Subject: Science
Year 5: Life Cycles and Reproduction
NC/PoS:

- 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

Prior Learning (what pupils already know and can do)
Key learning from the units *Science, Year 4, Living things and their habitats: Classification and changing habitats* and *Science, Year 3, Plants: Plant reproduction*:

- Flowering plant reproduction involves seed dispersal and pollination.
- Plants have different structures (root, stem, leaf, flower and fruit) that have different functions.
- Mammals are vertebrates; an example of a characteristic is having fur.
- Amphibians are vertebrates; an example of a characteristic is having moist skin.
- Birds are vertebrates; an example of a characteristic is having feathers.
- Insects are invertebrates; some have soft bodies, some have shells and some have an exoskeleton.

They should also know:
All animals obtain their food from plants or other animals. Understand simple food chains. Animals need shelter, nutrients, water and air. All plants need space, nutrients, water and air. Mammals, reptiles, birds, amphibians and fish are vertebrates. Insects are invertebrates. All animals have offspring. Seeds and bulbs grow into mature plants. The life cycle of plants includes germination, growth, reproduction and seed dispersal. To know basic life cycle of animals includes birth, growth, reproduction and death. All living things have a life cycle.

End Goals (what pupils MUST know and remember)

- Know that there are distinct types of reproduction, including sexual and asexual reproduction in plants, and sexual reproduction in animals.
- Know that sexual reproduction in plants involves pollen from one flower fertilising the egg of another to produce a seed.
- Know asexual reproduction in plants happens without pollen or an egg. The new plant grows from cuttings from the parent plant.
- Know the life cycle of a dog (mammal) - live young born and get milk from mothers, grow from babies to adults, reproduce
- Know the life cycle of a frog(amphibian)- egg in jelly laid in water, develops tail, and legs, grows lungs to breathe and leaves water, takes 2 years to grow to adult size
- Know the life cycle of a butterfly (insect) - eggs laid by the female insect; eggs hatch and larva are born; when the larva moults for the last time, a pupa is formed
- Know some insects only have 3 stages: born as an egg, hatches as a nymph and changes into an adult
- Know the life cycle of a robin (bird) – egg, hatches and is fed by the parents, juvenile– leaves the nest when flight feathers are grown, adult attracts mate to reproduce
- Know amphibians and insects go through metamorphosis

Key Vocabulary: life cycle, life span, metamorphosis, gestation, pupa, larva, sexual, asexual, nymph, naturalist, behaviourist, spores, runners, clones, stigma, stamen, pistil, filament, ovary, anther, fledgling, style, ovary

This first session will take a full afternoon/two lessons
Session 1: Recap and recall: check the children can recall some of the key learning from the units *Science, Year 4, Living things and their habitats: Classification and changing habitats* and *Science, Year 3, Plants: Plant reproduction*:

- Flowering plant reproduction involves seed dispersal and pollination.
- Plants have different structures (root, stem, leaf, flower and fruit) that have different functions.
- Mammals are vertebrates; an example of a characteristic is having fur.
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Use resources from Kapow Lesson 1: Life cycles and reproduction in plants
LO: To describe the life cycle of a plant, including the reproductive stage. (focusing on sexual reproduction in plants)
Working scientifically LO: To observe and compare equivalent parts in different flowers.
Use the pupil video: Sexual reproduction in plants, which details the structure of the flower, pollination, fertilisation and seed dispersal.
Dissect 3 different flowers/or use close-up images of 3 different flowers. Discuss differences in stigma and stamen and their function.
Dissect a flower into male and female parts.
Children write the function of the pistil (female) and the stamen (male) and describe the process of reproduction. Can draw (or label) a diagram to help describe the process.

Show slide 3 and inform the class that they will try growing a clone of a mint plant using the cutting method. Read through the method as a class.

1. Cut a stem of mint from the mint plant.
2. Carefully remove all leaves, except those at the very top, from the stem.
3. Place in a plastic water bottle filled with water.
4. Leave in a sunny spot.
5. Change the water every 3–5 days.
6. Measure the root growth weekly.
7. Photograph progress daily.

Vocabulary: sexual reproduction, pistil, stigma, stamen, anther, filament, style, ovary

Session 2:
Use resources from Kapow Lesson 2: Mammals
Recap and recall: differences between life cycles in previous lesson and life cycle of a flowering plant (use growing seed from Explorify as a stimulus)
LO: To describe the life of a mammal.

Children learn the life cycle of a dog (mammal) :

1. **Mating**: a male and female mammal produce offspring (new baby mammals) with characteristics of both parents.
2. **Gestation**: the offspring develop and grow inside the mother. The time it takes for the offspring to develop differs for different mammals.

3. **Birth**: the fully grown baby, or babies, comes out of the mother; most mammals give birth to live young.
4. **Newborn**: a baby mammal that has just been born; they usually need a lot of care from their mother. Female mammals produce milk, which provides their offspring with all the nutrients they need in the newborn phase.
5. **Infancy**: the baby mammal starts growing and learning things like walking and hunting. They usually still need a lot of help and protection from their parents.
6. **Juvenile**: the mammal is older and a bit more independent but is not yet an adult; they keep growing and learning to live independently.
7. **Adolescence**: the mammal is almost an adult; it undergoes changes that prepare it for adult life, like being able to reproduce.
8. **Adult**: they are now fully grown, independent from their parents and can reproduce.

Children research different mammals (hedgehog, kangaroo or blue whale) using the fact sheets provided. They choose one to create a mind-map/poster about that they can use to share facts with the class. Can use picture from fact sheet for center of mind-map/poster.
Vocabulary: mammal, mating, infancy, life cycle, adolescence, birth, gestation, juvenile, adult

Session 3:
Use resources from Kapow lesson 3: Life cycle of a bird, focusing on the life cycle of a robin.
Recap and recall: lifecycle of a mammal and the structure of animals within the vertebrate groups: birds, reptiles, mammals, amphibians and fish.
LO: To describe the life cycle of a bird and compare it with that of a mammal.

Children can use Venn diagrams to compare the life cycle of a robin with a mammal, for example:

- Birds develop in an egg whereas mammals develop inside the female.
- Both birds and mammals can be born blind without fur/feathers so they rely on parental care for warmth, food and protection.
- Birds must learn to fly before leaving the nest whereas mammals do not.
- Both birds and mammals need to learn how to find their own food before becoming independent.

Vocabulary: life cycle, fledgling, adult, juvenile, gestation, life span, weight, height

Session 4: Use resources from Kapow sessions 4 and 5 to compare the life cycles of a frog (amphibian) and a butterfly.
Recap and recall: lifecycles of birds and mammals.
Lo: To look for patterns when researching the differences between life cycles
Display slide 6, which shows the amphibian and insect life cycle. Explain that, like amphibians, insects develop in eggs and hatch as larvae (the juvenile stage of insects and amphibians is called the larval stage). The larvae of different species have different names, for example, tadpoles and caterpillars. They also both go through metamorphosis to change into dramatically different adult stages.

Children use the slide to draw the two life cycles and explain the similarities and differences between the two.
Vocabulary: metamorphosis, gestation, lifespan, amphibian

Session 5:
Recap and recall – Use the Kapow lesson 6 Recap and recall game allocating one of the 6 life cycles to different children (plant, mammal, bird, amphibian, three-stage insect and four-stage insect). Children use the posters for their life cycle and use it to create a short presentation for the rest of the class. Use the following questions to support:

- **Which life cycles involve metamorphosis (changing from distinctly different young to adult stages)?** (Amphibian life cycle; four-stage insect life cycle.)
- **Which life cycles involve an adult stage?** (All life cycles.)
- **Which life cycles start as eggs?** (All except mammals.)
- **Which life cycles involve parental care of the juvenile stage?** (Mammal life cycle; bird life cycle.)
- **Which life cycle has a fledgling stage?** (Bird life cycle.)
- **Which life cycles require the young to change to be able to reproduce?** (All life cycles.)

Link to career scientist:
https://pstt.org.uk/application/files/7916/2851/6348/Marine_biologist_-_Dawood_Qureshi.pdf
https://pstt.org.uk/application/files/2416/2851/6697/Veterinary_Surgeon_-_Daniella_Dos_Santos.pdf

Scientists who have helped develop understanding in this field: David Attenborough, Jane Goodall