YEAR 5: LIVING THINGS & THEIR HABITATS

LINKS TO NATIONAL CURRICULUM

- Describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird (Living things and their habitats, Year 5).

- Describe the life process of reproduction in some plants and animals (Living things and their habitats, Year 5).

LEARNING OBJECTIVES

1. What are the differences in the life cycles of a mammal, an amphibian, an insect and a bird?

2. How do animals reproduce?

3. How has the work of naturalists and animal behaviourists contributed to our understanding of the natural world?

NOTES TO TEACHERS

- **The process of reproduction in plants is covered in a separate lesson plan, which can be found here:** http://ypte.org.uk/lesson-plans/living-things-and-their-habitats-year-5-plant-reproduction
- Lesson plans are not intended to be of equal length and can be amalgamated or split to suit timings.
- Activities given are suggestions only. The main purpose of the lesson plans and presentation is to provide key information and visual aids for teachers to adapt to their needs.
- The PowerPoint presentation runs alongside the plans and all slides are referred to in the lesson plans. Please feel free to modify the presentation by adding your own slides or deleting those you don't need.

1. WHAT ARE THE DIFFERENCES IN THE LIFE CYCLES OF A MAMMAL, AN AMPHIBIAN, AN INSECT AND A BIRD?

SUGGESTED STARTER ACTIVITY

Exploring Children's Experiences

Explore the children's understanding of the human life cycle, using their own experiences of family and friends e.g. how babies grow into children, then into adults and what happens as we reach old age.

Ask the children if they have experienced a baby animal growing older. This could be a pet e.g. puppy, kitten, chick or perhaps lambs or calves on a farm. Ask them to choose an animal and then draw labelled illustrations explaining how their baby animal grows into an adult animal.

Having thought about the life cycles of different animals, can the children identify similarities and differences between them?

TEACHER INPUT

KEY WORDS

Lifecycle - the process of adults having young which then grow into adults and in turn produce young.
Gestation period - the period of time that a mammal carries her offspring, or babies, inside her body before giving birth.
Mammary glands - a gland in a woman's breast or in a female animal that produces milk.
Life expectancy/average life span - the average number of years that a person or animal can expect to live.
Incubate - to sit on eggs so that they will be kept warm and will hatch.
Metamorphosis - a major change in form or structure that some animals go through to become adults.
Marsupial - a type of mammal that gives birth to babies before they are fully developed; the babies continue to grow in a pouch on their mother's stomach.
Hatchling - a newly hatched young bird.
Nestling - a young bird that is living in the nest and is dependent on its parents.
Fledgling - a young bird that is ready to fly the nest.
Migrate - to move from one region or habitat to another, according to the seasons.

Mammal Life Cycle

Slide 4: The mammal life cycle is quite simple: the baby grows inside its mother's body until it is ready for birth, it is born, then slowly grows to become adult. Mammal young are similar to the parents, just smaller.
Slides 5-6:. Nearly all mammals give birth to live young; there are only 2 mammals that do not.
Slide 7: Different mammals have different gestation periods - for human babies it is 266 days (just under 9 months) but it can vary greatly.
Slide 8: Mammals all have mammary glands - in a female, these produce milk for feeding their young.
Slide 9: Just as gestation period varies hugely among mammals, so does life span.

The life cycles of mammals are similar in many ways: most give birth to live young, the young mammal is similar to the adult and grows larger to become adult and all have mammary glands to feed their young. But in other ways, mammal lifecycles can be very different.

Slides 10-11: Human Life Cycle

All humans follow the same stages of development, from growth in the mother's womb to old age. Average life expectancy for humans ranges from 46-84 years, depending on where in the world we live.

Slide 12 -13: Kangaroo Life Cycle (Australia and Tasmania)

Kangaroos are marsupials. They give birth to poorly developed babies that weigh less than a lump of sugar, are the size of a jelly bean and are blind and hairless. Shortly after birth, the baby kangaroo (called a joey) will crawl to the mother's pouch where it will live, feed and grow for 6-8 months.

Slides 14-15: Polar Bear Life Cycle (Arctic)

Pregnant polar bears make a den in the snow around October/November, after fattening themselves up with lots of food. They give birth in December/ January to small and helpless cubs which are cared for in the den until late March/April when they emerge. The cubs will stay with their mother for several years before they can cope on their own.

Bird Life Cycle

Slide 16: Birds have a similar life cycle to mammals in some ways.
Slides 17: But a very important difference is that **chicks grow inside eggs.** If an egg is fertilised before it is laid, the small white spot on the yolk (called the germinal disk) will gradually grow into a chick, using the nutrients stored in the

yolk.
Slide 18: Parent birds take it in turns to sit on the eggs to protect and keep them warm (incubation). Different birds sit on their eggs for different lengths of time. Bigger birds lay bigger eggs which take longer to hatch.
Slides 19-21: Most hatchlings can't walk or fly straight away. They stay in the nest (they are now called nestlings) where the parent birds look after and feed them. They practise flying until they are ready to leave the nest (they are then called fledglings).

Slide 22: Some birds migrate a long way as part of their life cycle. For example, the swallow breeds in the northern hemisphere, flies south in the winter to southern Africa and then returns to its breeding grounds in the Spring. This is because our temperature drops in winter, trees lose their leaves and so many insects begin hibernating. Rather than risk starvation, the swallow flies to Africa where the temperatures are high enough for their prey.
Slide 23: The Arctic Tern makes the longest migration of any animal in the world.

Slide 24: Kiwi (New Zealand)
Kiwis lay huge eggs for birds of their size and chicks emerge from them fully feathered.

Slide 25: Penguin (Antarctic)
In some birds, only the mother sits on the eggs. But for others, such as the penguin, the father takes his turn.

Amphibian Life Cycle
So far we have seen that mammal and bird babies/chicks have all the same body parts as their parents. But this is not the case for all animals.

Slide 26: Amphibians and insects have another type of lifecycle as they both go through metamorphosis - a stage in the growth of some animals in which the new form looks completely different from the old.

The Frog Lifecycle
1. **Slide 27:** In the Spring the frog lays eggs in a blob of clear jelly called frog spawn. Each black dot could eventually grow into an adult frog.
2. 1 week later the eggs start to change into tadpoles.
3. **Slide 28:** By late Spring the black dots hatch and are now tadpoles. They swim very well using their wriggly tails and breathe through gills.
4. **Slide 29:** 6 weeks after hatching, the tadpoles have grown back legs. They are still tiny but will soon grow bigger and stronger.

5. 10 weeks after hatching the tadpoles grow front legs and start to breathe through their lungs.
6. **Slide 30:** 12 weeks after hatching the tadpole develops into a small froglet. The froglet will soon lose its tail and its eyes will get bigger.
7. **Slide 31:** By late summer the froglet has grown into a large adult frog. After 2 years a female frog will lay more frogspawn and the cycle begins again.

Insect Life Cycle

Slide 32: Insects have very complicated life cycles and like amphibians, they go through metamorphosis.

The Butterfly Life Cycle

A butterfly begins its life as something completely different. This is how the transformation happens:

1. **Slide 33:** The female butterfly lays her eggs, usually on the leaves or stems of plants. Inside a tiny egg, a caterpillar (larva) starts to grow.
2. **Slide 34:** When it is ready, the caterpillar eats its way out of the egg and immediately starts chomping on the plant leaves! As it grows, its skin becomes too tight and it splits open to reveal a new and larger skin underneath.
3. **Slide 35:** Once fully grown, the caterpillar forms itself into a chrysalis (pupa). A hardened case forms around it to protect it from predators and weather. Inside, the tissue, limbs and organs of the caterpillar transform into a beautiful winged butterfly.
4. **Slides 36-37:** When the butterfly is ready, the case around the chrysalis splits open. The butterfly waits for its wings to dry and then takes to the air in search of flowers to feed on and other butterflies to mate with. So the cycle is complete and ready to begin again.

Slide 38: All butterflies start life as caterpillars. But the colouring of the caterpillars is often very different from the beautiful colours of the butterflies they become.

Slide 39: We have seen that the butterfly has 4 stages in its life cycle. But some insects have only 3 stages, with no pupal form. This is called incomplete metamorphosis.

SUGGESTED ACTIVITIES

Hatching Observation

If possible, it is wonderful for children to observe chicks hatching. There are many companies that provide schools with the equipment and expertise needed to incubate eggs, hatch and rear chicks.

Observations should be made before, during and after the chicks hatch:

- How long did the eggs have to be incubated for?
- How long was it before the eggs hatched?
- How long did it take the chicks to become dry and active after hatching?

If it is not possible to hatch chicks at school, there are websites that can provide you with video footage of chicks hatching etc.

Frog Life Cycle Observation

If possible, the children should watch tadpoles change into frogs in a school pond. They are most active in the Spring, so this is the best time to carry out an observation. Children could fill in an observation chart with drawings to show changes over time. If removed from the pond, it is vital that froglets are returned to the pond from which the spawn was originally taken.

If children are near a pond they must be warned about the dangers associated with ponds and must be supervised at all times.

Please see this guide for advice on how to care for frogspawn and tadpoles: http://ypte.org.uk/factsheets/care-of-frogspawn-and-tadpoles/overview

Butterfly Lifecycle: Ordering Task (see page 8)

Ask the children to draw (or cut and stick for less able/quicker option) each of the stages in the correct order, using arrows to link the stages. They should write labels to explain what is happening at each stage.

Frog Life Cycle Worksheet (see page 9)

The children should fill in the blanks by choosing the correct word from the word bank.

Mammal Lifecycle Research Task

a) Ask the children to choose a mammal they are familiar with e.g. a pet or farm animal and research the following:
   - What is the baby animal known as?
   - What is the gestation period?

- At what age does the animal become adult?
- What is the average life expectancy?
- How does their lifecycle compare with the human life cycle?

b) Ask the children to find one or more mammals from around the world, that do not live in the UK. They may choose to look in the rainforest, desert areas or the oceans perhaps. They should research the life cycle of these animals. How are they similar/different to the animals they have studied in their local environment? Can they suggest reasons for these differences?

BUTTERFLY LIFECYCLE

Draw each of these pictures in the correct order, using arrows to link them together. Then add detailed labels to explain what is happening at each stage.

FROG LIFE CYCLE

Frogs are _____ ; these are animals which spend part of their life cycle in _____ and part on _____. An adult frog likes to live on land, but will always return to water to lay their _____.

In the _____ the adult frog lays thousands of eggs in a blob of clear jelly called _____. The eggs are covered in jelly to help _____ them. By late Spring the spawn hatch into tiny _____. They swim very well using their wriggly _____ and breathe through _____ on the outside of their bodies.

Six weeks after hatching the tadpoles have grown hind _____. They are still tiny but will soon grow bigger and stronger. Ten weeks after hatching the tadpoles grow _____ legs and start to breathe through their _____. Two weeks later the tadpole's tail starts to disappear and it develops into a small _____. By late summer it has grown into a large adult _____ and has crawled onto land. After 2 years a female frog will lay more eggs and the _____ begins again.

WORD BANK

frog	frogspawn	froglet
cycle	legs	tails
gills	amphibians	protect
tadpoles	lungs	eggs
front	Spring	land
water		

2. HOW DO ANIMALS REPRODUCE?

SUGGESTED STARTER ACTIVITY

Class Discussion

Start with a recap to check the children's understanding of reproduction - what do they know about how plants and animals reproduce?
Follow on to discuss why is it so important for animals to reproduce. What would happen if they didn't? What happens when a species becomes extinct?

TEACHER INPUT

KEY WORDS

Reproduction - the process that produces babies, young animals or new plants.
Asexual reproduction - needs only 1 parent, so offspring are genetically identical to the parent.
Sexual reproduction - 2 individuals produce offspring that have genetic characteristics from both parents.
Cell - any one of the very small parts that together form all living things.
Gene - a part of a cell that controls or influences the appearance, growth etc. of a living thing.
Sperm - the male sex cell.
Egg - the female sex cell.
Fertilisation - the joining of an egg cell and a sperm cell.
Extinction - when an entire plant or animal species dies out and is gone forever.

Almost every animal uses sexual reproduction to produce offspring. Male and female cells combine to form a single cell - this is called fertilisation.

Slide 41: Offspring produced sexually have 2 parents, so although they resemble the parents, they are not necessarily identical to them (if you have already covered plant reproduction, you could compare with asexual reproduction where the offspring are identical to the parent).

Whilst sexual reproduction is common to most animal species, the way it is achieved varies. Most importantly, fertilisation can happen outside the female body or inside:

External Fertilisation

Slide 42: Fertilisation in many animals that live in water takes place outside the female's body (most amphibians and fish, some invertebrates). Most fish produce a large number of sex cells; the sperm and eggs are released into the water near each other and some are fertilised.

There are many hazards: the sperm and egg may not meet; they may be eaten by predators or they may die due to environmental conditions e.g. temperature. As the chances of fertilisation are low, huge numbers of sperm and eggs are needed to make sure enough young are produced.

Frog (amphibian)

Slide 43: The female releases thousands of unfertilised eggs into the water at the same time that the male releases his sperm. They combine in the water to create frogspawn.

Tuna (fish)

Slide 44: The female releases millions of unfertilised eggs into the water, where the male tuna adds his sperm to cause fertilisation. Young fish hatch from the fertilised eggs.

Internal Fertilisation

For most animals which live on land (and some aquatic animals), offspring are fertilised inside the female's body. Internal fertilisation has the big advantage that the fertilised egg is protected from harsh environments and predators. Fewer offspring are produced than with external fertilisation, but survival rates are much higher.

There are 3 ways that internal fertilisation can happen:

Slide 45: 1) The egg is fertilised inside the female's body. The young develop within the female, receiving nourishment from the mother's blood through the placenta and offspring are born alive (this includes almost all mammals).

Slide 46: Human (mammal)

Male sperm is placed inside a woman's body and fertilises an egg. The baby grows inside the mother for about 9 months, receiving nourishment from her blood through the placenta, before being born.

Half of the baby's genetic material is from the father and half from the mother - this means the baby will have characteristics of both his/her parents.

Physical differences are easiest to spot e.g. hair colour, height, shape of nose.

But we also inherit other things from our parents such as personality, talents and medical conditions.

Slide 47: 2) The egg is fertilised inside the female's body. The fertilised egg is then laid outside the female's body and develops there until ready to hatch, receiving nourishment from the yolk of the egg (this includes all birds).

Slide 48: Penguin (bird)

Male sperm is placed into the female and fertilises her eggs. After about a month, the female lays 1 or 2 eggs.

Slide 49: 3) Fertilised eggs are held within the female where the offspring develop, receiving nourishment from the yolk of the egg. The eggs hatch as they are laid, making it resemble live birth (this includes some fish, some reptiles and some invertebrate animals).

Slide 50: Fruit fly (insect)

The male places sperm inside the female which fertilises her eggs. She will lay up to 500 eggs, from which maggots (larvae) will soon hatch.

SUGGESTED ACTIVITY

Research Project

Ask the children to choose 2 animals - one that lives in the UK (preferably a pet or animal they can observe first hand) and one that does not. They should ideally be different types of animal too e.g. a mammal and an amphibian. They should research the life cycle of their chosen animals, comparing how they reproduce and grow.

The children could produce a mini project on their chosen animals. It should include:

- a title page
- a contents page
- information on the reproduction methods and life cycle of each animal
- illustrations/photographs
- a comparison of their 2 animals
- a list of sources used for their research

3. HOW HAS THE WORK OF NATURALISTS AND ANIMAL BEHAVIOURISTS CONTRIBUTED TO OUR UNDERSTANDING OF THE NATURAL WORLD?

SUGGESTED STARTER ACTIVITY

Class Discussion

The following questions could be discussed as a class or in smaller groups, with ideas then being fed back to the whole class:

- **Why is it important that we understand how plants and animals live?** Ideas might include: helping endangered species, understanding why some habitats are important for the survival of particular species, helping us improve conservation and look after the environment, understanding how removing a species can affect the whole food chain in that habitat.
- **Do they know what naturalists and animal behaviourists do?** Can they name any?
- **What aspects of animal behaviour could we study?**

TEACHER INPUT

KEY WORDS

Animal Behaviourist - a person who studies animal behaviour, especially as it occurs in the natural environment.

Naturalist - A person who studies plants and animals as they live in nature.

Primates - any member of the group of animals that includes human beings, apes and monkeys.

Slide 52: There are many aspects of animal behaviour that can be studied. Can the children add to those on the slide?

Slide 53: Jane Goodall is a well known animal behaviourist. She is an expert on primates and well known for her work with chimps, over a period of 50 years.

Slide 54: A naturalist is an expert in natural history. He/she may also be called a zoologist, biologist or botanist. Naturalists study plants and animals and help us all appreciate the natural world.

Slide 55: Charles Darwin changed the way humans viewed themselves and the world around them through his amazing ideas on evolution and natural selection. He is most well known for his ground-breaking Theory of Evolution, published in his 'On the Origin of Species' in 1859. His theory stated that all species have evolved from simple life forms, becoming more and more complex over millions of years. Over time, evolution meant that individuals within a species that were stronger and better adapted to their environment, were more likely to breed and pass their genetic advantages e.g. strength, camouflage, speed onto their offspring, who in turn would pass on and magnify these advantages in the genes of their own offspring. 'Natural selection' meant that weaker, less well-adapted members of a species were more likely to die before they bred and that over time, genetic weaknesses in a species would be naturally removed through predation/lack of success in hunting and breeding etc. Evolution is now accepted by most people as scientific fact and has been supported by fossil discoveries.

Slide 56: David Attenborough is a naturalist and broadcaster who has become known as the face and voice of natural history documentaries. His storytelling has inspired many generations to learn more about the natural world. Attenborough's many superb television series include *The Living Planet*, *Living With Dinosaurs*, *The Blue Planet*, *Planet Earth* and *The Frozen Planet*.

Slide 57: Steve Backshall is a naturalist, writer and television presenter who has inspired thousands of young people and adults to take an active interest in animals and nature. His many TV shows include *Deadly 60, Live n' Deadly* and *Deadly Pole to Pole*. Steve has been a President of YPTE since 2010.

SUGGESTED ACTIVITIES

Nature Observation and Sensory Mapping

If possible, take the children outside to a natural and quiet area with pencils and clipboards. Ask them to sit quietly and using their senses, record everything around them:

- **What can they see?** (e.g. perhaps a bird finding food, an ant carrying something to its nest, a flower being pollinated by a bee).
- **What can they hear?** (e.g. bird song, grasshoppers in summer, insects buzzing).
- **What can they smell? (e.g. flowers, cut grass).**

Slide 58: They could also make a sensory map - draw a circle in the middle of a page to represent themselves, then draw lines of different lengths and in different directions to the things they hear and see (see slide 58 for an example).

Research Task

Ask the children to choose a naturalist or animal behaviourist and produce a factfile on their life and their contribution to our understanding of the natural world.

Creative Task

Ask the children to imagine they are a famous naturalist and have discovered a new species of animal in a remote part of the world e.g. the rainforest, desert, Antarctica, under the sea. They could draw or make a model of their new species, give it a name and describe its characteristics and life cycle.

We value your feedback!

Let us know what you thought of this lesson plan by completing this Google Form https://forms.gle/cGAwi9AWXfSZgrYa9. **Thank you!**