

Nuffield Primary Science

SCIENCE **P**ROCESSES **A**ND **C**ONCEPT **E**XPLORATION

KEY STAGE

1



LIVING THINGS IN THEIR ENVIRONMENT

Teachers' Guide



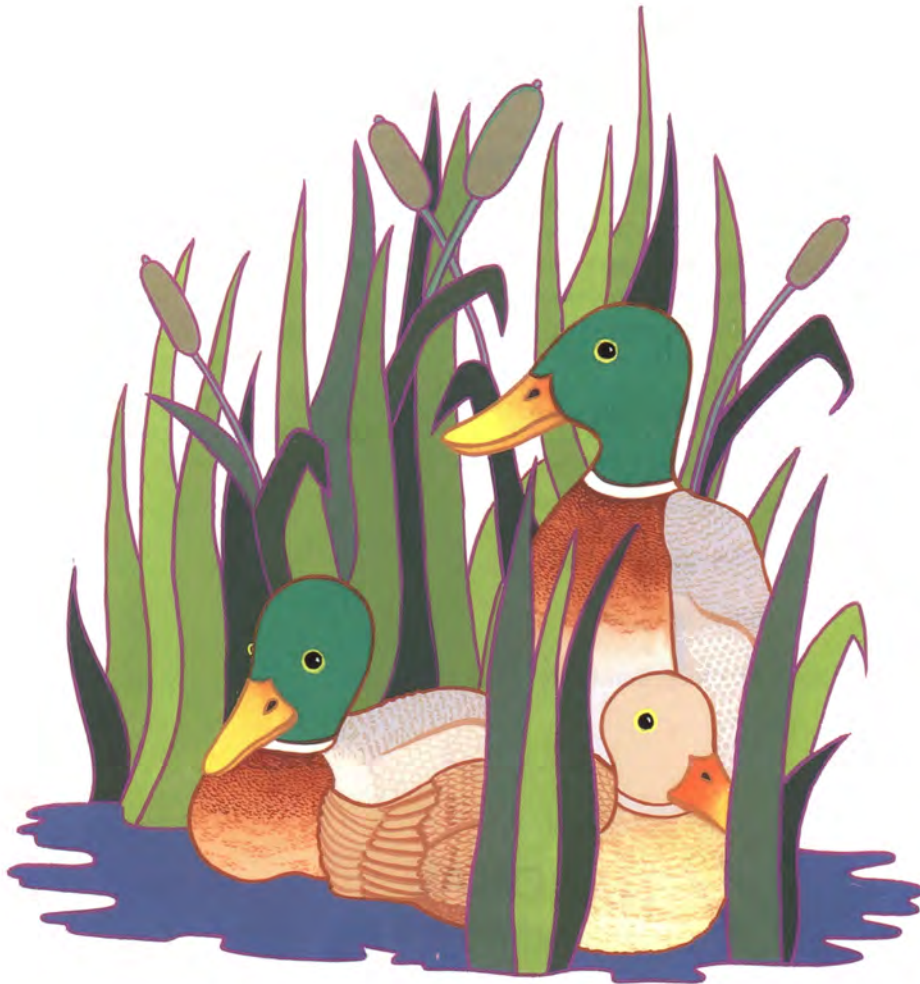
Collins Educational

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Key Stage

1

Living things in their environment



TEACHERS' GUIDE



Trial schools

The SPACE Project and the Trust are grateful to the governors, staff, and pupils of all the trial schools. It will be obvious to readers of these publications how much we are indebted to them for their help, and especially for the children's drawn and written records of their hard work and their growing understanding of science.

All Saints Primary School, Barnet, Hertfordshire
Arnot County Primary Infant School, Arnot Street, Walton, Liverpool
Balladen Primary School, Rawtenstall, Rossendale
Blacko County Primary School, Blacko, Lancashire
Chalgrove JMI School, Finchley, London N3
Fairway JMI School, Mill Hill, London NW7
Fazakerley Junior School, Formosa Drive, Liverpool
Foulds Primary School, Barnet, Hertfordshire
Frenchwood County Primary School, Preston, Lancashire
Hillbrook Primary School, Tooting, London SW17
Mawdesley Church of England Primary School, Lancashire
Padiham Green Church of England Primary School, Padiham, Lancashire
Roe Lee County Primary School, Blackburn, Lancashire
St Aloysius Roman Catholic Infants School, Knowsley
St Ambrose Junior School, Alderfield Drive, Speke, Liverpool
St Hughes RC JMI School, Earle Road, Liverpool
St Michael in the Hamlet Infant School, Neilson Road, Liverpool
St Stephen's Church of England School, Burnley
St Theresa's Roman Catholic Primary School, Finchley, London N3
Salterforth Primary School, Salterforth, Lancashire
Snaresbrook Primary School, Wanstead, London E18
Stubbins Primary School, Ramsbottom, Lancashire
Thorn County Primary School, Cowtoot Lane, Bacup, Lancashire
Trawden County Primary School, Dean Street, Trawden, Lancashire
Walton-le-Dale County Primary School, Preston
Water County Primary School, Burnley Road East, Water, Rossendale
Waterfoot County Primary School, Thornfield Avenue, Waterfoot, Rossendale
Whittlefield Infant School, Tabor Street, Burnley, Lancashire
Woodridge Primary School, North Finchley, London N12



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Chapter 3

Assessment

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Explanation of symbols in the margins



Warning



Good opportunities for
work related to
Attainment Target 1
(Science 1)



Notes which may be
useful to the teacher



Vocabulary work



Opportunities for
children to use
information technology



Equipment needed



Reference to the pupils'
books

e

1.1 Resources

This is what you may need to carry out the investigations shown in this book.

Access to the school grounds, and other areas of the local environment which are safely accessible

Classroom pets (in accordance with LEA and RSPCA guidelines)

Modelling clay or Plasticine

Magnifying glass

Pictures of roads, fields, cars, houses, toilets

A selection of clean waste materials:

- plastic bottles

- crisp packets

- egg boxes

- sweet wrappers

- various metal objects

- vegetables and fruits

Pictures of plants and animals, and ways in which humans have affected the local environment

!

1.2 Warnings

Activities which need particular care are indicated by this symbol in the margin. Everything possible should be done to ensure the safety of the children during their investigations. You should consult any guidelines produced by your own Local Education Authority and, if your school or LEA is a member, by CLEAPSS. See also the Association for Science Education publication *Be safe! some aspects of safety in school science and technology for Key Stages 1 and 2* (2nd edition, 1990). This contains more detailed advice than can be included here.

The points listed below require particular attention.

Take care when handling litter and other forms of rubbish – protect hands with disposable gloves or plastic bags.

Consider immunization against tetanus for both teachers and children.

Mouldy material produces spores to which some people are allergic. All mouldy material should be kept in sealed containers which are not opened. Avoid glass containers.

Children should wash their hands thoroughly after handling any rubbish or similar materials.

Fieldwork and visits must be carefully organized and supervised. Beware of dog mess and poisonous plants. Check your school's policy on visits.

1.3 Pupils' books

Here is a list of topics included in *A first look at where things live*.

Containers

What lives in a garden?

Litter bin game

Elephants

Look at those feet!

One green apple

Where do they live?

Hiding

The animals' picnic

Can I take these home, Miss?

How Peter saved his town

You may also find *A first look at different plants and animals* and *A first look at living things* particularly useful.

1.4 Living things in their

Nuffield Primary Science Themes

Habitats

The aim of this theme is to help children understand that living things are suited to the places in which they live.

Most children will be aware that animals and plants live in different places. They might suggest that a place provides safety, food or warmth for animals and plants. Few are likely to mention that different habitats provide different conditions.

Children could visit different habitats such as a school field or hedgerow, observing how the habitat and the animals and plants within it change over a period of time. Visits to a zoo or farm could enable them to consider the needs of a broader range of animals. Children can draw, photograph and discuss their experiences. This will provide a basis for developing an understanding of the ways in which living things interact with their environment.

Programme of Study

Pupils should study plants and animals in a variety of local habitats, for example *playing field, garden, and pond*.

Drawing upon their study of living things in school and in the local environment they should be introduced to the idea that plants are the ultimate source of all food in the living world.

Statements of Attainment

- 2a) know that plants and animals need certain conditions to sustain life.
- 2c) know that different kinds of living things are found in different localities.
- 3c) know that green plants need light to stay alive and keep healthy.



Waste and decay

This theme aims to familiarize children with the ways in which everyday waste changes over a period of time.

Young children often explain that waste materials will stay the same or that they will be moved by a person, animal or the wind. Some children might mention that items will change colour or go rusty. A few may explain that some waste will rot.

Children can be helped to understand that some waste products decay naturally while others can be recycled or re-used. Children can record waste at home or at school, investigating changes in waste as well as considering some of the ways waste materials are reused in the classroom. Through discussion, visits and secondary sources, children will increase their awareness of what happens to household waste.

Effects of human activity on the environment

The ways in which humans affect their environment are explored in this theme.

Young children mention some of the negative ways people affect the places they inhabit such as dropping litter and breaking windows. Children can consider both the good and bad ways that people affect the places where they live. Observing the school and the surrounding area, talking to parents and grandparents as well as looking at secondary sources, should help children understand the variety of ways in which the place where they live has been affected by people.

They should investigate how far everyday waste products, for example, *garden refuse, paper, plastic materials and cans*, decay naturally and use this knowledge to improve the appearance of their local environment.

[Pupils] should discuss how human activity produces local changes in their environment.

2d) know that some waste materials decay naturally but do so over different periods of time.

3b) know that human activity may produce local changes in the environment that can affect plants and animals.

1.5 Planning a topic

Here is a case study which may help you in planning a topic.

Case study: Shopping

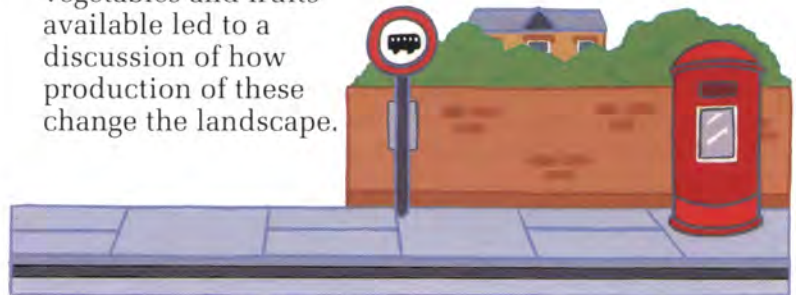
The teacher was keen to put children's study of science into a topic on shopping. In this way children could use their everyday experiences to look at Living things in the environment. Within the topic there was scope for children of all abilities to develop their ideas about waste and the effects of human activity on the environment. Some links with English, Maths and Geography were planned.

The starting point for the topic was a visit to the busy local market. Children drew pictures of what they had noticed during that visit; they also recorded their ideas about what the area might have looked like before the market was established. Following their visit children drew pictures of what they thought would happen to some of the waste from the market. Groups of children were then encouraged to develop their ideas through investigation and by using secondary sources. Finally children shared their experiences with each other through discussion, posters, collages and models, and role play.

SCIENCE

Effects of human activity on the environment

- ◆ Using sequenced drawings children described what they noticed about the shopping area and what they thought it had looked like before.
- ◆ They considered the changes that had been made to the neighbourhood as a result of the shops, drawing pictures of roads, pavements, toilets, street lights, and bus stops.
- ◆ The selection of vegetables and fruits available led to a discussion of how production of these change the landscape.



Waste

- ◆ Children drew pictures of the sorts of waste materials the shops would make; they recorded what might happen to the waste.
- ◆ They observed changes in a group of items over several weeks and recorded what they noticed in a class diary.
- ◆ Ideas about how and why some waste materials change were exchanged during investigations and discussion.



LINKS WITH OTHER CURRICULUM AREAS

English

- ◆ Children made a poster advertising the class shop.
- ◆ They wrote stories or sequenced pictures describing their visit to the shops.
- ◆ They wrote poems describing fruit they had noticed. (Looks like ... tastes like ...)
- ◆ A discussion of how people both improve and harm the place where they live formed the basis for a school assembly.

Mathematics

A shop was made in the classroom which enabled the children to use their understanding of money.

- ◆ Buying sweets and biscuits allowed children to develop their number skills.
- ◆ Some children counted the number of sweets and biscuits contained in a packet and were able to practise sharing these between different groups of friends.
- ◆ Other children sorted toffees and biscuits according to shape.

Geography

- ◆ Children matched pictures of goods to the shop where they were bought.
- ◆ They produced maps of their visits to the shops showing familiar landmarks.
- ◆ Pictures and photographs of different shopping areas were collected and children discussed why shops were situated near roads.



2.1 Habitats



AREAS FOR INVESTIGATION

- ◆ Exploring different habitats.
- ◆ Observing short and long term changes in a particular habitat.
- ◆ Examining the conditions needed for plants and animals to live.
- ◆ Investigating ways of caring for various animals and plants.

KEY IDEAS

- ◆ Living things live in a variety of places which are called habitats.
- ◆ Living things are suited to the places in which they live.
- ◆ Living things need certain conditions to stay alive.
- ◆ *Living things respond to changes in their environment.
- ◆ *Plants are the ultimate source of food for all living things.
- ◆ *Living things interact with each other in various ways, including competition for resources.

(*Asterisks indicate ideas which will be developed more fully in later key stages.)

A LOOK AT where things live

The places where living things live are called habitats. Each habitat provides conditions such as shelter, warmth, moisture, oxygen and food. Each habitat has its own particular set of conditions.

Animals and plants have certain features which suit them to a particular habitat: the animals and plants found in the local pond will differ from those living in the park.

Living things respond to changes in their habitat. Animals may leave a habitat if their food supply is threatened. Some plants need more sunlight than others, and will not survive if the habitat becomes shaded.

Food is the source of energy which all living things need to live. Plants are the ultimate source of food. Animals may feed directly on plants or they may eat other animals; the food of these other animals will ultimately have been provided by plants.

NATIONAL CURRICULUM PROGRAMME OF STUDY

Pupils should study plants and animals in a variety of local habitats, for example *playing field, garden, and pond*.

Drawing upon their study of living things in school and in the local environment they should be introduced to the idea that plants are the ultimate source of all food in the living world.



Check the area so that things like dog mess, broken glass, and poisonous plants can be avoided

Finding out children's ideas

STARTER ACTIVITIES

Where do animals and plants live?

A class discussion can be used to stimulate children's ideas about the kinds of places in which animals and plants might live. You could have this discussion following a visit to an actual habitat, preferably in the school grounds.



Q What sorts of places do animals and plants live in?
What kinds of animals and plants might you find there?
Why do you think that is a good place for the animals and plants you have mentioned?

Q Can you draw an animal/plant in the place where it might live?
Why do you think the animal/plant lives here?
Could it live anywhere else?

Some children may be able to add to their drawings or discuss the things that animals/plants need to live.

Q What do you think the animal/plant needs to live?
How does it get what it needs?

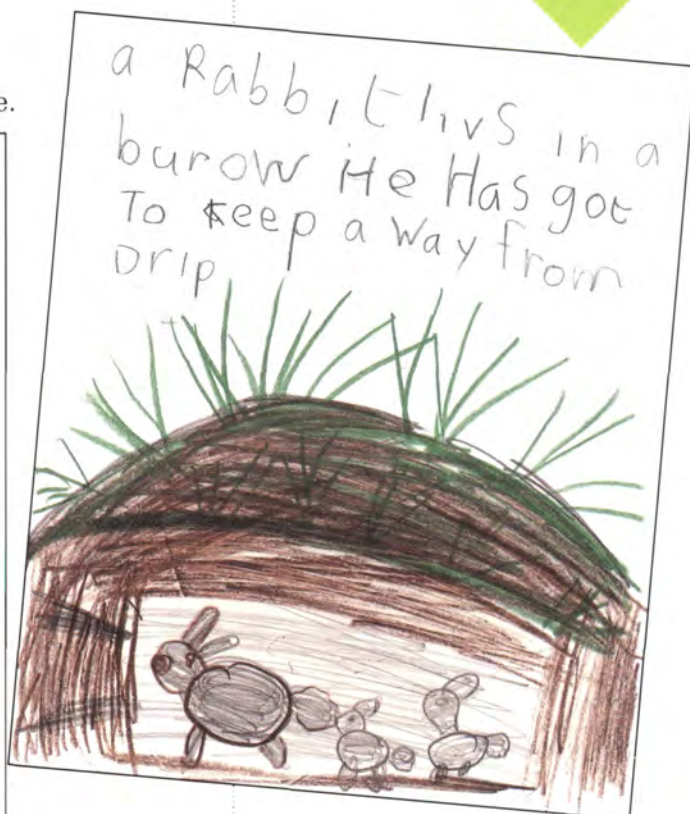
Find out if the children are aware that other animals/plants might live in the same place or in different surroundings.

Q Are there any other animals/plants that might be able to live here?
Can you name other places where you might find different animals/plants?

Children's ideas

Where animals and plants live

Children suggest a range of places where animals live.



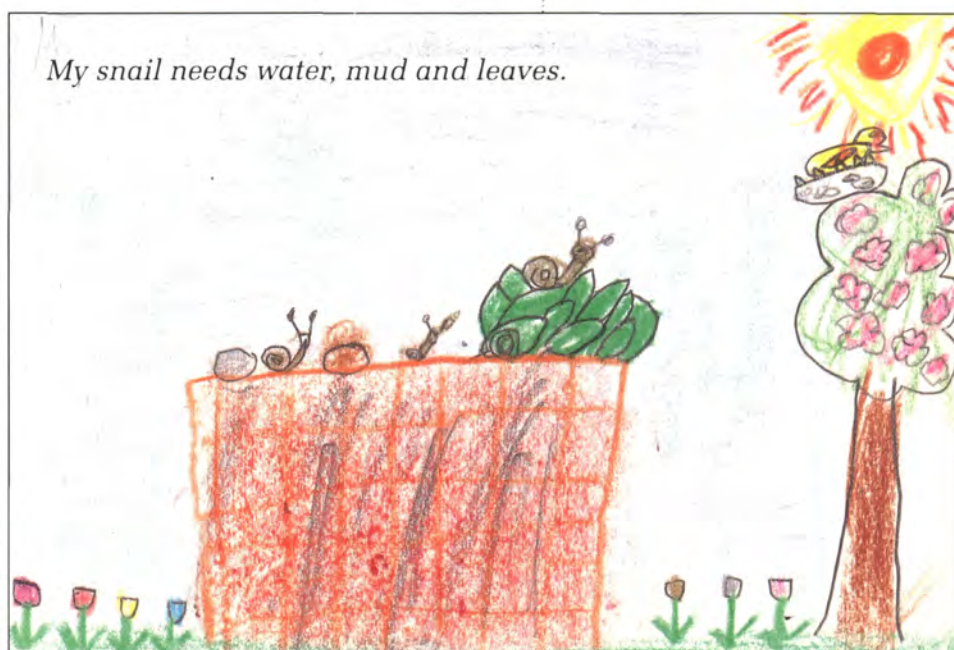
Many children explain that animals live in a particular place because they like it in that place.

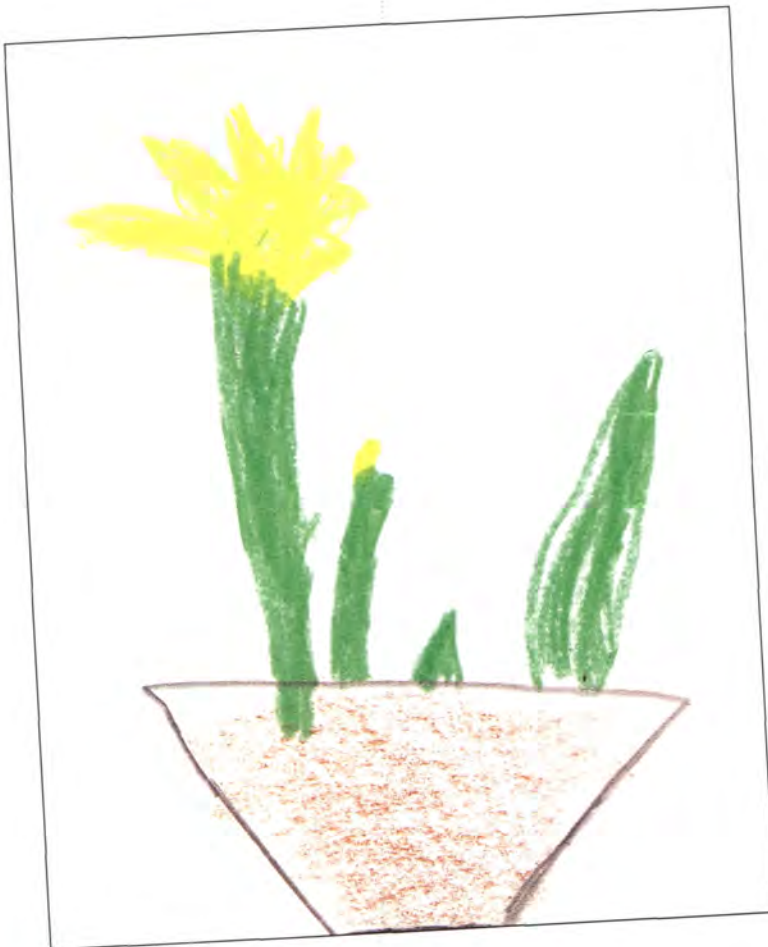
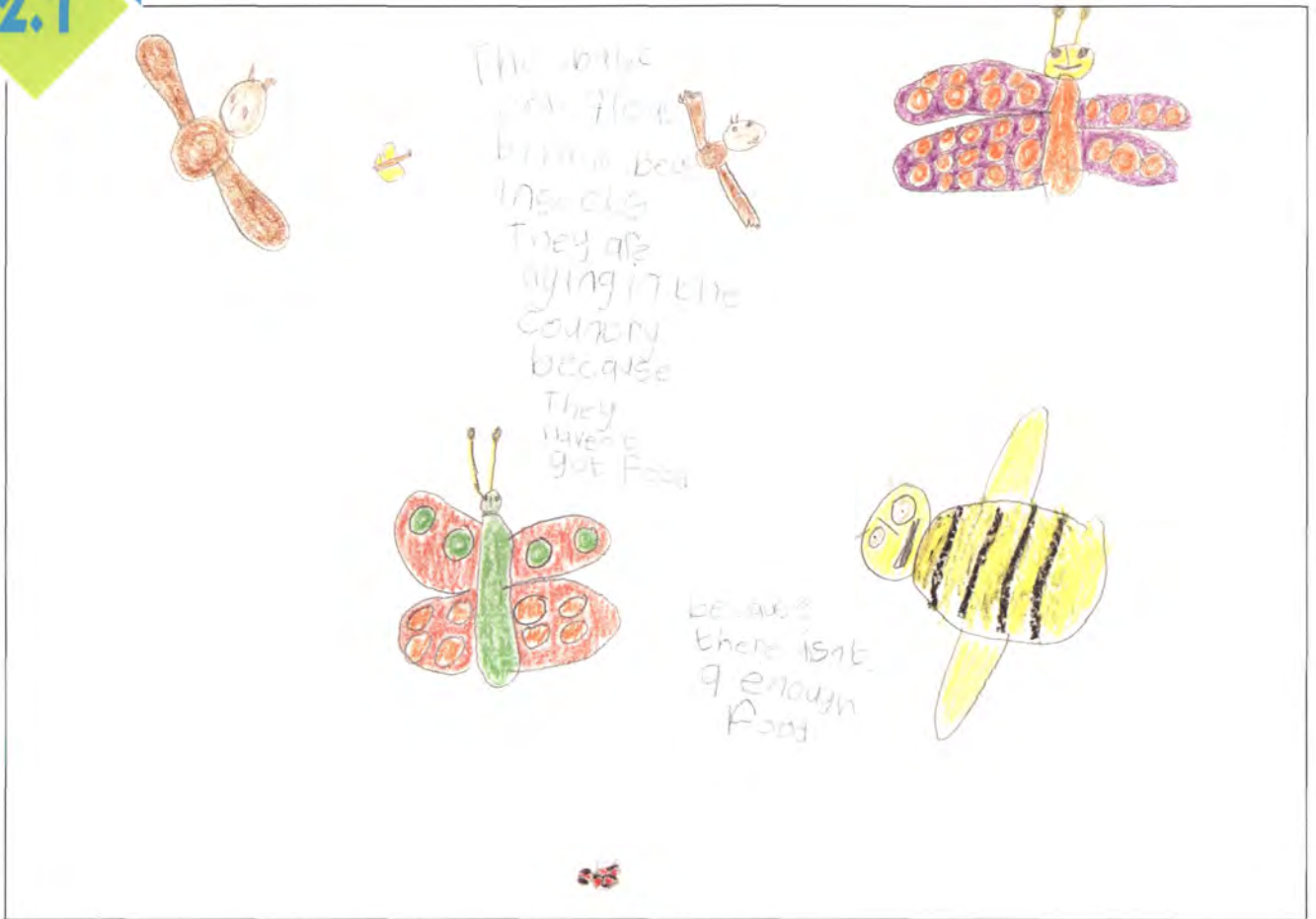
It's dark, the worm likes it dark.

A few children believe that the place should be safe. They might mention that the place needs to provide some protection from people or other animals.

Worms eat dead plants. Darkness so no-one can trample them.

Children might mention the food animals need. Some drawings reveal an awareness that food should be available in the habitat.





This child describes how a shortage of food affects the number of bats in a habitat.

When asked about plants, young children tend to suggest a limited range of places where plants can live, such as plant pots on a windowsill, or in the garden. A few children might draw a tree on some grass.

Some children mention that plants need care in order to live.

They need you to keep an eye on them because they might die.

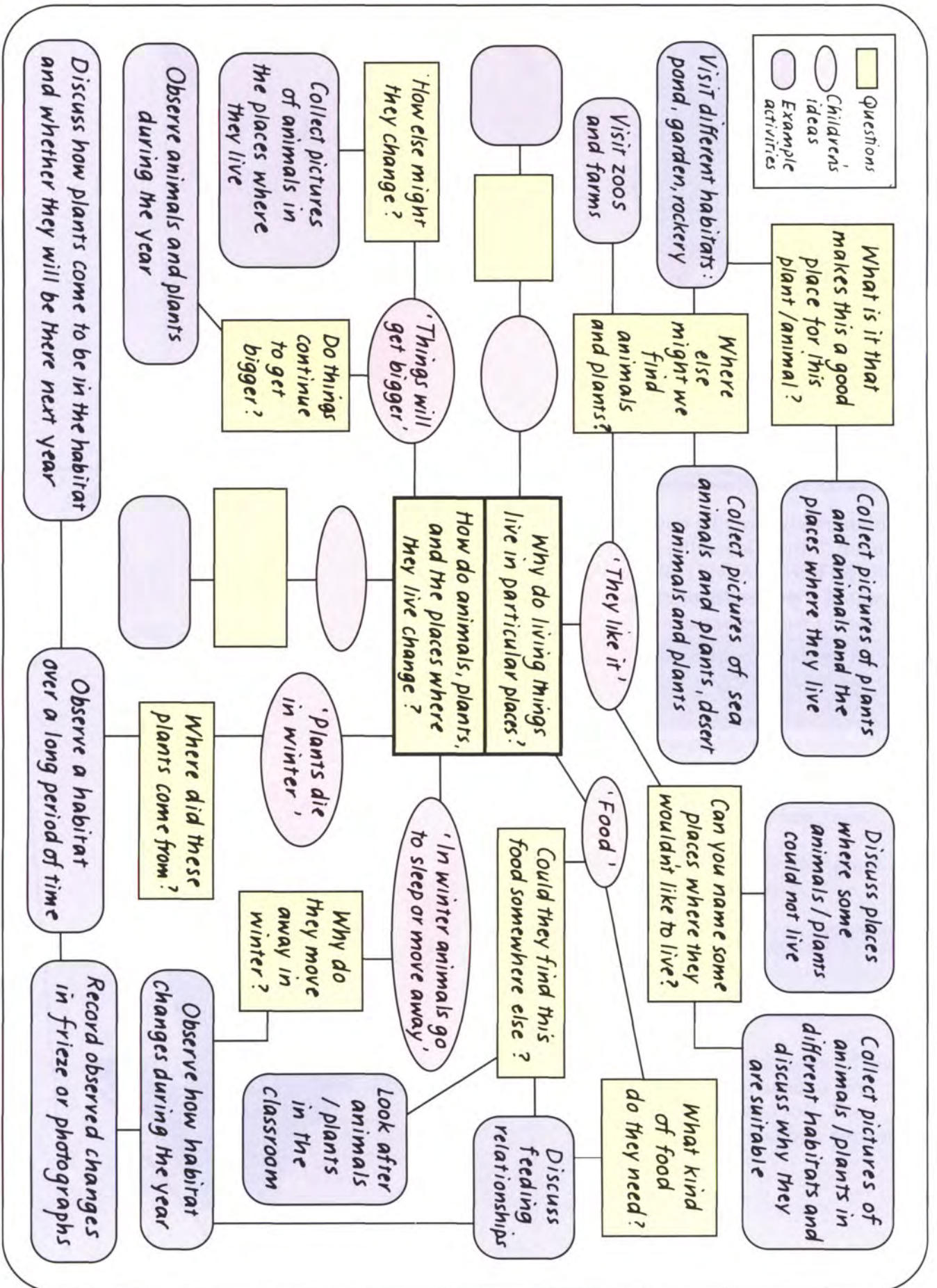
Most children mention some of the things a plant might need to live, such as water, sun and soil. The water may be provided by a person, or by rain.



Children rarely describe how the sun, soil or water help the plant to live. Generally, children explain that the plants get thirsty. A few children might be aware that the amount of water could affect the plant's health.

It needs water outside in the garden. Every time it rains it gets water. Too much water kills it.





Helping children to develop their ideas

The chart opposite shows how you can help children to develop their ideas from starting points which have given rise to different ideas.

1 Observing habitats

Children should visit two habitats, one of which they may have looked at in the starter activity.

Teachers have successfully used parts of the school field, nearby wasteland, a hedge, a school garden, and even the school wall for habitat studies. Choose something which is safe and easily accessible.

Daily as well as long term changes may be observed. The study could take place over a few weeks or at intervals during the year.

Children will need to return to the area at different times during the study, so they should think about how they will find the exact place again. A good way is to mark out a patch about 1 metre square with string stretched between wooden stakes.



Children can take photographs of the area so that these, together with drawings and writing, provide a record of the first visit. They could record what they see on each visit on a frieze.



Investigative work with living things has ethical and legal obligations, so choose practical investigations with care. The collection of plants and animals from the wild is severely restricted – see 'Animals and plants in schools: legal aspects' (DES Administrative memorandum 3/90)



A small area which shows noticeable change will encourage children to observe closely



Follow school or LEA rules about supervision. Check your school's policy on visits



Take care that people do not fall over the string



Be especially careful about ponds. (See 'Safety and the school pond' in *Primary science review*, Summer 1988.)



- Q** *What do you notice about the habitat?
Do a lot of people come near the habitat, or is it
undisturbed?
Is it wet or dry?
Is it warm or cold?
Is it sunny or shaded?
Is it windy or sheltered?*

Encourage the children to consider how the animals and plants might be suited to this place:

- Q** *What kind of animals do you notice?
Where are the animals?
What are they doing?
Will the same animals be here the next time you visit?
What plants do you notice?
Why is this a good place for these plants?
What would the plants need to live here?*

Encourage the children to observe different parts of the plants carefully.

- Q** *Do all the plants have flowers?
Are all the plants the same size?
Are the plants still alive when they lose their flowers?
What will the plants be like the next time you visit?*

Children should draw or photograph some of the animals and plants they notice. These should form the basis for class discussions.

- Q** *What are the animals and plants eating in the habitat?
What makes this a good place for these animals and plants?
Could any other plants or animals live in this habitat?
How will the area have changed on your next visit?*

2 Animals and plants in different habitats

Visiting different habitats such as a farm or a pond can help children to develop their ideas. Ask questions which will help children think about what the animals and plants need to live.

- Q** *Where did you notice the [ducks]?
What were they doing?
What food does the [duck] eat?
What did they look like?
Why do you think they have [feet]
like that?
What other animals did you notice
at the [pond]?
What would they need to live?
What kind of plants did you notice
at the [pond]?
Were the flowers in a shaded or
sunny spot?
Was the area wet or dry?*



Encourage children to notice whether the plants are at different stages of their life cycle.

- Q** *How do you think the plants came to be there?
Are they all flowering?
What are the flowers for?
In what ways might the plant change?
Will the plants grow again in the same place next year?*



Warn children about poisonous plants – especially attractive fruits and berries. Teach them never to taste any part of a plant unless a grown-up says that it is safe.



Zoos can provide children with some experience of different habitats. Ask children to consider the needs of various animals, and how their needs might differ.

- Q** *What does the monkey need to live?
What do the snakes need to live?
What were the animals doing?
What were they eating?
What would happen at the zoo if the fish lived in the same place as the sealions?*

Some children will have had difficulty noticing some animals. Use these difficulties to talk about the value of camouflage.

- Q** *Why could you not see the lizard on the stone?
Why would it be useful for the animal to be able to hide?*

A first look at where things live has some camouflage pictures. Secondary sources, such as videos and books, can provide more information about how animals live in their natural habitats.

Let children make their own zoo in school, with model animals. Ask questions that will encourage them to use their knowledge of the range of things which animals need to live.

- Q** *What kind of place does the giraffe need to live?
Which animals can you put together?
Which animals would need to be in different places?*



Check your school's policy on visits.

AT
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Observing
Communicating

AT
1

Communicating

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Children must wash their hands before and after handling animals. Wash animal bites and scratches carefully, and consider the need for medical advice.

AT
1

Observing
Communicating

pb

3 Caring for animals in the classroom

Children could bring pictures of their own pets into school, so that the whole class can become familiar with the needs of a wider group of animals. Encourage close observation of a classroom pet.



Q *What sort of food does the [rabbit] eat?
How does it manage to pick up the food?
What does the fish use to swim about?
What does the [stick insect] need to live?*

A first look at living things gives examples of animals that might be kept as pets. Children can use these for the basis of a discussion about caring for pets.

Let each child make a poster or a book about one of the animals, describing the place where the animal lives as well as the things it needs to live.

4 Plants in the classroom

Let children take care of some plants in school. Ask questions to help children notice that the plants have different needs.

Q *Where do you find the plants in school?
Do all the plants live on windowsills?
Do all the plants need watering every day?*



5 Animal collage

Children can build up a collage of pictures of different animals showing some of the places where they might live. A class discussion will encourage children to think about the needs of some of the animals.

- Q** *Where would you find these animals?
Would you find any of them in the same place?
What do these animals need to live?*

Encourage children to consider which features suit the animal to its habitat.

- Q** *Why does the [pelican] have [a large beak]?*

Further questions could encourage children to think about what animals feed on.

- Q** *What kinds of food might the penguins eat?
What would happen if the spider and the fly were together?*



A first look at where things live gives examples of animals that live in different places. These can be used for information and the basis for further discussion.

6 Plant collage

Children could make a collage of plant pictures including places where the plants live. A class discussion will familiarize children with the needs of a range of plants.

- Q** *Where would you find this ivy/cactus/lily?
What would it need to live?*

A first look at different plants and animals encourages children to think about the habitats in which different plants might be found. This could provide the basis for discussions.



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Animals live in various places

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Plants have particular requirements

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7 Matching animals and plants to the places they live within a habitat

Give children pictures of different animals and plants and the places they might live within a habitat. You could use the ones in *A first look at where things live*.



Q Can you match the animals and plants with the places where they would live?

Group or class discussions could help children think about why animals and plants are suited to where they live.

8 What is this animal's name and where should it live?

This game can extend children's knowledge of the needs of different animals and plants. Give children a series of clues about an animal or a plant until they are able to guess the plant or animal and suggest where it could live.

Q This animal is covered in fur.
The animal eats fish.
It lives in cold places.
The animal can swim in water.

A first look at where things live shows how different kinds of bird have different kinds of feet. Children can use this material as the basis for discussion about how animals are adapted to habitats and ways of food gathering.

2.2 Waste and decay

2.2



A LOOK AT waste and decay

People throughout the world produce a variety of waste materials. Most waste from British homes is taken away by refuse collectors. Certain waste, such as vegetable peelings, will decay in suitable conditions (for instance a compost heap); the material will soften and break up. Other waste material is usually dumped at a landfill site, such as a disused gravel pit. When the site is full it is covered with earth, and some attempt may be made to landscape it.

Some waste will not rot. This may also be dumped, on land or at sea. Sometimes it is burnt.

Not all waste needs to be thrown away. A few things such as milk bottles can be re-used as they are. Other glass, and paper, metal and to a certain extent plastics, can be recycled and made into new items. The proportion of British rubbish that is recycled is still very small, but growing.

AREAS FOR INVESTIGATION

- ◆ Examining the range of waste materials produced by human activities.
- ◆ Examining how various everyday waste products might change.
- ◆ Recording changes in waste products.

KEY IDEAS

- ◆ Some materials change and decay quickly, while for others the changes only occur over a long time.
- ◆ *Many human activities produce waste materials which can cause changes to occur in the environment, locally and/or globally.
- ◆ *Materials can be re-used, recycled or discarded.

(*Asterisks indicate ideas which will be developed more fully in later key stages.)

NATIONAL CURRICULUM PROGRAMME OF STUDY

[Pupils] should investigate how far everyday waste products, for example, *garden refuse, paper, plastic materials and cans*, decay naturally and use this knowledge to improve the appearance of their local environment.



Rubbish may be contaminated. It should be enclosed so that it cannot be handled.

Fermentation may cause gas pressure to rise.

Wear gloves when collecting waste or litter.

Protect children from sharp pieces of metal

Do not allow children to handle glass.

Some people are allergic to mould spores

Finding out children's ideas

STARTER ACTIVITIES

What happens to household rubbish?

To reveal children's ideas about how household rubbish might change, you could ask them to list the things that are thrown away at home or give them a selection of (clean) rubbish to look at. Encourage them to think about what will happen to these things.

- Q** *What kinds of things do you think are used up and thrown away during the day?*
Can you draw the rubbish as it is now, and how it will look in two weeks?
Can you sort the rubbish into things that will look the same and things that might change?

Choose one of the items from a child's list or pile of rubbish, and ask:

- Q** *What will happen to it?*
If we leave it in the bin will it stay the same or will it change?



Children's ideas

What happens to household rubbish?

Some children have little awareness of what happens to the rubbish after it has been placed in the dustbin. Most children just say that the binmen take it away. Some may mention that it goes to a central collection area such as a scrapyard.

There is little awareness that some rubbish is sorted. Most young children seem to believe that all the rubbish is treated in the same way. Some children suggest that rubbish is burnt after it has been collected.



I threw a bean tin away. It went in a big tip with the sausages. The tip went on a big wagon and was taken far away to the woods and put on a big fire. Then the fire went out and there was loads of dirty black mess.

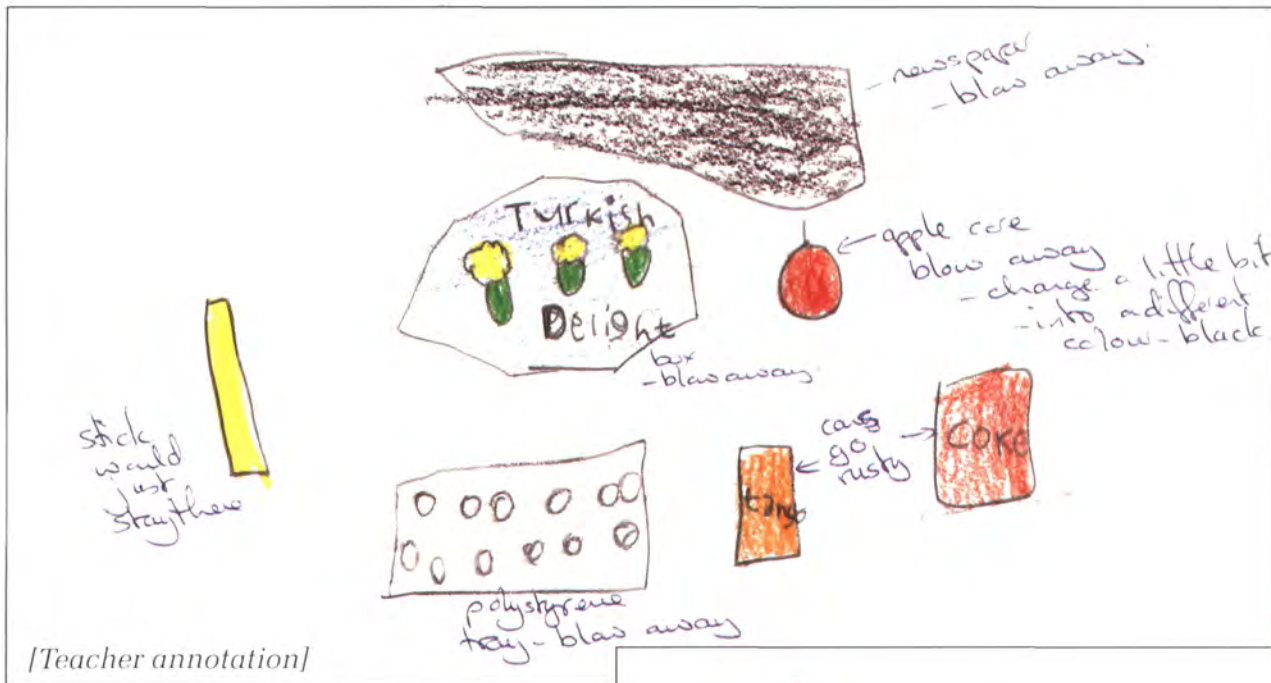
Occasionally, children mention that rubbish could be re-used, but usually they do not distinguish between re-used in its original form and recycled.



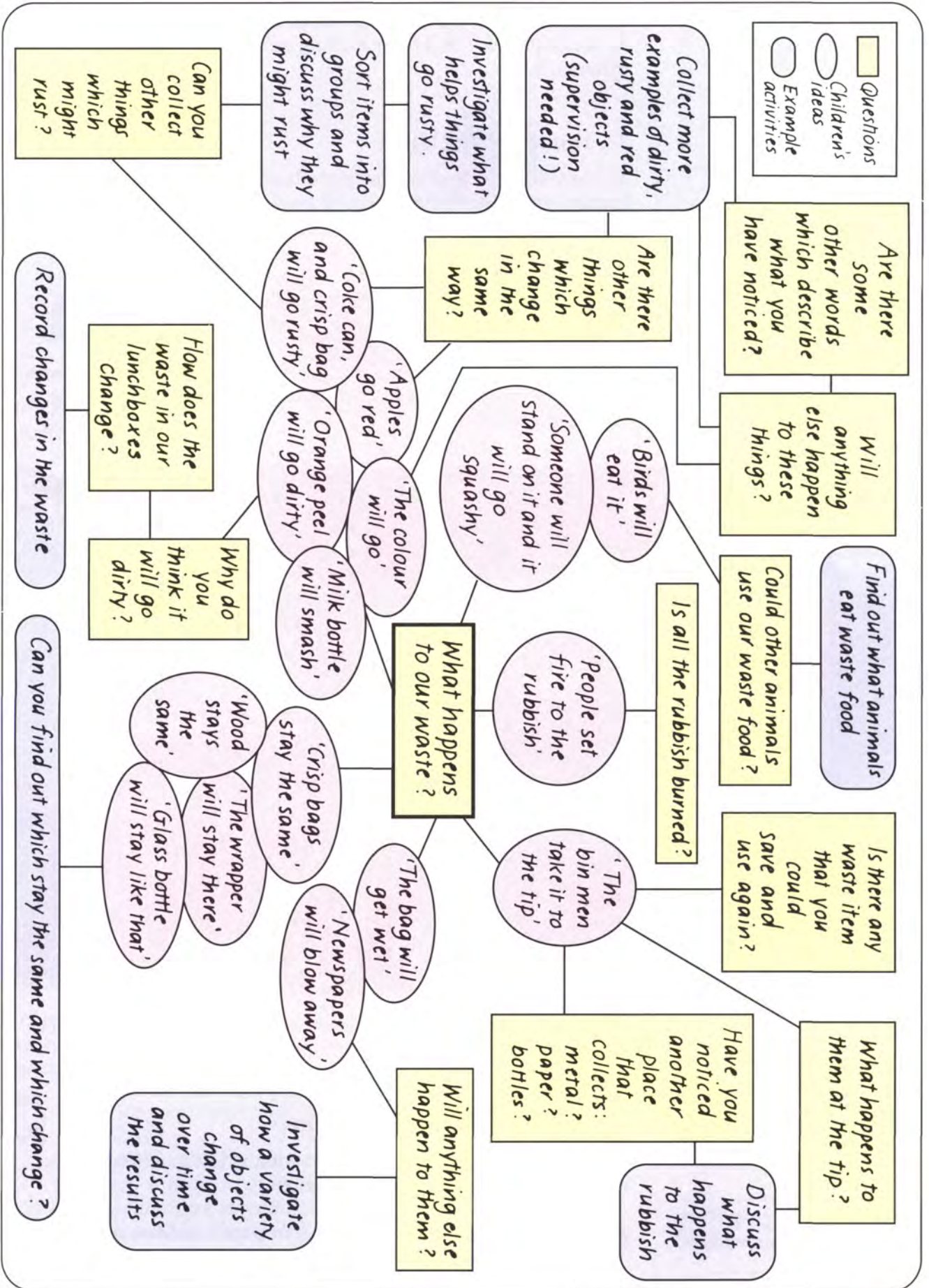
Children typically believe that changes to waste materials are brought about by human intervention.

*A girl stood on the orange peel and it would go squashy.
Wood would stay on the ground until the bin men came.*

Children may be aware of changes brought about by weather. They often mention that objects would become dirty or wet, or would be blown away by the wind. Some children may decide that items will change by rusting. Young children rarely suggest that items would rot. Occasionally, they mention the colour changes they notice in items such as apple cores.



Helping children to develop their ideas about waste and decay



Helping children to develop their ideas

The chart on the previous page shows how you can help children to develop their ideas from starting points which have given rise to different ideas.

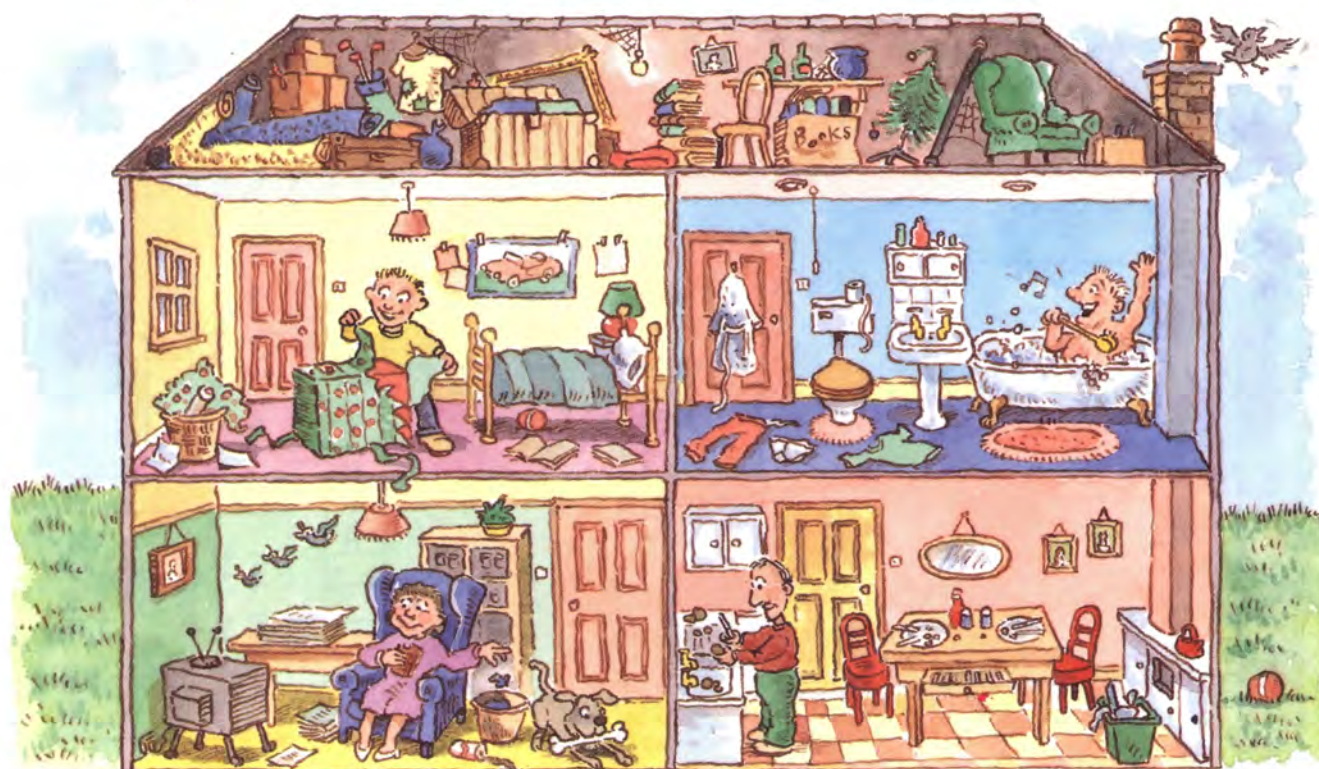
1 Household rubbish

To consider the range of waste products produced by different human activities, children could keep a diary of what is thrown away at home over a weekend. Discuss the variety of things that have been thrown away. Then ask:

Q *What happens to the water after you have had a bath?
What happens to the rubbish that we throw away?*

A first look at where things live gives examples of some domestic waste that can be recycled. This could be used as the basis for further discussions.

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Children could interview a school cook or caretaker about what happens to waste materials and rubbish at school.

2 What is left in the lunchbox?

After lunch children might look at what is left in a lunchbox to investigate how rubbish might change.

Q *What kinds of things are left in your lunchbox after you have finished eating?*

!

Warn children not to handle rubbish, and about safety and hygiene

AT
1

Observing
Communicating

t

Some waste changes with time

*Will it stay the same?
What could we do with it to find out?
Can you draw what is in the lunchbox as it looks now, and as it might look in four weeks' time?*



Children could investigate what happens to the rubbish from the lunchbox over a month.

Q *Where might you put the waste from the lunchbox?
Should you leave the waste where you can see it, so you can be sure to notice if it begins to change?*

Each item should be placed in a transparent sealed container such as a plastic bag or old lemonade bottle (avoid glass) at the beginning of the test, and the whole thing disposed of unopened at the end.

Q *How will you remember what the things looked like?*



Encourage the children to keep a record of what the rubbish looks like now, so they can identify any changes. They may decide to draw pictures of the waste or to photograph it.

A class diary will enable children to draw or write about changes they noticed during the investigation. Encourage children to discuss these changes.

Q *What do you notice now about the things from the lunchbox?
Have all the things changed?
Can you sort the items into things that have changed and things that have stayed the same?
How have they changed?
Why do you think those things have changed?
What can you say about those things that didn't change?*

AT
1

Predicting
Planning and
carrying out fair tests



Seal containers sufficiently tightly to trap spores, but not so tightly that gas from fermentation cannot escape. Avoid temperatures higher than about 20 °C (room temperature), in case the growth of bacteria which favour human body temperature (37 °C) is encouraged

AT
1

Communicating



Children should view the waste but not handle it

AT
1

Interpreting results and
findings

3 Objects which rust

Children's beliefs about which objects rust may be developed by providing them with a wide range of objects, including things which are red or brown, tarnished items, coins, old cutlery, rusted and tarnished nails, old steel wool and old pieces of copper wire.

Q *Can you put together the things that could rust?*



During the group discussions encourage children to exchange ideas about rusting.

Q *What do you think rust might be?
What made you say these things are rusty?
How do you know when something is rusty?
How does rust happen?
Where else have you noticed rust?*

Discussion of other things which rust could help children to consider what is happening when objects rust.

Q *Where do you find rust on [your bike]?
What do you think is happening to make the rust?
Where do you leave [your bike]?
Why do you think [your bike or the car] goes rusty?*

4 Investigating rust

Help children to plan investigations which will enable them to develop their ideas about why some items rust. Children could investigate their hypotheses about why a bicycle goes rusty, using nails instead. They could put nails in warm, cold, light, dark, dry and wet places.

Q *How will you decide whether somewhere is warm or cold?
Will you wet all the nails or keep one dry?
Will you wet the nail completely or put it half in water with the top half dry?
What about trying different metals?*

AT
1

Hypothesizing

AT
1

General

Children could cover nails in different substances such as paint, grease, and polythene – supervise this carefully.



Give children an opportunity to discuss their results.

Q How could you stop a bicycle from rusting?

5 Waste in the garden

The school or local park gardener, or a parent might talk to the children about garden waste. The children might ask:

- What kind of rubbish do you have to deal with?*
- Where do you put it?*
- Does it change if it is left lying about?*
- How does it change?*
- Is there any rubbish that you can use again?*
- Why do you use garden waste again?*
- How is it used?*



A first look at where things live encourages children to think about what happens to garden waste and could be used as a basis for further discussion.

The gardener might be able to show children a compost heap and talk about what kinds of waste material it consists of and whether it contains anything alive.

e

2.2

t

Iron and steel rust (steel rusts faster); most other metals corrode less noticeably

AT
1

Communicating

pb

!

Safety and hygiene are essential here

!

The teacher/gardener should wear gloves when showing the children what is in the compost heap



Children must wear gloves or plastic bags over their hands if they handle compost/rubbish

Raising questions will help children observe the compost heap more closely.

- Q** *What do you notice about the heap?
What kinds of things are there in the heap?
Can you tell which things have been there a long time, and which things are new?
Is the compost heap wet or dry?
What do you think the compost will look like in two more weeks?*

Children could measure the temperature of the compost heap using a thermometer (avoid glass ones). You could take the children back to the heap to monitor any changes that take place. The children could compare this compost with potting compost bought from a garden centre.

- Q** *What do they look like?
Do they look different?
Do they feel different?
Do they smell different?*



6 Re-using materials

Children often bring discarded items into school to be re-used: old shirts are used as overalls, margarine tubs becomes plant pots, detergent bottles are made into models. A class discussion can help them to think about the way in which some of the materials they use can be re-used:

- Q** *What kinds of things do you use? Why?
What happens to them?
Could some of them be used again?*



Children should become aware that some items are re-used for their original purpose, while others are re-used in different ways.

A first look at where things live contains examples of domestic waste that are recycled, which could provide a starting point for discussion.

Q *Can you make a collection of items that are re-used in the same ways and another of those that are used in different ways?*

Suggest a few items to start them off – carrier bags, jam jars, newspapers – without saying which group they belong to.

Sequenced drawings that show how an item is used initially, and then how it is used again in school, could provide a record of the activity.

pb

AT
1

Communicating

2.3 Effects of human activity on the environment



AREAS FOR INVESTIGATION

- ◆ Observing the local environment.
- ◆ Exploring how it might be improved.

KEY IDEA

- ◆ Human activity has changed all parts of the environment.

A LOOK AT the effects of human activity on the environment

The results of human activity are apparent in urban, rural and wild environments, locally and worldwide. The effects can be both good and bad:

- ◆ building houses improves people's living conditions, but also calls for mining and quarrying;
- ◆ roads are needed to enable people and materials to move from place to place, but vehicles use up limited resources of land and fuel and cause air pollution;
- ◆ improved drainage and sewerage systems in some countries have almost eliminated many diseases, but disposing of sewage into the sea contaminates it.

NATIONAL CURRICULUM PROGRAMME OF STUDY

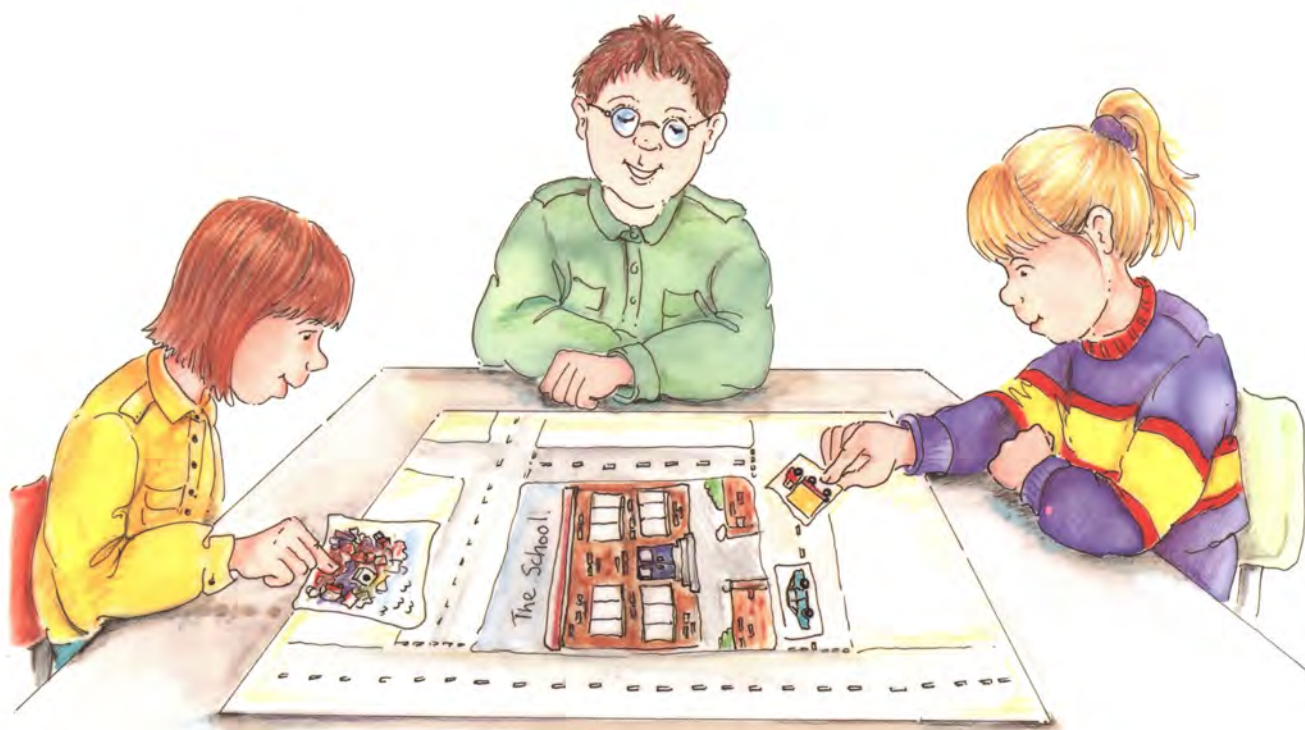
[Pupils] should discuss how human activity produces local changes in their environment.

Finding out children's ideas

STARTER ACTIVITIES

How people affect their environment

Explore children's ideas about how people's actions affect the environment. Encourage them to consider the ways in which people improve the places where they live, as well as ways in which they may damage the environment.



Draw a large outline map of the area around the school and collect some pictures of things like broken windows, litter, cars, lorries, toilets, busy main roads, quiet residential roads, gardens, animals. Make these into cards and ask the children to place them on the picture to show different things done to their environment by people.

Q *If you walked around the town where do you think you might see some of these things?*

You might ask children to draw the place where they live, showing the kinds of things people do to it. They could prepare a 'radio broadcast'.

Q *What kinds of things around us have been done by people?
What do you think makes this a nice place to live?
What do people do that makes it less nice?*

e

Children's ideas

Most children suggest that litter is the main effect that humans have on the environment.

*There will be rubbish all over the place.
There is paper everywhere.*

This man is dropping
litter and he is polluting
the world



I have noticed that
people have been
doing graffiti on walls

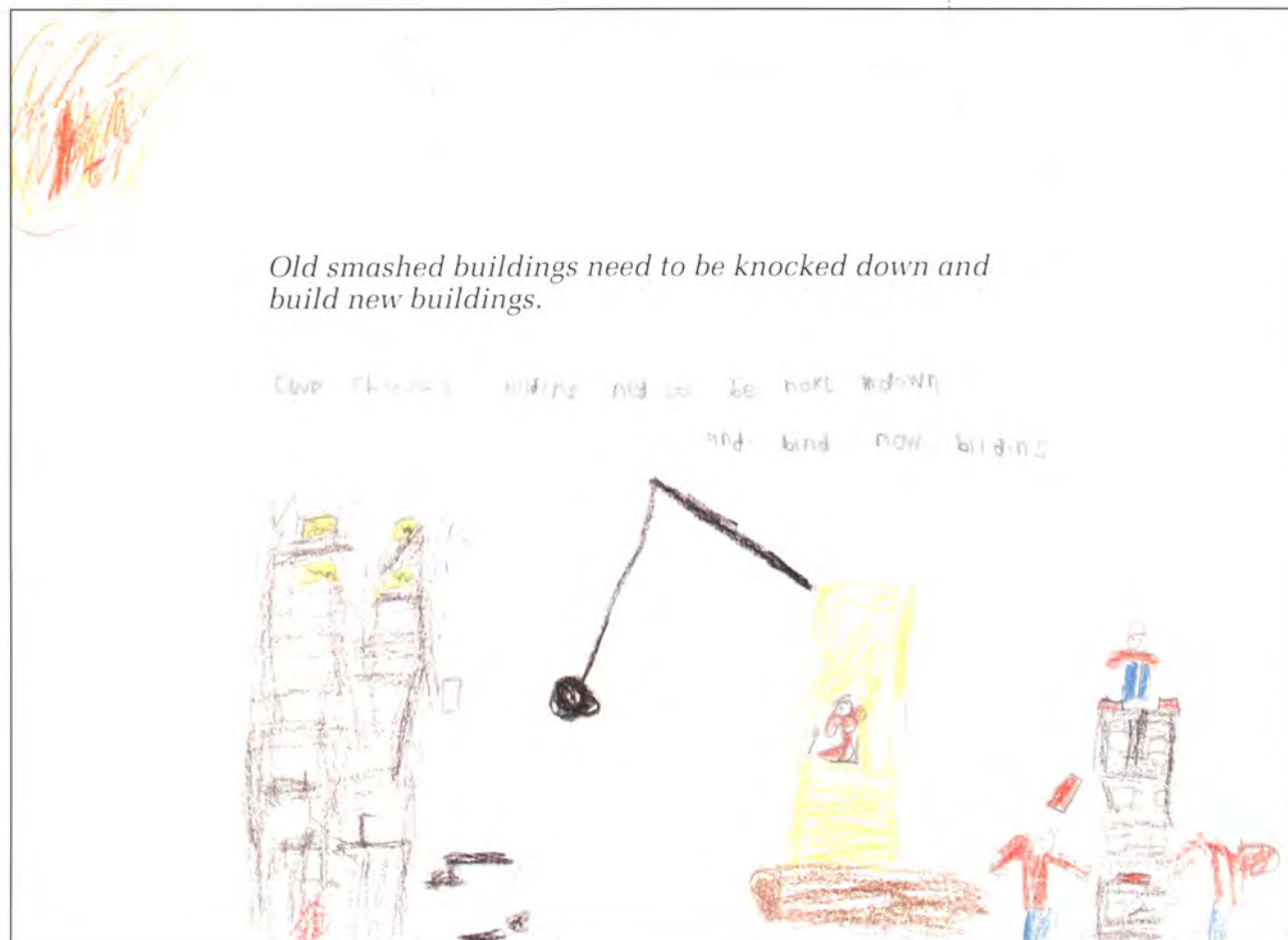


Children are aware of other ways in which people affect their local environment: they often include broken windows and graffiti on fences in their drawings.

Some young children are aware of the ways in which the air and sea might be polluted.

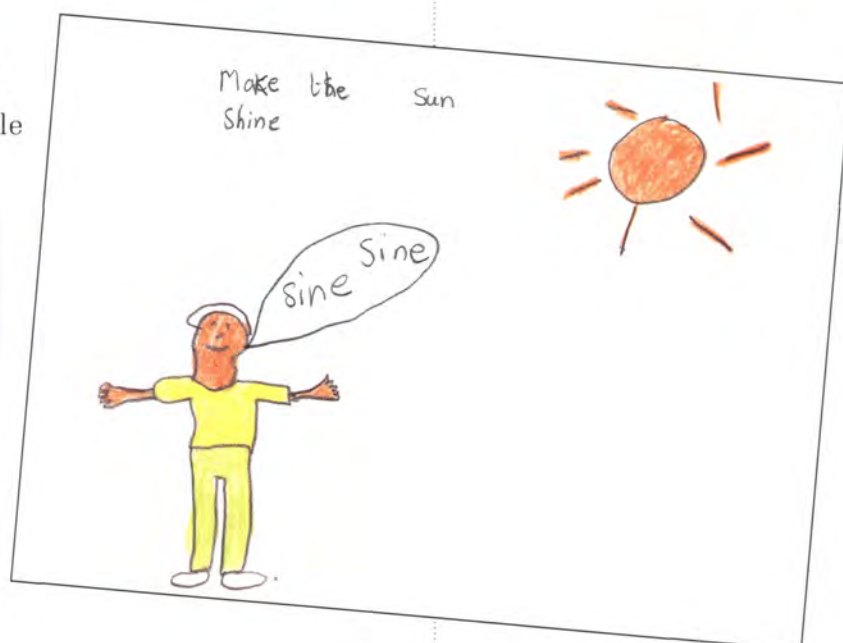
Children do mention the positive effects that people have on the environment. They frequently say that homes could be redecorated, that graffiti could be painted over, or that new buildings could be built.

You plant more trees to keep the earth nice.

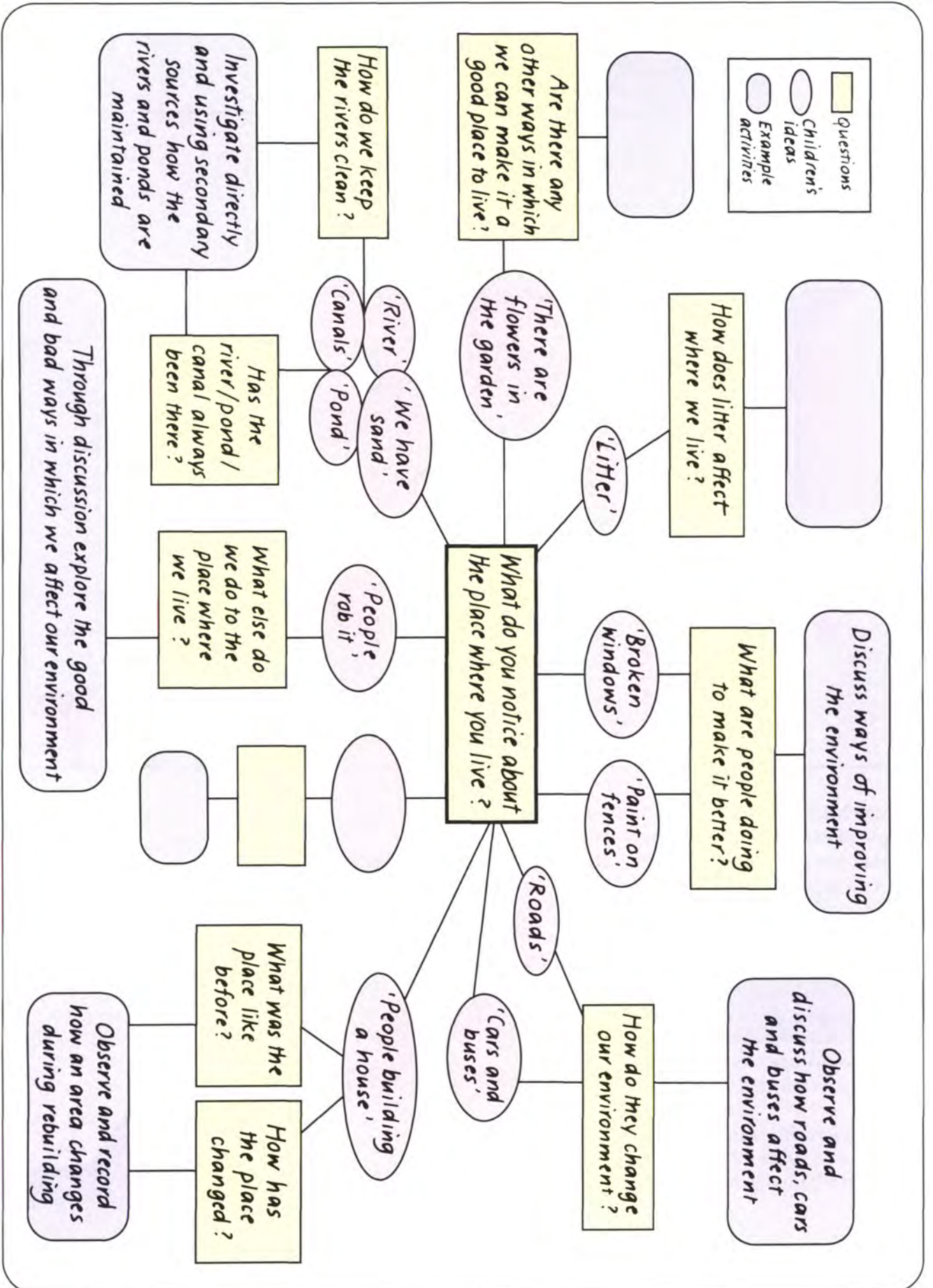


Young children also mention how people affect one another. They point out that people fight, and suggest that improvements would encourage people to be nice to one another.

I would make it sunshine, so people will be kind to each other.



Helping children to develop their ideas about the effects of human activity on the environment



Helping children to develop their ideas

The chart opposite shows how you can help children to develop their ideas from starting points which have given rise to different ideas.

1 Litter around the school



Children might begin to develop their ideas by investigating how their own activities influence their environment. You could take children to collect litter around the school and in the grounds. (Wear gloves or plastic bags on the hands when collecting litter or waste.) They could keep a diary of the litter they notice here.

Q What kind of litter is it?
Where do you find it?
Where do you find most litter?
How can you measure the amount of litter?

The investigations might help children to think of ways of discouraging people from dropping litter.

Q How can you stop people from dropping litter?
Is it left in some places because there are no bins?
Are the school bins in the best places?
What happens when the bins are full?

Children can make posters, collages or badges showing how litter affects the school environment. They might present a short play to other children to encourage them to put litter in the bin.



Hygiene

AT
1

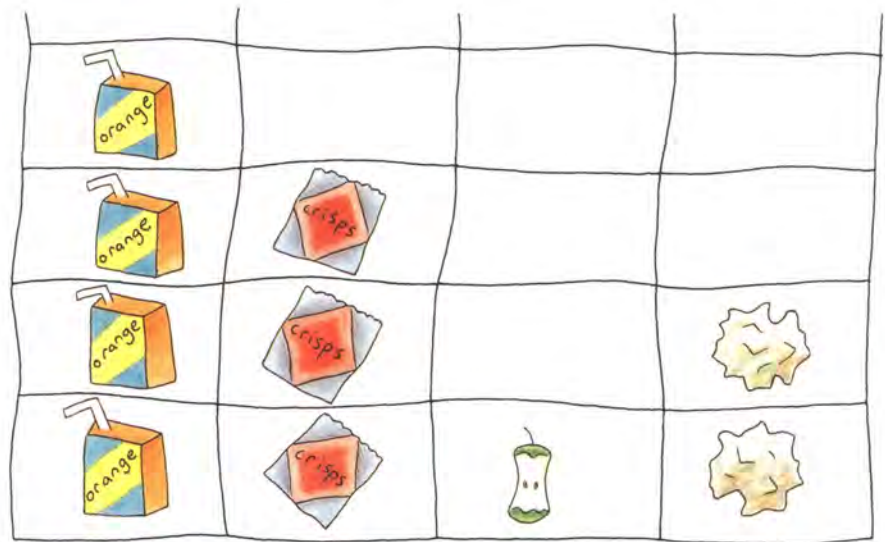
Measuring
Observing

AT
1

Communicating

Children may want to find out how successful their campaign is. Help them to identify patterns in their data and draw conclusions from their investigations.

- Q** *Are people dropping the same amount of litter? How do you know?*
Do the bins get too full?
Is the litter being dropped in different places or the same places as before?
Could we do anything else to stop the litter being dropped?



A first look at where things live encourages children to think about the origin of litter they might find in the local environment, and can be used to provide further discussions.

2 The [urban] environment

Take the children for a walk to look at the different ways in which human activity affects the local environment.

They could draw pictures of the things they notice, showing how the area might have been changed by people. Posing questions will increase children's awareness of how humans can change their environment.

- Q** *What are you walking on? Was this/were these made by people?*
What are the gratings at the side of the road for? Who put them there?
Are the streets light or dark at night?
How have people helped to make the streets light?
What do you notice about the fences?
Who has planted the flowers in the park?

Give the children an opportunity to discuss their observations, and to suggest reasons for the changes they notice.

- Q** *Has this place always looked like it does now?*
What made it change?



Follow school or LEA rules about supervision. Check your school's policy on visits.

3 Changes in the air

The walk might give you a chance to guide children towards considering how human activity could affect the air and atmosphere.

- Q** *Can you see any smoke from the chimney?
How do you think the smoke was made?
Are there any other ways in which we put smoke into the air?*

Children might make collages of magazine cuttings to show the ways in which people affect the atmosphere. Through discussion they might begin to consider some of the ways in which people have tried to reduce air pollution.

AT
1

Communicating

4 Noise in the environment

Children might investigate the range of noises they can hear in different places during their walk, perhaps using a tape recorder.

- Q** *Are there any noises which are too loud?
What could people do to make the world a quieter place to live?*

AT
1

Communicating
Observing



5 Looking at rivers and streams

It may be possible to draw children's attention to changes in streams, rivers or canals during the walk.

- Q** *What do you notice about the water?
Is there anything in the local streams which shouldn't be there?
Do you think the water will change or stay the same?
Do you think there will be any living things in the water?*

Through class discussion children could think about some of the ways people try to protect the water we drink.

- Q** *Where does the water in our taps come from?
Is it dirty or clean?
Who makes it clean?
What are reservoirs for?
How did people make the reservoirs?*



Check your school policy on visits.
Be especially careful near water

AT
1

Observing
Predicting

e

pb

pb

t

A wildlife area will need careful planning and a lot of support from other people, including the school governors and possibly the LEA. Children should be encouraged to recognize that the area will need to be constantly maintained

!

Check the area for absence of dog mess, broken glass, and poisonous plants. Beware of buried pipes and cables

6 People and animals

Rhymes such as this might lead to consideration of how people affect animal life.

*One, two, three four five,
Once I caught a fish alive.
Six, seven, eight nine ten,
Then I let it go again.*

Q *What happens when people catch fish?
Why do people catch fish?*

Children might find pictures, or make Plasticine models, of endangered animals – not only exotic species such as tigers, but local ones such as frogs. They should discuss with each other the possible reasons for the threat to these animals.

A first look at where things live encourages children to think about the effect of removing animals and plants from the seaside, and how hunting endangers elephants.

7 Improving the locality

Give children a picture of a landscape, such as the Dutch scene shown in *A first look at where things live*.

Ask questions that will encourage children to think about the ways in which people might have improved the environment.

Q *Would you be able to live in the fields in this picture?
Where in this picture would you like to live?*

8 Setting up a wildlife area at school

It may be possible for children to take charge of a small piece of land in the school grounds.



- Q** Can you describe what the place looks like now?
 What do we want it to look like?
 What kinds of animals do we want to attract?
 What changes are necessary?
 How will we make the changes?
 Will we need to plan anything?
 Could garden centres/shops/parents help us?

9 Changes in the locality

Children might be aware of local attempts to improve the environment which they could discuss. These could include clearing rubbish out of ponds or nettles and brambles from churchyards, making paths for walkers, rebuilding stone walls, traffic calming, cycle tracks, pedestrian areas.

They could use wall displays to show the improvements they would like to see in the area.



3.1 Introduction

This chapter is designed to help you to express information about your pupils' achievements in terms of the National Curriculum levels. It does this by looking at examples of children's work and seeing how they link to the general statements of the curriculum. By pointing out features of the examples which indicate activity at a certain level we hope to show you what to look for in your pupils' work as evidence of achievement at one level or another.

It should be possible to use the work which your pupils have already done in order to assess their achievement in relation to this part of the curriculum. It should not be necessary to give special exercises in order to complete what is required for teachers' assessment of this part of pupils' work.

There are two sets of examples provided. The first is concerned with the assessment of skills in the context of the activities related to the concepts covered in this guide. The second deals with the development of these concepts.

Stephen



3.2 Assessment of skills (AT1)

During a class discussion many children had suggested that living things need care and people to look after them. The teacher planned that the children should study an animal or plant over a number of weeks. In this way they would be helped to understand some of the needs of living things in their habitats.

Ask questions, predict and hypothesize

Following a visit to the local fields children were asked what the snails they had observed would need to live. Children expressed a range of ideas based on their observations and their own experience.



Vicky

Stephen's idea that snails are in their shells because of noise is one that is based on his own reactions to noise and is testable; it meets the criterion for level 3 in this respect. Vicky's description of the needs of snails represents the needs of different living things. She has gained her understanding through experience, but gives no explicit prediction or idea that can be tested. Discussion would help to clarify what is behind her statement about giving the snails food and water.

Observe, measure and manipulate variables

Children's ideas about the needs of living things were explored through observation and investigation of the needs of a range of animals and plants.

Lindsay's description of the snail demonstrates her ability to make careful observations. This work is at level 1. More detailed observations, such as what happens when the snail moves, would be typical of work at level 2.



Lindsay

Interpret results and evaluate scientific evidence

A group of children had explored the conditions necessary for plants to grow. They recorded their observations in annotated drawings and discussed their observations with their teacher. John Paul observed that a plant in the light was a darker colour than a plant in the dark. His conclusion was that the darker plant was sunburnt. Although an unusual interpretation, his attempt to explain darker in terms of the conditions indicates work at level 2.

3.3 Assessment of children's understanding (Part of AT2)

Level 2

Children who have reached level 2 should be aware that different kinds of living things live in different localities. In addition they should be aware of the conditions which favour a particular living thing.

These drawings do show an awareness of different living things. Some of the plants are shown in soil and the snail is shown in the ground. However, the drawings do not reveal any understanding of the different places in which different living things might live, which is necessary to achieve level 2.



Dawn has described a number of places where she might find different living things. The drawing illustrates a number of places where living things might be found. An awareness that different living things can be found in different places indicates achievement at level 2.

Dawn



Level 3

Children at level 3 know that light is necessary for green plants to stay alive.

In the discussion and in her drawing, Kate shows that she realizes that water, food and sunlight are needed by plants. She says 'all plants' and so it will be necessary to probe her meaning of plants in this context. Some children use the word plant in a limited way, excluding ones which are not green. The teacher might explore this point further and discuss what Kate thinks happens when plants don't have light in order to decide whether her work has reached level 3.

Kate

Kate: *The spider plant needs water. The cactus needs a little bit of water. All plants need soil and sun. The spider plant needs sun.*

Teacher: *Why does the spider plant need sun?*

Kate: *The sun keeps it healthy. If it has no sun it won't grow.*



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