Reproduction in Plants

Flowers

Flowers are important in the sexual reproduction of plants. They produce male sex cells (pollen grains) and female sex cells (contained in the ovules). These must meet for reproduction to begin - a process called pollination.

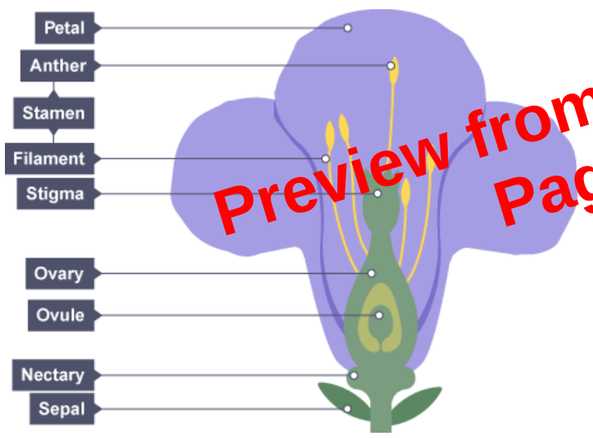
Parts of a flower

Structure	Function
Sepal	Protects the unopened flower
Petal	May be brightly coloured to attract insects
Stamen	The male part of the flower, comprising an anther attached to a filament
Anther	Produces the male sex cells (pollen)
Stigma	The top of the female part of the flower, which collects pollen grains
Ovary	Produces the female sex cells (contained in the ovules)

The female parts of the flower together are called the carpel.

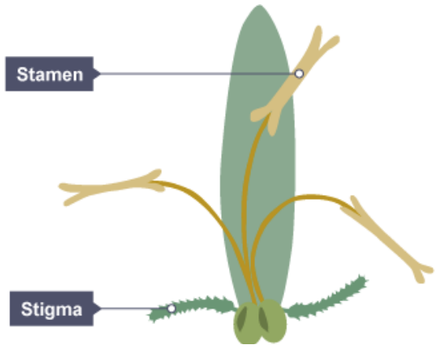
Insect-pollinated flowers

Flowers with brightly-coloured petals are usually insect-pollinated flowers. Insects carry pollen from one flower to another



Wind-pollinated flowers

Grasses have wind-pollinated flowers. They have small petals, and their stamens and stigmas hang outside the flower.



Pollination and flowers

Flowers are adapted for pollination by insects or by the wind.

Feature	Insect-pollinated	Wind-pollinated
Petals	Large and brightly-coloured – to attract insects	Small, often dull green or brown – no need to attract insects
Scent and nectar	Usually scented and with nectar – to attract insects	No scent or nectar – no need to attract insects
Number of pollen grains	Moderate - insects transfer pollen grains efficiently	Large amounts – most pollen grains are not transferred to another flower
Pollen grains	Sticky or spiky - sticks to insects well	Smooth and light – easily carried by the wind without clumping together
Anthers	Inside flower, stiff and firmly attached - to brush against insects	Outside flower, loose on long filaments – to release pollen grains easily
Stigma	Inside flower, sticky - pollen grains stick to it when an insect brushes past	Outside flower, feathery – form a network to catch drifting pollen grains

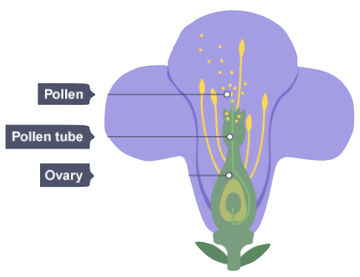
Forming seeds and fruit

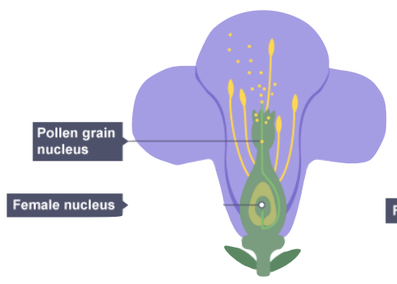
Fertilisation

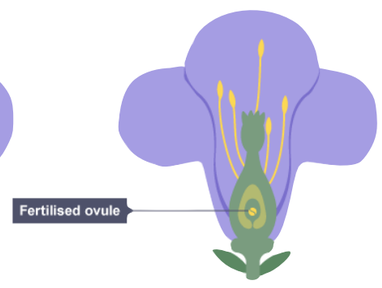
When a pollen grain lands on the stigma of a flower of the correct species, a pollen tube begins to grow. It grows through the style until it reaches an ovule inside the ovary. The nucleus of the pollen then passes along the pollen tube and fuses (joins) with the nucleus of the ovule. This process is called fertilisation.

Plant reproduction

1. Pollen lands on stigma and grows a pollen tube
2. The pollen grain travels down the pollen tube to fertilise the female nucleus of the ovule
3. The fertilised ovule develops into a seed







Sexual and asexual reproduction

There are two types of reproduction - sexual reproduction and asexual reproduction.

Two parents are needed in sexual reproduction, and the offspring produced are genetically different to the parents.

Only one parent is needed in asexual reproduction, and the offspring produced are genetically identical, eg reproduction in bacteria, production of spores by fungi, and the formation of tubers in potatoes and bulbs in daffodils.

Sexual reproduction

These are some of the advantages of sexual reproduction:

- *introduces variation into a population*
- *the species can adapt to new environments*
- *a disease is less likely to affect all the individuals in a population*

These are some of the disadvantages of sexual reproduction:

- *time and energy are needed to find a mate*
- *not possible for an isolated individual*

Asexual reproduction

The advantages of asexual reproduction include:

- *population can increase rapidly*
- *can exploit a suitable habitat quickly*

The disadvantages include:

- *does not lead to variation in a population*
- *the species may only be suited to one habitat*
- *disease may affect all the individuals in a population*

Forming seeds and fruit

After fertilisation the female parts of the flower develop into a fruit:

- *the ovules become seeds*
- *the rest of the carpel becomes the fruit*

Germination

A seed has three main parts:

- *embryo – the young root and shoot that will become the adult plant*
- *food store – starch for the young plant to use until it is able to carry out photosynthesis*
- *seed coat – a tough protective outer covering*

Germination is a process, controlled by enzymes, in which the seed begins to develop into a new young plant. It needs: water, oxygen and warmth. Germinating seeds use their food stores until the seedlings can produce their own food by photosynthesis.