

Reproduction in Plants

1



Gear Up

Have you noticed the young ones of pets in the neighbourhood? They are also taken care of by their parents. Try to extend a helping hand to these little ones whenever possible.

You have learnt that living things grow and reproduce. Animals give birth to their young ones in many ways. Plants, being living things, grow up and reproduce plants of their own kind. Plants which produce flowers are called **flowering** plants. They reproduce through seeds.

Plants which reproduce through spores are called **non-flowering plants**. Some plants reproduce with helps of various **vegetative** body parts like leaves, stems and roots.

NEW PLANTS FROM SEEDS

Most plants that grow around us have flowers. Flowers are the reproductive organ of the plant. Flowers develop into fruits. Fruits contain seeds.



Flowers



Fruits

A seed has a baby plant enclosed safely within it. The outermost part of a seed is called the **seed coat**. It protects the seed from being damaged. Seeds of flowering plants have one or two seed leaves or **cotyledons**. Open the cotyledons. You can see a baby plant inside it. It is called the **embryo**. The cotyledons store food for the baby plant. The food stored is used by the baby plant till it grows the first green leaves.

We Will Learn About

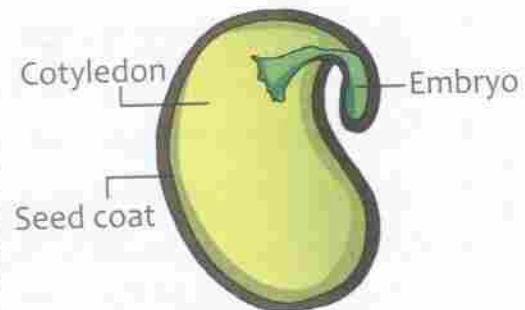
- New plants from seeds
- Dispersal of seeds
- New plants from other parts of plants
- Crops
- Agriculture



Know More

The flower consists of following parts.

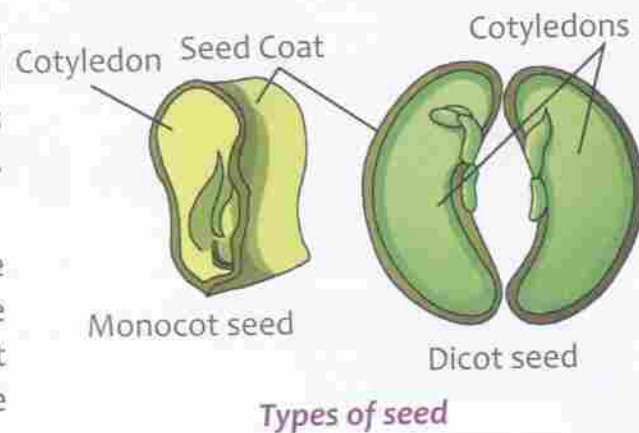
1. Sepals
2. Petals
3. Stamens – [Male reproductive part]
4. Pistil [Female reproductive part]



Structure of a Seed

Seeds of some plants like grams and beans have two seed leaves. Such seeds are called **dicotyledonous seeds**. Seeds of some other plants like maize, wheat and rice have one seed leaf. These seeds are called **monocotyledonous seeds**.

The embryo has a **shoot** and a **root**. Later on The shoot grows out of the ground the stem and the roots spread under the ground. The embryonic root of the plant is called **radicle** and the part of the embryo giving rise to shoot is called the **plumule**.



Types of seed

Activity

Soak a few seeds of wheat, gram, mung, mustard, maize, rice and groundnut in water for a few hours. Find out which of these are dicot seeds and which are monocot. Record your observations here.

wheat	monocot	gram		mung		mustard	
maize		rice		groundnut			

Germination of a Seed

The development of a seed into a seedling under appropriate conditions is called **germination**. Most plants grow from seeds. But all the seeds do not grow into plants. Only healthy seeds which get all the favourable conditions grow into new plants. Germination of a seed is also called **sprouting**.

Conditions necessary for germination :

1. Water — Makes the seed coat soft
2. Warmth — Makes the cells of the seed active.
3. Air — Required for breathing.

Activity

- ◆ Take four bowls and number them 1, 2, 3 and 4. Take some dry gram or bean seeds.
- ◆ Put some seeds in bowl 1 and keep the bowl on a window sill where it can get air and sunlight.
- ◆ Put some seeds in bowl 2. Fill the bowl with water. Now, keep the bowl on the window sill.
- ◆ Put some soaked seeds on moist cotton in bowl 3. Keep the bowl inside a refrigerator.
- ◆ Put some soaked seeds on moist cotton in bowl 4. Keep the bowl on the windowsill. Keep the cotton moist all the time.

Now, complete this table based on your observation. First one is done for you.

Sprouting : Coming out from inside from of a seed.

Bowl No.	Conditions the seeds got	Conditions the seeds didn't get	Did the seeds germinate?
Bowl 1	Air, warmth (sunlight)	Water	No
Bowl 2	Water, warmth		
Bowl 3	Air, water		
Bowl 4	Air, water, warmth		

You will note that only the seeds in bowl 4 have germinated. Why is it think so?

Oral Test



1. Say True or False.

1. Cotyledons protect the seeds from being damaged.
2. A seed will grow into a plant if it gets enough air, water and sunlight.
3. Maize and wheat are dicot seeds.
4. A seed kept in dry soil will germinate.

2. Fill in the blanks.

1. Outer most part of a seed _____.
2. Embryonic root is called _____.
3. Reproductive part of a plant _____.
4. Dicots have _____ cotyledons.

Stages of germination



1. The seed gets air, water and warmth.
2. The seed coat breaks and the baby plant emerges. It gets food firstly from the cotyledons.
3. The baby plant develops roots and shoot.
4. As the plant grows in size, it develops leaves. The cotyledons shrink and disappear.

Stages of germination

DISPERSAL OF SEEDS

We have learnt that seeds germinate when they get suitable conditions such as right kind of soil, air, enough water and the right temperature. If all the seeds fall on the ground near the parent plant, they will not get enough food, water, sunlight and space to grow. Hence, there are some agents in nature to scatter these seeds. These agents carry the seeds or fruits away from their parent plant. This process is called **dispersal** and the agents are called **agents of dispersal**.

Dispersal is carried out in several ways. Let us read about some of them.

Dispersal : Process of scattering of seeds with the help of natural agents of nature.

Dispersal by Wind

Seeds of Cotton, Hiptage, Sycamore, Madar, Poppy, Orchid are light and have hair or wings, so they can be easily carried by the wind.



Cotton



Hiptage



Madar

Seeds dispersed by wind

Dispersal by Water

Seeds and fruits of some plants such as Lotus and Coconut are spongy or have a fibrous covering which help them to float on water. Water takes these from one place to another.



Lotus



Coconut

Fruits dispersed by water



Spear grass

Seeds dispersed by animals



Xanthium



Tiger nail



Coconuts can travel several thousand kilometres across oceans. The coconut palms on South Sea Islands grew from coconuts carried there by ocean currents.



The smallest seeds in the world are those of an orchid the largest seeds in the world are those of a double coconut".



Squirrels bury seeds and nuts for eating them during winter, when food is hard to find. Sometimes squirrels forget where they had buried these seeds. These seeds often germinate and grow into new plants.

Faeces : Waste matter remaining after food has been digested or undigested and discharged from the bowels, through anus.

Explosion

Some fruits like pods of squirting Cucumber and Peas Balsam and Pansy burst open or explode when dry. This mechanism of seed dispersal is called **explosion**.



Squirting cucumber



Peas in pod

Seeds dispersed by explosion



Project Time

1. Work in pairs and make a chart on 'Dispersal of Seeds'. Collect and paste pictures of different seeds dispersed by different agents. Write their features which help in their dispersal below the pictures.
2. To study the method of vegetative propagation Take potato with eyes on it, Cut it in such a way that the eye remains. Bury the potato in the soil. After few days leaves will be seen, which Indicates new plant has been produced from those eyes.



1. 'Red Honeysuckle tree disperses its seeds in response to fire.

NEW PLANTS FROM OTHER PARTS OF PLANTS

Most plants grow from seeds. But some plants grow from vegetative parts of plants too. This is called **vegetative propagation**.

New Plants from Stems

Plants like Rose, Hibiscus and Sugarcane grow from stem cuttings.

Potato and Ginger are underground stems. Potatoes have buds called **eyes** on them. Each eye can grow into a new plant. Buds present in Ginger also give rise to new plants. Onions, Colocasia and Gladiolus are some of the plants which grow from their stems.



Rose stem cuttings



Potato with eyes



New Plants from Roots

Carrots, Dahlias, sweet potatoes are examples whose roots can grow into new plants. The swollen root of a sweet potato is called **Tuber**.



Carrots



Dahlia

Rhizome – It is a fleshy underground stem eg. Ginger.
Runner – Stems of some plants that run above the ground horizontally eg. Grass



New Plants from Leaves

Leaves of Bryophyllum give rise to new plants from the buds present in their margins. Complete plants can be grown from these leaves if they are placed in the moist soil.

Bryophyllum



Some plants like Ferns, Mosses and Mushrooms do not produce flowers and hence no seeds. They are called non-flowering plants as they produce tiny powder-like reproductive bodies called **Spores**. New plants grow from these spores.



Spores on ferns



Mushroom



Mosses growing on a tree trunk

Oral Test

A Complete the sentences.

- _____ contain food for the baby plant. (Cotyledons/Roots)
- A baby plant is also called a _____. (rootlet/seedling)
- Only _____ seeds can be dispersed by wind. (light/heavy)

B State one example of each of the following.

- A plant which grows from stem.
- A plant which grows from roots.
- A plant which grows from leaves.

CROPS

Plants of one kind grown in a particular area at a particular time are called **crops**. The particular area in which a crop is grown called a **farm**. A **farmer** works on the farm.

Different plants need different types of soils, minerals, moisture, climate and temperatures to grow. Farmers know about the various conditions in which different plants grow well. Accordingly, they choose the seasons and soils to grow different crops.

Crops like wheat, gram, lentils and mustard grow well in winter season. Crops grown in winter season are called **rabi crops**. They are grown from November to April. These plants require less water.

Spores : Very small cells produced by plants

In summer, crops like rice, maize, jowar and bajra are grown by the farmers. They are called **kharif crops**. They are grown from June to October. These crops require more water.



Wheat



Mustard



Rice



Bajra

Rabi crops

Kharif crops

Tea plants need moist conditions. That is why, we have huge plantations of tea in hilly areas like Assam, the Nilgiris and Darjeeling. Plants like dates can grow in very dry conditions.



Tea garden



Date palm trees



Rice grows in clayey soil

Different plants need different types of soil. Wheat grows well in sandy and **irrigated** soil whereas rice needs clayey soil. Sorghum (jowar) and Pearl millet (bajra) grow in sandy soil.

Sandy soil near the coasts is good for coconut trees. Cotton grows in black soil. Coconut grow in coastal areas. Maize grows in dry soil.



Jowar grows in sandy soil



Cotton grows in black soil



Wheat grows in sandy irrigated soil

Common crop plants in India	
Type of crop	Example
1. Oil seeds	Sunflower, mustard
2. Cereals	Wheat, rice, maize
3. Pulses	Beans, grams, peas
4. Root crops	Sweet potato
5. Fibre crops	Cotton, jute

Irrigated : Artificially watered

Growing Vegetables

Vegetables need a lot of care. They have to be watered regularly. Many vegetables grow throughout the year. But vegetables like *cauliflowers*, *carrots*, *green peas* and *radish* grow well in winter. On the other hand, vegetables like *Brinjal*, *Gourd* and *Lady's Finger* are mostly grown in summer.



Vegetables growing in a field

AGRICULTURE

Crops are grown on a large scale to feed the entire population of a country. The practice of farming or cultivating crops on a large scale is called **agriculture**. For a good and healthy crop, farmers do the following.

1. They sow seeds of good quality and irrigate the crop at regular intervals.
2. They add manure and fertilizers to the field to increase soil fertility.
3. They remove weeds or wild plants that grow in the field with crops.
4. They spray chemicals (pesticides) to destroy plant **pests**.
5. They protect the crop from grazing animals.
6. They harvest the crop at a proper time and store it safely till it is sold in the market.



1. The field is ploughed.



2. Seeds are sown.



Examples of fertilizers – Urea, Potash
Examples of pesticides – DDT, Warfin



3. Manure is added.



4. Pesticides are sprayed to protect the crops.



5. The crops are harvested.



6. The product is taken to the market.

Importance of Manure

- It is not harmful
- Improves soil texture
- Makes soil porous

Harmful effect of Fertilizers

- Makes soil less fertile
- Lead to soil and water pollution

Pest: An organism that harms crops and food

Storage of Harvested Crops

It is not always possible for the farmers to sell the entire crop at one time. So it becomes important for them to store the harvested crop properly. The grains are dried and then stored.

Crops have to be stored in a clean place under proper conditions.

Different agricultural crops require different kinds of storage facilities.

Fruits and vegetables are stored in cold storages. Dry grains and pulses are stored in large rooms called **granaries**.



7. Grain stored in a godown



You can bring sprouted seeds to the classroom and show it to the students to explain the concept of germination. Discuss the concept of dispersal of seeds and how various agents scatter the seeds. Tell them how plants also develop from other plant parts and show them a potato with eyes, Bryophyllum leaf, etc. Explain the various crops and the agricultural processes.

Project Time

Make your own manures using vegetable and fruit peels with the help of your teacher, and use it in your garden or in your school garden.

LET'S REVISE

- ❖ New plants mostly grow from seeds.
- ❖ The development of a seed into a seedling is called germination. A seed needs air, warmth, water and the right type of soil to germinate.
- ❖ Seeds are dispersed by wind, water, animals and by the explosion of fruits.
- ❖ Some plants grow from different parts of a plant like stems, roots and leaves.
- ❖ Plants of the same kind grown in a particular area at a particular time are called crops. The particular area is called field.
- ❖ Crops grown in winter season are called rabi crops. Crops grown in the summer season are called kharif crops.
- ❖ The practice of growing crops on a large scale is called agriculture.



EXERCISES

A. Tick (✓) the correct answer.

- The outermost part of a seed is called the _____.
a. Seed leaf. b. Seed Coat. c. Seedling.
- Which of these conditions are required by a seed to grow into a new plant?
a. Warmth and Water b. Air and Water c. Air, Water and Warmth
- Seeds of Cotton, Hiptage and Sycamore are dispersed by _____.
a. Wind. b. Water. c. Animals.
- A new dahlia plant will grow from the _____.
a. Stem. b. Roots. c. Leaves.
- Which of these are kharif crops?
a. Wheat and Lentils b. Tea and Coffee c. Rice and Maize

B. Fill in the blanks.

- The baby plant present inside the seed is called the _____.
- The development of a seed into a seedling is called _____.
- Seeds are _____ by wind, water, animals and by the explosion of fruits.
- Plants like rose, hibiscus and sugarcane grow from _____ cuttings.
- Farmers add _____ and _____ to the field to increase soil fertility.

C. Write the differences between the following using the hints given in the brackets.

- A dry seed and a soaked seed (size, seed coat)
- A maize seed and a pea seed (cotyledons)
- Rice and groundnut (soil)
- Coconut seed and Xanthium seed (agent of dispersal)
- Rabi crops and Kharif crops (season)

D. Match the following.

Column - A

- Squirting cucumber
- Bryophyllum
- Tea plantation
- Dates
- Pesticides

Column - B

- Require moist conditions
- Grow in very dry conditions
- Dispersal by explosion
- Destroys plant pests
- New plants grow from leaves

E. Write short answers.

- What are the functions of seed coats and cotyledons?
- What is the difference between dicot seeds and monocot seeds?
- Why are seeds scattered by various agents?
- Name some vegetables that grow throughout the year.
- Why are harvested crops stored?

F. Answer these questions.

- What is germination? Name the conditions necessary for germination and draw suitable diagrams to show stages of germination.
- What are the special features of the seeds which get dispersed by wind?
- How are animals helpful in the dispersal of seeds?
- Write a note on different type of crops and its usage.
- What does a farmer do to ensure good and healthy crop?
- How do farmers store different crops?
- Write the function of hooks, thorns and sticky hairs possessed by fruits.



HOTS

G. Answer these.

- A watermelon has many seeds. Each watermelon seed can grow into a new plant. However that does not happen. Why?
- Why can't we grow rice in Rajasthan?
- Why seeds kept in your kitchen containers do not germinate?