

Year 5 - Living things and their habitats

Reference to the Programme of Study 2014

Pupils should be taught to:

- Describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird
- Describe the life process of reproduction in some plants and animals.

The learning journey: Living Things and Their Habitats

| Year group | Statutory Requirements from the Programme of Study |
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| 2 | <ul style="list-style-type: none"> • Explore and compare the differences between things that are living, dead, and things that have never been alive • Identify that most living things live in habitats to which they are suited and describe how different habitats provide for the basic needs of different kinds of animals and plants, and how they depend on each other. • Identify and name a variety of plants and animals in their habitats, including micro-habitats • Describe how animals obtain their food from plants and other animals, using the idea of a simple food chain, and identify and name different sources of food. |
| 4 | <ul style="list-style-type: none"> • recognise that living things can be grouped in a variety of ways • explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment • recognise that environments can change and that this can sometimes pose dangers to living things |
| 5 | <ul style="list-style-type: none"> • Describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird • Describe the life process of reproduction in some plants and animals. |
| 6 | <ul style="list-style-type: none"> • Describe how living things are classified into broad groups according to common observable characteristics and based on similarities and differences, including micro-organisms, plants and animals • Give reasons for classifying plants and animals based on specific characteristics |

How the children should learn science at Upper Key Stage 2

The principal focus of science teaching in Upper Key Stage 2 is to enable pupils to develop a deeper understanding of a wide range of scientific ideas. They should do this through exploring and talking about their ideas; asking their own questions about scientific phenomena; and analysing functions, relationships and interactions more systematically. At Upper Key Stage 2, they should encounter more abstract ideas and begin to recognise how these ideas help them to understand and predict how the world operates. They should also begin to recognise that scientific ideas change and develop over time. They should select the most appropriate ways to answer science questions using different types of scientific enquiry, including observing changes over different periods of time, noticing patterns, grouping and classifying things, carrying out comparative and fair tests and finding things out using a wide range of secondary sources of information. Pupils should draw conclusions based on their data and observations, use evidence to justify their ideas, and use their scientific knowledge and understanding to explain their findings.

Suggestions for Working Scientifically

Pupils might work scientifically by: observing and comparing the life cycles of plants and animals in their local environment with other plants and animals around the world (in the rainforest, in the oceans, in desert areas and in prehistoric times), asking pertinent questions and suggesting reasons for similarities and differences. They might try to grow new plants from different parts of the parent plant, for example, seeds, stem and root cuttings, tubers, bulbs. They might observe changes in an animal over a period of time (for example, by hatching and rearing chicks), comparing how different animals reproduce and grow.

Further Guidance

These opportunities for working scientifically should be provided across Years 5 and 6 so that the expectations in the programme of study can be met by the end of year 6. Pupils are **not** expected to cover each aspect for every area of study.

Planning enquires. Children should plan different types of enquiry to answer questions.

Identifying variables. Children should recognize and control variables where necessary.

Secondary sources. Children should recognize when secondary sources will be most useful to research their ideas and begin to separate opinion from fact.

Using equipment. They should choose the most appropriate equipment. Children should take measurements, using a range of scientific equipment with increasing accuracy and precision.

Collecting data. They should make their own decisions about what observations to make, what measurements to use, and how long make them for.

Recording. They should choose how to record data. Children should record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables and bar and line graphs. They should report and present findings from enquires, including conclusions, causal relationships and explanations of results (in oral and written forms).

Analysing data. Children should use test results to make predictions to set up further comparative and fair test. They should use simple models to describe scientific ideas. They should identify scientific evidence that has been used to support or refute ideas or arguments.

Making Improvements. They should use their results to identify when further tests and observations might be needed

Preparation for this unit of study

When - This unit will need to be studied at various points throughout a year.

Know the names - Do a little research and **find out the names of some of the plants** growing around your school. This should include any trees, wild flowers and garden plants.

The following website is useful to help you work out which plants you have: www.shootgardening.co.uk/plant/identify

The identification charts from [Gatekeeper](#), the identikit from the [Great Plant Hunt](#) website (free) and the identification charts from [OPAL](#) (free) are useful for you and the children.

Recording findings throughout the year - It may be worth keeping a **large floor book** (like a giant scrap book) in which 'evidence' of the plant world developing in the school can be placed – e.g. photos of trees in different seasons, photos of dandelions over a period of time, etc. Some of this 'evidence' could be **collected at different points throughout the year**, but used in the studies during this unit of work.

Preparing the learning spaces –

Without some thought and time being devoted to this area of learning in advance of it being studied it is likely that the learning could end up being solely through information books and websites. This would be a real shame when one considers the wealth of wildlife that we have in our country and the wonder that children experience when they get to encounter living things at first hand.

Look carefully through these plans on how to keep and watch animals over a period of time. This might mean purchasing both the containers and animals themselves, or preparing the outdoor areas so that the animals are easier to view. You could, for instance, invest in making a bird hide, and even install a bird box with a webcam.

Make sure that you have a **great range of plants growing in the school grounds**. This will mean having: long grass areas, wild flower area, garden flower area, trees, plants in and around a pond, vegetable allotment, and possibly plants in a green house. You will need to mark where particular plants are for

particular activities. This could be done by laminating letters or number with a background of a particular colour that links to a particular activity. This will help not only for the children to focus in on the plants that are relevant to their activity, but can help the children to make links over time.

Use information from [CLEAPSS \(Developing and Using Environmental Areas in School Grounds L221\)](#), as well as organisations such the [Bee Conservation Trust](#), the [Butterfly Conservation Trust](#) and the [RSPB](#) to ensure that plants you grow are useful for the range of animals that could live in your school grounds.

Also, look out for any **national surveys** that may be taking place which are looking different plants in local environments.

Planning for artificial pollination

Contained with this unit are instructions as to how to artificially pollinate plants. So, in advance you will need to grow these plants. The plants suggested are: daffodils (plant from October to December for germination in spring), lilies (plant in autumn) and pelargonium

Planning for keeping animals indoors

1. **Insects** – It would definitely be worth while purchasing ladybird larvae and butterfly larvae (i.e. caterpillars). However, you will need to have prepared the correct kit in which to keep them. You will also need to keep these animals at the correct time of the year, and ensure that they have the correct conditions in which to be released. This is a little bit of effort, but the children will be so excited when they see the changes as they occur.
2. **Amphibians** – You can keep tadpoles in the classroom, but ensure that you follow good guidance.
<http://www.cleapss.org.uk/attachments/article/0/G206.pdf?Primary/Resources/Guides/>
3. **Chickens** – It is possible to incubate eggs in the classroom, but you must follow good guidance. L71 by CLEAPSS will provide the information that you need. There are companies who will deliver the eggs and incubating equipment and then rehome your chicks. For example -
<http://www.thehappychickcompany.co.uk/index.html>
4. **Small mammals** – You can keep mammals in the classroom, but ensure that you follow good guidance.
<http://www.cleapss.org.uk/attachments/article/0/L052.pdf?Primary/Resources/Guides/>

Planning visits and/or visitors

As wild mammals are extremely difficult to find outside, it would be worth trying to contact an organisation to find out whether one of their member could visit your school and bring in some mammals and information about them. Maybe you could even assist one of these organisations with their surveys.

1. Mammal society - <http://www.mammal.org.uk/>
2. Bat conservation trust - <http://www.bats.org.uk/>
3. Badger trust - <http://www.badger.org.uk/content/home.asp>

Alternatively, you could arrange a visit to a zoo or farm to find out about a range of mammals.

- Farms for schools - <http://www.farmsforschools.org.uk/index.htm>

You could also try contacting other organisations that are experts in some of the other animal classes and plants:

1. Butterfly conservation trust
2. Marine conservation trust
3. Wildlife trusts
4. Natural England
5. Woodland trust
6. Royal horticultural society
7. Key gardens
8. Royal Society for the protection of Birds (RSPB)
9. Organisations that educate about reptiles and amphibians – e.g. Krag (Kent Reptile and Amphibian Group)

Watching TV!

There are some brilliant wildlife programmes on TV throughout the year. You could place a timetable on display in a science area (or on your website) so that children know when these are on. Maybe, as a school, you could watch a few clips as part of an assembly. For this particular unit, Spring Watch and Autumn Watch on the BBC would definitely be worth watching, as children will soon begin to see the different lifecycles throughout the year.

Resources

- Plants that produce flowers that are useful for children to study. There are common plants which, at the right point in their development, show the whole sequence of their sexual reproduction really clearly. Plants of the cabbage-cress family, including weeds and cultivated wallflowers, bloom throughout the spring, when wild and garden hyacinths (English and Spanish bluebells) might also be available. Throughout the summer and into early autumn, foxgloves and a variety of willowherbs are useful wild-flowers. Among summer-flowering garden plants, hollyhocks show the sequence well, as do lupins and antirrhinums (snapdragons) though their flower-structure is more difficult to understand.
- Information books on mammals

- Bat boxes
- Hedgehog homes
- Hibernation stack/minibeast hotel
- Equipment for keeping a small mammal in the classroom
- Bird box with web cam
- Information books on birds
- Incubators and chicken eggs
- Pond nets
- Large trays/tanks to watch the animals caught in pond
- Information books on amphibians
- Equipment for keeping tadpoles in the classroom
- Dark areas outside for newts to hide in colder months
- Information books on insects
- Ladybird growing kits
- Equipment for making own ladybird hibernation homes
- Caterpillar growing kits
- Flower press
- Geraniums (pelargoniums) and various species of 'wandering sailor' (tradescantia and its relatives)
- Daffodils and lilies growing in pots
- Paint brushes
- Coloured string
- Large floor book (can be made from A2 sheets of card/sugar paper folded and stapled).
- Video camera

- Digital camera
- Plant identification charts from Gatekeeper (www.gatekeeperel.co.uk)
- The Great Plant Hunt identikit – (www.greatplanthunt.org/teachers) – scroll down the menu www.opalexplornature.org/sites/default/files/7/file/OPAL-Tree-chart-web.pdf
- <http://butterfly-conservation.org/121/habitat-advice.html>
- <http://bumblebeeconservation.org/get-involved/>

Key vocabulary

Animals – amphibians, reptiles, birds, mammals, insects, fish

Animal development – egg, larva, pupa, nymph, adult, metamorphosis

Parts of a flower – petal, stamen (anther + filament), carpel (stigma + style + ovary + ovule)

Processes – pollination, fertilisation, germination

Key information for teachers

Life cycle of animals

Most animals including fish, mammals, reptiles and birds have very simple life cycles:

These animals have three stages -- before birth, young and adult. The young are typically similar to the parent, just smaller. The young slowly "grow" to become adults.

Amphibians:

Amphibians, like frogs and newts, have a slightly more complicated life cycle. They undergo a metamorphosis:

they are born (either alive from their mother or hatched from eggs)

they spend their childhood under water, breathing with gills

they grow into adults and move to the land, breathing with lungs

Animals that Undergo a Complete Metamorphosis:

Insects

These insects have four stages in their life cycle:

egg: unborn stage.

larva: young stage -- this is when most of the feeding is done.
(they usually look like worms)

pupa: inactive (no feeding) stage between larva and adult stages.
(usually well camouflaged)

adult: final, breeding stage.
(they usually grow wings)

Animals that Undergo an Incomplete Metamorphosis:

About 10% of insects go through an incomplete metamorphosis. They do not have a pupal form -- these include dragonflies, grasshoppers and cockroaches.

These insects have three stages in their life cycle:

egg: unborn stage.

nymph: young stage -- this is when most of the feeding is done.

adult: final, breeding stage - including wings.

Plant reproduction

Structure of the flower

Sepals – (if present) help to protect the flower in bud

Petals – attract insects with colour, scent and nectar

Stamens – make pollen and hold it in position

Stigma – receives pollen during pollination

Ovary – contains undeveloped seeds (ovules) which, if fertilised following pollination, develop into seeds

Fruit – holds the seeds

Reproduction of flowering plants

The anther produces the pollen. The filament positions the anther where it can distribute the pollen. Together the anther and the filament make up the stamen.

The female reproductive organs are at centre of the flower and consists of the stigma, , which is sticky so that pollen remains attached, the style which positions the stigma so that it can receive the pollen, and the ovary, which contains one or more ovules. The best way to see the structure of the ovary is to look at it after fertilisation, when it is called a fruit.

Key scientists

There are plenty of contemporary scientists working in this field. Look out for current information on science related to reproduction. For example:

1. Kansas State University is currently investigating how to shut down the reproductive ability and desire in pest insects - <http://www.sciencedaily.com/releases/2013/08/130826182917.htm>
2. Berry J. Brosi, an assistant professor at Emory University in Atlanta, and Heather M. Briggs, a graduate student at the University of California, Santa Cruz found that a loss of bees affects a plant's ability to reproduce. http://www.nytimes.com/2013/07/23/science/loss-of-bees-can-affect-plants-ability-to-reproduce-study-finds.html?_r=0

| Learning Expectations | Possible Tasks | Resources |
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| <p>To be able to explain the differences in the life cycles of a mammal, an amphibian, an insect and a bird.</p> <p>To be able to plan the correct enquiry to answer a question.</p> | <p>Introduction to Life cycles</p> <p>Often, children at the Primary phase will only learn about the life cycle of a few animals; normally the frog and butterfly. However, the great British countryside is full of a wide range of examples of life various life cycles, all of which are quite incredible.</p> <p>The following video shows some great images of plants and animals at different stages of their life cycles. This should encourage a little discussion amongst the children as to what they understand by the term life cycle. http://www.bbc.co.uk/learningzone/clips/an-introduction-to-life-cycles/2250.html</p> <p>Survey – At what part of their life cycle are the animals in the school grounds?</p> <p>Begin by asking the children to remind each other about the different types of animals they might find outside and the classes in which they are classified.</p> <p>Take the children on a quick evidence hunt around the school grounds. In preparation, clearly</p> | <ul style="list-style-type: none"> • |

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| | <p>mark the areas that you wish the children to observe. Although mammals will be extremely difficult to observe in the wild, you might well find amphibians, invertebrates and birds.</p> <p>Recording The children can choose how they can record their finds. They must try to correctly identify the animal, and then they must record where it is in its lifecycle. If they are unsure, they could record this as a question – e.g. At what stage is a tadpole in a frog’s lifecycle?</p> <p>Research – What can you find out about the different stages of life cycles of different animals?</p> <p>1. Arkive contains many great photos and videos of animals at different points in their lifecycles http://www.arkive.org/</p> <p>2. The following BBC web pages have a huge amount of videos on different aspects of the life cycles of different animals:</p> <ul style="list-style-type: none"> a. Courtship displays - http://www.bbc.co.uk/nature/adaptations/Courtship_display b. Maternal care - http://www.bbc.co.uk/nature/adaptations/Maternal_effect c. Metamorphosis - http://www.bbc.co.uk/nature/adaptations/Metamorphosis d. Moulting - http://www.bbc.co.uk/nature/adaptations/Moulting e. Parental investment - http://www.bbc.co.uk/nature/adaptations/Parental_investment f. Paternal care - http://www.bbc.co.uk/nature/adaptations/Allomothering | |
| <p>To be able to explain the life cycle of a mammal.</p> <p>To be able to recognise which secondary sources will be most useful</p> | <p>Life cycle of a mammal</p> <p>Research – Asking questions to an expert</p> <p>As wild mammals are extremely difficult to find outside, it would be worth trying to contact an organisation to find out whether one of their member could visit your school and bring in some mammals and information about them. Maybe you could even assist one of these organisations with their surveys. http://www.mammal.org.uk/</p> | <ul style="list-style-type: none"> • Information books on mammals • Bat boxes • Hedgehog homes • Hibernation stack/minibeast |

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| <p>to their research (non-statutory).</p> | <p>http://www.bats.org.uk/ http://www.badger.org.uk/content/home.asp</p> <p>It might be that the bat conservation trust or the RSPB could assist you on a bat watching evening at your school.</p> <p>Alternatively, or in addition, you could arrange a visit to a zoo or farm to find out about a range of mammals. http://www.farmsforschools.org.uk/index.htm</p> <p>Observations over time – How does the small mammal change over time? You could keep a small mammal in the classroom, but you MUST follow the guidance http://www.cleapss.org.uk/attachments/article/0/L052.pdf?Primary/Resources/Guides/</p> <p>Using secondary sources research – How do different mammals develop as they get older? The children can start by trying to find out the gestation period for the mammals that they are finding out about. They can then find out more about: the average life span, the developments at different ages, and maybe any courtship behaviour. National Geographic - http://animals.nationalgeographic.co.uk/animals/mammals</p> <p>The following video shows a horse giving birth: http://www.bbc.co.uk/learningzone/clips/a-horse-giving-birth/2262.html</p> <p>The following video shows female hares fighting off the advances of male hares: http://www.bbc.co.uk/nature/life/European_Hare#p00tgpx2</p> <p>The following video explains the matting rituals of grey squirrels: http://www.bbc.co.uk/programmes/p007g7yv</p> <p>Recording</p> | <p>hotel</p> <ul style="list-style-type: none"> • Equipment for keeping a small mammal in the classroom |

| Learning Expectations | Possible Tasks | Resources |
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| | <p>The children could choose how they will present the information that they find out about their animals. It might worth insisting that children, as part of their research, must find out about at least one British mammal. If you don't insist on this, there are likely to many children who only choose the biggest mammals, many of which are not in our country.</p> | |
| <p>To be able to explain the life cycle of a bird.</p> | <p>Secondary resources research – How do bird eggs change over time? The following video shows how chaffinch chicks grow until they fledge. http://www.bbc.co.uk/learningzone/clips/the-growth-and-development-of-a-chaffinch-no-narration/7521.html</p> <p>Encourage the children to watch programmes such as Spring Watch so that they can see the development of many different species of birds. http://animals.nationalgeographic.co.uk/animals/birds/</p> <p>If possible, arrange from a visit from the RSPB, or contact them via a webcam, or visit one of their reserves.</p> <p>Observations over time – How do bird eggs change over time? It is worth while installing web cam in a bird box so that children can keep a diary of the development of the chicks Children could view video of chicks hatching - http://www.msichicago.org/online-science/videos/video-detail/activities/the-hatchery/</p> <p>You can incubate chicken eggs in the classroom. Ensure you follow the correct procedure. There are companies that will loan you incubators, provide the eggs and rehouse the chicks. For example - http://www.thehappychickcompany.co.uk/chick-hatching-at-schools.html</p> | <ul style="list-style-type: none"> • Bird box with web cam • Information books on birds • Incubators and chicken eggs |

| Learning Expectations | Possible Tasks | Resources |
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| | <p>Recording The children could choose how they will communicate their information about birds.</p> | |
| <p>To be able to explain the life cycle of an amphibian.</p> | <p>Life cycle of amphibians Secondary research – What are the life cycles of amphibians? http://www.bbc.co.uk/nature/collections/p00fxg0m#p006x6xy http://animals.nationalgeographic.co.uk/animals/amphibians/</p> <p>The following website has several videos on newts: http://www.bbc.co.uk/nature/life/Great_Crested_Newt#p003k0x8 The following website has some video about our common frog: http://www.bbc.co.uk/nature/life/Common_frog The following video shows the journey toads go through to reach their breeding grounds: http://www.bbc.co.uk/programmes/p006x6yg</p> <p>Observations over time – How do smooth newts and common frogs develop over time? Allow the children to monitor your pond throughout the year. Sometime around mid-February frogs might arrive at your pond and lay their spawn. Newt eggs are much harder to find, but you should see several stages of their life cycles throughout spring and into summer.</p> <p>Recording Children could maintain a diary – noting down their observations, questions, and further research.</p> <p>Observations over time – Tadpoles indoors. You could keep frog tadpoles indoors and keep a diary over time. Please make sure that you follow the advice in the following CLEAPSS guidance in order to ensure that they are kept in</p> | <ul style="list-style-type: none"> • Pond nets • Large trays/tanks to watch the animals caught in pond • Information books on amphibians • Equipment for keeping tadpoles in the classroom • Dark areas outside for newts to hide in colder months |

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| | <p>healthy conditions. Ensure you know where you are going to release your tadpoles. http://www.cleapss.org.uk/attachments/article/0/G206.pdf?Primary/Resources/Guides/</p> | |
| <p>To be able to explain the life cycle of an insect.</p> | <p>Life cycle of an insect Using secondary sources research – What are the different lifecycles of insects? Hopefully during Year 2 the children had a chance to examine up close the lifecycle of a couple of invertebrates; including butterflies and ladybirds. The videos below could help children to remember and share those experiences: http://www.bbc.co.uk/learningzone/clips/butterfly-awakening/12846.html http://www.bbc.co.uk/learningzone/clips/chrysalis-to-butterfly/12882.html http://www.bbc.co.uk/learningzone/clips/orange-tip-butterfly-metamorphosis/12844.html http://www.bbc.co.uk/learningzone/clips/time-for-change/12845.html http://www.bbc.co.uk/nature/collections/p00fxg0m#p00cnsls The following video shows what a spider must go through to find a mate: http://www.bbc.co.uk/learningzone/clips/the-journey-of-a-male-house-spider-to-find-a-mate/13982.html The following video shows a lacewing laying her eggs - http://www.bbc.co.uk/nature/collections/p00fxg0m#p003kmg3 The following video looks at leaf-cutter bees lifecycle (as well as how butterflies when feeding on flowers help to pollinate them) http://www.bbc.co.uk/learningzone/clips/insects-pollinating-flowers/7516.html Although not insects, the following videos on other minbeasts are incredible and will help children to understand the life cycle of other small animals: The following video shows how harvestmen reproduce -</p> | <ul style="list-style-type: none"> • Information books on insects • Ladybird growing kits • Equipment for making own ladybird hibernation homes • Caterpillar growing kits |

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| | <p>http://www.bbc.co.uk/nature/collections/p00fxg0m#p003x6gk The following video shows how leopard slugs attract each other and then mate (amazing!) - http://www.bbc.co.uk/nature/collections/p00fxg0m#p00f0tw1</p> <p>Observations over time – What are the different stages of the life cycle of a ladybird? Most minibeasts life-cycles are too long for children to observe all events from egg to adult, but ladybirds are an exception. They have a life-cycle of 4 to 5 weeks. You can purchase ladybird growing kits: http://www.greengardener.co.uk/product.asp?id_pc=22&cat=45&id_product=177</p> <p>This could be a really exciting project for your class. The children could not just observe the larvae and pupae, but they could develop their own ladybird area in which to release the adults. This area will need to contain the correct plants for greenfly, on which the ladybird adult will feed, as well as a hibernation area made by the children in which the adults can hibernate throughout the winter.</p> <ol style="list-style-type: none"> 1. You could start breeding ladybirds in early May. The sexes are not easy to tell apart, so try to capture two that are pairing, or keep in a container until you see mating taking place. 2. After mating has occurred remove the male as he may eat eggs that the female lays. Keep the female in a transparent container and provide her with greenfly (aphids). 3. Remove the female to another container once she has produced one batch of eggs. By doing this, she might lay eggs in different containers, so there is more for children to observe. 4. Once the larvae have hatched from the eggs, be sure to provide plenty of greenfly or they may eat each other. 5. Each larva will moult 3 times and then turn into a pupa which should not be disturbed. After a further 4-6 days an adult will emerge | |

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| | <p>Observations over time – What are the different stages of the life cycle of a butterfly? Check that the children have not already done this whilst in Key stage 1 Information on how to do this can be found at the bottom of this unit.</p> <p>Recording Once again, the children can each maintain their own diary showing their observations, and explanations of the lifecycles of the insects.</p> | |
| <p>To be able to describe the life process of reproduction in some animals.</p> | <p>Secondary sources research – How do animals make babies? Generally speaking, you need to help the children to establish that cells from the male must combine with cells from the female. YouTube is often a good source of videos on animal life cycles. Examples could include: dragonflies, hedgehog (mating rituals – Attenborough – Life of Mammals), and frogs. Arkive also contains some great videos – e.g. Great crested newt - http://www.arkive.org/great-crested-newt/triturus-cristatus/video-09.html</p> <p>The following short video is an introduction to the terms reproduction and fertilisation (be aware that the context is human, so consult your sexual education policy) http://www.bbc.co.uk/learningzone/clips/an-introduction-to-fertilisation/116.html</p> <p>The following video takes the story further by looking at the development of the foetus. http://www.bbc.co.uk/learningzone/clips/development-of-a-foetus/861.html</p> | <ul style="list-style-type: none"> • |
| <p>To be able to describe the life process of reproduction in</p> | <p>Reproduction – plants You need to first focus children’s attention to the flower of the part, as this is where their reproductive features are to be found.</p> <p>Observation – What are the functions of the different parts of the flower? Children can look at each part of the flower closely using a hand lens or microscope. Children can</p> | <ul style="list-style-type: none"> • Plants with obvious sexual parts in their flowers |

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| <p>some plants.</p> <p>To be able to use scientific diagrams and labels.</p> | <p>cut open an ovary to describe what can be found inside.</p> <p>The following video will help the children: http://www.bbc.co.uk/learningzone/clips/reproduction-in-plants/117.html</p> <p>Recording Children can dissect flowers and stick them on a sheet, label, and explain the functions of the different parts.</p> | |
| <p>To be able to describe the life process of reproduction in some plants.</p> | <p>Observations over time – When do plants have their flowers?</p> <p>You need to allow children to look for flowers from early spring through to autumn. Some trees such as blackthorn will produce flowers early in the year, whereas plants like ivy will still usually have flowers through October</p> <p>Recording They can keep a diary; a page for each species of tree. They can stick specimens (after being pressed for a couple of weeks) in the class diary/floor book. For each specimen they can show how flowers are arranged on the stalk, their colours, shapes, and how they think they are pollinated.</p> <p>Use a home-made flower ID sheet to help the children identify the plants at particular times of the year.</p> | <ul style="list-style-type: none"> • Flower press • Geraniums (pelargoniums) and various species of ‘wandering sailor’ (Tradescantia and its relatives) |

| Learning Expectations | Possible Tasks | Resources |
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| |  <p>Secondary sources research – How does the pollen from one flower reach another flower? Help the children to make the comparison between the sex cells of the male part of the flower having to join with the sex cells in the female parts of the flower, and the same requirement for animals. This will also reinforce one of the reasons why both plants and animals are living; they have the life process of reproduction. Children can find examples on the internet and in books of different methods by which the pollen reaches the ovary of the flower. The following website contains many great short videos of plant reproduction: http://www.bbc.co.uk/nature/adaptations/Flower</p> <p>Secondary sources – How do animals pollinate plants? Begin by considering what is meant by the term pollination. The following video will help the children: http://www.bbc.co.uk/learningzone/clips/pollination-in-plants/118.html The following website contains many short videos of different ways in which animals pollinate plants: http://www.bbc.co.uk/nature/adaptations/Pollinator The following video is good introduction to insect pollination and artificial pollination. http://www.bbc.co.uk/learningzone/clips/insect-pollination/119.html</p> <p>You can then study the amazing adaptations of some flowers that want to attract the pollinating insects:</p> | |

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| | <p>Comparative test – At what distance can different flowers be seen? Children can imagine that they are a pollinating insect looking for flowers. They can then devise a quick test to find out how far away a flower can still be seen.</p> <p>Comparative test – Which flower has the strongest scent? Encourage the children to smell flowers throughout the year.</p> <p>Observations – How long do pollinators spend at each flower? Recording Children keep a tally over 10 minutes showing the number and species of invertebrates that visit the flower. They must also note: whether or not they go into the flower, if they are outside how they collect food, whether any part of the invertebrate touches the plant’s stamens and stigma.</p> | |
| <p>To be able to describe the life process of reproduction in some plants.</p> <p>To be able to use scientific diagrams and labels.</p> | <p>Observations over time – How does the flower change over time? Children should study the change in the flower over a period of time. They should be able to observe and record the following:</p> <ol style="list-style-type: none"> 1. Formation and growth of the flower-bud 2. The flower opening 3. The flower withering and the petals dropping off 4. As the flower withers, the fruit begins to grow in the middle of it 5. The fruit grows in size and becomes juicy, or dries and splits open, releasing the seeds inside. <p>These stages above can be used as a framework within in which to look in more detail of the stages of sexual reproduction.</p> <p>Investigation over time – Can we artificially pollinate plants? The plants most likely to be used for artificial pollination are daffodils, lilies and pelargoniums</p> | <ul style="list-style-type: none"> • Geraniums (pelargoniums) and various species of ‘wandering sailor’ (Tradescantia and its relatives) • Daffodils and lilies growing in pots • Paint brushes • Coloured string |

| Learning Expectations | Possible Tasks | Resources |
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| | <p>grown in pots.</p> <p>Collect pollen with a small, soft paint-brush of fine hair and deposit it on a stigma. All three have anthers which split open at the sides to release their pollen, which is rather like coloured, sticky dust. The pollen will need to be put on a ripe stigma.</p> <p>Daffodils - In daffodils the stigma is a slightly feathery cup which opens when ripe.</p> <p>Lilies - In lilies it is a three-lobed club which when ripe becomes shiny and covered with a sticky fluid.</p> <p>Pelargonium - The stigma of a pelargonium has five arms. While the anthers are shedding pollen these stay together; when the stigma is ripe, they open into a star-shaped structure.</p> <p>To pollinate successfully, the children should look for younger flowers which are shedding pollen and the older ones with ripe stigmas.</p> <p>The flowers pollinated should be marked by tying a piece of coloured string round the flower-stalk so that subsequent development can be observed.</p> <p>Recording The children can record what happens over a period of time</p> <p>Observations over time – What happens to the plant after fertilisation has occurred? The sequence of changes in the development of fruit and seed The first visible consequence of fertilisation is often than the petals and stamens either wither or drop off. The ovary will begin to develop into the fruit.</p> <p>Children can cut growing fruits open to see the seeds early in their development. Observe using a hand-lens, and compare these with ripe fruits, either at the same time or later. In most plants the ovary (wall of the developing fruit) is green and juicy, while the immature seeds are soft and white.</p> <p>Recording</p> | |

| Learning Expectations | Possible Tasks | Resources |
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| | The children can draw what they have seen and explain what has happened. | |

Keeping caterpillars

You do not need a fancy insect terrarium to raise a caterpillar. Just about any container large enough to accommodate the caterpillar and its food plant will do the job. Since some caterpillars burrow in the soil to pupate, it's a good idea to line the bottom of your container with about an inch of slightly moist sand or soil. The soil should not be too wet – you don't want to end up with condensation on the sides of your jar. Other caterpillars hang from twigs or other surfaces to pupate. Add a stick or two, secured in the soil and leaning against the side. This also gives the caterpillar a way to climb back on its food plant, should it fall off. To keep the caterpillar's food plant fresh, place the stems in a small jar of water. Fill any space between the stems and the lip of the small jar with wadded paper towels or cotton balls to prevent your caterpillar from falling into the water and drowning. Put the small jar with the food plant into the caterpillar jar. When the butterfly or moth emerges, it will need a place to cling while it unfurls its wings and dries them. Once the caterpillar pupates, you can tape a paper towel to the wall of the jar or aquarium to give the adult a place to cling. Place the tape at the top, and allow the paper towel to hang freely to the bottom. Sticks also work well for giving the butterfly or moth a place to hang. You don't need to provide water – caterpillars get their moisture from the plants they consume. Cover the jar opening with a fine mesh screen or cheesecloth, and secure it with a rubber band.

If you don't know for sure what kind of caterpillar you've found, feeding it can be tricky. Most caterpillars are herbivores, eating only plants. Some caterpillars feed on a variety of food plants, while others consume only a specific plant. You can't force a caterpillar to eat something different – it will simply stop eating. A little trial and error may be required to find the proper food. Your first and most important clue is where you found the caterpillar. Was it on a plant? If so, there's a good chance that's its food. Take some cuttings of the plant, and be sure to include both new and old leaves, as well as flowers if the plant has bloomed. Some caterpillars prefer old leaves to new ones, and others may feed on the flowers. Offer the cuttings to your caterpillar, and see if it eats anything. If the caterpillar was not on a plant at the time you found it, you'll have to make some educated guesses about what to feed it. What plants are nearby? Start with those, taking cuttings and offering them to the caterpillar. If it eats one, you've solved the mystery and

should continue to collect that plant for feeding. If you're still really stumped about the caterpillar's food preferences, you can try introducing one or more of the most common caterpillar food plants. Popular tree species include oak, willow, cherry, poplar, birch, apple, and alder. Some herbaceous plants, like dandelions and clover, are also common hosts for larvae. Whatever your caterpillar does eat, you will need an abundant supply of the food plant. Remember, a caterpillar's job is to eat and grow. As it gets bigger, it will eat more. You need to keep a fresh supply of food available to the caterpillar at all times. Change the food once most of it has been eaten, or if it starts to wilt or dry out. Since caterpillars eat a lot, they also produce a lot of droppings. You'll need to clean out the caterpillar's housing regularly. When the caterpillar is on its food plant, it's a fairly easy process. Just remove the food plant and the caterpillar, and let it continue munching away while you clean house. Make sure you clean out the small jar holding the food plant, too. If conditions become too moist in the housing, you may discover fungus forming in the soil layer. When that happens, be sure to remove the soil completely and replace it.

You won't need to do much once the caterpillar successfully pupates. Remove the food plant. The pupa can dry out if conditions become too dry, or become moldy if too damp. Some lepidopterists recommend removing the pupa from the caterpillar housing, but this isn't necessary if you check the jar once in a while. If the soil appears extremely dry and crumbly, a light spray with water will add a little moisture. If condensation appears on the jar, wipe it down.

Spring and most summer caterpillars may emerge as adults within a few weeks after pupating. Autumn caterpillars usually overwinter in the pupal form, meaning you will have to wait until spring to see the moth or butterfly. Keep any overwintering pupae in a cool basement or unheated garage, to prevent premature emergence. When the adult emerges, it will need time to dry its wings before it can fly. This may take a few hours. Once it is ready to fly, it may begin fluttering its wings rapidly, which can damage its wings if the butterfly or moth is left in the jar. Take the jar outdoors, preferably to the area where you collected the caterpillar, and release your butterfly or moth.

Year 5 – All living things and their habitats

Assessing children’s knowledge and understanding of the nature, processes and methods of science

| Learning expectation | Group 1 (lower ability) | Group 2 (average ability) | Group 3 (higher ability) | Comments |
|---|----------------------------|------------------------------|-----------------------------|----------|
| To be able to explain the differences in the life cycles of a mammal, an amphibian, an insect and a bird. | | | | |
| To be able to describe the life process of reproduction in some plants and animals. | | | | |
| To be able to plan the correct enquiry to answer a question. | | | | |
| To be able to recognise which secondary sources will be most useful to their research (non-statutory). | | | | |
| To be able to use | | | | |

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|---------------------------------|--|--|--|--|
| scientific diagrams and labels. | | | | |
| To be able to explain findings. | | | | |
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| Children <u>below</u> the learning expectations | Children <u>above</u> the learning expectations |
|---|---|
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