

UNDERSTAND, DESCRIBE AND EXPLAIN: LIFE CYCLES

To understand and describe the differences in the life cycles of:

- Mammals
- Amphibians
- Birds
- Insects

<b>Learning links:</b>
Science:
Y4: Living things and habitats Classification/ Animals/ Mammals/ Amphibians/Birds/ Insect
Y6: Evolution and inheritance Life cycle/ Reproduction

<i>Life cycle</i>	<i>Mammal</i>	<i>Foetus</i>	<i>Baby</i>	<i>Child</i>	<i>Adult</i>	<i>Amphibian</i>	<i>Metamorphosis</i>
<i>Bird</i>	<i>Egg</i>	<i>Incubation</i>	<i>Hatchling</i>	<i>Nestling</i>	<i>Fledgling</i>	<i>Juvenile bird</i>	<i>Adult bird</i>
<i>Insect</i>	<i>Egg</i>	<i>Hatch</i>	<i>Larvae</i>	<i>Pupa/Chrysalis</i>	<i>Adult insect</i>	<i>Metamorphosis</i>	<i>Transformation</i>

Life cycle means the **stages** a **living thing** goes through **during its life**. Different living things can have very different life cycles.

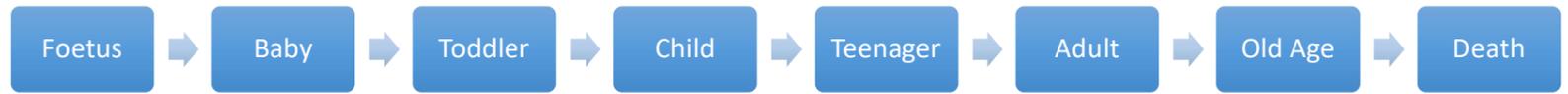
**Mammals:** Mammals are a particular **class of animal**. They must have glands that **give milk** to feed their babies. Second, they are **warm-blooded**. Third, all mammals have **fur or hair**. Humans are mammals and so are dogs, whales, elephants, and dolphins. **Most** mammals **have teeth** with the exception of the ant eater which doesn't have any teeth. Mammals live in all sorts of environments including the ocean, underground, and on land. Some mammals, bats for example, can even fly.

**THINKING POINT:**



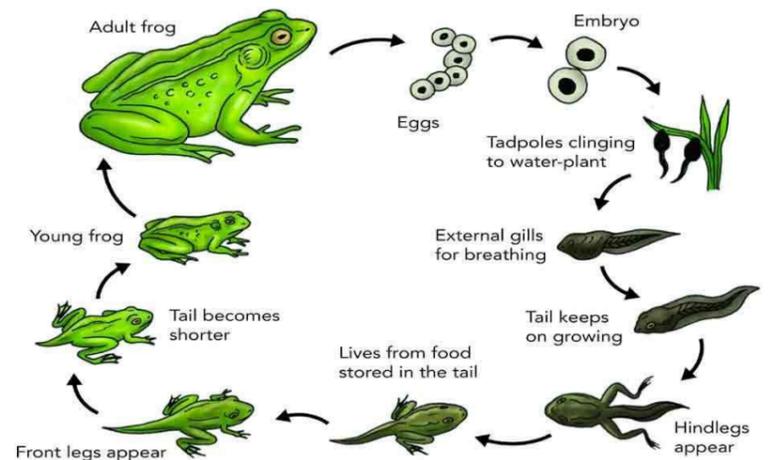
What 3 things **MUST** a creature have or do to be classified as a mammal?

Here is the life cycle of a human:



**Amphibians:**

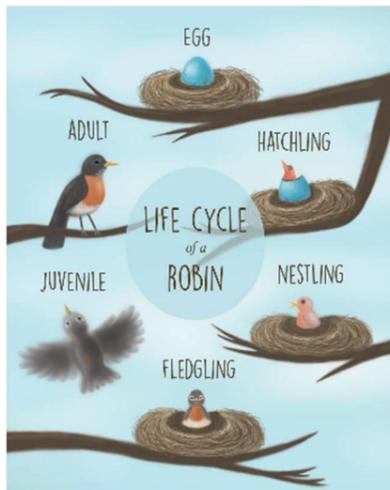
Amphibians are a class of animals like reptiles, mammals, and birds. They live the **first part of their lives** in the **water** and the **last part** on the **land**. When they **hatch from their eggs**, amphibians have **gills** so they can **breathe in the water**. They also have **fins** to help them **swim**, just like fish. **Later**, their bodies change, **growing legs** and **lungs** enabling them to **live on the land**. The word "**amphibian**" means **two-lives**, one in the water and one on land. Like fish and reptiles, amphibians are **cold-blooded**. This means their **bodies don't automatically regulate their temperature**. They must cool off and warm up by **using their surroundings**. Most amphibians **hatch from eggs**. After they hatch, their bodies are still in the **larvae stage**. In this stage, they are very **fish-like**. As they **grow older**, their bodies **undergo changes** called **metamorphosis**. They can grow **lungs to breathe** air and **limbs for walking** on the ground. The transformation isn't the same in all amphibians, but they **all** go through some sort of **metamorphosis**.



**THINKING POINT:**



What does the word amphibian mean and what has it got to do with its life cycle?



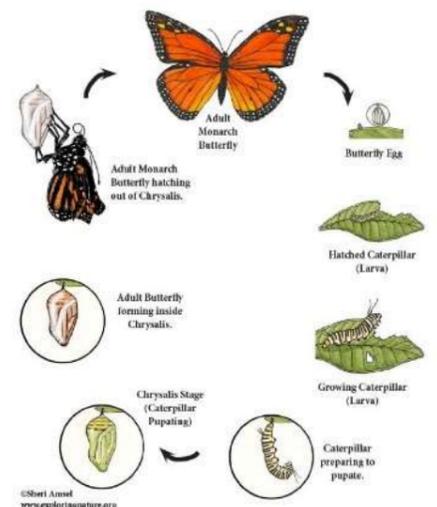
**Birds:**

Birds have a similar life cycle to mammals in some ways. However, 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**. **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. 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**). When confident, the bird will leave the nest (**juvenile**) and, over time, develop in to an **adult** bird.

**Insects:**

Insects have **very complicated** life cycles and, like amphibians, they go through **metamorphosis**. Most insects will go through **4 stages: Egg, Larva, Pupa & Adult**. An **egg will be laid** by the **parent insect**. When the **egg hatches**, the insect will still be in the **larvae stage** and usually look worm or slug-like. During this stage, the insect must **heavily feed** before the **Pupa** stage. The **larva** will then **shed its outer skin** and begin the **transformation** in to a **pupa or chrysalis**. After about **2 weeks**, eventually, the insect will **emerge or hatch** from the **pupa/chrysalis** as the **adult insect** and the **life cycle** begins again.

**Life Cycle of a Monarch Butterfly**



**THINKING POINT:**



How are the life cycles of insects and amphibians similar and how are they different?

EXPLORE AND INVESTIGATE:

HYPOTHESE  
ENQUIRE  
TEST  
RECORD  
REPORT  
CONCLUDE

<https://www.insectlore.co.uk/education/butterfly-garden-with-5-live-caterpillars.html>  
To observe, record (photos) and describe the life cycle of a butterfly.

To watch and observe time-lapse videos of different lifecycles of plants, insects, birds and animals.  
Observe and record the various stages of each.

KEY ASSESSMENT AND APPLICATION OPPORTUNITIES:

**EXS:**

1. Describe the difference between the life cycle of a human, a robin, a butterfly and a frog.

**GDS:**

- Write a chronological report with diagrams about the lifecycle of a chosen creature for a target audience.

**UNDERSTAND, DESCRIBE AND EXPLAIN: REPRODUCTION IN ANIMALS**

To understand and describe reproduction in animals

<b>Learning links:</b>
Science:
Y6: Evolution and inheritance Genetics/ Offspring/ Reproduction

Reproduction	Animals	Sexual reproduction	Asexual reproduction	Cell	Sperm	Egg	Fertilise/ Fertilisation
External Fertilisation		Internal Fertilisation	Genetic material	Offspring	Male	Female	Nourishment

**Reproduction** is vital for all living things. If a species does not reproduce, it **cannot survive** and will **become extinct**.

**Animal Reproduction:**

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

**Sexual reproduction:** **Offspring** produced **sexually** have **2 parents**, so although they **resemble** the parents, they are not necessarily **identical** to them.

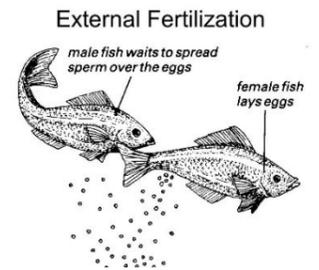
Whilst **sexual reproduction** is **common** to most **animal species**, the way it is achieved varies.

Most importantly, **fertilisation** can happen **outside** the **female body** or **inside**:

- External Fertilisation:** **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**.

**Examples:**

- Frog** (amphibian) - 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) - 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.



**THINKING POINT:**



Describe the process of fertilisation for fish to a partner.

- 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:

**Examples:**

- Mammal** (e.g. human) - 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**). **Male sperm** is **placed inside** a **woman's body** and **fertilises an egg**. The **baby grows inside** the mother for about 9 months. **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**. **The offspring will not be identical to either parent**. Physical differences are easiest to spot e.g. hair colour, height, shape of nose.



- Bird** (e.g. penguin) - **Male sperm** is **placed** into the **female** and **fertilises her eggs**. After about a month, the **female lays 1 or 2 eggs**. **Fertilised eggs** are **held within** the female where the **offspring develop**, receiving **nourishment** from the **yolk** of the **egg**. **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**. The offspring will not be identical to either parent.



- Insect** (e.g. fruit fly) - The male **places sperm inside** the **female**, which **fertilises the eggs**. She will then lay up to **500 eggs**, from which **maggots (larvae)** will soon **hatch**. These larvae will go through metamorphosis to become a fruit fly.

**THINKING POINT:**



What are the similarities and differences between these 3 examples?



**KEY ASSESSMENT QUESTIONS AND SCENARIOS:**

**EXS:**

- Describe and explain the process of reproduction in animals and how this can happen internally or externally.

**GDS:**

- Explain why you think that animals such as fish and frogs, who fertilise externally, lay hundreds/thousands of eggs compared to animals, such as humans and penguins, who fertilise internally, only use 1 or 2 eggs.