

# PROGRESSION OVERVIEW

## Sustainable Palm Oil (SPO) to the Science Programme of Study for KS2

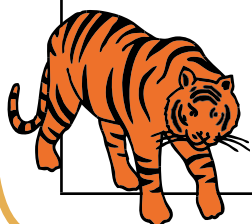
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Please refer to examples of good practice from “case study schools” in the news section of our education page.

Some of the following suggested activities have been further developed and made into a **detailed lesson plan with supporting resources**. The detailed plans can be found in the **lesson plan** section of the KS2 SPO Conservation Teacher Toolkit.

Year 3 - Science National Curriculum Objective Links	Year 3 - Sustainable Palm Oil Overview
<b>Plants</b> explore the requirements of plants for life and growth (air, light, water, nutrients from soil, and room to grow) and how they vary from plant to plant	<p>Y3 - Sustainable Palm Oil - Plants - Autumn / Spring Term</p> <p><b>Activities:</b>            Children to investigate the effects of ‘air, light, water, nutrients from soil, and room to grow’ on plant growth.</p> <p>Children to carry out a fair test and change one variable (air, light, water, nutrients from soil or room to grow).</p> <p>Children to conclude from their findings what the individual effects of lack of air, light, water, nutrients from soil, and room to grow have on plant growth.</p> <p>Children to compare the oil palm tree (to the plants they have carried out a fair test with) and how the oil palm trees only grow in warm wet climates such as in Indonesia, Malaysia and Western Africa (where they originated).</p> <p><b>Resources:</b>            Non-fiction books on various plants such as the air plant, cactus plants and oil palm trees. Several of the same type of plant in a pot readily available in local shops such as carnation or dianthus (for experiment purposes).</p>
<b>Plants</b> explore the requirements of plants for life and growth (focusing on light and water)	<p>Y3 - Sustainable Palm Oil - Plants - Autumn / Spring Term</p> <p><b>Activities:</b>            Children to compare the amount of sunshine and rainfall between the UK and a warm rainforest - how does this affect plant production and growth?</p> <p>Children to research in to the unusual plants which grow in the rainforest which love the rain, humidity and shelter from the forest trees.</p> <p>Children to think which of these plants do not grow in the UKs forests? Why? Children are to relate to the lack of</p>





### Plants

investigate the way in which water is transported within plants  
identify and describe the functions of different parts of flowering plants:  
roots, stem/trunk, leaves and flowers

warmth, water and difference in light.

Children to use reliable sources of information to support their research such as library books and the online kiddle website.

Resources: Rainfall statistics from the MET office, library books on plants and online information on the Kiddle website:  
<https://kids.kiddle.co/Rainforest>

### Y3 - Sustainable Palm Oil - Plants - Autumn Term

**Children to investigate the way in which water is transported within plants, linking this to rainforest plants or the oil palm tree.**

#### Activities:

Children to learn how water and nutrients are transported from a plant's roots through the stem of plants to the leaves. And that a plant's leaves use water in the process of photosynthesis to make the plant new food. The water evaporates from the leaves, leaving a space, drawing further water up from the roots.

Children to observe an experiment involving celery or carnations, to show how water moves through the stem of a plant. (Teachers may wish for children to carry out their own science investigation on this).

Children are to be encouraged to predict what might happen by drawing appropriate diagrams and are to record their observations through annotated diagrams.

Children to review the learning objective and success criteria through differentiated questions:

*e.g. What did you observe to happen?*

*Can you explain why water is able to move up the stem to the leaves of the plant?*

*Why is water needed in the leaves of the plant?*

*What do you think might happen if the leaves were to be removed?*

Children to be shown a diagram of an oil palm tree. Children to label and annotate the plant, showing how water is transported from the roots to the leaves, to demonstrate their understanding of the process of transpiration.

#### Resources:

KS2 KWL impact sheet, camera, Chester Zoo's Year Three Conservation Knowledge Organiser. Paper and pencil.

BBC Science clip: 'What do plants need to survive?'

<https://www.bbc.co.uk/teach/class-clips-video/science-ks1-ks2-ivys-plant-workshop-parts-of-a-plant/zvdkpg8>

BBC Science clip: 'How does water get from the roots to the leaves of a plant?'

<https://www.bbc.co.uk/teach/class-clips-video/science-ks1-ks2-ivys-plant-workshop-how-does-water-get-from-the-roots-to-the-leaves/zdtfjnv>

BBC Bitesize: What do a plant's roots and stems do?

<https://www.bbc.co.uk/bitesize/topics/zy66fg8/articles/zcxh4qt#:~:text=The%20stem%20carries%20water%20and,keeps%20the%20plant%20standing%20upright.>

Power Point: 'Experiment to show movement of water through a stem'. (Optional: two carnation plants, food colouring, water and a clear jug for teacher demonstration). Worksheet: 'How water is transported in an oil palm tree'. Worksheet with diagram of oil palm tree, with space surrounding it for annotation/ labels.

### **Animals, including humans**

identify that animals, including humans, need the right types and amount of nutrition, and that they cannot make their own food; they get nutrition from what they eat

## Y3 - Sustainable Palm Oil - Animals, including humans - Autumn Term

**Children to identify that animals, including humans, need the right types and amount of nutrition, and that they cannot make their own food; they get nutrition from what they eat.**

### **Activities:**

(Making links to the rainforest animals e.g. Discuss the plight of orangutans who cannot survive on oil palm fruit – they need a diversity of plants to eat).

Children to be introduced to and explore food chain cards containing rainforest animals which live in South-east Asia.

Children could be asked various questions such as (see lesson plan for details):

*How might you group plants and animals?*

*How do plants obtain their food?*

*Do you know an example of an animal that will only eat plants? Only eat meat? Eat plants and meat? What is a food chain?*

*Can you give an example of a food chain?*

*Can you name any producers? Omnivores? Carnivores?*

*What would happen if food from these food chains is not available?*

*What might happen if there was only one type of food to eat? How might this affect the animal?*

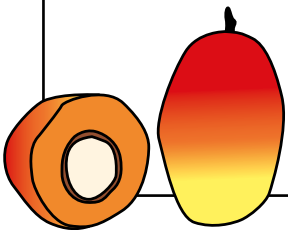
Children to discuss the importance of animals eating a range of different types of food with a range of nutrients. Refer to the Chester Zoo Conservation Organiser for Year 3.

Class teacher to discuss the issues facing the orangutan in the South-east Asian islands of Sumatra and Borneo. (Discuss the fact that orangutans are only found in the wild in these particular rainforests in the world). Show children the wildlife corridors that can be kept or created to allow the animals to reach food and habitats surrounding the plantations, giving them access to a wider diversity of food than just from oil palm trees, which would be insufficient for their needs.

Class teacher to review the learning objective and success criteria. Review learning through differentiated questions

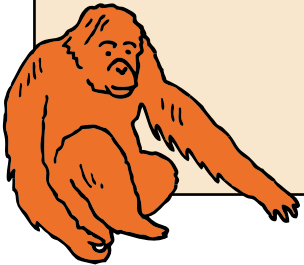
### **Resources:**

Chester Zoo's Year Three Conservation Knowledge Organiser, 'Cards of South-east Asia rainforest habitat for food chains and food webs', Bornean food web, Digital camera to record food chains made from the cards, A3 paper to record own food webs upon, Chester Zoo resource: Sustainable Palm Oil Campaign Booklet. (see more detailed resources on lesson plan).



**Animals, including humans**

identify that humans and some other animals have skeletons and muscles for support, protection and movement.



## Y3 - Sustainable Palm Oil - Animals, including humans - Autumn / Spring / Summer Term

**Activities:**

Children to compare how similar the human skeleton is to an orangutan and how they have muscles for support, protection and movement. Researching about this through children's internet search engines (kids geographic) and information books.

Children to find out how the orangutan is suited to its environment, looking at and comparing the skeleton to a humans.

Children to find out facts such as:

**The orangutan:**

- It's equipped with very long, powerful arms to help them climb and swing from tree to tree with ease.
- Has hook-shaped hands and feet to help them reach, climb and swing from one tree to the next across the gap.
- Has a skull like humans to protect its brain
- On the ground Orangutans walk on all fours, using their muscles to help them move.

**Resources:**

Images of a skeleton frame of the orangutan and skeleton of a human. Information books on orangutan and human skeleton.

Children's search engines: Kiddle website information on the orangutan:

<https://kids.kiddle.co/Orangutan>

National Geographic website information on the orangutan:

<https://kids.nationalgeographic.com/animals/mammals/orangutan/>

## Year 4 - Science National Curriculum Objective Links

### Living things and their habitats

recognise that environments can change and that this can sometimes pose dangers to living things.

## Year 4 - Sustainable Palm Oil Overview

### Y4 - Sustainable Palm Oil - Living things and their habitats - Autumn / Spring / Summer Term

#### Activities:

Class teacher to explain to children that they are going to be conservationists!

Children to be given time to read facts from the 'Palm Oil Fact cards'

Children to also watch the BBC Newsround on: **'What is palm oil and why is it thought to be bad?'**

Children to be given these questions from the 'Sustainable Palm Oil Challenge Teachers pack'

Ask them to find answers to questions such as:

*Where in the world does palm oil grow?*

*What animals live there?*

*What is their habitat?*

*Why do they live there?*

*What has happened to this habitat, how has it changed?*

*How has palm oil endangered these animals?*

*What other threats do these animals face?*

Children may wish to watch the video again to help them answer the questions and also look back over the fact cards. After collating their answers it is hoped children will recognise that environments for the animals of the rainforest can change by the removal of their habitat home and planting of unsustainable palm oil plantations and that this can sometimes pose danger to them.

Children could also be asked: *What is the positive impact of man on rainforest animals when palm oil is sustainably farmed?*

It is hoped that children will learn that no rainforest was deforested to make way for the sustainable plantation, no endangered wildlife living on the original land was affected by the plantation. Any wildlife found in the plantation area is allowed to travel through the plantation to reach food and the natural habitat surrounding the plantation. Animals can travel through by travelling along wildlife corridors.

(Link to persuasive writing project work – English).

#### Resources:

Prompt questions on page 3 of the 'Sustainable Palm Oil Challenge Teachers pack'

Sources of information: Palm Oil Fact cards

#### BBC Newsround - What is palm oil and why is it thought to be bad?

Why is palm oil seen as a bad thing? Why is palm oil seen as a good thing? So what's the solution?

<https://www.bbc.co.uk/newsround/39492207>



### Living things and their habitats

recognise that environments can change and that this can sometimes pose dangers to living things.

### Working Scientifically -

- Reporting on findings from enquiries, including oral and written explanations.

## Y4 - Sustainable Palm Oil - Living things and their habitats - Autumn / Spring / Summer Term

### Human impact on the environment

Children to explore the negative impact of man on the environment through the deforestation of rainforests in Borneo because of unsustainably produced palm oil plantations (Link to persuasive writing project work - English).

#### Prior learning:

Previous lessons should involve the children learning about changes to environments that are natural; The consequence of expected changes to the environment; and the consequence of extreme changes to the environment and how these changes can affect the wildlife population and deplete numbers

#### Activities:

Show children clips from 'Our Planet' series on forests and jungles:

[www.ourplanet.com/en/video/biome-tour-of-our-forests/](http://www.ourplanet.com/en/video/biome-tour-of-our-forests/)

[www.ourplanet.com/en/video/biome-tour-of-our-jungles/](http://www.ourplanet.com/en/video/biome-tour-of-our-jungles/)

Ask the questions such as:

*'Are changes to the environment always caused by humans?'*

*'What sort of environmental changes occur naturally?'*

Children can write down examples on their whiteboards and feedback to the class.

Children to watch the BBC Bitesize video clip:

Humans and the Environment: [www.bbc.co.uk/bitesize/topics/zp22pv4/articles/z2md82p](http://www.bbc.co.uk/bitesize/topics/zp22pv4/articles/z2md82p)

Explain that an ecosystem is a community of organisms (plants and animals) that live together and interact in the same environment. Generally, human action can have a positive and/ or a negative impact on these ecosystems.

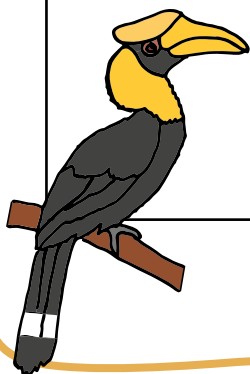
Ask the children: *'How do human beings affect their environment?'*

The children should work in pairs and write the titles 'positive impact' and 'negative impact' on a shared whiteboard. They should be given about three minutes to list ways humans impact the environment under these headings. After this, they will be encouraged to share their ideas with the children in their group (about six). Each group will feedback to the class.

#### Activities:

In pairs/ small groups the children will sort pictures into positive impact of humans/ negative impact of humans and explain how they have sorted them. Class teacher could ask them: *'Why does this picture show a positive/ negative impact by humans?'*

Emphasise the information under specific pictures that relate to Chester Zoo, to show how the staff at Chester Zoo are having a positive impact on the environment. In particular, discuss the work they are doing to promote the use of sustainable practices in oil palm plantations and their local and global campaign to promote the use of sustainable



	<p>palm oil products. Discuss also the importance of sustainable palm oil. This means that deforestation and 'slash and burn' clearing of vegetation has not occurred. The practices are better, safer, have better working conditions for the local workforce and fewer animals and plants are affected (and biodiversity is preserved). Chester Zoo supports various schemes as well as doing its own conservation work abroad. For instance, it supports a scheme to protect the orangutans through the blocking of ditches that had been dug to drain the forest. The ditches refill with water, re-wet the peat soil underlying the forest and the forest is prevented from drying out, stopping uncontrolled fires that destroy the habitat for orangutans and other wildlife.</p> <p>There are two activity worksheets for the children to carry out. See details on the lesson for these.</p> <p>Class teacher to review the learning objective and success criteria, using the PowerPoint to support.</p> <p><b>Resources:</b> Worksheet / cards: 'How do human beings affect the environment?'</p> <p>Worksheet: 'Human Impact on the Environment'</p> <p>Clip from 'Our Planet' series on forests and jungles:  <a href="http://www.ourplanet.com/en/video/biome-tour-of-our-forests/">www.ourplanet.com/en/video/biome-tour-of-our-forests/</a>  <a href="http://www.ourplanet.com/en/video/biome-tour-of-our-jungles/">www.ourplanet.com/en/video/biome-tour-of-our-jungles/</a></p> <p>BBC Bitesize video clip: Humans and the Environment:  <a href="http://www.bbc.co.uk/bitesize/topics/zp22pv4/articles/z2md82p">www.bbc.co.uk/bitesize/topics/zp22pv4/articles/z2md82p</a></p> <p>David Attenborough: 'Our Planet: A reason for hope'.  <a href="http://www.ourplanet.com/en/video/a-reason-for-hope">www.ourplanet.com/en/video/a-reason-for-hope</a></p> <p><b>See also Chester Zoo's webpages on sustainable palm oil:</b>          Chester Zoo: 'Sustainable palm oil: Act today to protect wildlife':  <a href="http://www.chesterzoo.org/what-you-can-do/our-campaigns/sustainable-palm-oil/">www.chesterzoo.org/what-you-can-do/our-campaigns/sustainable-palm-oil/</a></p> <p>Chester Zoo: Our Position on Palm Oil:  <a href="http://www.chesterzoo.org/what-you-can-do/our-campaigns/sustainable-palm-oil/our-position-on-palm-oil/">www.chesterzoo.org/what-you-can-do/our-campaigns/sustainable-palm-oil/our-position-on-palm-oil/</a></p> <p>'The impact of humans on the environment' - PowerPoint</p>
<p><b>Science:</b>  <b>Living Things and their Habitats</b>          Recognise environments can change and that this can sometimes pose dangers to living things</p> <p>Pupils should explore examples of human impact (both positive and negative) on environments, for example, the positive effects of nature reserves, ecologically planned parks, or garden ponds, and the negative effects of population and development, litter or deforestation.</p>	<p>Y4 - Sustainable Palm Oil - Living things and their habitats - Autumn / Spring / Summer Term</p> <p><b>The reasons why deforestation occurs and its impact.</b></p> <p><b>Prior learning:</b>          Children should have learned in previous lessons about changes to environments that are natural; The consequence of expected changes to the environment; The consequence of extreme changes to the environment and how these changes can affect the wildlife population and deplete numbers; and The effect of humans on the environment.</p>

### Geography:

#### Human and physical geography

To describe and understand key aspects of human geography, including: types of settlement and land use, economic activity including energy, food, minerals and water in the context of rainforests.

### Activities:

Children to be introduced to the learning objective and success criteria for 'The reasons why deforestation occurs and its impact.'

Class teacher to explain several historical reasons for deforestation (see detailed lesson notes) then play the video: 'What is deforestation?' which explains the reasons for deforestation and also the impact of deforestation on animals, plants and the environment. Children could take notes on whiteboards and then think about these questions *Why does deforestation occur? And 'What is the negative (bad) impact of deforestation?'*

Class teacher to model how to write a few ideas offered by the children on to a mind map. Then in pairs or groups, the children should write down all the knowledge they remember that answers the above questions, using knowledge gained from the video and perhaps gained from previous lessons. This could occur on a worksheet: '**Reasons for and against deforestation**'; ideas could be collated from the group. Children should feedback their ideas to the class. The teacher should then complete the class mind map, collating all the main ideas gathered so far.

Explain that people are now increasingly recognising the negative impact of deforestation and so it is important to seek other ways of e.g. farming and logging using more sustainable methods (ways that do not have such a negative impact on plants, animals and the environment). Ask the children: *'Can you think of more sustainable methods?'*

If the children have been taught other lessons involving deforestation or discussion of sustainable palm oil, then the children could explain some of these e.g.:

- farming should re-use land previously deforested and should not cut down more areas of trees.
- wildlife corridors can be included to enable animals to move from one part of the rainforest across plantations to another part of the rainforest.
- replanting trees following removal for logging.

Children to be encouraged to discuss some of these ideas through suitable questioning.

**Deforestation Chain Game** - Children to play the chain game which has been designed to reinforce some of the major issues about deforestation that have been explained in the video.

The activity will also be a good assessment of whether the children have grasped some of the deforestation issues.

The children should work together in pairs for peer support. \*Children to be paired with a child of higher ability.

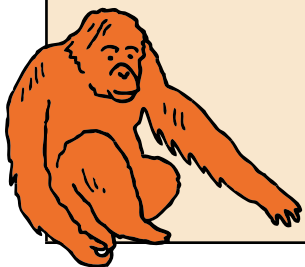
\*\*The children could be given questions to answer on their whiteboards that are related to the chain game, when they have completed the activity and they should prepare feedback to the class e.g.: *'How do you think the life of the indigenous people might be affected by deforestation?'* *'Why do you think warming of the atmosphere affects plants and animals?'* *'What do you think might happen to life on Earth if too many trees are cut down?'*

Ask the children: *'Have you learnt any new information about deforestation from the chain game?'*

The higher ability children should be asked to feedback their answers to the questions they were given, related to the chain game.

The children should be encouraged to add any further learning to their mind maps.

**Plenary** - Important information should be added to the class mind map when the children feedback to the class. Review and discuss problems that the children encountered whilst answering the questions in the chain game. See lesson plan for more detailed ideas and suggestions.





	<p><b>Resources:</b> Power Point: 'The reasons why deforestation occurs and its impact.' 'The reasons for and against deforestation' worksheet. 'Deforestation chain game' Paper and pencils. (Possibly sized A3). Marker pens. Whiteboards and whiteboard pens.</p> <p>Paper for assessment.</p>
<p><b>Living Things and their Habitats</b> Recognise environments can change and that this can sometimes pose dangers to living things</p> <p>explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment</p>	<p>Y4 - Sustainable Palm Oil - To understand the impact of deforestation on animals and plants in the rainforest</p> <p><b>Prior learning:</b> Previous Science lessons should involve the children learning about: Changes to environments that are natural; The consequence of expected changes to the environment; The consequence of extreme changes to the environment and how these changes can affect the wildlife population and deplete numbers; and The effect of humans on the environment.</p> <p><b>Activities:</b> Children to be introduced to the learning objective and success criteria for: exploring the impact of deforestation on an animal from Borneo or Malaysia, in South-east Asia and/ or an animal in South-America.</p> <p>Children could be asked: '<i>Can you give an example(s) of how deforestation affects animals?</i>' Responses by the children can be written on the board. Children to read one or two Chester Zoo fact files about endangered animals and then choose an animal to write about.</p> <p>Class teacher to demonstrate how to use the fact file about this specific animal (and information which might have been previously created on a mind map in a previous lesson) to write down how the chosen rainforest animal is affected by deforestation.</p> <p>Exemplify to the children how a drawing of their animal in the centre of the page can be annotated around the outside to show how the animal itself can explain how it is affected (using different points in separate speech bubbles).</p> <p>Children can take facts gathered from the various sources e.g. from the fact file: 'I need the rainforest for camouflage since I have brown fur and white stripes and spots. Without camouflage my predators can spot me!'</p> <p>All children: Use information learned about deforestation and the fact card to support your work. * You may plan your writing in pairs. ***If possible, use further research about your chosen wild animal.</p> <p>Children to review the learning objectives and success criteria.</p> <p>Class teacher to ask differentiated questions related to the children's own work e.g.: 'How does deforestation affect the animal you researched?' 'How did you include your general knowledge about deforestation to explain the effect of deforestation on this animal?'</p>

*'How could the situation be improved for the animal?'*  
*'What information did you learn from other sources (not the fact files)?'*  
See lesson plan for more details.

**Resources:**

Power Point: 'The impact of deforestation on plants and animals'. Chester Zoo fact files on endangered animals.

Focus on the animals in South-East Asia and South America.

[www.chesterzoo.org/schools/resources/palm-oil-animal-fact-file-collection/](http://www.chesterzoo.org/schools/resources/palm-oil-animal-fact-file-collection/)

The children's mind maps from the lesson: 'The reasons why deforestation occurs and its impact'. (The work may have been written on the worksheet: 'The reasons for and against deforestation'), Paper, pens and pencils.

**Living things and their habitats**

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**

Y4 - Sustainable Palm Oil - Living things and their habitats - Autumn / Spring / Summer Term

**Grouping and classifying local UK animals in to categories vertebrates and invertebrates (1)**

**Activities:**

Class teacher to share with the children the section on the Chester Zoo's Year Four Conservation Knowledge

Organiser which relates to Grouping and Classifying living things in a variety of ways.

Class teacher to explain two main groups of animals – vertebrate and invertebrates, showing the definitions.

Class Teacher to discuss with the children there are different groups of animals within these two main groups:

Vertebrate: amphibians, fish, reptiles, birds and mammals.

Invertebrates: arachnids, annelids, crustaceans, echinoderms, insects, molluscs and protozoa.

Class teacher to share images of these different animal groups for children to sort in to these groups based on their features and children's new or existing knowledge.

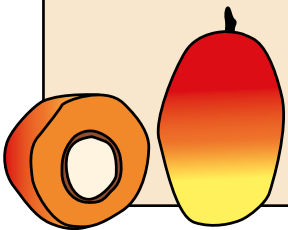
Children to explain their reasons why they chose those categories (they could refer to the animal classification chart).

**Resources:**

Chester Zoo's Year Four Conservation Knowledge Organiser.

A simple Animal Classification chart - containing simple definitions and images of vertebrates and invertebrates

Chester Zoo's Separate 'animal classification cards' – containing images of animals from the different animal groups.



**Living things and their habitats**

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**

## Y4 - Sustainable Palm Oil - Living things and their habitats - Autumn / Spring / Summer Term

**Grouping Rainforest animals in to categories vertebrates and invertebrates (2)**

**Children to categorise the animals of the wider environment – in the world's rainforests.**

**Activities:**

Class teacher to share with the children the section on the Chester Zoo's Year Four Conservation Knowledge Organiser which relates to Grouping and Classifying living things in a variety of ways and a simple Animal Classification chart.

Class teacher recap from previous lesson on grouping and categorising UK animals in to broad groups of micro-organisms, animals and plants.

Children to use the same process of sorting the rainforest animals into vertebrate and invertebrates, re sharing the simple animal classification chart with its definitions.

Children to look at the given image cards of typical rainforest fish, reptiles, birds, mammals, snails, slugs, worms, spiders and insects and sort them in to these groups based on their features (and previous knowledge from previous lesson).

Children to then (using their prior learning about UK animals) classify them in to either 'invertebrate' or 'vertebrate', explaining why they chose which category.

Class teacher to assess children's sorting and explanations and explain to the children which animals are endangered by the deforestation caused by unsustainable palm oil production.

**Resources:**

Chester Zoo's Year Four Conservation Knowledge Organiser.

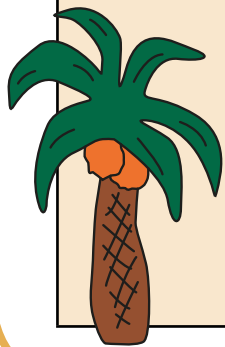
Chester Zoo's 'animal classification cards' – containing images of UK and rainforest animals from the different animal groups.

Simple 'animal classification chart.

## Year 5 - Science National Curriculum Objective Links

### Living things and their habitats

describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird



## Year 5 - Sustainable Palm Oil Overview

Y5 - Sustainable Palm Oil - Living things and their habitats - Autumn / Spring / Summer Term

Describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird (Comparing and contrasting UK animals with rainforest animals).

### Prior Learning:

In year 4, the children should have covered work to recognise that living things can be grouped in a variety of ways. The children should have also explored classification keys to help them group, identify and name a variety of living things in their local and wider environment.

### Activities:

Children to carry out activities where they are given the opportunity to learn about the life cycles of mammals, amphibians, insects and birds and practise naming major stages within specific groups.

**Activity 1** - They could recreate a life cycle for each of these different groups using sets of cards and review their cycles, explaining the different stages and making comparisons between them.

### Resources:

The PowerPoint: 'Comparing and contrasting the life cycle of mammals, amphibians, insects and birds'

Life Cycle Cards (see more details on lesson plan)

'Incomplete Metamorphosis Insect Life Cycle'

'Complete Metamorphosis Insect Life Cycle'

'Compare and Contrast Life Cycles' worksheet.

'Comparing two different animals within the same animal group'

Secondary resource e.g. books and the internet related to animals within specific groups.

'Chester Zoo Animal Fact Files' (that relate to endangered animals in South-east Asia')

Paper for life cycle cards activity. Paper, pens and pencils.

### **Living Things and their Habitats**

describe the life process of reproduction in some plants and animals.

## Y5 - Sustainable Palm Oil - Living things and their habitats - Autumn / Spring / Summer Term

**Understand how reproduction occurs for amphibians and most insects. Learning about how metamorphosis differs between these groups and how most amphibian and insect reproduction is sexual reproduction. Looking at the similarities and differences between a rainforest animal and a UK animal.**

**Describe the life process of reproduction in some plants and animals. Focusing on different types of reproduction, including sexual and asexual reproduction in plants, and sexual reproduction in animals (including a rainforest plant and animal).**

### **Prior Learning:**

See lesson plan: 'Y5 Sci Lesson1 Comparing and contrasting life cycles.' The children will have undertaken activities to compare specific animals within specific groups and between groups. They will have compared and contrasted the general life cycles of each of these groups.

The children may have been given work to describe the life process of reproduction in some plants and may have looked at life cycles of plants prior to this lesson. Both could also be taught after this lesson.

### **Introduction and activities:**

Children to recap on their previous learning about animal lifecycles.

**Activity 1** - Children to sort the 'Life cycle of a frog and a butterfly' using the worksheet: 'Sorting the life cycle of a frog and a butterfly'.

They will cut out the pictures and use them to create two life cycles, one of the frog and the other of a butterfly.

They will then connect the images in to the cycle using arrows (as shown on the Chester Zoo Life Cycle Posters) and annotate with as much information as they can recall about frogs, butterflies and the groups to which they belong.

Children to review their work.

Children to learn about the lifecycles and reproduction of amphibians and insects, looking at life cycles. They will also learn about sexual reproduction of animals, including internal and external fertilisation. As well as asexual reproduction.

**Activity 2** - Children will carry out differentiated activities which involve comparing the reproduction of amphibians and insects. See lesson plan for details.

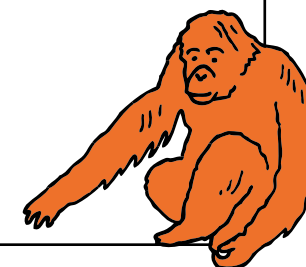
**Plenary** - Children to review their learning against the success criteria and learning objectives as a class and with their class teacher.

### **Resources:**

PowerPoint: Reproduction in Animals.

Sorting the life cycle of a frog and a butterfly.  
Chester Zoo Life Cycle Posters.

Amphibian Life Cycle



	<p>Incomplete Metamorphosis Insect Life Cycle</p> <p>Complete Metamorphosis Insect Life Cycle</p> <p>Comparing the repro of an insect and an amphibian.</p> <p>Paper, pens, pencils and coloured pencils.</p> <p>Secondary resources e.g. books and the internet related to amphibians and insects (from the UK and in the rainforest of Borneo or Sumatra).</p> <p>These two websites show how sensible replanting of oil palm can improve the loss of diversity encountered by replanting new oil palm plantations:</p> <p>Mongababy.com: Replanting oil palm plantations reduces frog diversity, but researchers say there are ways to fix that <a href="https://news.mongabay.com/2016/07/replanting-oil-palm-plantations-reduces-frog-diversity-but-researchers-say-there-are-ways-to-fix-that/">https://news.mongabay.com/2016/07/replanting-oil-palm-plantations-reduces-frog-diversity-but-researchers-say-there-are-ways-to-fix-that/</a></p> <p>Gates Cambridge: Replanting reduces frog diversity in oil palm <a href="http://www.gatescambridge.org/about/news/replanting-reduces-frog-diversity-in-oil-palm/">www.gatescambridge.org/about/news/replanting-reduces-frog-diversity-in-oil-palm/</a></p>
<p><b>Living Things and their Habitats</b> describe the life process of reproduction in some plants and animals.</p>	<p>Y5 - Sustainable Palm Oil - Living things and their habitats - Spring / Summer Term</p> <p><b>Observe and compare the life cycles of plants and animals in their local environment and find out how these plants and animals are similar to those found in the rainforests of Borneo. Focus on how animals and plants in Borneo are affected by deforestation from unsustainable palm oil production.</b></p> <p><b>Activities:</b> It is expected that the following suggested activities would take place over a series of lessons:</p> <p><b>Plants</b> - Children to explore, observe plants in their local environment and investigate their different life cycles. Children to research plants found in the rainforests of Borneo and make simple comparisons.</p> <p>Children to investigate a variety of plants 'hands on' in their school grounds or local area (e.g. strawberry plants which produce runners and new plants, sunflowers which produce seeds etc). They could visit Chester Zoo's botanical gardens and the Tropical Realm to see UK and rainforest plants in person.</p> <p>Children to study the oil palm tree and how it bears fruit and a these contain seeds. Children could look at how long it takes to grow in to a mature adult tree before it produces fruit with seeds (part of its life process and life cycle).</p> <p><b>Animals</b> - Children to explore, observe animals (birds and insects for example) in their local environment and learn about their different life cycles.</p> <p>They could also visit Chester Zoo's Tropical Realm to see the rainforest animals in person.</p>

See Chester Zoo's Y4 and Y5 Conservation Knowledge organisers for life cycles.

Children to be taught about how some of these plants and animals are similar to those found in the rainforests of Borneo (e.g. same or similar life cycles, same needs). Teacher to explain how animals (such as the orangutan and hornbill) are affected by deforestation from unsustainable palm oil production and how Chester Zoo is working hard to encourage people to be more aware of purchasing choices of household items. Helping people choose sustainably produced produce.

**Resources:**

There is a wide range of resources which could be utilised such as images of UK and rainforest plants. A range of different plants and exploring equipment. iPads and cameras to photograph animals and plants. Chester Zoo's Y4 and Y5 Conservation Knowledge organisers for images.

**Animals including humans**

describe the changes as humans develop to old age

**Non-statutory:**

Pupils could work scientifically by comparing data about the gestation periods of humans and other animals

Y5 - Sustainable Palm Oil - Animals including humans - Autumn / Spring / Summer Term

**Research the gestation periods of animals and comparing them with humans; by finding out and recording the length and mass of a baby as it grows.**

**Prior learning:**

It is hoped that children have experienced learning about life cycles in science lessons and are familiar with the meaning of gestation.

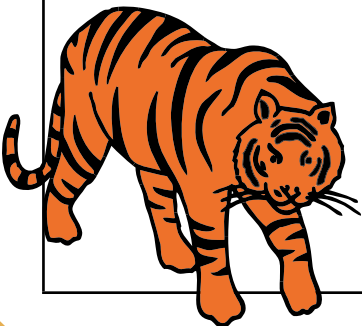
**Activities:**

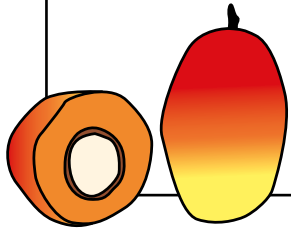
Children to research the gestation period of animals. They could use the document produced by Chester Zoo as a starting point for their research. They are then to compare the length of these to the gestation period of a human (typically 9 months / 40 weeks). Links could be made to mathematics.

**It contains these facts:**

Agouti – 3.5 months  
Bongo – 9.5 months  
Chimps – 8.5 months  
Giant Anteater – 190 days  
Jaguar – 14 weeks  
Lar Gibbon – 213 days  
Leaf cutter ant – adults emerge 40-60 days after egg laying  
Okapi – 15 months  
Orangutan – 8.5 months  
Sloth – approx. 11 months for two-toed. Much shorter for three toed!  
Tapir – 13 months  
Tree Kangaroo – 38 days

Children to research the gestation period of animals. They could use the document produced by Chester Zoo as a starting point for their research.





Children to also research about the length and mass of a human baby as it grows and compare to one of the animals in the above list. Children to see Chester Zoo's 'Length and mass of Animals' document.

There are lots of opportunities to make links to mathematics within this lesson.

**Resources:**

Chester Zoo's 'Gestation Period of Animals' document Chester Zoo's 'Length and mass of Animals' document.



## Year 6 - Science National Curriculum Objective Links

### Living things and their habitats

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

## Year 6 - Sustainable Palm Oil Overview

### Y6 - Sustainable Palm Oil - Living things and their habitats - Autumn / Spring / Summer Term

**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.**

**Prior Learning** - Children should have prior learning (from year 4) about grouping living things.

**Introduction** - Introduce the children to the origins of classification and the reasons for it.

Discuss how Chester Zoo makes it their mission to prevent extinction and their 'The Sustainable Palm Oil Challenge!' "The issue of palm oil is an incredibly complex one. We are confident that, when sustainably managed, palm oil has a place in sustaining an economic future for people while still allowing wildlife space to survive and thrive". Chester Zoo

**Grouping plants** - Children to reflect on previous learning about the 'general grouping of plants into: **'Non-flowering'** and **'Flowering'**'. They will be shown a wide range of plant groups. Children to be taught about trees and the two main groups: **'evergreen'** and **'deciduous'** and will be given opportunity to share what they already know about them. Children to be asked questions (see plan for details) and there is opportunity here for children to explore these trees first hand in their local environment. Children to focus on the broad groups of non-flowering mosses and ferns.

**Activity** - Children to look at the pictures or real plants growing in the local environment/ school grounds, taking photographs of them). Using a 'Plant classification chart' to support them, children are to classify the different plants, giving reasons why they put them in to the different classification.

N.B. You may wish to end the lesson here. Starting the next section on animals in a separate lesson.

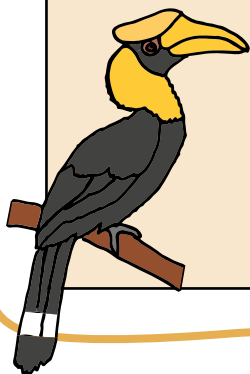
**Grouping animals** - Children to recall main groups of the animal kingdom: vertebrates and invertebrates. Children to be introduced to the other main groupings and some additions). As well as the meanings of warm and cold-blooded animals. Children are to look at the different characteristics of the different animal groups and particularly focus on the vertebrate groups: Amphibians, Fish, Reptiles, Birds, and mammals.

Time to be given to allow them to learn facts about the different species of orangutan and how humans have caused the severe decline in orangutans from poaching, the illegal pet trade and destroying their natural habitat to make way for oil palm plantations.

Children are to look at the different characteristics of the different animal groups and particularly focus on the invertebrate groups: spiders (arachnids), worms, insects and snails and micro-organisms.

**Quiz on plants and animals** - Children could work individually to answer the quiz questions, recording their answers on paper. Teachers may wish to simplify or extend the quiz depending on their class.

**Activity** - What am I? Class teacher to model how to play the game by giving several examples until the children understand the concept. )See differentiation details and the game on lesson plan).



**Plenary** - Review the learning objective and success criteria with the children, asking them to reflect and self-assess, as well as give answers to questions.

**Resources:**

PowerPoint: 'Y6 1 Classifying Living Things'

**Plants:**

'Selection of plant species images cards' or real plants to classify

Chester Zoo's 'Plant classification chart'

iPads and cameras

**Animals:**

Chester Zoo's 'Animal classification chart'

Chester Zoo's 'Animal classification cards UK and rainforest'

**Living Things and their Habitats**

give reasons for classifying ..... animals based on specific characteristics.

Y6 - Sustainable Palm Oil - Living things and their habitats - Autumn / Spring / Summer Term

**Classify common animals (and some rainforest animals) using a classification key into commonly found invertebrates (such as insects, spiders, snails, worms) and vertebrates (fish, amphibians, reptiles, birds and mammals).**

**Give reasons for classifying plants and animals based on specific characteristics. Use a classification key to classify rainforest animals affected by unsustainable palm oil plantations.**

**Prior learning** - Children should have prior learning (from year 4) about grouping living things. Children should have learned how to classify animals, micro-organisms and plants in to broad groups by looking at their characteristics in previous science lessons.

**Introduction** - Children to recap from previous lesson on 'Y6 Science 1 Classifying living things'

Children could be asked:

*Can you recall the two groups the animal kingdom is divided into?*

*Can you recall what a vertebrate is?*

*Can you recall what an invertebrate is?*

Children to be shown a simple animal classification key and how it works to classify **vertebrates** from the UK (fox, owl, tortoise, goldfish and toad) and world-wide animals, such as those living in the rainforest (orangutan, hornbill, snake, piranha and frog).

Children to also be shown a simple animal classification key and how it works to classify **invertebrates** from the UK (Spider, Dragonfly, Butterfly, Ant, Snail, Slug, Fly, Worm and Bumble Bee).

**Activity** – Children to be given the task of classifying animals in to the right group, using given classification keys.



Activities to be differentiated (see plan for details).

**Activity** - Children to be given the task of making their own animal classification key.

Activities to be differentiated (again, see plan for details).

(N.B. washable white board pens on a wipeable surface could be a suitable alternative for drawing the flow chart arrows and putting the post its upon?).

Children to give reasons for grouping their animals. Children to also share with their peers their reasons for grouping and classifying animals on their own classification keys.

**Plenary** - Review the learning objectives with the children: Ask the children to check their work against the success criteria with another individual or pair of children. Review as a class.

**Resources:**

Chester Zoo's 'Vertebrate simple classification key' – colour

Chester Zoo's 'Invertebrate simple classification key' – colour

Chester Zoo's 'Invertebrate simple classification key' – Black and white

Chester Zoo's 'Animal classification cards UK and rainforest'

Post it notes and large sheets of paper (or marker pen and a clear wipeable surface)

Chester Zoo's 'Animal classification chart'

**Evolution and inheritance**

how animals and plants are adapted to suit their environment in different ways...

Y6 – Sustainable Palm Oil – Evolution and inheritance – Autumn / Spring / Summer Term

**Identify how the rainforest animals and plants are adapted to suit their environment**

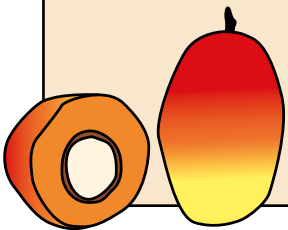
**Activities** - Children to look at how rainforest plants and animals are adapted to their environment.

Children could watch the BBC video clip <https://www.bbc.co.uk/bitesize/guides/zx8n39q/revision/2>

to find out answers to questions such as:

- *How have some plants adapted their leave and why?*
- *How have some trees adapted their bark and why?*
- *How have some trees adapted their roots and why?*
- *Which rainforest animals can be seen in captivity at Chester Zoo?*

Ring Tailed Lemurs, Golden Mantella Frogs, Chimpanzees, Mandrills, Red river pigs, Okapi, Congo Buffalo, Red Forest Duiker, Jaguar, Ecuador Amazon Parrots, Macaws and much more.



Children could watch a short video of them here:

<https://www.chesterzoo.org/schools/resources/which-rainforest-animals-are-at-chester-zoo/>

**Resources:**

<https://www.bbc.co.uk/bitesize/guides/zx8n39q/revision/2>

