CurriculumVisions 2B Science@School

Plants and animals

Teacher's Guide CD

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Curriculum Visions

A CVP Teacher's Guide

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Introduction

The pupil's book

The Key stage 1 Science@School series is a series of twelve books. Each one addresses one of the QCA units in the Key Stage 1 science curriculum.

Each spread in the book addresses one or more objectives in a QCA unit by providing photographs, simple text and questions to stimulate discussion.

Each book has an illustrated glossary and a simple index for finding information.

The teacher's guide

It may be that you already have a scheme of work and wish to use the books to support it. Alternatively you could use the books, this CD ROM and the **CurriculumVisions.com** web site, which provides support material in the form of extra text (with audio option), pictures, captions, activities and demonstration videos to build a new scheme. Whichever way you choose, the notes in this teacher's guide have been set out as if you were using each page or spread as the basis for a lesson. You may follow each set of notes in their entirety to build up your lesson or take parts of the notes to fit into your scheme.

The teacher's notes contain information about practical work. You should check your school policies on practical science work and only select activities for which you are confident to take responsibility.

The book *Be Safe!* published by the ASE (ISBN 978–0–86357–324–8) provides useful guidance on carrying out science activities.

The structure of the notes

The notes for each page or spread follow the same structure, which is outlined here.

Objectives

These may be linked to the QCA objectives or build on them to enrich the topic.

Resources and preparation

Suggestions may be made for building on the visual display of the books with posters and models.

There are also pictures (aka flashcards) at the end of the notes to each lesson, which may be printed off and used as triggers to start the lesson or used in the plenary as revision. When the pictures have been used they could be displayed on a wall and others added as the subsequent lessons are completed. This will make a colourful summary of the work which could be used as a final revision resource when the book is completed.

If you are using the **CurriculumVisions.com** web site log in, go to Science, Year 2, Unit 2B Plants and animals.

There may be some suggestions for building practical work into the use of the pages in the book and these include a list of requirements (simple, readily available materials) and advice on preparing the requirements for use in the lesson.

Introduction

Starting the lesson

Each lesson begins with a short activity, which helps settle the children and focus them on the work ahead.

Activities with the page

These may be reading activities, observing and discussing the pictures or answering a question. There may also be practical activities which are designed to develop a range of practical science skills from making observations to carrying out fair tests.

Differentiation

There are suggestions for providing help and activities for children of different abilities.

Assessment

There are suggestions for assessing the children's work. There are three assessments for you to print off at the end of this guide. These are for use with lesson 1 (page 59), lesson 2 (page 61), lesson 4 (page 63) and lessons 6 and 7 (page 65) or you could use all four together as an end of unit test. Guidance for the answers is given in the assessment section of the lesson notes.

Plenary

The work done in the lesson is reviewed in this section and there may be a further activity to help secure the children's knowledge.

Outcomes

These may be linked to the QCA objectives or build on them to enrich the topic.

1

Teacher's sheet

2B

Plants and animals

Objectives

- To know that there are different kinds of plants in the immediate environment.
- To know that there are different kinds of animals in the immediate environment.
- To fill in a table.
- To practice good hygiene after handling soil.

Resources and preparation

Survey the immediate environment of the school. Check that dogs are not allowed in the school grounds to foul the soil, lay out some small planks, old rotten logs and old plant pots a few days before the lesson. Photocopies of the survey sheet at the end of the guide (page 59). Teacher helpers. A photograph of a humming bird (see flashcards).

Starting the lesson

Ask the children what kinds of plants they might expect to find outside. Record their answers on the board and make sure that they mention grass, trees, bushes, moss, ferns. They may also mention specific plants such as holly. Ask the children what kinds of animal they might expect to find outside. And record these answers too. Make sure they mention slugs, snails, earthworms, woodlice, beetles, spiders, flies, birds. Issue the sheet and let the children compare the words on the board with the words on the sheet. Let them fill in any extra words on the board. If there are more than three allocate the names among the children. Let the children explore the school grounds with you and your helpers and tick the yes or no columns as appropriate. When the children have completed their work outdoors make sure they wash their hands (reminding them of their work on germs) before they begin their work in the classroom. Let the children compare their results.

Activities with pages 4 and 5

- Read the opening line and ask what it could mean. Look for an answer about animals needing plants to shelter in. Be prepared for someone mentioning that plants need bees to spread pollen.
- Look at the picture of the daisies with the children and ask where they may find them and look for an answer about a lawn or a garden.
- Read the first paragraph with the children and ask them which parts of the plants they saw when they were outside. Look for answers about leaves and stems if they venture out in late autumn or winter.
- Read the second paragraph and point out that many people call plants flowers such as wild flowers or woodland flowers. The children

should remember that these are really plants and have roots, stems and leaves as well as flowers. Look at the picture of the beech trees. Remind the children that trees are plants and that there are different kinds. Ask the children if they can think of the names of different kinds of trees. Look for oak, holly and conker (horse chestnut).

- Read the last line on page 4 with the children and ask them if they can think of any animals that eat plants. Look for farm animals in their answers.
- Read the paragraph on page 5 with the children. If the children found any slugs on their excursion ask them what the slugs were doing. Move to the picture at the bottom of the page and read the caption with the children. If the children kept slugs in lesson 10 when studying Science@School 1A Ourselves they may wish to tell you about it.
- Move to the picture of the ants and read the caption. Be prepared for stories about ants invading a picnic!
- If someone mentioned about bees earlier return to it now and talk about how bees move pollen. Show the children a picture of a humming bird, which lives in rainforests and feeds on flowers and carries pollen between them. You may tell them that the humming bird is unusual because it can fly backwards! Tell the children that birds with muddy feet, like ducks and geese can pick up seeds in the mud and carry them on their feet.
- Look at the picture of the osprey and read the caption. Ask the children how they might find out more about the osprey and look for an answer about looking in the glossary. Let them look up osprey on page 22. Ask the children if they know of any other birds that nest in trees and guide them to crows and rooks. Tell them they will also meet another very large bird that nests in trees a little later in the book.

Differentiation

Ask the children to draw an imaginary place with plants and animals in it. They must label the plants and animals they draw. Less confident learners will need help thinking about what to draw and spelling the labels. More confident learners could look at books about rainforests and base their drawings on what they find.

Assessment

The children can be assessed on the detail in their drawings and the presentation of their work.

Plenary

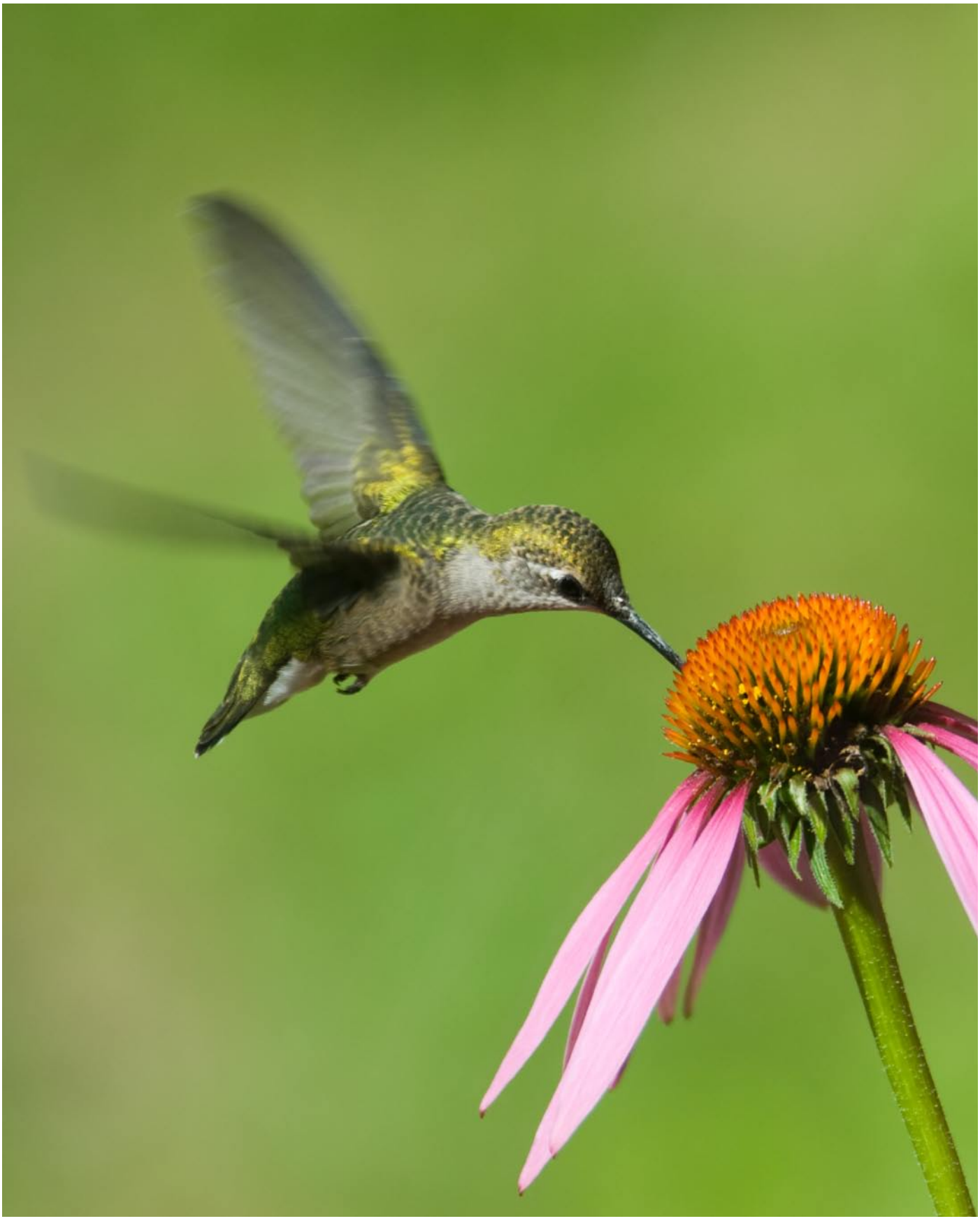
Let the children display their imaginary places and talk about what they would find in them. Review by saying that we have been talking about plants and animals then ask them to answer the question on page 5. Guide them to look on page 4 for the sentence about plants growing in the ground and the sentence on page 5 about animals moving around.

Teacher's sheet

Outcomes

The children:

- Know that there are different kinds of plants in the immediate environment.
- Know that there are different kinds of animals in the immediate environment.
- Can fill in a table.
- Can remember to wash their hands after handling soil.



2

Teacher's sheet

2B

Life in a park

Objectives

- To know that a habitat is a place where plants and animals are found.
- To know that there are different habitats around us.
- To predict the living things that might be found in a habitat.
- To record a habitat by making a drawing.

Resources and preparation

A preliminary visit to a local park to plan a route round the park to take in its key features which might include, a band stand, a memorial, a fountain and a play area. If the park has a pond or lake you may like to take this in and use the observations there in lesson 4 'The pond'. The visit must be planned in accordance with school policies. Adult helpers. A large shallow bowl about 22 cm x 16 cm with damp paper towel in the bottom. A card to cover half the top of the bowl. A jar of damp leaf mould containing woodlice collected from under a rotten log or damp stones. Secondary sources on wildlife and plants found in parks. A large picture of a fox (see flashcards).

Starting the lesson

Ask the children if they have been to a park. Tell the children that they are going to visit a park but before they go, they are going to predict what they might find there. Write down their answers on a board and make up a table on your computer similar to the one provided for lesson 1 at the end of this guide. Take the children on the visit and when they get back let them make a drawing of the park and label it. They should mark the places where they found particular plants and animals.

Activities with pages 6 and 7

- Read the introductory line with the children. Ask the children what they think the word 'wildlife' means then let them check their ideas by looking it up in the glossary on page 23.
- Look at the top picture and read the caption. Ask the children which parts of a park in the picture have been specially grown. Look for an answer about the flowers and the trees.
- Read the line about grass and look at the second picture and the caption. Ask the children to look back at their maps and show you where grass was growing in the park. They should conclude that their observations confirm the information in the book.
- Read the final paragraph on page 6 and ask the children to describe a flower bed. Let them check their answers by looking it up in the glossary on page 22. Ask the children to check their maps to see if they have drawn groups of trees as suggested in the text.

Teacher's sheet

- Move on to page 7 and let the children look at the pictures and read the captions. Let them find out more about insects, spiders and woodlice by using the glossary. As the park visit was probably made in winter the children may have seen spider's webs and woodlice but butterflies will not have been present. Ask the children when they might see butterflies and look for an answer about summer. Tell the children that there were probably some butterflies in the park but if they saw them they would not recognise them and explain that they will find out why this was so later in the book.
- Read the first paragraph on page 7 with the children and let them comment on the wildlife that they found.
- Move on to the last paragraph and ask the children to describe the appearance of a fox. Show them a picture of a fox to check their answers.
- Ask the children what it would be like for the woodlice living under the rotting branches and look for an answer about it being dark. Ask the children what would happen if you had some woodlice and you put them in the light but there was a dark place nearby. Look for an answer about the woodlice going into the dark place. Gather the children round the bowl and pour out the jar of woodlice into it. Remove the leaf mould so the woodlice can be seen clearly and cannot hide under it. Ask the children how they could test their idea and look for an answer about covering half the top to make it dark. Put the card in place and leave the bowl for a quarter of an hour.
- Let the children look at the bowl of woodlice and discover that probably all have settled in the dark place. Tell the children that when scientists make experiments they repeat them to check so move the card to the other side of the bowl, ask the children to make a prediction and leave for another quarter of an hour. The woodlice should move back under the card.

Differentiation

Less confident learners will need help in constructing the picture of the park. They could start by drawing something that was in the middle of the park or the gate and move out from there. More confident learners could use other secondary sources to find out about some of the wildlife and plants they found and provide extra information about them with their map.

Assessment

The children can be assessed on the detail and quality of their maps and on their enthusiasm to explore the park. There is an assessment sheet at the end of the guide (page 61).

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Answer guidance

The correct sentences are 1, 3, 5, 6, 9, 10. The correct versions of the other sentences are 2 – Spiders have eight legs, 4 – Insects have six legs, 7 – Spiders weave webs in bushes, 8 – Woodlice are not the largest animals in the park. (Foxes, humans are.)

Plenary

Begin by letting the children answer the question on page 7 and conclude that plants are easier to see. Ask them if their predictions about the animals living in the park were correct. Ask them if they found any animals in the park that did not live in the school grounds. Remind the children, by way of the woodlouse experiment, that animals choose places to live because the places have the things the animals need. You could extend this idea to say that plants only live in places where they have everything they need and could conclude that a place where animals and plants live is called a habitat.

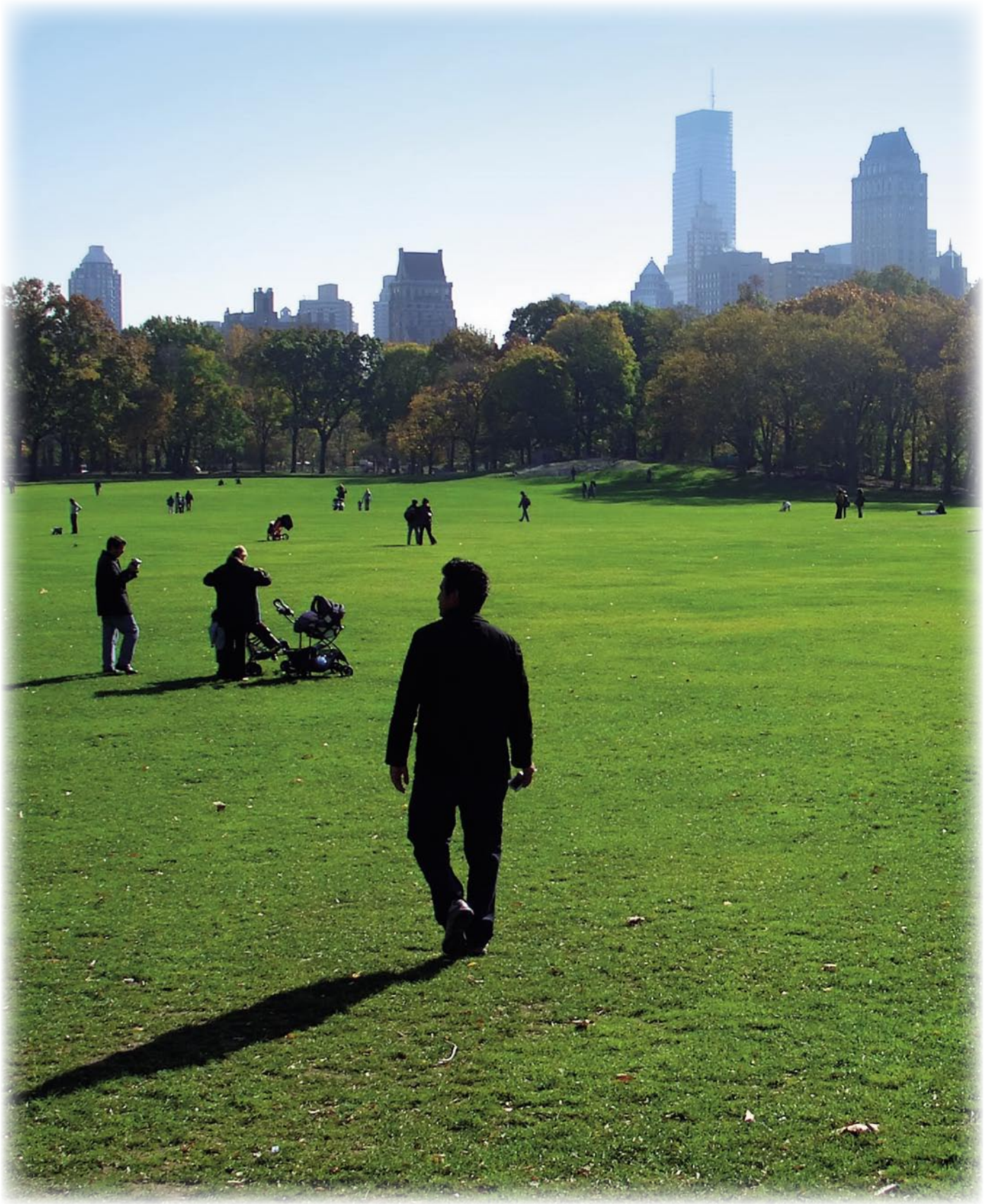
Note

For the next lesson you may like to move to Lesson 9 based on pages 20 and 21 in the pupil's book and consider the life cycle of the butterfly before continuing to lesson 3.

Outcomes

The children:

- Know that a habitat is a place where plants and animals are found.
- Know that there are different habitats around us.
- Can predict the living things that might be found in a habitat.
- Can record a habitat by making a drawing in the form of a simple map.



3

Teacher's sheet

2B

Under a tree

Objectives

- To know that a tree affects the conditions around it.
- To know the ground under a tree may be different from other ground close by.
- To make drawings of animals found in a habitat.
- To predict an arrangement of earthworm burrows.

Resources and preparation

Examine trees and bushes in the school grounds to find places where it is too dry or dark for other plants to grow. Arrange for teacher helpers to assist you in taking the children to look at these places. A trowel and plastic bag to scrape up some leaves and dig up some soil from around the tree (only if there is no danger of dogs fouling the soil). A large shallow tray. Secondary sources about animals found in soil and leaf litter. A clean plastic sweet jar, a sample of damp soil to fill two thirds of it from an area safe from fouling by dogs, half a dozen earthworms, some leaves from the tree, brown paper, cling film, a pin, sticky paper, scissors.

Starting the lesson

Ask the children what they know about trees. They should begin with the tree being a plant and having woody roots stem and branches. They may say that some trees are in leaf all year round while others grow leaves in the spring and lose them in the autumn. The discussion does not need to be too detailed as the children look at broadleaved trees and conifers in more detail in Science@School 2C Variation. Ask the children about how people use trees. They may talk about the uses of wood but steer them onto their observations in the park about planting the trees to make the park look attractive, to provide shade so they can sit under them in the summer. Move on to people sheltering under trees in the rain and look for answers about it being drier under a tree.

Activities with pages 8 and 9

- Read the introductory sentence with the children and remind them that they had discussed this at the start of the lesson.
- Read the first paragraph with the children and ask them why the plants will not grow there. Look for an answer about plants needing light to survive and there is too little light for most plants.
- Read the second paragraph and remind the children that they had said it was dry under the tree because the leaves stopped the rain reaching the ground under the tree. The leaves deflected the rain to the ground around the tree. Here in this text it says that the roots take up the water in the soil too.

3 Teacher's sheet 2B

- Look at the picture with the children and point out the large roots. Tell them that the large roots take up large amounts of water and this is what makes the soil dry.
- If there are trees in the school grounds take the children out to look at the areas underneath them. Some trees with high branches may have plants growing beneath them but some with lower branches and especially bushes may have areas of bare soil around them. If possible make a collection of leaves and soil from under a tree or bush.
- Move on to page 9 and read the paragraph with the children. Let them look at the pictures and read the captions.
- Ask the children to answer the question on page 9 and look for answers mentioning the lack of light and water.
- Pour out the sample you have collected into a tray and look for beetles or woodlice crawling away, millipedes curled up, earthworms, slugs and snails. You may even find the pupa (equivalent to the chrysalis in butterflies) of beetles, moths and crane flies. Let the children look at the animals then gather everything together and return the sample to the tree or bush.
- The children could draw the animals that are found in the soil from observing the real animals and from photographs.
- Ask the children how they could find out about earthworms moving around in the soil. Look for answers about digging them up and watching them, then show them the sweet jar and ask how this could help them. Look for an answer about putting soil and the earthworms in the jar. Tell the children that earthworms do not like light so how could you get them to make burrows close to the sides so you could see them in the burrows? Look for an answer about covering the sides of the jar with paper.
- Put the soil and earthworms in the jar. Add the leaves to the surface, cover the top with cling film and make a few small holes in it with the pin. Let the children see the sides and the absence of burrows then wrap the paper around the jar and secure it with sticky paper. Tell the children that the jar must be left for a few days before the paper is removed. The children could look daily at the top of the soil to see if any leaves have been pulled down by the earthworms.
- Ask the children to make a drawing of how they think the burrows may look when the paper is removed.

Differentiation

Less confident learners may need help in looking closely and making a drawing with details. More confident learners could use secondary sources to find out more information about the animals and to produce a simple written account to accompany their drawing.

Teacher's sheet

Assessment

The children can be assessed on the quality of their drawings and their accuracy of predictions about the earthworm burrows.

Plenary

You may like to postpone the plenary until the paper is ready to be removed from the jar. Begin by reviewing the conditions under the tree, the absence of plants and the animals that were found there. Let the children take out their drawings of how they think the earthworm burrows would look and then remove the paper and let them compare their ideas with what they see. Some burrows may be close to the sides and have earthworms in them.

Outcomes

The children:

- Know that a tree affects the conditions around it.
- Know the ground under a tree may be different from other ground close by.
- Can make drawings of animals found in a habitat.
- Can predict an arrangement of earthworm burrows.

Teacher's sheet

The pond

Objectives

- To know that some plants grow in ponds.
- To know that some animals live in, on or around ponds.
- To sequence events in words and pictures.

Resources and preparation

An aquarium tank, gravel, water jug (you may wish to pour the water from one jug to another a few times to allow chlorine to escape before adding the water to the tank). Canadian pond weed, pond snail and water fleas (daphnia) from an aquarist's shop. Magnifying glasses. Secondary sources providing pictures of pond life mentioned in the plenary.

Starting the lesson

Ask the children what they know about ponds. Look for an answer about them being small places where there is water that could be deep. Emphasise that ponds should be approached with caution and care taken not to slip into one. Ask the children if anything lives in a pond and expect an answer about frogs and fish.

Activities with pages 10 and 11

- Read the introductory sentence and comment that people tend to think of animals when they think of ponds and don't realise that ponds are places for plants too.
- Read the paragraph with the children and then look at the picture and read the caption and labels.
- Tell the children that pond plants die if the pond dries out and that the duckweed is a tiny plant, which grows on the surface of the water and has a small root that just dips below the water surface.
- Tell the children that you are going to set up a miniature pond and show them the aquarium tank and gravel. Pour in water until the tank is about three quarters full. Add the pondweed.
- Move on to page 11 and read the paragraph with the children. Look at the top picture and read the caption. Tell the children that this is the large bird you told them about in lesson 1 and it is almost as tall as them. Ask the children why they think the heron has got long legs and look for an answer about wading about in the water. Ask them to describe its beak. Tell them it uses its beak as a spear and ask them what it might catch. Look for an answer about fish and frogs.

Teacher's sheet

- Look at the picture of the fish and ask how the lily pads may help them. Look for an answer about hiding the fish from the heron.
- Let the children look at the pond skater and read the caption. Tell the children that the pond skater does not sink into the water because the water behaves as if it has a thin, delicate skin. The pond skater is so light in weight that it can rest on the surface without going through it. Put the soup bowl of water on the table and let the water settle. Take the pin and put it across the prongs of a fork and then lower it very slowly and carefully into the water. As the prongs go under water the pin should rest on the surface. You should be able to remove the fork and let the pin move about on the surface.
- Let the children look at the dragonfly and read the caption. Tell them that the dragonfly takes other insects on the wing by flying up to them, stretching out its front legs and grabbing them and then pulling them into its jaws. The young dragonfly is not a caterpillar but a small version of the adult without the wings and is called a nymph. It lives in the water and has a special part to its mouth. Put your right hand, palm downwards under your chin to show where this part, called the mask is located. Tell the children that when the dragonfly nymph sees a tadpole or a small fish it shoots out its mask, grabs it and pulls it back to its mouth. You could mime this movement and let the children try it too.
- Move on to the pond snail and show the children the snails you have bought then put them in the tank.
- Tell the children that there are many small animals that live in ponds that can hardly be seen. Put some of the daphnia in the bowl of water and let the children look at them. Issue magnifying glasses so the children can take a closer look.
- Put all the daphnia in the tank and let the children use their magnifying glasses to see them.
- Ask the children to write and draw about setting up a miniature pond in the classroom. They could draw the tank and write a step by step account of how the "pond" was set up.

Differentiation

Less confident learners may need help with the sequencing of the events in making the "pond". More confident learners could draw a picture for each event in the sequence.

Assessment

The children can be assessed on their accounts of making the "pond". There is an assessment sheet at the end of the guide (page 63).

Answer guidance

2, 4, 5, 8, 9.

eg, Heron, duck.

Teacher's sheet

Plenary

Ask the children to answer the question on page 11. After they have mentioned the animals on the page they could mention frogs, toads, newts. Others that you could mention are leech, water mite, great diving beetle, water spider, pond mussel, water boatman, water scorpion and show them pictures of the animals.

Outcomes

The children:

- Know that some plants grow in ponds.
- Know that some animals live in, on or around ponds.
- To sequence events in words and pictures.

5

Teacher's sheet

2B

The rock pool

Objectives

- To know that sea water is salty.
- To know that the tides flow over a rock pool.
- To be able to recognise some sea creatures.
- To know that rock pool plants have to grip tight to hold on.
- To use a range of materials to make a model rock pool.

Resources and preparation

Two clear plastic cups of water, two shallow black plastic trays as used in packaging of meat slices at supermarkets, a container of salt, a teaspoon, a strip of polythene about 40 cm by 6 cm, four pipe cleaners, a strip of bubble wrap 40 cm by 6 cm, a large bowl of water.

Starting the lesson

Remind the children of their work in Science@School 2A Health and growth by asking them what does the body need to take in besides food. Look for an answer about water. Show the children a cup of water and tell them that you would have no problem drinking it. Now bring the second cup forwards and tell the children that most of the Earth is covered in a different kind of water and put two teaspoonfuls of salt in it. Tell the children that if you drank only this kind of water it would eventually kill you.

Ask the children where you might find this water and look for an answer about the sea.

Tell the children that you are going to try an experiment and pour a few drops of fresh water into one tray and the same number of drops of salty water into the second tray. Ask the children what might happen when you left the drops alone for a long time. Look for an answer about drying up. Ask the children if they thought both water samples would dry up in the same way. Look for anyone predicting the salt will stay behind then leave the sample for a few days to test the prediction. The salt will stay behind because it cannot change into a gas (water vapour) as water can.

Ask the children about their adventures on the shore and be prepared for stories of jellyfish. Tell them that there are two kinds of habitat on the shore – the sandy beach and the rocky shore and they are going to look at the rocky shore.

Activities with pages 12 and 13

- Read the introductory sentences and remind the children about the salty water you have just made. Ask them what would happen if you put a few spoonfuls of salt in the miniature pond you set up in the last lesson to make it more like a rock pool and look for an answer about the plants and animals dying.

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- Look at the picture with the children and read the caption and labels. Ask the children to look up sea anemone in the glossary and tell them that sea anemones sting fish with their many tentacles and then haul them into their mouths which are at the centre on the top. The mouth of the large sea anemone can be clearly seen with the ring of tentacles around it.
- Move on to page 13 and read the first paragraph. Ask the children what it would be like if the water changed in the pond twice a day. Mime emptying half of it out (as the tide goes out) and pouring more salty water in (as the tide comes in).
- Read the second paragraph and say what you might expect to happen to the seaweed as the tide comes in and out. Look for an answer about being broken up and being washed away but tell the children that this does not happen. Show them the strip of polythene and say that many seaweeds are like this which means they are difficult to break up. Tell them that the seaweeds grow root like structures called holdfasts which do just that. They grip the rocks and stop the seaweed being washed away. Twist four pipe cleaners together and then splay one end to make four strands. Bend these round a rock or pebble to show how they can hold on. Real holdfasts also grow into the rock surface to make an even stronger grip. You could attach the pipe cleaners to the polythene strip to make a model seaweed.
- Ask the children if they know anything else about seaweed. They may reply that it is slippery and slimy. You can tell them that this is to stop them from drying out when the tide goes out. Probe their minds a little more and see if any tell you about popping the swellings on some of the seaweeds. Tell the children that the swellings are called bladders and one seaweed with lots of bladders is called bladderwrack. When the tide comes in some seaweeds are under deep water and the light cannot reach them so they have the bladders to make them float up nearer to the light to survive. Ask the children if they can think of any material a bit like the polythene that they could use to be bladderwrack. Look for an answer about bubble wrap and produce the strip and bowl.
- Ask the children how they could see if the bladders did make the seaweed float better than a piece of seaweed without bladders and steer them to consider immersing the polythene strip and the bubble wrap strip in water and comparing their floating ability. Let some children try the fair test and draw a conclusion for the class.
- Move on to the third and fourth paragraphs and read them with the children, then let them look at the pictures and captions. Ask them to find out more about sea snails by looking in the glossary.
- Suggest that as you cannot set up a real rock pool you could set up a model rock pool. Work on

a design making the rock pool out of cardboard and painting it rock colours. Ask the children to think about how they could make model sea anemones out of tubes of cardboard and paper or wool tentacles. Challenge them to work out how to make starfish, shrimps and crabs from a range of material such as cloth, paper, cardboard, modelling clay and pipe cleaners. There may already be some seashells in school, which could be added to the model. Seaweed could be made out of strips of green card. Bubble wrap could be added to some strips to make bladderwrack fronds.

Differentiation

Less confident learners could use a smaller range of materials such as modelling clay to make models while more confident learners could use a wider range of materials.

Assessment

The children could be assessed on the realism of their models or their ingenuity in combining materials.

Plenary

The children can bring their model plants and animals together to put in the "rock pool". They should answer the question at the bottom of page 13 and conclude that rock pools, and the living things in them, are very different from ponds and pond life. Show the children the result of your evaporation experiment which should show that salt grains are left behind when the water evaporates.

Outcomes

The children:

- Know that sea water is salty.
- Know that the tides flow over a rock pool.
- Are able to recognise some sea creatures.
- Know that rock pool plants have to grip tight to hold on.
- Can use a range of materials to make a model rock pool.

6

Teacher's sheet

2B

How seeds are made

Objectives

- To know that seeds are made in flowers.
- To know that pollen is needed for seeds to form.
- To know that seeds can spread in a variety of ways.

Resources and preparation

Ten large sheets of red paper to form petals, a plastic cup, eight yellow squares of paper with sides 6 cm long with sticky paper attached to represent pollen grains. Eight pieces of paper 6 cm by 4 cm to be made into model winged fruits. Each should then have 2 cm of one end screwed up to represent the seed and the remaining part should be cut down the middle and bent apart to form two wings opposite each other like a miniature helicopter.

Starting the lesson

Ask the children what they know about flowers. Look for answers which include they have petals, they are brightly coloured, they have scents and they make seeds. Tell the children that these facts need sorting out before we look more closely at flowers. Ask the children to imagine a flower bursting out of its bud. What do they see first – its coloured petals. As the flower continues to open what do they smell – its scent. When the flower is fully open what may visit it – bees and butterflies. Tell the children that the bright colours of the petals and the smell of the scent attract the insects to the flower but why should the insect visit the flower? – to get some food. Tell the children that the flower produces a sugary liquid called nectar. It contains a lot of energy which the insects need to fly around but why should the flower do this for the insect? Tell the children that it is time to take a closer look.

Activities with pages 14 and 15

- Read the opening line with the children and emphasise that this is the reason why plants attract insects with their flowers. They need the insects to help them make seeds.
- Let the children read the next two paragraphs and summarise by saying that the flower needs the insect to carry pollen from one flower to another. Review the start of the lesson by asking the children how the flowers attracted the insects and what the insects did when they reached the flowers and say that we can put this information together with our knowledge of pollen to make a short play.
- Arrange some of the children into two groups of eight. Each group represents a flower in the following way – five children form a circle and each one holds up a large red card as a petal. One child in the centre holds

an empty plastic cup. In one "flower" this child is flanked by two others, who hold four yellow squares each. In the other the child is flanked by two children, who do not have any yellow squares.

- Select a child to play the part of a bee. Let the "bee" wave its arms as wings and fly to the flower with the pollen grains. The bee should go to the centre of the flower take the cup and pretend to drink the nectar. While the bee is doing this, the other two parts of the flower stick the pollen grains onto the bee's body. The bee finishes its drink and flies to the next flower. It enters the flower and drinks more nectar and as it does so the two children remove the pollen from its body.
- You may like to repeat this activity several times with different groups and combinations of children. This activity shows pollination at its simplest with a male and female flower on different plants as in the holly. Many plants have flowers that begin by producing pollen and then change to receiving pollen as they get older. Their pollen is collected by flowers that opened before them. The children do not need to know this detail but it may help to answer any questions that arise.
- Read the third paragraph on page 14 and tell the children that seeds form in fruits and birds eat fruits. The seeds in the fruits pass all the way through the bird and are released with the solid wastes. They land on the ground with their own supply of manure ready to start growing into a new plant.
- Let the children look at the pictures of the dandelion and read the captions. Tell the children that in the dandelion the white tuft on the seed is part of the dandelion fruit.
- Assemble the "flower" again that had received the pollen and give the children who had collected the pollen four model winged fruits. Tell the children that they are different from the parachute fruits seen in the pictures but can also move through the air.
- Tell the children that the "flower" is now going to show what happens after it has received pollen. Let the children holding the red petal sheets drop them. Let the children holding the winged fruits hold each one up in turn and throw it. Some of the fruits may spin as they fall. Tell the children that the pollen does not turn into the seeds and fruits but helps the flower make them.

Differentiation

Less confident learners will need more guidance in performing the actions. More confident learners may like to make wings for the bee and cut out the petals into more realistic shapes. The children could work in groups to refine their performance as bees and flowers for the plenary.

6 Teacher's sheet 2B

Assessment

The children can be assessed on the way they follow the instructions, perform the actions and work in a team. There is an assessment sheet to use after this lesson and lesson 7 at the end of the guide (page 65). The answers are given in lesson 7.

Plenary

Ask the children to answer the question on page 15, then let groups of children perform the activity of pollination and seed dispersal.

Outcomes

The children:

- Know that seeds are made in flowers.
- Know that pollen is needed for seeds to form.
- Know that seeds can spread in a variety of ways.
- Can work together in a group.

7

Teacher's sheet

2B

Seeds, fruits and nuts

Objectives

- To know that seeds are found in fruits.
- To know that seeds are found in nuts.
- Can make observations on seeds and fruit.

Resources and preparation

Chopping board, knife, tomato, sweet pepper, avocado, orange and apple. Check for children being allergic to nuts before showing a selection of nuts. If there are allergies in the class use pictures of various nuts such as peanuts, Brazil nuts, walnuts, cashew nuts, acorns (you may like to keep a few of these to compare with pine cones in Science@School 2C Variation as acorns and pine cones can be confused), wheat grains and barley grains. Plastic knives, paper towels, cherry tomatoes. Sycamore fruits. Plant pots, compost trowels.

Starting the lesson

Ask the children what they know about fruits. They have studied them in Science@School 1B Growing plants and 2A Health and growth so there may be a mixture of information. They may already know that seeds are found in fruit and that we eat many kinds of fruit. You may like to itemise their knowledge on the board and then remind them of the previous lesson in which flowers received pollen to make seeds and that the flower then made seeds and fruits.

Activities with pages 16 and 17

- Read the introductory sentences with the children and emphasise that the seeds are inside the fruit.
- Read the first two sentences of the first paragraph and then move across to page 17 to look at the tomato. Cut one open and count the seeds. Show the children a sweet pepper and ask them to predict how many seeds it might have. Cut it open and show the children the position of the seeds and count them. Show the children an avocado and ask them to point to where the seed is inside it then cut it open and compare it with the photograph.
- Look at the peas with the children and read the caption. Tell the children that bean plants also produce their seeds in pods. Also tell them that other plants including the laburnum tree produce seeds in pods but they must not be collected or eaten as they are very poisonous.
- Ask the children to answer the question and then take an orange and apple and cut them open to check their answers.

7 Teacher's sheet 2B

- Move back to page 16 and read the third sentence of the first paragraph. Look at the picture of the acorns and read the caption. Show the children the acorns and let them compare them with the picture. Show the children samples or photographs of other nuts.
- Read the first sentence of the second paragraph and look at the picture of wheat and read the caption. Show the children some real wheat grains to compare with the picture and show them some barley grains. Ask the children how they can tell barley grains from wheat grains.
- Read the last sentence of the second paragraph and look at the sycamore fruits and read the caption. Tell the children that the wings help to spin the fruit and keep it in the air as it is blown along by the wind. Ask the children why it is good for the seeds to spread out. Look for an answer about if they all grew close together, their roots would compete for water and their leaves would overlap and compete for light. Some children may recognise that the model winged fruits in the last lesson were spread out in the same way.

Differentiation

Less confident learners may need more help in making comparisons and observations. More confident learners could cut open three cherry tomatoes with plastic knives and count the seeds to see if each tomato has the same number of seeds.

Assessment

The children could be assessed on their contribution to the activities. There is an assessment sheet to use after lesson 6 and this lesson at the end of the guide (page 65).

Answer guidance

1. pollen, 2. wind, bees, 3. They fall off, 4. Seeds, 5. Acorn, 6. A wing, 7. A stone, 8. Pea, 9. Tomato (Cherry, strawberry), 10. New plants.

Plenary

The children could half fill the plant pots with compost and put a few acorns in one pot and a few sycamore fruits in another. They could set up pots with different thicknesses of compost over the acorns and fruits then water the pots and leave them outside through the winter. In the spring they should bring them in and carefully dig out the compost and record what they find. After a few more weeks any seedlings could be planted outside in the school grounds. You could help the children decide where the seedlings should best be planted bearing in mind how big the trees may grow.

Outcomes

The children:

- Know that seeds are found in fruits.
- Know that seeds are found in nuts.
- Can make observations on seeds and fruit.

8

Teacher's sheet

2B

Sprouting seeds

Objectives

- To know that seedlings sprout from seeds.
- To know that a seedling has a root and a shoot comprised of stem leaves and flowers.
- To know that seeds need warmth and water to sprout.
- To know that seedlings need water, warmth and light to grow well.

Resources and preparation

The children will have done some work growing seedlings in year 1 and will look at it again in year 3 where more rigorous measuring will be performed. In this lesson the focus should be on consolidating year 1 work and introduce a little more mathematical work into considering the results.

Starting the lesson

Ask the children to imagine that they are a seed and have been planted in the ground. Ask them what they will need to grow and look for an answer about water and warmth. Ask the children what will happen to them when they have got everything they need and look for an answer about swelling up, the root growing out and then the shoot. Challenge the children to mime how a seed germinates and a seedling bursts out by asking them to curl up on the floor like a seed. Look for them curling up as tightly as they can then uncurling a little to appear larger. They could then put out one or two legs to represent the root and side and raise their arms to represent the stem. They could then lower their hands, palm downwards to represent the leaves.

Activities with page 18 and 19

- Read the first introductory line with the children to confirm their answers at the start of the lesson. Move on to the second sentence and ask the children what extra requirement is needed by a plant.
- Look at the first two seedlings with the children and compare them with how the children mimed the growing seedling. Read the first caption and ask the children how they could find out if all the seeds germinated at the same time. Steer the conversation round to setting up thirty cress or mustard seeds on a dish of damp sand and looking at them closely with a magnifying glass every day. The children should record how many have germinated each day. This will be the total seen on the first day of germination but in subsequent days the previous day's number must be subtracted from the total seen. The results can be recorded in a table and a bar chart.
- Read the second caption and ask the children to compare the second and third pictures of the seedling.

8 Teacher's sheet 2B

- Move on to the third caption and then ask the children to measure the length of the stems (note the shoot is the stem, leaves and flowers) of the fifth and sixth seedlings. Help them to work out how much they had grown. Ask the children to answer the question and look for an answer about the leaves having grown well enough to produce the food for flower growth. Look also for the stem being longer and more leaves in place to help make the food required.
- Ask the children how they could set up an experiment to measure the growth of the shoot. Steer them into planting a broad bean seed in compost in a plant pot and when the shoot appears inserting a lolly stick close by. They should mark the level of the soil on the lolly stick and every few days mark the height of the stem.

Differentiation

- Less confident learners will need help in making measurements and drawing tables to record their work. They will also need help with making bar charts. They could provide a pictorial account in the plenary with a few simple captions. More confident learners could set up the pots in warm and cold conditions and give some pots more water than others.

Assessment

The children could be assessed on their mime and their contribution to discussions in setting up the experiments. They could be assessed on their ease of taking accurate measurements and the presentation of the tables and charts.

Plenary

The children could write a short account of how they grew from a seed into a plant with flowers. They could illustrate their work with pictures at every stage. They could be encouraged to make a large plant with colourful flowers. Some of the stories could be read out and the pictures displayed.

Outcomes

The children:

- Know that seedlings sprout from seeds.
- Know that a seedling has a root and a shoot comprised of stem, leaves and flowers.
- Know that seeds need warmth and water to sprout.
- Know that seedlings need water, warmth and light to grow well.
- Can devise and carry out experiments on germination and seedling growth.
- Can record data in tables and transfer it to bar charts.

Teacher's sheet

A butterfly

Objectives

- To know that the life cycle of the butterfly has four stages.
- To use modelling clay to show the four stages in the life cycle of the butterfly.

Resources and preparation

Modelling clay for each child. There should be enough to make some eggs, three caterpillars, a chrysalis and an adult butterfly.

Starting the lesson

Turn to page 7 and let the children look at a picture of a butterfly. Ask them to name the times of year when butterflies are seen. Look for an answer about spring and summer and sometimes in the autumn. Ask the children what they think happens to butterflies at other times of year. The children may have seen dead butterflies and perhaps even a butterfly hibernating. Tell the children that when they go for a walk in the countryside in winter there are butterflies present but you would not recognise them because of the strange way they grow up.

Activities with pages 20 and 21

- Read the introductory paragraph and remind the children about animals such as puppies and kittens they studied with Science@School 2A Health and growth that are like miniature adults and just get bigger. Tell them that they are going to study a butterfly called the monarch which does not live in Britain (it lives in North and South America) but all butterflies grow up in the same way.
- Read the first paragraph and let the children look at the photograph of the hatching caterpillars and read the caption. Issue the modelling clay and ask the children to take a pinch of the clay and make some small model eggs and caterpillars like the ones they can see in the photograph.
- Let the children read the last sentence on the page and look at the lower picture and caption. Ask them to make a model of a caterpillar that is a bit larger than the ones that hatched out of the eggs.
- Tell the children that a caterpillar grows in a different way to many other animals. It has a shell like a suit of armour and when it has grown too big for it, the armour breaks open and the caterpillar with a softer suit climbs out. The caterpillar immediately takes

in air to pump itself up and stretch its new armour before it hardens. The caterpillar then starts eating again to build up its body and fill in the air spaces. A caterpillar may moult its armour a few times as it grows. Let the children make a model of a large caterpillar.

- Read the first paragraph on page 21 with the children, let them look at the picture of the caterpillar making a chrysalis and read the caption. Let the children make a model chrysalis.
- Move on to the last paragraph and picture and let the children make a model adult butterfly. It should have a body in three parts – a head, middle called the thorax and longer back section called the abdomen. There should be two long antennae or feelers and a curly tube which it uncoils to suck up nectar on the head, six legs and two pairs of wings on the thorax and no limbs on the abdomen.

Differentiation

Less confident learners may need help in making their models from the pictures. More confident children could use other sources to find out more about the adult butterfly's body. All children could paint their models and the less confident learners may need help in making the patterns on the caterpillar and butterfly wings.

Assessment

The children could be assessed on the quality of their models. They could be asked to randomly group their models together and then arrange them in sequence. They could be assessed on their ability to sequence them quickly for display.

Plenary

The children can set out their models for display and answer the question on page 21. You could ask them to explain why butterflies may not be seen in winter and draw them to conclude that they spend their time in eggs or in chrysalises as there are few leaves on which the caterpillars can feed and few flowers for the adults to feed on.

Outcomes

The children:

- Know that the life cycle of the butterfly has four stages.
- Can use modelling clay to show the four stages in the life cycle of the butterfly.

Assessment

Name: .....

Plants and animals

Local plants and animals		
Living things	**Yes**	**No**
Grass		
Moss		
Ferns		
Bushes		
Trees		
Slugs		
Snails		
Earthworms		
Woodlice		
Beetles		
Spiders		
Flies		
Birds		

Assessment

Name: .....

Life in a park

Which of these sentences are correct?

1. Trees are plants. ☐
2. Spiders have six legs. ☐
3. Woodlice live under rotting branches. ☐
4. Insects have eight legs. ☐
5. There is lots of grass in a park. ☐
6. You may find a butterfly in a park. ☐
7. Insects weave webs in bushes. ☐
8. Woodlice are the largest animals in a park. ☐
9. Squirrels live in parks. ☐
10. Foxes visit parks at night. ☐

Write down the correct answers for the sentences that are wrong.

.....

.....

Assessment

Name: .....

The pond

Which of these living things live in a pond?

1. Daisy ☐
2. Bullrush ☐
3. Oak ☐
4. Duckweed ☐
5. Goldfish ☐
6. Woodlouse ☐
7. Rabbit ☐
8. Dragonfly ☐
9. Tadpole ☐
10. Butterfly ☐

Name some birds that visit ponds to get food.

.....

.....

Assessment

Name: .....

Seeds

1. What is the dust flowers make?

   .....

2. What two things move this dust from flower to flower?

   .....

3. What happens to the petals when a flower makes seed?

   .....

4. What are found in fruits and nuts?

   .....

5. What is the nut of the oak tree?

   .....

6. What does a sycamore fruit have to help it move through the air?

   .....

7. What is the hard part inside an avocado fruit called?

   .....

8. What plant grows fruits called pods?

   .....

9. Name a soft red fruit. .....

10. What do seeds make? .....

    .....