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B10. Reproduction in plants

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B10.01 Asexual and sexual reproduction

1. Asexual reproduction

- Involves just one parent
- Parent organism's cell division - produce new cells
- Genetically identical

2. Sexual reproduction

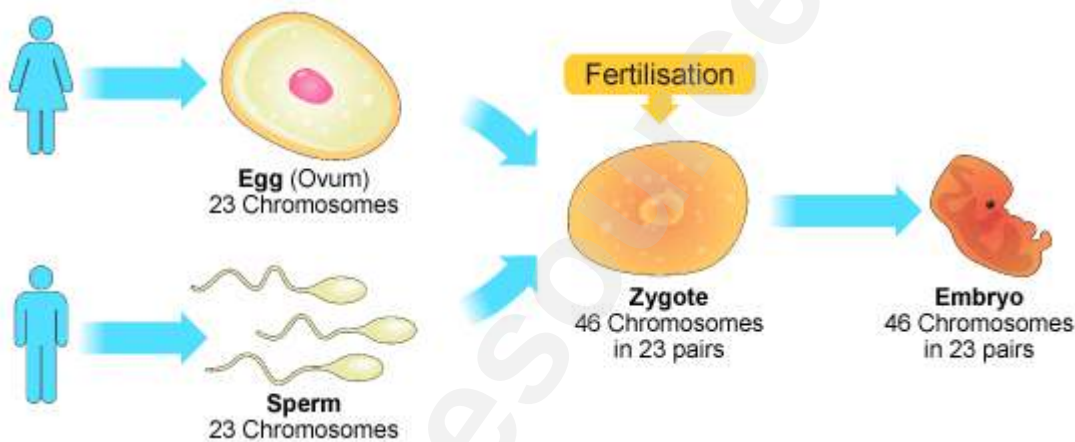
- Parent organism produces sex cells called gametes
- Two of these gametes join their nuclei fuse - **fertilisation**
- New cell formed - **zygote**
- Divide again and again, become new organism
- Combination of their genes - produce offspring that are genetically different

3. Gametes

- Different from ordinary cells - they contain only half chromosomes
- Egg -23 + sperm -23 = 46 chromosomes
- **Diploid cell** - cell which has the full number of chromosomes with two complete cells

4. Male gametes and female gametes

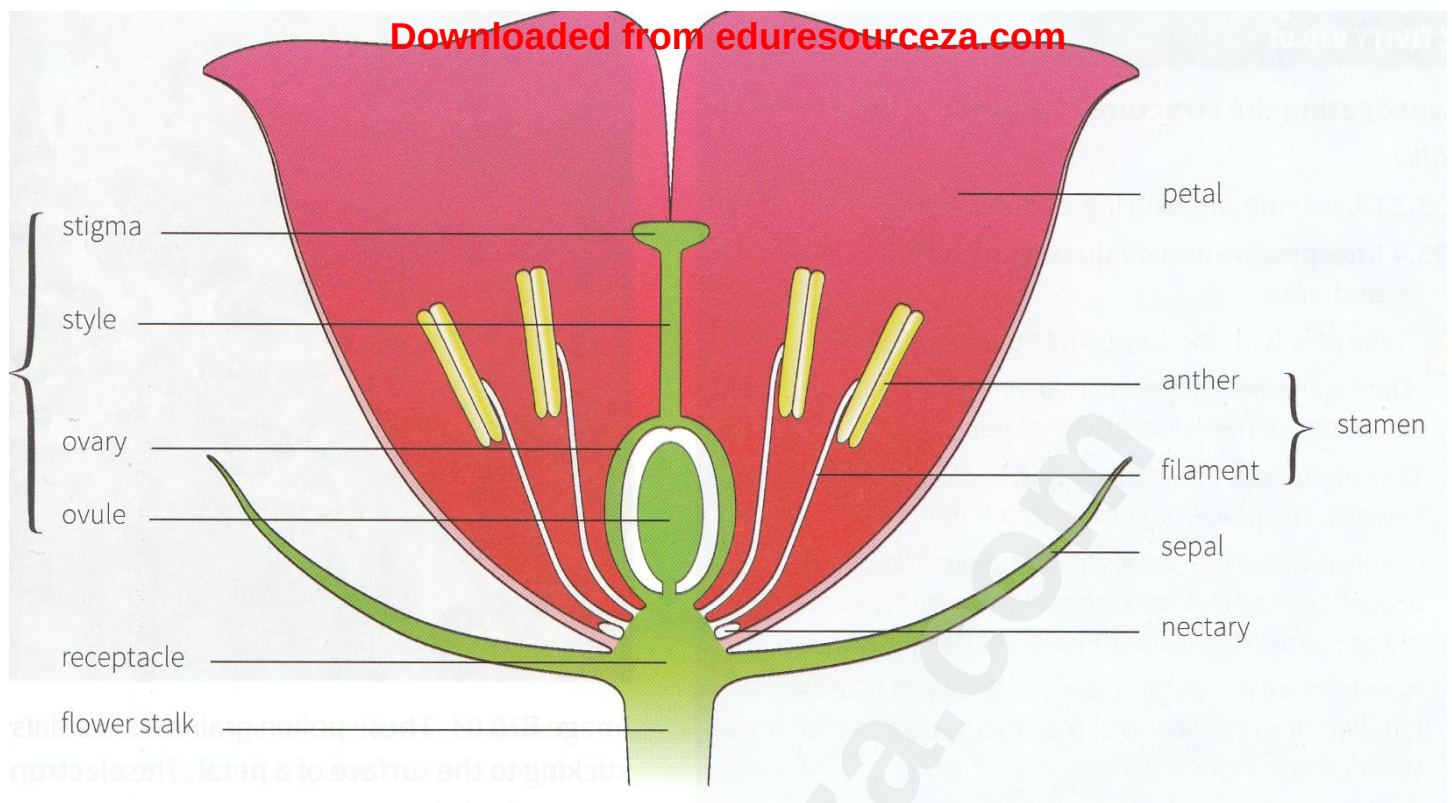
- Female gamete - large, not move so much
- Male gamete - smaller, move actively in search of the female gamete



B10.02 Flowers

1. Flower structure

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Sepal - outside of the flower

- Protect the flower while it is a bud

Petal - inside of the sepal

- Brightly coloured - attract insects to the flower

Nectary - gland

- Makes a sugary liquid called nectar - insects feed on

Stamen - male parts of the flower

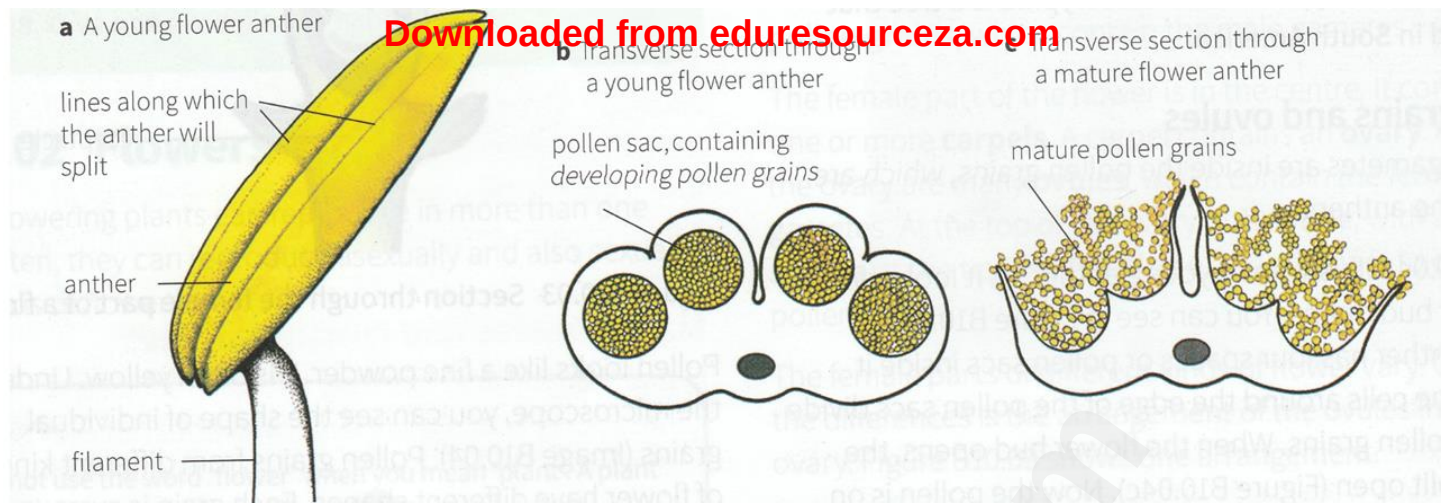
- Made up of long filament, with an anther at the top
- Anther contains pollen grain - which contain the male gametes

Carpel - female part of the flower

- Carpel contains an ovary
- Ovules - inside the ovary - contain the female gametes
- Style, stigma at the top of the ovary
- Stigma - to catch pollen grain

Structure	Function
Sepals	Protect the unopened flower
Petals	May be brightly coloured to attract insects
Stamens	The male parts of the flower (each consists of an anther held up on a filament)
Anthers	Produce male sex cells (pollen grains)
Stigma	The top of the female part of the flower which collects pollen grains
Ovary	Produces the female sex cells (contained in the ovules)
Nectary	Produce a sugary solution called nectar, which attracts insects

2. Pollen grains and ovules



Pollen

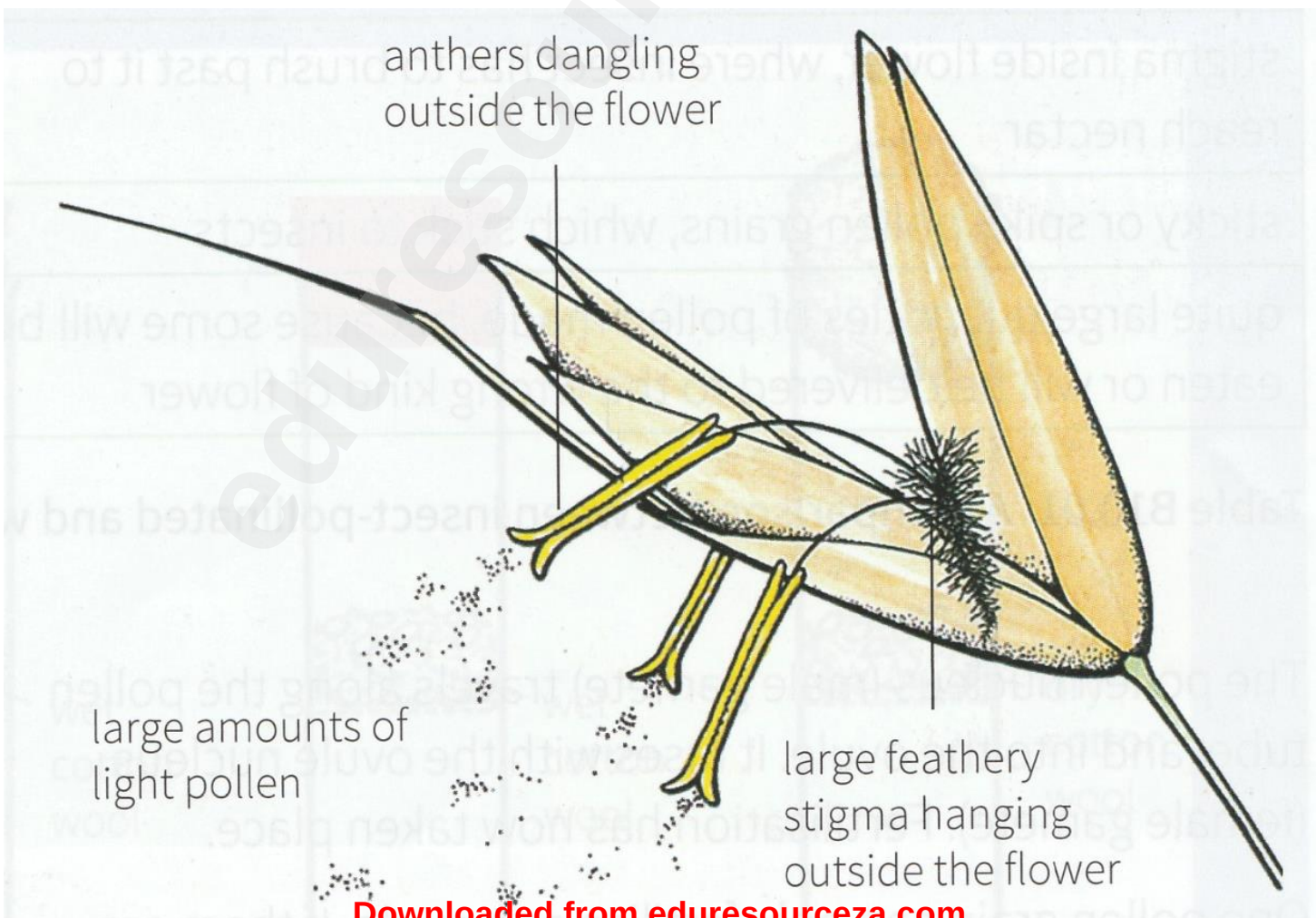
- Fine powder, yellow
- Pollen grain from different kinds of flower have different shapes
- Each grain is surrounded by a hard coat

3. Pollination

Pollination: the transfer of pollen grains from the male part of the plant(anther of stamen) to the female part of the plant(stigma)

1. Often carried by insects using colour and sweet scent
2. Bee follows the guidelines to the nectaries, brushing past the anthers
3. Some of the pollen picked up at first flower and sticks onto the stigma of the second flower
4. Stigma - sticky, pollen grain stuck on it => pollination takes place

4. Wind pollination



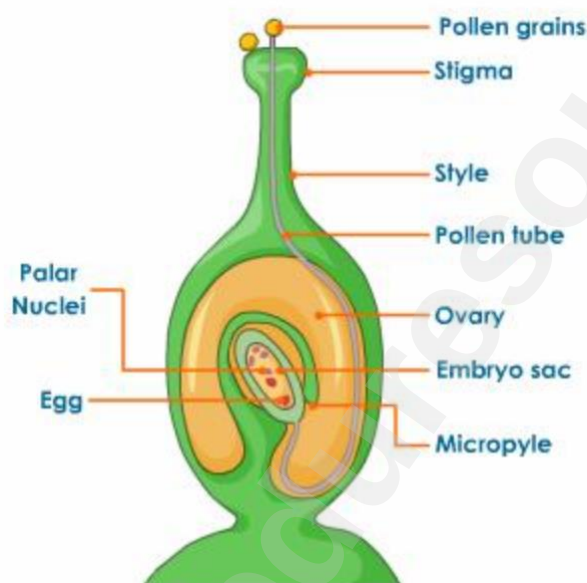
Comparison between insect-pollinated and wind-pollinated flowers

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

5. Fertilisation

- male gamete inside the pollen grain on the stigma is reaching the female gamete

1. Female gamete is inside the ovule, ovule is inside the ovary
2. Pollen grain landed on the stigma - begins to grow a tube
3. Pollen Tube grows through the style and ovary, toward the ovule
4. It secretes enzymes to digest a pathway through the style
5. Male gamete travels along the pollen tube, fuses



6. Seeds

- Ovules fertilised
- Many of parts of flower not needed anymore
- Sepal, petals, stamen have all done their job - wither and fall off
- Inside the ovary - ovules start to grow
- Each ovule contains a zygote, called seed
- Seeds contain tiny embryo plant, and also food for embryo(배아)
- Seed hardly have water - water is drawn out, so became hydrated
- Without water, no metabolic reaction can go inside it
- Seed is inactive or dormant => seed can survive the harsh conditions

B10.03 Comparing sexual & asexual reproduction

Asexual reproduction

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- They are clones, no genetic variation
- If plant is growing well in a particular place - well adapted
- Single organism can reproduce its own

Sexual reproduction

- Plant is not doing well, disease
- Produce seeds - likely to be dispersed over a wide area

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