TOPIC 9.4: PLANT REPRODUCTION

Flowering Plants

Flowers are the reproductive organs of certain types of plants and develop from changes to gene expression in the shoot apex

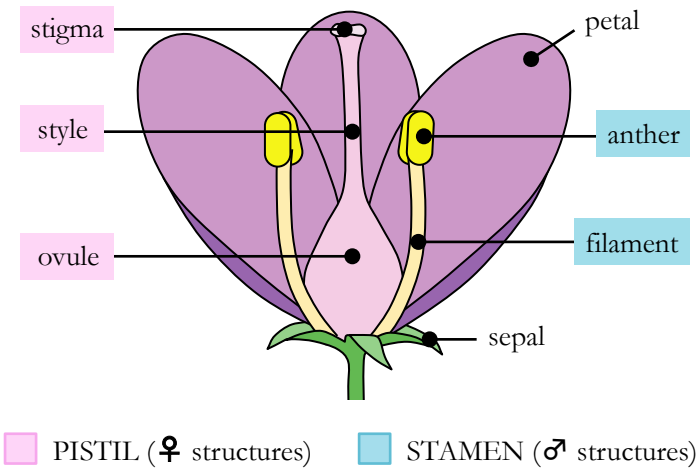
Sexual reproduction in flowering plants (angiosperms) involve three key stages:

- **Pollination** – The transfer of pollen from the anther to the stigma (usually occurs between different plants)
- **Fertilisation** – The fusion of the male gamete nuclei (in pollen) with the female gamete nuclei (in ovule)
- **Seed Dispersal** – The fertilised ovule (seed) moves away from the parent plant to reduce the competition for growth

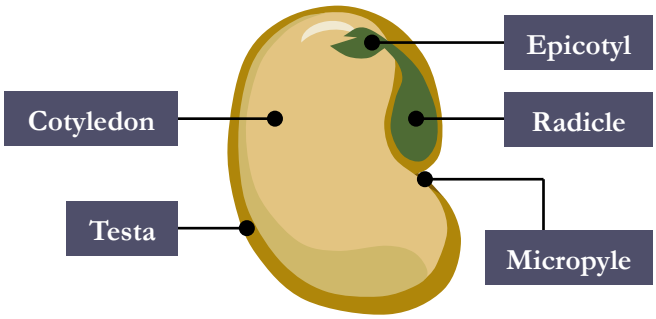
Most flowering plants will employ a mutualistic relationship with pollinators (e.g. birds, bees) in order to reproduce

- The plant gains a mechanism of pollen transfer, while the animal gains a source of nutrition (plant nectar)

Flower Structure



Seed Structure



Germination

Germination is the process by which a seed emerges from a period of dormancy and sprouts (forming a new plant)

Germinating seeds require the following conditions:

- Oxygen (to produce ATP via aerobic respiration)
- Water (to metabolically activate the cells)
- Suitable temperature and pH (for enzyme activity)

Photoperiodism

Flowering in plants is controlled by **photoperiodism**

- The response of a plant to the length of day or night

Flowering is regulated by *phytochrome* which exist in 2 forms:

- Inactive red form (P_r) absorbs red light (to become P_{fr})
- Active far red form (P_{fr}) absorbs far red light (forms P_r)

Sunlight contains more red light, so:

- The active far red form is predominant during the day
- Reverts to mainly the inactive red form at night

Flowering is triggered by the active form, but effects differ

- Flowering requires a set length of *uninterrupted darkness*

Long Day Plants:

- P_{fr} **activates** flowering in long-day plants
- Flowering induced when night length is short (⬆ P_{fr})

Short Day Plants:

- P_{fr} **inhibits** flowering in short day plants
- Flowering induced when night length is long (⬇ P_{fr})