**16.3 Sexual reproduction in Plants**

**Identify and draw, using a hand lens if necessary, the sepals, petals, stamens, filaments and anthers, carpels, style, stigma, ovary and ovules, of an insect-pollinated flower**



**State the functions of the sepals, petals, anthers, stigmas and ovaries**

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| **Part** | **Function** |
| **Petal** | Often large and coloured, to attract insects |
| **Sepal** | Protects the flower while in bud |
| Petiole (stalk) | Supports the flower to make it easily seen by insects, and to be able to withstand wind |
| Stamen | The male reproductive part of the flower, made of anther and filament |
| **Anther** | Contains pollen sacs, in which pollen grains are formed. Pollen contains male sex cells |
| Filament | Supports the anther |
| Carpel | The female reproductive part of the flower, made of stigma, style and ovary |
| **Stigma** | A sticky surface that receives pollen during pollination |
| Style | Links the stigma to the ovary, through which pollen tubes grow |
| **Ovary** | Contains ovules, which develop into seeds when fertilised |

**Use a hand lens to identify and describe the anthers and stigmas of a wind-pollinated flower**



Figure showing wind-pollinated flower

A-Bract,

B-Feathery stigma,

C-Anther loosely attached to the filament, D- Ovary

**Distinguish between the pollen grains of insect-pollinated and wind-pollinated flowers**

Pollen grains from an insect pollinated flower



**Define *pollination*** - the transfer of pollen grains from the anther to the stigma

**Define *self-pollination*** - the transfer of pollen grains from the anther of a flower to the stigma of the same flower or different flower on the same plant

**Define *cross-pollination*** - transfer of pollen grains from the anther of a flower to the stigma of a flower on a different plant of the same species

**Discuss the implications to a species of self-pollination and cross-pollination in terms of variation, capacity to respond to changes in the environment and reliance on pollinators**

**Describe the structural adaptations of insect-pollinated and wind-pollinated flowers**

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| Feature | Insect-pollinated | Wind-pollinated |
| Petals | Present- often large, coloured and scented | Absent or small and inconspicuous |
| Nectar | Produced by nectaries to attract insects | Absent, or small and green |
| Stamen | Present inside the flower | Long filaments, allowing the anthers to hang freely outside the flower so the pollen is exposed to the wind |
| Stigmas | Small surface area, inside the flower | Large and feathery, hanging outside the flower to catch pollen |
| Pollen | Smaller amounts- grains are often round and sticky, or covered in spikes to attach to the furry bodies of insects | Larger amounts of smooth and light pollen grains, which are easily carried by the wind |
| Bracts (modified leaves) | Absent | Sometimes present |

**State that fertilisation occurs when a pollen nucleus fuses with a nucleus in an ovule**

**Describe the growth of the pollen tube and its entry into the ovule followed by fertilisation (details of production of endosperm and development are not required)**

**Investigate and state the environmental conditions that affect germination of seeds, limited to the requirement for water, oxygen and a suitable temperature**

*IGCSE Biology* (Jones & Jones), p.190, activity 13.4 – ‘to find the conditions necessary for the germination of tomato seeds’.

*Environmental conditions affecting germination*

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| *Environmental condition* | *Explanation* |
| Water | Absorbed through micropyle, needed to activate enzymes which convert insoluble food stores into soluble foods needed for growth and energy production. |
| Oxygen | Needed for respiration, to release energy for growth and chemical changes for mobilization of food reserves |
| Suitable temperature | For enzymes to work as enzymes work best at optimum temperature |
| Light | Not usually a requirement for germination but some seeds need a period of exposure to light before they germinate |