



Driving Question: See Amazon Rainforest

Power Skill: Communication

National Curriculum Learning Objectives

- 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.

Key Vocabulary

flower	pollination	seed formation	seed dispersal	germination
Sexual reproduction	asexual reproduction	fertilisation	mammal	bird
reptile	amphibian	insect	metamorphosis	

Key Learning

Reproduction

This is vital for all living things. If a species does not reproduce, it cannot survive and will become extinct. Plants can reproduce in two ways: Sexually or Asexually.

Sexual reproduction in plants:

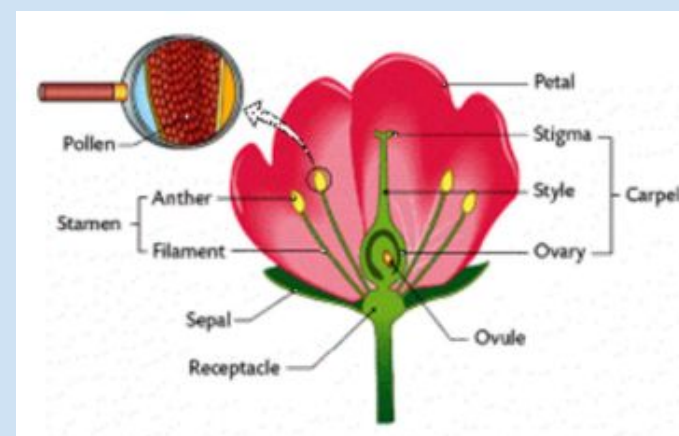
Flowers have male and female parts inside them. Each has a unique job to do (function). In different species the number, shape and size of each part of a flower may be different.

To reproduce sexually (2 plants), pollen from one flower must first be transferred to another flower, either by insects, animals or the wind.

The Flower:

Flowers are the reproductive organs of the flowering plant. The main structures of a flower include:

- Sepal - is a support structure for the petal. It is typically green and helps to protect and hold up the petal.
- Petals - are bright and colourful in order to attract insects that help with pollination.
- Carpel - is the female part of the flower. It contains the ovary and the stigma.
- Stigma - is the area where pollen is received. The stigma may be located at the end of a stalk called the style.
- Ovary - is the ovary of the flower and contains ovules, which are potential seeds.
- Stamen - is the male part of the flower that produces pollen. There are 2 main parts of the stamen:
 - Filament - is the stalk that holds the anther.
 - Anther - is made up of lobes that attach to the filament. These lobes hold sacs which contain pollen



Thinking Point

Which parts of a flower do you think have the most important functions?



Explore and Investigate

Identify different seeds around the school grounds, in particular sycamore 'helicopters' (sensory garden area)
Dissect and label the parts of a flower, using lilies or another flower with large stamen etc.
Watch videos which show the life cycle of amphibians/reptiles, including metamorphosis.

Resources:

Key Learning

Pollination and Seed Formation:

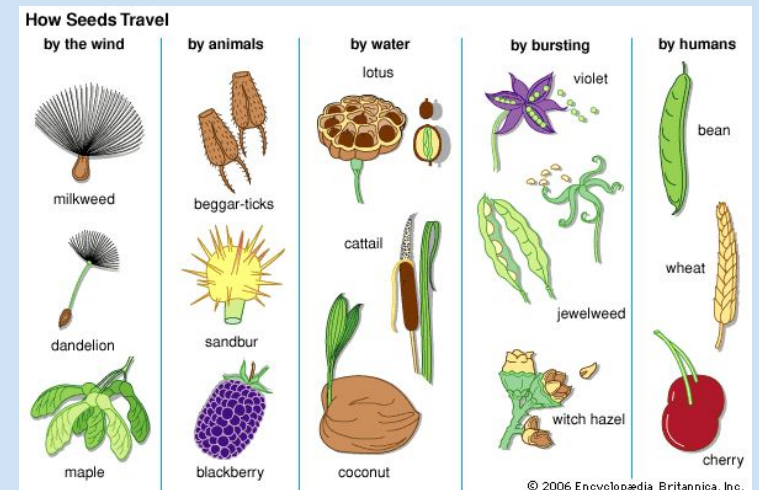
In order for an ovary to become a seed containing ovules, it must receive pollen. Insects and birds can play an important role in pollinating plants.

When an insect or bird is attracted to a flower by its bright colour, pollen sticks on their fur/feathers. As they move from plant to plant, they transfer the pollen from one plant to another - pollination. The pollen travels down the style to the ovary and fertilises the ovules. When this plant dies, the ovules will be deposited in to the surrounding land/soil to create a new plant.

Seed Dispersal:

Seeds are dispersed away from each other and from the parent plant so that there is less competition. The most common methods of seed dispersal are:

- **Wind:** Sycamore fruits are light and have extensions which act as parachutes or wings to catch the wind.
- **Animal internal:** Tomato, plum, raspberry and grape plants have brightly coloured and succulent fruits which contain seeds with indigestible coats which allow the seeds to pass through the animal undamaged.
- **Animal external:** Goose grass and burdock fruits have hooks which attach themselves to the fur of passing animals.
- **Explosive/Self-propelled:** Pea pods burst open when ripe projecting the seeds away from the plant.



Germination:

After the seed has made it to a new location and is covered with dirt, it can begin germination. When seeds are planted, they first grow roots. Once these roots take hold, the shoots, or growth above ground, will begin to emerge and eventually break through the soil. When this happens, we say that the seed has sprouted. The seed sends a shoot towards the surface, where it will grow leaves to harvest energy from the sun. The leaves continue to grow towards the light source. The scientific name for this process is germination.



Thinking Point



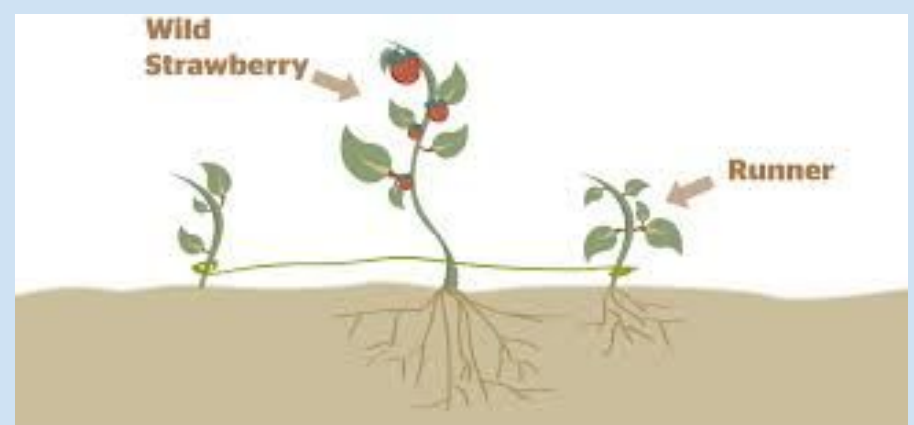
What do plants need to grow successfully?

Asexual reproduction:

Whilst some plants create offspring using sexual reproduction, others do so using asexual reproduction. The main difference is that whilst sexual reproduction needs 2 parent plants; asexual reproduction needs only one parent.

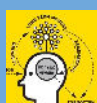
It is possible for plants to naturally produce offspring from one parent, without flowers or fertilisation. There are a number of ways plants can do this, but 3 important methods are:

1. **Runners** - a slender, fast-growing stem that grows sideways (horizontally) over the soil surface and pushes down roots to form new plants. Example: Spider plant and strawberry plant. The new plants are called plantlets.
2. **Tubers** - many plants naturally develop underground food storage organs that later develop into the following year's plants. The tuber is the swollen, fleshy underground stem of a plant, bearing buds from which new plant shoots grow. These new shoots use stored food in the tuber to grow. Example: The potato plant produces large numbers of potatoes, each with several buds that can form new shoots.
3. **Bulbs** - a bulb is an underground short stem which has one or more buds enclosed in special thick leaves (or scales) which are full of stored food - this gives energy to the buds when they start to grow in the Spring. Example: Onions, garlic and tulips.



Thinking Point

Why do you think some plants reproduce asexually?



Key Learning

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 in animals:

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 inside the female body or outside.

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.

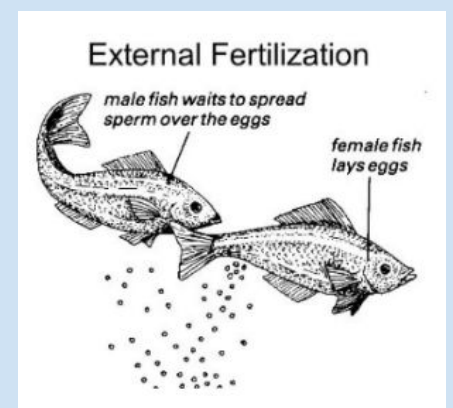
There are 3 ways that internal fertilisation can happen:

Examples:

1. 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 female's body and fertilises an egg. The baby grows inside the mother. 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.
2. Bird (e.g. penguin) - Male sperm is placed into the female and fertilises her eggs. After some time, the female lays 1 or more 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.
3. Insect (e.g. fruit fly) - The male places sperm inside the female, which fertilises the eggs. She will then lay hundreds of eggs, from which maggots (larvae) will soon hatch. These larvae will go through metamorphosis to become a fruit fly.

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.



Thinking Point

Why do you think more animals go through internal fertilisation?



Life cycle

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

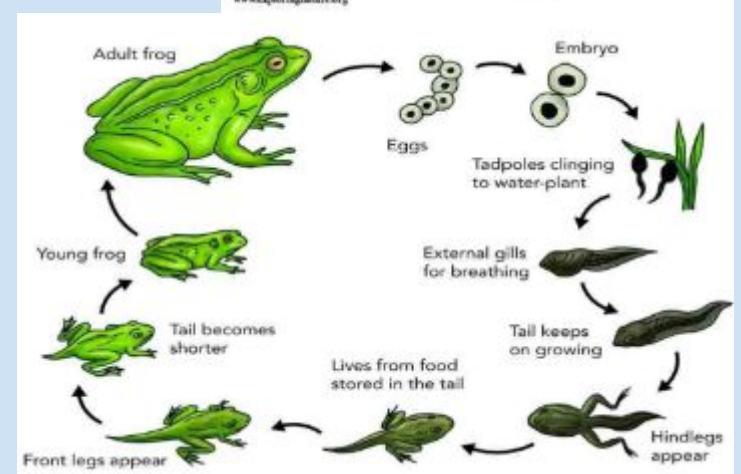
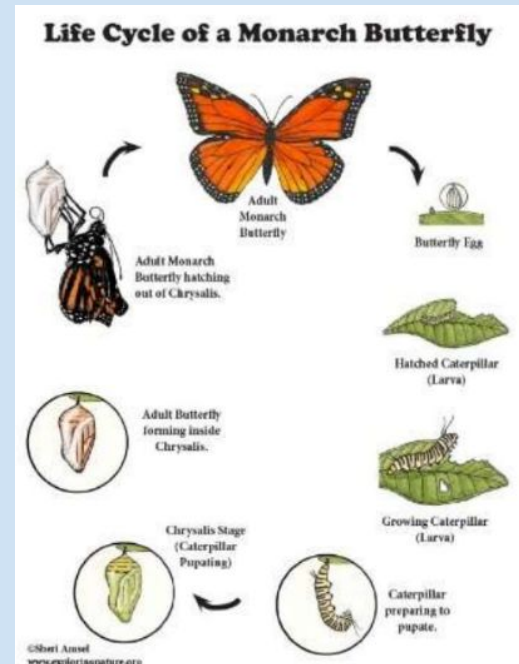
babies. Second, they are warm-blooded. Third, all mammals have fur or hair. Humans are mammals and so are dogs, whales, elephants, and dolphins. Most mammals have teeth with the exception of the anteater which doesn't have any teeth. Mammals live in all sorts of environments including the ocean, underground, and on land. Some mammals, bats for example, can even fly.

Amphibians, Insects and Metamorphosis

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. This process of full body changes is called metamorphosis.

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.



Thinking Point

Why do frogs need to be born with gills, if they are going to live the second part of their lives on land?

