

Plants: The Source of All Life

Let's Begin

Is it correct to say that all living things depend on plants? Why or why not?

Plants play an important role in supporting life on the Earth. Humans depend on plants in many ways. We depend on plants for clean, fresh air. Plants absorb carbon dioxide present in the air and release oxygen which we need for breathing. All the food we eat comes from plants either directly or indirectly. We also get material to make clothes, medicines, paper, rubber and many other materials from plants.



Plants keep soil from being eroded because their roots bind soil particles together. They also regulate the water cycle. If we cut down trees, there will not be sufficient rainfall. Planting new trees and preserving old forests is important as many kinds of birds, insects and large animals depend on them. Variety in plants also helps keep our planet healthy and beautiful.

PLANTS GROW FROM SEEDS

Seeds are very important as they help a plant make more of its kind. Seeds come in many shapes, sizes and colours. Many plants produce a large number of seeds but not all seeds grow into plants. Some are eaten by animals, including birds and human beings. Others get destroyed by bad weather. Some seeds do not get the required conditions to germinate. Some seeds may not be mature enough.



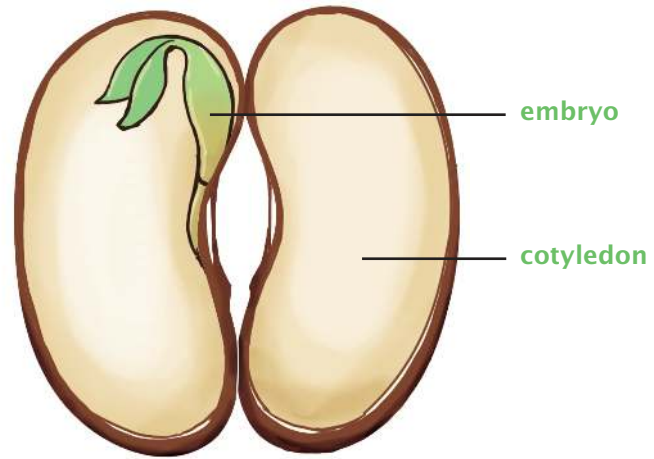
Seeds remain **dormant** or asleep until they get water, soil and warmth.

PARTS OF A SEED

In a bowl of water soak a few bean seeds for 2–3 hours. The seeds absorb water and the outer protective covering (seed coat) of the seeds swells up.

Remove the seed coat. You will see two **seed leaves** called **cotyledons**.

Seeds such as peas, grams and beans have two cotyledons and are called **dicot** seeds. Seeds like rice, wheat and maize have only one cotyledon and are called **monocot** seeds. The cotyledons have food stored in them. The baby plant uses this stored food for its growth until it can make its own food.



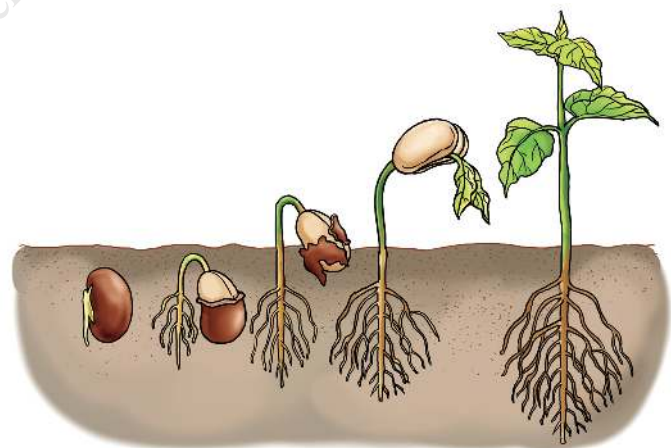
parts of a seed

Separate the cotyledons of a bean seed. A baby plant called the **embryo** can be seen between the cotyledons. The baby plant has both a tiny root and a tiny shoot.

GERMINATION OF A SEED

The process by which a plant grows from a seed is called **germination**. A germinating seed needs air, nutrients, water (moisture) and plenty of sunlight (warmth) to grow into an adult plant. When a seed falls in the soil it absorbs water causing its seed coat to swell up. The seed coat splits allowing air inside the seed. First, the root of the plant grows downwards due to gravity and fixes the plant in the soil.

Then the shoot grows upwards towards sunlight. The baby plant is now called a **seedling**. The seedling produces leaves and starts producing its own food.



germination of a seed

Activity

You will need: four small plastic cups, garden soil, mustard seeds and water

1. Label the cups 1, 2, 3 and 4.
2. Place some mustard seeds in cup 1 and leave it on a windowsill.
3. Fill cup 2 with water and add some seeds to it. Leave it on the windowsill.
4. Add some soil to cup 3, put some seeds in it and place the cup in the refrigerator.
5. Add soil to cup 4, place some seeds in the soil and place the cup on the windowsill. Water it every day.

Record your observations.

Cup	Do the seeds germinate?	Other conditions needed
1 has air and sunlight		
2 has water and sunlight		
3 has soil and air		
4 has soil, air, sunlight and water		

SEED DISPERSAL

If all seeds from the parent plant fall in the same place they will not get enough light, water, nutrients and space to grow. Since plants cannot move from place to place, they use methods to scatter seeds to distant places. This distribution of seeds, away from the parent plant, is called **dispersal**.

AGENTS OF SEED DISPERSAL

The various agents that help to disperse seeds are explained below.

Wind

Seeds that are light and have wings or hair are easily carried by wind over long distances. Cotton, milkweed and dandelion are plants whose seeds are dispersed by the wind.



Water

Seeds and fruits that float in water are dispersed by water. Coconuts have a fibrous covering which help them float. The fruit of the lotus plant is spongy and light. These fruits can easily float to faraway places.



lotus

Animals

Animals (including birds) eat some fruits along with their seeds. These seeds are passed out in their droppings. Guava seeds are dispersed like this. Other seeds like those of the apple, cherry and mango are thrown away after the fruit is eaten. Some seeds have hooks, spines or stiff hairs on them. They get stuck to the bodies or mammals or birds. Sometimes they even stick to our clothes when we walk past such plants.



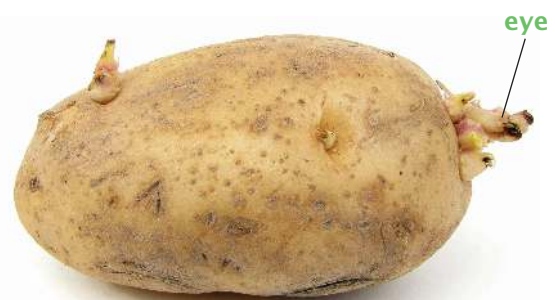
hooked seeds

Explosion

The fruits of some plants like the pea and balsam burst open when they dry up. Due to the force of the explosion, the seeds are scattered to distant places.

PLANTS GROW FROM OTHER PLANT PARTS

All new plants do not grow from seeds. Some plants can grow from a part of the parent plant like its root, stem or leaf. Some plants like the drumstick, sugarcane, rose and hibiscus can be grown by planting stem cuttings of the parent plant. The potato and ginger, which are underground stems, have buds called eyes from which new plants can grow.



sprouting potato

The carrot, cassava and sweet potato are root vegetables. New plants can be grown by planting these roots in the soil. *Bryophyllum* and begonia are examples of plants that can grow from the leaves of the parent plant.

CROPS

Plants that are grown in large quantities by humans for food and other purposes are called **crops**. The growing of crops is called **cultivation**. The cultivation of crops depends on various factors.

Seasons

Crops that are grown in the winter from November to April are called **rabi** crops. Wheat, barley, mustard and gram are examples of rabi crops. Other crops like cauliflower, pea, carrot, cabbage, radish, beans, apple and orange are also grown in winter.

Crops that are grown in the summer from June to October are called **kharif** crops. Rice, maize, jute and cotton are examples of kharif crops. Other crops like brinjal, gourd, pumpkin, lady's finger, melon and mango are also grown in summer.

Climate and Soil

Different plants require specific types of climate and soil for proper growth. Rice grows well in **alluvial** soil with standing water. Wheat is grown in **loamy** soil with plenty of water. Jowar and bajra grow well in **sandy** soil that does not hold water.

Cotton grows well in **black** soil.

Watermelons need sandy soil and a hot and dry climate.

Coconuts grow well in coastal areas with sandy soil and plenty of water.

Tea grows well in moist, well-drained soils found on hilly slopes.



rice fields

HEALTHY CROPS AND GOOD HARVESTS

Farmers work very hard to make sure that crops stay healthy. A lot of work is required before and after planting crops.

1. Farmers loosen the soil by **ploughing** it. This brings fertile soil to the top and prepares the field for seeds.
2. Healthy, mature seeds are planted in the fields. This is called **sowing**.



irrigation

3. **Fertilisers** and **manure** are added to the soil so that the plants will get more nutrients. Compost and cow dung are examples of manure. Chemical fertilisers like urea, ammonium nitrate and superphosphate are also used. Such chemicals should not be overused because overuse can damage both the soil and the crops.
4. The field is watered properly so that the crops get the right amount of water. This is called **irrigation**.
5. Unwanted plants that grow in the field are removed. This process is called **weeding**.
6. As the crops grow they are protected from **pests** like grasshoppers and caterpillars by using **pesticides**.
7. Crops should be protected from animals like cows, donkeys and goats by fencing the field properly. The crops can be protected from birds like parrots by placing a scarecrow in the field.
8. Plants that are attacked by germs are treated with special medicines.
9. Once the crops are mature, they are **harvested**. Crops that spoil easily like vegetables, fruits and flowers are taken to the market immediately. Crops like grains and pulses are stored in granaries.
10. Crops in granaries must be protected from moisture and stored in dry, airtight containers. This also protects them from rats and mice.

A proper, continuous supply of crops will keep a country happy and healthy. We must treat plants as a precious resource.

Let's Remember

DORMANT alive but not growing

Let's Sum Up

- ❖ We depend on plants either directly or indirectly.
- ❖ Seeds are important for plant reproduction.
- ❖ The seeds of dicots have two cotyledons. The seeds of monocots have one cotyledon.
- ❖ The growth of a seed into a seedling is called germination.
- ❖ Seeds are dispersed by wind, water, animals (including birds and humans) and explosion.

- ❖ Plants can also grow from other plant parts such as stems, roots and leaves.
- ❖ Plants that are grown in large scale are called crops.
- ❖ Winter crops are called rabi crops and summer crops are called kharif crops.
- ❖ Farmers take various steps to make sure crops are protected during growth and storage and that they are harvested properly.

Let's Understand

A. Choose the correct answers.

1. The part of the seed which has stored food for the baby plant is the _____.
 a. seed coat b. shoot c. seed leaf d. root
3. _____ are examples of crops grown in the winter.
 a. Rice and bajra c. Jowar and pumpkin
 b. Maize and brinjal d. Wheat and gram
4. Which of the following is **not** a characteristic of a fruit dispersed by wind?
 a. The fruit is light and small.
 b. The fruit has hair or wings.
 c. The fruit has a parachute-like structure.
 d. The fruit has hooks or spines.
5. The process that prevents over-crowding and ensures the survival of seedlings is _____.
 a. pollination b. seed dispersal c. germination d. irrigation
6. Which of the following plants can reproduce through its leaves?
 a. cotton b. *Bryophyllum* c. cherry d. coconut

B. Form similar pairs of words.

1. Potato and eyes / rose and _____
2. Jute and clayey soil / cotton and _____
3. Manure and cow dung / _____ and superphosphate
4. Bean and dicot / maize and _____

C. Say if the sentences are true or false.

1. All seeds do not grow into plants.
2. When a seed germinates, a tiny shoot comes out of the seed first.
3. The fibres that surround the cotton seed help it to get scattered away from the parent plant.
4. Jowar and bajra require plenty of water for cultivation.

D. Answer in brief.

1. Draw a bean seed and mark its parts.
2. Name the agent/mechanism of dispersal of the following.
a. dandelion b. lotus c. guava d. pea
3. What is a crop? Name two cereal crops.

E. Answer the questions.

1. Explain how plants are useful for life on earth.
2. Name the process by which a seed grows into a plant. Explain the conditions necessary for the process.
3. What is meant by dispersal of seeds? Why is it important?
4. How can crops be protected from damage when they are cultivated and when they are stored?

Let's Think

FA

Sometimes we hear about damage to crops due to unseasonal rainfall. Why do you think the crops are damaged, even though they need water to grow?

Let's Learn

FA

1. Take two similar-sized cartons A and B. Sow a handful of seeds in A and about 5 seeds in B. Provide adequate sunlight and water. Compare the growth of plants in crowded and uncrowded conditions.
2. Visit a greenhouse. Observe how plants are raised there. Find out how light, water and other resources are used to increase the growth and productivity of plants.

Let's Have Fun



FA

How air dispersal works

You will need: paper, scissors, glue

Method

1. Cut two rectangles from paper and glue the long ends together to form tubes.
2. Make cuts in one tube to form thin strips at one end.
3. Fold down the thin strips so that they stick out from the tube.

Drop the two tubes from the top of a building on a windy day. The tube with strips stays in the air longer and can float farther away from where it was dropped. In the same way as the strips help the tube stay in the air, wings or hairs on seeds help them to spread far away from their parent plants.

Life Skills



Learn to make compost from kitchen waste. Use it as manure for your potted plants.

