sure that pupils know what they want to ask, but do allow extra questions to be asked if they arise during the conversation. It is essential that pupils keep notes of the answers so that they can make use of the information later. The notes do not need to be in correct English form. Sentences are not necessary – just the main words or phrases. This is a good opportunity to do language work on such points of grammar.



religious education

Once all the information is collected by the different groups of pupils, let them share it with the class. You could collate the information from the groups as they report to the class. A table would be the most effective way as it will allow pupils to compare the findings easily. Focus particularly on what each religious group does *not* allow members to eat or drink and their *reasons* for this.

The topic then moves on to the issue of fasting. Let pupils say what they know of this practice and also express their opinions. Stress that it is not only done for religious reasons. Many do it for the sake of their

health as they believe that it benefits their bodies to go without food for a day or so.

### Activity 7



This is a group activity, so it should involve a lot of talking before any form of meal is produced. If you have sources of information, such as books, magazines, leaflets from the clinic, CD-ROMs and knowledgeable people, then make them available to the class so that they can base their meals on good background information.

Once the groups have chosen the foods to use in their meals, they must then decide the form in which they will present them to the class – a menu, a drawing or a model. Members of each group need to share out the work of producing the ‘vegetarian meals’.

Produce a display of the pupils' products so that the whole class can see what others have done. This gives them the chance to make comparisons – to look for what is similar and what is different. They should find that all meals use vegetables and fruits of various kinds, but none of them include meat. Some may contain eggs or milk, but others will not. Vegetarians differ in what foods they choose to eat from animal sources. Some eat nothing at all and others eat some animal products.

### Additional Activities

1. Read the poem *The Junk Food Man* and let the pupils discuss its meaning.
2. Let groups devise a mime or role play to show the advantages of a balanced diet.

## KEEPING CLEAN pages 26 to 28

### General concepts

We need to keep our bodies clean. Washing removes the germs which can make us ill. Conjunctivitis (pink eye) is an eye disease caused by germs, which are easily passed on from one person to another. Medicines can cure illness and help to prevent it spreading.

### Materials

1. Large sheets of paper for charts
2. A doll
3. Colouring pens or pencils
4. Paper and pencils

### Background

Our skin is naturally oily and sweaty. This makes it easy for germs (*microscopic* bacteria, viruses and other living organisms), to stick to our skin and feed off these materials. They grow and multiply. If there is an opening in the skin, such as a wound, then they can enter the body and spread all over it in the blood. This is how we can become infected. Other germs enter our bodies when we breathe. Some infect the throat, nose and lungs, producing colds, flu or worse diseases such as pneumonia.

One way of reducing our chance of being infected is to keep ourselves and our surroundings clean. Germs get washed off our skin and hair so that they have no chance to multiply and infect us. Clean clothes, bedding and dishes, etc. all help to reduce our chances of infection.

Conjunctivitis is caused by a germ which is very

easily passed from person to person and so it is highly infectious. The eyes become very sore, the white part becomes reddish/pink, the eyes feel itchy and *pus* is produced, which is discharged from the eyes and sometimes sticks the eyelashes together. This happens during sleep, so that in the morning the eyes cannot be opened. Vision can be blurred because of the pus floating over the surface of the eye. Children keep rubbing their eyes and this transfers the germs to their fingers. This makes it easy for them to pass the germs on to others when they touch them. Even towels, wash cloths, sheets and clothes can carry the germs from one to another. They should not be shared by the infected and non-infected members of the family. *Antibiotics* can cure the infection. They are usually given as eye drops or ointment which has to be put into the eyes to kill the germs. Washing the eyes with clean, salty water can remove the pus and reduce the spread of the germs.

### Using the Pupils' Book

The whole class, or groups, could look at the picture on **page 26** to find the differences between the clean and the dirty children. Let them produce a list of ways to keep clean and healthy and then collate their ideas on the blackboard. Use this as the introduction to the next activity.

### Activity 8



Each group should choose a different part of the body. The task for each group is to

produce a set of rules for keeping that body part clean. Display the charts with the rules, then give the class time to move around the room to read them. Sit the class down to discuss what they have seen. Some aspects should be the same in all of them: using soap and water to wash, cleaning and covering wounds to prevent infection, changing clothes regularly so that germs do not build up in them. Hair and nail cutting and cleaning are also necessary.

The doll can be used by each group in turn to demonstrate to the class one of their rules.

**Page 27** starts with pictures of infected and healthy eyes. This is the introduction to the activity on pink eye. Let pupils look at the pictures and identify the differences they can see. Someone should be able to identify the disease, as they may have suffered it themselves, or seen a member of their family with it.

### Activity 9



The table should be drawn by everyone first, before the information is collected. You could start by collecting the figures for your own class, so that pupils have the chance to practise using the table before going to other classes. Send one group to each class, so that

they are not disturbed more than necessary. When all the groups have returned to class, *collate* the results of the survey on the board and get the pupils to copy them into their tables.

Then look at the bar graph on Page 28 so that they can see what they are to do with their results. Each group could draw a graph for their own figures, or you could ask them to draw two or more sets of data. Make sure that the scale on the vertical axis is correct before the blocks are drawn. Colouring the blocks in two colours will help to make the meaning clearer. Display all the graphs so that the class can look at them all and make comparisons. They may find that pink eye was more common in some classes than others, or that boys have been more/less infected than girls. These are the kind of differences and similarities which you want to encourage the class to look for. There is potential for more maths using these graphs.

### Additional Activity

1. Work with a nurse to produce a list of recommendations to reduce the incidence of conjunctivitis/pink eye in the school.

## PROTECTING OUR EARS page 29

### General concept

The ears are easily damaged. The eardrum can be broken by hard sharp objects. Very loud sounds can also permanently damage the sense of hearing. We need to keep them clean and protect them.

### Materials

None

### Background

The outer ears, on the sides of the head, are not very important for hearing. They do help to funnel the sound waves into the canal/tube which leads into the skull. At the end of the canal is the eardrum. This is an elastic skin/membrane which vibrates when sound waves hit it. This membrane is easily torn or punctured by sharp, hard objects. It can heal over, but hearing is reduced whilst the eardrum is damaged. Sounds are many and varied, some pleasant and useful, others unpleasant and damaging. We should take care of our hearing when we are young, as some

forms of damage cannot be repaired. Dirty ears are more likely to become infected and this can be very painful.

### Using the Pupils' Book

### Activity 10

You should choose the route for the "sounds walk" so that pupils have the chance of hearing as many different sounds as possible. Do not hurry them, as they have to tune in to how the sounds make them feel – relaxed, excited, irritated, afraid, happy, etc. They must share these reactions when they get back to class, in descriptive words or in role play. The writing of sentences about the care of ears should be done after some discussion of the issue. First let pupils read the text at the bottom of **Page 29** and look at the pictures of people using ear protectors, discussing what they are doing and why it is necessary.

## REST AND EXERCISE pages 30 to 33

### General concepts

Physical and mental rest are essential for good health. The mind needs to have regular periods of sleep for it to continue working properly. The body and mind become exhausted if they are not rested. Exercise stimulates the systems of the body, such as the circulation, respiratory, skeletal and muscular systems. This keeps them healthy and fit and less likely to suffer weakness and damage.

### Materials

None

### Background

During the time that we are awake, our bodies are active in numerous ways. This activity uses up the energy which we extract from our food, as well as leading to tiredness of the muscles. They may ache after a busy day and we may feel as if we have no energy left – we are tired. In addition, our minds also become tired. The senses are sending an endless stream of information to the brain all the time we are awake. We make millions of choices, movements, thoughts, reactions and feelings throughout a day. The mind cannot go on without a break from this ceaseless activity. It must be allowed to rest. This can be through resting physically, relaxing in some way, or most effectively through sleep. The brain never stops certain activities, such as controlling the heart beat and breathing, but during sleep it can “shut down” a lot of what goes on during our waking life and just “tick over”. This allows it to recover from the business of the previous day and reawaken in a refreshed state, able to deal with another day’s life. Relaxation is refreshing for the body and the mind. We can “take our minds off” work, our worries, etc., when we play a game, go for a swim, listen to music, etc.

Exercise makes the muscles work harder than normal and helps to make them grow in size and strength. It also makes the heart and lungs work harder and this helps to keep them in a good, fit condition. The joints of the skeleton are kept more flexible through exercise and we are generally fitter and healthier if we exercise regularly. It does not need to be strenuous, violent exercise. In fact such stress on the body can be damaging, especially if we are not used to it.

### Using the Pupils' Book

#### Activity 11

The minute of stillness and silence is to help pupils to focus on what is going on in their

minds and feelings. It should lead to a class discussion when pupils will tell what came into their minds as they sat quiet and still, then how they normally choose to relax at home. As individuals or groups describe their different methods of relaxation, you should list them on the board. The relaxation methods of others, not in the class, can then be added to the list. Pupils should write the list in their science exercise books as a record of the activity.



**Page 30** then has a picture of sleeping and resting animals. Let the groups discuss what it shows, before individuals draw a picture of a resting animal. Encourage them to make the pictures large and colourful. The sentence should add some information about what is shown in the picture, rather than just saying what it is. Display all the pictures and give the class time to look at them and discuss them.

**Page 31** extends the topic into resting and sleeping people. You could use the picture to start a class discussion about what it shows and then divide the class into groups for them to continue talking about how they relax and rest and about their sleeping habits. This should lead them to identify the reasons why we must do these things. Each group should produce a list of reasons and when you stop the discussions, let each group share their list with the class for comparison.

Then let the groups form again for the discussion of what happens if we do not rest. Their ideas should include such effects as increasing tiredness, leading to collapse and exhaustion. Also, we become unable to concentrate or to “think straight” – we become easily confused. We also become less and less tolerant of any problems and become irritable with other people. Our emotions are very “fragile”, so we are easily upset and we feel unable to cope.

**Page 32** then presents an alternative to resting and relaxing, which still has beneficial effects on health – exercise. This may not seem restful or relaxing, but it still “takes the mind off” the routines of life and this is refreshing for mind and body. From the picture, make a list of the types of exercise on the board as pupils identify them. Then add any others which pupils can think of. The class should copy the list into their science exercise books.

**Activity 12**

This is best done outside, so that pupils can move around freely. If it must be done in the room, you will have to limit the movements used by pupils. Let them choose their own form of exercise. It is essential that the heart beat is noted before the activity begins, so that pupils can compare it with the rate afterwards. The exercise should lead to a great increase in the heart/pulse rate. If anyone does

not find that result, they have either made a mistake, or they have not been doing much exercise!

**Page 33** emphasises what the class should have found at the end of their exercise – they feel hotter (more muscular activity, so more heat produced), sweaty (the body's way of trying to cool itself when it gets hot) and breathless (the lungs have had to work hard to supply enough air (oxygen) to the muscles for them to work at full speed).

**SAFETY**  **pages 34 to 41****General concepts**

Accidents can happen at home because it contains many dangerous items and materials. We should have safety rules at home and at school to avoid accidents happening. We should know how to get help from skilled people when there is an accident. Medicines are useful, but also dangerous, so they must be used and stored carefully. The surroundings also have dangerous places. Warning signs can help to keep people safe. Earthquakes and fires are two very serious dangers and we should know what to do when they occur. First Aid is a useful way of dealing with accidents.

**Materials**

1. An old telephone
2. Pencils and exercise books
3. Teaspoons
4. Droppers
5. Coloured water
6. Drawing paper and coloured pens or pencils

**Background**

It is not possible to live in a totally safe environment, so the best we can do is to recognise the dangers, make rules about how to deal with them to avoid problems and know what to do if there are accidents. Prevention is the best defence against dangers, so young children need to be taught about them as soon as possible. Children do not appreciate the dangers associated with water (the sea and rivers, for example), or fire and hot objects, or liquids which can burn or explode, or poisons which look like drinks or sweets. Adults do know, and so it is their responsibility to educate the young.

Falls are often caused by people tripping over objects left on the floor, so tidiness is good for health as well as appearance.

Dangerous tools and appliances are attractive to young children, so they must be stored carefully, if possible out of the reach of children, with strict rules

about touching them.

In spite of all the best efforts of adults, accidents do happen – not always to children! So, they must be told what to do if there is an accident. This means First Aid kits and how to use them, plus which numbers to call on the telephone for expert help, from medical or fire-fighting services.

Medicines present a particular hazard, as we give them to children to make them well. What they do not understand is that the amount taken each time has to be just right for the age and condition of the sick person. Tablets can be brightly coloured and look like sweets. Liquid medicines can be mistaken for fruit drinks. The safest way to handle them all is to put them in places where young children cannot get them – very high up, locked away in a cabinet or in containers which small hands cannot open. Obviously, medicines should not be left lying about where children might find them. Child deaths occur every year because of careless adults, not naughty children.

Rules for safety are easy to teach both at home and at school. It is up to adults to enforce them. Certain places and things should be forbidden, e.g. playing with matches, poking things into electric sockets, swimming in places where the current is very strong. There are the particular dangers associated with earthquakes and fires and these should be prepared for with "drills", a formal training in how to behave if an emergency occurs. This training needs to be repeated regularly so that children do not forget it and it must be treated seriously so that they learn its importance.

A First Aid kit/kits should be in every school and everyone should know how to find it. Signs should guide people to where a kit is kept, so that there is no delay in finding it when needed to treat a wounded person. The contents need to be replenished as they are used and they should be checked regularly to ensure that all the items are in good condition.

Many dangers exist in the outside world. Some can be avoided altogether by not going to certain places,

e.g. the edge of a cliff, up an electricity pylon. Others have to be handled carefully to minimise the danger, e.g. walking along a busy road, playing on rough ground.

Rules of behaviour are important here too, but adults at home are likely to be the main teachers and enforcers.

### Using the Pupils' Book

**Page 34** starts with the familiar domestic scene. The task is for pupils to discuss what it shows and suggest ways of making the home a safer place. This should lead to a set of written rules which the group thinks would keep people in the house safer. This will be based on their ideas of how to prevent accidents. This whole activity should be given plenty of time, so that pupils can think and share ideas before getting down to writing. Share the rules somehow – display or read them aloud.

**Page 35** extends the safety issue into a specific place in the home, where dangerous tools, etc. are kept.

#### Activity 13

The pupils should look closely at the picture and decide why each item is stored there so carefully. They should answer the question individually, using their imagination. Let some share their answers with the class for comment. Clearly, the parent would not be pleased to be disobeyed and afraid of what harm may come to the children.

#### Activity 14



After acting out the scene in the picture, groups could each decide on a particular accident to role play, then have time to prepare their little scene. Each group would then act in turn as the class watches. They should be watching for the correct use of the telephone and the care of the injured person. Encourage them to make suggestions for improvements.

**Page 36** then introduces the emergency services in the picture. Let the pupils explain the roles of these people, with suitable personal experiences if they have any to tell.

**Page 37** moves on to the specific dangers of medicines. This may be a new idea for some children, so spend plenty of time on it, so that they are really aware of why medicines must be seen as dangerous as well as helpful. You could have a class discussion

about the safe use of medicines, after the groups have had time to share their ideas.

#### Activity 15



This is a practice and development of measuring, where the skills of the pupils are being extended. The table should be drawn before the pupils begin the practical work, so that they can record their results immediately. The results should show that individuals can vary quite widely in the amounts they measure out. This is a serious issue when dealing with real medicines, where the "correct amount" is so important. More maths could develop from this activity on the issue of standard and non-standard measures of volume.

**Page 38** shifts the focus on safety to the outside world, where there is a great variety of dangers. Individuals or groups could study the picture and list the dangers they see. Then the rules for staying safe on the road could be devised and written. The whole class should then have the chance to hear or to read the ideas produced by the various pupils. A general set of rules which everyone could agree with, can then be written on the board and copied by the class.

#### Activity 16

This can be an individual activity. You should let pupils move about the school yard freely, to look for dangerous places. They will already be aware of some from their experience. The sign making should follow immediately. You may choose to limit the number of signs made by each pupil. The designs are for individuals to decide. Display them all and let the class vote for the ones which they think are best for warning other children about the dangerous places in the yard. If possible, put them up in the appropriate places outside. The pictures of the fenced yard should be done individually and the sentence should be an explanation of why it is there (to prevent children running or falling into the street; to prevent vehicles coming into the yard and causing accidents).

#### Activity 17

The groups should discuss accidents at school before they draw the table. Each group should decide what to list in the accidents column. The person who keeps a record of accidents in

school may be able to come to the class for a short time to give pupils the information they need. This is easier to manage than sending them to find the relevant person. Once all the information is recorded in the table, let the groups share it. You could collate it all on the blackboard. Then it is easy for pupils to compare the figures and answer the questions. Explanations of why some accidents are more common, etc., require pupils to use their imagination as well as their knowledge of what happens in the yard.

### Activity 18

The picture shows two safe environments at school. The groups have to look at them and identify why they are safe. From this they can go on to write the 5 most important safety rules for each place. In the room, issues such as not running, putting equipment away, keeping the floor clear of bags, etc., should be amongst the rules. Outside, the issues will include not throwing stones, not climbing on buildings or trees, removing broken glass from the ground, etc. The class could listen to the various suggestions and then choose the five best rules for inside and outside. It would be easiest if you wrote them all on the board as the groups read them out, then the class can see them all at once, before deciding.

**Page 40** moves on to the specific dangers of fire and earthquakes. The school should have a drill for each situation and pupils should have been trained in what to do when either event occurs. This would be a good time to practise the two drills and to follow them with a discussion about why they are needed and why the rules are as they are.

**Page 41** introduces the concept of First Aid. As its name states, this is only the FIRST help to give in an accident. It may not be all that is needed, but it can prevent the problem getting worse, e.g. bleeding from a wound can be stopped by First Aid, then a doctor or nurse can stitch the wound later. The kit should have *antiseptic* for cleaning wounds, cotton wool, bandages, sticking plaster, tweezers for removing splinters and

thorns, safety pins, scissors and maybe ointments for stings and scratches. The kit should be kept in a place where it can easily be found, not hidden away at the back of a cupboard or in a locked room. Signs should be put up, telling people where to find the kit. A sign on the wall or door where the kit is kept is also important. It should be large and clear.

### Additional Activities

1. Read the story "The Bear and the Kettle" and discuss the situations and issues in the story.
2. Write out on a chart some instructions from medicine packaging, which warn about their dangers.
3. Display posters from the Ministry of Health or drugs counselling service, to draw the distinction between legal/helpful drugs and illegal/dangerous drugs. Use them to initiate a class discussion on the issue.
4. Invite a doctor, pharmacist or Ministry of Agriculture representative to answer questions about the harmful effects of various chemicals.
5. Make a 'Safety Book' – blank pages in large format – and ask the pupils to draw pictures and write lists of rules for walking and riding safely on the road. Each rule could be illustrated.
6. Read the story "Speed Limit". Ask the pupils whether or not they have any sympathy for Donald and to explain their answers.
7. Pupils can write out and illustrate the rules for fire and earthquake drills. Their pictures and writing should be stuck in the "Safety Book".
8. Read the story "Do Not Play in the River Today". Pupils should write three things they learn from the story.
9. Groups are given particular small injuries to write about, e.g. cuts, bruises, burns, nail scratches, insect bites. Each group should produce First Aid instructions for their given injury. Put all their products in a "First Aid" section of the "Safety Book".

## CARERS pages 42 to 45

### General concepts

Babies depend totally on others to care for them. As we grow, we develop more independence and learn

to do things for ourselves. However, we still need caring for, especially when we are ill. Skilled people can take care of our health throughout our lives.

## Materials

1. Rulers
2. Paper and pencils

## Background

Unlike many other mammals, such as lambs and horses, the human baby is helpless at birth. This means that it is unable to survive without care from other people. It takes years of growth – physical, mental and emotional – before a human being is ready for an independent existence. There are so many skills and facts to learn. The brain must gather and store huge amounts of information about the world around. The body and mind together have to learn many skills, such as walking, talking, manipulation of tools such as pencils, knives and spoons, running, throwing, feeding, etc. – the list goes on and on. In the end, human babies develop into the most intelligent and skilful of all the creatures on earth, but the process is long and slow. Childhood is longer for a human than for any other animal.

We go on needing care throughout our lives. We all need love, through friendships and family and only other *people* can give us this kind of care. At some times we need special care, from medical personnel such as nurses, doctors and dentists. They have expert skills and knowledge which we have to depend on when we are suffering pain, disease or physical damage. Clinics and hospitals are centres where such help is available and they focus a lot of their care on the young child, because a healthy childhood is more likely to lead to a healthy adult. Children are prone to many infectious diseases which can be fatal if they go untreated. *Vaccinations* given to babies and young children can protect them from many such illnesses and so it is important that parents use the services offered in medical centres.

## Using the Pupils' Book

**Page 42** uses pictures of storybook characters to introduce the concept of being cared for by others. Let the pupils discuss the stories and focus their attention on the carers – who they are and what they did to care for characters in the stories. The whole class should then share their ideas and you should record them on the blackboard. This list should stay on display as you move on to the pictures of childcare. Again, let the pupil groups discuss what is shown and decide which things they can now do for themselves. Bring the group discussion to an end by asking them to report what they have decided. Last of all, ask them why babies need so much care. The answers should deal with the physical weakness, the lack of control of

the body, the lack of speech, the inability to walk, the lack of knowledge, etc.

## Activity 19



The page should be turned so that it is wider than it is tall. A ruler must be used to draw the line across the middle of the page and to divide it into equal portions, representing the months from birth to three years. The width of the paper will control the spacing of the months. Each group should discuss what happens as the baby gets older and decide which “events” to add to the line, e.g. sits up, stands, talks, walks, has first teeth, eats solid food, uses a spoon, stops wearing nappies, drinks from a cup. The lines should be displayed and compared, to find similarities and differences. Some items may need to be changed when the class have discussed them together. The order of “events” is not strictly the same for every child, but there is a “typical” sequence of development, e.g. standing must come before walking, sitting up must come before drinking from a cup or using a spoon. The individual collections of photos and other items which show the growth and development of the children in the class should be carefully put together in a special book, an album. As some items are very special records of the child’s life, great care needs to be taken so that they are not lost or damaged. The lists of what children can and cannot do will vary, to some extent, from child to child, e.g. riding a bicycle, playing a musical instrument, speaking or reading a second language. Most will be able to take care of many aspects of their lives, but cooking food may not yet be one of them and driving themselves around in a vehicle will certainly not be included! Let individuals read some of their sentences to the class for comment. Language work could develop this activity, with particular emphasis on verbs – the actions which pupils can and cannot yet do independently.

**Page 44** shifts the focus from the family to the clinic, where specialist carers are found. This picture can be discussed by the whole class as the introduction to Activity 20. The questions should be worked out before going on the visit. It is best if each pupil writes down their own question. They should focus on the work of the clinic in caring for children, not its general role.

**Activity 20**

This should follow as quickly as possible after the visit to the clinic. You should have visited first and arranged when the class will visit and what you hope to get from the visit. You must make sure that someone on the staff is willing and available to answer the pupils' questions. If you can let them know the questions in advance, then they will be better prepared. Each group should be left to choose which scene they want to act out for the class. Give them time to decide and then to prepare the roles. They should rehearse the scenes before

showing them to the class. After each sketch, the class should discuss what was shown, to express their agreement or to query any points which were not clear to them.

**Additional Activities**

1. Let pupils choose a story book each and identify the roles of the adult characters.
2. Arrange a visit to a Health Centre so that pupils can question staff about the ways in which children are cared for. Groups should discuss and prepare their questions before they go on the visit.

## Term 2 Unit 2

# Satisfying our needs

**Objectives**

Pupils will:

- Demonstrate an understanding that the basic needs are essential for healthy growth

**Time allocation: 6 weeks**

**Discussion of concepts and skills**

This very short unit should be set in the context of a wider consideration of the needs we have and how they are satisfied, i.e. spiritual and intellectual needs, as well as physical needs. The body depends on food, water, air and protection from the environment if it is

to stay alive and well. Some of these concepts have been dealt with in Year 1 and this unit extends them to include other needs. It has strong links with the arts, religious education, PE and social studies. No practical skills are taught or applied, because the approach is through thinking and talking.

**BASIC NEEDS**  pages 46 to 48

**General concept**

Our needs as human beings are not just physical and, as we grow and develop, our needs change.

**Materials**

None

## Background

We are more than just physical beings – bodies which need feeding, washing, clothing, rest and exercise. We are animals, scientifically speaking, but we are also more than that. We have minds and “spirits”, or “souls”, or “hearts” which also have needs. If these are neglected we may remain physically fit, but we will not be fully human. So, the unit widens the consideration of our needs to include these other, non-physical, needs. Health should not be confined to the body; we can be mentally or spiritually sick too. The treatment here is simple, taking into account the age of the pupils, but it introduces these more abstract concepts of need and health to the picture.

## Using the Pupils' Book

**Page 46** asks pupils to recall what they have learned about their basic needs, using the picture to help them. The needs are: food, water, shelter, clothes, rest, exercise and love. The task is then to think of their other needs, now that they have grown beyond the baby stage and are at school. Let each pupil do this for themselves, before sharing their ideas with the class. Write them on the board as they tell one another, so that a complete list is produced. Allow

discussion, with queries, disagreement and agreement. In particular help pupils to distinguish between *wants/desires* and true *needs*.

**Page 47** should be read as a class, with time to look at and to discuss what is shown in the pictures. This should help pupils to see that their needs inevitably change and multiply as they grow towards being adults. Learning skills and knowledge plays an enormous part in meeting needs and school makes a vital contribution to that process.



art



music



language

physical  
educationsocial  
studies

**Page 48** summarises these points, in the picture and the text. Allow pupils to talk about what they feel and what they “dream of” as they consider these things. Make use of the links with art, music, poetry, religious education and social studies to develop these ideas. There is a lot of imaginative and creative expression possible.

# Term 3 Unit 1

# This is my community

## Objectives

Pupils will:

- Group things in the environment into natural and man-made
- Preserve the environment while studying it
- Tell ways they can take care of home/school and the things in these places
- Describe materials in terms of source, properties or uses

**Time allocation: 4 weeks**

## Discussion of concepts and skills

There are two aspects of the environment which are focused upon in this unit. The first is the natural environment of land, air, water and the living things. The concepts of damage and protection of the natural world are developed. The natural environment has been used by human beings for thousands of years to provide food, shelter and various materials for a vast number of uses. However, there have never been so many people living on the earth before and we are using the natural resources (water, minerals, wood, etc.) at a greater speed than ever before. Some countries are careless about how they treat the land, leaving it polluted, or stripped of vegetation and eventually the soil. Large areas are being turned into deserts and so they are useless for food production.

The problems created by people are many and, taken as a whole, are very serious for the survival of life on the planet. Human beings must take responsibility for the preservation of the natural world – no other creature can do it. Protection, through reducing damage such as pollution and by recycling wastes, is suggested as a means of preserving our natural world.

The second environment is that built by people as structures of all kinds. These are looked at in terms of the materials used and the purposes behind the structures. They also need work done on them to preserve them from the effects of the environment, such as weather and the breakdown of the materials, e.g. rotting and rusting.

## PROTECTING THE ENVIRONMENT pages 49 to 52

### General concepts

The environment is easily damaged and people must behave in ways which protect it. Recycling waste materials is one way. Human structures are also in need of preservation, whatever material they are built from.

### Materials

1. Large sheets of paper
2. Coloured pencils/pens or paints
3. Cardboard boxes
4. Scissors
5. A plastic bucket or bag
6. Pencils
7. Exercise books

### Background

The pressure on the natural environment from the growing human population is an ever increasing problem, which the governments and individual people of the world have to take seriously. We cannot go on behaving the way we have been doing in the past, or even as we still do. We are wasteful of resources, such as oil, which will eventually be completely used up. We pump millions of tonnes of gases and soot into the air from our factories, vehicles and fires. We pour millions of litres of sewage and chemical wastes into the rivers and seas of the world. We extract millions of tonnes of minerals from the ground and leave the earth totally scarred and useless. We strip trees and other vegetation from the earth's surface, exposing the soil to the rains which wash it away, leaving nothing for plants to grow on. We destroy natural habitats in forests and grasslands,

condemning the wildlife in those areas to death and exterminating species totally – driving them to extinction. So the list goes on. As the human race we should be concerned and this should express itself in the way we choose to live. Waste can be reduced and what we do with our waste can be changed, so that it is less damaging. This is the main focus of this unit. It brings the much wider, bigger issues of environmental damage down to something which even young children can understand and do something about. This is vital if their attitudes towards the protection of the environment are to be changed.

The identification of different materials used to build structures forms the second part of the unit. Wood, glass and stone are easily named. Plastics and metals are not so familiar as sets. Young children often do not think of steel, copper or gold, as "metals", just as PVC, nylon and polystyrene are not necessarily all recognised as belonging to the set called "plastics". The weather, especially rain and changes in temperature, causes damage to structural materials. Wood rots if it is not covered in paint or a preservative such as creosote. Metals are corroded. Iron and steel develop rust if they are not covered in paint or plastic, or plated with another metal such as zinc. This is often used to "galvanize" metal posts and railings or other fencing.

### Using the Pupils' Book

**Page 49** introduces the topic through a picture of a perfectly cared-for community, where everyone behaves correctly. As they look at it, pupils should think about the harm that people can do to the environment and share their thoughts with their

group. After time for discussion, bring the whole class together to listen to examples of damage which individuals have seen.

### Activity 1



These are posters rather than pictures, so the illustrations need to be large and clear, with a short text aimed at people who look at the poster. It is a form of propaganda to encourage everyone to take care of their environment. If possible, they should be displayed around the school, inside and outside.

**Page 50** also contains the concept of recycling. This is not as simple as it seems, since pupils will need to understand that materials are different and that some are organic (plant and animal materials), whilst others are inorganic (metals, plastics, glass, stone, etc.). The organic can be decomposed – broken down – and returned to the soil. Plants can then “recycle” the minerals which come from this material, called compost. Paper, which is made from wood, can be reused to make cardboard and other low quality papers. Inorganic materials do not decay and they cannot just be returned to the soil, even if that is where they originally came from. Some can be melted and reused to make new items; metals and glass are two such materials. Some plastics can also be recycled, but some cannot. If they are just thrown away they will just stay in the sea or on the land, spoiling it.

The picture should start the pupils thinking about collecting and recycling common materials. If possible, find out about the local arrangements for recycling wastes so that the class can really become active in protecting the environment through recycling.

### Activity 2

There is no point in doing this activity unless you have somewhere to take the collected materials. If pupils know that it is just a “game” they will not take part seriously and damage will be done to their view of how important such issues as environmental damage and protection are. You should be able to recycle the organic waste, such as leaves, skins and cores from fruits eaten at school, etc., by composting it and adding it to the soil in the school yard or garden.

**Page 52** moves the topic on to structures which are found in the environment. As a class, you could find all the structures in the picture, list them on the board and try to identify the materials used in their construction. This will be practice for the activity which follows.

### Activity 3

The table should be drawn by everyone first, before going out to look for structures. The sizes will be estimates, rather than measures. The ages will also be “guessed”, as there will be little to tell them exactly. Some buildings may have a date on them, but most structures are not marked in this way. The pupils should be able to identify most materials correctly, along with colour and purpose. When the observations and recording are complete, the class should share what they have. You can expect differences in what has been written, especially in terms of age and size. The more important results are the materials and purposes, so focus on those.

### Additional Activities

1. Read stories from religious sources and others, which deal with care or destruction of the environment. After class discussion of a story, get pupils to list the positive and negative actions included in the story.
2. Invite one or more of the following people from the community to come to class for the pupils to question them about their role:

farmer  
policeman  
nurse  
baker  
refuse collector  
fireman  
doctor

The focus should be on the need to take care – in terms of the community and one’s health and safety. Pupils should prepare questions before the visit and record what they find out. Try to obtain pictures and other materials about the roles of those people who cannot visit the class. Make a display of these materials.

## Term 3 Unit 2

# Places of interest in my community

### Objectives

Pupils will:

- Use the senses to explore and recognise the similarities and differences between materials
- Group things in the environment into natural and man-made

**Time allocation: 3 weeks**

### Discussion of concepts and skills

The one simple concept in this unit deals with the fact that some parts of the environment are natural and others are manufactured. Pupils are given more opportunity to distinguish between the two sets of

objects and materials and to consider again the need to care for the natural world. Collecting and sorting skills are applied in two activities.

## COMPARING THINGS pages 53 to 55

### General concept

Everything in the world is either natural, or has been manufactured by people.

### Materials

1. Glue
2. Card or paper
3. Drawing paper
4. Pencils or wax crayons

### Background

Over the long period of human existence, the natural world has been changed by the activities of people. In the last 150 years or so, the pace of change has become much faster, as machines were invented and used to turn the raw materials of the natural world into manufactured products. Cloth production, mineral extraction, iron and steel making, food processing, oil and gas production, chemical manufacture, electricity generation, air transport,

space exploration, etc.: the list goes on and on. All these advances have been made through exploitation of the earth's natural resources to provide the raw materials for the new processes and products. By nature, human beings are curious and inventive and so this constant search and desire for new ways and new products will go on. However, people have begun to see that the natural world is being seriously damaged by our behaviour and so we are being forced to think more carefully about what we do.

### Using the Pupils' Book

#### Activity 1



Before taking the class out, you should go and look for the most suitable route for the walk, so that the pupils will have the best chance of seeing and collecting what they need. Each pupil should take some kind of container with

them – a plastic bag or a box for example – so that they can easily gather several items to bring back to class. Let them choose what to collect, but do not let them do damage to plants. A single leaf or flower from any particular plant is enough for each pupil. Help them to focus on the variety of shapes and colours, rather than just the variety of objects. In class, the use of the items should be left to the individual imaginations of the pupils. Some will choose to make patterns and others will prefer to make a picture. The main concern is that they are paying attention to the textures, shapes, colours and materials they are working with, rather than the finished product of one kind or another. There is obviously a strong link with art and craft in this activity and it could easily be extended. The pupils' work must be displayed, so that all can enjoy and share it. Encourage them to talk about the display, using the correct terms – texture, shape, colour, material.

**Page 54** introduces the concept of sorting things into two sets – the natural and the manufactured. Let groups or individuals use the picture to draw up two lists of things, using the letters provided. When all have finished, have a whole class feedback and build up the two sets on the board. Where there are differences of opinion, let the pupils try to explain why they sorted the items the way they did and let other pupils put forward their evidence against them. For example, anything living or once alive must be natural. People do not manufacture living things. Plastics are made from a natural material –oil from

the ground – but they do not exist naturally. Plastics are all manufactured.

### Activity 2



This activity can be done in the room as well as outside. Encourage pupils to draw large outlines of the two objects and then to find two very different surfaces for doing the wax rubbing. If they have not done wax rubbing before, you should show them the best way to do it. The paper must be held still – a second pupil can help with this – whilst the crayon is moved backwards and forwards in the same direction, rather than at random across the paper. When all the pictures are displayed, pupils should try to compare them and find some common feature in the natural surfaces and the manufactured surfaces. The most likely feature will be that the manufactured are very uniform. They may be smooth, such as glass or plastic, or they may be patterned, but it will be regular. Natural surfaces are likely to be irregular, covered in random bumps and dips, e.g. tree bark, stone. However, this is not always the case, since leaves are often very smooth and have a regular pattern of veins, whereas bricks are manufactured and have irregular surfaces.

The picture has two surfaces. Surface (a) is a natural one – the bark of a tree, whereas (b) is a manufactured one – a sack cloth. The regularity of the fabric pattern should be seen easily by the pupils.

## Term 3 Unit 3

# Plants and animals in my community

### Objectives

Pupils will:

- Use the senses to explore and recognise the similarities and differences between materials
- Sort, group and classify collected data
- Display and analyse data using attributes, e.g. materials, shapes, sizes, colours and patterns
- Name a variety of living and non-living things that were created
- Use voice/sound makers to create sounds depicting those in the environment
- Identify the source and type of sounds in the environment
- Show by their behaviour that plants and animals should be cared for
- Discuss ways in which we depend on plants and animals
- Take safety precautions during investigations
- Describe materials in terms of source, properties and uses
- Make objects for named purposes using given materials
- Preserve the environment while studying it

**Time allocation: 4 weeks**

### Discussion of concepts and skills

There are many concepts in this large unit. Some, such as care of the natural environment, have been introduced before and so they are developed further. Others, such as adaptation to particular habitats, are new and will therefore need more attention. Plants and animals are very varied and each has a place where they “fit” best. Scientists speak of them being “adapted” to their environment, having characteristics which suit the living conditions in a particular place.

However, all plants and animals share some characteristics, as they are all living things. Growth, respiration and reproduction are common to all living things, but some animal characteristics are *not* shared by plants, and plants have some that are peculiar to them. This unit begins to identify these differences

and similarities. The sounds which animals make are focused on as one topic, with practice at identification and imitation as two points of emphasis. Both plants and animals move, but in very different ways. This is also explored in this unit, allowing comparisons to be made, based on close observation and recording. These skills continue to be central to what science is about, so you can expect the pupils to become increasingly skilful as they go through the year.

The context for sustained close observation is a period of caring for a plant or animal at school. This is designed to allow the pupils to repeat measurements and other observations over a period of time, so that patterns of behaviour and changes can be noted. It is essential that pupils have this first-hand experience,

rather than trying to understand important ideas only from a book. In fact the book does not supply the information which the activity will teach. The activity is essential; there can be no substitute.

A final concept is another which has been touched on previously, that of how we use plants and animals for various purposes. One receives particular attention – that of medicinal plants. You may need to rely on someone local with this special knowledge, so you will need to prepare in advance for this topic.

Many skills are applied and developed in this unit. Measurement should be more precise and accurate, with units such as millimetres as well as centimetres being used by some pupils. Time reading and recording will be necessary. Close observational drawing, using a magnifying glass, is a new skill which you will need to teach. Sorting, observing, recording, comparing, reporting and measuring are used throughout the unit, so pupils' skills should be developing and progressing.

## ANIMALS AND PLANTS pages 56 to 60

### General concepts

Plants and animals are all living things, but they have some characteristics which are different. Animals make a great variety of sounds which are particular to each type of animal.

### Materials

1. Containers for small animals
2. Plastic or paper bags
3. Magnifying glasses
4. Paper and pencils
5. Rulers
6. Tape player with tape of animal sounds

### Background

The characteristics of living things – such as growth, sensitivity to *stimuli*, and excretion, are shared alike by plants and animals. However, there are differences between the two sets of creatures. If there were no differences, there would not be two sets! The one major difference is that plants *make food*, rather than feed off other organisms. This is a feature unique to plants and the whole animal kingdom depends on plants to do this, since animals cannot make food at all. The green chemical in the plants is able to “capture” the energy in sunlight and use it to build materials, such as starch and various sugars. To do this they need water and the gas called carbon dioxide. This process is called photosynthesis. The roots of plants take in water and minerals which are dissolved in it. Using these minerals, and the products of photosynthesis, plants can combine them in various ways to make proteins, vitamins and many kinds of oils and carbohydrates. These materials then provide the foods for all the animals which either eat the plants directly (herbivores), or eat animals (carnivores).

Animals are mostly free to move from place to place, using some form of limbs, or other body parts. Plants cannot do this, but they do move their parts, often in response to light or gravity, or water, or

temperature. Some flowers open and close each day, as the light increases and decreases. Roots move through the soil, downwards and sideways, searching for water and minerals. Leaves change their positions as the sun's position in the sky changes throughout a day. Buds open and leaves or flowers unfold from inside. All these movements are happening around us, but they are slow and we can easily overlook them. Plants cannot produce sounds “on purpose”, but animals can. They use a variety of methods. Some body parts are specially adapted for the purpose, such as the cheeks of frogs, whilst others are just put to work as sound makers, such as the trunks of elephants – their noses, which are mainly used for drinking and eating! This unit does not explore the reasons for, or uses of, animal sounds. It just focuses pupils' attention on the range of sounds which can be heard and the way we can use the sounds to identify the animals.

### Using the Pupils' Book

**Page 56** starts the unit with a sorting task, based on the picture. Individuals should do this task, then report their sets to the class. Two sets of letters should be recorded, rather than the names of all the items in the picture. The answers will reveal to you how well individuals can recognise plants and animals. Ask them how they know the difference before going on to Activity 1.

### Activity 1



You will need to decide before the walk begins where you will take the class. You will also have to have containers ready for the collection of animals and plants. You could warn the pupils in advance and ask them to bring containers from home. Each animal collected should be kept separately if possible. Transparent containers – plastic bags, glass jars, etc. – are best. Warn pupils about the danger of breaking the glass. Do not let

individuals collect more than two or three things. Once back in class, pupils can exchange items, when they have finished observing those which they collected themselves. If you do not have sufficient magnifying glasses for each pupil, give as many as you can to each group. You will need to demonstrate how to use them correctly. The glass should be kept against the eye and the object brought closer and closer until the image is clear and enlarged. Encourage the pupils to draw with care, making them large and detailed. The table should be used to record features of each item collected, with the shape column sometimes left blank as there will not be a suitable word. The drawings should stand in place of a named shape. Display all the drawings for comparison by the pupils. Differences such as limbs, or no limbs, leaves or no leaves, eyes or no eyes, should be the focus of conversation by the class. This will emphasise the animal/plant differences.

**Page 58** extends this concept by asking pupils to compare the cat and the tomato plant. Make sure that the class can see that there are some features of both which are the same, such as death and parents. Get the class to think of more similarities before you ask them to make the two lists. The pupils can work in groups or individually to list the differences between plants and animals.

### Activity 2

The groups should bring together whatever ideas the individuals have had. Introduce the word "characteristics" and encourage pupils to use it, after looking at the glossary to check on its meaning. After time to discuss, individuals should write their own sentences,

describing ways in which animals and plants differ. Try to help them make general statements about animals or plants, not about any particular ones. The summary at the bottom of Page 59 deals with the main points of difference.

**Page 60** moves on to one particular difference – the ability to make sounds. Let individual pupils choose the animal they want to imitate from the picture and ask them in turn to make the sound, so that the class can recognise the animal they chose.

### Activity 3



You will need to prepare a tape, or obtain it from someone else. The sounds must all be made by animals. Play each sound one at a time and ask pupils to identify each one. This activity allows pupils to apply their knowledge of pitch and volume to the recorded sounds. The answers should use words such as "lower pitch, higher pitch, louder, softer, highest, lowest, loudest, softest", etc. Once the taped sounds have been discussed, let the groups choose a number of sounds to imitate and give them time to prepare a "sound picture" for the class to listen to. When all groups have performed, put the sounds to use in the song suggested, or some other songs which include animal noises. There are many opportunities to link this topic with music and poetry.

### Additional Activity

Display the new words which came out of the discussion about plant and animal characteristics. Add them to the class Word Bank.

## CARING FOR ANIMALS AND PLANTS pages 61 to 64

### General concepts

Living things have certain needs which must be met if they are to go on living. Animal movements vary from animal to animal.

### Materials

Various items and materials which pupils can use to make homes for their chosen plants and animals, e.g. boxes, plastic bags and pots, glass jars, wire, string, cardboard, sticks, stapler.

### Background

Taking care of a living thing is a good way to learn what its needs are. Certain needs will be common to all the creatures chosen by pupils, as they are the basic needs of life – water, air and some kind of nutrients. Plants will have to be given light and most will require soil. Animals will have to be fed suitable food and this will vary from animal to animal. Pupils cannot be expected to know all the specific needs of the creatures they choose to collect and care for, so it

is important to provide them with sources of information before they begin. Water is essential to all life, because the cells of which tissues are made are filled with a solution of chemicals which keep the processes of life going. If the creature lacks water, these processes begin to fail and the cells die, which eventually leads to the death of the whole organism. Air is the other vital material for life. It contains many gases, but the two used by living things are oxygen (needed by plants and animals for respiration) and carbon dioxide (needed by plants to make food).

## Using the Pupils' Book

### Activity 4



The picture at the top of **Page 61** should be used to start the pupils discussing the idea of caring for a plant or animal. It should give them some help in planning the "shelter" for their chosen creature. The first issue is to choose which one to care for. Obviously there are practical issues involved – how easy will it be to find/collect the creature, how difficult will it be to provide what it needs to stay alive in class. For instance, sea creatures may be easy to collect, but they will be very difficult to keep alive away from the sea. Reference books and other sources of information are essential as the groups prepare to begin caring for a creature. They should make a plan in writing so that you can see how well prepared they are, before letting them collect a creature and bring it to the class. The shelter plan should include the materials to be used, how they are to be fitted together and, if items need to be bought, what the cost will be. Few groups should need to spend any money, as creatures are likely to be small and containers can be adapted to house them. The making of the shelter should be recorded. Drawings are the simplest way to record a process, with a picture at each stage from start to finish. Point 6 is very important. It requires pupils to think of the evidence they will use to answer their questions about feeding, growing and moving. Animals will be given food. If it is weighed before being put in the animal shelter and then again some time later, the difference in weight could be used as a measure of what the animal has eaten. Measurements of an animal's length, thickness or mass, for example, could be used to monitor growth. Movements are simple to record for animals, especially if a sketch is kept of where the

animal is each time an observation is made. Observing for a period of time, say five minutes, can also reveal the animal's movements.

In all three aspects, it is harder to answer the questions about plants. They do not feed in the sense which animals do. This question does not apply to them. Growth can be measured. Total height/length of a plant can easily be measured, as can the length/width/area of a leaf. Flowers can be sketched from the opening of the bud, through the stages of its growth, till it withers and dies. Plant movements are hard to "see" as they are so slow. However, if the position of a particular leaf or flower is carefully noted early in the day and then again later, it may be clear that it has changed its position. This will be more likely if the plant is not kept in full sunlight all the time. The record of observations, with dates and brief notes, is essential. This is good scientific behaviour and is developing the skill of recording which will be used throughout the pupils' science education. It is necessary to return the creatures to where they were found, as this is good conservation practice, which we are trying to teach to the pupils. Comparison of the observations will reveal similarities and differences amongst the animal group – they feed on plant or animal foods, they move by hopping, walking, sliding, etc., they grow heavier, longer, fatter, etc. The plants may show similar patterns of growth, with more/larger leaves/flowers, taller stems, longer roots, etc.



**Page 63** moves on to the topic of animal movements. Let each pupil choose an animal to imitate. After a short practice, each child should perform the movement, without telling the class the name of the animal. The class should try to identify the animals from the movements. The chosen animals should then be drawn, with notes on its food, movement and habitat. There are plenty of language links with this activity. As suggested, a poem or story could be written to go with the picture. Make a display of all the work for the class to share what has been done.

### Additional Activities

1. Read the story "Accident". Get the pupils to identify the problems included in the story which are connected with caring for the cow.

2. Read the poem "Jenny's Animal Book". Use it to initiate drawings and creative writing by the pupils about their favourite animals. Make a class book with the pictures and writing.
3. Use the internet and e-mail to communicate with pupils in other parts of the island and the world, sharing information about the growth, movement and feeding habits of animals and plants. Pupils should compare the information with what they can find out about local plants and animals.
4. Read the story "A Bad Drought". Pupils should explain how the plants and animals in the story were affected by the lack of water.

## USING PLANTS AND ANIMALS pages 65 to 68

### General concepts

Plants and animals produce many things which we can use for a variety of purposes. Plants contain materials which we can use as medicines.

### Materials

1. Paper and pencils
2. Rulers
3. Squared paper
4. Coloured pencils/pens
5. Glue, paste or flour
6. Newspapers
7. Scissors
8. A bowl or bucket
9. Leaves, sticks, seeds, straw, fruits, bark
10. Cotton wool
11. Collection of plants used for medicine

### Background

Plants form the basis of food for all the animals on earth, including humans. We eat all the different parts of plants – the leaves, the stems, the roots, the seeds, the fruits and even the flowers of some plants. Cereals form the largest part of the world's staple food, produced by various grasses, such as rice, wheat, maize and millet. People have been collecting and cultivating grasses for thousands of years and science has helped to breed more productive and healthier varieties. The seeds of the cereals are full of starch, an energy rich material which is easy for our bodies to digest. We have learned how to cook it in various ways, turning it into bread, porridge, cakes, pasta, noodles, biscuits, etc. It is a very versatile foodstuff. Potatoes are another source of starch. They originated in South America, but are now grown all over the world, especially in the colder regions, where some other crops do not thrive. Sugar, another energy rich material, is produced from a giant grass, sugar cane, and also a root vegetable, sugar beet. The first requires a hot climate and the latter grows in colder climates. A great variety of fruits is grown and eaten

by people. Different fruits come from different regions, depending largely on the climate, though there has been a lot of transfer of plants from one place to another as people have migrated around the world. For example, pineapples originated in the Americas, but are now grown in Australia and parts of Africa. We obtain examples of all the food groups from plants, though they do not have such concentrated amounts of proteins as animals. Animals of many kinds are used as food. Fish, birds and mammals are the most common sources of meat, but other animal types, such as reptiles, insects and molluscs, are eaten in some parts of the world. We eat their bodies, their eggs, their milk and, in some cultures, their blood. Like plants, we can obtain a wide range of food groups from animal foods.

Plants are also unique in producing a material called cellulose. This is the basis of wood and, from that, paper. Wood is a most useful material, as it is relatively easy to work with, is very strong, can be shaped in numerous ways and is suitable for making boats, furniture, buildings, tools and a great many other things. People have been using wood for thousands of years for home building, etc. It can be beautiful, as well as useful.

Fabrics are another ancient product from plant materials, such as linen, cotton and even bark. These materials are composed of fibres which can be rearranged to form threads for weaving. Animals also produce fibres, such as wool and fur, which can be made into clothing, etc.

Plants have been used as sources of medicines for thousands of years, long before science became involved. Herbs of many kinds have been used to treat a wide range of illnesses, even though the traditional doctors/herbalists did not know how or why the medicines were effective. Recently, modern scientific medicine has begun to take more notice of these ancient remedies and there is a serious attempt to preserve both the plants and the knowledge, before they are completely lost. There is the hope that, in the

tropical forests of the world, there are plants which could hold the cure for many diseases, which at present we cannot combat successfully.

## Using the Pupils' Book

### Activity 5



Individuals should make their own lists, then share them with the class. You could collate their lists on the board, so that the class can then add items to their own lists and discuss the picture which has emerged – that we have many uses for plants and animals. Leave the individuals to choose which four plant and which four animal products to draw. Encourage them to draw large pictures, with as much detail as possible. Let the class have time to look at what has been drawn. Individuals should then sort their own lists of plant and animal products into the 5 sets listed, before turning the figures into a bar graph. If you have no squared paper, let the pupils use a ruler to measure in centimetres for each column. The graphs should be shared in some way (hold them up, pass them round, display them on the wall, lay them out on the desks for pupils to move around and look at, etc.) They should make comparisons and try to conclude which are the most common items, etc.

**Page 66** continues the topic with a picture of certain objects made from plant or animal materials. The task is to identify which parts of the plants or animals have been used to make the items. Beads can be made from seeds and bones. Other jewellery may have feathers included. Musical instruments are often made of wood, with animal guts used for strings or skins to cover drums and tambourines. Wooden spoons, bowls and chopping boards and handles for knives, etc., are very common throughout the world. The skins of gourds can also be dried and used as containers of various sizes, as well as shakers for music. Animal horns can be made into instruments, ornaments, buttons and cups.



The second picture should be used to help pupils imagine being one of the plants or animals which are so useful to people. This is a creative writing activity and can easily be developed further as a language activity.

### Activity 6

Allow pupils to choose which model to make.



You may choose to collect the materials before the lesson, or it may form part of the activity to go out and find some of them. Guide the pupils to make models of a reasonable size, so that they do not take too long to complete and do not use large amounts of materials. If pupils are not familiar with *papier mache* making, you should guide them through the steps shown in the pictures. The secret is to tear the paper small enough to be able to mash it with the hands once it is soaked. The raw materials for the other models should be collected as far as possible from the surroundings of school or home. Make a class display of all the models once they are finished. Some should be painted to complete them. The class should spend time looking at them and talking about them.

**Page 67** then goes on to the separate topic of plants used as medicines. The plants in the picture may not be familiar to the pupils, so let them have time to look closely at it.

### Activity 7

The task is to identify which parts of the plants are shown in the picture on Page 67. The names should be copied into the science exercise books. Groups should discuss their ideas about the uses. They may know a lot or nothing about the particular plants shown. If you do not know their uses, you should ask someone in the locality to give you the information, or consult a book or other source. From the information you can provide, the pupils can make short notes against each of the names in their list.

### Additional Activities

1. Read "The Talking Tree". Discuss with the pupils the meaning of any unfamiliar words. Pupils should learn to spell them. Using them in sentences will help them to do this. They could then draw pictures of animals and plants to go with their writing.
2. Invite someone who knows about the origins of foods to visit the class and give information to the pupils about which foods come from plants or animals. Pupils should make notes and drawings and create a scrap book to put them in.
3. Teach the class to sing songs such as "Elena an" or "im Muma go a grun". Once

known, the pupils should dramatise the story told in the song, emphasising care needed when using plants for medicines.

4. Read the story "Going to the Concert" or "Sunday School" and then ask pupil groups to discuss the various ways we use plants and animals for transportation and recreation.
5. Go on a field trip to a large, fast-flowing river (e.g. Rio Grande, White River) and observe river rafting. Each group of pupils

makes a model raft from bamboo on returning to school. Teach the class to sing "Rafting on the Rio Grande". If a field trip is not possible, look at videos or other pictures, e.g. from tourist literature, newspapers, magazines, etc.

6. When the pupils mimic the movements of various animals, play appropriate music for them to move to (e.g. slow, fast, smooth, jerky, loud, soft).

## CARING FOR THE WORLD'S DIFFERENT ENVIRONMENTS pages 69 to 72

### General concepts

Plants and animals have places where they "fit" best, because the particular environment provides them with all they need. People must protect all these environments, to prevent the death of the creatures which live there.

### Materials

1. Notebooks and pencils
2. Scissors
3. Paper or card
4. Glue
5. Thread
6. Coloured pencils or pens
7. Cardboard boxes
8. Tracing or greaseproof paper
9. Sticks or wire
10. String

### Background

The world has a great variety of different places where plants and animals can live. These environments are called habitats and each one has particular characteristics of weather, soil, light and shade and *competition* from other organisms. Animals and plants survive best in a habitat to which they are adapted, i.e. having characteristics which allow them to live successfully in a particular place. For instance, sea creatures are adapted to life in salt water. River fish would not survive in the sea, as they are adapted to fresh water. Mangrove trees are adapted to living in areas of swamp, with special roots which grow out of the mud and allow the plants to take in oxygen and "prop" roots which raise the plants above the level of the mud and allow them to survive the daily tidal movements of the sea. All creatures, including human beings, have adapted to where they live. People are all one species, but appearances vary. The darker

skinned people are best adapted to life in the hottest, tropical parts of the world, whereas the paler skinned people survive better in the colder parts of the world. It is no accident that human beings from different continents look different. It would be extraordinary if we all looked the same! Our ancestors have adapted to the places in which they settled. This is a very slow process and its effects cannot be seen in one generation, but over time the people of the world, who probably all originated in Africa, have gradually become differentiated into various ethnic groups. There is only one human **race** – we are all of one species, but there are local variations, which reflect the adaptation of people isolated from one another over time and space. The same process has happened to all living things, in response to the particular features of any habitat in which they tried to survive. As people, we are responsible for maintaining the rich diversity of habitats, so that the full range of plants and animals, which have gradually developed, can survive into the future. Pollution, destruction of the natural vegetation and careless exploitation of natural resources, all lead to the loss of habitats, with the loss of living things too.

### Using the Pupils' Book

**Page 69** focuses pupils' attention on a familiar "habitat" – the school yard, in which they live for a time each week. They are asked to compare the two versions and say why they would choose one of them. They may not all choose the same one, so allow them to express their different opinions, but insist that they explain their choices. The groups could make plans for their "ideal school yard", drawing scenes from imagination, but based on the actual size and location of the yard they have. A display of the plans and drawings is bound to set off a valuable discussion about the merits of one plan over another. Lead the

conversation round to the second picture on the page, where several local habitats are shown. Let pupils look at them and express their feelings and knowledge. This should be used as the introduction to the nature walk, when the focus will be on the variety of habitats found locally.

### Activity 8

You must go out prior to taking the class on the walk, so that you can plan the most varied route, taking in as many habitats as possible, e.g. grassy, wooded, seashore, rocky, riverbank, roadside, garden, farmland. Before setting out, make the objective of the walk clear to the class. They should be ready to focus on the physical characteristics of each habitat, plus the kind of plants and animals found in each one. Plain paper books or sheets would be ideal for their sketches and notes, which must be made as they move along, rather than on return to class. Once the walk is over, let everyone look at one another's records of the walk. There may be disagreements about habitats, or the creatures living there, so allow a discussion after pupils have had time to look and read what others have done.

Page 70 ends with a picture which sets pupils the

challenge of matching creatures to suitable habitats. This is an opportunity for them to apply what they have learned about adaptations to habitats. Three live in water, two in dry places and one in a forest. The appearance of the creatures shown should give the pupils some clues about where each one lives and they can base their descriptions on that.

### Activity 9



art



technology

This is as much a craft activity as a science one. It allows pupils to create items which express their understanding of a chosen habitat, with its living things in place. Provide materials for them to look at before they begin the construction of the mobile or the peepshow. This will help them in their planning. The groups should be small enough for all pupils to be fully occupied in making the many parts involved. This activity has potential to develop social skills of cooperation and negotiation. The products are intended to be seen and enjoyed, so they must be displayed in suitable places. The mobiles should be hung high in a space where they can turn freely. The peepshows must be on desks or ledges low enough for pupils to look into them. Discussion should then focus on the beauty of natural places and how easy it is to spoil them by careless behaviour.

## PROTECTION



## Pages 73–77

### General concepts

Animals and plants protect themselves in various ways, but people must also take care to protect the natural world and everything which lives in it. Human beings are not separate from the natural world – we are part of it.

### Materials

1. drawing paper
2. pencils
3. books about plants and animals

### Background

All animals react to threats and danger in some way. If escape is not possible, they may use a variety of defences to overcome the attack from a predator or rival. Adaptations of various kinds have developed which are particular to certain animals. Weapons, such as teeth, claws, horns, stings and other poisonous bites, are some of the defences used. Other animals

have defensive structures, made by themselves, or borrowed for the purpose of giving them a safe place to hide from enemies. Shells, spines, thick skins and holes in the ground or trees, offer protection to animals which may be unable to escape fast enough. Some plants have also developed self-protection. Poisons, stings, thorns and thick coats on seeds and stems are some of the forms of protection used by plants.

Human behaviour can be another source of protection, especially now that we are so aware of how much damage people have already done to the world. If we choose to help, the plants and animals in our communities can be better protected. There are various ways of doing this. One is to control our destructive behaviour, so that we cut out or greatly reduce the damage we all do to the environment. Others, are to take positive steps to improve the protection of plants and animals. Three examples are suggested which can all be attempted by young

children. These can help the children to understand the objectives of environmental protection, in a practical way.

The total failure of protection, leads to the extinction of plants and animals. Such losses are not all caused by human activity, but many of them are. To lose any creature is a careless mistake, as we now realise how all living things are connected with one another in the web of life and this includes ourselves.

### Using the Pupils' Book

**Page 73** introduces the topic of protection with the pictures of animals and plants that have some way of defending themselves. Let the groups of pupils discuss what they see and help them to focus on the aspects of each creature that are protective e.g. the hermit crab's borrowed shell, the tree's thick bark. Once you are satisfied that all the features have been observed correctly, collect them from the groups and write the list on the board for the class to copy.

The collection of other examples can be started in class as an individual activity, then carried on at home and in the wider community, through observations by the children and by asking adults. Pupils must make notes and drawings so that they can later share them with the class. Add the new examples to the list and get the class to copy them.

**Page 74** allows the children to express some of the information they have gathered. If they have understood what they have found out, their actions and sounds should be accurate demonstrations of the animals' protective behaviour. Let the class observe them one by one and try to identify them. This activity has strong links with drama and could be developed into a scene telling a story about an animal which is able to protect itself when threatened. The use of sounds by some animals to warn one another of danger is very important. Pupils will probably already know that dogs and birds make loud noises when there is a threat. Animals which live in groups often use sounds to spread the message when there is an attack. Let pupils talk about any examples they may have from their own experience.

**Page 75** provides some more examples of three ways animals have of protecting themselves. Let the class look at the pictures and ask individuals to explain what the pictures show. Keep them focused on the issue of protection.

**Page 76** begins with a group discussion task. You can let the groups choose which of the three situations they want to discuss, or you can decide that for them. Give the groups enough time to share their ideas and to come to a conclusion so that they can answer the two questions: 'What would happen?' and 'What are the bad results of such behaviour?'. You are hoping

for answers such as:

1. The nest with eggs would be destroyed and so their would be fewer young birds. This would reduce the population of adult birds and so there would be fewer birds mating and producing young. The loss of the nest would help to damage the survival of that particular type of bird.
2. Without plants, the animals which depend on them for food and shelter would be unable to live there. Either they would move away to other places or they would die. Whichever result came about, the area would be completely without animals of any kind until some plants were able to return.
3. All the animals which used to feed on the one which has been killed off will have to find alternative food. This may not be possible, so those animals would also die out. The death of all the animals of a particular kind means that it will never be able to return – it is extinct for ever, lost and gone.

### Activity 10

This is a group project which should be done over a period of time, rather than in one session. Groups should be allowed to choose which of the three options they want to work on. Let them have a brief time to share ideas about what they need to do and then stop them to check that all the groups have properly understood the task they have chosen. Once you're sure they are clear about the tasks, let them continue. The first session could get as far as the planning, which should answer the four bullet points under number 2. The second session could let the groups start the drawing and note making, drafting the text for the finished plans and choosing the content and sizes of the pictures.

The final session could see all the parts of the plans finished and put together in a form ready for display. The plans should be spread around the room, not bunched together. Once all the groups have displayed the plans, let the class move around the room to read the plans and look at the pictures. If two or more groups have made plans for the same project, encourage the children to compare them and explain which they think is best. Do not expect perfect or complete project plans. The pupils are young and do not have the knowledge and experience to think of everything related to such activities. When you bring the class together to make conclusions about the

activity, focus on the useful and important ideas about protection included by pupils in their plans, rather than any deficiencies which there might be.

**Page 77** is not for the pupils to copy, but it can be

used to give them help in thinking about what they are trying to do in Activity 10.

The final point on the page is very important and should be emphasised. Human beings have to accept that they are just part of the natural world not something separate.

# Using Pupils' Book 3 / Year 3

## Term 1 Unit 1 My body (Part 3)

### Objectives

Pupils will:

- Name and locate different types of teeth and match them with their uses
- Make inferences about types of teeth and their properties – colour, shape, texture (rough, smooth, hard)
- Distinguish between temporary and permanent teeth (number, shape, size)
- Illustrate approximate location of teeth, stomach and lungs
- Make observations about the relationship between types of teeth and their uses
- Relate information about teeth, stomach and lungs in sentences, using S.J.E.
- Describe the appearance of the stomach – size, shape colour and texture
- Discriminate between inhaled and exhaled air
- State reasons why we should take care of our teeth
- List ways to take care of teeth, stomach and lungs
- Identify factors which contribute to good health
- Identify foods according to groups and nutrients
- Discuss what each nutrient contributes to the body for healthy growth and development
- Discuss some problems which result from improper diet
- Describe ways of preparing food
- Identify favourite foods and suggest how they are prepared
- Identify and describe some dietary customs which conform to guidelines for good health and stated religious practices
- Discuss hygiene practices to be followed in preparing foods
- Group teeth in a variety of ways (e.g. temporary, permanent, type, size, shape, uses)
- Collect and record attribute data
- State ways to show that regular exercise enhances the development of the body
- Identify and list ways in which exercise affects the body
- Demonstrate activities that create physical stress and fatigue

**Time allocation: 7 weeks**

## Discussion of concepts and skills

This very large unit covers a number of separate topics. They extend and develop the topics covered in Grades 1 and 2.

Teeth are looked at in detail, with their positions, shapes, sizes and functions being focused upon. The concepts involved will be new; children know they have teeth and use them to eat food, but they will not have looked at them in the scientific way – linking form and function. The topic also includes skills practice, with data collection, recording in graphs and interpretation of graphs.

Two more internal organs are investigated – the stomach and lungs. Again, their position, form and function are focused upon, developing pupils' understanding of what goes on inside their bodies.

Care of the body is a topic which revisits some concepts taught in previous Grades – such as personal hygiene, food and drink and resting. These are linked directly with the concept of healthy growth and

development of body, mind and spirit. Measurements of body parts are carried out, with graphs used to record them. This activity focuses on physical growth, with others dealing with exercise and good health. The same issues are dealt with as in earlier Grades, but the level of detail and the depth of understanding are significantly increased.

Finally, food is treated as a separate topic. The food groups and functions are recapped, then the concepts involved in food hygiene are introduced. Dietary rules of various religious groups are once again looked at, before the topic moves on to the scientific way of sorting foods, based on their nutrient content. This is a new set of words and ideas which will have to be matched with what pupils already know about food group and functions. Sorting plays a prominent part in the activities of this topic. It ends with the concept of diseases caused by deficiencies in the diet, which involves a lot of new vocabulary, as well as new ideas.

## TEETH pages 1 to 8

### General concepts

Teeth have various shapes and sizes. They are arranged in a particular order in the jaws, with a fixed number of each type. Each type of tooth has a special function. We have two sets of teeth during our lifetime – the milk teeth and the permanent teeth. We have to take care of our teeth to prevent decay.

### Materials

1. Notebooks and pencils
2. Mirrors
3. Various foods
4. Card
5. Scissors
6. Rulers
7. Squared paper

### Background

Science always tries to relate the form of body parts to their functions. In the case of the teeth this is relatively easy to do, as the teeth are arranged in an order which is directly related to the work they do in eating food. Since food must enter the mouth at the front, the sharp edged cutting and biting teeth – the incisors – are located at the front of the jaws, where they can cut off pieces of food and deliver them to the tongue, for pushing back towards the chewing teeth. At the sides of the jaws are the tearing teeth – the canines –

which can be used to tear through very tough food. The jaws act as levers when they are closed, so they exert a great force on the food. This is particularly the case at the back of the jaws where the grinding/chewing/crushing teeth are found – the pre-molars and molars. The shapes, sizes and surfaces of the teeth are matched to their functions. Some are smooth and sharp for slicing easily into and through the food. Others are bumpy and ridged for breaking, smashing and shredding the food.

Tooth care is essential if individuals are to retain teeth for their lifetime. Even milk teeth must be cleaned and kept as free of sticky, sugary foods as possible. If they decay, the permanent teeth, which are forming below them in the gums, can also become damaged. The only remedy then is to have dental repairs done or, as a last resort, to have false teeth. Tooth brushing, with paste, should be established as a habit from the earliest possible age and a low sugar diet should be eaten throughout life; these are the two main defences against loss of teeth. The value of the permanent teeth, as the second and last set we have, needs to be emphasised. Loss of the milk teeth is normal and can be expected to happen during the child's early years at school. They are pushed out, rather than falling out. The growing permanent teeth push from below and the smaller, more shallow rooted milk teeth are loosened and pushed out of the gums.

## Using the Pupils' Book

**Page 1** introduces the topic of teeth with pictures of teeth for pupils to look at. The task is to sort out the human teeth. All the teeth are to the same scale, so this should help them to choose correctly. The activity focuses attention on the many shapes and sizes of teeth, which leads directly into the activity below.

### Activity 1

If possible, give a mirror to each pair of pupils. If you cannot do this, either give as many as you can to each group, or alternate this activity with some other work, so that all pupils use the mirrors in turn. The sentences should refer to the smoothness or roughness and the sharpness or bluntness of the teeth, as well as the pointed, flat or sharp wedged shape and the fact that the teeth are of different sizes. The wide, bumpy topped teeth are towards the back of the mouth and the sharp, thin edged teeth are at the front. Once the diagram has been copied, the pupils should use the names from the diagram to identify the teeth in their own mouths. They will not have molars because they are not old enough. Molars are part of the permanent teeth, not the milk teeth.

### Activity 2

Provide some foods which need to be bitten off and then chewed before they can be swallowed, e.g. hard fruits, hard bread. The incisors will be used to bite/cut pieces off the food. The pre-molars will be used to chew the food. For the gripping and tearing of fibrous foods, such as tough meat and some fruits and raw vegetables, the canines will be used. Let the pupils tell one another what their answers are before they begin the writing of the incomplete sentences.

### Activity 3

You must decide which approach you will use for this activity. You can make the card sets for the pupils, or you can provide the blank sheets of card for the pupils to make them.

Either way, each group will need enough for 20 separate cards. Each card has one piece of information on it about the different types of teeth. Once they are made, the cards can be used as a game, to test what the groups or individuals have learned about teeth. It could be played as a competition between groups, to see which can sort them correctly first.

### Activity 4



The class should look at the pictogram and bar graph at the top of Page 6 and you should explain them to the pupils. Let them ask questions so that they fully understand what they mean and what the difference is between them. Once you are confident that they have understood, put the class into groups. Every individual in each group must count and draw for themselves, so that they all produce two records of the number of teeth within their group. Keep the groups small so that the numbers of teeth are not too big for counting and drawing. The questions should be answered by each pupil for themselves: a) canines, b) incisors and/or pre-molars. Let them compare the graphs from the other groups, because they will probably find that the numbers are not all the same for every group. This is to be expected, as the children are losing their milk teeth and different individuals will therefore have different numbers of teeth in each set.

**Page 7** presents pupils with a challenge in the form of interpretation of a picture. The gaps are due to the loss of milk teeth, a natural part of growing up. So it is not an accident and it is not a sickness. The story you tell can be taken from a book, or made up by you. The story should deal with the issue of all the children of the same age losing some of their teeth at the same time. The point of the story is to emphasise that teeth are either milk teeth, which will be lost, or permanent, which we have to use the rest of our lives. It is essential that there is a discussion after the story, so that pupils have the chance to share their ideas and opinions. It will also give you the chance to check that everyone has understood that we have two sets of teeth, etc.

## FEEDING AND BREATHING pages 8 to 14

### General concepts

The stomach is an elastic bag at the top of the abdomen (belly). The food and drink we swallow goes

into the stomach, where the process of digestion begins. The lungs are two elastic bags in the thorax (chest). They are used for breathing. The ribs, chest

muscles and diaphragm are all involved in breathing in and out. Their movement causes the air to be inhaled and exhaled.

### Materials

1. Notebooks and pencils
2. Cups and water
3. Balloons
4. Y-shaped sticks or card
5. Scissors
6. String
7. Plastic bags
8. Straws
9. Clay or Plasticine
10. Card
11. Bicycle inner tube

### Background

The stomach is at the bottom of the gullet, or oesophagus, down which our food and drink pass when we swallow. It has powerful muscular walls, which are elastic. This allows it to accommodate the different amounts of food and drink which pass into it. The muscular walls are used to squeeze and relax, so that the food inside is mixed and churned. This helps to break down the solid pieces of food into smaller and smaller pieces. At the same time the walls are adding special chemicals – enzymes – to the mixture. These attack the various foods and begin the process of digestion – the breaking down of the complex foods into the simpler substances from which they are built. It is these simpler substances which our bodies can then use to build our cells and tissues, as well as providing us with the energy we need to stay alive. If our diet contains too much acidic food – such as pickles – we can damage the lining of the stomach and suffer severe pains. This can go on to develop into ulcers – holes in the lining of the stomach wall.

The two lungs are also elastic, but they have much thinner walls. Their role is to exchange gases between the blood and the outside air. The body must have oxygen constantly for its survival. There is oxygen mixed with many other gases in the air around us. Somehow that oxygen has to be transferred to the cells of the body which need it if they are to stay alive. The lungs are the organ which brings the air and the blood close enough together for the oxygen to cross from one to the other. Oxygen dissolves in the liquid covering the inside walls of the spongy lungs. A thin wall separates this liquid from the blood, which flows through the lungs in millions of tiny blood vessels – the capillaries. Oxygen passes through these thin walls into the blood stream, where the red cells absorb it and carry it back to the heart, which then

pumps it out to all the parts of the body. All the body cells produce a waste gas – carbon dioxide – which must be removed from the body. The lungs are used to expel this waste gas back into the atmosphere. The same processes are used as with oxygen absorption, but in reverse. The gas, dissolved in the blood, travels to the heart from all the parts of the body. The blood is then pumped to the lungs where the carbon dioxide passes through their thin walls and becomes a gas again. When the lungs are squeezed by the muscles of the chest and the *diaphragm*, the carbon dioxide is pushed out of the body. This is exhalation. The lungs cannot inflate and deflate themselves. This increase and decrease in size is caused by the expansion and contraction of the chest, as the ribs are either pulled up and out by chest muscles, or pushed down and in by those same muscles. At the same time as the ribs are moving, the sheet of muscle under the lungs, called the diaphragm, is moved. During inhalation it moves down, increasing the volume of the chest and helping to draw air into the lungs. During exhalation, the diaphragm moves up and reduces the volume of the chest, which pushes the air out of the lungs. The lungs do not extract all the oxygen from the inhaled air, so some oxygen is exhaled along with the other gases in the air. Similarly, there is carbon dioxide already in the air before it is breathed in, but exhaled air has a higher proportion of carbon dioxide. The whole process of exchanging gases in the lungs depends on their inner surfaces remaining wet. When air is exhaled it is always moist because water evaporates into it whilst it is inside the lungs. The lungs are very smooth on the outside, which allows them to move easily inside the chest. The ribs are essential to the process of breathing in and out, but they are also important as the protection of the lungs, which are relatively soft and delicate. The windpipe must never become closed, as this would stop the air getting into the lungs. The pipe is enclosed in a series of C-shaped rings of cartilage, which keep it open, even when we bend our necks in any direction. Breathing through the nose is best because the cavities behind the nose contain sticky *mucus* and hairs, which trap dust and other solid particles, such as germs, in the air. This cleans it before it passes down into the lungs. The nose should be blown regularly to remove all the material which it has trapped. The cavities are also wet, which means that the dry air is moistened as it passes through them and this prevents the drying of the inner walls of the lungs.

### Using the Pupils' Book

**Page 8** introduces this new topic with a picture and a question. Use it with the class to focus their attention on the two activities – eating and breathing, with the

names of the organs being provided by the pupils if possible. If not, you should introduce them at this point.

### Activity 5

This is a small exercise which lets you know how much the pupils know about the location of their internal organs. Once they have shown what they think, let them look at the diagram together, dealing with any queries they may have. Then get the class to copy it into their exercise books and label the organs. The most important points are the locations and the sizes and shapes of the lungs and stomach.

### Activity 6

Each child should do this for themselves, so it may be necessary to do it with a group at a time, so that there are enough cups for each child to have one. The result of drinking the water should be an expansion in the stomach, which pupils will be able to feel pressing against their hands.

### Activity 7

If possible, this should be a group activity. You can provide the forked sticks, or you can let the pupils bring them. Alternatively, you can cut large Y-shaped pieces of card. Let the pupils decide how to put their models together, by referring to the picture on Page 9, or the picture alongside the activity. Once the class has had the chance to look at the models, let pupils use balloons to show how the lungs change as we breathe in and out. If they have understood what has been done so far, they will realize that the balloons should be blown up to model breathing in and allowed to deflate, to model breathing out. The one big difference between the model and the reality is that air is pushed into the lungs, because the pressure inside the chest is lowered when the ribs and diaphragm move to expand the chest. The atmospheric pressure, then being higher, pushes air into the lungs. In reverse, when the chest is contracted, the pressure inside the lungs is raised. This pushes the air out of the lungs, back into the atmosphere.

### Activity 8

This is a similar exercise to the one with the expanding stomach. The pupils should feel their chests expanding. In particular they should feel the ribs moving up and out as the chest muscles pull against them. As they breathe out, they should feel the chest contracting, as the ribs are lowered and moved inwards. Once they have talked about their observations, the class should look at the diagrams of the processes of inhalation and exhalation and apply them to what they have just observed. Ask them questions to explore how well they have understood the actions of the lungs.

### Activity 9



art



technology

This activity gives pupils the opportunity to be creative and imaginative, as well as showing their understanding of the three body parts. Let each pupil choose which model to make, using the materials as they choose. Tooth models could be larger than life-size, so that they make the small details clear for those looking at them. That is for you to decide. The limit may be the amount of material available for model making. If you do not have enough for every pupil, this activity can be done by groups. Put the models on display for the class to see and encourage them to talk about them. The activity has obvious links with art and technology.

Page 14 has a picture which should be used to get the class thinking about problems associated with the three parts of the body. Let pupils share their ideas about the three problems. Do not attempt to correct what they say. The value in letting pupils express what they think is twofold: it allows you to find out what their level of knowledge and understanding are and it gives them the challenge of explaining their thoughts to one another. Prevention ideas should deal with changes in diet to reduce the amount of sweet foods or acidic foods, increasing the cleaning of the teeth and regular visits to the dentist. Prevention of lung diseases would focus on smoking and polluted atmosphere in cities and towns. Remedies involve dental treatment, *antacid* medicines or even surgery and *radiotherapy* and *chemotherapy* to attack the lung cancer. Some of these may not be known by the pupils, so you should add what is missing from their ideas.

**Activity 10**

language



music



drama

This is a language, music or drama based activity which gives pupils the choice of expression which they prefer to convey their ideas about problems with teeth, stomach or lungs. Whichever form they choose, it should include the three issues of the cause, the remedy and the prevention. It should form a kind of narrative of the problem. The products must be shared, maybe over a number of sessions, to allow everyone to have their turn. Discussion should follow each one, with comments on the content more than on the quality of the presentation.

**Additional Activities**

1. Obtain an animal's stomach or a large picture of one. Display it for the pupils and encourage them to talk about what they see. They should keep a record in drawings and/or notes of their observations of size, shape, colour and texture.
2. Let groups choose which organ they want to "dramatise" in a mime, dance or drama, to express the function of the organ (i.e. tooth, stomach or lung).

**GROWING AND LEARNING**  **pages 15 to 20****General concepts**

Care of the body is the basis of healthy growth and development. The concepts of hygiene, good habits of rest, exercise, feeding and sleep are added together with the notion of learning. This involves the mind and the character or spirit. All aspects of a person need to grow and they all need care.

**Materials**

1. Paper
2. Paints and brushes
3. Posters
4. Magazines and books about growth, the body, etc.
5. Tape measures or metre sticks
6. Rulers
7. Bathroom scales
8. Notebooks and pencils

**Background**

The growth of the body follows a sequence of stages which proceed smoothly, so long as the body is provided with the things it needs from birth onwards. A minority of babies are born with *genetic* conditions which interfere with this normal development and they have problems of various kinds as they get older. For the vast majority, the body will grow and develop if it has the appropriate "materials" – the balanced diet, the fresh air, the clean water, the shelter of a home and clothing, the rest and exercise, the support of a loving family and friends, the chance to learn information and skills which can be used in everyday life. Similarly, the mind absorbs ideas, facts and skills from the daily experiences of life. A rich, varied, stimulating environment for a child will support rapid learning, whereas a dull, empty, un-stimulating one

will slow down the development of knowledge, understanding and skills. Play is vital to the mind's progress and children who play with adults can benefit even more from the experience. Skilful adults, such as teachers and some parents, can structure the play, so that the mind is challenged by questions, or practical puzzles, or tasks. This is "food" to the mind. The spirit or character of a child likewise needs to be taught. There are major concepts such as honesty, trust, cooperation, respect and courage which need to be learned, so that children are prepared for their adult places in society. Behind all this teaching and learning, whether in the home, the school or in the wider world, is a network of love, which expresses itself in the provision of everything needed by the growing child.

**Using the Pupils' Book**

language



drama



social studies

**Page 15** opens the topic with a large picture where all the aspects of body care are brought together. Most of what is shown has been taught in previous grades, so this is a kind of recap on what the pupils should know already. The discussion should just be a way of reminding pupils what has been done before and for you to check that they have remembered it correctly. The list of local, traditional forms of care should be written by you on the board, collecting the ideas provided by the pupils. Once it is complete, they should copy it. Then individuals should choose either to write a story on their own, or to devise a short play with other pupils. The story or play must make use of ideas from the list which the class has produced. The stories and plays should be shared with the class for

comment. This activity is as much language, drama and social studies as it is science. In fact many of the traditional ways of caring will probably be much older than the scientific ideas and may not agree with what science now says about such things.

**Page 16** summarises the concepts of care as they relate to the body, mind and spirit. Use it to check that pupils have understood the principles involved in growing and developing as a healthy human being.

**Page 17** shifts the focus to the way we change as we get older. This is an idea which the pupils will be well aware of, as they are in a period of quite obvious physical and mental change. They will be interested and knowledgeable about this idea, especially if they have younger or older *siblings* at home, with whom they compare themselves. Encourage them to talk about what the picture shows, asking them to pick out the child which most closely matches them, as well as to identify what each of the children shown can and cannot do for themselves.

### Activity 11



drama



art



language

The pupils could be allowed to choose to work individually on stories or posters, or in groups to make plays. You must decide what is best for your particular class. It would be best if there is a variety of tasks, rather than everyone doing the same thing. The topic of all they do must be healthy growth, but the emphasis could be on one or more of the three aspects – the body, the mind or the spirit. The pupils should be expected to do research for themselves before they begin to make a product. You will need to provide books, posters, leaflets from the clinic and other materials, such as CD-ROMs or other computer-based resources if you have them. Knowledgeable people, such as health workers, sports coaches, representatives of religious communities and others may be able to provide you with information or to pay a visit to the class to be questioned by the pupils. Posters should be displayed, around the school if possible, so that the messages about healthy living are shared. There are clear links with drama, art and language in this activity.

### Activity 12



maths

This is a long-term activity for each child to carry out for themselves. It will involve a series of 6 measurements being carried out

each week, over a whole term. This is necessary for the changes to become apparent. Once the routine of taking the measurements is established, it should only take a few minutes each week. It will be best if you can set aside the same time each week so that it is not forgotten.

In addition to the 4 measurements which everyone should do, each pupil should choose two others which interest them and measure them as well. The table must be copied into the exercise books before the measurements begin, so that they can be recorded immediately. It is vital to add the date each time a measurement is recorded, as this will be a way of calculating the time between the different measurements. When the collecting of measurements is complete, individuals must choose the type of graph they want to use for presentation of the results. Make sure that the scales drawn by the pupils cover the range of measurements for each aspect of the body. You may decide to limit the graph drawing to a few of the measures, rather than to ask for all 6 to be done. If all pupils make graphs of the same measures, then they can be compared. What pupils should see from the graphs is that their bodies have grown, but not necessarily all to the same extent. For example, the height may have changed more than the finger length. The sentences can be general statements about the changes, or they can be specific statements about particular aspects of growth. Different pupils will have changed by different amounts and this is normal, so it should not worry any particular child.

### Additional Activities

1. Invite a health worker to class so that pupils can question them about the following:

Care of the body  
Growth and development  
Hygiene  
Diet  
Appropriate social behaviour.

Groups should plan their questions before the visit. They should keep a record of what they find out.

2. Make a display of pictures and actual foods which are special to particular religious groups. Label the food items.

## HEALTHY LIVING pages 21 to 25

### General concepts

Our health is affected by the way we live. Some behaviours, such as regular exercise, are good for our health. Others, such as smoking, damage our health. We have to take care of our bodies, minds and spirits if we are to be healthy.

### Materials

1. Books, magazines, newspapers
2. Videos about sport
3. Notebooks and pencils
4. Card or paper
5. Rulers
6. Dice
7. Coloured pencils or pens

### Background

Muscles in general, and the heart in particular, only remain strong and fit if they are regularly made to work harder than normal. This is what exercise does for them. During sports and other forms of physical effort, the pulse rate and the breathing rate are increased, as the muscles work harder and so require more oxygen to continue working at full capacity. This kind of regular demand increases the capacity of the lungs, heart and muscles to deliver the force needed to run, or climb, or swim or lift heavy weights, etc. Muscles grow in size as well as strength when they are regularly exercised. The general health of the body is maintained when the blood and breathing systems are stimulated in this way. It is not just a matter of adding muscles – which most people are not interested in doing. Even the elderly can benefit from exercise, so long as it is suited to their physical condition.

On the other hand, there are damaging habits too, and these can gradually undermine health. Smoking is a very common example. Its effects are not immediately obvious. It may be years before the damage is noticed, since it is happening slowly to the internal organs, particularly the lungs and the heart. So, both the good and the bad behaviours do not usually have very sudden, dramatic effects, but act slowly to improve or damage the health.

All the other types of care we should take are recapped from earlier grades, plus a greater emphasis on the care of mind and spirit, which pupils should be more aware of as they get older. The basic message of the topic is that we can avoid many problems if we choose carefully how we live.

### Using the Pupils' Book

#### Activity 13

You will need to provide, or ask the pupils to bring, magazines, newspapers, books and other sources of information about exercise, sports players and other athletes. Groups should have a selection of these and use them to find out all they can about what exercise is, what its benefits are, how it is used by athletes as part of their training and how non-athletes use it to keep fit. They should keep notes as they gather information. Once the collecting phase is complete, the group should draw a table as on Page 21 and enter the facts they have found. Each group should then share their table with the class. This can be done by displaying all the tables on the wall and allowing the groups to circulate around the room, reading them. An alternative is to get the groups to exchange their work and repeat this until every group has seen the work of every other group. The advantages of exercise should include points about fitness, strength, endurance, muscle tone, benefits to heart and lungs and general well being. Disadvantages include being unfit, loss of muscle tone, weakness, being more prone to illness and muscle strains, lack of stamina, being easily and quickly "worn out" when physically active and general lack of well being.

Page 22 has a board game which may be familiar to some pupils, but it has been adapted as a health game. Before beginning the activity, let the class look at the picture and check that they have understood the principles of how it is designed and how it is used in the game. If any pupil knows the game of snakes and ladders, let them explain it to the class.

#### Activity 14



You will have to provide card for the groups to make the game. The more card you have, the more groups can produce a game for themselves. If you have squared paper, this would simplify the drawing of the grid. The paper could then be glued on to the card. The most important part of the task is choosing which good, healthy behaviours and which bad, unhealthy behaviours to add to the board. Groups need to discuss what they will

include. Obviously, the groups will end up with different behaviours on different squares and this is good, as it will make each version of the game different in some way. Once all the snake and ladder squares have their "behaviour" written in, the colouring and decoration of the game should be done. Pupils can either play their own game, or exchange it with another group. This activity has many links with other subjects, including art and maths.

### Activity 15



This is based on the picture at the top of the page. The class should look at it and give their



explanation of what they think it shows. The story is about a child who over-eats, gets sick and goes for help. Once everyone is clear about the story, the groups should discuss which story they will tell as a mime. It should not be the same story as shown in the picture. You should expect each group to develop a different mime. After having time to practise, the groups should mime their stories to the class one by one. The class must watch carefully to understand the meaning of the mime. Ask them to explain each mime as soon as it is over. This activity is as much about drama and stories as it is about science.

## FOOD AND DIET pages 26 to 33

### General concepts

Foods can be grouped in various ways. Different foods have different functions in the body. It is important to prepare food hygienically, as germs can get into the body with our food. Cooking is one way of killing germs which may be on the food. Some religious groups have rules about their diet. Science classifies foods on the basis of the nutrients they contain. If the diet does not contain all the nutrients which the body needs, the body can suffer from deficiency diseases.

### Materials

1. Foods, e.g. bread, cheese, margarine
2. Plates, knives
3. A bowl with water
4. Soap and towel
5. Foods or pictures of things not eaten by particular religious groups
6. Books, etc., with information about nutrients

### Background

The food groups which were introduced in Grade 2 are once again used at the start of this topic. A sorting activity on the basis of these groups acts as a reminder of what was learned previously. The groups are scientifically incorrect and illogical – they do not apply one criterion as the basis of the grouping. This "messy" grouping is corrected later in the unit, when the scientific basis of food classification is introduced. Foods are seen as the source of particular types of chemicals – known as nutrients – which the body needs for its health and survival. They are carbohydrates, fats, proteins, vitamins and minerals. Based on this short list of nutrients, it is possible to classify all foods as providing one or more of them.

So, for instance, the staples such as rice and bread are almost totally a carbohydrate called starch. Meat, on the other hand, is mostly protein, with varying amounts of fat, vitamins and minerals. This way of sorting foods is much more accurate and useful, especially when looking at diets to check that they are providing all the nutrients needed by the body. The terms "Go", "Grow" and "Glow", which were introduced in Grade 2, should not be used from now on, as the scientific concepts of energy, growth and protection are introduced.

Fats and carbohydrates are the most concentrated sources of energy in our food. They can come from plants and animals and we can eat a great variety of things to obtain the energy we need to keep our bodies alive. The danger for many people in the world, who have the money, is that they eat too much fat and sugar, with the result that they become unhealthy. Millions of people in the world are overweight, even obese in many cases, because their diets contain far too much fat and carbohydrate – much more than their bodies need to keep them warm and active. Carrying so much excess body weight puts a strain on the heart and increases the risk of heart disease and heart attack. Fat in the blood, especially fat from animal foodstuffs, can settle in the blood vessels and block them. If this happens to the arteries of the heart, it can prevent it from working and the result can be sudden death from heart attack. Such issues seem a long way from foods, but the issue of a healthy diet is directly linked to such health problems.

Proteins are essential for the building of our tissues, including blood. We can obtain them from plants or animals. Amino acids are the basic constituents of all

proteins. There are 20 different amino acids. If we choose to eat a vegetarian diet we have to be much more careful to ensure that we are eating a wide range of plant foods, so that all the 8 different amino acids which we cannot make in our bodies, are included in our diet.

Minerals are used by the body in a great variety of ways (e.g. iron is the vital element in the production of red blood cells, which carry oxygen in the blood; calcium is the vital element in the production of bones and teeth). A wide range of foods can provide us with all the minerals we need. The quantities are small compared to the amounts of carbohydrate, fat or protein needed by the body. If our diet is too "narrow" we may not get all the minerals we need. In some countries, the law is used to maintain a minimum amount of some essential minerals in products such as bread.

Vitamins are rather unusual, even mysterious, nutrients, as they are not used as "building materials" for the construction of our bodies, nor are they "burned up" to provide us with energy for warmth and activity. They seem to act "in cooperation with" other materials in vital processes of life. If they are absent, there are serious consequences for our health, as bodily systems fail to function correctly. We only need very small amounts but, as we cannot store some of them in our bodies, we must renew them each day through eating foods which contain them. There are 13 separate vitamins which have been identified so far.

Diets which do not provide the body with enough of any particular nutrient are said to be "deficient" and certain diseases are the direct result of such deficiencies. These deficiency diseases are most common amongst the poor people of the world who either cannot afford, or cannot find, the full range of foods which they need to remain healthy. Some people who have adequate incomes have inadequate diets because they are ignorant. They do not eat wisely and they take no account of what they *need* to eat, but only what they *want* to eat. Each specific deficiency leads to a particular disease, with its own symptoms. If the diet is improved, the diseases can be cured, but often the people who suffer do not have the knowledge or the money to do this. The World Health Organisation has feeding programmes operating in some countries, which focus on children and provide them with meals which prevent deficiency diseases developing.

### Using the Pupils' Book

**Page 26** starts the topic with a familiar sorting exercise. Do not spend a great deal of time on this. Individuals should complete the table in their books

and write a sentence about the three functions. Then you should finish with the whole class sharing what they have done. GO foods are: staples, fats and oils. GROW foods are: legumes, animal products. GLOW foods are: legumes, fruits, vegetables, fats and oils, animal products.

### Activity 16



This group activity is focused on what meals could/should contain. Pupils' choices and preferences will not necessarily lead to "good" meals that are balanced in terms of what the body needs. Costs can be based on real prices – which you will have to provide – or estimates made by the pupils. The meal with meat, staple and two vegetables is the one which provides what the body needs. The banana and biscuits will provide a high amount of energy, as fats and carbohydrates, and not much else, but of course it will be cheaper than the other meal.

**Page 27** then introduces a new concept. Food can carry germs into our bodies, which can make us ill, or even kill us. The idea of hygiene linked with food preparation is essential. The task with the sequence of pictures is intended to make pupils think about the order in which they carry out the various stages of preparing food. Obviously, washing of hands, utensils and surfaces should be done before any foods are handled. The ingredients should then be checked for freshness (i.e. animal products in particular can "go off"/begin to decay). Such contaminated foods should be discarded. Smell and sight are used to check for freshness. Raw ingredients should then be washed, to remove dirt and any germs which may be on the surface of the foods. Encourage pupils to explain why all these things are necessary. Their ideas will reveal to you how much they know and understand about food hygiene.

### Activity 17

If possible, you should provide enough materials for each group to make their own sandwich. If this is not possible, let a group make a sandwich as the rest of the class watch, asking questions as the process goes along. The sandwich makers should be able to explain why they are doing what they are doing. The written record of the process must be in the correct sequence of steps, so that you can check if the hygiene rules were properly applied.

The groups should then discuss which foods are eaten raw or cooked. Some will be in both sets, e.g. fruits, some vegetables, cheese. Each group should be allowed to choose which cooked food they want to use as their example. Again, the written sequence of steps in the preparation should include the hygienic controls in the correct places. There will be a large variety of meals suggested by the groups and this will become clear when they share their written work with the class.

**Page 29** deals with the second important means of keeping food safe to eat – cooking. Pupils may not think of cooking in this way. It may be seen only as a way of heating, softening or changing the taste and appearance of food. All of these are correct and important, but this page focuses on the safety issue. Cooking must be hot enough and long enough to ensure that germs are all killed. This is especially true for animal products such as fish and meat, which can often be thick and therefore take longer to heat through completely. Frozen foods are especially dangerous, because the centre of these foods can still be frozen when the outer layers have thawed. The cooking process then reactivates any germs still alive in the frozen parts and they go into the body along with the food, where they can cause food poisoning of various kinds.

### Activity 18



religious  
education

The picture should be looked at by the whole class together and discussed – what do they think it shows? What questions do they think the “interviewer” should ask? Once you are sure that they understand the scene, put the class into groups to prepare the role play, with representatives of any religious groups which you may have in the class shared out between the groups. They should be encouraged to “play” the part of representative for their particular religion. The groups will need time to plan who will do what in the role play and also what the questions and answers are to be. The production of pictures, posters and examples of foods will need to be done before the performances, so this will probably mean that the activity will need to be spread over more than one lesson. Let each group perform one at a time and allow the class to question and comment on each one before moving on to the next.

### Activity 19

The text at the top of the page must be read and explained first, as the activity is based upon it. Many new words and ideas are included in the text, so do not hurry pupils through it. Encourage them to ask questions so that they have a good, clear understanding of what they are being told. When you are satisfied that they are ready, allow the groups to begin collecting information about nutrients. You will have to provide suitable books, leaflets, posters and other sources of information for each group. You may decide to give each group a different nutrient to research, rather than ask them all to find out about all of them. The examples which groups find will be very varied, but the information given in the background to this topic will allow you to decide if their answers are correct. If there are disagreements between groups about any particular food, they must provide evidence for their point of view.

**Page 32** introduces the last new idea of the topic, that of deficiency diseases. This will probably be completely new for some of your pupils, so again, let them have enough time to question you so that they are clear about the ideas. They will not be expected to remember all the details in the table, but they should realise that diet is important if they are to avoid these diseases.

**Page 33** focuses on the vitamins linked to particular diseases, showing the foods which are good sources of each one. This list is very useful when deciding whether or not a diet is adequate. It makes clear that some vitamins are found only in plant foods, whilst others are only found in animal products and a third set are found in both types of food.

### Additional Activities

1. Let the class share the work of preparing a fruit salad. Each group could carry out the washing, peeling and cutting of a particular fruit, then add it to the salad for mixing. The class should discuss what they did, with the focus on cleanliness and then they should eat the salad!
2. Let individual pupils choose which food group they want to focus on. Then they can decide whether to make a picture or write a story about someone who eats too much or too little of that food. Display the pictures and listen to the stories.

## Term 3 Unit 1

# Living and non-living things in my environment

### Objectives

Pupils will:

- Identify and discuss processes that all living things undergo
- Use body parts and movements to depict life processes
- Discriminate between inhaled and exhaled air
- Infer that some plants produce flowers while some do not
- Observe the changes that occur to a seed as it germinates over a period of time
- Create sound pictures depicting scenes
- Differentiate between living and non-living things
- Use pictures or 3D forms to depict people, animals, plants, faces observed in the environment
- Recognise that movement occurs when the brain sends messages to the muscles
- Collect and record attribute data (relating to observation of living things that live in different habitats)
- Give similarities and differences for a given group of animals in their different habitats
- List some differences between plants and animals (of different habitats)
- Use visual aids to identify the features of animals in dry habitats and aquatic habitats and discuss the differences
- Explore relationships between the physical environment and the water, food, shelter and clothing of people in different parts of the world
- Collect information from a variety of sources (about special habitats of living things)
- Write to share ideas and feelings on what they have observed (on the habitats of some animals)
- Identify the effects that changes of time and seasons have on living things
- Identify ways in which the physical environment has changed over time in different places (locally)
- Discuss the importance of proper disposal of waste
- Make inferences and draw conclusions about the requirements of plants and animals
- Create or depict ways of influencing others to appreciate the importance of proper use and management of the environment
- Create a sound picture depicting environmental sounds

**Time allocation: 6 weeks**

## Discussion of concepts and skills

This long unit contains many opportunities for pupils to practise skills they have and to develop them. It involves surveys to collect information on fabrics and pollution and the results of the surveys can be presented as graphs. These are then open to interpretation by the pupils, leading them to conclusions about what they have discovered. This sequence of processes is typical of the way scientists work and it needs to be used repeatedly as the pupils progress through their science education. Alternative forms of recording are also used: tables of results and drawings are the methods where graphs are not possible or appropriate. There is a large element of careful observation in this unit, as living things are the focus of attention over a period of time. Observation must always be accompanied by recording, in some form or another.

The unit introduces a more scientific view of living things in their environments. New concepts, of adaptation to habitats, the characteristics of living things and the process of seed germination, are included. These are in addition to already familiar ideas about environmental changes caused by people and the basic needs of living things. The soil is given attention for the first time, but only so far as it is the habitat for some animals which either live on it or in it. Sounds in the environment are also focused on at two points in the unit – general sounds and the sounds made by living things. The overall idea which the unit tries to develop is that the environment – whether natural or built by people – interacts with the living things and they both have an effect on one another. This is particularly true of human beings.

## LIVING AND NON-LIVING pages 34 to 37

### General concepts

Everything in the world can be sorted into two sets – the living or the non-living. All living things have certain characteristics, which are used to define them as alive.

### Materials

1. String
2. Scissors
3. Pins
4. Paper and pencils
5. Books

### Background

The seven characteristics of living things are used to define what it means to be alive. They can be applied as a kind of “test” when trying to decide if a particular thing is living or not.

Respiration, feeding and excretion are directly linked to the processes of life which go on in all the cells of the creature. Raw materials of one kind or another are taken in from the environment and used to build and repair the body of the creature, as well as providing it with the energy needed to keep it alive. Respiration combines the food with oxygen to release that energy. This process continues in all the cells of the creature at all times. One result is the production of waste – the gas carbon dioxide and water. Other products are made as the result of other processes. All of these waste products must be excreted from the living thing.

Some very simple organisms, such as bacteria, grow

in size, reach their maximum size and then divide into two cells. More complex organisms, such as most plants and animals, grow in size and in complexity (e.g. a seed is very small and simple in structure, compared with a fully grown plant, having separate structures – leaves, stems, roots, flowers and fruits). Some non-living things are said to “grow”, in the sense of increasing in size, but this is not growth of the kind which occurs in living things. Clouds, beaches and patches of rust can all grow in size, but none of them is alive. In complex organisms, the growth in size is caused by multiplication of their cells, rather than just the expansion of the cells. The amazing growth which takes place when a human baby is conceived is one example of this process. The two cells which combine at conception – the egg and the sperm – begin a process of repeated division which, after nine months, results in a baby whose body is composed of about 6,000 billion cells! That is genuine growth.

This process is also an example of another characteristic of living things, that of reproduction. In every living thing there are special parts called “genes”, which are specific to the particular organism. They control the form and structure of the organism – they are like the pattern, or plan, for the creature. Each generation of living things has a way of passing this genetic information to the next generation through the process of reproduction. The parent plants or animals are then “reproduced” in their offspring. Some organisms can reproduce without sex, which is known as asexual reproduction (e.g. bacteria,

bananas, yeast). This is also the process by which tissues in our bodies grow and repair themselves (e.g. skin, blood cells). Whichever method is used, the end result of reproduction is new individuals which carry the genes of the creature into the next generation. Non-living things have no genes, so they do not reproduce.

Living things move independently. They may move their whole body from place to place by swimming, walking, flying, etc. They may stay fixed in one place, but move parts of their body into different positions (e.g. sea anemone moving its tentacles, a plant turning its leaves to follow the sun through the day, the roots of a plant moving through the soil, a coral colony feeding). Many animals, including some of the simplest, single cell creatures, have special structures which enable them to move more easily in their particular habitats (e.g. wings, flippers, legs, cilia (thread-like structures) on the surface of some bacteria which can be moved to push the cell along in liquid). Movements made by living things are for particular purposes – to feed, to mate or to escape from danger, for example. The movements of non-living things are completely random – they have no purpose. The movements are incidental, caused by forces acting upon the thing which move it in some way, e.g. the wind picks up litter and it flies, the sea washes sand and stones up or down the beach, the magnet pulls the pins towards it, the electrical motor drives the turntable of the record player. This last example is different because some person chose to design the machine to make the turntable move. This was the purpose behind the design of the machine, but the machine has no purpose of its own – it only moves because a person chose to make it that way. Our world is full of such machines which move according to the purpose of their makers and users; they are not living, just moving.

Movements in living things are often in response to some kind of stimulus – some information which the organism detects through some sensitive part of their body. This ability to detect and react to stimuli – being sensitive – is highly developed in animals such as the predators, which have to hunt and catch living prey. It is also well developed in the prey animals too, as they depend on their sensitivity to sounds, smells and movements to survive attacks by predators. The sense organs of animals are the specialised body parts which are sensitive to different types of stimuli – pressure, heat, light, sound, etc. But all living things are sensitive in some way to influences from the environment. Plants are light sensitive, even though they have no eyes, for example. They are also sensitive to gravity, touch and heat, but have no special organs for any of these stimuli. Natural non-

living things are not able to detect stimuli; they are inert – they do not react. People have invented devices which behave like living things, able to react to stimuli such as light, sound or movement (e.g. security devices which detect sounds or movements in or around a building, street lighting which reacts to the level of daylight.)

## Using the Pupils' Book

### Activity 1

The picture focuses pupils' minds on the central idea of the topic – the differences between living and non-living things. You should listen to their reasons for sorting the objects into the two sets; this will tell you how they think about the differences – the criteria they are using to sort them. Their sentences will also reveal their ideas. Do not correct them, but just let them express what they think at the moment. After the unit is complete, you can return to these sentences and ask them if they want to change any of them, after what they have learned. The third way for the pupils to show you what they think is to collect some examples of the two sets of things. Let them choose freely and then allow the class to move about and see what others have collected, commenting on what they see. Pupils who are challenged about their choices should justify them, revealing their ideas about living things.

Page 35 has a picture illustrating part of the story *The Greedy Dog*, which you will have to read or tell to the class. Before you begin, remind the class to listen for anything which is evidence that the dog is a living thing and to write it down. The pupils should then volunteer what they wrote and you could record their answers on the board. When the list is complete, get the class to compare it with what they wrote about things in Activity 1. This might provoke some pupils to change their minds, which is good.

### Activity 2



This is an opportunity for pupils to be creative, in using their imaginations to produce a mime or role play. The presentations by the groups will be ‘puzzles’ for the rest of the class to solve, as they try to work out which characteristics are being portrayed. Give groups adequate time to prepare and encourage them to express their ideas freely – there is no one, correct way.

You should spend time working through the list of characteristics on **Page 36**, as these are the basis of the whole unit. Let the pupils ask questions to help them fully understand the ideas included in the list. You could ask them for examples of each of the characteristics. (Note: the production of urine is part of excretion, along with sweat and carbon dioxide in exhaled air. Solid waste (faeces) are *not* part of excretion, as they are not made by the body, they are just the parts of the food which could not be digested, plus dead bacteria and cells from the gut.) The everyday use of the word “excretion” does not match the way it is used in science.

**Page 37** gives some examples of non-living things

which seem to have the characteristics of living things. Pupils should be able to think of others. The picture of the flower focuses attention on the fact that plants can move their parts, but it's not visible to us if we just watch. We have to observe them over a longer period of time to realise that their positions have changed.

**Page 38** extends this comparison of living and non-living by looking at some examples of change in non-living things, caused by agents outside the objects, rather than from within, as with living things. None of the objects shown in the picture are “reacting” in the sense of being aware of influences from outside. They are all chemical/physical changes, rather than the result of biological processes.

## BREATHING pages 38 to 39

### General concepts

Exhaled air is moist. It contains water vapour from inside the lungs.

### Materials

1. Mirrors

### Background

As was explained in an earlier unit, the inside of the lungs is always covered with a layer of liquid. This is essential for the lungs to do their work of exchanging gases in and out of the body. Air taken in during inhalation may be dry or moist, depending on the atmospheric conditions where the person is breathing. However, exhaled air will be moist all the time and warm too, because whilst inside the lungs it will have been warmed by the body and water will have evaporated from the liquid bathing the interior walls of the lungs. When this warm, moist air hits a colder surface outside the body, such as the mirror, it immediately cools down. This means that some of the invisible water vapour in the exhaled air will condense (i.e. turn back to the liquid form of water). This water is seen on the mirror as a “mist” of tiny droplets.

### Using the Pupils' Book

#### Activity 3



This is a very quick and simple activity. If you only have a few mirrors, get pupils to use them and pass them on, so that the whole thing is over in minutes. They should each write their own notes and explanations. When they share their writing, let pupils question one another, especially about the explanations. You must be ready to give the correct explanation once the pupils have all shared theirs. You can use the text on **Page 39**.

The pairs should then be set up for the task of listing words connected with living things. Allow any relevant words, but focus in particular on pairs which have prefixes, which change the meaning of the stem word, e.g. sexual/asexual, living/non-living. This is largely a language task and can be extended to include words which are not part of the science unit.

## SOUNDS IN THE ENVIRONMENT pages 39 to 40

### General concept

The environment contains sounds made by living and non-living things.

### Materials

None

### Background

The natural world is noisy. The “forces of nature” can produce deafening sounds – the wind, volcanic eruptions, the sea, hailstorms and landslides, for example. The living things also add to the noises of the world. Animals use sounds for communication, to others of their kind – attracting and warning them –

and to their enemies – frightening and threatening them. Young animals often use sound to locate their mothers and this is true of such underwater creatures as whales and dolphins. Bats and aquatic mammals use sounds to locate their food as they move along. The ears of different animals are sensitive to sounds of different pitch, so we cannot always hear what a dog hears, for instance. Added to all these natural sounds are the many made by human beings. Some are deliberate and serve a purpose, such as music, radio and various warning signals used by vehicles. Much of the sound made by humanity is really a form of pollution. It serves no purpose and just adds to the background noise of life. Vehicles are amongst the most common noise makers, along with other types of machine used for transport, manufacturing, mining and agriculture. Even our homes are made noisy by the appliances we use – the vacuum cleaner, the electric drill, the lawn mower, the liquidiser and the hair drier, for example. It is difficult to go

anywhere on earth and be in total silence – that is so “un-natural”.

### Using the Pupils' Book

Page 39 turns pupils' attention to sounds with the picture. Use it to start them thinking about sounds in their environment, especially the features which make each sound different in some way.

#### Activity 4



Put the pupils into groups and allow them to discuss what they will include in their “sound picture”. This is supposed to be a composition of sounds found in a particular place. When each group performs their “picture” the rest of the class must listen carefully and try to work out what place is being “painted in sound”.

## SOIL – LIVING IN IT AND ON IT pages 40 to 45

### General concepts

Many plants and animals live on the surface of the soil. When seeds are given the necessary conditions, they germinate and grow into plants. Some animals and plants live in the soil.

### Materials

1. Notebooks and pencils
2. Rulers
3. Squared paper
4. Rope, hoops or sticks
5. Small containers for soil animals
6. Jars
7. Absorbent paper
8. Corn or pea seeds
9. Water
10. Paper
11. Hand forks and trowels
12. Containers for small animals

### Background

Most land plants live on the ground surface, though a few grow on buildings, tree trunks and rocks. The soil is their source of minerals and water, which the roots absorb together; the minerals are dissolved in the water. Soil also anchors the plants, as the roots hold on to it. This is particularly important for the giant plants of the forest – the trees which are the biggest living things on earth. Without wide and deep roots, such trees would be easily blown down by strong winds. In addition to the plants whose stems and

leaves are above the soil, there are many animals which live on the surface too. Some eat the leaves and stems of the plants, with fruits and seeds added to their diet as they become available. The droppings of the animals and the dead plant and animal remains are all returned to the soil for “re-cycling” into the bodies of future plants and animals.

Some animals, such as earthworms, live in the soil and feed on the dead plant material which falls on to the soil surface. They drag dead leaves down into the soil, where they feed on them. Countless other tiny animals and bacteria take part in this process of decomposition – the breaking down of organic material into smaller and smaller pieces, with the release of minerals and other substances into the ground. There are some large animals, such as rabbits, which live underground, but they often come to the surface to feed on the plants. Others, such as predatory beetles, catch their tiny prey in the soil and on the surface, depending on where they are hunting. Snails and slugs have no means of burrowing into the soil, so they move around on the surface, or on the plants which they eat.

Seeds are a *dormant* stage in the life cycle of a plant. They consist of a tiny plant, attached to a store of food, wrapped up inside a seed coat for protection. The seed is living, even though it is dormant. If it were dead, it would not be able to germinate and grow. The food is stored in dry form and so the tiny plant cannot use it. Food must be dissolved so that it can travel through the cells of the plant. So, unless the

seeds are given water, they will not germinate, i.e. begin their growth and development into green plants. Some seeds also require a particular temperature for germination. Many tropical plants need to be in warm conditions for the seeds to grow. In temperate climates, tropical seeds have to be germinated in specially heated greenhouses, where the temperature can be made high enough. Seeds do not depend on soil or light for their germination and growth. They carry enough food stored inside them to grow above the soil. When they emerge into the light, the young shoots turn green and then they can begin to make food, using the energy from the sunlight. Seeds do not need minerals from the soil when they germinate. The stored food contains what they need. Once the plant is green it will need to take in minerals to combine with the materials it makes in its leaves through the process of photosynthesis. So, there is a brief period when a germinating seed is self-sufficient, so long as it is given water and air. Obviously they do not need light to germinate – we bury seeds underground in the dark!

### Using the Pupils' Book

**Page 40** shifts to the topic of living things on the soil. The whole class should look at the picture and talk about what they see. Make sure that they understand the actions of the children in the picture, because they must carry them out for themselves in the next activity. The new idea will be the marking of an area on the ground, to focus attention on the things found inside it. If you are sure pupils are clear about the task, move on to Activity 5.

#### Activity 5



Use whatever is available to mark the areas on the ground. If possible, make them all the same size for the groups, so that they can compare their results. Do not allow them to have an area larger than 1 square metre, as it will be too big for them to do the observations in the time allowed. The groups should be spread out and given different types of ground to work on, e.g. open grass, under a tree, bare earth. The plants do not need to be disturbed just counted. The animals can be collected whilst the counting goes on, to avoid counting them more than once. As soon as it's finished, they should all be released.

The data can then be presented as a bar graph or pictograph. Each group should produce one or the other. Display them and let the class compare them. They will probably all show that there were more plants than

animals in each area outside. They will also find that the areas were different in the numbers of plants and animals found. This is also normal, as some areas are better habitats for living things. Shady places do not encourage most plants, which need light to grow well. However, shady places are often cooler and damper, so some creatures prefer them, rather than the hot, dry open spaces. These are the kind of conclusions which some pupils may arrive at. Encourage them to think like this.

#### Activity 6

The picture on Page 42 should help you to introduce the seed growing activity. Get the whole class to look at it and identify the things being used by the children. Answer any questions pupils may have, then set up the groups. You can give out the materials, or get each group to send a representative to collect them from where you have gathered them. You can use newspaper if you are unable to obtain any more absorbent paper, such as kitchen towels, tissues or soft toilet paper. The large drawings of the seeds must be done by every pupil before the activity moves on to the jar, water and paper. Encourage pupils to carry out close observations of their seeds. You can expect them to notice lines, bumps and marks on the seed coat. Some may observe the small hole in the coat (the micropyle) through which water can enter the seed.

The paper should be rolled so that it fits tightly into the jar and keeps the seeds pressed against the side of the jar. You can fill the space in the centre of the jar with crumpled newspaper or some other material to keep the absorbent paper in place. Pupils should try to set the three seeds at different heights, at different places around the jar. This will allow them to compare them and decide whether or not height makes any difference to the speed of germination. The jars need to be labelled in some way so that each group can identify their jar. They do not need to be in the light to start with, as seeds can germinate in the dark. Once the plants have emerged from the seeds, they must be put in light so that they can begin to make food for their further growth. Each child should make daily drawings of a particular seed, as well as keep notes about what is happening to all three

seeds. Once the activity is ended, they must compare the first and last drawings, so that they can see how much change there has been. The small, hard, dry seed has become a much larger, green plant, with separate leaves, roots and a stem. It is important that pupils agree that neither light nor soil was involved in seed germination. They only become necessary once the plant has to turn green and make its own food.

**Page 43** moves the topic on to what lives in the soil, rather than just on the surface. Let groups study the picture and talk about it, identifying as many as possible of the animals shown. It will prepare the class for the next activity, which involves looking for living things in the soil. Some pupils will need the "cross section" idea explained to them. It is as if the ground has been sliced open to show what it's like inside.

### Activity 7

This should be done by the same groups as before, working on the same area of ground as far as possible. There is no need for the digging to go deeper than a trowel or hand fork depth. Once again, the animals should be collected temporarily to avoid counting them more than once. Records of what is found must be kept as the observations are carried out. Pupils should see the branching of the *fibrous* roots, or the thick single root (tap root) with small roots growing directly out of it. Tunnels and burrows of small animals might be found. These details should be noted in some way. The animals should be carefully treated and returned to the soil at the end of the work. Each pupil should record their group's results in a table in their exercise books.

## HABITATS AND ADAPTATION pages 46 to 52

### General concepts

Some animals live on particular plants. Animals and plants are adapted to their habitats in many ways. People also adapt to the habitat in which they live. This means that people eat different foods, dress differently and build different homes in different parts of the world. Clothes are made of various fabrics.

### Materials

1. Notebooks and pencils
2. Books, magazines, videos or CD-ROMs about various habitats
3. A TV and video player
4. Squared paper
5. Rulers

### Background

Plants are used by animals as food, shelter and a place on which to lay eggs. It is usually quite easy to find some kind of animal on any plant looked at. The insects, for instance make wide use of plants in the ways listed above. Generally, particular plants are colonised by particular insects, especially if they are used for food. The eggs of insects are often laid on the leaves or stems of the plants which the newly hatched caterpillars or other *larvae* will need for food. These eggs are often laid on the underside of leaves, or hidden under the bark of the stems. This reduces the risk of them being seen and eaten by predators. Birds are another group of animals which make extensive

use of plants for feeding, nest building and shelter. Like the insects, birds favour particular plants for food or shelter. Many seed eating birds feed low down on the ground, or among the grasses. But they build nests for their eggs and sleep high off the ground, away from many enemies who cannot reach them high up. Insects, birds, lizards, frogs and many other animals often live amongst plants where it is difficult to see them. Their skins, feathers, scales and shells can be camouflaged – coloured and patterned so that they are hidden amongst the leaves, or on the bark of the plant. Some insects even look like sticks or leaves, so that they are very hard to find. This helps them to escape from other animals which would eat them.

All these features of animals are examples of how living things become adapted to their habitats. Plants also become adapted, with some thriving in the driest places, whilst other can only survive where there is constant water bathing their roots. Some grow best in the shady, cool places and others prefer the hot, sunny open situation. Where fires are common, as in forests or the open grasslands, plants adapt to survive this regular destruction by having thick bark which protects the living part of the tree, or by having many low growing stems, with multiple growing points, some of which survive as the fire sweeps over them.

The better a creature is matched to its surroundings, the greater its chances of survival – this is the essential concept covered by the term "adaptation".

Human beings have settled in many different habitats over the surface of the earth. This has led to wide variation in the physical appearance of people, as well as differences in what they eat, what they use for clothes and the type of homes they have. People have adapted themselves to the places in which they live. Very slowly, over a long period of time, the human race has diversified into many ethnic groups, each of which is adapted to its particular physical habitat. The skills and knowledge which any group needs to survive in their habitat have been developed and passed on to the new generations, gradually improving their adaptation. The skills and knowledge are also part of the adaptation. Before the rise of global trading and the creation of fibres made from plastic (e.g. nylon), people used whatever was found in their habitat to make their clothes. Animal hair or skins of various kinds were used by many different groups, whilst others developed the use of plant fibres, such as cotton and linen. People used what they found available in their environment. Only later, through travel and trade, did these materials become more widespread. Similarly, with food and home building: local supplies of raw materials controlled what people used. They took what they had available in their habitats. The result has been an enormous variety of foods and a wide range of different home styles, all suited to their environments in some way.

As human society has become more and more *homogenised*, these traditional differences have gradually become less marked. It could be said that, biologically speaking, many of us are adapting to a "global habitat", rather than the much smaller, local one. Our foods and clothes, and even our house styles, are now the product of people who may be living far away from us and our type of habitat. Not everything is actually suited to where we live, but there is enormous pressure on us all to conform to the "global model" of human society.

## Using the Pupils' Book

### Activity 8

The purpose of this walk is to observe animals on plants. As far as possible, the animals and plants should be identified. If there is doubt about the names of some plants, a leaf from each one could be collected and brought back to school, where books or other teachers may help with their identification. Recap on the difference between trees (permanent single main stem), shrubs (several permanent stems) and herbs (non-permanent stems, which die back each year). Before setting out, make sure

that the class understand the purpose of the walk and how to record their observations. Individual pupils should keep their own records.

Back in class, the pupils can share their observations to compare what they have seen. Pupils will have to use their imaginations, as well as what they actually know from observations, about why particular animals were seen on particular plants. The reasons will include feeding, hiding from enemies, resting and egg-laying. The sentences should be written by each pupil, using their own ideas and observations. The picture should be as big and detailed as possible. Display the work so that the class can read the sentences and look at the pictures. The general conclusion, that certain animals are found more on some plants than on others, should be made after the class has shared the work. At this stage you cannot be any more specific than that.

**Page 47** applies the idea of animals being matched to particular habitats, with a set of pictures for pupils to sort out. The fish should be in the sea, the snail should be among leaves, the butterfly should be on a flower and the frog should be in a pond. Spend time teaching the word and concept of "habitat", so that pupils are clear about its meaning and can use it correctly. Pupils should explain why the habitats in the pictures are wrong – what features do not match the needs of the animal?

### Activity 9



Pupils can create a scene which expresses the problems faced by an animal in the wrong habitat. Their dramas will reveal to you how well they have understood the principle of creatures being matched to particular habitats. The class should watch each scene carefully to work out what is wrong about the habitat for the animal in the drama. When all the scenes have been shared, have a class discussion about the central idea of "suitability". This is vital because it will form the basis for the concept of "adaptation" which is introduced later in the topic.

**Page 48** uses pictures and incomplete sentences to reinforce the idea of animals being matched to their natural habitats. Each pupil should do their own writing, after the whole class have looked at the picture together and tried to match the animals with

their correct habitats. Remind them that each dash stands for a letter in the missing words. The answers for the missing words are:

1. tiger hide
2. fish sea feed shape water
3. cold penguins warm birds
4. snakes deserts smooth slide
5. bees flowers nest
6. pond frogs eggs tadpoles

**Page 49** introduces the term “adapted”. This is such an important concept that you must spend time helping pupils to understand it properly. You could do the picture matching task as a class. Ask the pupils to explain how they decide which plant matches a particular habitat. This will reveal to you what criteria they use when choosing a habitat – water, sunshine, temperature, etc. The cactus is a good example of adaptation, as it is a plant without leaves. In the desert, leaves would be a great disadvantage, as they are covered with tiny holes on the undersides and water evaporates from them. The big problem in a desert is shortage of water, so anything which reduces the amount of water lost from a plant is very useful to that plant. Cacti have adapted to the conditions in an extreme way, by having no leaves at all. This means that they lose very little water so they can survive on the small amount of water they can absorb from the soil, which they store in their fleshy stems.

### Activity 10

You will have to provide enough sources of information for the class to do research on their chosen plants and animals. If you do not have enough for all the pupils to do the activity at the same time, give them to a group at a time, and give the rest of the class other work whilst they wait their turn. The paragraphs should not just describe, they should also explain, i.e. give reasons why a particular feature of a living thing is useful in a particular habitat. The sharing session will have to be delayed until all pupils have had the chance to use the resources.

**Page 50** applies the concept of adaptation to groups of people who live in very different habitats around the world. The big advantage humans have over other creatures is the ability to imagine, to think, to use our minds to solve problems. In this way, people have become very widespread across a whole range of different habitats. The class could look at the pictures of the four families and share their ideas. Once the general comments are over, focus their attention on

the questions below the picture. All the people live in groups, they all eat food, they all wear some kind of clothing and they all have shelters of some kind. The pupils will be able to find many differences between their own way of living and those of others in the pictures, e.g. permanent houses, rather than tents or just branches and leaves for shade.

### Activity 11



geography



social studies

Once again, you will need to provide a collection of resources for this activity. Geography books may provide some of what you need, as well as social studies, religious education or even story books. The focus of the task is the three issues of food, clothes and homes, rather than anything else. Allow individuals a free choice of which people they find out about, so that the class produces the widest possible range of information about human societies. Encourage pupils to make their drawings large and clear. The notes should report on food, clothes and homes in separate paragraphs or in columns in a table, with illustrations of all three if possible. A display of the findings is essential, as it will emphasise the main point about humanity being extremely adaptable. Which other species has been so successful at living in so diverse a set of habitats, ranging from deserts to the polar regions?

**Page 52** focuses on fabrics used in clothing. The picture shows the four main types and their sources. Silk, made from the cocoons of a moth, is another ancient fabric, developed by the Chinese more than 3,500 years ago.

### Activity 12



maths

This is a survey, designed to gather information about the fabrics being worn by the pupils in the class. Some clothes may not have a label with the name of the fabric, so you may have to give pupils the benefit of your greater knowledge and help them to identify some items. The groups should each produce a bar graph to present their results and these should be looked at by the class. Comparing the graphs will show that groups have not all come to the same conclusions about some of the items of clothing, so the graphs will not be identical. This is not a bad thing, as science always involves interpretation as well as facts.

The graphs need to be “read” by the class to answer the question about the most common fabric. This will probably be cotton,

because it is very suitable for hot climates. It allows the body heat to escape through it, rather than trap it, as wool does.

## ENVIRONMENTAL CHANGES pages 53 to 57

### General concepts

Some changes in the environment are due to natural causes and others are the result of the actions of people. People do a lot of damage to the environment through pollution. It has effects on the living and the non-living things in the world.

### Materials

1. Notebooks and pencils
2. Large sheets of paper
3. Colouring pencils or pens
4. Squared paper
5. Rulers

### Background

The simple fact is that environments are never static – they are all the time changing in some way. Most changes are very slow and gradual and it is many years before we can tell that they have taken place. These include the natural changes such as erosion, deposition of sand, stones or mud, the rise or fall of the land and the patterns of weather over the whole earth. Some changes, such as earthquakes and floods, are sudden and catastrophic, but these are relatively rare and never happen at all to most parts of the world.

People cause the greatest amount of change to the world, either through their deliberate choices or accidentally through their ignorance or carelessness. In the last century, people began to realise that humanity was doing terrible damage to the natural environment and that we cannot simply ignore it, as though it does not matter. People are now aware that we must change our behaviour and take care of the world, as it must go on providing us with what we need to survive – the water, the air, the food and the materials we need for shelter, etc. There is a more “grown up” sense of being responsible for the natural world. We are the “stewards” of this place and have a duty to future generations to keep it in a healthy condition.

Pollution is one simple issue which even young children can understand and will be aware of even in their locality. It is actually a much bigger issue than just litter in the streets, but this is a good place to start in raising pupils' awareness of the subject. The greatest damage is done invisibly, through gases and

chemicals thrown away into the atmosphere and the waters of the planet. These pollutants are rapidly spread very far, often doing damage in places far from the sources of the pollution. So, it is not a local problem – it is international, it is global. For example, smoke from factories in Western Europe has polluted the rain which falls further to the east and this has killed whole forests of trees, poisoned the lakes and killed the fish which lived there.

Clearing land for the wood, or to turn it into fields for cultivation, has been going on for thousands of years. The problem now is that, with the largest population ever seen on earth, more and more land is being cleared in order to provide enough food for all these people and much of it is in the tropical areas and on steep slopes. With heavy rainfall in such areas, the soil is easily washed away and very soon nothing can be grown there, so the farmers are forced to clear more forest. This is repeated year after year and now the world community is alarmed by the loss of the forests, the soil and the flooding caused by the rivers which have so much soil in them. There is no quick or easy answer to these problems, but we certainly cannot just ignore them.

### Using the Pupils' Book

**Page 53** introduces this issue with two pictures of a Caribbean scene, which show changes over time. They are a mixture of positive and negative changes. Let the groups discuss what the pictures show and prepare their answers to the questions below them. Bring the class together to share their ideas and opinions. You should allow differences of opinion, as these reflect what individuals feel about the changes. Sort out the natural changes from those caused by people and make two lists on the board. Once all the pupils have had the chance to express their ideas, they should do the writing individually. It has three elements – the identification of the change, the cause and the pupil's opinion about it.

The second picture poses the questions about the effects on animals when their habitats are destroyed, either by people or by natural forces. Pupils should be encouraged to imagine what the animals would do if their habitat caught fire. Some would escape, by flying away or running. Others would die because they could not move fast enough. Some would hide

underground and re-emerge when the fire had passed. The problem for all the surviving animals would be to find food, whether from plants or other animals. The whole habitat would be "unbalanced" by the loss of some species, especially those which were the food of others.



**Page 54** carries this scene into the creation of a story. Pupils are asked to imagine themselves as animals caught in the fire. This is as much a language as a science activity. The picture should illustrate part of the story. The changes in the animals' lives may include moving to a new habitat, having very little to eat, or having more than usual because there is less competition for the food you eat, being separated from other animals of the same kind. When the class display their stories and pictures, give them plenty of time to read several so that they can compare them and decide which ones seem most likely to be correct.

### Activity 13



Before the groups go out to do their survey, you should have decided where they will go. If the school yard is badly littered, then there is no need for the pupils to go outside. Let the groups decide how they list the rubbish and keep their tallies. Back in class, they should turn the tallies into bar graphs. When they are displayed, the pupils can compare them and they should see that there is more litter in

some places than in others and that the types of litter are different in different places. The posters should be designed to give information and produce some change in people's behaviour. Ask the headteacher if the posters can be displayed around the school, especially outside.

### Activity 14

This can be a class activity, where everyone looks at the pictures of environmental damage and shares their thoughts about what they see. Then form the groups so that they can list the effects under the three headings. Once they are finished, ask the groups to report back to the class. You should keep a record of their lists on the board, so that you end up with a complete set of pupils' ideas. The effects should include:

Dead fish and other water creatures in the polluted rivers, with sick, even dying, people  
Injuries to people walking on the beach caused by ships' litter, as well as the beauty of the beach being destroyed

Illness and even death amongst people living near the open drains, carried by the rats and flies which live there. The water supply may also be contaminated.

Dead trees in the forest, poisoned lakes and soil and failure of crops.

Lung diseases suffered by the people living in the polluted atmosphere.

## CHAINS AND WEBS pages 58 to 62

### General concepts

All living things depend for their survival on having certain things in their environment. All animals depend on plants to make food. Everything is connected in some way to other things. Scientists call these relationships "webs" and "chains". Some animals make distinctive sounds, which we can learn to recognise.

### Materials

1. Notebooks and pencils
2. Books, pictures about plants and animals
3. Videos or CD-ROMs about plants and animals
4. TV and video player
5. Various musical instruments and sound makers

### Background

Plants are the basis of all animal life, because only plants can "catch" the energy from the sun and lock it up in substances which they make inside their leaves and stems. They are the producers. In that sense, all animals depend on plants for their survival. Animals which eat plants, such as sheep, goats, rabbits, caterpillars, snails, elephants and tortoises, are called herbivores. The plants they eat are converted into the bodies of the animals. They are called "primary consumers", because they are the first to eat and make use of the foods found in plants. Other animals never eat plants. Their food is the bodies of other animals. Eagles, seabirds, snakes, crocodiles, many beetles, crabs and many fish are

called “secondary consumers”, because they eat primary consumers to obtain all or most of their food. They do not feed directly on plants. They eat the bodies of animals which are built from the materials made by the plants. These animals are called carnivores. The third group of animals, to which humans belong, is called “omnivores”, because they eat both plants and animals. Chimpanzees, chickens and pigs are also omnivorous. They may be secondary or tertiary consumers, as well as primary consumers, depending on where they are in the food chain.

It is clear that everything living on earth is connected, directly or indirectly, to other living things through the basic need for food. Scientists use the term “food chains” to express this close relationship between different living things. This means that changes in the population of one living thing will have effects on others. Environmental changes of the kind covered in the previous topic can have consequences for animals and these consequences get passed on from one animal to another – a chain of feeding can be broken. In reality, the chains are not separate, but interconnected in a kind of “web”. This is because most carnivorous animals do not eat only one thing, but a whole range of things (e.g. a cat eats birds, mice, rats and other small mammals, in addition to fish and milk). So, one animal is connected to many others in these webs of feeding. It is clear that there is an enormous degree of dependence in the world of living things.

Basic to all life are the soil, the water and the air. If they are lost or spoiled there is no substitute – life will come to an end on this planet.

We can learn to use sounds to identify some living things. Even though we may enjoy the singing of birds, or dislike the barking of dogs, we have to admit that the sounds are not made for us at all. They are a means of social communication with other birds or other dogs. Animal sounds carry signals which attract or repel other animals. When an animal is trying to find a mate, it can use sound to draw attention to itself, even over great distances, when the animal cannot actually be seen. Similarly, if the animal is threatened, it can use sounds both to frighten the attacker and to call for help from others of its kind. Some animals give warnings to the rest of the flock or herd or troop by calling out in a special way which alerts all the members of the group to the danger. A few animals use sound to locate their food, by sending out sound waves and waiting for the wave to hit something and be reflected back to them, e.g. bats, some whales and two types of bird. These sounds are not audible to humans, because our ears are not sensitive to such high-pitched sounds.

## Using the Pupils' Book

**Page 58** uses unmatched pairs of pictures as the introduction to the topic. The task, for individuals, groups or the whole class, is to match each living thing with the things they depend on. The pairs are:

- Waves on the shore – rock pool creatures
- Flying insects – swallows/swifts in flight
- Leaves of the Lignum vitae tree – the caterpillars
- The pond – frog.

Each animal depends on the food provided by the other plants or animals shown.

### Activity 15

This activity is a mixture of first-hand observation of real creatures, with research from books and other resources. You will need to collect as many sources as you can, to allow all the groups to do the task at the same time. If this is impossible, the groups will have to take turns in using the resources to find the information they need. The first decision for the groups is their choice of living thing. It must be one which can be found locally. The observations must be recorded in some way by the groups as they carry out the task. The questions in the text should be the focus of their observations: that is what they are trying to answer through observation and later by research in various resources. Other things may be discovered, but they are of less importance in this context. The groups should each produce a display of their research results, in drawings and notes. Let pupils look at them and then question one another. The outcome of the activity should be a clear understanding of how one living thing depends on both living and non-living things in its environment.

**Page 60** illustrates the way some animals use shelters to protect themselves or their young from enemies.

### Activity 16



drama



music



art

Pupils can express their understanding and feelings relating to the “webs and chains of life” in creative and imaginative ways. Leave each group to form itself and to choose which form their expression will take. The results may be very dramatic, as pupils make clear the terrible harm done to living things and the environment and how this can change people’s



lives. The discussion after the presentations should be focused by you on the message(s) made clear by the work of the groups. The



activity is also a drama, music, art and language activity, with the potential to bring in ideas from religion as well as science.

### Activity 17



This activity is not really connected with the rest of the unit, except that it emphasises the way in which animals interact with one another. You should choose the route for the walk before the class sets out, taking a path which will allow pupils to hear the maximum number of different sounds. Pupils should be told the purpose of the walk before setting out

and they must take notebooks and pencils to record what they hear as they go along. They need to be thinking about which sound to mimic when they return to class. In the room, provide them with instruments and other sound makers, so that they can choose the best way of reproducing the sounds they heard. The class have to identify the animals from the sounds, so pupils will need to try their best to make them accurate.

Page 62 ends with a few common examples of animals which make sounds. The leaves are blown by the wind. The bird blows air through its beak. The frog inflates its cheeks. The dog barks and the bees' wings vibrate at high speed.

## Term 3 Unit 2 Caring for my environment

### Objectives

Pupils will:

- Classify things in the physical environment in a variety of ways
- Explain why it is now most urgent to protect the physical environment
- Identify ways in which the physical environment has changed over time, in different places (locally)
- Discuss and practise conservation of resources, e.g. water and electricity

**Time allocation: 6 weeks**

### Discussion of concepts and skills

The unit draws ideas about the environment from previous units in this grade and earlier ones.

Things can be sorted into two sets – the natural and the manufactured. The latter are made from raw materials taken from the natural environment, so

there is a direct relationship between the two sets. The environment can be damaged by human activity and this leads to consequences. Some are very immediate and obvious, whilst others are so slow and gradual that they can go un-noticed for a long time. The

damage may be localised, but sometimes it is spread far and wide. This is often the case when water or the atmosphere are involved. Flooding is one example of this kind of problem. The cause may be far from the place where the floods develop.

People have been responsible for the extinction of hundreds of plants and animals; they will never be seen again on earth. The creatures were either wiped out by deliberate action, such as hunting, or through carelessness and ignorance, such as burning and clearing natural forests. At present there is a vigorous debate going on about the preservation of the world's whale population. Some countries want to go on killing whales for food, whilst others want hunting totally banned, in order to avoid the extinction of the whales. This is no longer a local issue – it is global and is just one example of the choices which humanity must make, if the planet is to be cared for.

Changes to the earth's atmosphere have been taking place slowly over the years, caused by human activity such as burning fuels. Scientists have been collecting data about the composition of the air and the temperature of the earth over a long period and they have shown a relationship between the amount of carbon dioxide in the air and the temperature. It is now understood that, as we add more and more carbon dioxide to the air, the earth gets hotter and hotter. This is known as "the *greenhouse effect*", which leads to "*global warming*" and it is already doing damage through changes in climate. These cause droughts in some places and floods in others. The message to the world community is clear – we must burn less of the fuels which release carbon dioxide. The problem is that if we decide to do what is needed, we will have to change the way we live and this is hard for us to do. We like to drive around when

and where we like, we want more and more electrical gadgets to help us or entertain us, we like to be cooled by fans or warmed by heaters – the list goes on and on. To change human behaviour is difficult, but the warning from science is clear.

Another atmospheric problem which people have created is damage to the layer of ozone gas high up in the atmosphere. This gas reduces the amount of damaging *ultra-violet radiation* from the sun reaching the earth's surface. Our bodies are damaged by such radiation. In particular, we can develop cancers, especially of the skin. In fact, if the radiation was not blocked, all life would be wiped out on earth. At present, the "holes" in the ozone layer are confined to certain parts of the atmosphere, but the world community has been alarmed enough to introduce laws which ban, or severely restrict, the use of the chemicals which damage the ozone layer. These chemicals (*CFCs*) were commonly used in the cooling systems of fridges and in aerosol cans. Previously, we were carelessly allowing them to escape into the atmosphere, ignorant of the damage they were doing. Now we know about it, we have had to change the way we use the damaging *CFCs*.

Changes are to be expected and many are welcome, because they improve the environment for people and other living things. The problems often arise because we do not know enough, or we do not think carefully enough. Science has helped to make people all over the world more aware and more sensitive about the environment – that's why this unit is in the curriculum!

Pupils use their skills of sorting, researching from resources and collecting information through questionnaires.

## NATURAL AND MANUFACTURED pages 63 and 64

### General concept

Everything can be sorted into one of two sets – natural or manufactured. Raw materials from the natural world are used to manufacture other things.

### Materials

1. Notebooks and pencils
2. Pictures of different places, at home and abroad

### Background

The world is made of a great variety of materials and people have worked out ways of using many of them to produce useful things. For example, clay has been used by human beings for thousands of years to make pottery. Clay is a natural, raw material which can be

manufactured into many things. Certain types of sand can be made into glass – another material which people have been manufacturing for thousands of years. This manufactured material can then be used to make countless things, both useful and beautiful. These are just two of the natural raw materials which get turned into other things through manufacturing processes. We use some natural materials without changing them, such as wood and stone in buildings and furniture. However, we can change wood into paper through manufacturing processes and some types of limestone can be used to help in the production of iron and steel. These metals do not exist as such in nature. The element "iron" is found in nature as ore. This is a rock which contains iron

combined with other substances. This is true for most metals. Gold is an exception because it exists naturally as a pure metal.

### Using the Pupils' Book

Page 63 can be used as a group or individual task. The lists should be written down and then shared with the

class. You should keep a record on the board of what pupils tell you, so that the class can discuss what has been done when the lists are complete. Obviously, the items which pupils choose to add from their own minds will be unpredictable, so you will have to decide whether or not they have been sorted correctly.

## TAKING CARE OF THE WORLD pages 64 to 72

### General concepts

The world has natural and manufactured things in it. Raw natural materials are used to manufacture new things. The environment can be damaged by human actions. Some damage might be local, but there is also global damage which we all contribute to by the way we live. Some damage is done slowly, like global warming, the damage to the ozone layer and the extinction of plants and animals. Our environments change over time and not all the changes are beneficial.

### Materials

1. Notebooks and pencils
2. Books and pictures about environmental damage
3. Scissors
4. Glue
5. Magazines and newspapers for cutting up.
6. Various musical instruments and sound makers

### Background

Everything we make must use something as its raw material. These may be non-living materials, such as clay, stone, air, water and sand, or materials from living things, such as wood, wool, sugar, milk, leather and coffee. Manufacturing may change the materials totally, or just shape them into something else, e.g. paper, compared with furniture.

The living and non-living parts of the natural world are both in need of protection from people. Human beings exploit the world's resources and often treat it carelessly, as if the world is invulnerable. This is a bad mistake, as the world is our only home and everything on it is connected in some way with other things, including ourselves. There was a time when human communities were very separated and ignorant of one another. That is not the case now; we all live in the "global village". The actions of people in one part of the world have an effect on other people they will never see, living far away.

One problem in convincing the world's population that damage is being done and that it is serious is the slow and invisible way in which a lot of it happens. The problems develop gradually and then we notice

something is going wrong. The solving, the healing, the correction – these will also take time and we do not always have the patience to wait for the promised improvements.

A focus on the way the local environment has been damaged over the lifetimes of older residents is one way to make the issue more real and urgent. The message is not that *all* change is bad, but rather that people must think more carefully before they make changes.

### Using the Pupils' Book

#### Activity 1

You will need to have a collection of pictures showing natural places and those created by human activity. You could ask the pupils in advance to bring pictures from magazines and newspapers, as well as books and photos from home, to add to those you can provide. Give each group a selection of pictures, some of natural and some of "manufactured" places so that they can compare them. The first table should be used to record the features seen in the pictures, using the headings shown in the text. When this is complete, the groups should then compare them and record the similarities and differences in a second table. The whole class should then share their ideas. You should collate their lists and produce a final list of similarities and differences.

The story should be "The Boy and the Dyke", if possible. Otherwise it must be one which includes the idea of someone taking care of the environment. Before you tell the story, warn the class that they should listen for examples of how the environment was cared for. When it is finished, ask the class to share what they think.

#### Activity 2

This is a research activity, based on books and other sources of information, such as pictures,



CD-ROMs, videos, etc. If you cannot provide enough from the school's resources, ask the pupils in advance to bring items from home. Each group will need enough for everyone to have something to work on. The focus is on environmental damage – its causes and results. These two headings should be used by pupils to keep notes of what they find. They do not need to write the notes in complete sentences; the key words are all that are needed to convey the sense of what they think is important.

The "Environment Word Bank" can be kept by individuals in separate small exercise books, or at the back of their science exercise book. Alternatively, you can have a class book as the word bank, which is available for the class to refer to when needed. The individual version is preferable. Start the "bank" off with words which have already been used in the pupil text and are therefore familiar: *pollute, spoil, damage, rubbish, disease, atmosphere*. As the topic goes on, you should add others, such as *extinct*, and remind pupils to add words of their own. From time to time, review what individuals have put into their "word banks" and ask pupils to add more words if they have been forgetting to do so. This is an activity which has a lot of language objectives.

**Page 66** provides one example of how pupils can help to protect the environment. The groups should look at the pictures and discuss what they can do to keep the water flowing and so help to prevent flooding, i.e. do not throw things into the ditches, unblock the drain covers so that water can fall through freely.

### Activity 3

This special book could be combined with the "Environmental Word Bank", so that all the information is all in the one place. If you choose to do this, the book will have to be big enough for pictures to be stuck or drawn on the pages. The individuals should decide for themselves what to put into the book. Some may find newspaper photos or reports which they think are interesting and cut them out for gluing in their personal book. Reports of what they do can be written straight into the book, or on loose pages and then stuck in. It will be a kind of "scrapbook" on the theme of caring for the environment.

### Activity 4



This activity will require you to collect resources about environmental problems and to arrange for local people who have knowledge of some problems to be questioned by the pupils. You could invite them to the class, or arrange to take the pupils to talk to them elsewhere. The result should be a role-play from each group, dealing with the causes of a particular problem of environmental damage. The class should watch and try to identify what the causes are. If they have understood the role-play, they should be able to explain it afterwards. This is a drama activity as much as a science one.

The photograph of the planet Earth should be used as a reminder of how we are all totally dependent on this place and that we have no alternative home for ourselves or the rest of the world's living things.



**Page 69** introduces the issue of extinction.



This means that all the members of a particular plant or animal species have died, so that none remain anywhere on earth. Thousands have been lost throughout the long history of the planet, but people are the cause of very many during the last two or three hundred years. Let pupils share their feelings about this loss of creatures and the dangers which still exist for many others.

The text goes on to deal with another new concept, global warming. You do not need to tell the pupils any more details than are in the pupil book, but you will need to answer any questions they might have, as this is a new and difficult idea. The good thing about the problem is that we know how to reduce the damage. The issue for humanity is now one of will, not understanding. This topic has strong links with religious education and social studies.

**Page 70** moves on to the other new concept, of damage to the ozone layer. Use the same approach here as with the previous page.

Floods are particularly threatening to low lying countries and islands. Global warming is melting the ice caps at the poles of the earth and the sea level is rising. The message for your pupils is that everyone on earth is either making the problem worse or better by the way they live. Even if the problem is

damaging people far away, we cannot say our actions have nothing to do with it. Encourage the children to share their opinions and feelings about these issues. The links with RE and social studies are very obvious. **RE SS**

### Activity 5



geography



social studies

The unit ends with the collection of information through the use of a questionnaire. You will need to guide the pupils in the construction of the questionnaire, as they may have no experience of such a thing. The questions could be decided by the class as a whole, so that every group collects information of the same kind. Alternatively, each group could compile their own questionnaire and produce different information. Certainly, the questions should be a mixture, seeking factual information about changes and the opinions of the adults who are questioned. In this way, the pupils will discover that not everyone will remember the same things from the past and that people have different opinions about those changes.

The questions could include some straightforward yes/no answers. This is a simple and quick way to collect a lot of information. For example:

Has the place around the school changed in your lifetime? YES/NO

Do you like what has happened to the neighbourhood? YES/NO

Photos and drawings are very useful, as they carry a lot of information in a clear and easy way. If photos are borrowed, you must take

responsibility for their safe return. If you have use of a photocopier, then you can keep copies of photos which you borrow for a short time. A display of all the results is essential, as there should be a lot of detail which cannot be fully appreciated if pupils just read it out to the class. The display should try to emphasise the contrast of the present with the past, so far as the local environment is concerned.

**Page 72** has an illustration of one place in Jamaica which has changed significantly over the years. Pupils could compare what the pictures show with what they discovered from their questionnaire.

### Activity 6



drama

This can be a group or individual task, to create a picture in sound. It should include the two environmental conditions – stable, safe and protected contrasted with the damaged, spoiled and dangerous. Encourage the pupils to be imaginative and express their feelings about the issue of caring for the environment. Each “picture” should be performed for the class to identify the two environmental conditions.

### Additional Activity

Create a dance to depict the contrast between a polluted and a clean environment. It should include patterns, locomotory and non-locomotory movements and some form of motif. The costumes (masks, hats, clothes) should express meanings, including mood, through the colours and shapes.

# WORD LIST Book I

<b>accident</b>	something which you do not mean to happen (like a car crash)	<b>loud</b>	a big noise, easy to hear
<b>age</b>	how many months and years you have lived	<b>low pitch</b>	sounds below, down from another sound, lower in a scale
<b>ambulance</b>	carries sick and injured people to hospital	<b>mass</b>	the amount of material (stuff) in an object
<b>balance</b>	to make it stay level (not up or down on one side)	<b>material</b>	what something is made of, the stuff, the substance
<b>basic needs</b>	the things we must have to stay alive	<b>measure</b>	to find out the size
<b>blindfold</b>	a cover over the eyes that stops us seeing (a cloth or mask)	<b>medicines</b>	drugs that help to make us well when we are sick
<b>clean</b>	washed, not dirty	<b>object</b>	thing
<b>compare</b>	find out what is different and what is the same	<b>outside</b>	in the open, not in a building
<b>dangerous</b>	not safe, harmful, can hurt	<b>percussion</b>	sounds made by hitting something
<b>differences</b>	things which are not the same	<b>print</b>	make a mark by pressing
<b>direction</b>	the way something comes (from the front, from behind, from the left or right)	<b>record</b>	writing or drawings of what was done or what has happened
<b>ethnic group</b>	people who share common features	<b>rhyme</b>	a short song or poem
<b>exercise</b>	making the body work to keep it fit and strong	<b>safe</b>	not being hurt, damaged, harmed; out of danger
<b>fire engine</b>	a machine that carries water and ladders to fight fires	<b>same</b>	having common features, not different
<b>fire extinguisher</b>	a tool used to put out fires	<b>sense organs</b>	special parts of the body that tell us what is happening
<b>foods</b>	the things we eat to keep us alive	<b>set</b>	a group of things with something in common
<b>group</b>	a number of people with some thing in common	<b>shape</b>	what a thing looks like
<b>grow</b>	to get bigger, taller, fatter	<b>soft</b>	a small noise, hard to hear
<b>handspan</b>	the distance from the thumb to little fingure when the hand is spread open	<b>sort</b>	put into groups
<b>healthy</b>	not sick or ill; being well	<b>source</b>	place where something comes from
<b>heavier</b>	weighs more, has more mass	<b>table</b>	a way of writing things down in rows and columns
<b>height</b>	how tall you are, from the top of your head to the ground	<b>taller</b>	has a greater height
<b>high pitch</b>	sounds above, up from another sound, higher in a scale	<b>texture</b>	what a thing feels like (e.g. rough, smooth, hard, sticky, soft, silky)
<b>humanity</b>	all the people in the world	<b>town</b>	a place with lots of people and houses
<b>increases</b>	becomes more, gets bigger	<b>unsafe</b>	dangerous, harmful, damaging, can hurt us
<b>inside</b>	in the house, school or other building	<b>village</b>	a place with a small group of houses in the country
		<b>warning</b>	a notice that tells us to be careful because there is danger
		<b>work</b>	to move, lift, carry

# WORD LIST Book 2

<b>accident</b>	something which was not planned, e.g. a car crash	<b>extinct</b>	died out, all dead
<b>album</b>	a book in which pictures and writing are collected	<b>fasting</b>	not eating
<b>ankle</b>	the joint where the leg and foot meet	<b>fence</b>	wood or metal put around a piece of land
<b>appliances</b>	machines which help do jobs at home	<b>forget</b>	not remember
<b>athlete</b>	a person trained for sports	<b>function</b>	job, work, use
<b>avoided</b>	prevented from happening	<b>germs</b>	very small living things that make us ill
<b>axes</b>	the lines which form the edges of the graph	<b>gram</b>	a measure of mass
<b>balanced diet</b>	the correct amount and variety of foods for good health	<b>healthy</b>	lively, strong, well
<b>basic needs</b>	those things which we must have to stay alive	<b>heart</b>	the part that pumps blood around the body
<b>bones</b>	the framework of the body, inside the muscles	<b>ideas</b>	thoughts
<b>brain</b>	the part of the body which learns, thinks and controls the body	<b>illegal</b>	not allowed, against the law
<b>caught</b>	found doing something wrong	<b>imitate</b>	copy
<b>characteristics</b>	things which are special to something	<b>independently</b>	on our own, without help
<b>clean</b>	not dirty	<b>inject</b>	push into
<b>compare</b>	find out what is different and what is the same	<b>inside</b>	inside
<b>compound</b>	the yard, the grounds	<b>kit</b>	collection of things for a special job
<b>condition</b>	order, state, how something is	<b>legal</b>	allowed, within the law
<b>conjunctivitis</b>	an illness of the eyes which makes them sore and red	<b>legumes</b>	groups of vegetables such as peas or beans
<b>consequences</b>	the results, the effects	<b>length</b>	distance from one end of something to the other
<b>cure</b>	to heal an illness, to make well	<b>manufactured</b>	made by people
<b>damaged</b>	broken, spoiled	<b>mass</b>	the amount of matter
<b>dangerous</b>	not safe, harmful	<b>mate</b>	a partner
<b>decay</b>	rot, break down	<b>materials</b>	stuff, what things are made of
<b>development</b>	changes over time	<b>meal</b>	food served at one time
<b>diet</b>	all the food we eat	<b>measure</b>	to use a tool to find the size
<b>disease</b>	illness, sickness	<b>medicines</b>	things we use to make us well
<b>drill</b>	a set of rules which tell us how to behave	<b>millilitre</b>	a measure of volume
<b>drugs</b>	another word for <b>medicines</b> , but some drugs are <b>illegal</b> and harmful	<b>minerals</b>	substances in soil which plants must have for growth
<b>earthquake</b>	a shaking of the ground	<b>muscles</b>	the parts of the body that make it move
<b>elbow</b>	the joint where the arm bends	<b>natural</b>	not made
<b>energy</b>	ability to be active	<b>nursery</b>	a place where young are cared for
<b>environment</b>	the surroundings, the place to guess	<b>observe</b>	notice when paying careful attention (see, smell, hear, touch)
<b>estimate</b>	to guess	<b>pitch</b>	how high or low a note is
<b>examine</b>	to look closely	<b>poisonous</b>	damages or kills living things
<b>exercise</b>	activity to keep us healthy	<b>prevent</b>	stop
<b>external</b>	outside	<b>protect</b>	keep safe
		<b>pulse</b>	the movement in the wrist made by the heart beating
		<b>reasons</b>	why something is as it is
		<b>record</b>	write down or draw what was done or has happened
		<b>recycle</b>	use again

<b>refresh</b>	make fresh again	<b>structure</b>	something that has been built from parts
<b>relax</b>	stop working	<b>surface</b>	the outside of something
<b>report</b>	tell	<b>table</b>	a way of writing things down in rows and columns
<b>rest</b>	letting the body be still	<b>telephone</b>	a machine that we use to talk to people far away
<b>results</b>	the outcome, what happened	<b>texture</b>	the feel of something, e.g. rough or smooth
<b>role-play</b>	acting, pretending to be someone else	<b>tools</b>	things that help us do a job, e.g. pen, knife, axe
<b>rules</b>	laws, orders	<b>transport</b>	ways of moving about from place to place
<b>sanctuary</b>	a place of safety, a protected place	<b>treated</b>	cared for, looked after
<b>scales</b>	machine for measuring mass	<b>unbalanced diet</b>	not the correct amount and variety of foods for good health
<b>senses</b>	sight, smell, touch, hearing and taste are the five senses	<b>unhealthy</b>	sick, ill, not fit
<b>sets</b>	groups of things that have something in common	<b>vegetarian</b>	without meat
<b>shelter</b>	a place that covers and protects	<b>vegetation</b>	all the plants
<b>skeleton</b>	the set of bones in a body	<b>volume</b>	how much space something fills OR how loud a sound is
<b>skill</b>	what we are able to do	<b>warn</b>	to tell of danger
<b>skull</b>	the bone 'box' that has the brain inside	<b>wrist</b>	the joint where the hand meets the arm
<b>staple</b>	an important food that everyone eats, e.g. bread or rice		
<b>stethoscope</b>	a tool for listening to the heart beat		
<b>store</b>	a place where things are kept		

# WORD LIST Book 3

<b>abdomen</b>	the part of the body between the chest and the legs		
<b>acid rain</b>	rain that has been made into a weak acid through chemicals in smoke	<b>hygiene</b>	live, including the soil, weather and other physical features
<b>adapted</b>	fitted in with the surroundings	<b>incisor</b>	what we do to keep ourselves clean
<b>bar graph</b>	a way of showing data in bars or blocks, sometimes on a grid of lines	<b>inhale</b>	sharp-edged tooth at the front of the mouth
<b>benefits</b>	good things, positive results	<b>lungs</b>	breathe in
<b>canine</b>	pointed tooth at the side of the jaw, like a dog's tooth		the two 'bags' in the chest that are used for breathing taking oxygen into the blood and getting rid of carbon dioxide from the blood)
<b>carbon dioxide</b>	a gas that all living things make in their bodies and add to the air	<b>maintaining</b>	keeping in good condition
<b>cause</b>	what makes something happen	<b>melodic</b>	like a melody or tune, pleasant
<b>characteristics</b>	features that are always found, typical things	<b>milk teeth</b>	the first set of teeth we grow, which all fall out naturally and are replaced by a second set
<b>classified</b>	sorted into a group, set, family or class and given a name	<b>molar</b>	wide, bumpy tooth at the back of the mouth
<b>complex</b>	opposite of simple, highly developed, very complicated	<b>nutrients</b>	the chemicals that are needed by the body for its life
<b>condense</b>	change from a gas into a liquid	<b>organs</b>	parts of the body that have a special job to do
<b>decay</b>	rot, break down, fall apart	<b>outside</b>	not part of
<b>depend</b>	need, rely on, have to have	<b>oxygen</b>	the gas in the air that all living things need to stay alive
<b>diaphragm</b>	a large sheet of muscle below the lungs that helps us to breathe	<b>ozone</b>	a gas high up in the atmosphere that keeps out deadly rays from the sun
<b>diet</b>	all the things we eat	<b>permanent teeth</b>	the second and final set of teeth that we grow and must look after
<b>digestion</b>	the breaking down of food into its basic parts inside the body	<b>pictograph</b>	a way of showing information in small pictures arranged in rows or columns
<b>disposal</b>	getting rid of, removal	<b>pollutants</b>	the materials that spoil the sea, soil, air, water, etc.
<b>elastic</b>	can be stretched and then shrinks back to normal size	<b>pollution</b>	the spoiling/making dirty of the Earth
<b>erode</b>	to wear away, to slowly destroy	<b>pre-molar</b>	large tooth at the side of the mouth
<b>exhale</b>	breathe out	<b>remedy</b>	the cure, the answer to a problem
<b>extinction</b>	death of all the individuals of a particular plant or animal, so that none are left	<b>rhythmic</b>	a sound or movement with a regular beat
<b>function</b>	the work done by something, its purpose, what it is used for	<b>sewage</b>	the solid and liquid wastes that people get rid of in the toilet (faeces and urine)
<b>germs</b>	very, very small creatures that can cause diseases when they get into the body	<b>stimuli</b>	anything to which the senses can react, e.g. light, sound, heat
<b>germinate</b>	begin to grow (used of a seed)	<b>stomach</b>	the organ into which food passes when we swallow, where digestion starts
<b>global</b>	the heating up of the Earth due to carbon dioxide from	<b>stress</b>	worry or other bad feelings that disturb the mind
<b>warming</b>	burning fuels		
<b>greenhouse effect</b>	the effect of the heat trapped around the Earth in the atmosphere, like heat in a greenhouse		
<b>habitat</b>	the place where animals and plants		

**survive**

stay alive

**temporary**

only for a time, not lasting, not permanent

**thorax**

the chest, the part of the body from the neck to the abdomen

**windpipe**

the tube which leads from the mouth to the lungs, through the neck

# TEACHER'S GUIDE KEY WORDS

- Amplified – made louder
- Antacid – medicine which is taken to reduce the acidity of the stomach contents to relieve pain and reduce the chance of ulcers
- Antibiotics – drugs which kill germs when they have entered the body, e.g. penicillin
- Antiseptic – a substance which kills germs on surfaces, objects, on the skin, etc.
- Body-building – foods which the body uses to make muscles and other tissues
- Carbohydrates – foods which contain carbon, hydrogen and oxygen. They provide energy, e.g. sucrose, starch, glucose
- Cartilage – a tough elastic material which covers the ends of bones in the joints
- CFC – chlorofluorocarbons: gases which are used in refrigerators and aerosols. They damage the ozone layer in the upper atmosphere
- Chemotherapy – the use of drugs to treat diseases such as cancer
- Collate – to bring together for comparison
- Competition – what all the living things in a habitat are involved in, as they try to find what they need to survive, e.g. food, light, water
- Compounds – chemicals made of two or more elements, e.g. water is a compound of oxygen and hydrogen, written as H<sub>2</sub>O
- Criteria – the features chosen as the basis for comparison, judgement, decision
- Diaphragm – a sheet of muscle which forms the floor of the thorax (chest) and roof of the abdomen. It is used in breathing, when it goes up and down to deflate and inflate the lungs
- Dormant – inactive, asleep
- Energy – the capacity to do work, measured in joules
- Fats – substances made up of carbon, hydrogen and oxygen in the form of glycerol and fatty acids. They provide energy when eaten. They can be in solid or liquid form, such as oils
- Fibrous – made up of, in the form of fibres
- Genetic – related to the genes, the inheritance of characteristics and variation
- Global warming – the raising of the Earth's temperature
- Greenhouse effect – the trapping of the Sun's radiant heat by the Earth's atmosphere, which leads to global warming
- Homogenised – made into parts which are all similar
- Interpreted – to have the meaning explained
- Larvae – the second stage of the insect's life cycle after the egg, e.g. caterpillar
- Manipulate – to handle, to use skilfully
- Mass – the amount of matter in an object or substance
- Microscopic – too small to be seen only with the eye. A microscope makes such things visible
- Minerals – natural, inorganic substances which plants can absorb from the soil
- Mucus – slimy material produced by the lining of the nose and other parts of the body
- Non-standard measures – using natural objects, such as hands and feet, or variable objects such as cups and stones, to measure other things
- Nutrients – substances contained in food which are used by a creature to keep them alive
- Obese – excessively fat
- Papier mâché – a mixture of paper and paste which dries to form a hard substance useful for modelling
- Protective – foods which defend the body from harm, enabling it to resist attack from germs
- Proteins – substances which contain nitrogen and are an essential component of all living things
- Puberty – the period following childhood, when the sex glands begin to function
- Pus – yellowish liquid produced in wounds, spots and other areas of infection, made of dead bacteria and white blood cells
- Radiotherapy – treatment of diseases such as cancer, using high energy, very dangerous, radiation
- Siblings – brothers and sisters
- Stimulus ( pl. stimuli) – something that causes a response in a living thing
- Texture – the surface of a material as perceived by touch
- Ultra-violet radiation – invisible radiation from the sun which is dangerous in high doses
- Vaccinations – injections of dead or very weak germs into the body to produce immunity to the disease
- Vitamins – chemicals which are essential in small quantities for the normal functioning of the body
- Vocal cords – two folds in the wall of the voice box (larynx), which can vibrate and produce sounds