1 Reproduction in Plants

You will now learn about

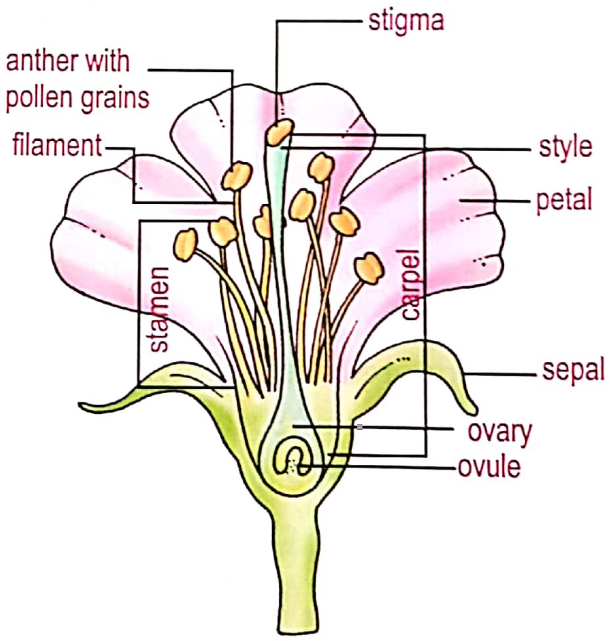
- Reproduction in plants
- Structure and dispersal of seeds
- Germination
- Food from plants.

Living things produce young ones like themselves. This is called reproduction. Humans have babies, fish lay eggs and simple forms of life just divide into two. In this chapter, we will have a look at how plants produce new plants. Plants grow flowers in order to reproduce. The colour and smell of the petals of flowers attract insects.

Parts of a Flower

The various parts of a flower are:

- **Sepals:** These are green leaf-like structures at the base of a flower. They protect the flower when it is a bud.
- **Petals:** These are the brightly coloured parts of a flower. They attract insects.
- **Stamen:** It is the male part of a flower. It is made up of identical filaments with a swollen head at the top called the anther. The anther has yellow powder like substance called pollen grains.



Parts of a flower

- **Carpel:** It is the female part of a flower. It is located at the centre of a flower. It consists of the stigma, style and ovary. Ovary contains tiny ovules. The ovary forms the fruit and the ovules form the seeds.

Reproduction in Plants

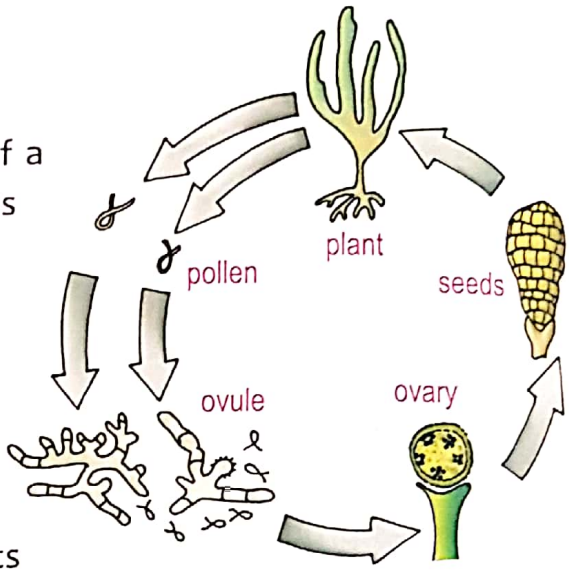
There are three ways in which a plant can reproduce:

- Reproduction through seeds
- Reproduction through different parts of the plant
- Reproduction through spores

Reproduction through Seeds

Seed and Fruit Formation

The transfer of pollen grains from the male part of a flower to the female part which contains the ovules is called pollination. When pollination is successful, the pollen grows a tube through the style to reach the ovary. There it gets fused with the ovule. This is called fertilisation. The ovule start growing into a seed and the ovary becomes the fruit. As the fruit matures, the petals dry up and fall off. As plants cannot move, they depend mainly on wind or insects for help to carry out this process of pollination.

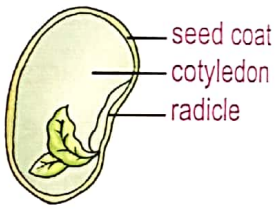


Process of pollination

Structure of a Seed

Take some gram seeds and soak them for a day. Now observe the seeds carefully. You will see an outer covering. That is known as the seed coat. The seed coat protects the seed.

Remove the seed coat carefully. You will now notice seed leaves. Seed leaves are called cotyledons. Cotyledons store food for the baby plant before the baby plant starts making its own food. In some seeds like grams, beans and peas there are two cotyledons. Such seeds are called dicotyledons. In others like wheat, rice and maize, the seeds have only one cotyledon. Such seeds are called monocotyledons.



Structure of a seed

Between the seed leaves (cotyledons) is the baby plant or the embryo with a tiny shoot and root. The seed leaves or cotyledons provide food to the embryo. Then the embryo grows up to become a new plant. The shoot part that comes out of the ground is called plumule and the root part that goes deep into the ground is called radicle.

Dispersal of Seeds

After a seed is formed it has to be dispersed. Dispersal means scattering of the seeds far from the parent plant before they touch the soil.


pea plant

Agents of Dispersal

- Explosion: The seeds are inside a pod. The pod bursts open and the seeds are ready for dispersal. The explosion shoots the seeds out and away from the parent plant.

  Peas, beans and violets use this method of dispersal.

- **Dispersal by Wind:** Wind disperses the seeds of many plants, trees and weeds. The seeds are usually small, flat, dry and light in weight. Fine hair help madar (aak), cotton and silk seeds to remain in the air. These seeds float in the air and after a long time, drop down. Maple and dandelion, seeds are dispersed by wind.

maple

dandelion

- **Dispersal by Water:** Coconut and water lily have seeds that are dispersed by water. These seeds have a covering that traps air. Air helps the seeds to float (in water) and keep the seeds dry.
- **Dispersal by Animals:** Brightly coloured fruits and berries are fleshy inside. These fruits and berries have hard seeds. These hard seeds are dispersed by animals.

water lily

mango

blackberry

Did You Know?

The poppy plant has a capsule that works like a salt and pepper shaker. When wind shakes the capsule, the seeds fall out of its holes.

When fruits like figs, tomatoes, strawberries and oranges are eaten whole along with seeds, the seeds do not get digested because they are coated. They pass out of the body as a part of waste matter and thus, are dispersed. Seeds of castor, burdock and mimosa plant have hooks, spines or glue. These seeds attach themselves to animals that pass by the plant and get dispersed.

Did You Know?

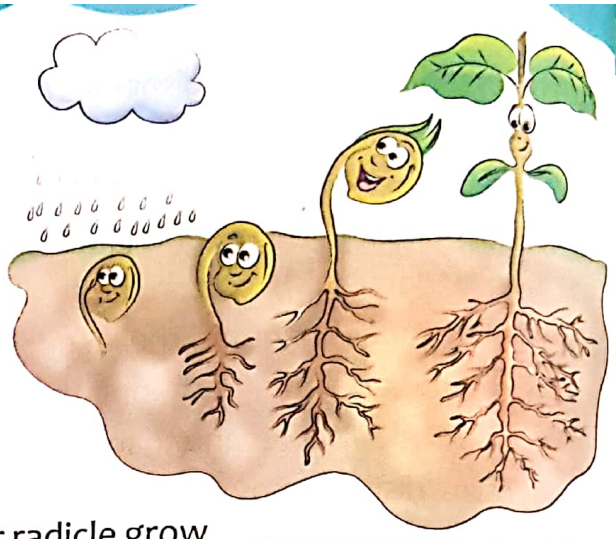
- The seeds of the Burdock plant inspired the invention of Velcro!
- Any vegetable with seeds inside it is scientifically a fruit.

- **Dispersal by Fire:** Fire is the dispersal agent of a few plants of the pine family. The jack pine and lodgepole pine give off their seeds only when they sense the high temperature of a fire that kills the parent plants and clears the ground for the seeds to germinate.

lodgepole pine

jack pine

Germination



Germination of seed

Germination is a process by which a seed becomes a seedling or a young plant. The conditions needed for germination may not be suitable at all times.

During germination, the seed absorbs water and the cells of the embryo divide and increase in size.

The seed coat then breaks open. First, the root or radicle grow downwards. Thereafter, the shoot or plumule grows upwards and produces stem and leaves.

Seeds need water, warmth and air to germinate. Let us see what happens if any of these factors (water, warmth and air) is missing.

Did You Know?

Plants like sunflower are called Annuals, as they live for just one year. Plants that live for two years are called Biennials.

Activity

Things needed: Some seeds of Bengal gram, four similar dishes, cotton and water.

Method: Put about 10 seeds in each dish.

In the first dish, put seeds in moist cotton at room temperature.

In the second dish, put seeds without water at room temperature.

In the third dish, keep seeds covered with water at room temperature.

In the fourth dish, keep seeds in moist cotton in an ice box or refrigerator.

Observe after 4-5 days.

Dish 1 Dish 2 Dish 3 Dish 4

Result: Seeds germinate only in the first dish.

Reason: All the three conditions were met only in the first dish. In the others, at least one condition was missing.

Reproduction by Plant Parts

Many plants can develop into new plants from their stem, leaves or roots. This is called vegetative reproduction. The resulting plants are clones, that is they are exactly like their parent plants.

Reproduction through Stems

The stems of many plants can develop roots and grow into adult plants. Examples are: banana, potato, sugar cane, rose and grape.

sugar cane

Reproduction through Roots

In some plants roots appear when kept in water. These roots develop into shoots and become new plants. This happens in dahlia and sweet potatoes.

sweet potato

Reproduction through Leaves

The bryophyllum plant also known as air plant or 'mother of thousands', can grow many new plants from its leaves.

Farmers can grow crops quickly on large areas of land. They use many methods. So farmers take advantage of vegetative reproduction.

bryophyllum leaf

Did You Know?

In some cases the stem of a plant is cut and then it is joined to another plant. It is then covered with grafting wax. Thus, you can grow different kinds of apples on the same plant. You can grow oranges on a lemon plant. This method is called grafting.

Activity

Take the stem of a money plant. Place it in a bottle of water. Expose it to the sunlight. It develops roots.

Reproduction through Spores

Moss and mushroom are example of ferns and fungi. They do not produce flowers. They produce tiny spores. Each of these spores can grow into a new plant.

mushroom

moss

Did You Know?

The stems of some plants bend down to touch the soil. They develop roots at this point. They can be cut away. They are then planted into the soil. They become a new plant. This is called layering.

Food from Plants

We get most of our food from plants. Different plants grow in different soils, climates and seasons. Wheat, gram, pea, mustard and linseed grow in winters. They are called *Rabi* crops. Paddy, maize, soyabean, groundnut and cotton grow in summer. They are known as *Kharif* crops.

Different crops grow in different soils. Rice and jute grow well in clayey soil. *Jowar* and *bajra* grow well in sandy soil. Cotton grows well in black soil. Tea plantation needs moist soil.

Growing Healthy Crops

In order to increase food production, we should know how to grow better and healthy crops.

- Use healthy seeds of the best variety.
- The soil should be ploughed. Fertilisers should be mixed to the soil. Fertilisers help the plants to grow well. Organic fertilisers or manures are natural fertilisers. These are obtained from cow dung or dead and decaying plants. Chemical fertilisers are man-made fertilisers. Urea and nitrates are chemical fertilisers.
- The crops should be protected from weeds and pests.
- The harvested crop must be stored properly. Then only we can protect it from moisture pests like rats, cockroaches, moles, insects and birds.

- All living things reproduce.
- Plants reproduce from seeds, body parts or spores.
- Plants depend on wind, insects and birds for pollination to produce seeds.
- Seeds have seed coat, seed leaves or cotyledons and embryo.
- Plants depend on wind, water, fire, animals or explosion for seed dispersal.
- The parts of a typical flower include — petals, sepals, stamen and carpel.
- A seed needs water, warmth and air to germinate.
- Plants can also reproduce through their body parts like stem, roots and leaves. This kind of reproduction is called vegetative reproduction.
- Different plants grow in different climates, seasons and soils.
- A healthy crop is the wealth of a nation.

KEY WORDS

- Cotyledons: the part of the seed that contains food for the baby plant.
- Germination: change of a seed to a seedling.
- Dispersal: scattering of seeds away from the parent plant.
- *Kharif* crops: crops that grow in summers.
- *Rabi* crops: crops that grow in winters.
- Embryo: the baby plant inside the seed.
- Pollination: the transfer of pollen grains from the anther to the stigma.

A. Answer the following questions:

1. What are the different ways in which plants can reproduce?
2. Explain the process of pollination.
3. Explain the parts of a flower. Draw a well-labelled diagram to show the parts of a flower.
4. List the agents of dispersal.
5. Explain the process of germination of seeds.
6. What are the conditions necessary for germination? Explain with an experiment.
7. Explain the different ways plants reproduce from their body parts.
8. What are *rabi* and *kharif* crops?
9. How can farmers get a healthy crop?
10. Define: (a) Pollination
    (b) Dispersal of seeds
    (c) Organic fertilisers
    (d) Germination
    (e) Vegetative reproduction
    (f) Reproduction

B. Fill in the blanks:

1. The seed coat _____ the seed.
2. Cotyledons store _____ for the baby plant.
3. The seeds of _____ are pollinated by wind.
4. The seeds of fleshy fruits are dispersed by _____.
5. Peas, beans and violets use the _____ method of seed dispersal.
6. _____ and _____ are pests that destroy harvested crop.