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The National
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Shmaisani

POLLINATION

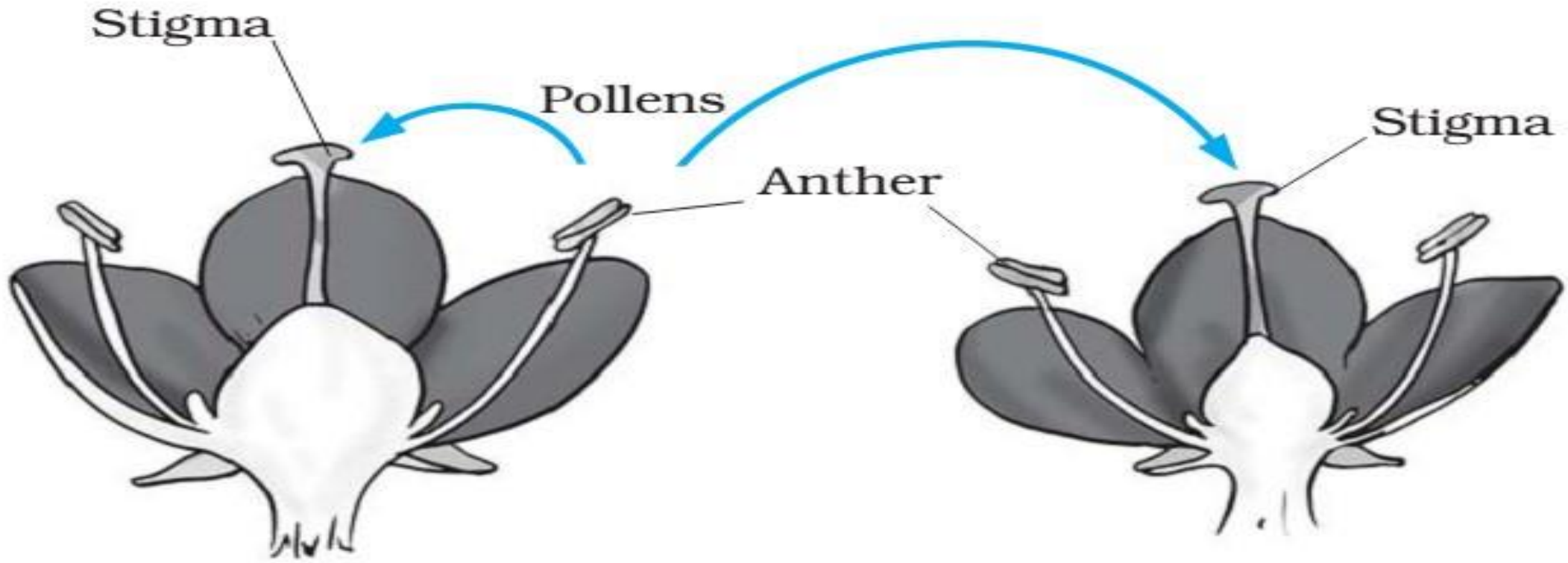
Objective :

- Compare between insect pollinated flowers and wind pollinated flowers
- Compare between self pollination and cross pollination .

Resources : book page 166 – 167

Work book page 72

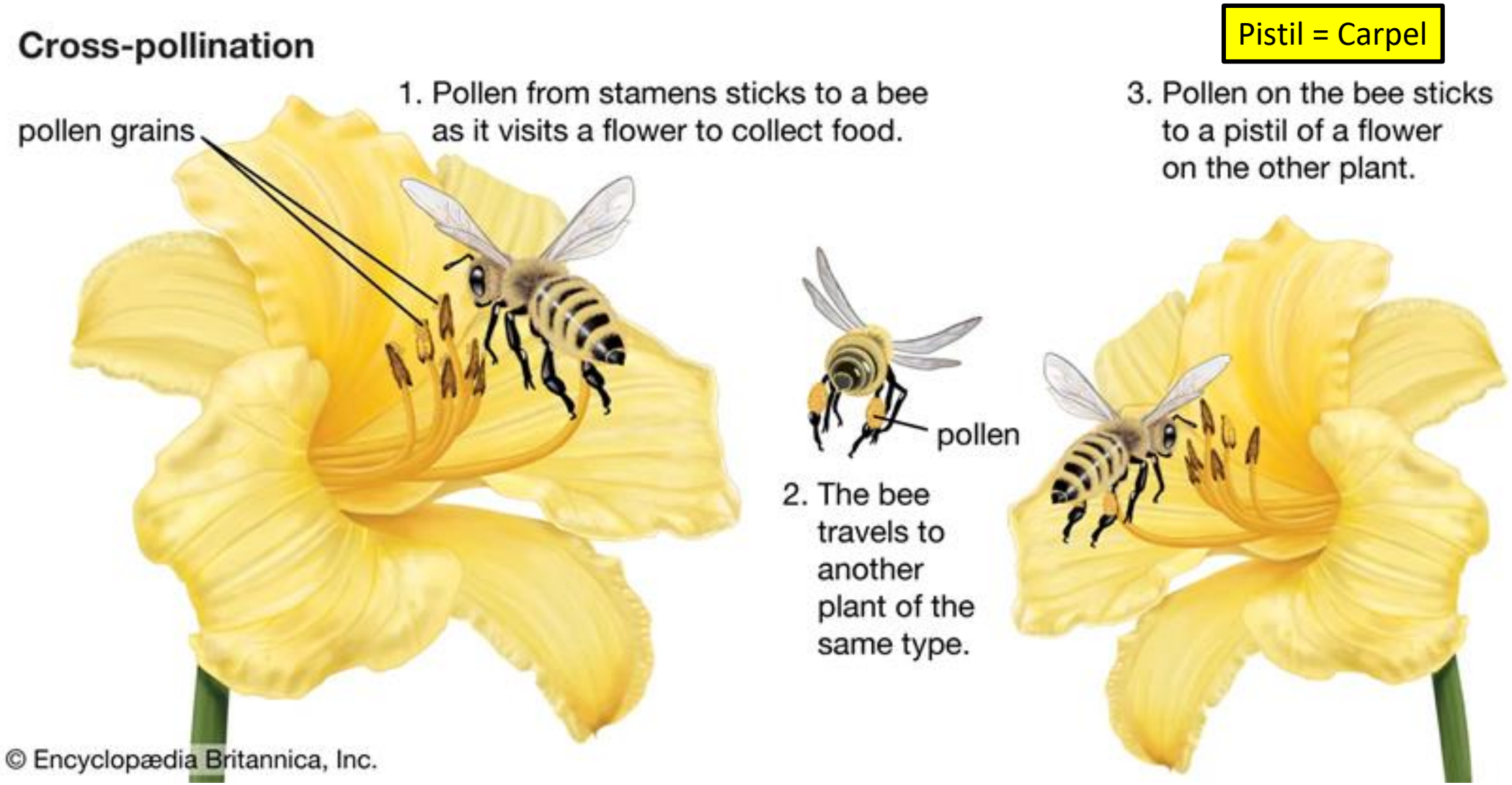
Compare between self pollination and cross pollination .



Pollination in flower

Self pollination	Cross pollination
It is the transfer of pollen grains from anther to stigma of the same flower or another flower born on the same plant	It is the transfer of pollen grains from the anther of one flower to the stigma of another flower the born on a different plant of the same species.
It does not require any external agency	An external agency (wind , water , insects) is always required
It can occur even when the flower is closed	It only occurs when the flower is open
Does not introduce any variations	Introduce variations

Pistil = Carpel



13.5 Flowers

Objectives

- Recognise each part of a flower and describe its function
- Understand how pollination and fertilisation take place
- Distinguish between insect-pollinated and wind-pollinated flowers

Reproductive organs

Flowers contain male and female sex organs. They let plants reproduce by making seeds.

Seed development begins when a male sex cell fertilises a female sex cell. Some plants produce male and female sex cells in separate flowers. Others have their male and female sex organs in the same flowers.

This flower contains both male and female organs.

The male parts of a flower

The male parts of a flower are called **stamens**. The most important part of a stamen is its **anther**. This produces **pollen** which carries the male sex cell. Each anther has a **filament** to hold it in a good position to spread its pollen.

The female parts of a flower

The female part of a flower is called a **carpel**. At the base of each carpel there is an **ovary**. This produces **ovules** which contain female sex cells. Above the ovary is a sticky **stigma** which catches pollen. The **style** separates the stigma from the ovaries.

Pollination

Male and female sex cells are called **gametes**. To bring them together, pollen needs to be moved from a stamen to a stigma. This is **pollination**.

(1) Many flowers can self-pollinate. This happens when pollen moves to a stigma in the same flower, or a stigma in another flower on the same plant. For the long-term future (2) of the species, cross-pollination is better. This means the pollen moves to the stigma of a flower on another plant. It gives the plants' offspring a greater variety of characteristics.

Self-pollination occurs when pollen land on the stigma in the same flower or on the same plant.

To stop self-pollination happening, flowers can produce their male and female gametes at different times.

Bees transfer pollen as they collect nectar from each flower.

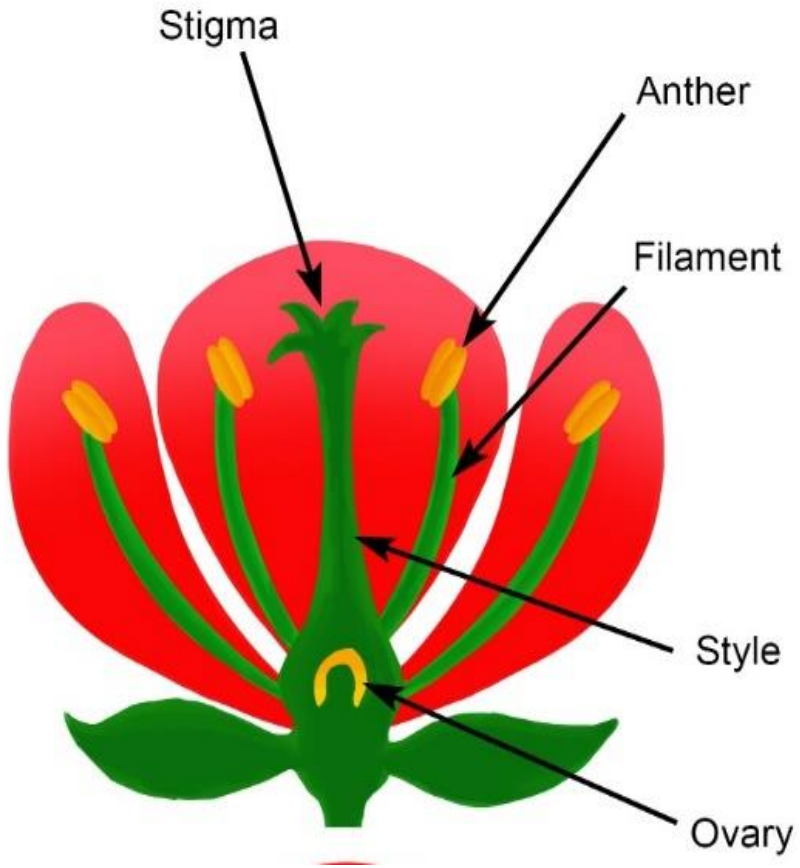
Using insects

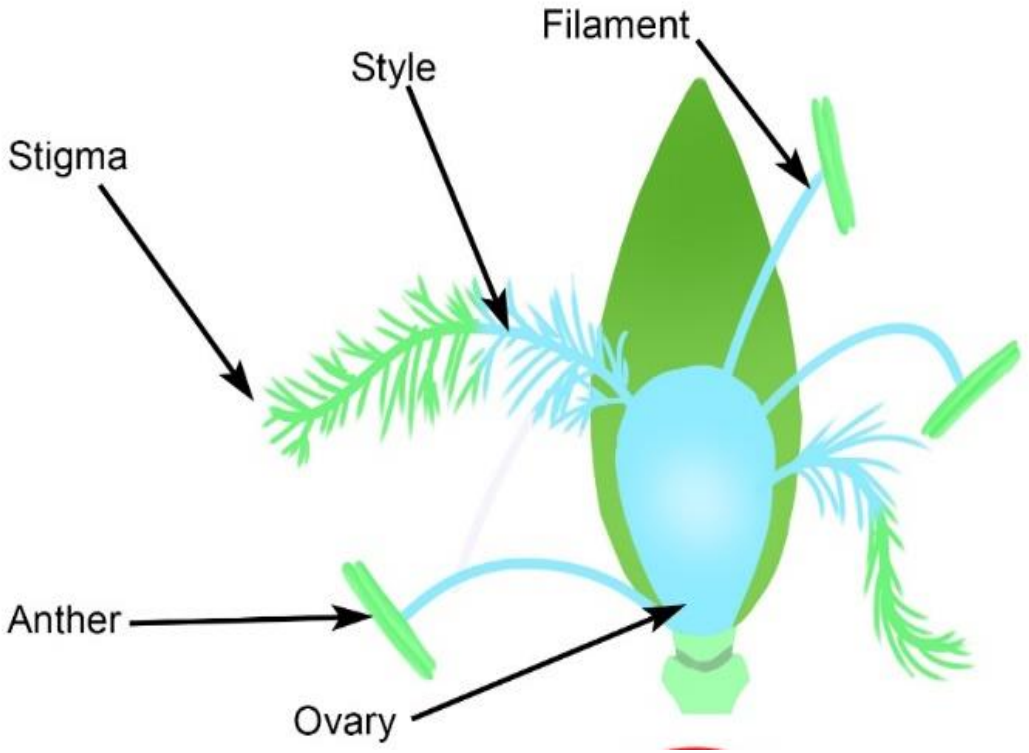
Many flowers use ins[illegible]s to spread their pollen. They use scents, coloured petals, and suga[illegible]t the bees.

When a bee visits a flower it gets [illegible] sticky pollen grains. As it moves from flower to flower, it leaves this poll[illegible]their stigmas.

From study sheet

Compare between insect pollinated flowers and wind pollinated flowers in the table below :





INSECT POLLINATED FLOWER	WIND POLLINATED FLOWER

Insect pollination	Wind pollination
Have a scent	No scent
Sticky, spiky pollen	Large amounts of light pollen
Sticky stigma inside flower	Feathery stigmas hang outside the flower
Stamens surrounded by petals	Large stamens hang outside flower
Produce nectar	Don’t produce nectar
Petals large & bright	Petals small & dull

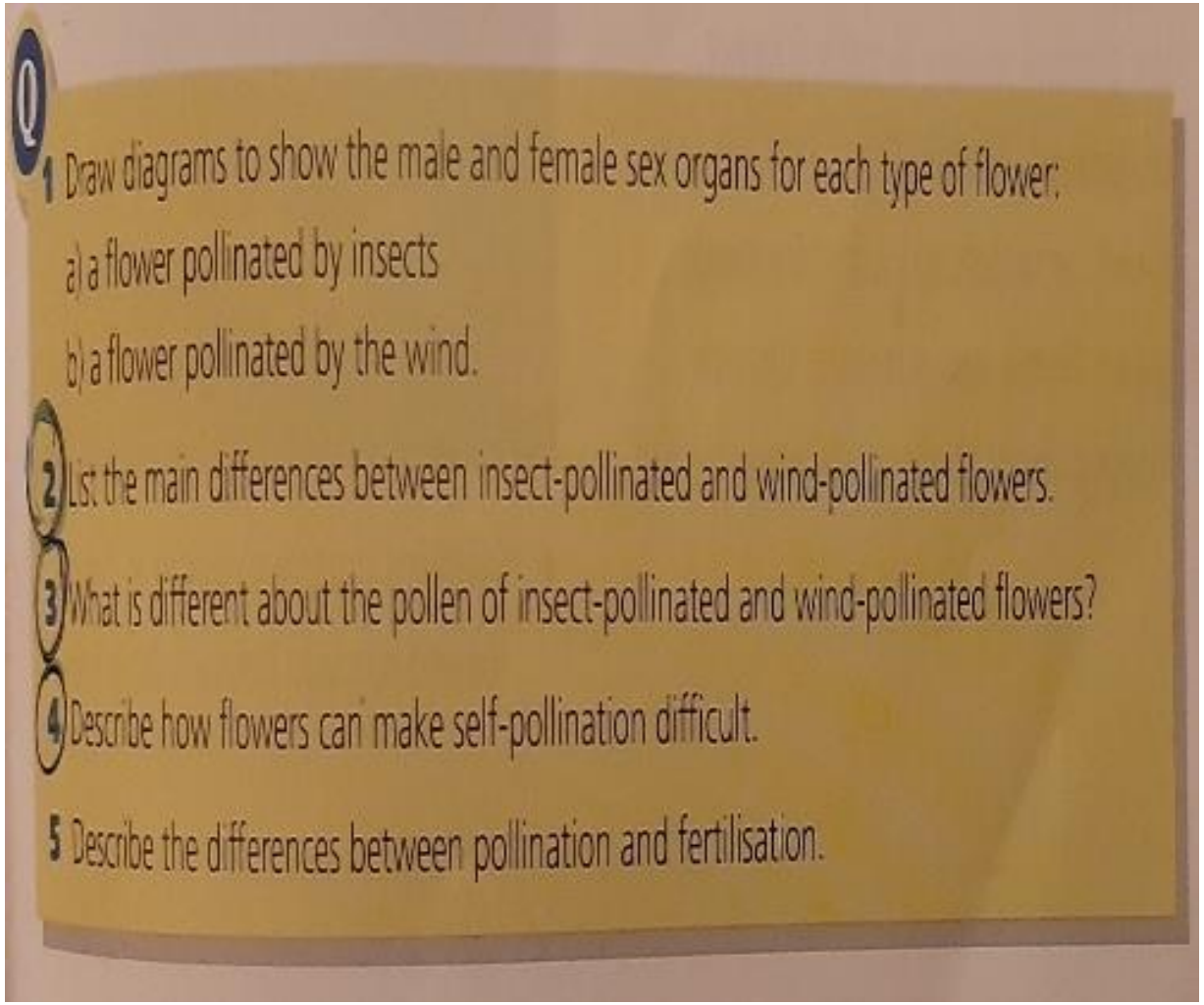
Text book page 167

Q2.The answer is in the study sheet : Pollination (table)

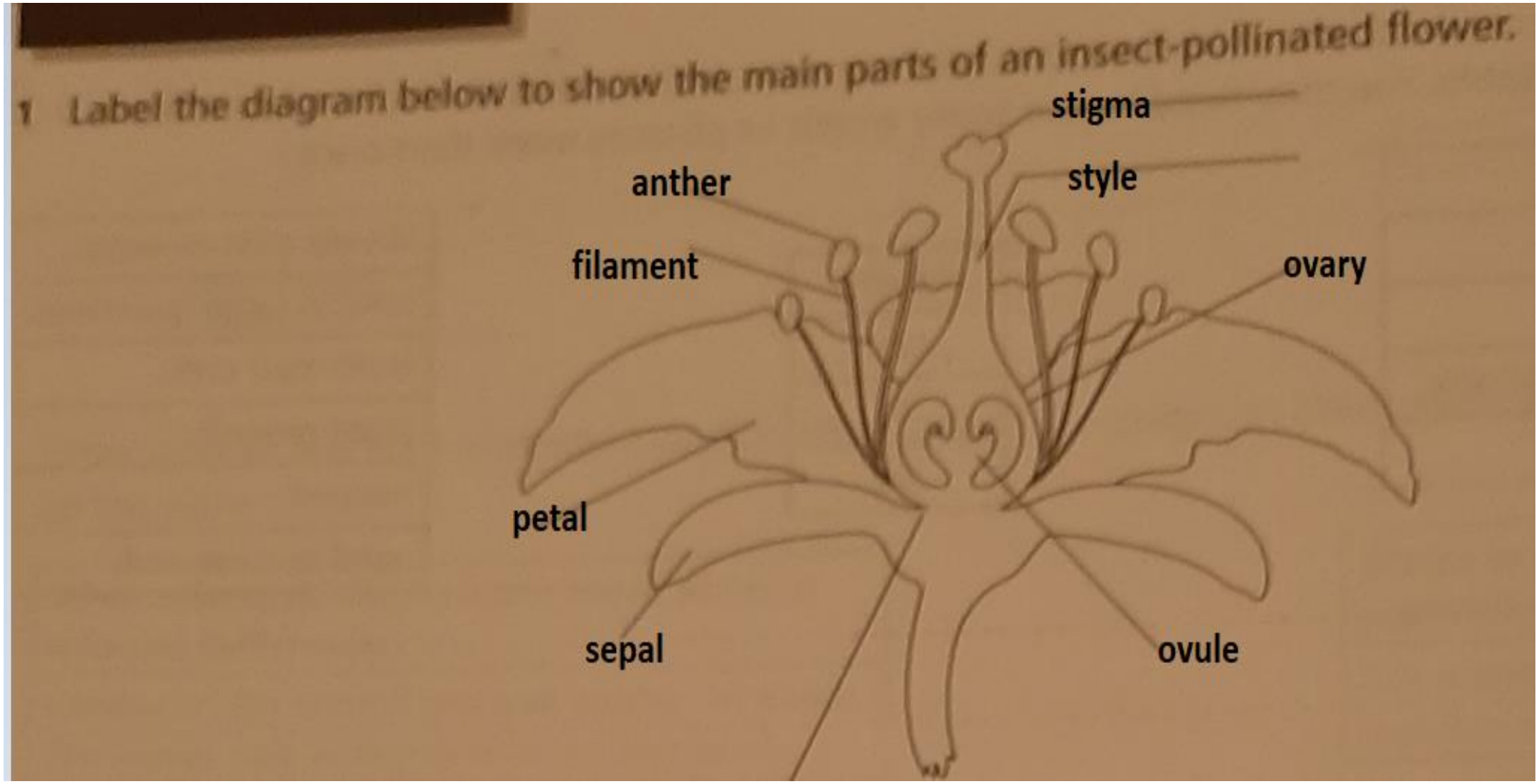
Q3.

Insect pollinated	wind pollinated
Sticky, spiky pollen	Large amounts of light pollen

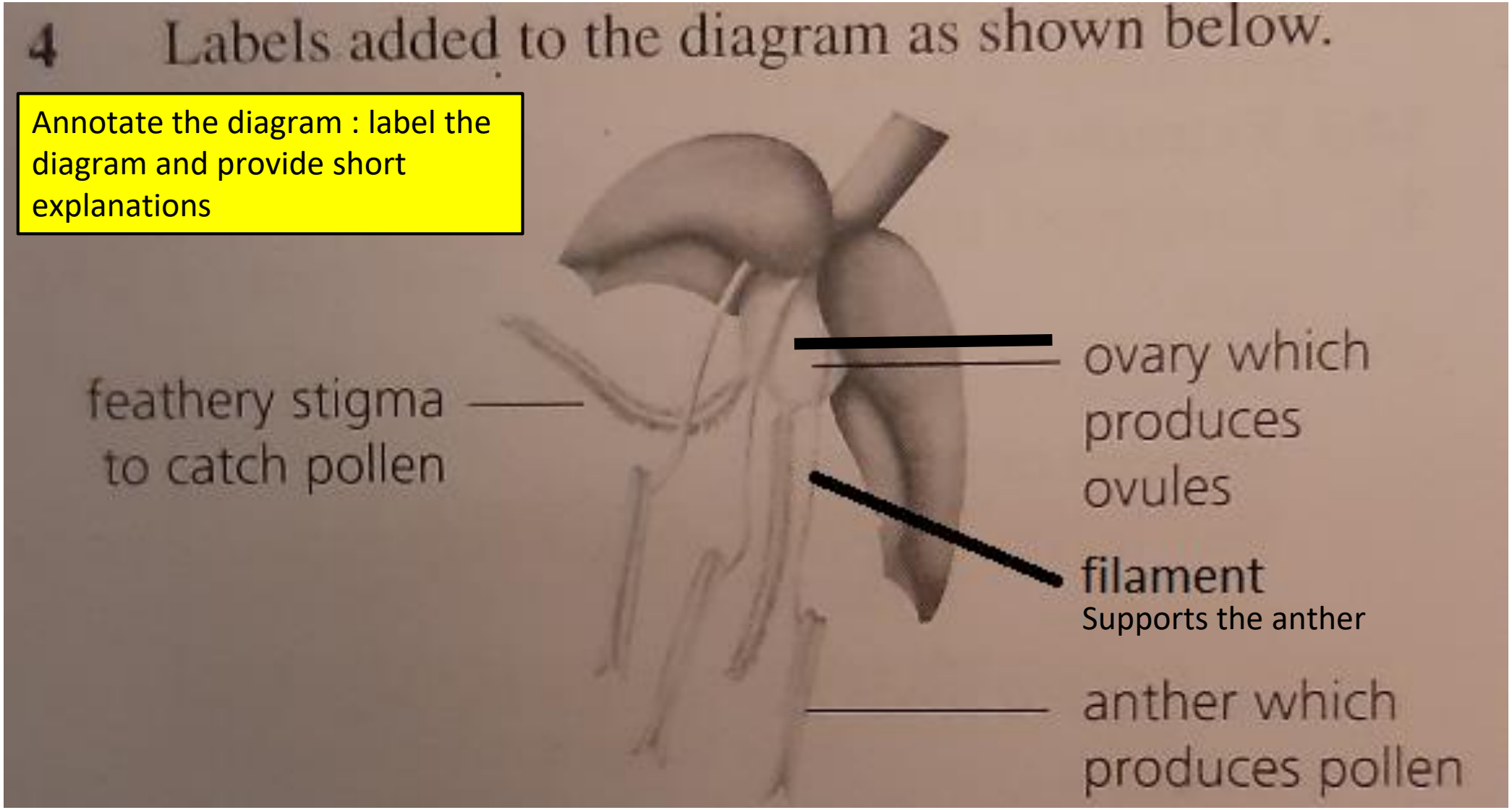
Q4. Flowers can make self-pollination difficult by producing their male and female gametes at different times



Workbook page 72 / Q1.



Workbook page 72 / Q4



Workbook page 72/ Q2

2 Name each of the following parts:

a Where ovules containing female sex cells are produced — ovary

b Where pollen containing male sex cells is produced — anther

c Where the pollen has to land for pollination to take place — stigma

d The structure a pollen tube grows down to reach an ovule — style

e The part that forms a seed after fertilisation — ovule

f The part that forms a fruit after fertilisation — ovary

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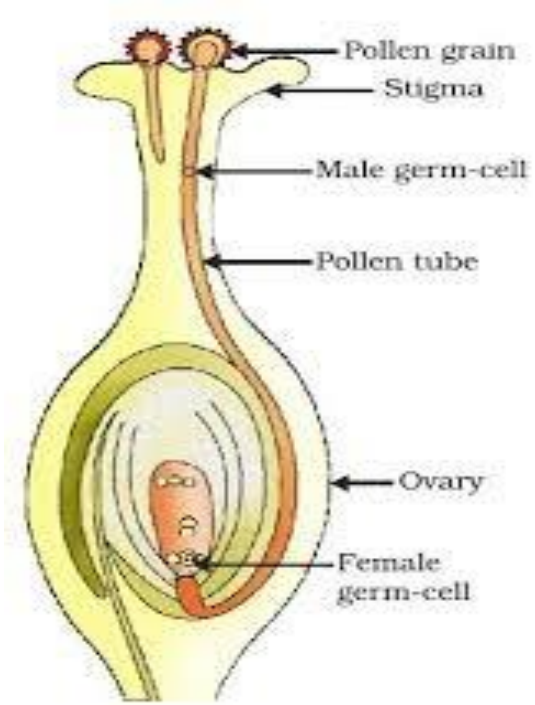
FERTILIZATION

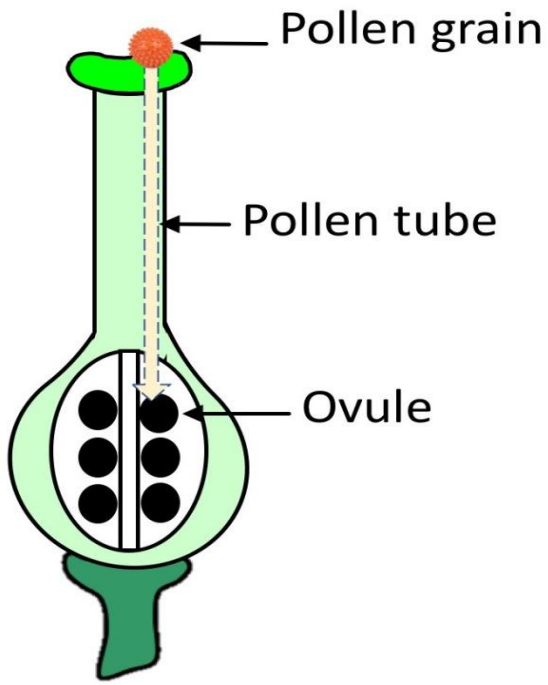


Objective : Understand how fertilization takes place

Resources : book page 166 – 167 /workbook Page 72

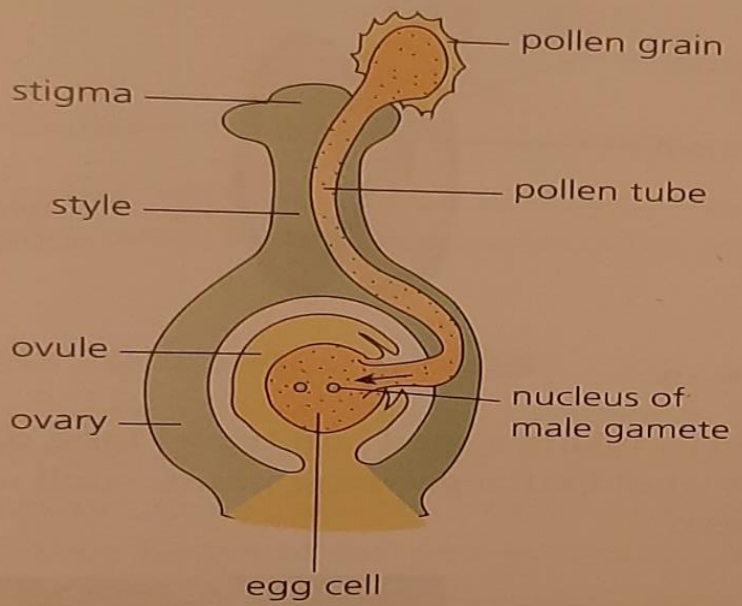
Plant Fertilization:

The process of fusion of the female gamete, the ovum or egg and the male gamete produced in the pollen tube by the pollen grain.

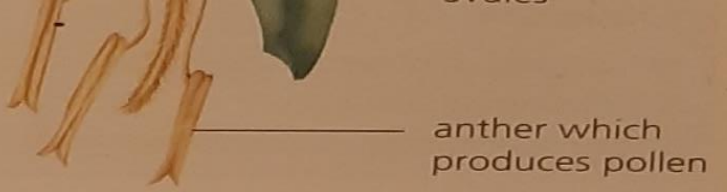


Fertilisation

A pollen grain begins to grow when it lands on a stigma. (1)
(2) It sends a pollen tube down through the style to an ovule.
(3) The male gamete's nucleus moves down through this tube, enters an egg cell, and fuses with the egg cell nucleus. (4)
This is **fertilisation**.



A pollen tube grows down through the style to carry the nucleus of the male gamete to the egg cell.



Grass flowers rely on the wind to carry pollen from flower to flower.

gametes : specialised cells which serve the function of reproduction.
male female.

Zygote : Single cell structure formed from the fusion of male and female gametes.

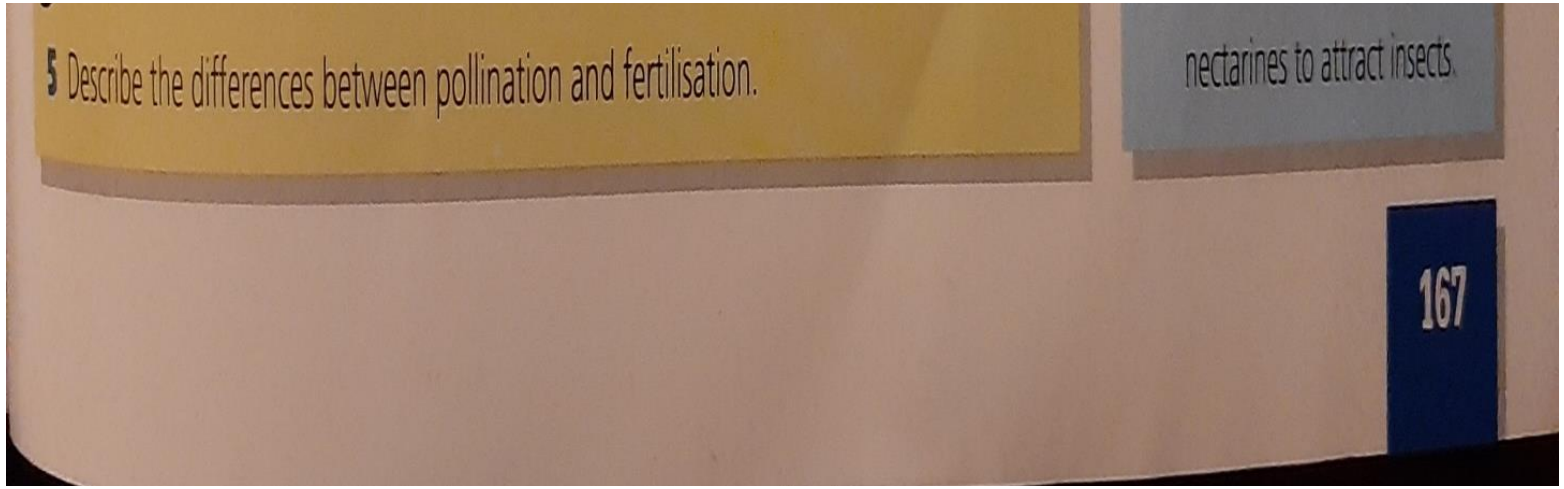
Zygote $\xrightarrow{\text{develop}}$ embryo → organ

The fertilised egg grows into an embryo, and the ovule produces a **seed** to protect it. As the seed develops, the ovary forms a **fruit** around it. If the ovary wall becomes very hard, the fruit is called a nut.

After fertilisation, seeds form and a fruit develops.

- The male parts of flowers are stamens.
- Each stamen has pollen-producing anther on a stalk called a filament.
- The female part of a flower

Text book page 167
Question 5:

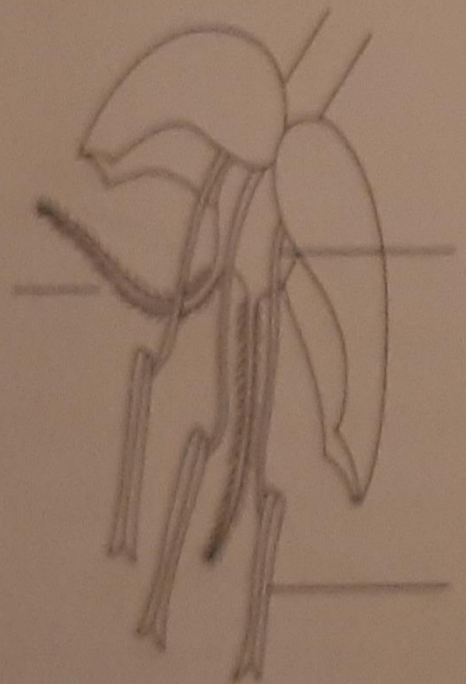


Q5. **Pollination** occurs when pollens move from the anther to the stigma and land on the stigma. **Fertilization** occurs (after a pollen tube grows down to the ovule) when the nucleus of the male gamete fuses with the egg cell nucleus.

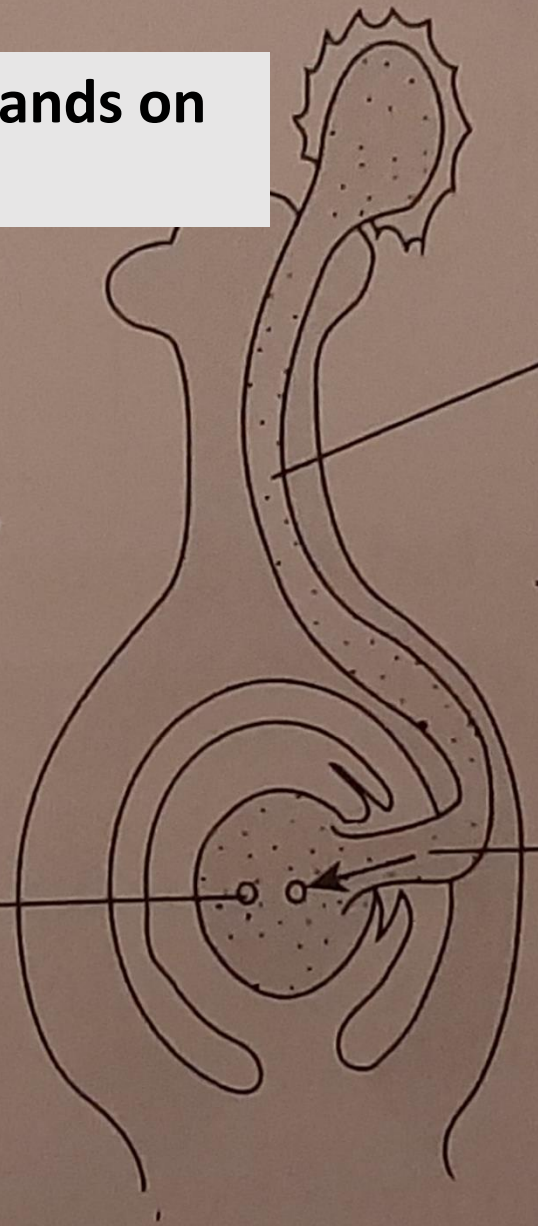
Workbook page 72

3 Label the diagram on the right to show the events that take place between pollination and fertilisation.

4 Label the diagram below to show the main parts of a wind-pollinated flower.



1. Pollen lands on stigma



2. A pollen tube grows down through the style to an ovule.

3. The male gamete's nucleus moves down through this tube.

4. The male nucleus enters an egg cell, and fuses with the female nucleus. This is **fertilisation**.

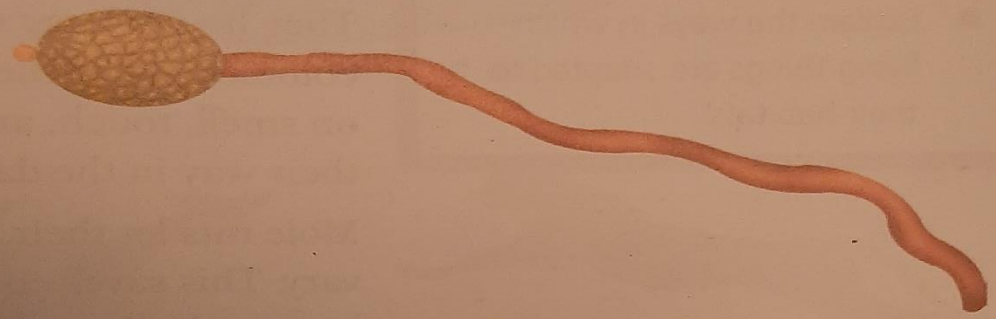
Question 7 / page 170

a. The concentration of the sugar solution the pollen was placed in.

b. (8/10) X 100% = 80%

c. Repeat the test.

7 Joshua is trying to find the concentration of sugar needed to make pollen grains grow. He makes different sugar solutions. He leaves 10 pollen grains in each solution for 4 hours. Then he observes them under the microscope and records how many of them grow pollen tubes.



Sugar solution concentration (g/dm³)	Number of pollen tubes that grew
0	0
50	2
100	8
150	1

a Which variable did Joshua change? [1]

b What percentage of the pollen grains grew a pollen tube in the 100 g/dm³ sugar solution? [1]

c Joshua thought the result for the 150 g/dm³ sugar solution might be anomalous. What should he do to make his results more reliable? [1]

[1]

[1]

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Thank you

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