CHAPTER 5: Plants

Lesson 1: The Structure and Functions of Flowers

Duration: 5 Days

I. Objective

Describe the reproductive parts in plants and their functions

II. A. Materials:

Flower
Metacards
Tarpapel

B. References:

http://leavingbio.net/thestructureandfunctionsofflowers

C. Process Skills: Describing, Identifying, Classifying,

Values Integration: Appreciation of God's creation

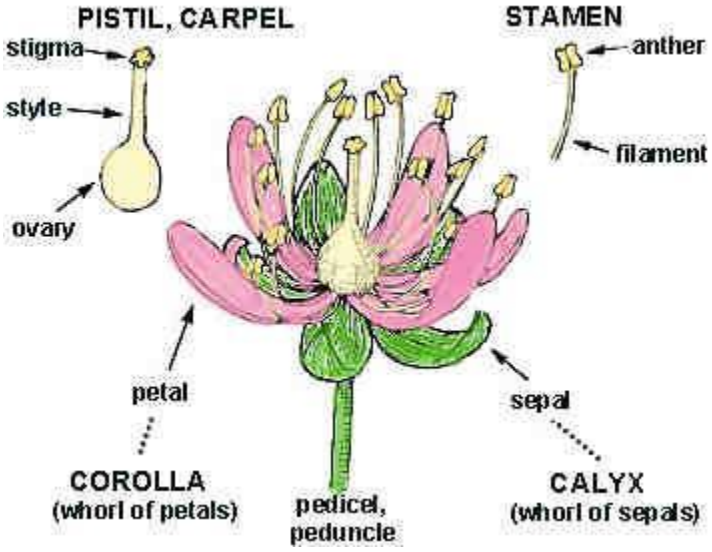
III. Learning Tasks:

Day 1

A. Engagement

1.Say: "In your grade IV class you have learned the different kinds of plants. This time we have to focus on the reproductive parts of plants."
What are the reproductive parts of plants and their functions?

The Structure and Functions of Flowers



B. Exploration

1. Group the class into groups, the female and male group. Each group will be given one folder consisting of words. They are going to arrange the words according to where it is belong male or female reproductive part of the flower

2.Remind the pupils to observe proper behaviour as they perform the group task.

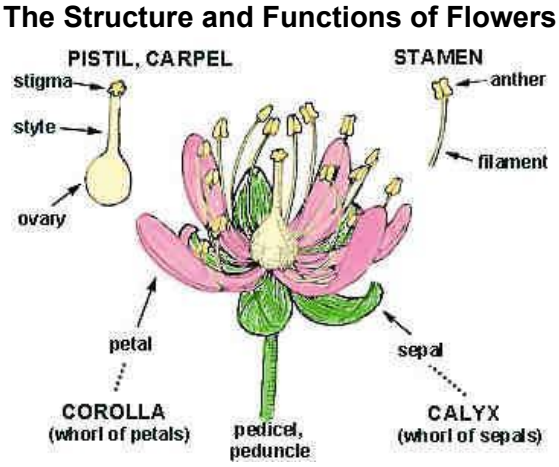
3. After doing the activity, ask the pupils to go back to their seats.

C. Explanation

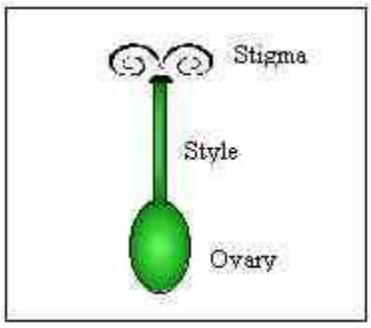
Day 2-3

1. Ask a group member to present the result of the activity.
2. Discuss and answer the guide questions:
   a. What are the parts of the flower?
   b. What are the female reproductive part?
   c. What are the male reproductive part?
   d. What are their specific functions?
3. Guide the pupils in constructing the main idea or concept of the lesson by asking these questions:
   a. What are the female and male reproductive organ of flower?
   b. How the sex cell are formed?
   c. How the embryo sac was developed?
   d. What is pollination? What are the two types of pollination?

Background information for teachers…



The Female Reproductive Organ: The Carpel

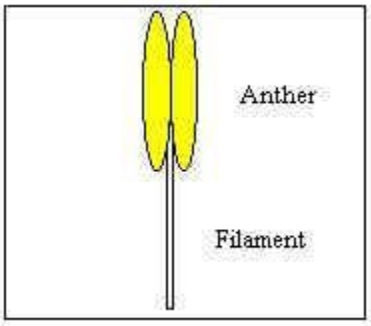


The female parts of a flower consist of an **ovary**, which contains one or more **ovules**, a **style** and the **stigma**. The ovary is at the base of the flower.

From the **ovary**, extends a tubular structure called the **style** and on the top of the style is a surface receptive to pollen called the **stigma**.

The **stigma** can take many different forms, most of them designed to help trap pollen. There are many variations on this basic structural theme.
After fertilization the **ovule becomes the seed** and the **ovary becomes the fruit**.

The Male Reproductive Organ: The Stamen

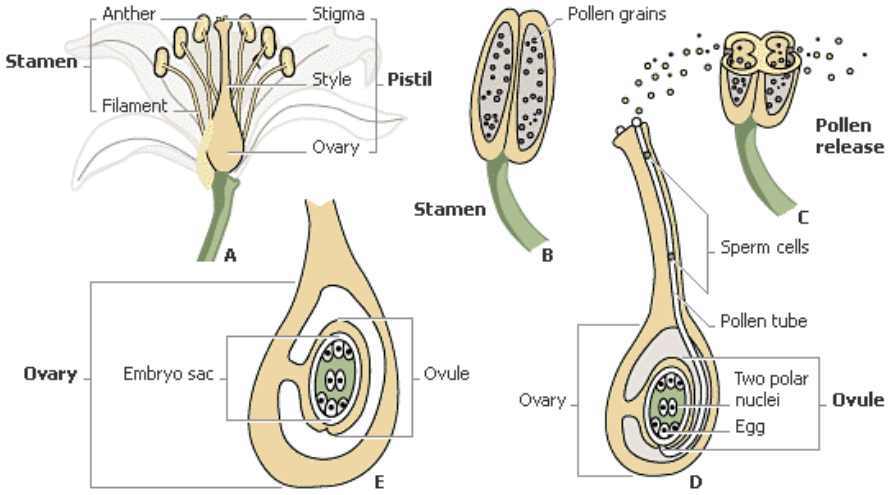


The male parts of a flower consist of one or more **stamens**. Each stamen is made up of paired **anthers** (sacs containing pollen) on a **filament or stalk**.
The anthers are the orange/yellow structures often seen in the centre of a flower.
Pollen from the anthers of one flower is transferred to the stigma of another usually either by wind, or by animals, especially insects.

PETALS, COROLLA, SEPALS, CALYX

The reproductive structures in higher plants are contained within flowers. Flowers have more than one petal, and the flower petals are collectively called the corolla. A flower bud is protected by green leafy structures called sepals. Collectively, all of the sepals form the calyx.

The corolla or petals are often brightly coloured with markings attractive to insects. The flowers may also be scented. For instance, Honeysuckle has showy, attractive flowers which attract insects by day. However, in the dark, their colourful show is not much use, and their heady scent then helps to attract night-flying moths.
In insect-pollinated plants, there are also usually nectaries which secrete sugary nectar, located within the flower. These provide an incentive to insects to visit the flowers. In the search for nectar, the insects will often get pollen grains caught on their bodies. This may then brush off onto the stigma of the next flower visited and in this way the flowers are pollinated.
The receptacle is the place on the stem where floral organs originate and attach.



D. Elaboration:

Day 4

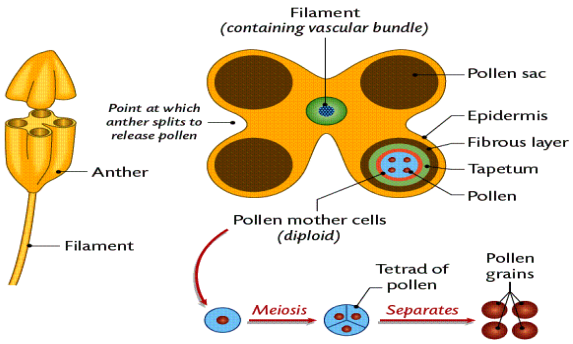
0. Say:

"Aside from the parts that we have learned. Let us read about the formation of sex cells, the development of embryo sac, and pollination."

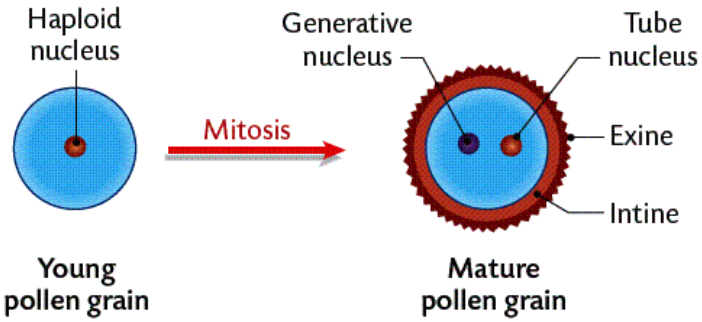
Formation of Sex Cells

The sex cells of the flowering plant are called gametes. There are both male and female gametes thus the flower undergoes sexual reproduction.

Male Gametes

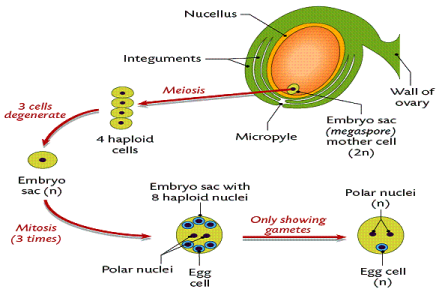


Pollen Formation: Development Of A Pollen Grain Within The Pollen Sac Of An Anther: A cross section of the developing anther displays four chambers. These chambers are called pollen sacs (see upper illustration). Each pollen sac is filled with cells containing large nuclei. As the anther grows, each of these cells goes through two meiotic divisions, forming a tetrad. These cells are called microspores. Each one of these microspores eventually becomes a pollen grain. Each pollen sac is enclosed by a protective epidermis and a fibrous layer. Inside the fibrous layer is the tapetum. This is a food store and will provide energy for future cell divisions.

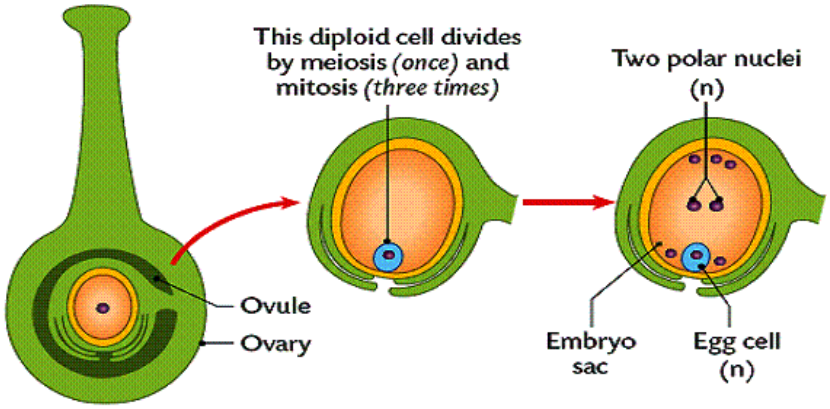


Each pollen grain is surrounded by a tough protective wall called an exine. This is a tough covering that allows the pollen grain to survive harsh conditions for long periods of time.
The intine is another thin protective coating.
First, each nucleus divides by mitosis to become two nuclei. One is the tube nucleus. The other is a generative nucleus. The wall of the cell thickens to protect the developing pollen grain. As the anther ripens, the wall between the paired pollen sacs disappears. The pollen sacs burst open and the mature pollen grains are ready for dispersal.

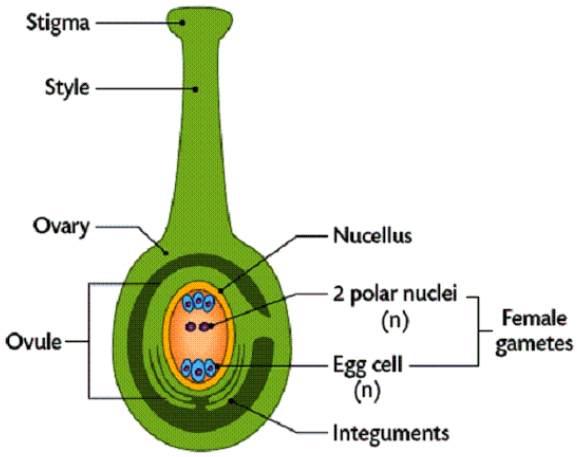
Development of the Embryo Sac



Each ovary contains one or more ovules. The green structure at the top of the diagram is the ovule. The integuments are the 2 walls of the ovule. There is a small opening in the walls called a micropyle. This is where the pollen tube will enter. (Will be discussed later.) The nucellus is cells that provide nutrition for the growth of the ovule. The embryo sac, also known as the megaspore, divides by meiosis to form 4 haploid cells. Three of these cells degenerate and one remains. Only one megaspore survives in each ovule. This becomes the embryo sac. The haploid nucleus of the surviving megaspore undergoes three mitotic divisions. Eight haploid nuclei are now present. Within the swollen 'megaspore cell' six haploid cells and two 'polar nuclei' are formed. The entire structure is called the embryo sac. One of the cells near to the micropyle end of the ovule is the haploid female gamete (eggcell).



The Carpel With a Mature Embryo Sac will appear as shown below:



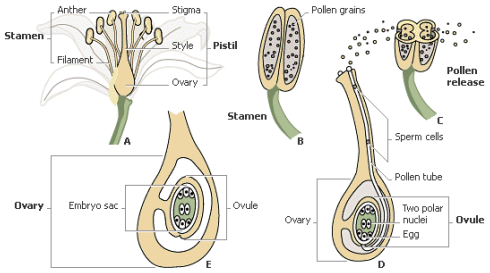
Pollination

Pollination is the transfer of pollen (male gamete) from the anther to a stigma. Cross-pollination: pollen is transferred to the stigma of another plant. Increases genetic variation, population more resistant to environmental change. Self-pollination: pollen transferred to the stigma of the same flower or a flower of the same plant. Guarantees reproduction if pollinating agent is absent or not efficient.

Pollination can be accomplished by the wind or by animals. Insects are the most common animals that will pollinate a carpel.

The most sophisticated relationships between plants and insects are generally those involving bees. Bees collect pollen and nectar not only for themselves but also to feed their young. For this reason bees have developed a number of adaptations that make them particularly good pollen carriers. Bees have special hairs that are arranged to form pollen 'baskets' on their hindlegs and the underside of their abdomen. These adaptations allow them to gather and carry large volumes of pollen. Bees are ideal pollinators because they visit many flowers while carrying lots of pollen, before returning to their nest. So the chance that a bee will transfer the pollen between flowers of the same species is very high.

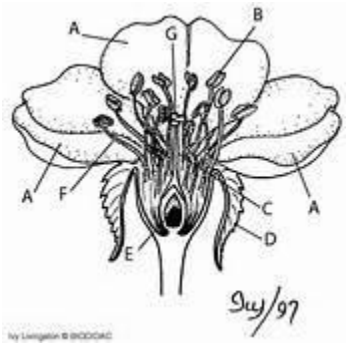
Many insects eat pollen. In the process of eating they become covered in it. Pollination happens when the pollen feeder transfers the pollen to the pollen receivers of the same plant, or another plant of the same species, as the insect looks for more pollen to eat.

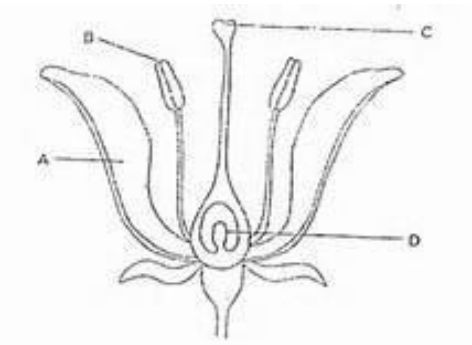


E. Evaluation:

Day 5

A. Direction: Write the parts of the reproductive organ of plant and the function of each part.





IV. Assignment

Direction: Complete the chart below

Female reproductive organ	Male reproductive organ