The Flower, Pollination, and Seeds

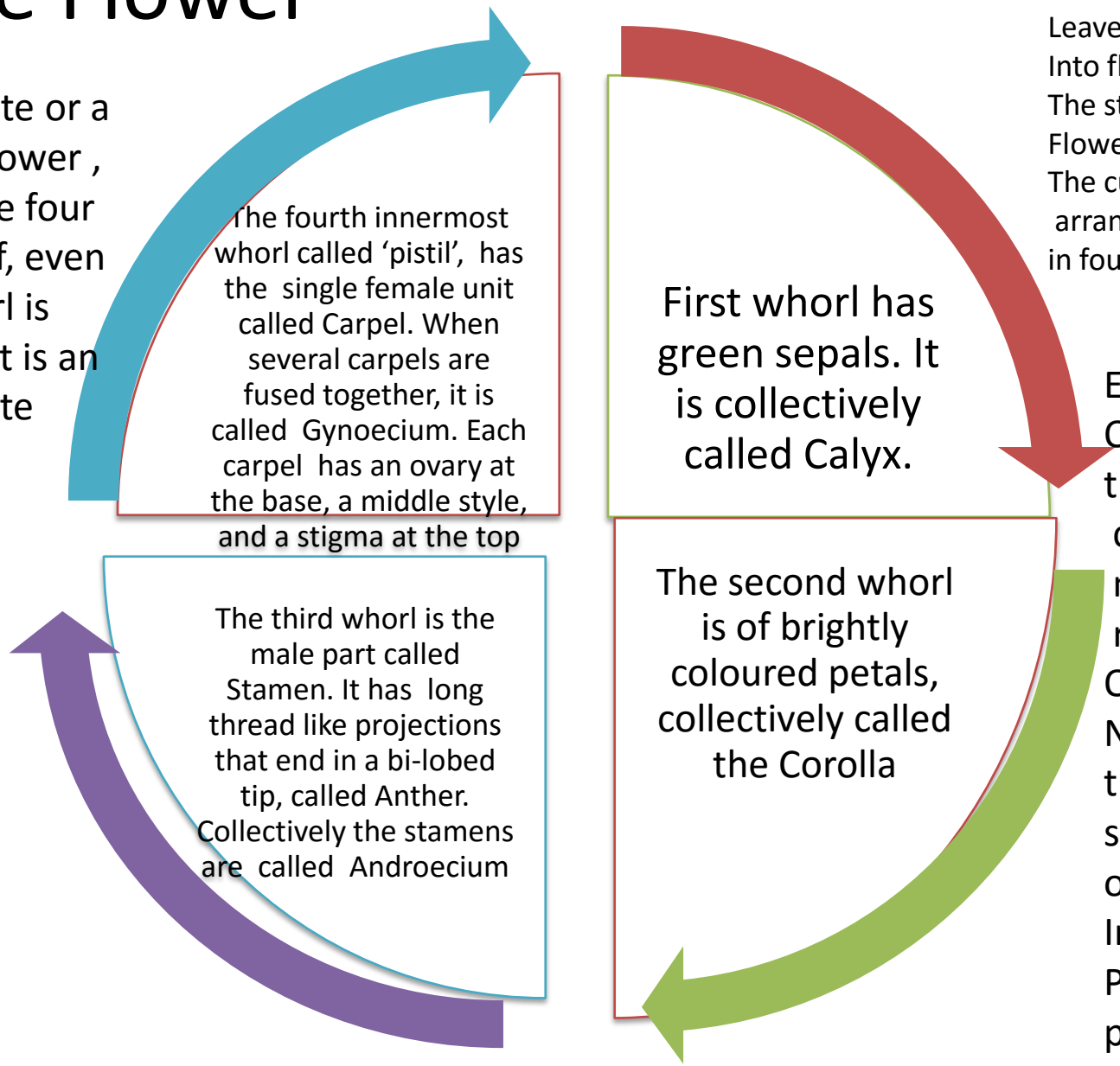
Class 9th

Chapters 6,7,8

The Flower

Flower is a specialized Shoot, in which the Leaves are modified Into floral structures. The stalk supports the Flower, and above it is The cup shaped Receptacle arranged on the Thalamus in four whorls.

A complete or a perfect flower , has all the four Whorls. If, even one whorl is missing, it is an Incomplete Flower.



Essential parts Of a flower are the stamens and carpels. Both are needed for reproduction. Other part are Non-essential, as they perform secondary functions of attracting bees Insects, birds for Pollination and protect the flower.

Floral Parts and their functions

(1) Calyx (Sepals) are five in number and green in colour. They cover and protect the bud and when green perform photosynthesis

Sepals may be (a) free or Separated from each other (polysepalous) Or (b) fused (gamosepalous) (c) They may also be fused in the lower half and Separate in the upper half . Sepals tend to fall off after the flower blooms. In rare cases , as in 'gul mohar,' they are red in colour and become part of the flower.

(2) Corolla (petals) are brightly coloured and in a variety of shapes. Sometimes there are two whorls of petals. They protect stamens and pistils and insects for pollination

(2.1) Inflorescence : Flowers are positioned on the plant in many ways – singly at the apex; or in the axils of leaves; reaching the same level after growing from axils of leaves at different levels; or as in the sunflower, the axils are flattened

(3) Androecium (stamens) have two parts – filament and anther. Anther has two lobes and each lobe has two pollen sacs – a total of four sacs in two lobes. When the pollen grains are mature, the sacs burst open to spill the pollen

(3.1) The Stamen in the Androecium may be free or joined in different ways. Single filament is called Monadelphous, double is called Diadelphous, and multiple is called Polyadelphous

(4) Gynoecium (carpels) Or the pistil . Each carpel has three parts: Stigma, Style, Ovary.

(a) Stigma is the top end knob like parts, with two or more lobes, covered with glandular papillae. It has a sticky substance on which pollen grains are retained.

(b) Style is the tubular slender stalk connecting the stigma and the ovary.

(c) Ovary is the swollen base portion having many carpels. The inner cavity may be divided into many chambers called 'locules'. Each locule has a number of ovules. Ovules originate in 'placenta'

Placentation is the manner in which ovules are arranged in the ovary

Pollination and Fertilization

Pollination is the process of transfer of pollen grains from the anther to the stigma

Fertilization is the union fusion of male and female gamete nuclei in a flowering plant

A mature pollen grain is a cell with a double wall: the outer wall called exine, and intine is the inner wall. The nucleus is already divided into tube nucleus and generative nucleus. At this stage the pollen grain is transferred to the stigma during Pollination

The Ovule is the inner part of the ovary. Each ovule has two protective integuments, that have a small opening for entry of the pollen tube. Inside the integuments is the nucellus (food laden cells) and deeper in is the embryo sac. Ovary becomes the fruit and ovule becomes the seed.

Pollination must occur between plants of the same species. Self pollination occurs within the same flower. Its advantage is no wastage of pollen grain, and preservation of heredity

Cross Pollination is better and is encouraged by flowers with their large size, brightly coloured petals, scent, nectar, to attract the agents such as insects, small birds, bees

For water pollination, pollen grains are produced in larger quantities and remain floating for long distances till they reach the stigma, as in water lilies

For wind pollination, flowers are dull coloured and without scent or nectar. Pollen grains are produced in large numbers, and are light, small and smooth . They are easily carried by the wind.

Stigma is long and hangs out to catch the floating stamens that protrude over the petals.

Seed : Ovule becomes the seed

Seed is the ripened ovule, containing the embryo, that develops into a new plant, under favourable conditions

The seed ovule , matures after fertilization of the flower. It also contains the food material for the nourishment of the embryo

Seeds vary in size from very small (millet, orchid) to quite large (watermelon, pumpkin, mango) to the largest (coconut).

Irrespective of their size, the structure of the seed is the same.

On basis of leaves, seeds are classified as :

(a) Monocotyledonous (single leaf) – grass, maize

(b) Dicotyledonous (two leaves) – gram, pea, bean.

On basis of endosperm, seeds are classified as:

(a) Albuminous (endosperm) : leaves are thin and membranous – cereals, palm, millets, custard apple, poppy.

(b) Ex-albuminous (non- endospermic) : The leaves store food and are thick and fleshy. Gram, pea, mango, mustard, orchids, vallisneria flower.

Parts of a Seed

(1) Seed Coat called Testa, is the outermost hard covering, that protects the seed from injury and bacteria, fungi, insects.

(2) Tegmen is the second inner protective layer.

(3) Hilum is the whitish oval concave side of the seed. It is the point at which the seed was attached to the ovule.

(4) Micropyle is the tiny pore located close to the hilum. It is the point at which the pollen tube entered the ovule.

Functions of the Micropyle are to absorb water for germination of the embryo, and to provide for the diffusion of respiratory gases for the growing embryo.

(5) The Embryo consists of the radicle that forms the root, and the plumule , that forms the shoot. The plumule has a short stem and a pair to tiny leaves with a growing point between them.

Germination is the formation of a seedling from a dormant embryo.

Conditions necessary:

- Soft , surface soil and water
- Oxygen
- Suitable temperature

Types of germinations:

(a) In Hypogeal germination, Epicotyle elongates and Leaves remain underground. Epicotyl is the axis between the point of attachment of cotyledons (leaves) and plumule (shoot)

- (b) In Epigeal germination, Hypocotyl elogates, and leaves are pushed above the ground.
- Hypocotyl is the region below the cotyledons