Fertilisation

Diploid cells in the pollen sac divide by meiosis to form haploid cells that develop to become the Pollen Grain. The Pollen Grain has a thick outer exine wall and a thin intine wall. In the plant, when the pollen grain is ripe the out layer of the anthers dry, the pollen sac curls away and exposing the pollen grains for pollination.
Pollen Grains have two nuclei, a tube nucleus and a generative nucleus. The Generative nucleus divides by mitosis to produce two haploid gametes

1. After the Pollen Grain lands on the stigma receptive surface during pollination, the pollen grain germinates to **produce a pollen tube** for the male gamete to travel along.
2. The pollen tube **grows down the style**, secreting digestive enzymes to form a pathway to the ovule
3. The pollen tube **penetrates the embryo sac found in the ovule,** the tip of the tube bursts, and the tube nucleus dies. The two haploid gametes from the generative nucleus follow down the tube and **double fertilisation occurs.**
4. One **male nucleus fuses with the female nucleus** to form a **zygote,** and the other fuses with both polar nuclei to form the **triploid primary endosperm nucleus**

Developing a Fruit and Seed

This occurs following fertilisation.

1. In the seed, the zygote divides many times by mitosis to produce an **embryo**. It differentiates to become a **plumule** (young shoot), **radicle** (young root) and either 1 or 2 **cotyledons** (seed leaves). This is found inside the seed (fertilised ovule)
2. The primary endosperm nucleus divides many times by mitosis to produce **endosperm tissue**. In some seeds this endosperm is a food store for later use by the seed. In others it may gradually disappear as the cotyledons develop.
3. The integuments surrounding the embryo sac become the tough and protective **Testa** (seed coat). The micropyle remains though so that oxygen and water can be taken in at germination.
4. The water content of the seed decreases drastically so the seed is prepared for dormancy.
5. The ovary wall becomes the **pericarp** - the fruit wall, the whole ovary now being the fruit. The function of the fruit is to protect the seeds and to aid in their dispersal, e.g. by an animal. That is why they can be brightly coloured and sweet; animals will eat them and scatter the seeds either at the time of eating or when they are passed out of the gut in defecation, unharmed

Seed is formed by the Fertilised Ovule

- Embryo is formed by the Zygote
- Testa is formed by the Integuments

Fruit is formed by the Ovary