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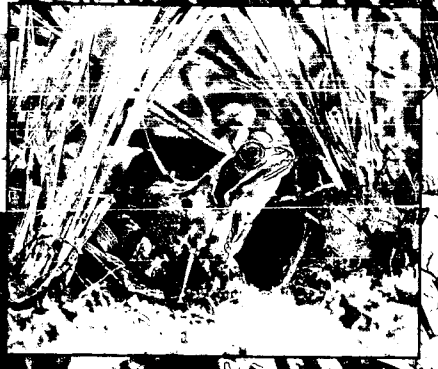
ABSTRACT

This booklet explores various ways that environmental learning opportunities can be created at elementary schools by utilizing school facilities and surrounding school grounds. The booklet's first two chapters present tips that can help educators determine a school grounds' environmental condition. There is advice that educators can use to develop proposals for improving the school grounds' environmental condition, as well. Also included are some basic principles to consider when using school grounds for environmental teaching. Subsequent chapters explain how to create environmental learning opportunities using not only the school building, but hard-surfaced areas, ponds, grasslands, wildflowers, insect gardens, and woodlands. Five case studies are included. These case studies discuss school grounds designs that support environmental education. The booklet concludes with a list of additional resources for further information. (GR)

RSPB

WILDLIFE

AND THE SCHOOL ENVIRONMENT



in conjunction with
Learning through LANDSCAPES

Supported by
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M Rose (FLPA)

WILDLIFE

AND THE SCHOOL ENVIRONMENT

This booklet was prepared by

The Royal Society for the Protection of Birds

and

The Learning Through Landscapes Trust

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C H Gomersall (RSPB)

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PROTECT
THE

INTRODUCTION

by Jonathan Porritt

The land around schools is a very significant early environment, and one which will influence children in complex ways. Vivid memories of time spent in the school grounds are likely to stay with them for the rest of their lives.

Far too often, such memories will be of a bleak, treeless, tarmac expanse, with little to stimulate the imagination or the senses - a grim first lesson in Environmental Education.

The Royal Society for the Protection of Birds and the Learning Through Landscapes Trust have shown that it need not be like this. The land around schools can be a valuable educational resource, managed for the benefit of the whole community. Whether in inner city sites with limited space or in suburban or rural settings, school grounds can be turned into exciting habitats offering a potential haven for wildlife.

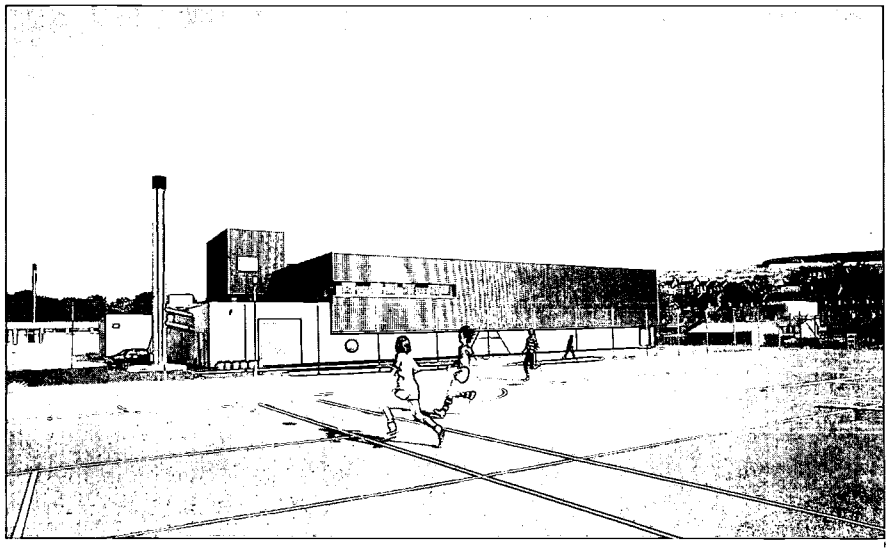
And where animals go, children follow! School grounds provide an ideal landscape in which they can begin to study bird and animal behaviour, and understand the complex relationship between species. Such 'outdoor classrooms' become an invaluable resource for teachers, bringing immediacy and excitement to every aspect of Environmental Education.

It has been said that today's children will be the first 'environmentally-literate' generation. But without the work of organisations like The RSPB and The LTL, that 'literacy' may amount to little more than an acute awareness of environmental impoverishment.

This booklet holds out the hope that our children will also be inspired to celebrate the natural world and, perhaps most importantly, equipped to begin a real stewardship of the Earth, on behalf of us all.

GROUNDS FOR CHANGE

With recent changes in the financial organisation of schools, there are new opportunities for you to look afresh at the design, use, development and maintenance of your most valuable educational and environmental resource: the school's grounds.



C Molyneux (Bruce Coleman Limited)

Many school grounds offer little to inspire a sense of belonging and do nothing to encourage a sense of stewardship. All-asphalt sites with nowhere to sit or shelter can be very dull for the young imagination. And large, closely mown playing fields are just as monotonous.

Such sparse environments are also unattractive to wildlife. If pupils' experience of the natural world is limited, we should not be surprised if their attitudes are negative. They may deduce that this is an environment about which nobody cares. Why, therefore, should they treat it responsibly?

In their 11 or so years at school, young people spend a lot of time in the grounds. Their experiences will affect their attitudes and values. How young people are introduced to the landscape and to wildlife in school is, therefore, very important.

Birds are very popular with children, and can be seen from classrooms in most schools. The location of your school and the way the grounds have been developed influence the type and number of birds you see.

Studying birds helps to clarify the complex ways in which species and habitats interact. Birds are useful indicators of a healthy environment. By providing an aesthetically pleasing landscape with a variety of habitats, well-designed for the needs of both young people and wildlife, all can live happily side-by-side. Help children to study and enjoy wildlife and you will encourage a responsible attitude towards the environment.

An Environmental Survey

The first step towards understanding your school's environment is to carry out a survey of what is there already and then to consider how to improve it. Each school and its grounds is different, but there will be a number of common features.

Look at the development of your school site as a whole; consider the management of the formal and informal curriculum and the resources available. Try to involve pupils in the survey; they will then have a direct input into decisions concerning their everyday surroundings.

Deciding which questions to ask in a survey can be a valuable activity. Adapt those below to your own situation:

- What is the first impression a visitor gains of your school and its grounds when entering the site? Is it favourable? Could it be improved?
- Does your school have an Environmental Education Policy? Does it encourage using the school grounds for Environmental Education?
- Has your school already implemented schemes to improve the school landscape and/or to encourage wildlife? Have these been successful? Can you make further improvements?
- What are the main formal educational activities that currently take place in the school grounds? (It is important to involve all interested parties when making plans for

environmental improvements.)
- In what ways are the grounds used for informal activities?
- How large are your grounds? What large scale maps/plans exist? What photographs exist? (Useful for before and after comparisons.)
- Does your school encourage a positive attitude to the quality of the learning environment: a) indoors? b) outdoors?
- Does your school recycle its waste? If so, what, how and where?
- Which of these features exist in the school grounds: playground markings, log/brushwood pile, seats and play equipment, maze, sheltered area, hedges, sand-pit, fences/walls, nestboxes, shed, batboxes, greenhouse, sundial, compost heap, weather station, mural, nature trail, sculpture, pond, marsh, ditch, stream, wildflower meadow, mown grass, herb garden, flowerbed, shrubbery, wood/copse, farm animals, birdtable?
- What changes would you and the pupils like to see?
- What is the history of your site?
- Are your grounds currently under a maintenance contract?

Once you have a clearer picture of what your grounds are like, consider the following before making any changes.

Curriculum uses:
- What subjects/themes/activities will benefit from improvements?
- What informal/extra-curricular use will be made?
- How will birds be more effectively studied and enjoyed?
- What other opportunities for wildlife study will there be?

Species and habitat benefits:
- How will the landscape be improved aesthetically?
- What birds do you want to attract?
- What other wildlife may be attracted to the grounds?

Implementation:
- Where will the improvements occur?
- What are the benefits of this location?
- How will they affect other users?
- When wil improvements be carried out?

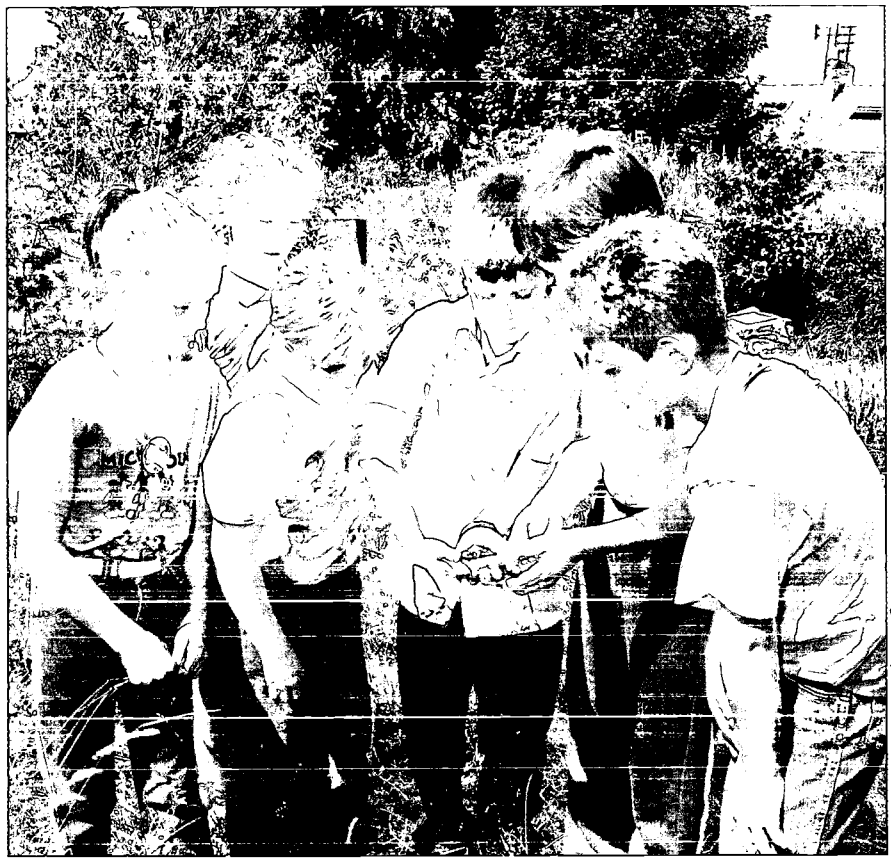
Costs
- How much will design costs be?
- How much will materials cost?
- How much will any labour charges amount to?
- Can parents help?
- Where else can you get help?
- Which aspects of the work can be undertaken by pupils within the curriculum?
- What are the current maintenance costs of your school grounds?
- Will there be additional maintenance costs or savings?

Community
- How do you define your community?
- How will it contribute to the process of change?
- Will the relationship between the school and its community be affected?

Try using colour-coded site maps to show each of the features you propose. Photographs will also help you and your pupils to visualise plans, as will a three-dimensional model.

Everyone with an interest in the school will have an opinion. Involve all those who will be affected by change.

A school environment that is attractive to wildlife will also be stimulating for children.



C. James (Bruce Coleman Limited)

USING THE SCHOOL GROUNDS FOR TEACHING

'Think globally, but act locally' is an important principle in Environmental Education. This refers to the need for young people to develop an understanding of the global context in which their own actions towards the environment will have a meaning.

C H Gomersall (RSPB)

Birds attracted close to the classroom window can be used for collecting data, inspiring artwork and practical investigation. Here, a classroom hide has been created using one-way transparent plastic.

The problems of managing the environment at the level of the school grounds may be a microcosm of problems that occur at local, national or global levels. In this booklet we suggest a number of activities that will help pupils gain the necessary understanding, skills and attitudes needed to form their own judgments about environmentally responsible life styles and to play their part in making decisions.

With very young children in infant and first schools, you should aim to inspire an interest in wildlife and the environment. Children are more likely to value something if they like it and if it is obvious to them that it is valued by the school. You can develop that interest with older pupils and emphasise understanding, learning and expressing feelings about how the environment operates and on inter-relationships between living things and the environment. You should also develop investigation skills.

Older students should understand people's impact on natural systems and the choices they make which disrupt or sustain environmental processes. This will help them to make informed, rational decisions concerning their own attitudes and behaviour.

Encourage pupils to extend the things they have learnt into their home lives so that they may improve the quality of the environment that lies beyond the schools' boundaries.

Learning across the curriculum

The National Curriculum, the Common Curriculum in Northern Ireland and the 5-14 Curriculum in Scotland encourage teachers to approach much of their work in the mandatory subjects through the selection of appropriate cross-curricular topics and themes.

Studies set in the context of the school grounds provide teachers with a huge range of opportunities for cross-curricular work, not only in the more obvious subjects, such as geography and science, but also in maths, language, technology, history, art, drama, dance, music and even RE. Linking Environmental Education with the existing curriculum is possible because all subjects have knowledge, skill, attitude and value objectives that may be explored through the environment.

Scientific and ecological concepts are included within the programmes of study for geography and science.

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However, including environmental topics within the creative and expressive subjects is just as important; these allow pupils to express their feelings and develop attitudes based on aesthetic, spiritual and moral values.

Understanding environmental concepts

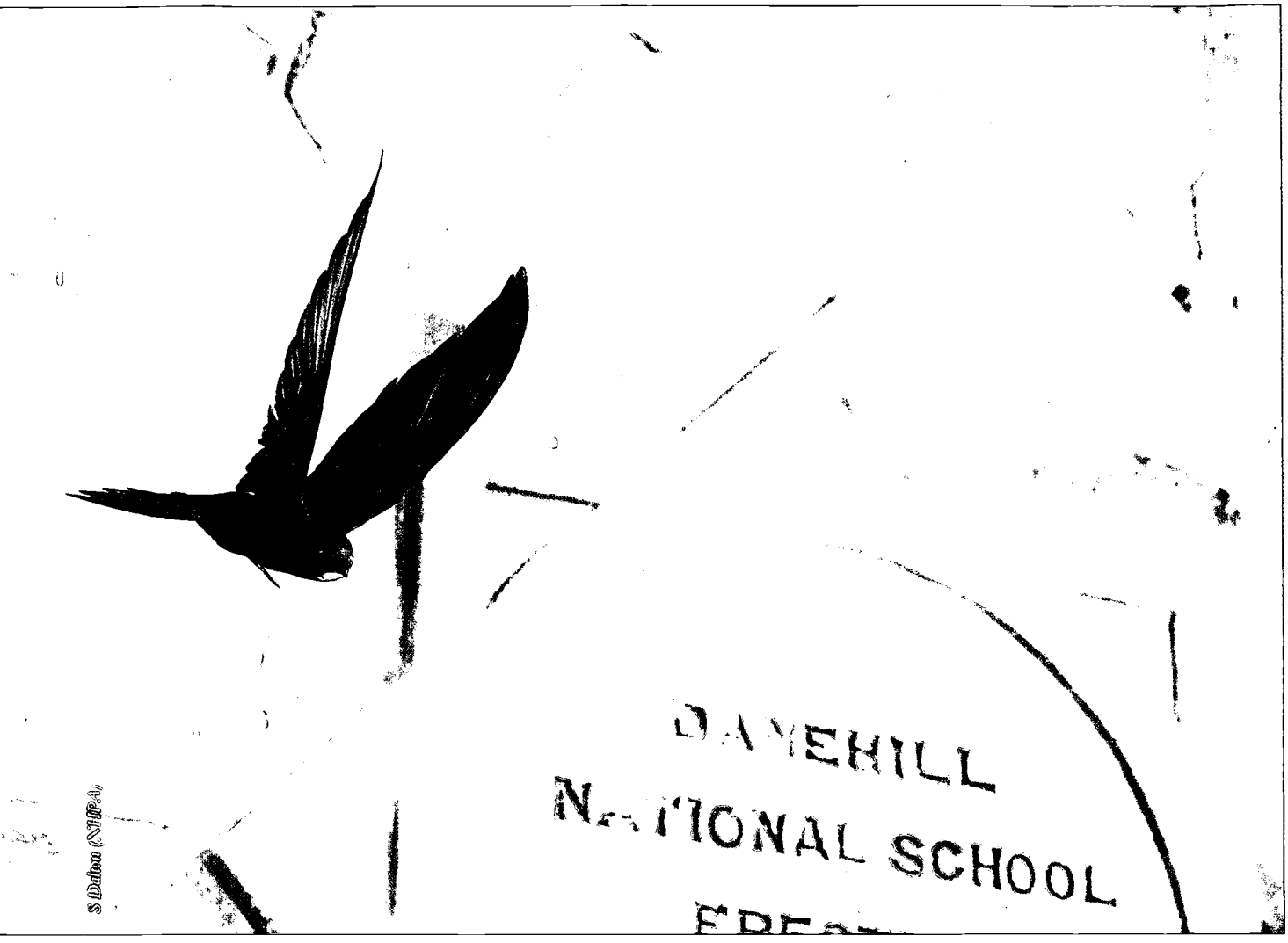
An understanding of basic environmental concepts will give meaning and order to pupils of the world around them and enhance their perception of it. By understanding such concepts as 'the ecosystem', they will be better equipped to behave responsibly and make informed decisions. Other ecological concepts which you can explore through the school grounds include:

- the biosphere
- environmental change
- competition between species for the use of resources
- conservation and stewardship
- endangered species and extinction
- energy - sources, forms and how energy flows through ecosystems
- interaction between species and with the physical environment
- natural and cultural heritage
- pollution
- populations
- recycling
- resource management - renewable and non-renewable resources
- technological change and its implications for the environment
- waste.

P Dean (FLPA)

(Daily Telegraph Picture Library)

Think globally; act locally.



Swifts may nest in the school's roof.

Environmental concepts should be taught from simple beginnings with young children to more abstract and diversified issues with secondary school pupils. The example below shows some of the stages in developing an understanding of the concept 'ecosystem' reflecting the pupils' stages of learning and previous experiences. Although the emphasis is scientific, it is important to provide an opportunity for pupils to express their feelings about the environment.

Infant and lower primary pupils

- Living things are all around us.
- Living things have needs such as food, water, air.
- Plants need sunlight, water and minerals to live and grow.
- Some animals eat plants, some eat other animals, some eat both.
- All living things need 'living space' - a home or habitat.

Upper primary pupils

- Plants, animals and the non-living things in the environment affect each other.
- Living things that depend on each other form a biological community.
- The sun is the source of the Earth's energy.
- Some of the energy in sunlight is stored by plants during photosynthesis.
- Fossil plants, in the form of coal, oil and natural gas contain energy from the sun stored when they were alive millions of years ago.
- People change the environment in many ways.
- The environment and its various conditions influence where and how living things exist.

Lower secondary

- People are part of the Earth's ecosystem.
- Humans can make decisions that may damage or protect the habitats and lives of other living things.
- Substances harmful to living things which accumulate in water, the air and soil cause pollution.

• Too much pollution results in damage to the environment.
• Natural cycles and ecosystems have only a limited capacity to disperse pollutants.
• Some living things adapt to changes in the environment, most cannot.

Upper secondary

• An ecosystem is complex and is vulnerable to sudden disturbances.
• Humans frequently alter the natural cycles and systems of the earth.
• People are capable of developing ways that enable them to live in harmony with the environment and which sustain and enhance its quality.

Experiencing and interpreting the school environment

The great advantage of using the school grounds for environmental teaching is that they provide first-hand experience of the living world for pupils. Many of the activities suggested later in this booklet relate directly to different habitats that you can create in the school grounds, but it is best to plan linking activities so that these are not seen in isolation.

An Environmental Trail

Encourage small groups of pupils within a class to develop and interpret their own 'environment and wildlife trail' using a variety of media. This may then be followed up by other groups as well as visitors to the school.

Such an approach can enhance learning in all areas of the curriculum and encourages:

• working together as part of a group
• improved awareness and sensitivity to the school environment
• enhanced perception and understanding of environmental concepts
• application of scientific experiments and investigative techniques
• creativity and self-expression using a variety of media
• enjoying the environment
• appreciating the creative efforts of others.

In their interpretation of the trail, pupils could use some or all of the following forms of expression:
Spoken/written - description, poetry, role play, drama, annotated drawings
Visual - drawing, photography, video, painting, sculpture
Sound - music, songs, sound recordings, playing instruments
Movement - mime, drama, dance, simulation.

Interpretation could take the form of a trail-guide that gives details of things to look for, or activities to carry out at numbered points along the trail (in which case the trail is 'self-guiding'), or the pupils could act as guides and demonstrators. The latter would give greater scope for pupils to use sound and movement activities in their interpretation. You can adapt this approach to all age levels.

A range of habitats in the school grounds will provide opportunities for first-hand learning.

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SCHOOL BUILDINGS

Buildings are 'home' to a range of wildlife, especially birds. Sparrows, swifts and starlings use them for nesting; pied wagtails roost; robins and blackbirds keep a lookout and sing, and pigeons rest. Birds use the recesses, porches, openings for ventilation, roof spaces, ridges, chimneys, aerials and outbuildings.

S Dalton (NHPA)

House martins may nest under the eaves of your school.

Plants beside buildings provide valuable shelter and food in the form of insects or berries and are the key to a bird-friendly building.

Make sure that planting complies with any local security policies. Below windows and beside doors you may prefer ground cover varieties. You should also avoid plants with poisonous berries, especially at nursery and some special schools.

(Heather Angel)

Ivy mixed with Virginia creeper

Clothing the walls

Climbing hydrangea, ivy and Virginia creeper cling to walls by 'suckers'. However, clematis and honeysuckle (Caution: poisonous berries) need something to twine around - one way to hide a drain pipe! If this seems likely to damage the pipe or block drains, fix trellis, netting or wire to the wall.

The nectar-rich flowers of hydrangea, ivy and honeysuckle attract insects, but during different seasons. Ivy and honeysuckle berries also attract birds, again at different times. Non-climbers, such as cotoneaster, pyracantha and crab apple grown against a wall also provide food for birds.

Once established, plants become good nest sites for wrens, robins, thrushes, wagtails and flycatchers.

Plant containers (window boxes, pots, tubs etc)

Containers are invaluable for growing plants in school grounds where tarmac or concrete prevails. You can hang them on walls or window sills; put them at the base of walls; or on hard areas nearby.

Containers are probably most valuable for growing nectar-rich plants to attract insects (especially butterflies and bees).

Some containers can be designed and built to suit particular locations as part of work in technology. Designs should consider:
- appropriate materials (exposure to weather and damp soil);
- dimensions (large enough to avoid frost damage to roots);
- support;
- drainage;
- ease of transport;
- maintenance (watering, feeding, replanting and renewing compost).

To attract butterflies, group several containers together. One square metre is considered the effective minimum. A butterfly garden is a source of many interesting curriculum activities.

P Perry (FLPA)

Nestboxes

Traditional nestboxes attract birds that use holes in trees for nesting. Others use open-fronted boxes, best placed amid climbing plants. You can also make swift boxes to fit a roof space.

Nestboxes can be designed and built as part of work in technology. Design considerations include:
- appropriate materials and construction methods;
- hole-size;
- internal dimensions;
- method of support;
- arrangements for cleaning.

NB Make sure your nestbox is safe from disturbance. If you want blue or great tits to nest, it must be within 30 metres of an area of trees or bushes. Otherwise they will not be able to gather enough insect food for their young, and chicks will die.

Try replacing a side of a nestbox with clear perspex. Attach it to a window frame, clear side to the glass. Cover the inside of the window with card so that the box is normally dark. It will do little harm to lift the card occasionally to look inside, but the room behind should be dark. This needs care and supervision.

Design an artificial nest for house martins. Consider what materials are appropriate, how they might be formed into a suitable shape and how it might be attached to a house.

Carry out a survey of local house martin nests. Gather data on preferred position, height and aspect; then fix your nest in a suitable place. Do this before house martins arrive in April. Try not to disturb them.

Flat roofs

These often provide similar study opportunities to playgrounds. Puddles are drinking and bathing sites for birds. Where safe access is possible, you can put out birdtables and feeders.

Sill, wall and window feeders

If it is difficult to put a birdtable in the grounds, you can get feeders to hang on the outside of buildings. These can be normal birdtables, attached to the window sill by brackets, with bracing wires for extra support.

You can hang simple feeders (such as peanut bags) from hooks in the wall or window frame, or from 'suction discs' attached directly to the glass. Fix a bar across the outside of the window and hang a variety of foods. Blank-off most of the window with card or paper to reduce disturbance, and the classroom becomes an excellent 'viewing hide'.

Much of the work described in the *RSPB Curriculum Guide Bird Studies in Primary Science* uses a classroom hide. Activities based on feeders are similar to those for birdtables (see pages 16 and 17).

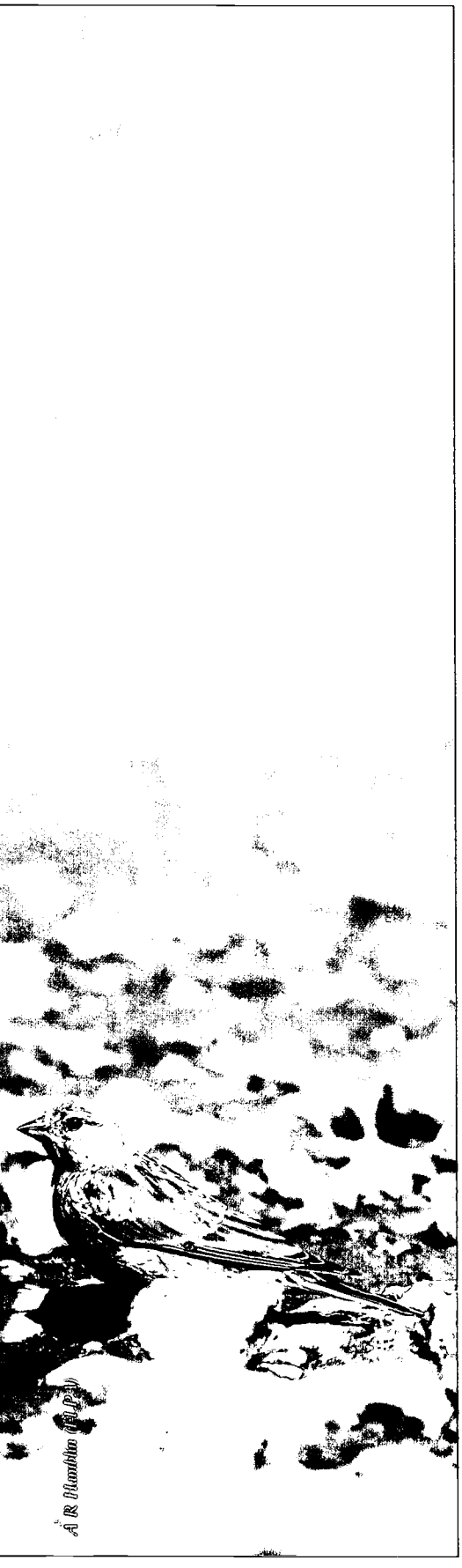
Activities based on plants
- Study how 'suckers', twining stems or tendrils appear to work.
- Measure temperature, humidity and air movement within the foliage and compare with that 'outside'. What does this tell you about the value of plants for shelter?
- Which parts of plants attract insects?
- Do the insects attract any birds?
- Which birds use plants as nest sites?
- When do birds eat berries or seeds?

Some questions and activities based on berries are in the section on Shrubs and Hedges on pages 26 and 27. Others, based on insects visiting plants, are on pages 24 and 25.

Activities based on plant containers
(Ideal if you have nowhere else to grow things.)
- Record the response of plants to changes in weather and seasons.
- Place containers in different conditions (light/shade/wet/dry) to find those that suit plant growth.
- Find out which insects are attracted to the plants. Activities based on insects are in the section on Creating An Insect Garden on pages 24 and 25.
- Which birds eat seeds produced by the plants?
- What features do these birds seem to have in common?

Activities based on nestboxes
- When do birds start showing an interest in the boxes?
- How do they show that interest?
- When do they start bringing nest materials?
- When do they start bringing food to the nest? (A sign that the eggs have hatched.)
- How often do they bring food? How many times in 10 minutes, an hour, a day, a week?
- Does it vary with the weather?
- How many young successfully leave the nest?

HARD-SURFACED AREAS



Birds use hard-surfaced areas to search for food such as crumbs or insects; to drink and bathe in puddles; and for dust bathing. You may see several species. Pied wagtails, starlings, sparrows or gulls, will be regulars. Others, such as blackbirds or robins, come less often or only at certain times of the year. Schools in suburban or rural places are likely to attract a greater variety of birds than those in town centres.

Birds will be disturbed when pupils go outside. Even a rush to the window will frighten them off. Designing an 'Observation Window' or 'Classroom Hide' is a good technology task.

Birdtables and feeders

You may attract birds to hard-surfaced areas by supplying food.

Foods to try:

Natural - seeds, grains, nuts, fruit, worms, mealworms, fishing 'casters', lard, dripping or meatbones. (Avoid salted peanuts and desiccated coconut.)
Processed - bread, cake, cheese or pastry. (Remember that too much of these, especially white bread, will not give birds all the nutrients they need.)

You can present food in different ways:
- hanging (such as in a peanut bag or half a coconut)
- in shallow containers
- loose.

Food may be selected by its colour. Colour food with harmless food-dyes or place in containers and dispensers of different colours to investigate preferences.

Remember, once you start a feeding programme, birds will become dependent upon it. Arrange for top-up visits during holidays, or for households bordering the grounds to have well-stocked tables as alternatives.

Birds will visit puddles to drink and bathe.

Water for birds

Birds need water to drink and to bathe in. Bathing and preening the feathers is essential for a bird's survival. Clean water is needed all year round, especially in winter when feathers must be kept in good condition to provide essential insulation against the cold.

NB: DO NOT ADD ANYTHING TO THE WATER TO STOP IT FROM FREEZING. ADDITIVES WILL HARM THE BIRDS' FEATHERS.

For birds to use water, it must be shallow. This is why playground puddles are popular. You can make a more permanent birdbath from an upturned dustbin lid, or other shallow container.

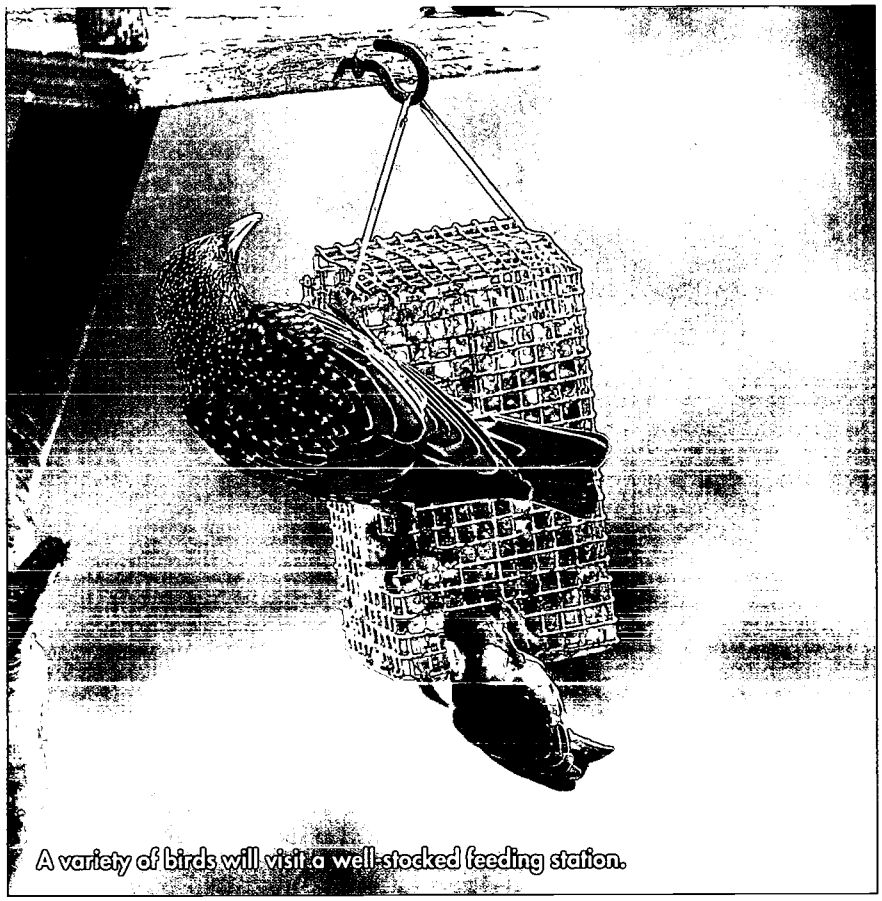
If an existing pond is too deep or has steep sides, stones, bricks, boxes or plant pots can be built up to provide areas of more shallow water.

Providing nesting materials

Birds need materials to build and line their nests. You could put out bundles of small twigs, plant roots, dog-combings, wool, dried grass, feathers from an old pillow and similar materials.

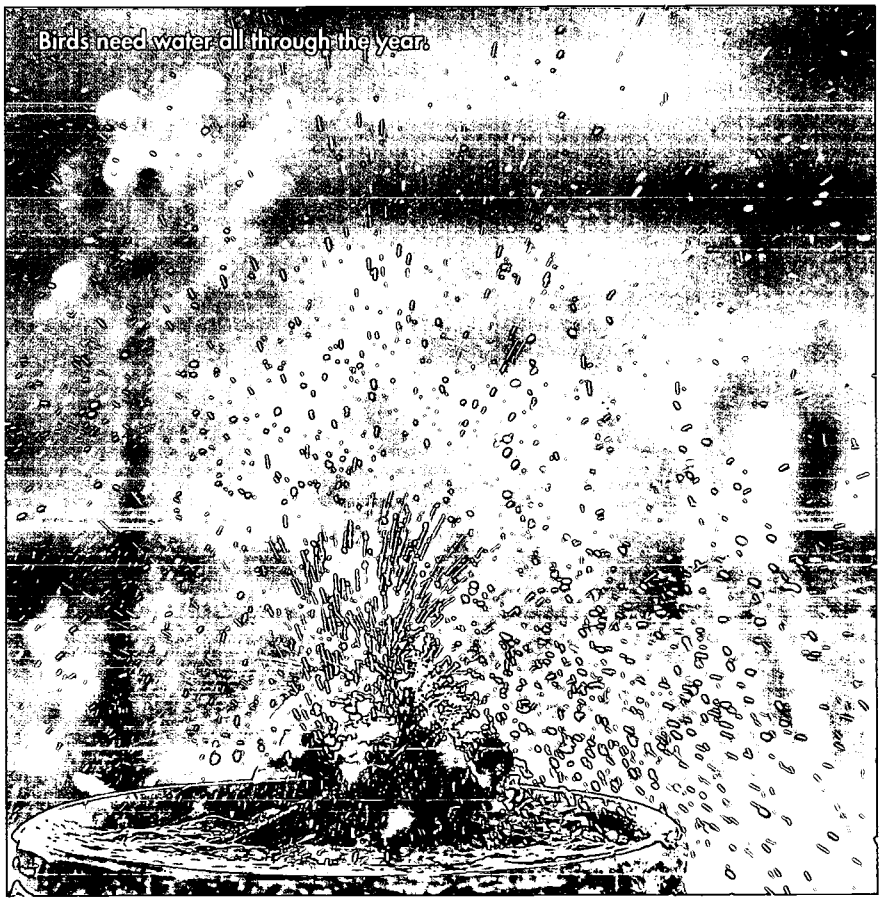
- Which birds select which material?
- Do birds use more than one kind of material?
- Do they use material in any particular order?
- By putting out known amounts of material, find out how much is used.

Some birds, such as house martins and song thrushes, use mud in their nests. A muddy patch or puddle edge will help them.



A variety of birds will visit a well-stocked feeding station.

(Heather Angel)



Birds need water all through the year.

A Henley (Biofotos)

Activities using birdtables and feeders

Once birds visit a feeder, you can see them much more clearly. They have enormous potential for work with science, maths, art and IT tasks.

Watch birds feeding

- Which birds come to the table or feeders?
- Think of a way of using a computer to show the types and numbers of birds visiting.
- Photograph or draw different visitors.
- Which are the most common birds?
- Count how many come to each kind of food. Which is the most popular?
- Does the popularity of any food change with the weather?
- How do birds respond to containers of different colours?
- How does the number of birds change with the weather or time of day?
- Do different species have preferences? Devise an experiment to test this.
- Look for any features the birds have that help them to feed.
- How might these features help them when feeding on their natural food?

Watch birds drinking

- How do they drink the water?
- How many 'sips' do they take?
- What do they do between each 'sip'? How does this help them? (Refers to 'keeping a lookout'.)
- How long do birds spend drinking?
- Do birds come to drink more often at particular times of day or year?
- Do some kinds of birds come to drink more often than others?
- Watch pigeons drinking. Do you notice anything different about them?

Watch birds bathing

- Do birds prepare for bathing?
- How far up a bird's body does the water come?
- What depth of water do birds prefer?
- How do they bathe?
- How do birds get water onto their backs?
- After bathing, how does the bird dry itself?

Watch birds preening

- How is preening carried out?
- Do birds pay attention to particular feathers?
- Do some bathe in dust or dry earth?
- Keep a diary in words and pictures to record your observations.

PONDS

(Heather Angel)

Water is a magnet for a variety of wildlife.

Ponds and wet areas are a valuable focus for environmental education. They are very different from other habitats in the school grounds because water is a magnet for a variety of wildlife and provides a place for birds to drink, bathe and collect mud.

Planning your pond

Decide how the pond will fit into your overall plan. The best location is one where things are unlikely to fall into it, such as leaves, litter and children! It should be in a flat, sun-lit place, away from main pathways and trees, but close enough to the buildings to be seen and not forgotten. It is vital to check that the chosen site does not contain buried electric cables, pipes, foundations of old buildings etc. Avoid places likely to be used for future buildings. Check any plans with your local authority.

Involve children in the planning. Survey the grounds using a trundle-wheel, and plot buildings, trees, paths, play-areas and other features on your plan. Remember, the pond must be filled and kept topped-up in hot, dry weather. Where is your water source? Can you channel run-off from a roof into the pond? Cut paper shapes to represent the pond and move them about on your plan until you find the ideal position.

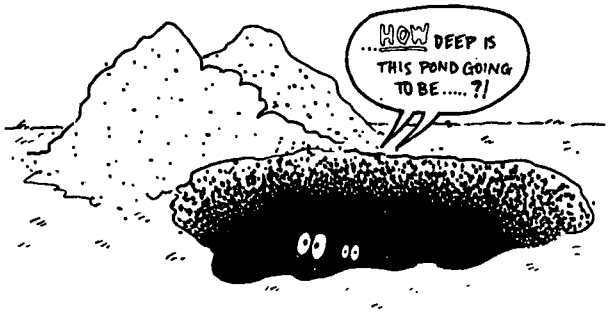
The pond should be as large as possible - the greater the water body, the better it will be at maintaining a natural balance. Include a variety of depths, with one area at least 75 cm deep to ensure that pond creatures can survive freezing weather. Make the sides shallow. They will be safer for small children; ideal for bog plants to grow and create a marsh habitat; shallow enough for birds to use and to help hedgehogs get out if they fall in.

Create other habitats near the pond, such as a boggy area, log pile and a rockery where amphibians can shelter; and a wildflower area to attract insects.

Digging your pond

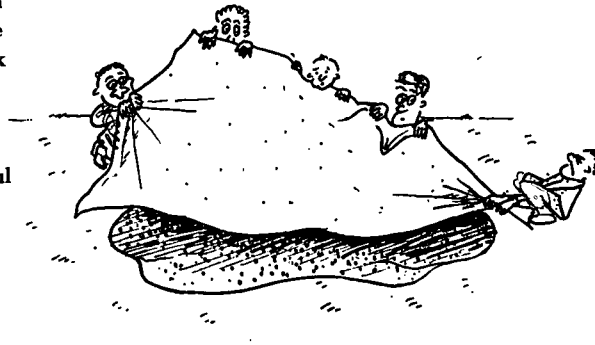
(NB We assume you will be using a flexible liner for your pond.)

Mark out the shape with sticks and string - a gently curved shape is easiest to dig and looks more natural when finished. Save turf to protect the edges, and the spoil can be used to level the sides and/or to make a bank - a rockery perhaps.



Dig out an extra 5 cm than your planned final depth. Then line the hole with sieved soil, sand or polyester matting to protect the liner from sharp objects.

Butyl rubber is the most durable, flexible lining. Others are cheaper, but need replacing more quickly. Allow an overlap of at least 30 cm round the edges. Working out the area required is an interesting task for pupils.



Gently stretch the liner to cover the bottom of the pond (be careful not to puncture it) and weigh down the edges. Cover the liner with sieved sub-soil to protect it from ultra-violet light (NB nutrient-rich top soil will cause algal blooms).

Planting

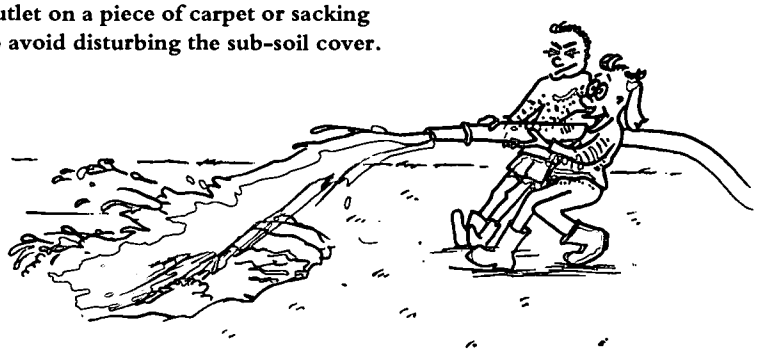
Water plants are grouped as follows:
Underwater plants - eg water milfoil and Canadian pondweed. They provide food, shelter and oxygen for aquatic animals and are vital to a pond ecosystem. Plant them with their roots in a hessian bag of soil.
Plants with floating leaves - eg water lilies (use a small-leaved variety) and frogbit (free-floating).
Emergent plants - eg arrowhead.
Marginal plants - eg marsh marigold and purple loosestrife. Avoid species like reedmace: they will overrun small ponds.

The best time to plant a pond is April or May. (Don't plant if prolonged frosts are likely.) Buy plants from garden centres - never take from the wild.

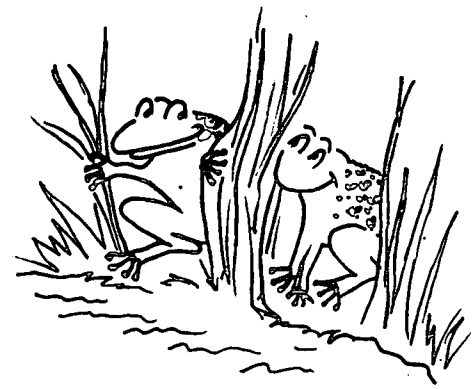
(Harry Smith Collection)

An established school pond with floating and marginal plants.

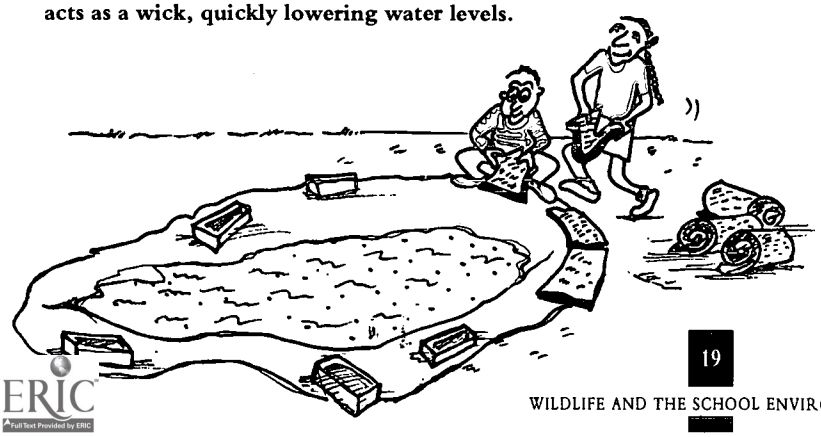
Fill the pond slowly, resting the hose outlet on a piece of carpet or sacking to avoid disturbing the sub-soil cover.



(Using butyl rubber is not the only way to make a pond. High-quality clay is one of many alternatives.)



Allow a week or two for the pond to settle. Remove the weights around the edges and replace with turf. Ensure that the liner acts as a barrier between the pond and the garden soil, or the soil acts as a wick, quickly lowering water levels.



Let the grass grow in spring so that froglets can safely hide. Paving slabs, stone, gravel or a boardwalk will give you access for pond dipping - the south side is best.

(Heather Angel)

Stocking your pond

Don't introduce fish into small ponds. In larger ones, wait until a good pond life community has formed. The sequence of colonisation makes an interesting study. Pond creatures will arrive naturally from a variety of sources. You could take a bucketful of water from an established pond to speed up the process.

Managing your pond

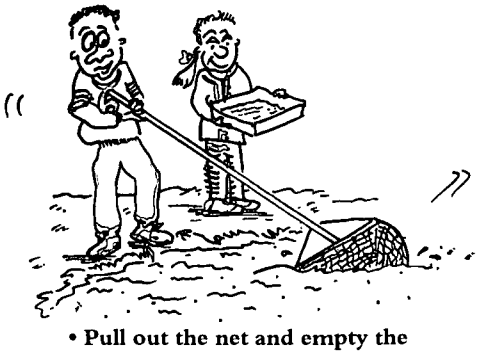
Occasionally, you will need to remove or thin out invasive plants, otherwise natural succession will reduce your pond to a muddy swamp! Do this in the autumn to minimise damage. Leave plants on the banks for a week after uprooting so that any creatures can return to the pond. Aim to maintain a stable ecosystem and prevent individual species from becoming dominant.

Safety

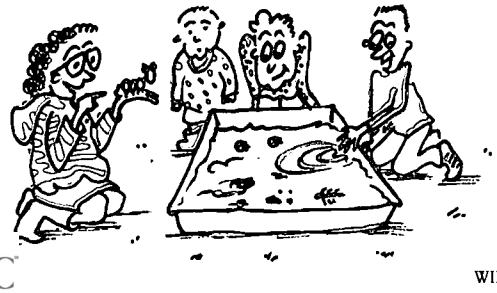
Safety is the most important consideration when children work or play near water. You could fence off the area and install a secure gate, or make a protective cover for all or part of the pond.

Pond-dipping

• Fill white or pale-bottomed trays with clean water from the pond.
• Dip a long-handled net into open water and move it from side to side, with the net half submerged.



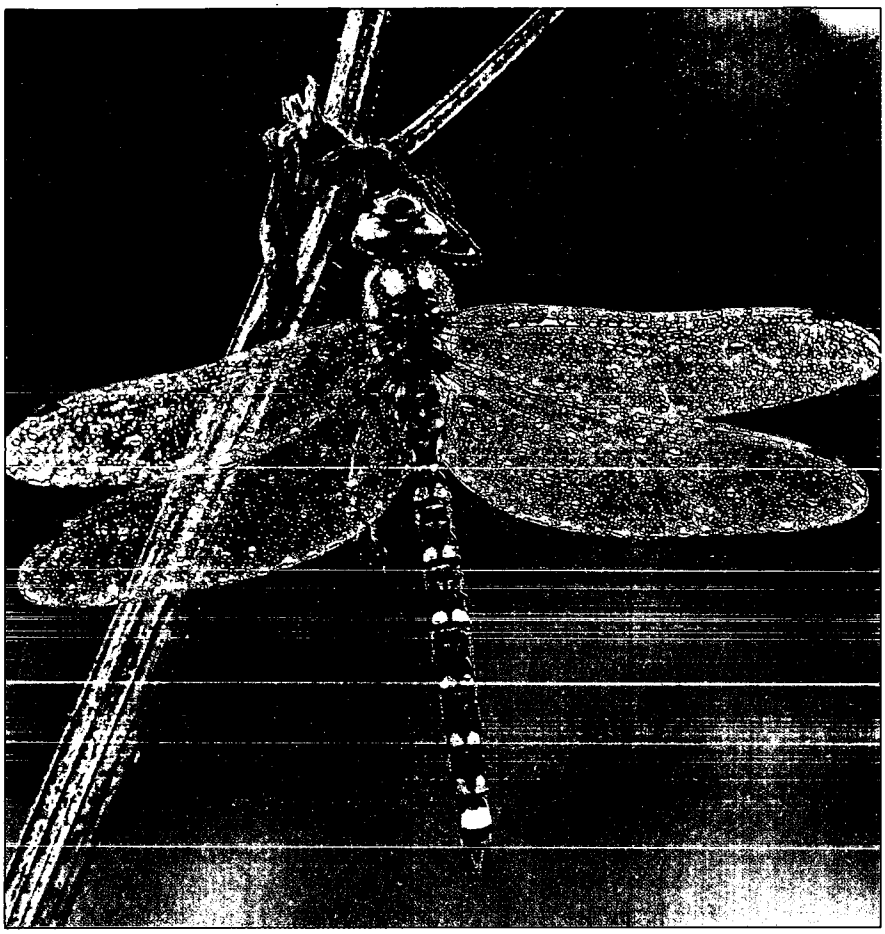
• Pull out the net and empty the contents into the tray.
• Allow contents to settle, then look at the creatures. They should show up against the pale background and will start to move around.



• Use a teaspoon to transfer examples of each type of creature to smaller containers (margarine tub or other shallow dish).

Try to keep predators and their prey separate.

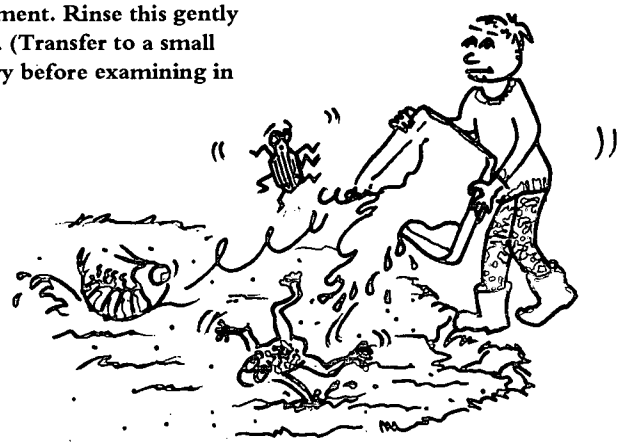
Make more detailed observations using a hand lens. Identify and record numbers of each species present.
• Change the water in the trays, then dip the net into different microhabitats, such as among vegetation.



C R Vandell

A pond predator - the southern hawker dragonfly.

Avoid the bottom of the pond at this stage, and rinse any cloudiness from the net before transferring to the tray.
• Last of all, dip the net into the bottom of the pond and collect a small amount of sediment. Rinse this gently but thoroughly. (Transfer to a small sieve if necessary before examining in the trays.)



• Return all unwanted creatures to the pond. Make sure snails and leeches are not still attached to the net or trays.
• Once the creatures have been identified, you can make a detailed study using textbooks.
• Always return the catch carefully to the pond.

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Maths, science, geography, technology and creative activities can be used in designing and building a pond.

• **How is each creature adapted to suit its own location in the pond:** eg, a mayfly nymph has gills along its abdomen to extract oxygen from the water. A pond skater rests on the surface using surface tension; its elongated legs spread the body weight over a larger area.

• **Predator-prey relationships:** eg, plant-eaters, such as mayfly nymphs, are eaten by dragonfly larvae, which in turn are eaten by birds such as tufted ducks and moorhens. Similarly, some creatures, such as sludge worms, feed on the pond litter deposited by animals and plants.

• **Pyramids of numbers.** These can be considered by older children using standardised sampling techniques: eg, three sweeps in each level of the pond, counting the relative numbers of carnivores and herbivores in their catch, together with plant stems within a similar area (a rough estimate). For younger children, a count of carnivores and herbivores should show that there are more herbivores than carnivores. This could be represented as a bar graph which, when turned on its side, forms a simple pyramid.

• **Which bird species use the pond, and for what purposes?** This could be done on a daily, weekly or even seasonal basis.

• **Life cycles of pond creatures.** For example a dragonfly or frog.

• **Habitat preferences of pond animals.** Illustrate by a Venn diagram, pie charts and bar graphs, using information gained from sweeping the surface, edge and pond bottom.

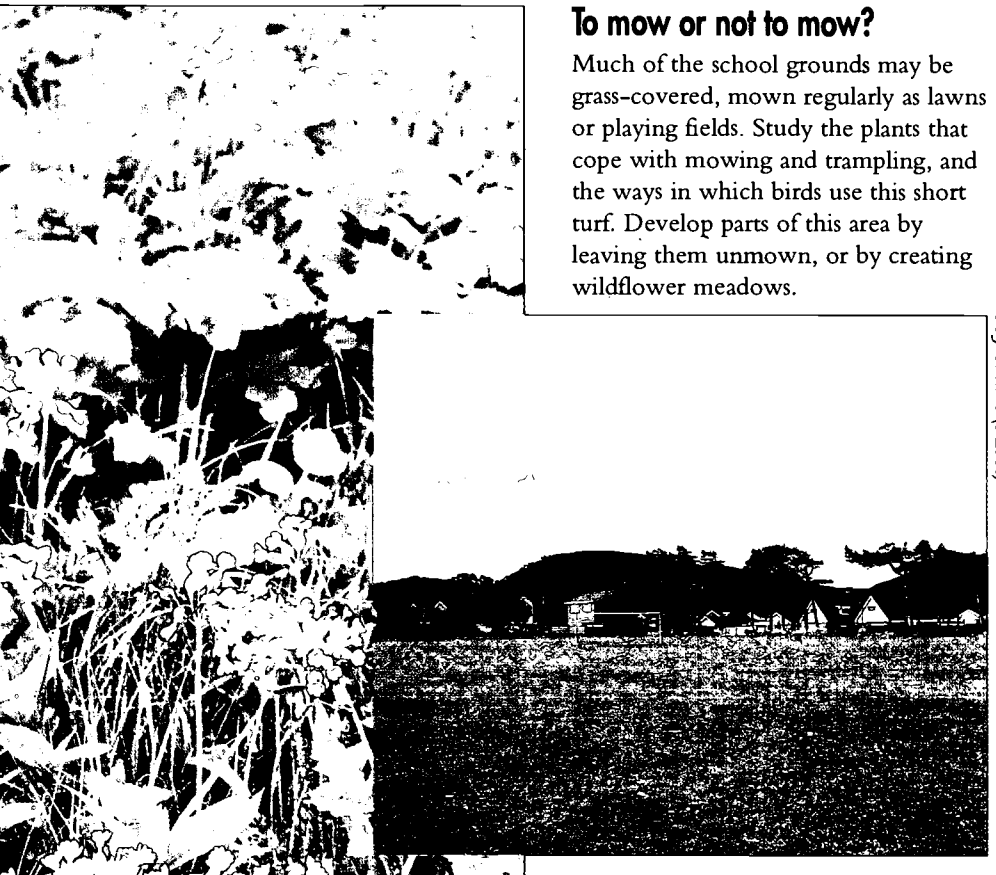
• **Investigate and measure some of the physical properties of the water.** How does its temperature compare with that of the air? How does it vary in different parts of the pond profile? At different seasons? What are its refractive qualities? How does water affect sound?

• **Surface tension.** Demonstrate this by resting a needle on water. (Put it on blotting paper first: this sinks!) Compare with the adaptations of water creatures, such as pond skaters.

GRASSLAND AND WILDFLOWERS

To mow or not to mow?

Much of the school grounds may be grass-covered, mown regularly as lawns or playing fields. Study the plants that cope with mowing and trampling, and the ways in which birds use this short turf. Develop parts of this area by leaving them unmown, or by creating wildflower meadows.



M J Thomas (FLPA)

Look for gulls on your playing fields.

Wildflower areas

An unmown area, apart from being interesting and attractive, will provide excellent material for looking at: sampling techniques; differences in plant form; species competition; changes with season and with plant succession; the insects and other animals that live there. The plant species of turf are adapted to respond to mowing or grazing. An area of lawn or field marked out and left unmown for a season will provide a site for learning about these through comparisons.

(Heather Angel)

Cowslips and bluebells in a spring flowering meadow.

With older pupils, you can sample the plants after a period of growth. Density or percentage cover may be estimated using quadrats. Compare this with data collected previously **in the same way** from the same area while it was still mown, or an adjacent mown area as a control. Are there any changes in species composition or in abundance of different species? Long term monitoring would be valuable here. Classes could build on results obtained by their predecessors.

If you can leave the unmown turf for more than a season, it will demonstrate more changes in vegetation structure and species composition. These areas will also give you scope to compare invertebrates by observation, by sweep netting and by searching the ground. The change in habitat means that different food plants and flowers are available, and there are different amounts of shelter and accumulation of dead plant remains. It may even allow colonisation by small mammals, especially field voles. Look for their runways beneath the vegetation, at soil level.

Disturbed areas

A newly dug area soon becomes colonised by plants. These colonists will be familiar to gardeners; they germinate, grow and produce seeds quickly. They form the first stages of a plant succession by which they themselves are eventually replaced - annual weeds by perennial weeds by larger and ultimately more woody plants.

Species monitoring or sampling at intervals can demonstrate this succession. Intervals might be a few days at first, lengthening to weeks or months as the succession proceeds. The plants themselves provide good examples of seed dispersal and will be visited by insect- and seed-eating birds. The seeds themselves provide good material for studies of germination and growth, as well as a good resource for art (such as for collages).

Cornfield plants

You could grow these as an attractive flowerbed by sowing them in a dug area, allowing them to flower and seed. Dig the border in the autumn to bury the seeds for next year's plants.

Annual cornfield weeds include: poppy, cornflower, corn cockle, corn marigold, scarlet pimpernel, heartsease (wild pansy).

A meadow community

The traditional meadow flowers, now scarce in our countryside, are perennial plants that can tolerate different conditions of grazing or cutting. These flowers can be grown as wildflower meadows:

- plant the flowers (grown from seed) into a cleared area. They find it difficult to grow with turf; or
- clear the ground (as if planting a new lawn), remove turf or asphalt and some top soil to reduce soil fertility and seed it with a mixture of wild plants suitable for the soil and the community you wish to create; or
- mow them after the seed has been scattered (as with a hayfield) and remove the cuttings. The latter prevents mulching of the ground and keeps fertility low to reduce competition from more vigorous plants.

It is important to decide what type of meadow community you wish to create, to select the right species for this, and to manage it carefully in the appropriate fashion, such as cutting it at the correct time.

A spring flowering meadow

Leave unmown and untrampled through the spring. Mow for the first time in July, when the plants have finished flowering and have set seed. Mow slightly higher than for a lawn. Leave the cuttings for two weeks to allow the seed to shed. Then remove. Mow the area occasionally and use the area lightly for the rest of the summer.

Some plants for a spring flower meadow: lady's smock, cowslip, self heal, daisy, dandelion, bugle, meadow buttercup, snakeshead fritillary.

A summer flowering meadow

This can be lightly used and mown early in the spring. Then leave it unmown and untrampled from May until late September. After this, it can be mown (and cuttings removed) and will not be harmed by light use.

Some plants for a summer flower meadow: knapweed, scabious, meadow cranesbill, white campion, ox-eye daisy, yarrow and most grasses. Small meadows can even be created in sites that were mainly all-asphalt by removing areas of asphalt and replacing with soil.

Birds and meadows

Look out for birds using your meadow areas during different seasons and at different stages of development. Some, especially swallows and house martins, may swoop to feed on flying insects above the meadow.

Others, like sparrows and finches (including linnets and bullfinches), take the ripe seeds from the plants. Goldfinches are especially attracted to the seed heads of thistles.

Teasels attract goldfinches.

A R Hamblin (FLPA)

Activities using mown areas

Find out about the birds using school fields. What species are they? (You may, for instance, get different species of gulls.) What are they doing there - feeding or just loafing?

Watch for birds, such as blackbirds and starlings, feeding in short turf. How do they do it? Do they watch for clues or test the ground by probing? What are they finding? Investigate some pieces of turf (they can be replaced afterwards) to a depth of about 5 cm to find which invertebrates are living there.

Activities using wildflower areas

Look at the growth forms of the plants, comparing mown and unmown. How do they survive mowing? Which rosette, low-lying or creeping forms can adapt to the taller, unmown situations? Which ones are now able to flower? Good plants to look at include daisy, hawkbits, catsear, plantains (rosettes), yarrow, clovers, creeping buttercup and grasses (low or creeping).

CREATING AN INSECT GARDEN

The key to attracting insects to an area, as with most other wildlife, is to provide food. With butterflies, for example, the caterpillars of several species feed on the leaves of stinging nettles, whereas the adult butterfly sucks nectar from flowers or the juices from fruits through its proboscis, which is used like a drinking straw.

Nettles thrive in a sunny place. Cut patches in rotation so that there are always some with young growth. If you wish to prevent them spreading, grow them in sunken tubs. Other suggestions here are aimed at attracting adult insects, especially moths and butterflies.

The colours, scents and nectar of most flowering plants are no accident. They are bribes for adult insects! So, what is in it for the plant? Plants need to transfer pollen from one flower to another of the same species. Many rely on the wind, but this is hit and miss. Some, therefore, have it transported from one flower to another by a carrier - an insect.

By planting a sheltered, sunny border, especially against a wall or fence, with a range of flowering plants, you will provide a source of nectar throughout the spring, summer and autumn, and a good variety of insects may be attracted into the school grounds. The following are all plants to consider and this, perhaps, is the one place in the creation of a wildlife garden where you may depart from the golden rule of planting native species. Some are native wild plants, but please buy your seeds or plants from a garden centre. Do not dig them up and transplant them from the countryside - this is illegal. Avoid using pesticides on your border.

Buddleia is an essential shrub for any insect garden.

R. Revels (RSPB)

Garden plants for insects (This list is by no means exhaustive.)

Annuals:		
Marigold	May - Nov	Bees, butterflies
Heliotrope	May - Oct	Butterflies, moths
Candytuft	Jun - Sept	Hoverflies, butterflies
Annual chrysanthemum	May - Oct	Various
Cosmos	Jul - Oct	Bumble bees
Night-scented stock	Jun - Jul	Moths
Tobacco plant	Jun - Sept	Moths
Biennials:		
Sweet william	Jun - Jul	Bees, butterflies
Sweet rocket	May - Jun	Bees, butterflies
Perennials:		
Marjoram	May - Sept	Bees
Red valerian	Jun - Sept	Butterflies, day moths
Ice plant (Sedum)	Sept	Butterflies
Hyssop	Jul - Sept	Bees, butterflies
Fleabane	Jun - Sept	Butterflies
Aubretia	Mar - Jun	Bees, butterflies
Hemp agrimony	Jul - Sept	Butterflies
Honesty	Apr - Jun	Butterflies, moths
Careopteris x cladonensis	Sept - Nov	Various
Primrose	Mar - May	Moths
Purple loosestrife	Jul - Sept	Bees, butterflies
Shrubs:		
Buddleia globosa	Jun - Jul	Various
Buddleia davidii	Jul - Sept	Butterflies
Hebes (various)	May - Oct	Butterflies, bees
Ivy	Oct - Nov	Various

G E Hyde (Eric & David Hosking)

The buff tip moth mimics a broken birch twig.

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Activities based on insects

Many activities based on observing insects are relevant to the Science curriculum. But don't let children handle bees without proper supervision and protection.

• **Watching insects feed**

An activity for a sunny day when butterflies are out. Record the numbers and kinds of insects attracted to the plants. Look at the proboscis being unrolled and inserted into flowers. Watch the effects of changes in weather (particularly temperature). Do butterflies favour particular colours or species of plants? Why?

• **Food chains**

Although many insects are plant feeders, some are carnivores: they eat other insects. Best known is the predation of aphids (greenfly) by ladybirds, hoverfly larvae and lacewings. Look for these where there are aphids. Look, too, for other carnivores, such as spiders. Web-spinning spiders are well known, but you may also spot crab spiders (mainly in southern England) and wolf spiders. Bats and birds also eat insects. You may see blue tits and great tits carrying insects and spiders back to their nests. Swifts, swallows and house martins feed only on flying insects such as gnats. You may see spotted flycatchers in rural sites chasing insects.

• **Colour and camouflage**

Some invertebrates have colours and forms that blend in with their background: eg the buff tip moth looks like a broken birch twig. Few flower-visiting insects do this, but one or two spiders do match the flowers in which they hunt.

Harmless insects such as hoverflies mimic more dangerous species such as bees or wasps. This helps to protect them from predators. Bright colours and patterns on butterflies or moths may be used to startle predators or confuse them.

The topic 'patterns and camouflage' can be extended to birds. There are many examples of camouflaged females and brighter males.

SHRUBS AND HEDGES

H Brehm (Bruce Coleman Limited)

Linnets are typical hedgerow birds.

Shrubs and small trees contribute greatly to the habitat variety in your school grounds. As well as being aesthetically pleasing, they have a vital function in providing shelter for wildlife. They break up large spaces and create areas for imaginative play. In nature, they form the understorey to the forest trees and a lower level layer around woodland edges and clearings. They form another stage in plant succession leading to woodland.

Many shrubs and trees are the food plants of a huge number of insects and they provide song posts, protection from predators, nesting, feeding and roosting sites for many birds. They can fulfil all these functions in the school grounds.

Shrubs and small trees are the basis of the hedgerows which are such a feature of our landscape. Again, in this form they can be invaluable around the school. A hedge provides a good, strong barrier, competitive in cost with certain types of fences.

Song thrushes are great berry-eaters.

K Taylor (Bruce Coleman Limited)

Your school may have existing hedges which will be valuable features. Older hedges, usually with ditches, are particularly rich in wildlife and should be managed with great care.

Selecting and planting

Planting trees and shrubs creates major changes, and should be carefully planned. Before planting trees and shrubs you should:

- carry out a careful survey of the existing site
- get specialist landscape and conservation advice
- have an overall plan for the development of the site
- take into account future uses of the planted areas.

Choose native species appropriate to your area. These will fit in better with the landscape, and will have a higher conservation value because they support many invertebrates. Some shrubs favour chalky districts, others are tolerant of more acid soils. A good guide is to see what already grows in any surrounding countryside. Select your shrubs also for their flowers and berries, and the structure they provide as roosting or nesting sites for birds. (See list opposite.)

Plant them as an understorey to your woodland area, or as a fringe around trees, imitating a woodland edge. Either will add to the eventual structure of your woodland, providing a great variety of 'layers' of foliage within and around it. Elsewhere, perhaps nearer the school buildings, ornamental varieties may be acceptable as berry-bearers.

A hedge

Your grounds may have hedges, or you may wish to plant new ones as part of a boundary for screening or to create internal structure planting ... even a maze. Plant the young shrubs fairly closely, about five plants per metre, possibly as a double, staggered row. Prune them fairly drastically for the first couple of years to give the hedge a thick, bushy base.

Once the hedge has grown, aim to keep this thick base by trimming the hedge narrower towards the top so the cross section resembles an 'A' shape.

When you have a tall or established hedge, you will need to trim it without preventing it from bearing its valuable blossom and berries. The best solution is to prune just part of the hedge each year, in rotation, and to leave the rest to flower. Avoid trimming during the spring and summer, the birds' nesting season, and early autumn, when berries are still on the hedge.

Native species of shrubs and small trees

* = particularly suitable for limy soils
x = valuable for berries
(xx = particularly valuable)
y = suitable to include in hedges

Blackthorn		x	y
Bird cherry		xx	
Buckthorn	*	x	y
Dogwood	*	x	y
Elder		xx	
Field maple			y
Guelder rose	*	xx	
Hawthorn		xx	y
Hazel			
Rowan		xx	
Spindle	*		
Wayfaring tree		x	
Whitebeam		x	
Climbers			
Bramble		x	
Clematis	*		
Dog rose		x	y
Honeysuckle		xx	
Ivy		xx	

Trees also suitable for use as hedging: beech, holly, hornbeam. Ornamental species bearing berries, suitable for use in garden and around buildings: barberry, cotoneaster, firethorn.

Birds and berries

The relationship between berries and birds is one of the great 'partnerships' in nature. The colour and flesh of most berries are attractive to birds and are valuable food for them. In return, the bird is the agent by which the seeds inside the berries are dispersed away from the parent plant. These seeds are either regurgitated as pellets by the bird, or passed out in the droppings. The seeds are not killed by the digestive juices - some may germinate better after being inside a bird.

CAUTION
Some berries are, of course, poisonous (although birds can eat them without harm). Warn children about this. No berries should be eaten. Avoid growing poisonous species if you have young children.

Hedge history

Hedges often mark old boundaries, eg parish boundaries. Is yours one of these? A hedge may be dated by finding the average number of woody species in 27 m x 100: eg four species x 100 = 400 years.

An A-shaped hedge is best.

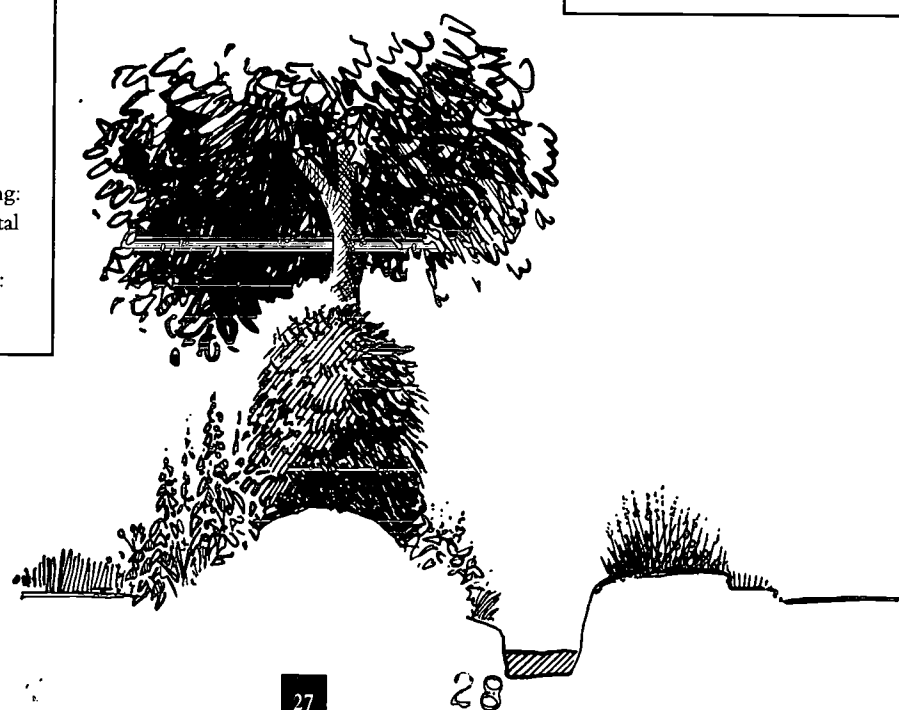


Illustration by Dan Powell

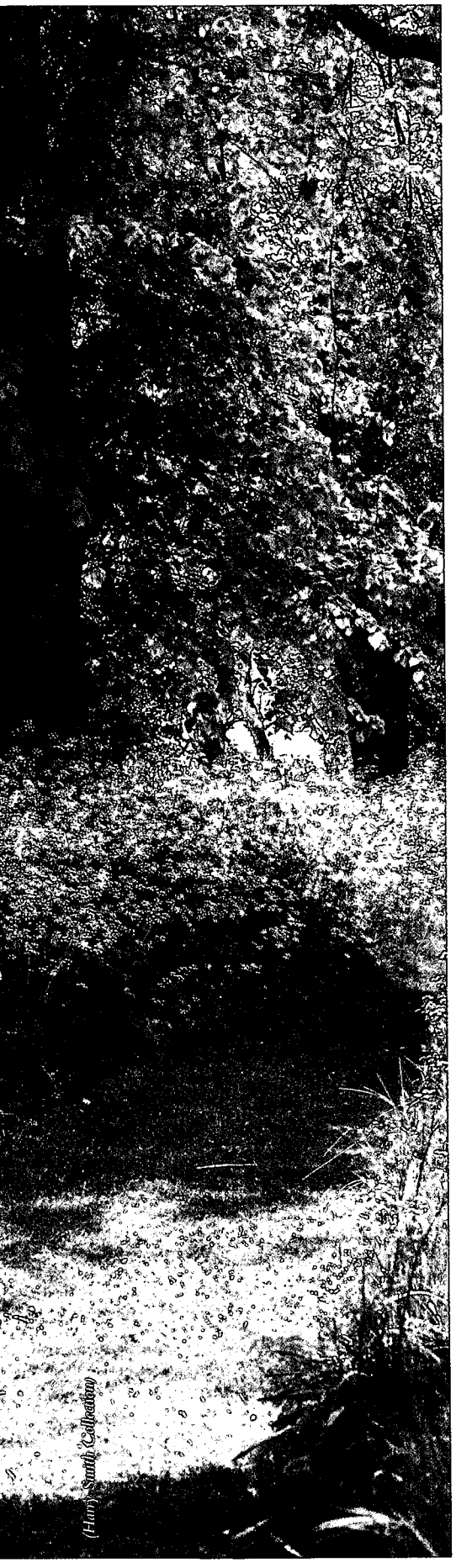
Activities based on hedges

Berries

- Watch birds feeding on berries and collate your observations. Which species of birds are involved? Do they show any preferences?
- Is there a sequence of ripening of berries on different shrubs?
- Is there evidence of berry seeds in droppings or regurgitated pellets? (Always wash your hands thoroughly after working with any such material.)
- Examine the structure of non-poisonous berries, and their seeds.
- Try to germinate and grow the seeds from berries in spring.

Invertebrates

- Collect invertebrates from the shrub layer and the lower branches of trees by 'beating'. Place or hold a collecting tray beneath the branch to be examined (a low, overhanging one is best). The tray can be a large piece of sheet or polythene or an upside-down open umbrella. Even a large sheet of newspaper will do.
- Shake the branch vigorously with short, jerky movements (you might want to wear a hat!). Some insects will fly away but many others, along with spiders, will fall on to the tray. They can be collected with a pooter, or tipped into a temporary container.
- Sort the catch - this will provide material for identification, comparison with other collecting sites, and for looking at adaptations, feeding and nutrition levels.



WOODLAND

Woods are the natural 'climax' vegetation for most of Britain. They mark the end of the slow succession of plants that begins with the first colonisers of open ground. Some wildlife (including birds like robins, blackbirds, blue tits and wrens) is really 'woodland' life adapted to the conditions of light, shade, moisture and shelter found there. Some birds, such as woodpeckers, nuthatches, treecreepers and pied flycatchers, have become so specialised that they can live nowhere else.

A small wood or copse planted in the school grounds can actively conserve part of our natural heritage. A woodland is not just 'trees', however. It is a whole community of particular plants and animals, dependent on the conditions created by the trees. Native trees provide the best support for native insects, birds and other animals. (Oak, the best, supports about 300 species.) Trees to choose for the school grounds include ash, beech, wild cherry, hornbeam, small-leaved lime and oak. Many of these are forest trees and become large. They should be planted at least twice their ultimate height from any building. They also create shade.

Smaller native trees which would be suitable include silver birch, field maple, hawthorn, holly, hazel, rowan, crab apple and whitebeam.

Non-native species tend to support less wildlife, including most conifers (except Scots pine), sycamore, horse chestnut and 'decorative' varieties of many species. Poplars, although some are native, are poor. Willows (excellent for craft material) and alder (good for birds) are damp-loving. Their roots seek water so plant them away from your drains.

NB Poisonous species, especially laburnum or yew, are not appropriate around a school.

Where to get your trees

Trees are expensive, so explore several sources. Tree-planting schemes are common and a local council, conservation or amenity group may provide trees as part of their scheme. This would also help school-community relations. The Forestry Commission can sometimes supply a number of very young trees. Otherwise, you may have to raise money to buy from a local nursery. You could try raising your own trees from seeds such as acorns, beech mast, hawthorn berries etc. Plant them in pots, then transfer to a nursery bed when large enough to handle. Later, they can be transferred to their final growing position.

Planting

A number of younger trees planted close together will grow better than a few older trees. They establish their roots and so make better progress. They should be planted about two metres apart and, ideally, the ground between should be mulched with chipped bark or leaf-mould to suppress weeds. Once they are established, you could underplant with shade-tolerant woodland plants. The trees will need plenty of water, particularly during their first summer, if they are to flourish.

Enhancing your woodland

Dead plant remains - leaves, twigs and wood - are vital components of a woodland. The animals that live here face conditions quite different from those living in the open. They play a major part in the breakdown of plant material, ultimately made available to plants again as nutrients in the soil.

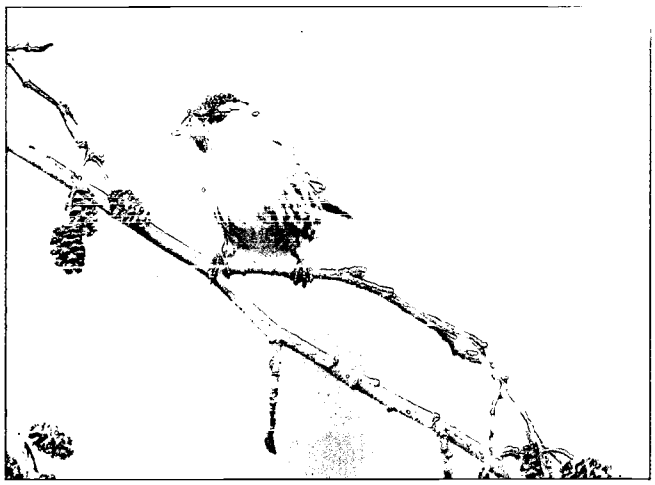
Accelerate the development of this community by adding material, particularly dead leaves and old logs, to the ground. It will greatly increase the possibilities for fieldwork on the invertebrate animals.

Woodland factors

Many of the environmental factors which characterise a woodland can be measured and compared with other habitats. They include light intensity, humidity, temperature, windspeed and exposure.

Trees and shrubs provide ideal situations for comparing development and stages of plant and animal life through the seasons.

Non-native trees could be planted to reflect the cultural backgrounds of the pupils in the school. However, these will not be so valuable to our native wildlife.



R Wilmshurst (FLPA)

Siskins are adapted to eat seeds of the alder tree.

(Eric & David Hosking)

Native trees provide endless study opportunities

A

Activities based on woodlands

Invertebrates

- Look for signs of leaves being eaten, or damaged - leaf miners, leaf rollers etc. Try to discover which invertebrates have done this.
- Look for plant galls, especially on young oaks and field maples. Discover something about the creatures that have caused them.
- Collect and examine invertebrates from the leaves by 'beating' (see pages 26 and 27). Which feed on leaves by eating the tissue or sucking sap? Which are predators? What might feed on them?
- On the ground, search for invertebrates in the leaf litter, or under logs where they will tend to congregate. (Replace logs with care.) How do they differ from invertebrates in the foliage? How do the conditions in which they live differ?
- What part do these invertebrates play in the decomposition process (and hence in the natural cycles in woodland)? Which feed on dead leaves or wood? Which are predators?
- Invertebrates, such as woodlice or ground beetles, found under logs can be carefully marked with a dab of paint to study movement. Marked animals can also be used to estimate populations by a capture and re-capture method.

Woodland birds

- What bird species are seen in your woodland?
- What can you see or deduce about their feeding? Are they feeding on invertebrates in the leaves or on the ground? Are they feeding on seeds or berries? Are they feeding on small mammals, amphibians or small birds?
- Many woodland birds nest naturally in tree holes. Which birds excavate their own and which find holes ready made? Could any of these be encouraged by setting up nestboxes (described on pages 14 and 15)? What is the importance of these animals in the life of the wood?

CASE STUDIES

Radipole School, Weymouth, Dorset

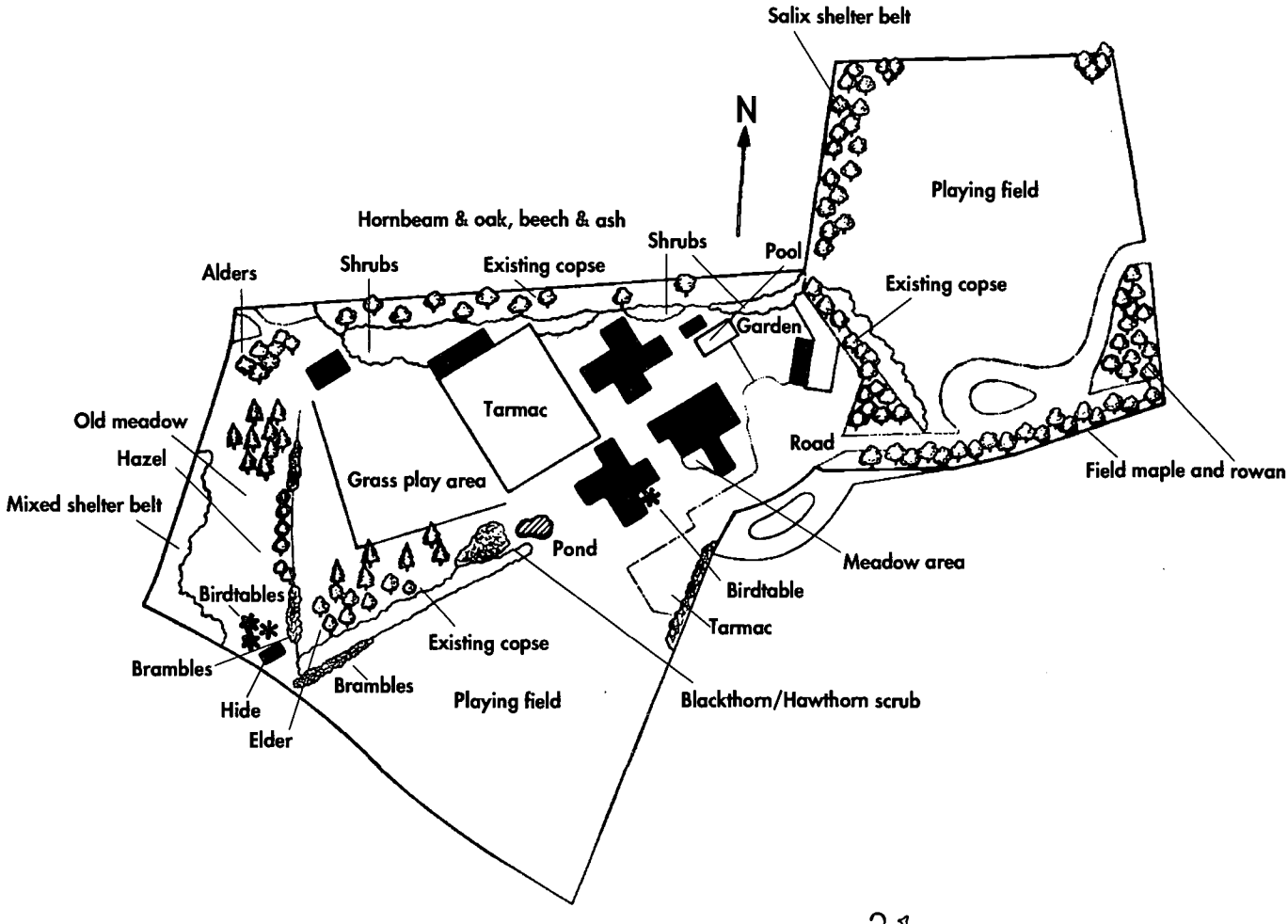
Radipole School is in a suburban area and, for more than 20 years, there has been a carefully planned scheme to improve the grounds for wildlife, and birds in particular.

Over 160 species of birds have been recorded here! The key to their success is the variety of habitats that were created. These include a linear copse; rank pasture; closely mown areas of lawn; several ponds; and more than 1,000 trees of 50 species. (Pupils are responsible for monitoring at least one tree each.)

The wildlife of the school's grounds is an important focus for curriculum studies and Environmental Education.

Birdtables in sight of classroom windows are used for collecting data on food preferences and for analysis in science and mathematics. A hide has also been constructed in a wildlife reserve area.

The strong involvement of children, parents, the local community and conservation organisations has been a major factor in maintaining interest and keeping vandalism down.



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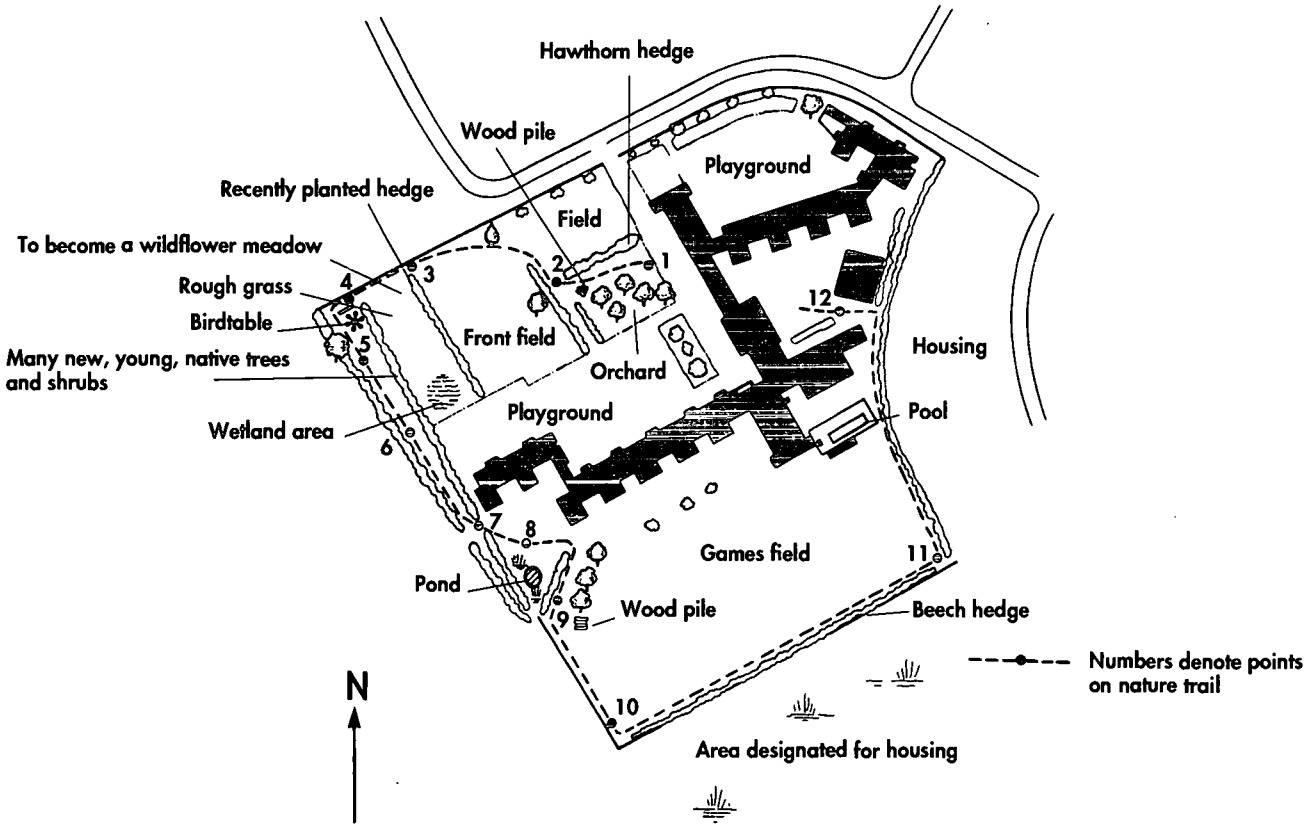
Rushmere Hall School, Ipswich, Suffolk



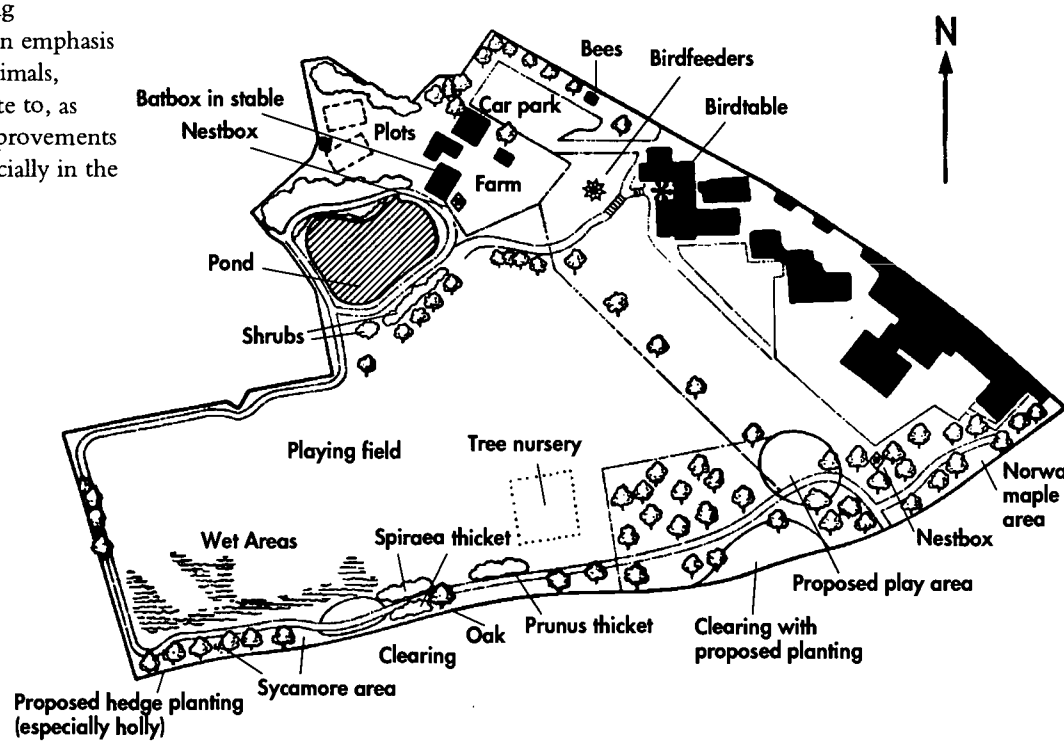
Emphasis on creating a pleasing school's grounds environment has a long history at Rushmere Hall. Indeed, the grounds won a design award during the Festival of Britain! In recent years, interest in the grounds revived when a bird club was established. This proved very popular with both parents and children. New habitats have been created and, with the help of a 'starter grant' from British Telecom, berry-bearing shrubs were planted to attract birds; a copse and meadowland are being planted; and a pond is being constructed.

A major feature is the nature trail linking different habitats. Numbered posts mark the trail and a leaflet guide is available. At post four, a wooden fence has been erected to provide a screen, with horizontal slats removed at child-eye height so they can watch birds feeding.

Curriculum activities are based on wildlife studies. These include a data bank of bird observations; mini-beast surveys using pit-fall traps; pond dipping; butterfly studies; grass and wildflower surveys; tree surveys (maths work here); and mapping.

Uffculme School, Moseley, Birmingham

This is a special school in a very built-up area. Because of the special needs of children with severe learning difficulties, there has been an emphasis on introducing domestic animals, which the children can relate to, as well as wildlife. Various improvements have been carried out, especially in the last five years.



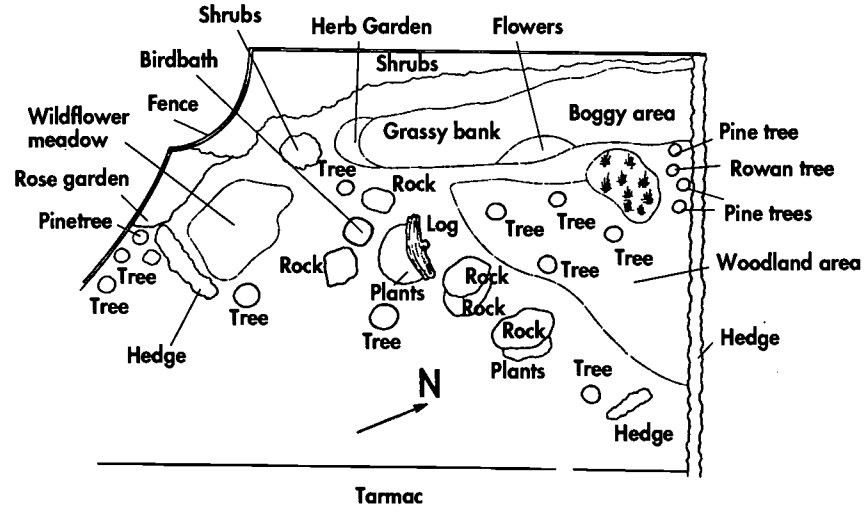
Westerton School, Aberdeen

An objective of this urban school is to create an environment that is attractive to wildlife of many kinds. In 1988, a variety of native broad-leaved trees were planted, as well as flowering and berry-bearing shrubs - buddleia for butterflies and other insects; and cotoneaster and honeysuckle for birds.

Once the trees and shrubs were established, pupils planned and planted the seeds for a wildflower meadow. Large boulders and a tree trunk were supplied by the local council.

Other features, also planned and created by the pupils, include: a bog area; drinking and bathing pools for birds; nestboxes; bird feeding areas.

The number and variety of insects and birds attracted into the school grounds has increased markedly. This is a great benefit for curriculum work, especially in biology and environmental studies, and pupils help to maintain the areas and study wildlife.



Pinewood School, Farnborough, Hampshire

This school is located on the fringes of a large, modern housing estate and has included a variety of useful features. At the heart of the school is a courtyard. This has been transformed into a science garden with a pond, birdbath, feeding tables and nestboxes. Containers are used by the children to grow a variety of plants, especially those that attract insects. Elsewhere in the grounds, habitats like woodland glades and meadowland have been created and they are used by a variety of insects and birds.

All classes are equipped with binoculars and tape recorders to help with bird studies and other wildlife investigations. Much of the work is carried out on a cross-curricular basis, providing opportunities for work with art, language and mathematics, as well as science and using computers for word processing and graphical representation of data.

Children, parents and school governors were all involved in implementing the scheme.

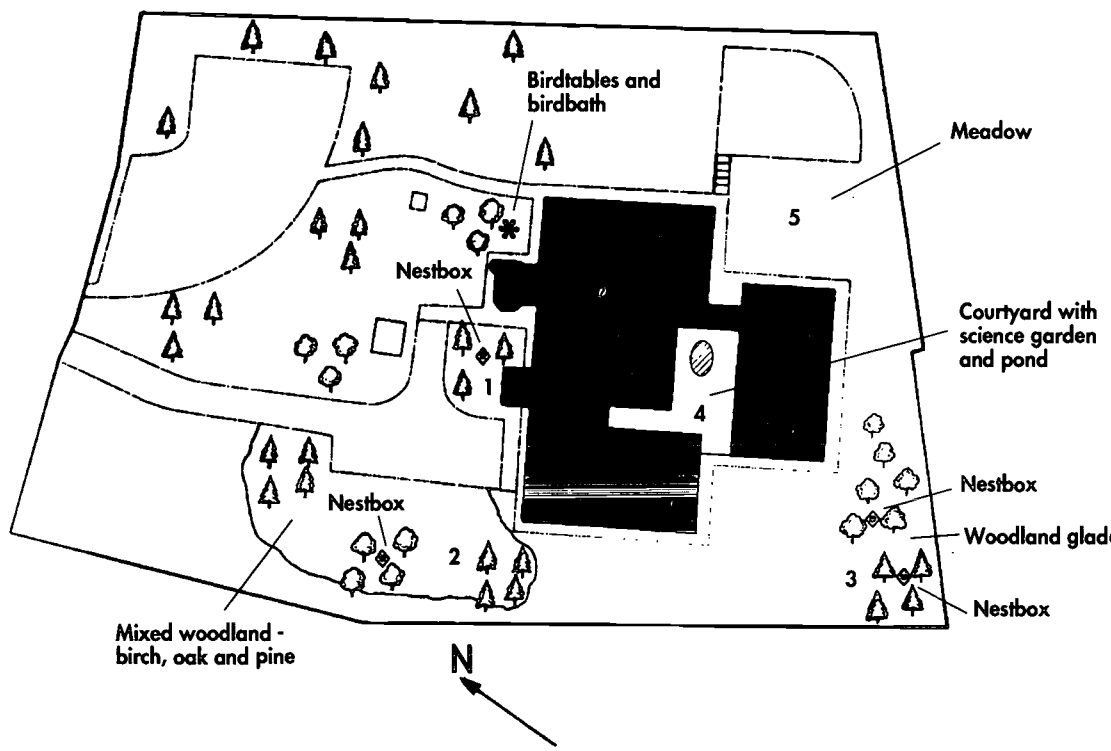
1. Nestbox used by great tits.

2. Mixed silver birches, pines and oaks. Often visited by jays, woodpeckers and blue tits.

3. Woodland glade: middle area cleared and bark chippings placed as a surface. Parents, staff and governors all helped with the clearing. Nestboxes sited July 1990. One used by nesting blue tits in spring 1991.

4. Science garden: provides growing areas for a variety of plants for the classes and a secure place for teaching. Lots of food is provided for birds and insects. Area includes birdtables, birdbath and a pond.

5. Meadow land: visited frequently by many species of birds.



RESOURCES

For immediate information on resources for Environmental Education and school nature areas, schools can access NERIS (National Educational Resources Information Service). This provides an on-line package and a CD-ROM service to schools. For further information, please ring their Helpline on 0525 290364.

Books:

School grounds

Using School Grounds as an Educational Resource, by Kirsty Young. Published by Learning Through Landscapes.
The Outdoor Classroom. Published by DES.
Ecology in School Grounds, by Rupert Booth. Published by LTL.
Science in School Grounds, by Gill Thomas. Published by LTL.

Wildlife Gardening

Wildlife Gardening, by Fran Hill. Published by the Derbyshire Wildlife Trust.
Creating School Wildlife Areas. Published by Wakefield Groundwork.
How to make a Wildlife Garden, by C Baines. Published by Elm Tree Books/ Hamish Hamilton Limited.
Creating a Wildlife Garden, by Bob and Liz Gibbons. Published by Hamlyn.
The Garden Bird Book, by David Glue. Published by Macmillan.

Buildings and Hard Areas

The New Bird Table Book, by Tony Soper. Published by David & Charles.
Nestboxes, by Chris Du Feu. Published by the British Trust for Ornithology.
RSPB Bird Feeder Handbook, by Robert Burton. Published by Dorling Kindersley.

Ponds

Collins Field Guide to Freshwater Life, by R Fitter and R Manuel. Published by Collins.
Pond Life - Collins Gem Guide, by R Manuel and C Shields.
Observer's Book of Pond Life, by J Clegg. Published by Warne.
Clue Books - Freshwater Animals, by G Allen and J Denslow. Published by Oxford University Press.
Young Specialist looks at Pond Life, by W Engelhardt. Published by Burke.
Urban Spaces Scheme - Pond Snack Pack, by G L Charles. Published by ILEA.
Life in Ponds - Althea's Nature. Published by Dinosaur Press.
Pond Design for Schools, by G Flatt. Published by LTL/Wheaton.

Insects and other Invertebrates

Butterflies in school grounds, by Dr John Feltwell. Published by LTL.
Slugs, Snails and Earthworms, by Dr John Feltwell. Published by LTL.
Wildlife Gardening, by Jennifer Owen.
A Field Guide to the Insects, by Michael Chinery. Published by Collins.
Clue Books - Insects. Published by Oxford University Press.

Hedges and Woodland

Hedges, by Pollard, Hooper and Moore. Published by Collins ('New Naturalist').
Discovering Hedgerows, by Streeter and Richardson. Published by BBC Publications.
Exploring Woodlands, by Tony Pearce. Published by LTL.

Birds

The RSPB Book of British Birds, by P Holden, JTR Sharrock & H Burn. Published by Macmillan.
Spotters' Guide to Birds, by P Holden. Published by Usborne.
The Complete Book of British Birds. Published by AA/RSPB.

RSPB Curriculum Guides

Titles include:
Birds in Primary Science
Birds in Mathematics
Birds in Art and Craft
Hedges
Environmental Education - the Vital Link

Computer programs:

Looking at Nature - Make a wildlife garden. BBC Soft Publications.
Pond Study Pack. Mercury Music Company Limited.
Bird Spy. BBC Soft Publications.

Grants:

A number of organisations and trusts provide grants and awards for improvements to the school grounds:
Grassroot Action Scheme. Social Policy Unit, British Gas plc, Rivermill House, 152 Grosvenor Road, London SW1V 3JL. Community award scheme for young people involved in greening the community. Schools are eligible.
Countryside Commission. Ask for leaflets cc211/cc219 available from Publications Dispatch Department, 19/ 23 Albert Road, Manchester M19 2EQ Tel: 061 833 0316.
Shell Better Britain Campaign. Red House, Hill Lane, Great Barr, Birmingham B34 6LZ.
English Nature School Grants Scheme. Ten grants per year, per county. Schemes must give benefit to wildlife and children must be involved in all stages. Action File and application form available from P O Box 300, Peterborough PE1 5TQ.
Pondwatch. c/o The Wildfowl and Wetlands Trust, Slimbridge, Gloucestershire. Awards of up to £1,000 for outstanding ponds.
Education Industry Partnership Awards. Schools can apply for grants to develop curriculum projects. Contact The Centre for the Study of Comprehensive Schools, The Queens Building, University of Leicester, Barrack Road, Northampton NN2 6AF.
The Prince of Wales Committee. (For Wales only.) Provides advice supported by grant aid, and an Award Scheme for projects which improve the Welsh environment. Contact: Head Office, 4th Floor, Empire House, Mount Stuart Square, Cardiff CF1 6DM.

Videos:

Making the best of your school grounds (approx 24 minutes). LTL.
Wake up to Birds (approx 22 minutes). Training for primary teachers. RSPB.
Gardening - Strictly for the Birds. RSPB.

RSPB Teaching Resources:

Full details of RSPB resources for teachers and where to find our Regional Educational Advisers are in the RSPB Teaching Resources pack. This is FREE from:
RSPB, The Lodge, Sandy, Bedfordshire SG19 2DL.

THE RSPB AND THE LTL

The Royal Society for the Protection of Birds, Europe's largest wildlife conservation charity, is supported by over 850,000 members, including more than 120,000 in its junior section, the Young Ornithologists' Club.

We are committed to Environmental Education as an entitlement for all pupils within the school curriculum. This will provide the vital link between people understanding the environment and taking effective action for its conservation.

We provide a professional advisory service to teachers and local education authorities and we produce a wide range of educational resources. Field teaching programmes are available to schools on many RSPB nature reserves.

The RSPB is *the* charity that takes action for wild birds and the environment. For more information and membership details, please write to the appropriate address:

England: RSPB, The Lodge, Sandy, Bedfordshire SG19 2DL.
Scotland: RSPB Scottish Headquarters, 17 Regent Terrace, Edinburgh EH7 5BN.
Northern Ireland: RSPB Northern Ireland Office, Belvoir Park Forest, Belfast BT8 4QT.
Wales: RSPB Wales Office, Bryn Aderyn, The Bank, Newtown, Powys SY16 2AB.

The Learning Through Landscapes Trust is the only national charity concerned with all aspects of school grounds.

With teachers, pupils and a wide variety of local and national groups, LTL is committed to improving the quality of the outside of all schools. It believes that improvements can only be sustained if pupils are directly involved in decisions about the land in which they spend so much of their time. LTL promotes the fullest possible educational use of school grounds in the UK and Europe.

The Trust provides a range of publications and services for schools, local authorities and any individual or organisation interested in this work.

LTL, Third Floor, Southside Offices, The Law Courts, Winchester SO33 9DL.

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