Methods of Pollination and Fertilization

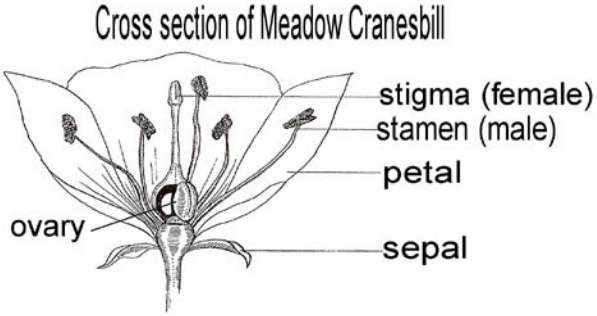
On site choose one type of plant and look closely at the flowers.

You are going to examine how the method of pollination is reflected in its form.

1. What type of plant have you chosen?_____

2. Draw your flowering plant and label the parts you can see.

Label the following: petals, sepals, anthers, stigmas, pollen, stem, leaves, style, filament, ovary and ovules. Here is an example-



3. Do you think that this flower relies on insects or the wind to pollinate it? Why?

_____

_____

4. Now repeat the same procedure with a flower that is pollinated in a different way.

Compare the following features of each flower-

	Wind Pollinated	Insect Pollinated
Petals		
Stigma		
Style		
Pollen Grains		
Scent		

5. What advantages does insect pollination have for most plants?

_____

_____

_____

Sc1 Scientific Enquiry

Sc2 Life Processes and Living Things

On site choose one type of plant and look closely at the flowers.

You are going to examine how the method of pollination is reflected in its form.

1. What type of plant have you chosen?

It may be helpful to choose in advance which plants to study, and guide students to a selection. April, May and June are the best times of year to look for flowering plants. By June and July many will have started to form interesting seed heads and students will be able to follow up their earlier observations.

Many trees rely on wind pollination. Hazel, in which the male and female flowers grow separately on the same tree is a good example. The male pollen is released on the wind from the long catkins, whilst the female receptacle is a small red tuft situated on the branches. The male catkins and female 'pussy willow' of the goat willow are produced on separate male and female trees. Ash and oak are also wind pollinated and typically flower before the leaves grow. These trees can flower early on in the year because they do not require insects to pollinate them. Insect pollinated trees, like limes, flower later in the year when insects become active and have flowers with strong scent to attract insects.

Most wildflowers are insect pollinated. Plants such as dandelions and buttercups are easy to find but, because they are composite flowers, each one of the dandelion's 'petals' is actually a complete flowering head with male and female parts that can be accessed by both butterflies and bees. It is therefore not easy to see the tiny separate elements of the individual flowers. One complete flowering head from a non-composite plant such as buttercup, wild rose or cranesbill is easier to work on.

2. Draw your flowering plant and label the parts you can see.

Label the following: petals, sepals, anthers, stigmas, pollen, stem, leaves, style, filament, ovary and ovules.

3. How do you think it is pollinated? By wind, insects or animals? Why?

Plants that require insects to pollinate them generally have flowers with large coloured and patterned petals. They are often scented and produce nectar. The flowers of wind-pollinated plants have little colour or scent. The anthers are long and feathery, releasing large quantities of pollen into the wind, and the female flowers, which are often separate, have long, sticky stigmas to catch it.

4. Now repeat the same procedure with a flower that is pollinated in a different way.

Compare the characteristics of each flower.

5. What advantages does insect pollination have for most plants?

Insects tend to move from one flower to another of the same species. The pollen is therefore transferred to another flower directly rather than being discharged onto the wind where it is only by chance that it reaches another plant. If there is time let the students spend some time watching insects moving from flower to flower, recording their movements.

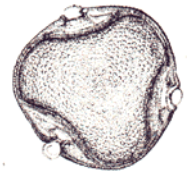
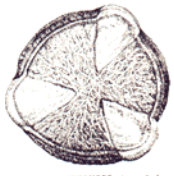
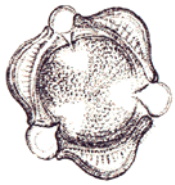
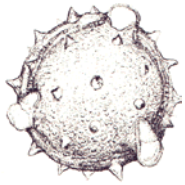
Pollination and Fertilization

1. From a plant on your school site select a flower.

Gather pollen from the flower by tapping it gently onto white paper.

Observe your pollen under a microscope.

Draw a diagram of a single pollen grain. It may look like these examples-

2. Are there any features of your pollen that may suggest how it is transported from the **anther** of one plant to the **stigma** of another plant?

3. In what way is a **pollen cell** different from other plant cells?

4. In what way is an **ovule** different from other plant cells?

5. Describe in your own words what **pollination** involves.

6. What does the term **fertilization** mean?

7. What is the advantage to the plant of reproducing in this way?

Sc1 Scientific Enquiry

Sc2 Life Processes and Living Things

Section	Objective
5	How are new cells made?

Care must be taken to ensure that none of the pupils suffer from acute hay fever when carrying out this investigation.

1. From a plant on your school site select a flower.

• Gather pollen from the flower by tapping it gently onto white paper.

• Observe your pollen under a microscope.

• Draw a diagram of a single pollen grain.

2. Are there any features of your pollen that may suggest how they are transported from the anther of one plant to the stigma of another plant?

The size of the grains is an important indicator, smaller gains being more easily borne on the wind. Other indicators are-

• Wind blown- clouds of light, small pollen grains which may have tiny air sacs to aid flight.

• Insect pollinated- larger pollen grains, frequently with a sticky or bumpy surface.

3. In what way is a pollen cell different from other plant cells?

Pollen is the male sex cell and contains only half of the genetic information of a full plant cell.

4. In what way is an ovule different from other plant cells?

An ovule is the female sex cell and similarly contains half of the genetic information of a full plant cell.

5. Describe in your own words what pollination involves.

Pollination is simply the transfer of pollen cells from the anther of one flower to the stigma of the same or another plant. There is a bias against plants pollinating themselves. Plants carrying separate male and female flowers clearly reduce the risk. Most others have stamens and stigmas that ripen at different times. In some the stigma is ready to receive pollen before its own stamens are open whilst in others the pollen is shed before the stigma becomes receptive.

6. What does the term fertilization mean?

Fertilization is achieved when the male pollen cell fuses with the female ovule to produce an embryo.

7. What is the advantage to the plant of reproducing in this way?

Sexual reproduction introduces variation into a plant population and new characteristics occur which may be valuable in enabling the plant to adapt to its environment or extend into new ones.