Education Support Pack

Living Things in Their Environments

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Introduction

This Pack

Living Things in Their Environments for Key Stage 2 provides students with the opportunity to use Kar2ouche to help them develop their knowledge of Science through exploration, discussion and visualisation. The work in the virtual world will complement practical experiments and book research in the classroom.

One of the benefits of using Kar2ouche is its versatility. It allows you as a teacher to use it in the ways you consider most appropriate with your students. At its most basic Kar2ouche can be used to create:

- storyboards
- animations
- publications.

However, depending on the tasks set, students can use the program to develop a whole range of thinking skills. The software enables them to:

- make sense of information – understand and visualise text
- reason – interpret, justify, compare, observe and predict
- enquire – investigate multiple meanings and perspectives
- create – respond imaginatively
- evaluate – modify and improve
- communicate ideas to others.

The four suggested units in this pack integrate class, group and pair discussions with a range of computer activities. These will help you work with students as they develop their knowledge and understanding of scientific ideas, processes and skills. In each unit there is a range of suggested activities closely linked to the National Curriculum. It is up to you to decide in which order you ask students to work through these activities. However, as you and your students become more familiar with the potential uses of Kar2ouche, it is likely that you will build on these activities and add to them in order to create differentiated materials for mixed ability classes. In particular you may like to do some work to explore the key words listed in the Teacher Notes for each unit.

Units

Unit 1: Plant Structures and the Growth and Nutrition of Plants The activities in this unit focus on the conditions that plants need to grow and flourish, the functions of their main parts and the process of photosynthesis.

Unit 2: Flowers and Plant Reproduction This unit focuses on the reproductive organs of flowers and the life cycle of plants including seed dispersal and pollination.

Unit 3: Classification, Local Habitats and Adaptation This three-part unit considers how living things are grouped, the different habitats that organisms live in and how they have adapted to these environments.

Unit 4: Feeding Relationships This unit allows students to investigate food chains and ecosystems.

Each activity within the units consists of 2 to 3 lessons. Consequently the suggested introduction, development and plenary may need adapting, according to your preferred timings, the length of lessons and your students' attention spans. You may also need to consider reshaping work where you have access to only one or two computers at a time. Some of the storyboards can be picked out for students to complete by writing in words. Others work well with small groups. The aim is to provide a flexible tool that can be adapted to individual circumstances.

Most of the work involving Kar2ouche requires students to work in pairs or small groups and ultimately to present ideas and work to larger groups. It is, therefore, worth spending some time with students exploring the skills of good group work and presentation. If they establish the criteria with you, they can then reflect on how well they have done and identify the skills they want to improve.

The product from their work is usually a storyboard, animation or publication and can therefore provide evidence of their achievements. Students can be engaged in self and peer-reviews of these presentations, but will probably need some modelling of constructive criticism. Such self and peer review can inform redrafts and improvements before some work is formally submitted for your assessment.

Opportunities for presentation and review are indicated in the Teacher Notes of each unit.

If you would like to share your plans or storyboards with other teachers and so add to this shared resource, you can e-mail them to esp@kar2ouche.com

Assessment

The tables below show how the units in this title cover the required range of work in the National Curriculum.

SC1 Scientific Enquiry

Unit No.	1		2												
	a	b	a	b	c	d	e	f	g	h	i	j	k	l	m
1		•	•		•					•	•			•	•
2															
3	•	•	•		•					•	•			•	•
4															

SC2 Life Processes and Living Things

Unit No.	1			2								3				4				5					
	a	b	c	a	b	c	d	e	f	g	h	a	b	c	d	a	b	c	d	a	b	c	d	e	f
1		•	•									•	•	•							•				
2															•										
3			•													•	•	•			•	•			
4																•	•	•					•	•	

Crossover with QCA Schemes of Work (SoW)

QCA SoW	Units and Activities								
	1.1	1.2	2.1	2.2	3.1	3.2	3.3	4.1	4.2
1B Growing plants	•	•				•	•		
2B Plants and animals in the local environment	•		•	•	•	•	•		•
2C Variation			•		•			•	
3B Helping Plants Grow Well	•	•					•	•	•
4B Habitats				•	•	•	•	•	
5B Life cycles			•	•			•		
6A Interdependence and adaptation			•	•		•	•	•	•
6B Micro organisms									•

What is Kar2ouche?

Kar2ouche is a multimedia authoring tool, and is used in a series of content titles focused on enhancing learning in a number of different subjects. In each instance the application's functions and interface are the same; it is just the backgrounds, characters, props and texts that change. Consequently, once children have learned to use Kar2ouche they are able to use it across a range of subjects.

Enhancing Learning

Not only does Kar2ouche help students develop the skills relevant to particular subject areas, it also facilitates the development of more generic thinking skills. Thus students are encouraged to know *how* as well as *what*.

Information-processing skills	Using Kar2ouche students can be encouraged to: • read for meaning • identify key images, text and ideas • sort the relevant from the irrelevant and extract what is essential • organise and where necessary prioritise ideas • sequence events • develop cultural awareness.
Reasoning skills	Using Kar2ouche students can be encouraged to: • justify decisions using evidence • make informed choices • work out subtexts • consider alternative perspectives, interpretations, ambiguity and allusion • extract meaning beyond the literal.
Enquiry skills	Using Kar2ouche students can be encouraged to: • work collaboratively to question text • observe events and predict subsequent action • consider consequences • explore how ideas, values and emotions are portrayed • analyse the relationship between characters.

Creative thinking skills	Using Kar2ouche students can be encouraged to: • offer individual interpretations of texts or situations • create original multimedia texts • add imagined scenes and events • respond imaginatively to texts and situations.
Evaluation skills	Using Kar2ouche students can be encouraged to: • consider how meanings are changed when texts are adapted to different media • review, modify and evaluate work produced • reflect critically on written text, their own work and the work of peers • compare and contrast their work with the work of others.
Communication	Using Kar2ouche students can be encouraged to: • engage in collaborative working and dialogue • listen, understand and respond critically to others • articulate ideas in groups of different sizes • use visual aids and images to enhance communication.

Creating Your Own Activities Using Kar2ouche

You and your students can use Kar2ouche in a range of contexts and in a number of ways. Roughly, Kar2ouche can be used to create:

- storyboards
- animations
- publications.

Storyboards

These are particularly useful in encouraging students to show their understanding and ability to extract key information. By producing storyboards, students often show their ability to summarise and synthesise key information. Students can be asked to create:

- a summary of a particular event or piece of text in a specified number of frames
- witness reconstructions – step by step – as if for the police
- a summary with speech bubbles or caption containing important quotations
- a storyboard with their own commentary or summary in their own words
- alternative beginnings
- alternative endings
- before and after shots
- additional episodes
- alternative interpretations of a key moment where the text is ambiguous
- outlines of structure
- explorations of subtext through the use of thought bubbles
- illustrations of the difference between what people say and what they may think with reference to evidence
- presentations for class
- illustrations of alternative points of view/debate
- imagined meetings between characters
- photographs/freeze frames for a particular moment
- a proposal for a new film/advert/documentary etc to be presented to a board of executives.

In all of these, students can add sound, their own digital images, special effects and recordings of their own voices.

If time is limited, you can complete partial storyboards for your students to complete in the lesson. Partially completed storyboards may comprise, for example:

- the first and last frame – students make the frames for the central section
- storyboards that contain blank thought bubbles, blank speech bubbles and/or blank text boxes
- storyboards with questions in text boxes or caption windows
- storyboards with text in the caption window – students create the pictures
- storyboards with odd frames missing
- sequencing activities
- a quiz – 'who says what?', 'what happens next?' etc.

Students can also create their own incomplete storyboards for other students to complete.

Animations

Students who have access to Kar2ouche out of class time, can enjoy creating animations. As with storyboards, animations enable students to demonstrate their understanding and ability to extract key information. Most of the activities listed below *can also be created as still storyboards*. Students may be told that they have been commissioned to create a:

- news programme
- documentary
- TV chat show/interview
- film trailer
- advertisement
- musical score
- fashion show to show fashions of the time.

Publications

As a plenary, students can either present their storyboards to the class using a data projector or on screen. Alternatively, they can use the print facility to create publications in Kar2ouche. The sorts of publications students create, could include:

- a newspaper front page – using Kar2ouche to compose the pictures (students may choose to create broadsheets and tabloids to compare the differences)
- storybooks – picture above, story below (concentrating on structure/settings etc)

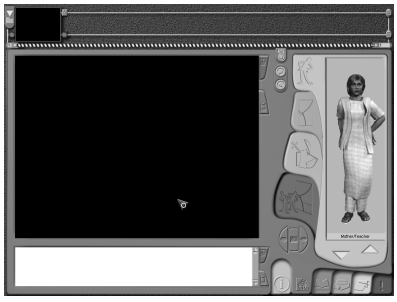
- cartoon strips (or film strips)
- graphic novels
- estate agents' details
- diary entries (with photos/pictures)
- letters (with pictures)
- photo albums
- magazine spreads
- advertising posters
- 'wanted' posters
- guides
- catalogues
- book and magazine covers.

In all of these activities students may be asked to consider audience and purpose. You can stipulate this audience.

The possibilities are almost endless. As you get used to the software and use it within your area of expertise, other activities will suggest themselves.

If You Haven't Used Kar2ouche Before – A Starter

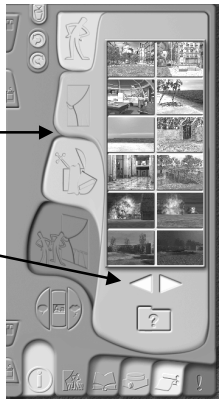
If students have not used Kar2ouche before, they should refer to the QuickStart Guide, or work through the Apprentice Activities in Kar2ouche *Composer*. However, if they haven't had time to do this, a good way of showing them the main functions is to demonstrate how to create a title sheet. This introduces selecting backgrounds, adding and posing characters, introducing text bubbles, as well as adding text and sound. They can pick up other skills as they go.



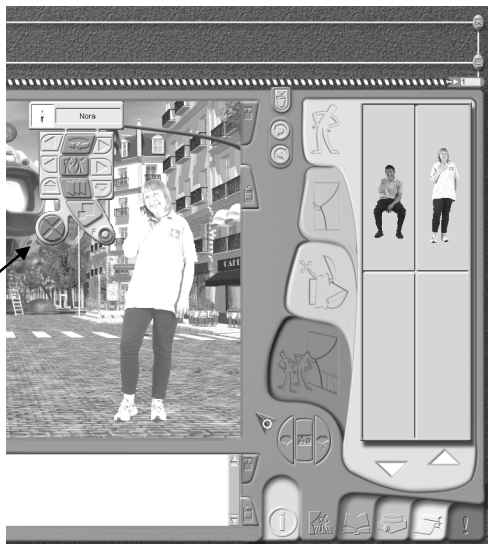
To create a title slide

1 Ask students to open Kar2ouche – the first screen they see is the composition screen.

2 Next ask them to select a background by clicking on the blue background tag. They should click again to see six backgrounds and yet again to see twelve. (Do not click again otherwise they return to a single view.) They can scroll through the backgrounds using the green arrows at the bottom. Once they have browsed the backgrounds they should select one they like by left clicking on it. It will appear in the composition window.

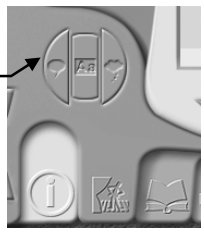


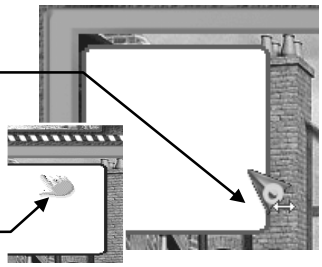
3 Having selected a background, students should choose a character to add to the frame. They do this by clicking on the green character tab (click once more to see four characters, click again to see sixteen) and scrolling through using the green arrows at the bottom. They select the character by left clicking (holding down) and dragging it into the frame. Now for the fun. This character can be resized, posed and rotated by right clicking on it in the frame. This brings up the manipulator tool.



- To rotate the character students click on the left and right facing arrow heads at either side of the top icon.
- To repose the characters they click on the arrow heads either side of the central, characters icon.
- To resize the character students should left click on the blue squares at the bottom of the manipulator tool then drag the mouse towards them to make it bigger or backwards to make the character smaller.
- The bottom icon allows the layering of characters and/or props.
- The character can be moved around by left clicking and dragging.

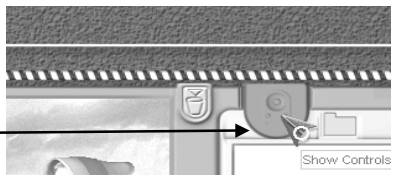
4 Next ask students to add a text bubble. They can do this by left clicking on the text bubble icon. The text bubble will appear in the top left hand portion of the screen. Students can then write in their name, form and the title of the storyboard they are about to complete. If they need to make the bubble bigger they do this by passing the cursor over the right or bottom borders until a double arrowhead appears. They should then click and drag to size. To move the bubble to elsewhere on the screen students should hover over the top of the bubble until the hand appears, left click to grab it and then drag to position.





5 Finally, students could be asked to add some sound, either in the form of a sound effect or a recording of their own voice. In either case they should begin by clicking on the text audio tab at the bottom of the screen.

Next they should click on the show controls icon at the top of this text audio frame. This will bring up the audio control panel.



To add a sound effect they should click on the orange folder, then select one of the sound effects offered by clicking on it and then on open. If they want to preview these sound effects they should click on the effect and then on play. To record their own voices students press on the red microphone icon and speak into their microphones. To stop the recording they should press the square red button. They will be prompted to give their soundfile a name. They type this into the box and then click on save. The sound is attached to their frame.

Students will now know how to use the main functions of Kar2ouche. Encourage them to play in order to learn what other things it can do. For instance how to attach a soundfile to a frame.

Useful Contacts

Websites

The following websites contain useful information. Please check that the sites are suitable for your students and currently available before recommending them to your class.

Primary Resources	This website is a free resource for teachers and includes lesson ideas and student worksheets on all aspects of the science curriculum. http://www.primaryresources.co.uk/science/science.htm
Teaching Ideas	This is a free science resource for teachers with suggestions for lesson ideas for each attainment target. http://www.teachingideas.co.uk/science/contents.htm
ICTeachers	This website provides lesson ideas linked to NC science and QCA schemes of work. It includes a students' page which contains homework help, quizzes and links to other sites. http://www.icteachers.co.uk/resources/resources_science.htm
Educate the Children	Includes a full unit of work of weekly lesson plans, worksheets, interactive resources and assessment. http://www.educate.org.uk
Guardian Website	Lots of teaching resources including lesson planning, homework and research. Has a good section for students for revision and practical investigations. http://www.learn.co.uk
The Great Plant Escape	Excellent for both students and teachers and includes lots of information and activities on green plants. http://www.urbanext.uiuc.edu/gpe/gpe.html
Living Things and Their Environment	Found on Learn.co.uk's science website this provides an excellent summary page and a number of multiple choice activities that could be used to check knowledge. http://www.learn.co.uk/default.asp?WCI=Unit&WCU=2284

All web addresses were correct at the time of going to press, but are subject to change. *You may like to add other addresses you come across below:*

Website	URL	Comments

Unit 1 Plant Structures and the Growth and Nutrition of Plants

The activities in this unit focus on the conditions that plants need to grow and flourish, the functions of their main parts and the process of photosynthesis.

Teacher Notes

Unit 1.1 Plant Structures

Key Stage/Year	Key Stage 2/Years 3-4 but could be a preparatory activity for Years 5-6
Group Organisation	This activity requires some small group work, but students work mainly in pairs with some class discussion.
Suggested Timing	One to two lessons

Overview of Task

This activity introduces students to the idea that although plants are different from animals, they are still living things that grow. They will also learn that plants consist of different parts, each of which is important to the plant's nutrition and growth.

Objectives

All students will: be able to name some common plants and identify their main parts.

Most students will: recognise that different parts of a plant have different functions.

Some students will: understand the important role that different parts of a plant play in achieving successful growth.

Curriculum References

National Curriculum

Science

Sc1 Scientific enquiry 1b that it is important to test ideas using evidence from observation and measurement; **2a** ask questions that can be investigated scientifically and decide how to find answers; **2c** think about what might happen or try things out when deciding what to do, what kind of evidence to collect, and what equipment and materials to use; **2i** use observations, measurements or other data to draw conclusions; **2l** use their scientific knowledge and understanding to explain observations, measurements or other data or conclusions; **2m** review their work and the work of others and describe its significance and limitations.

Sc2 Life processes and living things 3c that the root anchors the plant, and that water and minerals are taken in through the root and transported through the stem to other parts of the plant; **5b** about the different plants and animals found in different habitats.

Outcomes

By the end of this activity, students will have:

- named some common plants
- identified the main parts of a plant including the leaf, root, stem and flower by completing a storyboard and worksheet
- completed a storyboard to demonstrate that different parts of a plant have different functions.

Resources

Kar2ouche *Living Things in Their Environments*

- **Plants** storyboard
- **Plant Parts** storyboard
- **Function** storyboard

Sheet 1.1a *Nutrition and Growth*

Sheet 1.1b *Plant Functions*

Sheet 1.1c *Plant Functions Teacher Answer Sheet*

Plant reference books

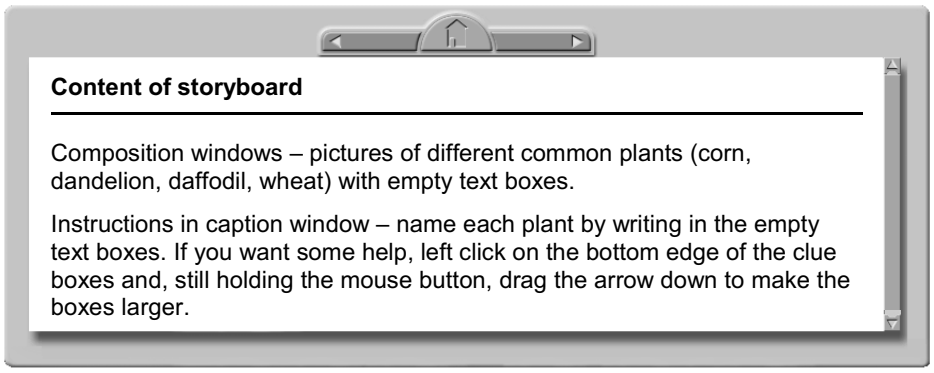
Key Words: function, nutrition, leaf, root, stem, flower

Activities

Introduction

1. Students brainstorm the names of different plants found growing in and around their school. Ensure you point out to the students that not all plants have flowers, for example, ferns.

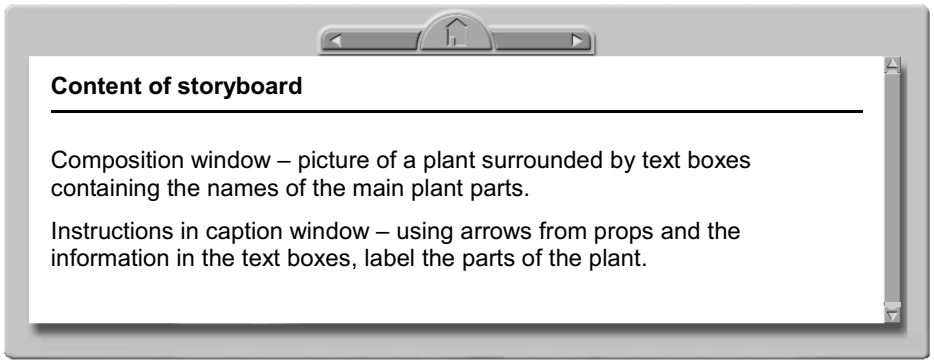
2. Using Kar2ouche, students open the **Plants** storyboard and identify different plants.



Development

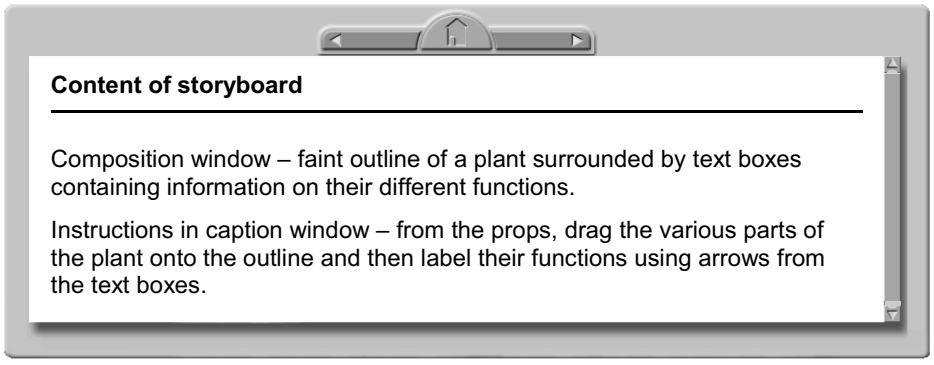
3. Using Sheet 1.1a *Nutrition and Growth*, students locate and circle the names of the major plant parts: leaf, stem, root and flower. At this point students may enquire about other parts of plants such as the stamen. Explain that you will be covering these in a later lesson: Unit 2.1 *Flowers*.
4. Students share answers with the class. You may want to record these on the board.

5. Students load and open the **Plant Parts** storyboard and name them by matching jumbled up names and pictures.



6. The students complete Sheet 1.1b *Plant Functions* by writing in the functions of each of the parts (for example, the root anchors, and transports water and minerals through the stem to other parts of the plant).

7. Students open the **Function** storyboard and complete it by putting the parts in the correct place before matching the correct function to each part using arrows.



Plenary

8. Students find two pictures of plants they know to stick in their exercise books before labelling the important parts along with the functions they perform. You may need to provide some magazines, or have internet access for the students to find their plant pictures.

Extension/ Homework

9. Set up a practical experiment by asking students to grow runner beans or peas on blotting paper – investigate root systems, stems and leaves. There are quite a few examples of possible experiments on Science Internet sites and in reference books. One useful site is http://www.primaryresources.co.uk/science/science.htm

Student Notes

Unit 1.1 Plant Structures

Objectives

During this activity you will look at different types of plants and understand that they are all living things that grow. You will also learn that plants consist of several different parts, each with an important job to do, to keep the plant alive and growing.

Outcomes

By working through this activity you will:

- name some common plants
- identify the main parts of a plant including the leaf, root, stem and flower by completing a storyboard
- complete a storyboard to demonstrate that different parts of a plant do different things to help it grow.

Resources

To complete the activity you will need:

Kar2ouche *Living Things in Their Environments*

Sheet 1.1a *Nutrition and Growth*

Sheet 1.1b *Plant Functions*

Activities

Introduction

1. Brainstorm the names of different plants growing in and around your school.
2. Open the **Plants** storyboard and identify different plants.

   click here to open the **Plants** storyboard

Development

3. Complete Sheet 1.1a *Nutrition and Growth* by circling the parts of plants that are important for nutrition and growth.
4. Elect someone in your group to read out your list of parts to the class.
5. Load and open the **Plant Parts** storyboard and name them by matching the jumbled up names to the pictures.

   click here to open the **Plant Parts** storyboard.
6. Complete Sheet 1.1b *Plant Functions* by writing in the things that each main plant part does (its function).
7. Open the **Function** storyboard. Put the parts in the correct places, and label what each part does.

   click here to open the **Function** storyboard

Student Notes

Plenary

8. Find two pictures of plants and stick them in your exercise books. Label the important parts of the plants with the functions they perform.

Extension/Homework

9. Carry out an experiment to investigate root systems, stems and leaves. Your teacher will help you set this up.

Plant Structures Sheet 1.1a

Nutrition and Growth

Below are lots of words describing parts of plants. Draw a circle around the parts that you think are important for nutrition and growth.

Tendrils **Thorn** **Flower**

Rose **Bush**

Leaf **Tree** **Grass**

Corn **Stem**

Plant **Ground** **Roots**

Plant Structures Sheet 1.1b

Plant Functions

Complete the table by filling in the functions of each of these plant parts.

Plant Part Name	Function (what it does)
Root	
Stem	
Leaf	
Flower	

Plant Structures Sheet 1.1c

Plant Functions Teacher Answer Sheet

Plant Part Name	Function (what it does)
Root	Takes in water and food from soil. Anchors the plant to the ground.
Stem	Transports water through plant. Increases the height of plant. Brings flowers closer to light.
Leaf	Makes food for the plant. Has little veins to carry water and mineral salts. Absorbs Carbon Dioxide and releases Oxygen into the air.
Flower	Produces seeds for new plants. Attracts insects to help pollination.

Teacher Notes

Unit 1.2 Growth and Nutrition of Plants

Key Stage/Year	Key Stage 2/Years 3-4 but could be a preparatory activity for Years 5 and 6
Group Organisation	Mainly in pairs with some class discussion.
Suggested Timing	One to two lessons

Overview of Task

This activity not only allows students to investigate the effects that water, temperature and light have on the growth of plants but also gives them the opportunity to understand the process of photosynthesis.

Objectives

All students will: understand what plants need for growth, including the process of photosynthesis.

Most students will: recognise the effects that light, air, water and heat have on plant growth.

Some students will: understand the importance and role of healthy roots and stems for successful plant growth.

Curriculum References

National Curriculum

Science

Sc1 Scientific enquiry 1b that it is important to test ideas using evidence from observation and measurement; **2a** ask questions that can be investigated scientifically and decide how to find answers; **2c** think about what might happen or try things out when deciding what to do, what kind of evidence to collect, and what equipment and materials to use; **2h** use a wide range of methods, including diagrams, drawings, tables, bar charts, line graphs and ICT, to communicate data in an appropriate and systematic manner; **2i** use observations, measurements or other data to draw conclusions; **2l** use their scientific knowledge and understanding to explain observations, measurements or other data or conclusions; **2m** review their work and the work of others and describe its significance and limitations.

Sc2 Life processes and living things 1b that the life processes common to plants include growth, nutrition and reproduction; **1c** to make links between life processes in familiar animals and plants and the environments in which they are found; **3a** the effect of light, air, water and temperature on plant growth; **3b** the role of the leaf in producing new material for growth.

Outcomes

By the end of this activity, students will have:

- completed an interactive storyboard on the effect that water, light and temperature have on plant growth
- used a storyboard to find out information on photosynthesis
- watched a storyboard on the process of photosynthesis.

Resources

Kar2ouche *Living Things in Their Environments*

- **Effects** storyboard
- **Leaf** storyboard
- **Leaf Poster** storyboard
- **Photosynthesis** storyboard
- **Plant Growth** storyboard

Sheet 1.2 *Plant Crossword*.

Key Words: photosynthesis, chlorophyll, shrivel, yellow, thrive, nutrition

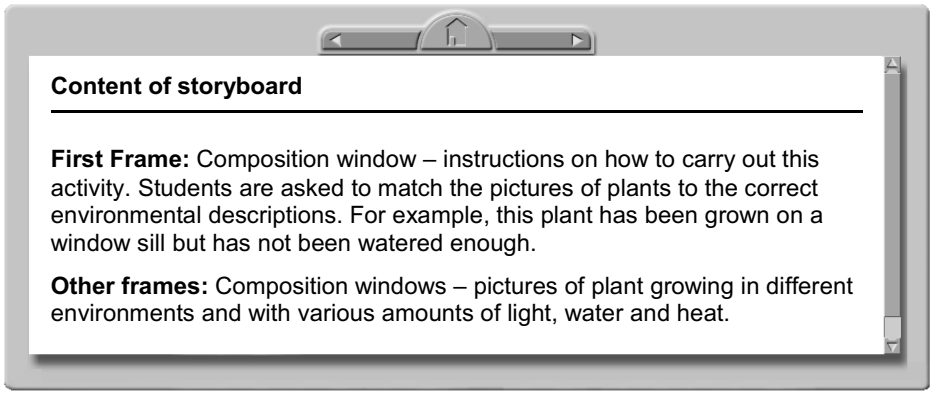
Activities

Introduction

1. Hold a discussion on the things that plants need to have in order to grow. (Ensure that water, air, light and temperature are discussed.)

Development

2. In Kar2ouche students use the interactive **Effects** storyboard to look at the effect of water, light and temperature on the growth of a plant.



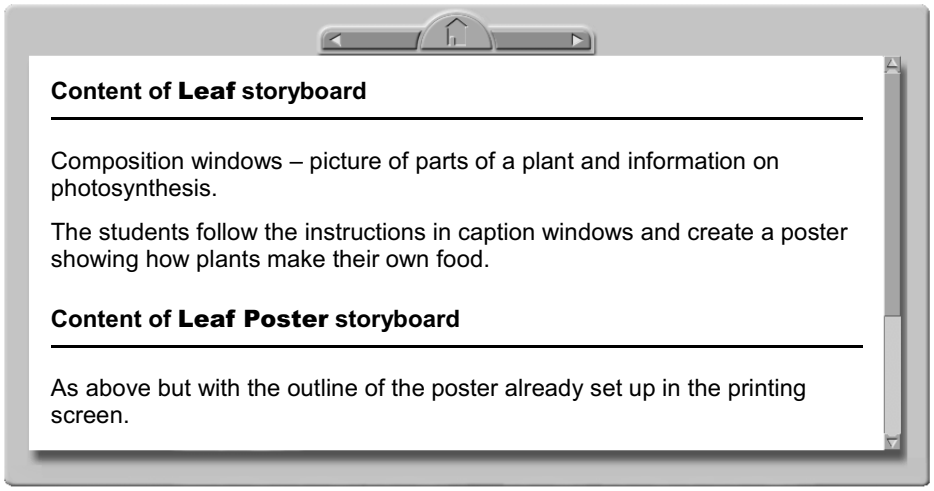
Content of storyboard

First Frame: Composition window – instructions on how to carry out this activity. Students are asked to match the pictures of plants to the correct environmental descriptions. For example, this plant has been grown on a window sill but has not been watered enough.

Other frames: Composition windows – pictures of plant growing in different environments and with various amounts of light, water and heat.

3. Hold a discussion on the importance of food for plant growth. This may have been mentioned in Activity 1. Pose the question, 'Where do plants get their food?' Explain that plants have the ability to produce their own, and that this process is called photosynthesis.

4. Students open the **Leaf** storyboard. By matching up the statements and pictures, they create a poster which explains how leaves produce new material for growth. Those who need more support can open the **Leaf Poster** storyboard which has an outline of the poster already in the printing window.



Content of Leaf storyboard

Composition windows – picture of parts of a plant and information on photosynthesis.

The students follow the instructions in caption windows and create a poster showing how plants make their own food.

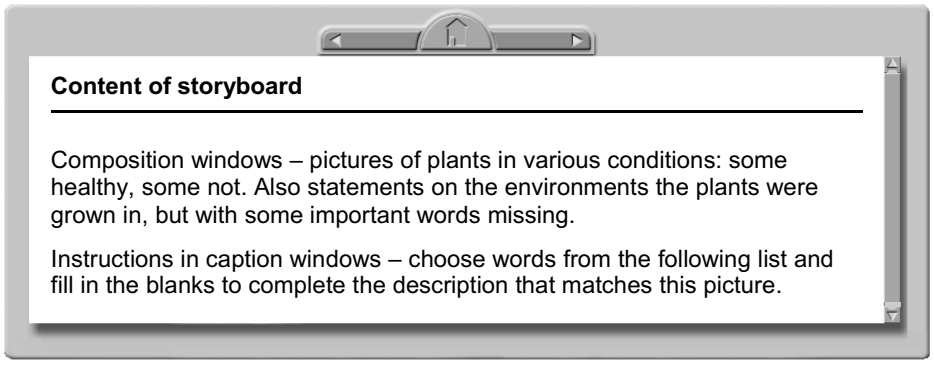
Content of Leaf Poster storyboard

As above but with the outline of the poster already set up in the printing screen.

5. Students check their posters against the **Photosynthesis** storyboard.

Plenary

6. Students complete the **Plant Growth** storyboard to demonstrate their knowledge of the factors that affect plants.



7. Plan an experiment that shows the impact of light, water and heat on plants. You can relate this to the runner bean or pea seed experiment if grown as part of Unit 1.1.

Extension/ Homework

8. Students carry out the planned experiment. There are quite a few examples of possible ways of doing this experiment to be found on Science Internet sites or in reference books. A useful site is http://www.urbanext.uiuc.edu/gpe/gpe.html
9. Alternatively students can complete Sheet 1.2 *Plant Crossword* to test their knowledge about plants. Get them to check their answers with a partner.

Answers

Across:		**Down:**	
1	Light	2	Growth
5	Water	3	Leaves
6	Root	4	Nutrient
8	Plants	7	Flower
10	Temperature	9	Stem

Student Notes

Unit 1.2 Growth and Nutrition of Plants

Objectives

After this activity you will recognise the effects that water, temperature and light have on the growth of plants. You will also begin to understand the process of photosynthesis and its importance to plant growth.

Outcomes

By working through this activity you will:

- complete an interactive storyboard about the effects that water, light and temperature have on plant growth
- use a storyboard to find out information on how leaves make food for growth
- watch a storyboard about how plants make their own food (Photosynthesis).

Resources

To complete the activity you will need:

Kar2ouche *Living Things in Their Environments*

Sheet 1.2 *Plant Crossword*.

Activities

Introduction

1. What things do plants need in order to grow? Share your ideas with your class.

Development

2. Open and watch the interactive **Effects** storyboard. This looks at the effects of water, light and temperature on the growth of a plant.

   click here to open the **Effects** storyboard

3. What else do plants need in order to grow? Discuss your ideas with a partner.
4. Either open the **Leaf** or **Leaf Poster** storyboard and make a poster explaining how leaves produce new material for growth. This is called photosynthesis.

   click here to open the **Leaf** storyboard.

   click here to open the **Leaf Poster** storyboard.

5. Check your work by watching the **Photosynthesis** storyboard.

   click here to open the **Photosynthesis** storyboard.

Student Notes

Plenary

6. Open and complete the **Plant Growth** storyboard. This will show your knowledge of the factors that produce healthy or unhealthy plants.

   click here to open the **Plant Growth** storyboard.

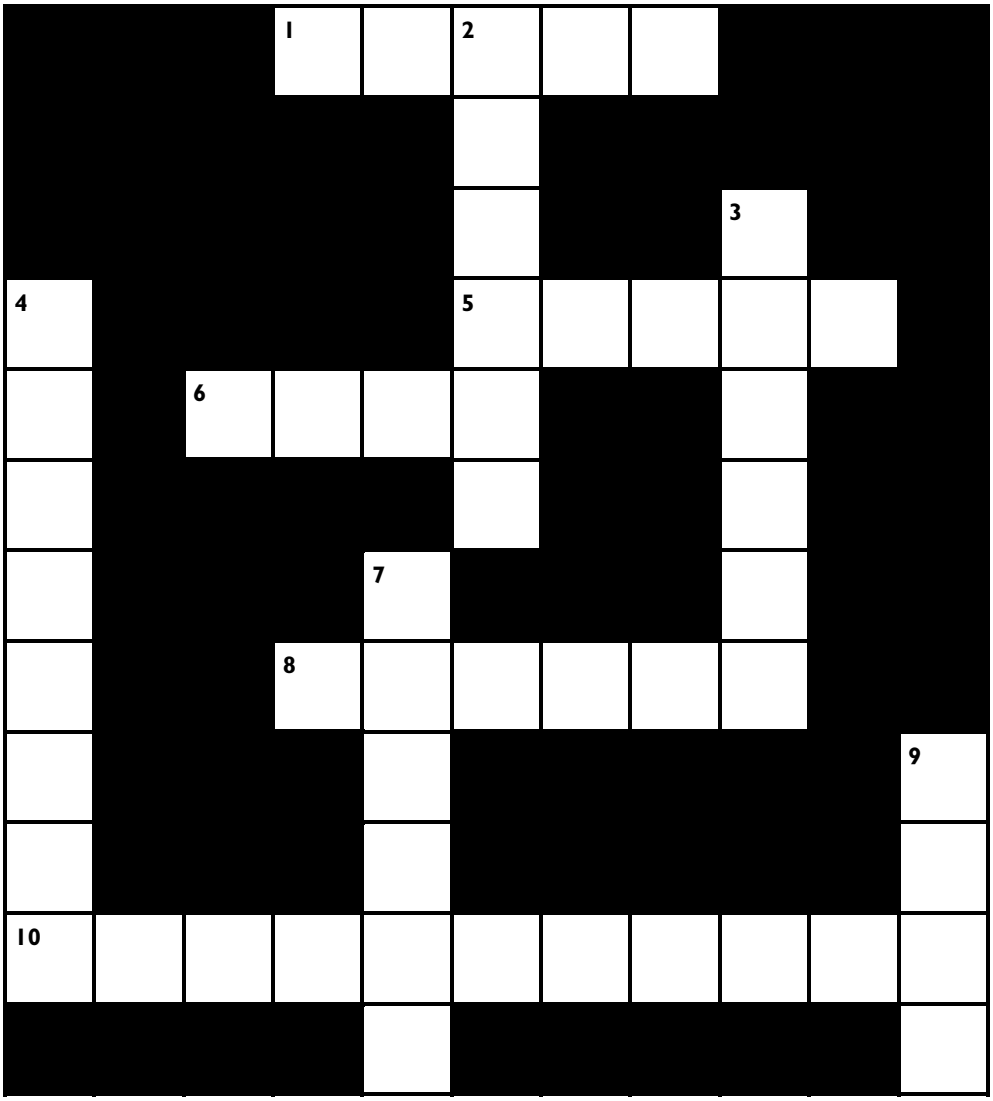
7. With the help of your teacher, plan an experiment to show the impact of light, water and heat on plants.

Extension/Homework

8. Do the planned experiment.
9. Complete Sheet 1.2 *Plant Crossword* and then check your answers with a partner.

Growth and Nutrition of Plants Sheet 1.2

Plant Crossword



Clues Across

1 Comes from the sun and makes plants grow

5 Liquid that is transported through the roots to the rest of the plant

6 Anchors the plant into the soil

8 Living things that grow in the soil

10 Grows better in summer because the t_____ is higher

Clues Down

2 Process of getting bigger

3 Green parts of the plant that capture sunlight

4 Food for the plant

7 Often has brightly coloured petals

9 Stiff upright part of the plant

Unit 2 Flowers and Plant Reproduction

This unit focuses on the reproductive organs of flowers and the life cycle of plants including seed dispersal and pollination.

Teacher Notes

Unit 2.1 Flowers

Key Stage/Year	Key Stage 2/Years 3-5
Group Organisation	In pairs, but with some class discussion.
Suggested Timing	One to two lessons

Overview of Task

Through discussion and the creation of storyboards, students have the opportunity to identify the parts of a flower and to understand their role in plant reproduction. This is distinct from Unit 1.1, which deals with plant growth and nutrition.

Objectives

All students will: recognise that flowers are made up of distinct parts.

Most students will: recognise different parts of a flower and describe their functions.

Some students will: begin to predict why the size, colour, smell and type of flower are important factors.

Curriculum References

National Curriculum

Science

Sc2 Life processes and living things 3d about the parts of the flower and their role in the life cycle of flowering plants, including pollination, seed formation, seed dispersal and germination.

Outcomes

By the end of this activity, students will have:

- identified the main reproductive parts of a flower by completing a storyboard
- watched a storyboard to gain an understanding of the functions of these parts
- completed an interactive storyboard matching flower parts with their functions in plant reproduction.

Resources

Kar2ouche *Living Things in Their Environments*

- **Flower** storyboard
- **Flower Quiz** storyboard

Sheet 2.1 *Parts of a Flower*

Key Words: stamen, seed, stigma, style, anther, petal, ovary, pollen, filament, egg cell, receptacle, germination, function, reproduction

Activities.

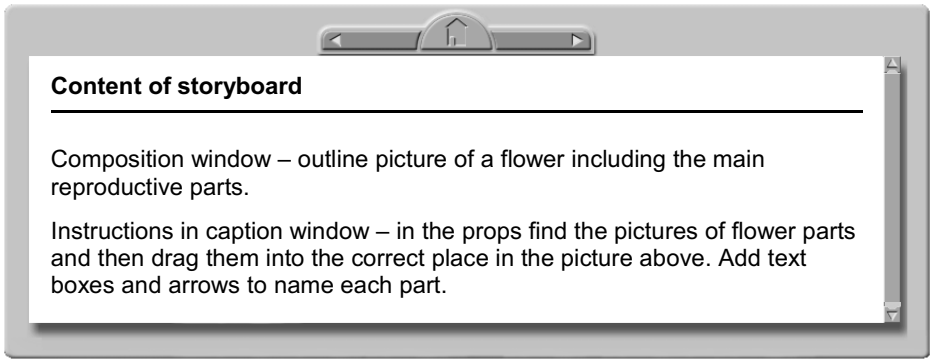
Introduction

1. Ask students to brainstorm the names of flowers (as distinct from the plants they named in Unit 1.1) that they know. Discuss their different shapes, smells and colours, as well as why you see most flowers at certain times of the year.

Development

2. Remind students that flowers, like plants, are made up of different parts and each part has a job to do. Inform them that the function of a flower is reproduction. You may want to explain what this means.

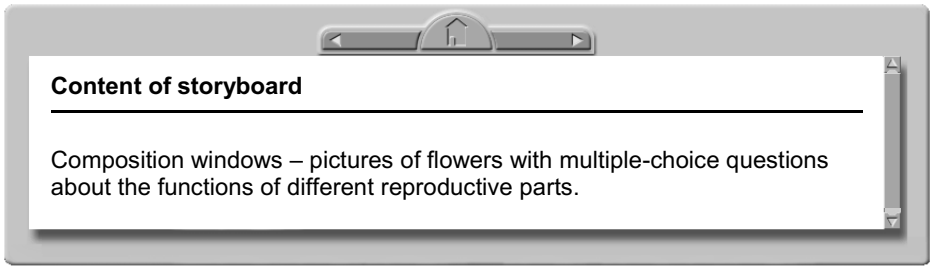
3. Students open the **Flower** storyboard and complete by dragging the named parts onto the outline flower. They then print their work.



4. The students look at Sheet 2.1 *Parts of a Flower*, which shows the parts in their correct positions and provides information on their function. They use the sheet to check their work and add the information to their picture.
5. For display, students draw their favourite flowers on paper, label the parts and provide a description of what each part does. Alternatively, take a photograph of flowers using a digital camera, and load this into Kar2ouche as a background. Students can then open a new storyboard and add the flower background before completing this activity.

Plenary

6. Students open and complete the interactive **Flower Quiz** storyboard, which will give you the opportunity to test their knowledge of flower reproduction.



Extension/Homework

7. Students bring in some flowers and, with the help of an adult, dissect and identify key parts. Get them to stick the parts into their book, or on a sheet for a wall display, and then label them.

Student Notes

Unit 2.1 Flowers

Objectives

During this activity you have the opportunity to consider the role of flowers; identify the different parts of a flower and find out how flowers help plants reproduce.

Outcomes

By working through this activity you will:

- identify the main reproductive parts of a flower by completing a storyboard
- watch a storyboard showing the functions of these parts
- complete a storyboard matching up flower parts and their roles in plant reproduction.

Resources

To complete the activity you will need:

Kar2ouche *Living Things in Their Environments*

Sheet 2.1 *Parts of a Flower*

Activities

Introduction

1. Brainstorm the names of flowers that you know. Discuss why they have different shapes, smells and colours.

Development

2. Listen to some information from your teacher on plant reproduction.
3. Open the **Flower** storyboard. Drag the named parts onto the outline flower and print your picture.

   click here to open the **Flower** storyboard.
4. Look at Sheet 2.1 *Parts of a Flower*, and check that you have shown the parts of the flower in the right positions. Add the information on the sheet about the function of each part to your own picture.
5. Draw your favourite flower. Label the parts and describe what each part does.

Plenary

6. Open and complete the **Flower Quiz** storyboard.

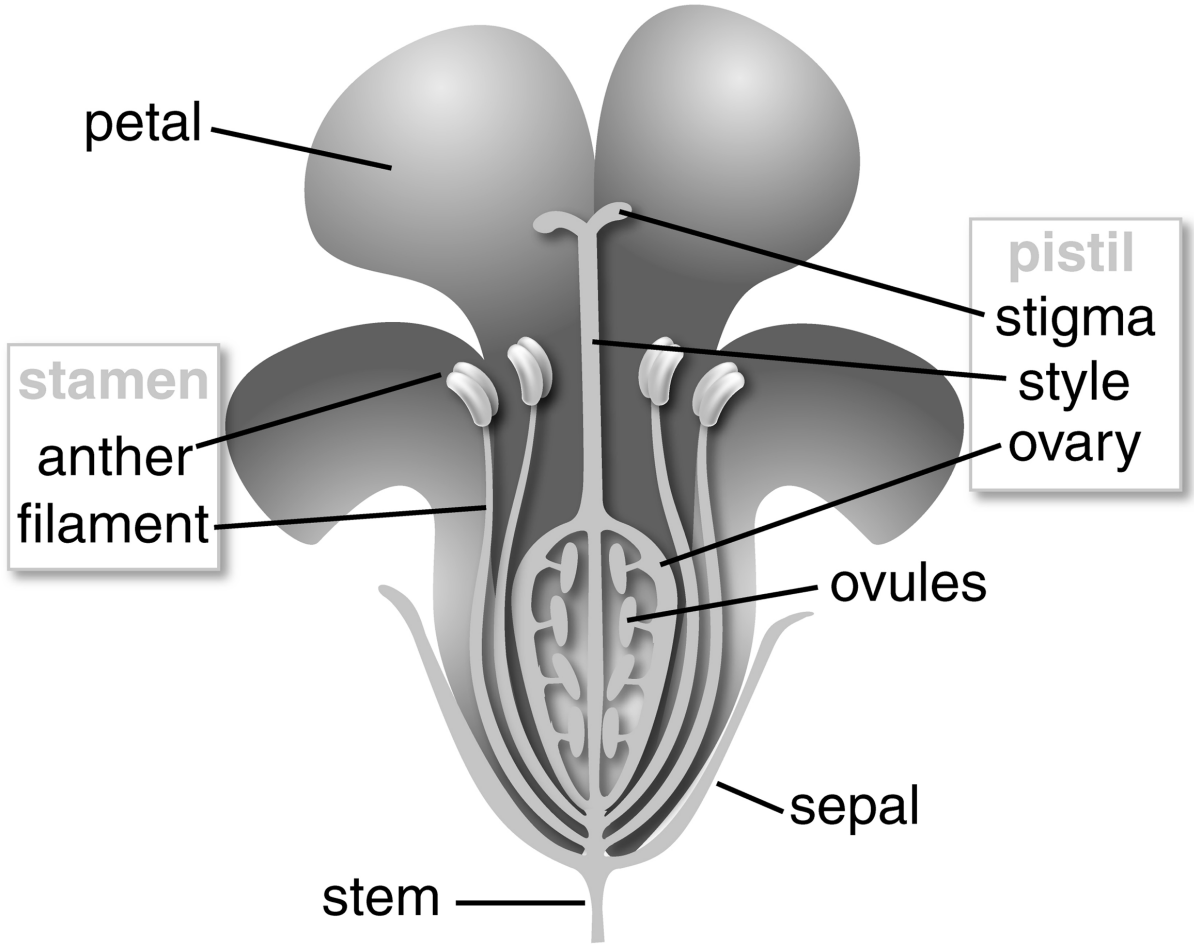
   click here to open the **Flower Quiz** storyboard.

Extension/Homework

7. See if you can get hold of a flower to bring into school and, with the help of an adult, cut up or carefully break it apart and then identify the key parts. Stick these parts into your book, or on a sheet for a wall display, and then label them.

Flowers Sheet 2.1

Parts of a Flower



Flower Part Name	Function
Petal	Has the job of attracting insects to the flower.
Sepal	Protects the flower in bud and holds the flower together.
Anther	Produces the pollen.
Stigma	Is sticky, so when insects carrying pollen arrive, the pollen grains get stuck to it.
Ovules	Contains the female sex cells.
Style	A tube that allows pollen grains to travel from the stigma to the ovules.
Filament	Holds up the anther.
Stem	Connects flower to roots.

Teacher Notes

Unit 2.2 Plant Reproduction

Key Stage/Year	Key Stage 2/Years 3-5
Group Organisation	Students will be engaged in small groups, but will work mainly in pairs with some class discussion.
Suggested Timing	One to two lessons

Overview of Task

Students will consider the life cycle of plants and investigate the different processes and methods of plant reproduction including pollination and seed dispersal.

Objectives

All students will: understand that plants have a distinct life cycle.

Most students will: understand the life cycle of flowering plants including the reproductive process.

Some students will: understand why the size, colour, smell and type of plant are important factors for the survival of plants.

Curriculum References

National Curriculum

Science

Sc2 Life processes and living things 3d about the parts of the flower and their role in the life cycle of flowering plants, including pollination, seed formation, seed dispersal and germination.

Outcomes

By the end of this activity, students will have:

- completed a storyboard showing the process of pollination
- worked through a storyboard to consider the ways that seeds can be dispersed
- produced a storyboard poster on the life cycle of a plant
- made their own storyboard describing the life of a seed.

Resources

Kar2ouche *Living Things in Their Environments*

- **Pollination** storyboard
- **Dispersal** storyboard
- **Life Cycle** storyboard
- **Life of a Seed** storyboard
- **Life of a Seed Starter** storyboard

Key Words: fertilisation, germination, pollen, pollination, reproduction

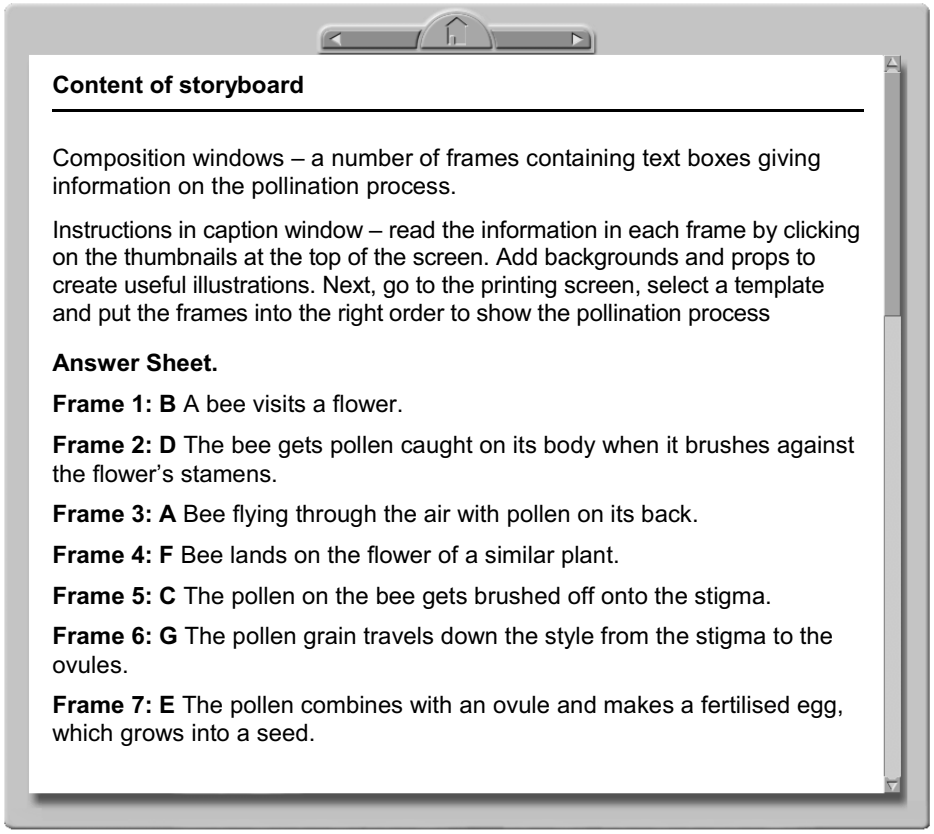
Activities

Introduction

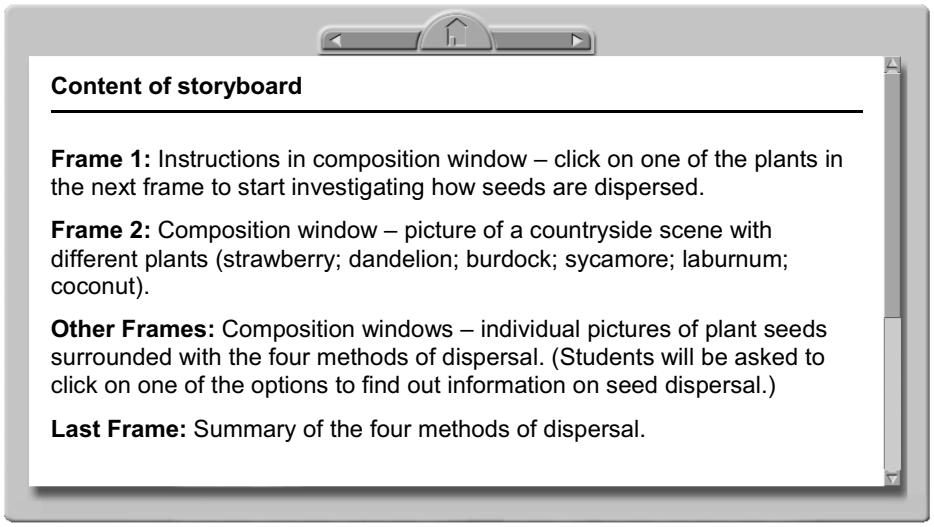
1. Explain to students that plants need to be pollinated if they are to produce seeds. You may wish to explain what pollination means. This is when the pollen from one flower is transferred to the stigma in another flower. Discuss the function of the seed. (Refer to runner beans and peas grown in Unit 1.)

Development

Students open the **Pollination** storyboard and complete to show how pollination takes place.



2. Explain that the seeds need to be dispersed so that the plant can grow somewhere else. Discuss why they may need to be away from the parent plant (competition for similar resources – water and nutrients).
3. Students open the interactive **Dispersal** storyboard and match up the image of a seed with its correct method of dispersal (wind, animals, water, explosion).



Content of storyboard

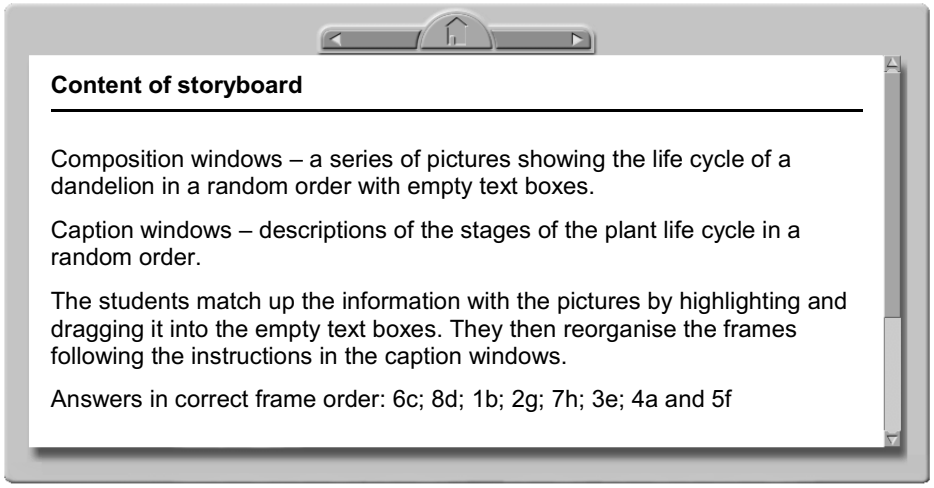
Frame 1: Instructions in composition window – click on one of the plants in the next frame to start investigating how seeds are dispersed.

Frame 2: Composition window – picture of a countryside scene with different plants (strawberry; dandelion; burdock; sycamore; laburnum; coconut).

Other Frames: Composition windows – individual pictures of plant seeds surrounded with the four methods of dispersal. (Students will be asked to click on one of the options to find out information on seed dispersal.)

Last Frame: Summary of the four methods of dispersal.

4. Students open the **Life Cycle** storyboard and arrange the pictures in the correct order to show the life cycle of a plant and produce a poster for display.



Content of storyboard

Composition windows – a series of pictures showing the life cycle of a dandelion in a random order with empty text boxes.

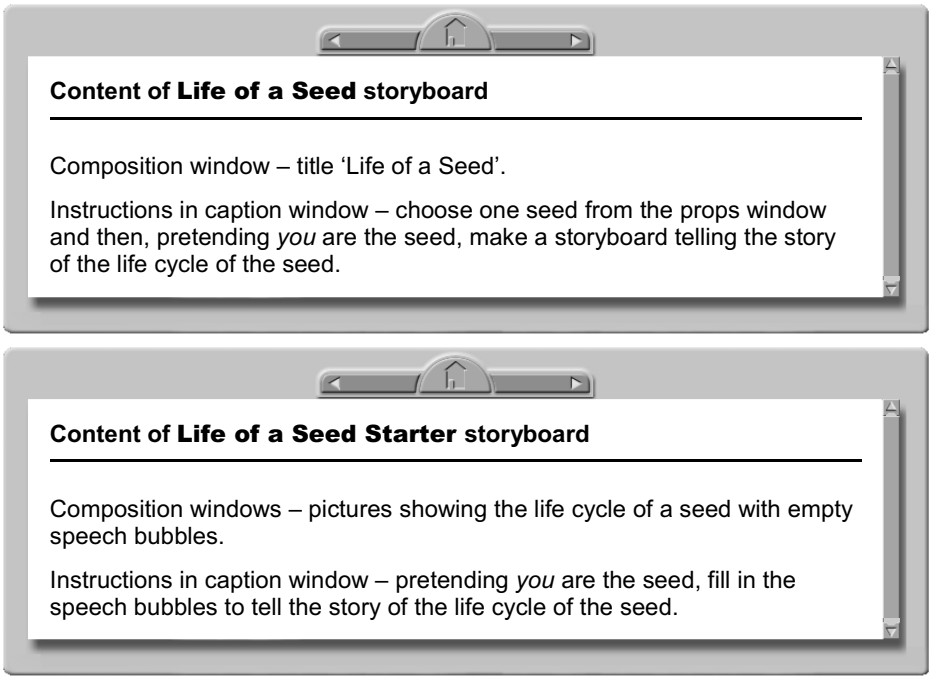
Caption windows – descriptions of the stages of the plant life cycle in a random order.

The students match up the information with the pictures by highlighting and dragging it into the empty text boxes. They then reorganise the frames following the instructions in the caption windows.

Answers in correct frame order: 6c; 8d; 1b; 2g; 7h; 3e; 4a and 5f

Plenary

5. Students open the **Life of a Seed** storyboard and complete as if they were the seed in the story. Those who need more support can open the **Life of a Seed Starter** storyboard.



Extension/ Homework

6. Set up an experiment for the students to show why seed dispersal is important to plant reproduction. There are a few examples of possible ways of carrying out this experiment to be found on Science Internet sites and reference books. A useful site is http://www.urbanext.uiuc.edu/gpe/gpe.html

Student Notes

Unit 2.2 Plant Reproduction

Objectives

This activity will allow you to investigate the life cycle of plants, and help you to understand how they reproduce.

Outcomes

By working through this activity you will:

- complete a storyboard showing the process of pollination
- use a storyboard to consider how seeds can be dispersed
- produce a storyboard poster on the life cycle of a plant
- make your own storyboard describing the life of a seed.

Resources

To complete the activity you will need:

Kar2ouche *Living Things in Their Environments*

Activities

Introduction

1. Listen to some information on why plants need to be pollinated if they are to produce seeds. Join in with a class discussion on the function of seeds.

Development

2. Open the **Pollination** storyboard and complete to show the process of pollination.

   click here to open the **Pollination** storyboard.

3. Open the **Dispersal** storyboard and complete to find out about different methods of seed dispersal.

   click here to open the **Dispersal** storyboard.

4. Load and open **Life Cycle** storyboard and arrange the pictures and information in the correct order to show the life cycle of a dandelion and produce a poster for display.

   click here to open the **Life Cycle** storyboard.

Plenary

5. Either open the **Life of a Seed** or **Life of a Seed Starter** storyboard and complete as if you were the seed in the story.

   click here to open the **Life of a Seed** storyboard.

   click here to open the **Life of a Seed Starter** storyboard.

Extension/Homework

6. Carry out an experiment to show why seed dispersal is important to plant reproduction.

Unit 3 Classification, Local Habitats and Adaptation

This three-part unit considers how living things are grouped, the different habitats that organisms live in and how they have adapted to these environments.

Teacher Notes

Unit 3.1 Classification

Key Stage/Year	Key Stage 2/Years 3-4
Group Organisation	Students can begin this activity in pairs then join with another pair to compare ideas. They will come together for class discussion time but work mainly in small groups of 2 or 3 when using the computers.
Suggested Timing	1-2 lessons – if computers are not available for the full time, the introductory part of this activity could be completed in the classroom.

Overview of Task

During this activity the students will explore how the great diversity of living things on this planet can be organised and grouped to make study more manageable. They begin by devising their own categories for grouping a wide-ranging collection of organisms before exploring how keys can be used to help identify living things.

Objectives

All students will: recognise that there are a large number of organisms that can be grouped in a number of ways.

Most students will: begin to devise different categories to classify organisms.

Some students will: recognise that some ways of grouping organisms are more useful than others, and consider the benefits of classification.

Curriculum References

National Curriculum

Science

Sc1 Scientific enquiry 1a that science is about thinking creatively to try to explain how living and non-living things work, and to establish links between causes and effects.

Sc2 Life processes and living things 1c to make links between life processes in familiar animals and plants and the environments in which they are found; **4a** to make and use keys; **4b** how locally occurring animals and plants can be identified and assigned to groups; **4c** that the variety of plants and animals makes it important to identify them and assign them to groups.

Outcomes

By the end of this activity students will have:

- devised their own criteria for grouping animals and plants
- worked out one method for classifying vertebrates
- discussed the benefits of classification.

Resources

Kar2ouche *Living Things in Their Environments*

- **Diversity** storyboard
- **Key** storyboard
- **Mini-beast** storyboard

Sheet 3.1 *Mini-beasts Key*

Selection of plant or bird books that contain keys and classifications that help readers identify unknown plants/birds

Key Words: organism, classification, criteria, vertebrate, invertebrate, diversity

Activities

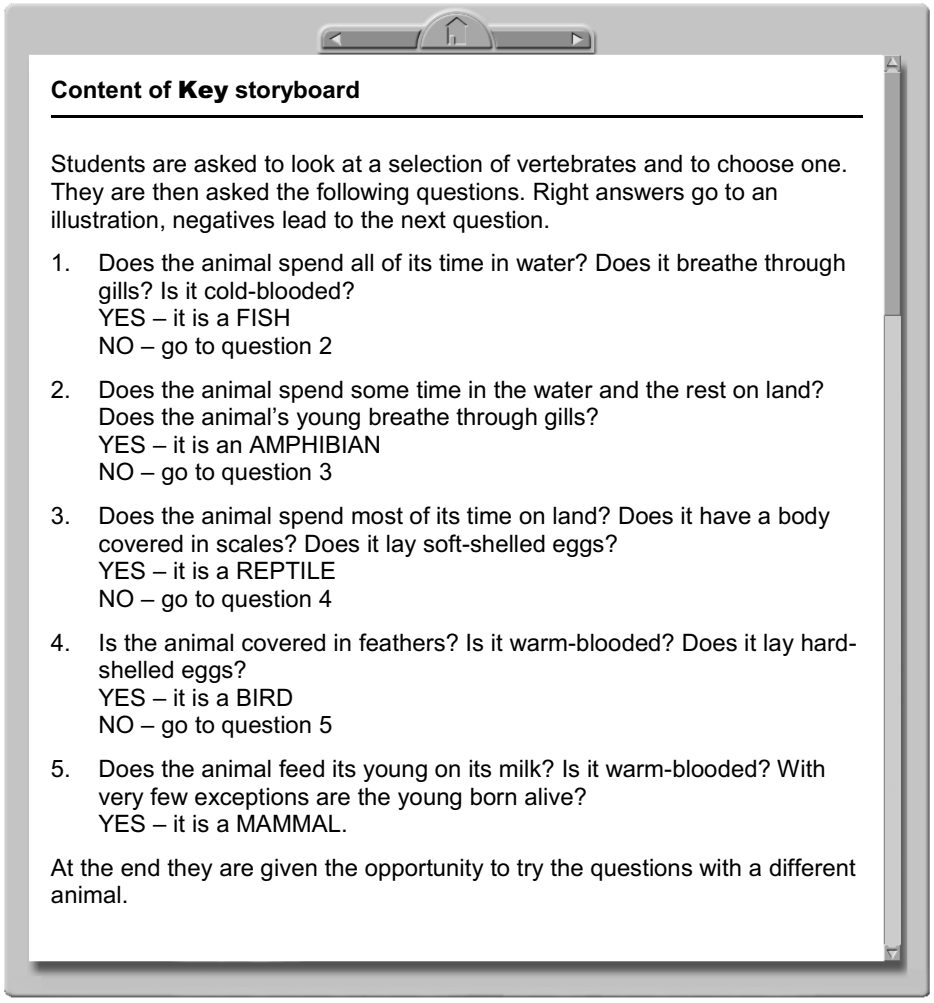
Introduction

1. Students look at the range of animals and plants in the **Diversity** storyboard and devise some way of grouping them to show similarities and differences. If necessary give clues, for example, classification may be based on outward appearance, internal features, what they eat, where they live, how they live and so forth. If PCs are unavailable, the storyboard can be printed. The animals and plants can then be cut out and arranged physically into the groups they have formulated.
2. Once students have arranged the animals and plants in groups, they can give these to another pair of students and ask them to work out the criteria they used to allocate organisms to the various groups.

Development

3. Discuss how they classified the organisms and relate what they created to some of the more commonly used groupings, such as, animal/plant, vertebrate/invertebrate, carnivore/herbivore etc. Explain that classification places together organisms that share similarities and are different from all other organisms. These groupings can begin with very general descriptions, but each successive grouping becomes more specific.

4. Introduce keys by telling students that these are tools used to identify living organisms or the group to which they belong. Keys can take different forms, but many involve working through a series of questions that allow the user to narrow down and name the organism. To see a key in action, students work through the **Key** storyboard. This provides interactive questions and answers that allow them to classify a number of vertebrates.



Content of Key storyboard

Students are asked to look at a selection of vertebrates and to choose one. They are then asked the following questions. Right answers go to an illustration, negatives lead to the next question.

1. Does the animal spend all of its time in water? Does it breathe through gills? Is it cold-blooded?
   YES – it is a FISH
   NO – go to question 2
2. Does the animal spend some time in the water and the rest on land? Does the animal's young breathe through gills?
   YES – it is an AMPHIBIAN
   NO – go to question 3
3. Does the animal spend most of its time on land? Does it have a body covered in scales? Does it lay soft-shelled eggs?
   YES – it is a REPTILE
   NO – go to question 4
4. Is the animal covered in feathers? Is it warm-blooded? Does it lay hard-shelled eggs?
   YES – it is a BIRD
   NO – go to question 5
5. Does the animal feed its young on its milk? Is it warm-blooded? With very few exceptions are the young born alive?
   YES – it is a MAMMAL.

At the end they are given the opportunity to try the questions with a different animal.

5. Building on what they have discovered, students can look closely at a series of creatures in the **Mini-beast** storyboard, then drag and drop them onto the correct space in the blank key. The completed storyboard can be printed out or students can use Sheet 3.1 *Mini-beasts Key* and complete by hand.

Plenary

6. In groups, ask students to brainstorm why it's useful to be able to classify organisms. Ask them to feed back their ideas and list them on a board or flipchart.

7. In managing the discussion, it is worth noting that there are more than 2,000,000 plants and animals in the world – a bewildering number of individual species. By grouping them, they become easier to study and compare. Classification and keys also allow us to identify unknown organisms. What's more, by answering the sorts of branching questions that appear in keys, we're encouraged to look much more closely at the organism being studied, and so learn more about it.

Extension/ Homework

8. Students could look at plant or bird-spotting books to see how classification and keys help people to identify unknown organisms, and then use one of these books to find out about something new in the local environment.
9. Students could be asked to take photos of animals and plants in the local environment, and then create a series of branching questions and a key for these items. Groups could use their pictures, questions and keys to create a class display.

Student Notes

Unit 3.1 Classification

Objectives

During this activity you will explore how the huge number of living things on this planet can be grouped. You will make up your own system for grouping a number of organisms and look at how keys can be used to help you find out the name of living things.

Outcomes

By the end of this activity you will have:

- worked out different ways of grouping animals and plants
- answered questions that allow you to group a range of vertebrates, that is, creatures with backbones
- explained how classification is a helpful tool for scientists.

Resources

Kar2ouche *Living Things in Their Environments*

Sheet 3.1 *Mini-beasts Key* (optional)

Plant and bird books that contain keys and classification systems

Activities

Introduction

1. Open the **Diversity** storyboard and look at all the living things in the first few frames. It's really hard to talk about these organisms without grouping them in some way.

   click here Click here to open the **Diversity** storyboard.

2. With a partner think of ways to group them. Drag the living things from the start of the storyboard into the blank frames at the end of the storyboard. Each blank frame should be one group. If you need more frames, you can make them by clicking on the red bead. Delete any that you don't need. Do your groups help to show how the organisms are similar and different?
3. Swap your storyboard with another pair of students. Can they work out what your ideas were for grouping your living things? Talk together about the decisions you made.
4. There is a blank text box in each of the new frames. Type a description of your grouping in this box.

Student Notes

Development

5. With your teacher, talk about how you classified the different organisms. Listen carefully to how other people grouped the same organisms. Which were the best classifications and why?
6. Keys are tools that help you work out the identity of an animal or plant. There are many types of keys but most ask a series of questions. To see a key in action, open the **Key** storyboard and answer the questions.

   click here Click here to open the **Key** storyboard.
7. Look closely at the animals in the **Mini-beast** storyboard. Follow the instructions to complete the key.

   click here Click here to open the **Mini-beast** storyboard.

Plenary

8. With a partner, list the reasons why it's useful to be able to classify organisms. Think about how many living things there are in the world and how we find out about them.

Extension/Homework

9. Skim the first few pages of a plant or bird-spotting book. How do these books help you to find the names of plants and birds you have seen? Use one of these books to find out about something new you have spotted near your school.
10. If you have a digital camera, you can take photos of animals and plants around your school and home. Write some questions and create a key to help one of your classmates identify the items you have photographed. Use your pictures, questions and keys to create a class display.

Classification Sheet 3.1

Mini-beasts Key

Draw or print out a picture of a suitable mini-beast and stick it in the correct blank box.

Does it have legs?

No

Does it have a shell?

No

Yes

Yes

Does it have more than eight legs?

No

Yes

Does it have six legs

No

Yes

Does it have wings

No

Yes

What could you ask about the wings to narrow the search even further? Look closely at all the winged mini-beasts in the Kar2ouche props. Write your question here. →

Teacher Notes

Unit 3.2 Local Habitats

Key Stage/Year	Key Stage 2/Years 3-4, but could be used as preparatory activity for Years 5-6 leading on to Activity 3.3
Group Organisation	Students can begin this activity in pairs and then join with another pair to compare ideas. They will come together for class discussion time, but work mainly in small groups of 2 or 3 when using the computers.
Suggested Timing	1-2 lessons, possibly more if they complete the practical work referred to in the extension section.

Overview of Task

Students begin by working out the features that enable them to recognise local and UK habitats. They go on to look closely at one particular habitat and the features within it that allow the organisms found there to survive. If there is time, they can design and conduct an experiment to test which habitats are most suited to a particular organism.

Objectives

All students will: recognise that there are a variety of organisms and habitats.

Most students will: recognise that different organisms can be found in different habitats.

Some students will: define why specific organisms thrive in particular habitats and explore ways of finding out the habitats that best support particular organisms.

Curriculum References

National Curriculum

Science

Sc1 Scientific enquiry 1a that science is about thinking creatively to try to explain how living and non-living things work, and to establish links between causes and effects; **1b** that it is important to test ideas using evidence from observation and measurement; **2a** ask questions that can be investigated scientifically and decide how to find answers; **2c** think about what might happen or try things out when deciding what to do, what kind of evidence to collect, and

what equipment and materials to use; **2h** use a wide range of methods, including diagrams, drawings, tables, bar charts, line graphs and ICT, to communicate data in an appropriate and systematic manner; **2i** use observations, measurements or other data to draw conclusions; **2l** use their scientific knowledge and understanding to explain observations, measurements or other data or conclusions; **2m** review their work and the work of others and describe its significance and limitations.

Sc2 Life processes and living things 1c to make links between life processes in familiar animals and plants and the environments in which they are found; **4a** to make and use keys; **4b** how locally occurring animals and plants can be identified and assigned to groups; **4c** that the variety of plants and animals makes it important to identify them and assign them to groups; **5b** about the different plants and animals found in different habitats.

Outcomes

By the end of this activity students will have a:

- definition of habitat
- description of a particular UK habitat
- design for an experiment to test the conditions that a particular organism prefers.

Resources

Kar2ouche *Living Things in Their Environments*

- **Habitat** storyboard
- **UK Habitats** storyboard
- **Woodlouse's House** storyboard

Sheet 3.2a *Surviving*

Sheet 3.2b *Habitat Experiment*

Key Words: habitat, organism, thrive, season, survival, predator, shelter

Introduction

1. To relate this to the previous lesson, discuss how one of the ways of classifying animals and plants is according to where they can be found, or their habitats. Work with the class on a definition of habitat. For instance, the environment where a plant or animal is usually found – the natural home of a living thing. Explain how living things rely on specific habitats for food, water, shelter and a place to raise their young.

Development

2. In pairs, students open the **Habitat** storyboard. This presents a range of habitats. If you have time, you can add digital photographs of recognisable local environments. Students are asked to sort them according to the sorts of habitats to be found locally, those found within the UK and those found abroad. If they have time, they can discuss how they know this. The final frame asks them to brainstorm the sorts of features they might identify in order to recognise a habitat.

3. Students open the **UK Habitats** storyboard. Again if you have time, add digital photos of some local spots. Students are asked to research and describe the features that are important to the organisms in the habitats presented. For example, they may be asked to describe the amount of light, the average temperature, the variations in temperature (seasonal and daily), potential shelter, available food, soil type and depth, amount of moisture, number of predators, gradient etc. The questions vary according to the particular habitat. If you have added your own pictures, you will need to add a couple of guided questions too.
4. Allocate the different UK habitats to different groups of students. Finally, students describe why each of their organisms is suited to the particular habitat in the caption window below the picture.

Plenary

5. Students print out and compare the frames they have created. Discuss with them what they think would happen if conditions in the habitat changed.

6. To consolidate learning, and based on what they have found out from each other, students should complete Sheet 3.2a *Surviving*. To complete the first column, students could print and cut out pictures of organisms from Kar2ouche.

Extension/Home work


7. In small groups, ask students to devise an experiment they could do in the classroom or at home to test the sort of habitats specific organisms prefer. See Sheet 3.2b *Habitat Experiment.* Those who need more support can open the **Woodlouse's House** storyboard and put together the elements needed to test what conditions woodlice prefer.

Student Notes

Unit 3.2 Local Habitats

Objectives

In this activity you will look at the conditions that plants and animals need in order to survive in a location. Finally you will design an experiment to test what conditions organisms prefer when they have the choice!

Outcomes

At the end of this activity you will:

- be able to describe what we mean when we say habitat
- have explored at least one habitat found in the UK
- have designed an experiment to show what sort of habitat is needed to support a particular organism.

Resources

To complete this activity you will need:

Kar2ouche *Living Things in Their Environments*

Sheet 3.2a *Survival*

Sheet 3.2b *Habitat Experiment*

Activities

Introduction

1. You can group animals and plants by where they live. Another name for an organism's natural home is its habitat.

Development

2. Open the **Habitat** storyboard. Sort the pictures of habitats into the ones that you might find near your school, the ones you'd find in the United Kingdom and those that you'd find in another country. What things do you look at to help you decide?

   click here to open the **Habitat** storyboard.

3. Open the **UK Habitats** storyboard. Look closely at the pictures and describe the things that are important to help a plant or animal survive. You'll find some questions to help you.

   click here to open the **UK Habitats** storyboard.

4. Now your teacher will ask you to look at just one of the backgrounds. Explain how the organism survives in this habitat.

Student Notes

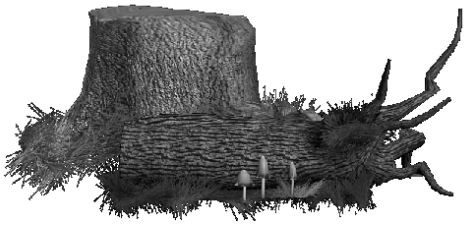
Plenary

5. Print out your frame. Show your frame to another pair of students. How is it similar and how is it different? What would happen if conditions in the habitat changed?
6. Now show how much you have learnt from each other by filling in Sheet 3.2a *Survival*. If you have time, print and cut out pictures of organisms from Kar2ouche.

Extension/Homework

7. In small groups make up an experiment you could do in the classroom or at home to test the sort of habitats specific organisms prefer. Sheet 3.2b *Habitat Experiment* gives you some questions to get you thinking.
8. If you need some help, click on the storyboard

to open the **Woodlouse's House** storyboard.



Local Habitats Sheet 3.2a

Survival

Organism – animal or plant	Habitat – where it lives	Features of the habitat important to the survival of the organism
	[insert picture with space for label here]	
	[insert picture with space for label here]	
	[insert picture with space for label here]	
	[insert picture with space for label here]	
	[insert picture with space for label here]	

Local Habitats Sheet 3.2b

Habitat Experiment

Science is about thinking creatively and explaining how living and non-living things work. It is important to test your ideas using evidence from observation and measurement.

1 What simple living things can you find around you? For example, woodlice, maggots, worms, slugs, snails, cress, bean sprouts

Choose ONE of these.

.....

2 How might you find out which habitat is best for the organism you have chosen? Remember, you mustn't be cruel or harm living things. What things will you test?

.....

.....

3 What equipment and materials will you need?

.....

.....

.....

4 What kind of evidence will you collect?

.....

.....

5 How will you present your findings? For example, will you use diagrams, drawings, tables, bar charts, line graphs and/or writing?

.....

6 What can you say about what habitat is most suitable for your organism?

.....

.....

Teacher Notes

Unit 3.3 Adaptation

Key Stage/Year	Key Stage 2/Years 5-6
Group Organisation	Students begin in pairs so that they can discuss the decisions they make and try to explain their reasoning.
Suggested Timing	Two lessons not including time for the suggested extension or homework activity.

Overview of Task

In this task the students look at features that make animals suited to the environments in which they live. They begin by selecting the right environment for a number of creatures before looking more closely at the specific adaptations of camels and cacti for desert living.

Objectives

All students will: recognise that there are many different habitats that are unlike the local environment.

Most students will: learn how animals are adapted to different habitats.

Some students will: identify the particular features of habitats and the characteristics of particular organisms that mean they are well suited.

Curriculum References

National Curriculum

Science

Sc1 Scientific enquiry 1a that science is about thinking creatively to try to explain how living and non-living things work, and to establish links between causes and effects; **2a** ask questions that can be investigated scientifically and decide how to find answers; **2l** use their scientific knowledge and understanding to explain observations, measurements or other data or conclusions.

Sc2 Life processes and living things 1c to make links between life processes in familiar animals and plants and the environments in which they are found; **5b** about the different plants and animals found in different habitats; **5c** how animals and plants in two different habitats are suited to their environment.

Outcomes

By the end of this activity students will have:

- completed an interactive storyboard in which they have to decide which animals are adapted to particular environments
- created posters describing how two different organisms are suited to two different habitats
- designed a new plant and animal suited to living in a particular environment.

Resources

Kar2ouche *Living Things in Their Environments*

- **Stop the Bus** storyboard
- **Camel and Cactus** storyboard
- **Just the Right Spot** storyboard
- **Creation** storyboard

Sheet 3.3a *This is the Right Place for Me*

Sheet 3.3b *Adaptation Scaffold*

Post-it™ notes (optional)

Key Words: adaptation, camouflage, habitat, suited, environment, hibernate, conserve, evaporation

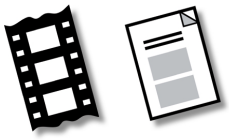
Activities

Introduction

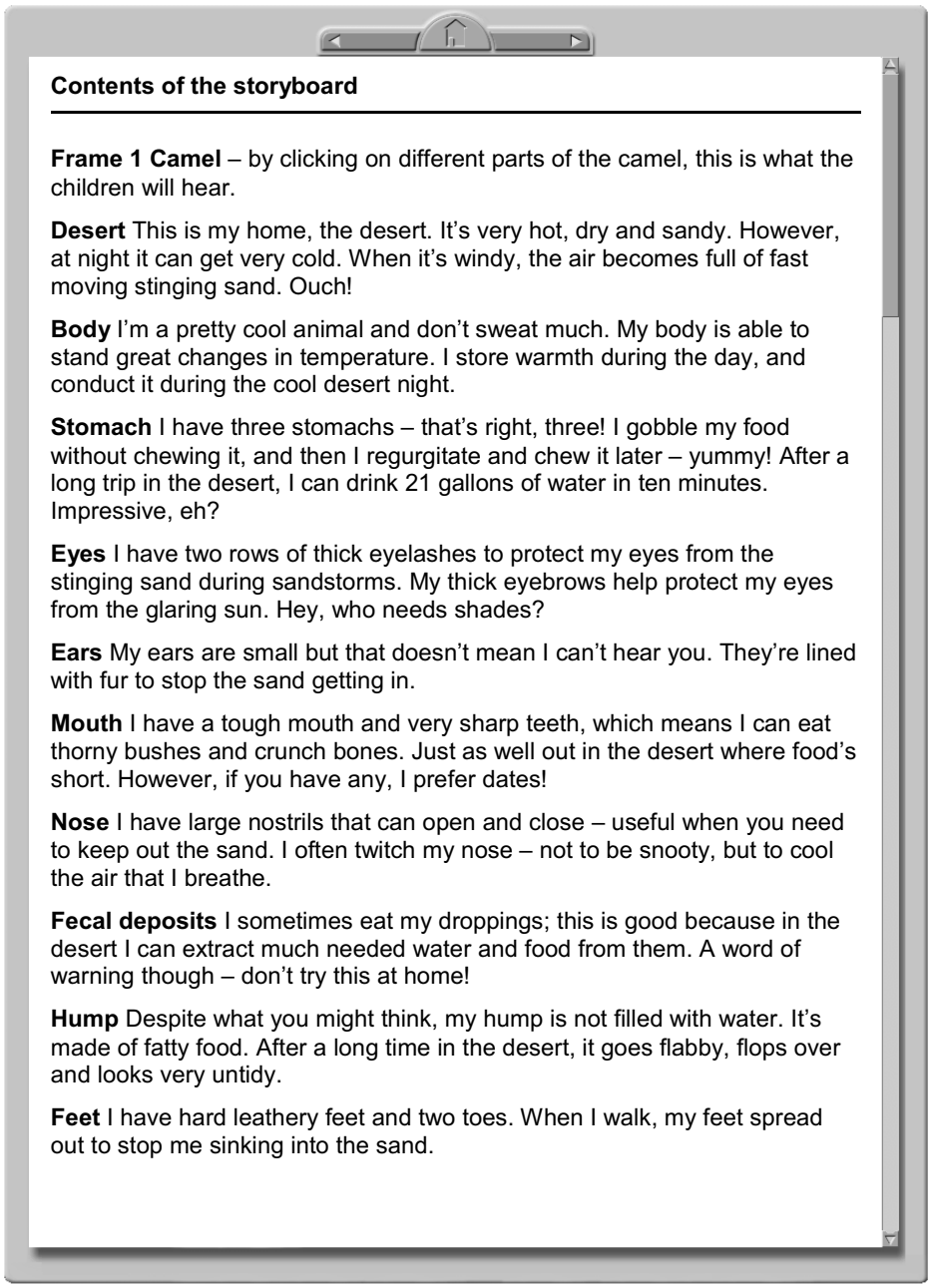
1. Begin by discussing quite briefly why you find different organisms – plants and animals – in different habitats. You might want to ask specific prompt questions to get students thinking about features of habitats and the main characteristics of a number of organisms. For instance, why wouldn't you find a frog in the desert or a sunflower at the North Pole? Try to get students to explore the way in which adaptation improves the organism's ability to reproduce, find food and defend itself against predators and/or harsh conditions.

2. Play the **Stop the Bus** storyboard in which pairs of students are asked to say when a particular animal has reached the correct habitat. If they get it right, there is a fanfare and the animal is left in the landscape; if they get it wrong, the animals all make a terrible noise and they have to try again. There is a camel, a polar bear, a woodlouse, an alligator and a badger on the bus. The habitats they visit are a deciduous wood, a swampy river, a rotting log, a desert and an ice field in the arctic.

Development



3. Students watch the **Camel and Cactus** storyboard. You could show this on an interactive whiteboard and invite individuals to click on various parts of the animal and plant. By doing this they find out how the organisms are adapted to life in the desert. They can record their findings on Sheet 3.3a *This is the Right Place for Me.*



Contents of the storyboard

Frame 1 Camel – by clicking on different parts of the camel, this is what the children will hear.

Desert This is my home, the desert. It's very hot, dry and sandy. However, at night it can get very cold. When it's windy, the air becomes full of fast moving stinging sand. Ouch!

Body I'm a pretty cool animal and don't sweat much. My body is able to stand great changes in temperature. I store warmth during the day, and conduct it during the cool desert night.

Stomach I have three stomachs – that's right, three! I gobble my food without chewing it, and then I regurgitate and chew it later – yummy! After a long trip in the desert, I can drink 21 gallons of water in ten minutes. Impressive, eh?

Eyes I have two rows of thick eyelashes to protect my eyes from the stinging sand during sandstorms. My thick eyebrows help protect my eyes from the glaring sun. Hey, who needs shades?

Ears My ears are small but that doesn't mean I can't hear you. They're lined with fur to stop the sand getting in.

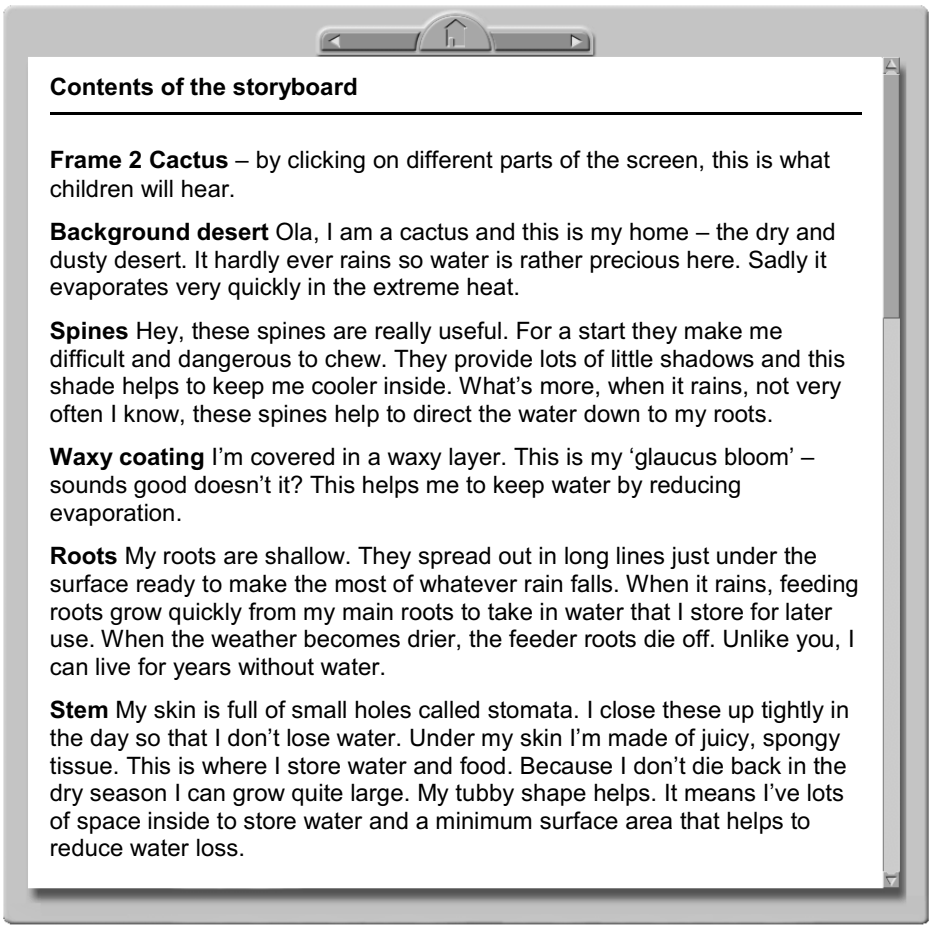
Mouth I have a tough mouth and very sharp teeth, which means I can eat thorny bushes and crunch bones. Just as well out in the desert where food's short. However, if you have any, I prefer dates!

Nose I have large nostrils that can open and close – useful when you need to keep out the sand. I often twitch my nose – not to be snooty, but to cool the air that I breathe.

Fecal deposits I sometimes eat my droppings; this is good because in the desert I can extract much needed water and food from them. A word of warning though – don't try this at home!

Hump Despite what you might think, my hump is not filled with water. It's made of fatty food. After a long time in the desert, it goes flabby, flops over and looks very untidy.

Feet I have hard leathery feet and two toes. When I walk, my feet spread out to stop me sinking into the sand.



Contents of the storyboard

Frame 2 Cactus – by clicking on different parts of the screen, this is what children will hear.

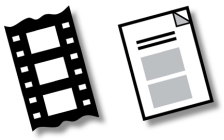
Background desert Ola, I am a cactus and this is my home – the dry and dusty desert. It hardly ever rains so water is rather precious here. Sadly it evaporates very quickly in the extreme heat.

Spines Hey, these spines are really useful. For a start they make me difficult and dangerous to chew. They provide lots of little shadows and this shade helps to keep me cooler inside. What's more, when it rains, not very often I know, these spines help to direct the water down to my roots.

Waxy coating I'm covered in a waxy layer. This is my 'glaucus bloom' – sounds good doesn't it? This helps me to keep water by reducing evaporation.

Roots My roots are shallow. They spread out in long lines just under the surface ready to make the most of whatever rain falls. When it rains, feeding roots grow quickly from my main roots to take in water that I store for later use. When the weather becomes drier, the feeder roots die off. Unlike you, I can live for years without water.

Stem My skin is full of small holes called stomata. I close these up tightly in the day so that I don't lose water. Under my skin I'm made of juicy, spongy tissue. This is where I store water and food. Because I don't die back in the dry season I can grow quite large. My tubby shape helps. It means I've lots of space inside to store water and a minimum surface area that helps to reduce water loss.



4. Using what they have learnt from the camel and the cactus, pairs of students open the **Just the Right Spot** storyboard and choose two from the four organisms to compare (badger, worm, water lily and duck). In the first instance, they drag the chosen organism into the right habitat and then delete the others. Finally they select from the pile of text boxes the ones that apply to their organism and how it is adapted to the habitat. They join these to the correct feature using arrows. Irrelevant descriptions can be discarded. Finally they take it in turns to write a paragraph about each organism in the appropriate caption window and check each other's work. If they need help they can refer to Sheet 3.3b *Adaptation Scaffold* that provides the structure for writing about all four organisms.

Plenary

5. Students can print out their work as posters and compare what they have written with other pairs.
6. If there is time, they can return to their work to make any improvements stimulated by seeing what others have written.

Extension/ Homework

7. In the **Creation** storyboard students find descriptions of a number of habitats. They have to design a new animal and plant that would be adapted to the conditions. If you have a scanner, these new organisms can be scanned and imported into Kar2ouche by clicking on the orange folder at the bottom of the backgrounds palette.
8. Ask students to get into pairs and swap work. They need to label the features that make their partner's animal suited to the conditions described. They can add text boxes in Kar2ouche or use Post-it™ notes on paper artwork.
9. To create a class slideshow of a wacky safari add the storyboards together. To do this, go into the utilities screen and load the first storyboard. Now click and drag the load icon to the bead at the end of the first storyboard. When you let go you will be able to open the next student's storyboard. Repeat this process until either a small group's or whole class's storyboards have been combined.

10. Alternatively, students could listen to the polar bear's speech in the text/audio window and make a storyboard about how she is adapted to her environment.

Student Notes

Unit 3.3 Adaptation

Objectives

During this activity you will look at the features of environments and the ways that animals and plants adapt to the conditions.

Outcomes

At the end of this activity you will have:

- explored some animals and plants that can be found in particular environments
- shown how certain animals and plants are adapted to survive in particular habitats.

Resources

To complete this activity you will need:

Kar2ouche *Living Things in Their Environments*

Sheet 3.3a *This is the Right Place for Me*

Sheet 3.3b *Adaptation Scaffold*

Activities

Introduction

1. Why do you think you find different plants and animals in different habitats? Why wouldn't you find a frog in the desert? Would you find a sunflower at the North Pole? Why do you think this is?
2. With a partner open the **Stop the Bus** storyboard. The bus is full of animals looking for their natural homes. When you get to the right habitat click on the animal to let them off the bus.

   to open the **Stop the Bus** storyboard.

Development

3. Watch the **Camel and Cactus** storyboard. Click on various parts of the animal and plant to find out how they are adapted to life in the desert. Record your findings on Sheet 3.3a *This is the Right Place for Me.*

   to open the storyboard.
4. Open the **Just the Right Spot** storyboard and, with your partner, choose two from this list of four: badger, worm, water lily and duck. Delete the two you don't want.

   to open the **Just the Right Spot** storyboard.
5. Drag the two you have chosen into the habitats where they would naturally be found. Delete the other habitats. Right click on the thumbnail and click on the delete icon. Select the descriptions that describe how your chosen organisms are adapted to their habitats from the text boxes in the corner.

Student Notes

6. You need to write one paragraph each to describe how the organism is adapted to the particular environment. Decide between you who will write about which organism. Write in the caption window and check each other's work. If you need help, ask your teacher for Sheet 3.3b *Adaptation Scaffold*.

Plenary

7. Print your work as a poster and compare what you have done with at least one other pair.
8. Ask them if they can suggest how to improve what you have done.
9. If there is time, go back to your work and make it better.

Extension/Homework

10. Open the **Creation** storyboard and read the descriptions. Ask yourself:
    - What sort of animal and plant could live there?
    - What features would plants and animals need to survive in one of these habitats?

    Think about the available food, potential shelters, weather conditions and what the ground is like. What sorts of leaves, stalks, roots and flowers might the plant need and why? What sort of mouth, skin covering, legs, feet, colour would an animal need to survive? Why? Where would they live? What would they eat? How do they move around? Let your imagination run wild and think of all the features that might be adapted to a particular environment. Now draw your new plant and creature.

    to open the **Creation** storyboard.
11. Ask another student to label the features that make your animal suited to the conditions described.
12. If you want to, you can listen to the polar bear audio in the text/audio palette and make a storyboard to explain how this creature survives in sub-zero conditions.

Adaptation Sheet 3.3a

This is the Right Place for Me

Camel

I live:

The conditions here are:

My hump is made of:

This helps me survive because:

My teeth are:

This is good because:

My eyes are:

This helps by:

My ears are:

This helps by:

My nostrils:

This is useful because:

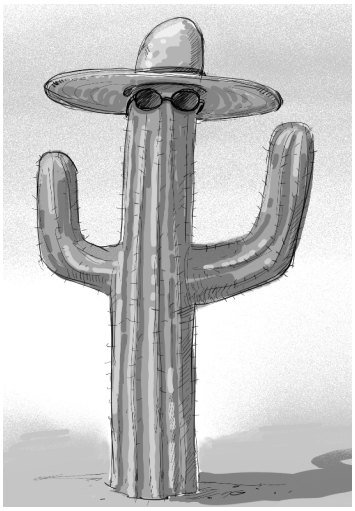
My mouth:

This means that:

My feet are:

These help me to:

Cactus



You will find me:

The conditions here are:

My stem is:

This helps me because:

My spines are:

These are really useful and help by:

I'm covered in:

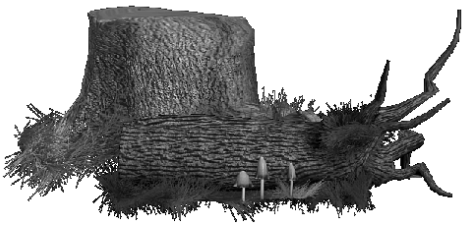
This means that:

My roots are:

This means that:

Adaptation Sheet 3.3b

Adaptation Scaffold



Badgers

A **badger** is well suited to living _____. It has a _____ coat to help it _____.

Its powerful legs mean that it can _____.

Although it has small ears it can hear well which means it can hear _____.

Its nose is _____ for _____.

_____.

The badger protects its young by digging a burrow called a _____.

Earthworms

The **earthworm** is well suited to living in moist soil. Its body is covered in tiny bristles that help it to _____.

The circular muscles around its body and the longitudinal ones along it enable it to travel deep into the soil. This can be used as protection against _____, _____ and _____.

The earthworm is a hermaphrodite. Hermaphrodites contain both male and female reproductive organs. This means they can _____ _____.

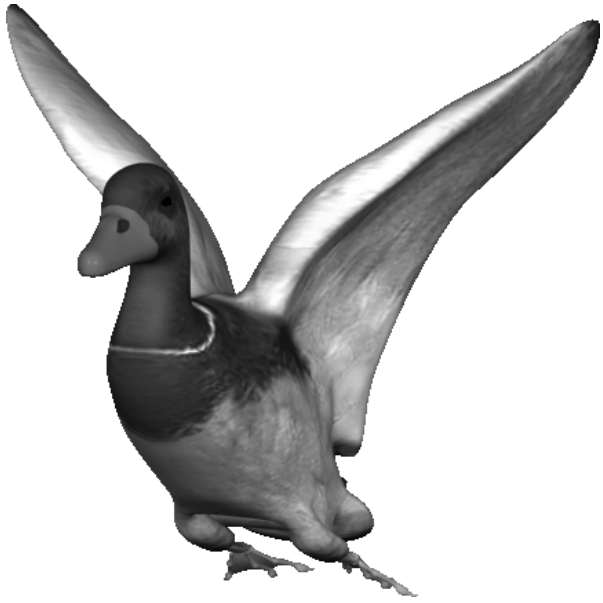
Earthworm eggs are _____ to protect them from damage and so increase the chances of hatching.

Water lilies

The **water lily** likes damp conditions and is well suited to living in water. Although it is rooted, it has a long stem and flower that reaches up to the _____. It has air spaces in the stem that enable it to _____. The holes, or stomata, in the leaf allow the water lily to breath. These are only found _____ because _____. The upper surface has a thick waxy coating to _____ _____.

Ducks

A **duck** is well suited to living on land and water. It has a filter in its bill to _____ and a long neck to reach _____ . Its webbed feet act like paddles and help it to _____. Because there are no blood vessels in a duck's feet they do not feel the _____. Its waterproof feathers, layer of downy under-feathers and layer of fat also help to keep it _____ and _____ in the water.



Phrases (optional sheet)

If you have trouble filling in the gaps, these phrases and words might help. Sometimes they can be copied into the gaps. At other times they will just act as a prompt to give you ideas.

Badgers

long woodland set sniffing food grey enemies hide run

Earthworms

cold move reproduce easily heat capsules birds

Water Lilies

float sun upper surface waterproof in water

Ducks

mud swim warm sift food cold dry

Unit 4 Feeding Relationships

This unit allows students to investigate food chains and ecosystems.

Teacher Notes

Unit 4.1 Food Chains

Key Stage/Year	Key Stage 2/Years 5-6
Group Organisation	Begins with class work but can move on to pair or individual work at the 'Development' stage.
Suggested Timing	One or two lessons depending on how quickly they grasp the concepts. There is a range of storyboards that consolidate the basic ideas and give students practice in exploring how food chains work.

Overview of Task

Students discuss what they know about the ways in which an organism's diet can be explained. They create a storyboard to show the main steps in food chains and then reorganise a storyboard to show where different organisms come within the food chain. They finish by playing a card game that requires them to discuss which creatures are higher in the food chain than others.

Objectives

All students will: understand that all living things in an area are connected in some way and recognise that many organisms are eaten by other organisms.

Most students will: learn that organisms can be classified in different ways according to where they come in the food chain – producers, consumers and decomposers.

Some students will: recognise that there are different levels within particular categories and predict where organisms are placed in the food chain.

Curriculum References

National Curriculum

Science

Sc1 Scientific enquiry 1a that science is about thinking creatively to try to explain how living and non-living things work, and to establish links between causes and effects; **2b** consider what sources of information, including first hand experience and a range of other sources, they will use to answer questions.

Sc2 Life processes and living things 1c to make links between life processes in familiar animals and plants and the environments in which they are found; **5d** to use food chains to show feeding relationships in a habitat; **5e** about how nearly all food chains begin with a green plant.

Outcomes

By the end of this activity students will have:

- completed a storyboard that defines the main stages in the food chain
- reorganised a storyboard to put organisms in the right place within a food chain
- defined organisms according to whether they are herbivores, carnivores or omnivores
- played a game to test their understanding.

Resources

Kar2ouche *Living Things in Their Environments*

- **Producer and Consumer** storyboard
- **Food Chain** storyboard
- **Who Eats What?** storyboard
- **Consumers** storyboard
- **Card Game** storyboard

Sheet 4.1a A *Card Game Reference*

Sheet 4.1b *Food Chains*

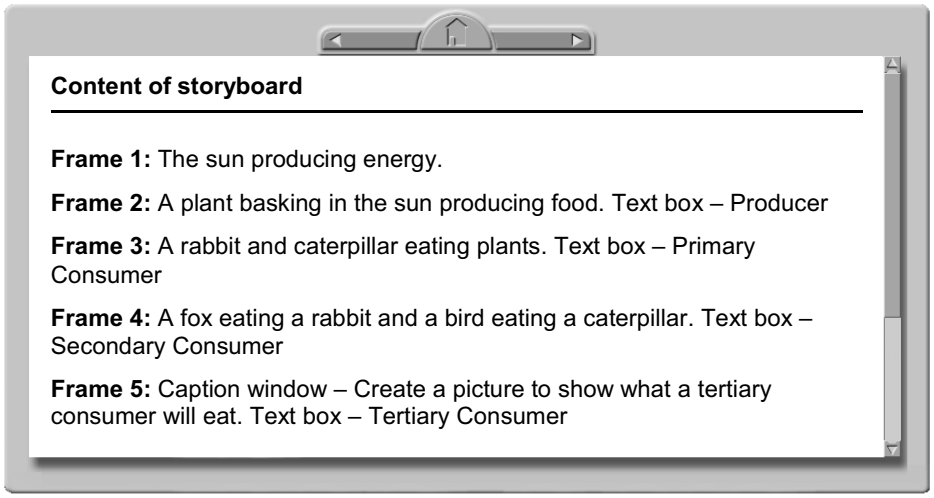
Key Words: producer, consumer (primary, secondary and tertiary), herbivore, carnivore, omnivore, predator, prey, food chain

Activities

Introduction

1. Discuss diet and what different organisms need to survive. Find out the vocabulary students already know to describe what sorts of things organisms eat.
2. Introduce the idea that the transfer of energy from the sun into the tissue of plants sustains life and that plants are at the bottom of the food chain. Subsequently this energy is passed on to animals that eat plants, and from there to animals that eat the animals that eat the plants. Plants are therefore producers of energy whereas animals are consumers. Primary consumers eat plants and are herbivores. Secondary consumers eat herbivores, and are themselves called carnivores.

3. Show the class the **Producer and Consumer** storyboard. When you get to the end ask them to predict what a tertiary consumer might eat. Drag a carnivore or omnivore that eats another carnivore or omnivore into the frame. For instance you could put a cat with the caterpillar-eating bird.



Content of storyboard

Frame 1: The sun producing energy.

Frame 2: A plant basking in the sun producing food. Text box – Producer

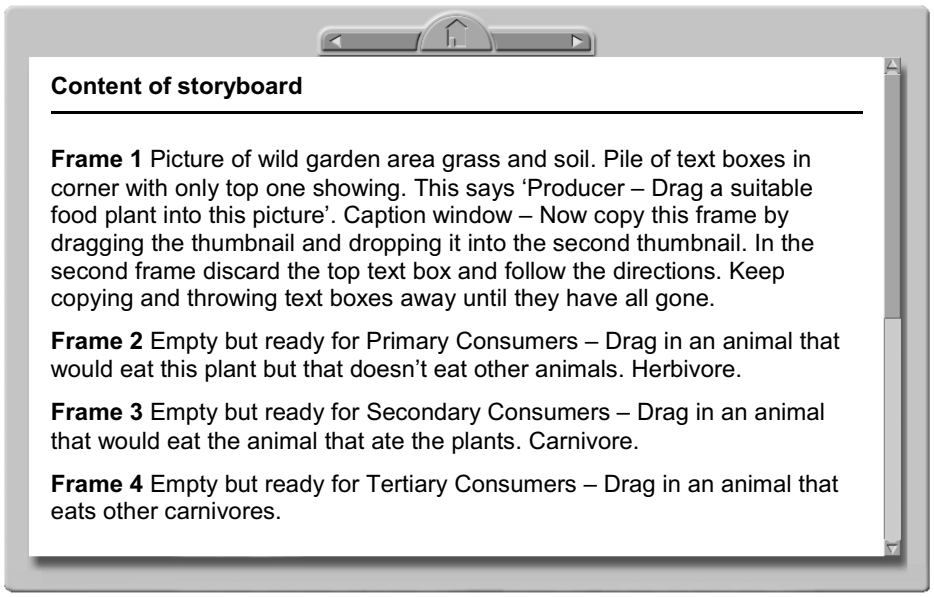
Frame 3: A rabbit and caterpillar eating plants. Text box – Primary Consumer

Frame 4: A fox eating a rabbit and a bird eating a caterpillar. Text box – Secondary Consumer

Frame 5: Caption window – Create a picture to show what a tertiary consumer will eat. Text box – Tertiary Consumer

Development

4. Having worked through the definitions, students can test their understanding of the process by working through the **Food Chain** storyboard. Introduce the terms predator and prey.



Content of storyboard

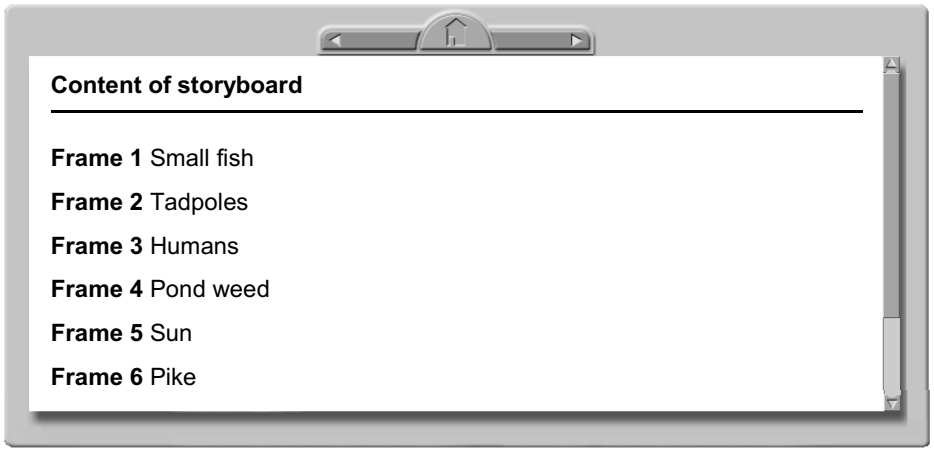
Frame 1 Picture of wild garden area grass and soil. Pile of text boxes in corner with only top one showing. This says 'Producer – Drag a suitable food plant into this picture'. Caption window – Now copy this frame by dragging the thumbnail and dropping it into the second thumbnail. In the second frame discard the top text box and follow the directions. Keep copying and throwing text boxes away until they have all gone.

Frame 2 Empty but ready for Primary Consumers – Drag in an animal that would eat this plant but that doesn't eat other animals. Herbivore.

Frame 3 Empty but ready for Secondary Consumers – Drag in an animal that would eat the animal that ate the plants. Carnivore.

Frame 4 Empty but ready for Tertiary Consumers – Drag in an animal that eats other carnivores.

5. If students still need more practice they could work in pairs to try the **Who Eats What?** storyboard. Here they work in the printing screen to drag frames into the right order. The order should be: 5, 4, 2, 1, 6, 3. More able students could create a new storyboard from scratch using the props available to create their own six-frame food chain. Ask them to add labels in the caption windows.



6. Students should compare their order with another pair and discuss any differences. When they are happy that the order is right they might want to print out their work for reference.

7. Define omnivore as an organism that eats both animal and plants. Students open the **Consumers** storyboard and look at the range of animals in the first frame: mouse, cow, camel, snail, cat, duck, human, shark and wolf. They have to decide whether they are herbivores, carnivores or omnivores. They then drag them to the correct frame Frames 2-4: herbivores, carnivores or omnivores. They may need to do some research on the web or using books from the class library. If there is time they can drag other herbivores, carnivores and omnivores into the correct frames from the props palette.
8. In Frame 5 a child says, 'I'm a vegetarian. What about me?' Discuss which group vegetarians come under. (In fact they are omnivores, because they *can* eat meat, and many eat dairy produce.)

Plenary

9. Create a game by printing the **Card Game** storyboard onto card. Explain that the rules are along the lines of those for *Paper, Scissors, Stone* crossed with *Snap*. Children turn over cards and the person with the highest element in the food chain wins the cards – They can continue until one person has all the cards. If necessary they can refer to Sheet 4.1a *Card Game Reference* to settle disputes about which organism comes highest on the food chain, but encourage them to discuss their ideas and reasons first.

Extension/ Homework

10. Students could use Sheet 4.1b *Food Chains* to make a revision sheet. Complete the tables by sticking on pictures. These could be cut from magazines, drawn or printed out from Kar2ouche.

Student Notes

Unit 4.1 Food Chains

Objectives

During this activity you will learn about the relationships between animals and plants that share a habitat.

Outcomes

At the end of this activity you will have:

- a storyboard that gives examples of producers and consumers
- a storyboard that shows a food chain
- a definition of producer, consumer, herbivore, carnivore and omnivore.

Resources

To complete this activity you will need:

Kar2ouche *Living Things in Their Environments*

Sheet 4.1a *Card Game Reference*

Sheet 4.1b *Food Chains*

Activities

Introduction

1. What sorts of things do living creatures eat? What do you call an animal that only eats plants? What about one that eats meat?
2. Plants get energy from the sun. They pass this energy on when animals eat them. Plants are therefore *producers* of energy whereas animals are *consumers*. *Primary consumers* eat plants and are called *herbivores*. *Secondary consumers* eat herbivores, and are called *carnivores*.
3. Watch the **Producer and Consumer** storyboard. What might a tertiary consumer eat?

   click here Click here to open the **Producer and Consumer** storyboard.

Development

4. Now test your understanding by working through the **Food Chain** storyboard.

   click here Click here to open the **Food Chain** storyboard.

5. If you still need more practice, try the **Who Eats What?** storyboard. Drag the frames into the right order.

   click here Click here to open **Who Eats What?** storyboard.

   See if you can create a new six-frame storyboard from scratch using props to create a typical food chain. Add labels in the caption windows.

   click here Click here to open a new storyboard.

Student Notes

6. Compare your order with someone else and discuss any differences. When you are happy that the frames are in the right order ask your teacher if you can print out your work.
7. What's an omnivore? Open the **Consumers** storyboard and look at the range of animals in the first frame. Decide whether they are herbivores, carnivores or omnivores. Drag each one to the correct frame. Ask your teacher for help researching the ones you don't know. If there is time, drag other herbivores, carnivores and omnivores into the correct frames from the props palette.

Click here for the **Consumers** storyboard.

Plenary

8. See how much you have learnt by playing the Food Chain Card Game. This is a bit like a cross between *Paper, Scissors, Stone* and *Snap*. Work in pairs. Divide the cards between you. Turn them over one at a time and lay them on the pack. The person with the organism highest in the food chain wins the cards. They don't necessarily have to eat each other, just be higher on the food chain. If they're the same, keep playing until someone wins, at which point they pick up all the cards. Continue until one person has all the cards. If you're stuck, ask your teacher for Sheet 4.1a *Card Game Reference* – but try to work out what you think first.

Extension/Homework

9. Ask your teacher for Sheet 4.1b *Food Chains*. Complete it by sticking on pictures of animals and plants that fit the category and are either eaten by or eat each other. These pictures could be cut from magazines, drawn, or printed out from Kar2ouche.

Food Chains Sheet 4.1a

Card Game Reference

Level 1	Level 2	Level 3	Level 4
pond weed	caterpillar	blackbird	wolf
cabbage	tadpole	fox	shark
dandelion	rabbit	frog	human
algae	snail	robin	lion
sunflower	cow	spider	polar bear
grass	slug	crow	fox hound
cress	worm	snake	hawk
rose	sheep	toad	
dates	field mouse	beetle	
leaves	aphid	ladybird	

Food Chains Sheet 4.1b

Food Chains

Producer

Primary Consumer

Secondary Consumer

Tertiary Consumer

Teacher Notes

Unit 4.2 Ecosystems

Key Stage/Year	Key Stage 2/Years 5 and 6
Group Organisation	Begin work in pairs and then join together into groups of four or six.
Suggested Timing	One lesson

Overview of Task

Students begin by brainstorming how organisms rely on each other for food, shelter and so forth. They move on to focus on one specific microhabitat: a rose bush, and conjecture what happens when the number of organisms supported in such an environment increases or decreases significantly.

Objectives

All students will: explore the interrelationships between living organisms in a particular habitat.

Most students will: learn that some organisms are helpful whilst others can cause harm.

Some students will: begin to explore human impact on an ecosystem.

Curriculum References

National Curriculum

Science

Sc1 Scientific enquiry 1a that science is about thinking creatively to try to explain how living and non-living things work, and to establish links between causes and effects; **2b** consider what sources of information, including first hand experience and a range of other sources, they will use to answer questions.

Sc2 Life processes and living things 1c to make links between life processes in familiar animals and plants and the environments in which they are found; **5d** to use food chains to show feeding relationships in a habitat.

Outcomes

By the end of this activity students will have:

- a storyboard about the interrelationships between organisms
- a frame explaining what happens when the number of organisms in a particular habitat changes.

Resources

Kar2ouche *Living Things in Their Environment*

- **Support** storyboard
- **Life on a Rose** storyboard

Key Words: ecosystem, decompose, camouflage, dispersal, respiration, photosynthesis

Activities

Introduction

1. Brainstorm with students the different ways in which plants and animals depend on each other to survive. This will remind them of work done in previous units. For instance, students may come up with the following categories:
   - Shelter and protection – animals may use plants (trees and bushes) to provide a home, or as materials for a nest. Often the animals will be camouflaged so that they are virtually invisible when in this place.
   - Food – many animals eat plants and in turn are eaten by other animals. Plants will find nutrients from decomposing plants and animals, and some plants even ingest insects.
   - Reproduction – animals can aid the dispersal of plant seeds. A habitat will also provide a relatively safe place for animals to raise their young.
   - Gas exchange – plants produce oxygen and use carbon dioxide in photosynthesis; animals produce carbon dioxide but use oxygen in respiration.

2. If there is time, students could complete the five-frame **Support** storyboard to illustrate these relationships. This comprises five frames that are blank except for the headings: Shelter; Protection; Food; Reproduction and Gas Exchange.

Development

3. Ask students to open the **Life on a Rose** storyboard. Ask them to watch the first 11 frames showing organisms that live on or near a rose bush. Each frame gives a little information about the organism. In Frame 12 they are asked to add the organisms that are beneficial to the rose bush. Finally they are asked to consider what would happen if the numbers of any of the organisms increased or fell significantly.

Contents of the storyboard

Frame 1 Picture and text box: Blue tit eats insects, caterpillars, seeds and nuts

Frame 2 Picture and text box: Lacewing larvae attack caterpillars and other insect larvae

Frame 3 Picture and text box: Caterpillar eats rose leaves

Frame 4 Picture and text box: Ladybird and ladybird larvae eat aphids

Frame 5 Picture and text box: Leaf cutter bee takes section of rose leaves to make its nest

Frame 6 Picture and text box: Hoverflies lay their eggs in the soft bodies of caterpillars

Frame 7 Picture and text box: Robins love to munch on caterpillars

Frame 8 Thrushes eat rose hips

Frame 9 Picture and text box: Aphids settle in large numbers on buds and suck the plant's sap – the honeydew they leave behind can cause mildew

Frame 10 Picture and text box: Hungry deer may feed on rose shoots

Frame 11 Picture and text: Microbes in the soil help to break down dead plant material and provide nutrients for plants

Frame 12 Heading: Organisms that benefit roses; caption: Drag in the organisms that are of benefit to roses

Frame 13 Caption: What do you think would happen if the number of blue tits, ladybirds and hoverflies increased? What does this tell you about the nature of life around a rose bush? Create an image to show what you think. Add a text box to explain your theory.

Frame 14 Picture of human in garden with pesticides and chemical fertiliser. Caption: Do humans have a positive or negative impact on ecosystems? Explain what you think in the text box.

Plenary

4. Ask students to work in groups of 4-6 to compare their ideas about ecosystems, that is to say what happens when there is an imbalance in the numbers of organisms in a habitat.
5. If there is time, ask students to think about how, in a garden, people can contribute to this imbalance.

Extension/ Homework

6. Ask students to research another microhabitat – for instance, an oak tree or pond. They could visit the habitat on a regular basis and keep a notebook including drawings and photographs of what they find there.

Student Notes

Unit 4.2 Ecosystems

Objectives

During this activity you will explore how different organisms in a particular habitat rely on each other for survival.

Outcomes

At the end of this activity you will have:

- a storyboard explaining how living things rely on each other to survive
- a poster explaining what you think happens when the number of a particular organism increases or decreases rapidly.

Resources

To complete this activity you will need:

Kar2ouche *Living Things in Their Environment*

Activities

Introduction

1. How do plants and animals depend on each other to survive? Think about where things live, what they eat, how they reproduce and how they breathe.
2. If you have time, make a four or five frame storyboard to show how living things support each other.

   click here Click here to open the **Support** storyboard.

Development

3. Open the **Life on a Rose** storyboard. Watch the first 11 frames. Try to work out which organisms are good for the plant and which are bad. Follow the instructions for the final three frames.

   click here Click here to open the **Life on a Rose** storyboard.

Plenary

4. Compare your ideas with another group of students. How far do you agree? Do you think it is good to use pesticides in a garden? How else can you control the number of pests?

Extension/Homework

5. What other small habitats could you explore locally? Is there a pond nearby or maybe a tree? Visit this habitat regularly and keep a notebook recording what organisms you see. Include drawings and photographs.

Appendices

This section contains an explanation of how Kar2ouche supports students with special needs. It also provides a paper copy of the scripts used to record the audio for the content title.

Appendix 1
Kar2ouche and Special Needs

It may be a truism to say that all children have special educational needs, but it does mean that you are always considering ways of differentiating the lessons that you teach in order to meet the requirements of individual students. A totally flexible learning and teaching tool, Kar2ouche is easily adapted to these needs so that you and/or a learning support assistant can plan lessons that appeal to the full ability range from the least to the most able.

However, looking at the more widely-used definition of special needs as referring to those students who experience some kind of sensory or learning difficulty, on average 20% of students in comprehensive schools fall into this category. A number of studies have shown that computers can enhance the learning experience of these children.

> From 1988-90 the Palm Project explored the effects of computers on pupils' autonomy in learning. The project found that not only were they more autonomous but also more motivated.
>
> Glendon Ben Franklin in Leask, M Ed. (2001) *Issues in Teaching Using ICT*, Routledge.

In particular, multimedia products, such as Kar2ouche, appeal to a wide range of learning styles and have the advantage of being able to reinforce learning in a multi-sensory way through the use of visual and auditory stimuli. The fact that Kar2ouche enables students to create storyboards, animations and publications, plus manipulate and interpret text, also appeals to those with a preference for a kinaesthetic approach to learning.

Special needs children are often prevented from functioning effectively in lessons because much of the work required is based on reading and writing, skills that are often underdeveloped. In Kar2ouche all of the text is supplemented by soundfiles so that students can access information even if their reading skills are impaired. Listening to increasingly complex texts extends a student's vocabulary whilst also increasing his or her attention span. By following the text as they listen, students begin to recognise words and are provided with a real context for their learning.

In addition, Kar2ouche enables children to record their own voices, thus providing an alternative to writing. This provides immediate gratification and the ability to communicate with their peers in a way that increases their confidence. 'Nothing motivates children with

special needs more than success, especially when their peer group can see that success is demonstrated on an equal basis without allowances being made.' (Angela McGlashon in Gamble, N and Easingwood, N (2000) *ICT and Literacy*, Continuum.) Once confidence has been built, the speech and thought bubbles offer the opportunity for students to write in small bite-size chunks. This can be increased gradually by requiring students to produce a paragraph in the caption window and subsequently maybe use the writing frames and scaffolds provided in the education support packs that accompany the software.

The soundfiles and recording facility can therefore be seen to enable the learner to develop greater independence and this encourages them to continue with tasks that may once have been beyond them. Using Kar2ouche makes a range of curriculum areas far more accessible to non-readers and also to children whose first language is not English. These children often find reading the language far more difficult than speaking it.

As well as children with learning difficulties, Kar2ouche enhances the learning of children with behavioural problems, such as attention deficiency syndrome. In trials, these students found the multi-sensory and creative approach motivating, non-threatening and rewarding. It has been shown in a range of research that, students who experience difficulties interacting socially often find using computers less intimidating or confusing. However, ideal for pair or small group work, Kar2ouche can be used by you to encourage collaborative learning thereby supporting these students as they begin to develop the ability to express themselves in a social situation. Having rehearsed ideas in a small group, they are then more confident when required to present their ideas to the class or an adult.

For students with visual impairment, you can go into the password-protected area to increase the size of the font. The soundfiles also help these children. Likewise the brief soundclips support dyslexic children many of whom find processing large amounts of information in a single unit difficult. They can also control the pace of the reading and repeat it as necessary thus allowing them to consolidate learning. For those whose hearing is impaired, the combination of text and exciting visual material is motivating and by being able to attach pre-recorded soundfiles, students are provided with an effective means to communicate with their hearing peers. The record and playback facility also allows children with less severe hearing problems to rehearse their enunciation in a safe environment before sharing with others.

Every effort has been made to make Kar2ouche a fully flexible learning and teaching tool, to enable children of all abilities to have fun whilst engaging in activities that challenge them appropriately as they develop skills, knowledge and understanding in a range of curriculum subjects. To this end we are continuing to listen to you, support research projects and use findings to develop additional features that will help to move learning forward.

Appendix 2
Scripts for Audio Files

Key

Speaker	Speech
Narrator 1	Does the animal spend all of its time in the water? Does it breathe through gills? Is it cold-blooded?
Narrator 2	YES – It is a FISH.
Narrator 1	NO – Go to question 2.
Narrator 1	Does the animal spend some time in the water and the rest on land? Does the animal's young breathe through gills?
Narrator 2	YES – it is an AMPHIBIAN
Narrator 1	NO – go to question 3
Narrator 1	Does the animal spend most of its time on land? Does it have a body covered in scales? Does it lay soft-shelled eggs?
Narrator 2	YES – it is a REPTILE
Narrator 1	NO – go to question 4
Narrator 1	Is the animal covered in feathers? Is it warm-blooded? Does it lay hard-shelled eggs?
Narrator 2	YES – it is a BIRD
Narrator 1	NO – go to question 5
Narrator 1	Does the animal feed its young on its milk? Is it warm-blooded? With very few exceptions, are the young born alive?
Narrator 2	YES – it is a MAMMAL

Mini-beasts

Speaker	Speech
Narrator 1	Does it have legs?
Narrator 2	Does it have a shell?
Narrator 1	Does it have more than 8 legs?
Narrator 2	Does it have six legs?
Narrator 1	Does it have wings?
Narrator 2	What else could you ask about the wings to narrow the search?

Habitat

Speaker	Speech
Narrator 1	The desert is hot and dry with very little rainfall. Although the days are scorching hot, the nights can be very cold. Terrific winds can cause sandstorms. Very little grows in the poor soil of the desert.
Narrator 2	Deciduous woodlands are full of tall trees that lose their leaves in autumn. This means that the light at ground level is quite low especially in summer when all the leaves are fully out. However, light levels are higher during the spring. The soil is rich with leaf humus and rotting organisms. There are lots of places for animals to shelter. There is plenty of rain for good growth and the average temperature is around 24°C.
Narrator 1	Water levels often change as rivers flood during heavy rain. The flood plain and river margins are areas of rich soil that support the growth of reeds, sedges, coarse grass and a wealth of wild flowers. The banks are often quite soft in places making burrowing easy.
Narrator 2	A jungle is a tropical rainforest of dense tangled vegetation. They are hot humid places with temperatures often between 30 and 32°C throughout the year. The heat and heavy rainfall mean that things grow quickly. Trees grow tall towards the light creating gloomy spaces below.
Narrator 1	British towns are often full of litter, traffic and buildings. However, areas of wasteland can stand empty for years before redevelopment. Gardens vary from the carefully tended to the wild, weed-infested, rarely visited spot. The weather in Britain is temperate: never exceedingly hot or exceptionally cold. Temperatures tend to be higher in town than in the country because of heat pollution.
Narrator 2	Fields in Britain are often cropped in rotation – although some crops attract bigger Government subsidies and so get grown more often. Some farmers are organic and so don't use artificial pesticides or fertilisers; others rely more on chemicals to feed the soil, increase growth and kill pests. Mixed hedgerows surround many fields. Temperate conditions mean that rain falls throughout the year – although it does decrease in summer – and the growing season is long: from spring until late August.

Speaker	Speech
Narrator 1	The main features of the Arctic are low precipitation and high winds. This means very low rain and snow fall. However the snow that does fall stays creating long, cold, icy winters. The winter is also dark with the sun not rising on some days. Summers are short with a growing season of 50-60 days. During the summer the ground only thaws to about 1m, leaving a layer of permafrost below this. The result is boggy waterlogged soil and a landscape dotted with bogs and ponds.
Narrator 2	Cooled by sea breezes, tropical coastlines aren't as hot as the jungles inland. Rain can be heavy particularly during the 'rainy' season. Because there is little variation in temperature or length of day, the growing season is very long.
Narrator 1	Caves are frequently damp, dark and cold. They get darker and cooler the further in you go. Little grows below ground unless there is some light, so any plants tend to be found near or at the entrance. Any water in a cave is likely to be filled with mineral deposits from the rock.

UK Habitats

Speaker	*Speech*
Narrator 1	What makes the woodland a suitable habitat for the bluebell, rabbit and fox?
Narrator 2	What makes the riverbank a suitable habitat for the bulrushes, duck and water vole?
Narrator 1	What makes the town a suitable habitat for the dandelion, flies, robin and cat?
Narrator 2	What makes the field a suitable habitat for rape seed, field mice and adders?

Stop the Bus

Speaker	*Speech*
Chimp	Stop the bus, stop the bus – someone needs to get off, but who is it?
Chimp	No silly, he wouldn't survive here.
Chimp	That's right. (Bell). Off we go again.
Chimp	Well that's it – all the passengers have gone. Time for my supper ... but where should I live?

Camel and Cactus

Speaker	*Speech*
Camel	This is my home, the desert. It's very hot, dry and sandy. However, at night it can get very cold. When it's windy, the air becomes full of fast moving stinging sand. Ouch!
Camel	I'm a pretty cool animal and don't sweat much. My body is able to stand great changes in temperature. I store warmth during the day and conduct it during the cool desert night.
Camel	I have three stomachs; that's right, three. I gobble my food without chewing it and then I regurgitate and chew it later – yummy! After a long trip in the desert, I can drink 21 gallons of water in ten minutes. Impressive, eh?
Camel	I have two rows of thick eyelashes to protect my eyes from the stinging sand during sandstorms. My thick eyebrows help protect my eyes from the glaring sun. Hey, who needs shades?
Camel	My ears are small but that doesn't mean I can't hear you. They're lined with fur to stop the sand getting in.
Camel	I have a tough mouth and very sharp teeth, which means I can eat thorny bushes and crunch bones. Just as well out in the desert where food's short. However, if you have any, I prefer dates!
Camel	I have large nostrils that can open and close – useful when you need to keep out the sand. I often twitch my nose, not to be snooty, but to cool the air that I breathe.
Camel	I sometimes eat my droppings; this is good because in the desert I can extract much needed water and food from them. A word of warning though – don't try this at home!
Camel	Despite what you might think, my hump is not filled with water. It's made of fatty food. After a long time in the desert, it goes flabby, flops over and looks very untidy.
Camel	I have hard leathery feet and two toes. When I walk, my feet spread out to stop me sinking into the sand.
Cactus	Ola, I am a cactus and this is my home, the dry and dusty desert. It hardly ever rains so water is rather precious here. Sadly it evaporates very quickly in the extreme heat.
Cactus	Hey, these spines are really useful. For a start they make me difficult and dangerous to chew. They provide lots of little shadows and this shade helps to keep me cooler inside. What's more, when it rains, not very often I know, these spines help to direct the water down to my roots.

Speaker	*Speech*
Cactus	I'm covered in a waxy layer – this is my 'glaucus bloom' – sounds good doesn't it? This helps me to keep water by reducing evaporation.
Cactus	My roots are shallow. They spread out in long lines just under the surface ready to make the most of whatever rain falls. When it rains, feeding roots grow quickly from my main roots to take in water that I store for later use. When the weather becomes drier, the feeder roots die off. Unlike you, I can live for years without water.
Cactus	My skin is full of small holes called stomata. I close these up tightly in the day so that I don't lose water. Under my skin I'm made of juicy, spongy tissue. This is where I store water and food. Because I don't die back in the dry season I can grow quite large. My tubby shape helps. It means I've lots of space inside to store water and a minimum surface area that helps to reduce water loss.

Polar Bear

Speaker	**Speech**
Polar Bear	How dare you suggest I'm overweight! Those five inches of blubber keep me warm in these chilly conditions. It also means I can survive the winter without much food. I'll be much slimmer come the spring.
Polar Bear	Are you admiring my fur coat? Fabulous isn't it? In fact, I'm a bit of a show off and have two fur coats. These keep me warm in temperatures that reach below zero.
Polar Bear	The fur's rather special too – it's covered in oil to keep the icy water off my skin when I go for a dip. I'm a super swimmer, you know.
Polar Bear	You might think the colour is a little impractical, but when you live and hunt in the snow, white is ideal. It means I can sneak up on my prey undetected (laugh).
Polar Bear	Who needs a manicure when you have claws like mine? Splendid aren't they? So strong with such a lovely curve and oh so sharp, there's no way I'll slip on that treacherous ice even when I run.
Polar Bear	I'm such a special creature. My sense of smell is wonderful. I can smell a tasty seal from as much as ten miles away. Hmm … in fact, what is that I can whiff now? Must dash.

Creation

Speaker	Speech
Voice 1	Heh, this is a strange place. We could almost be on the moon. The soil is poor and hard with huge cracks. There aren't many plants. There are thunderstorms every afternoon and the small amount of rain that falls evaporates almost as soon as it hits the ground.
Voice 2	Well, this is a smelly place: thick, sticky mud covered in green slime. Puddles of stagnant water fill the hollows. The rain falls regularly flooding the whole area. There are a few big rubbery plants with broad leaves – oh, and dragons.
Voice 3	Brrr, it's cold. This ice hardly ever disappears and it's ever so hard to reach those tender leaves on top of the Bunjug trees. The wind can reach speeds of 30 miles per hour.
Voice 4	It's very dark in here – I can't remember the last time I saw daylight. It's also very chilly and occasionally the slimy worms that inhabit the smaller passages brush against my legs and feet. They're quite tasty if you can catch them. The water leaking from the roof and forming pools is salty but full of nutrients.

Food Chain

Speaker	Speech
Narrator 1	Drag a suitable food plant into this picture. Now copy this frame by dragging the thumbnail and dropping it into the second thumbnail. In the second frame discard the top text box and follow the directions. Keep copying and throwing text boxes away until they have all gone.
Narrator 1	Drag in an animal that would eat this plant but that doesn't eat other animals. Herbivore.
Narrator 1	Drag in an animal that would eat the animal that ate the plants. Carnivore.
Narrator 1	Drag in an animal that eats other carnivores.
Child 1	I'm a vegetarian. What about me?

Support

Speaker	Speech
Narrator 1	Shelter and protection – animals may use plants (trees and bushes) to provide a home, or as materials for a nest. Often the animals will be camouflaged so that they are virtually invisible when in this place.
Narrator 2	Food – many animals eat plants and in turn are eaten by other animals. Plants will find nutrients from decomposing plants and animals, and some plants even ingest insects.
Narrator 1	Reproduction – animals can aid the dispersal of plant seeds. A habitat will also provide a relatively safe place for animals to raise their young.
Narrator 2	Gas exchange – plants produce oxygen and use carbon dioxide in photosynthesis; animals produce carbon dioxide but use oxygen in respiration.