

How Plants Grow

Focus On

- Growing New Plants
- Growing Plants from Seeds
- Growing Plants from Roots
- Growing Plants from Stems
- Growing Plants from Leaves
- Agriculture

Teacher's Aid

- A potato with buds or eyes.
- An overnight soaked pea seed.

Have you ever imagined our world without plants? Just think what will be our world, if there is no plant. Can living beings survive without plants?

Plants are the primary producers on earth. They are the only source for all food on the earth. Growing plants was learnt by human beings to meet their needs for food.

Plants are the only living things that produce their own food. They make their food through the process of **photosynthesis**. The leaves prepare food in the presence of air and sunlight. Humans and animals depend on plants for food.

Life on the earth would not be possible without plants. It is very important that we preserve the plants around us and grow more plants. All the parts of plants are useful for us. Plants not only supply food to us but also give us oxygen to breathe. In the process of photosynthesis, green plants take up carbon dioxide and water from their surroundings and convert them into glucose and oxygen.

Growing New Plants

As we know there are various kinds of plants. Most plants grow from their seeds while other plants grow from various parts like leaves, stems and roots.



A carrot plant grows from its root.



A rose plant grows from its stem.



A new bryophyllum plant grows from one of its leaf



A pea plant grows from its seed.

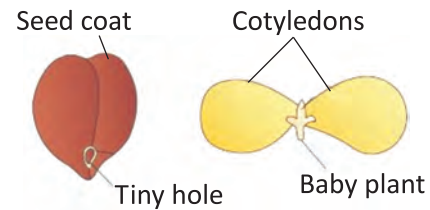
For the Teacher

Start a debate on 'A pea seed is hard and dry.' Tell the children the pea seed is not dead. After soaking it becomes alive and ready to grow. Show them the overnight soaked pea seeds. Tell them that if the seeds are soaked for a week, there water should be changed daily.



ACTION TIME 1

Soak some black gram seeds in water. Leave them overnight. Then keep them tied in a cotton cloth. Leave them for a day. What do you see?



Growing Plants from Seeds

In plants flowers change into fruits. Seeds are contained inside the fruits.

A baby plant is contained safely inside a seed. The hard outer covering of a seed is called **seed coat** that protects the baby plant. There are two thick structures called cotyledons, inside the seed coat. The food for baby plant is stored inside these **cotyledons**. The baby plant begins to grow, when water enters the seed coat through a tiny hole.

Number of seeds varies in various plants. Each seed has the **potential** to grow into a new plant like its parental plant. Only some seeds get a chance to grow into a plant. Some other seeds are destroyed by rain and storm and do not get favorable conditions i.e., air and warmth to grow or are eaten up by animals.

Thin long thread like structures coming out of the seeds are baby plants.

A seedling or a baby plant needs fertile soil, water, air, right amount of sunlight and favourable warmth to grow from a seed.

Germination

Germination is the process of a seed growing into a new plant. When a seed takes in water, it rapidly begins to produce a new plant. Due to this rapid action, the inner layer of the seeds begin to swell, and it splits the outer coverings and seed coat.

At the initial stage, the seed uses food reserves from the cotyledons to grow. In the beginning, baby plant also uses this food reserve to grow. When this food reserve is finished, it starts taking food from the soil. It also takes the needed amount of oxygen through pores in the soil.



Stages of Germination of a Seed

Roots of the plant grow downward into the soil while the other parts of the plants grow upward. These parts convert into stem, branches and leaves. The roots absorb water and nutrients from the soil and transfer them to stem. Stem transports these water and nutrients to the other parts of the plant. The leaves of the plant convert water and carbon dioxide into glucose and oxygen by using the energy of sunlight.

Many new born plants would die if they do not get proper space to grow. A seed requires enough space to grow into a healthy baby plant. The seeds that are close to each other will struggle for water, food and light to grow after germination.

Dispersal of Seeds

Sometimes seeds are taken away from the parent plant and grow in a distant area. There are many factors which are responsible for the scattering of seeds. The process by which seeds get scattered away from the parent plant is called **dispersal**.

Following are some factors through which seeds get scattered :



Parachute-like Dandelion

Wind

Many small seeds that are very light and have wing-like structures are carried away by the wind to distant places. For example, dandelion and sycamore fruits are very light-weight and their parachutes or wings like extensions help them to fly with the wind. Hairy cotton seed that is very light also gets dispersed by wind.



Hairy Cotton Seed

Water

The seeds of aquatic and coastal plants get dropped into or near water bodies. For example, the fibrous covering of the seeds of lotus and coconut plants supports them to float away and germinate at a different place.

Animals

Birds and other animals eat fruits. The undigested seeds come out with waste from their bodies, often at a distant place from the parent plant.



Coconut Seed Gets Dispersed By Water

Fact Byte

- ❖ Some animals stores their food for later use, such as, squirrel burry seeds. Sometimes they forget their storage and these seeds grow to become a plant.

Sticky or prickly seed coats help some seeds such as cocklebur to stick to the fur of animals. They carry these seeds to far off places. Later somehow, these seeds fall down from their bodies and germinate to become new plants.



Prickly Cocklebur Seed



Seed Dispersed By Birds

Explosion

Poppy pea and bean seeds are the fruits that scatter their seeds by explosion. The seed pod of the plant ripens and bursts open and forcibly shoots the seeds in different directions.

Growing Plants from Roots

Some plants grow from their roots. Radish, turnip, carrot and beetroot are such plants.

ACTION TIME 2

Objective : Growing a new plant from a carrot.

Things needed : A flower pot with some sand, pebbles, a carrot and water.

Process : Remove the leaves of carrot. Cut the carrot 2.5 cm from the top. Sow it in the soil and water it daily. Place the flower pot in sunlight.

Conclusion : Fern like sprouts are seen in few days.



Growing carrot

Growing Plants from Stems

Potato, rose, hibiscus and onion are some plants that grow from the stem of their parent plant.



Growing a New Plant from Stem Cutting

Growing Plants from Leaves

Jade, Rex Begonia and Bryophyllum plants are plants that can be grown from the leaves of the parent plant.

The leaf of these plants develop many shoot buds. These buds form roots at their base. When these plants drop on moist soil, they grow into new plants.



Bryophyllum Leaves



Your Turn

If you want the butterflies to visit your potted plants or gardens. Grow colourful flowers plants as butterflies get attracted to colourful flowers for nectar. Butterflies wants a sunlit place and plants for shelter.

Lilac, Zinnias and Sunflower are some nectar bearing plants that attract the butterflies.

Let's Recall

Fill in the blanks :

1. _____ is the process of scattering seeds far away from the mother plant.
2. The process by which a seed produces a new plant is called _____.
3. A baby plant is called a _____.
4. _____ is the parts of the plant that store food for its early stages.

Agriculture

A number of same kind of plants grown in a field in a particular area and in a particular season to fulfill the need of food is called **crops**. Crops are also used as raw material for industries.

Growing and harvesting crops are called **Agriculture**. Cutting and storing the crops is called **harvesting**.

We get food and different raw materials from agriculture. As sugarcane is used as a raw material to make sugar and jaggery.

There are different crops grown in India in different seasons.

Rabi crops are grown from November to April. Wheat, barley and legumes are some examples of rabi crops. These crops are sown in winter and harvested in spring.



Terrace Farming

Kharif crops are grown from June to October. Maize, rice and jowar are some kharif crops.

In mountain areas, farmers practice terrace or step farming. They make steps by cutting the mountain side.

In the hilly areas of Assam and Darjeeling tea plants are also grown by terrace farming.

To get healthy crops, a farmer needs :

- ❖ Healthy seeds to sow.
- ❖ Fertile soil and right amount of manure.
- ❖ Right amount of water to irrigate crops.
- ❖ Agricultural tools and machines.

For the Teacher

Show a potato with eyes or buds to children. Ask them why these buds have grown.

HOTSPOT

1. Can a coconut seed be dispersed by wind? Give reason for your answer.
2. Rohit and Rohan bury some leaves of a carrot plant in the soil. There are no signs of a new plant coming out of the soil. What was the mistake done by them?

Environment Friendly Step

By mixing soil, kitchen waste, garden waste and cow dung, we can make compost. That is an organic manure.

Stages of Agriculture

The field is ploughed and the soil prepared.

Manure is added to the field.

Seeds are sown.

The field is irrigated or water is provided to the crops.

Pesticides is sprayed on the crops.

Ripe crops are harvested.

The harvested crops are stored.

Flash On

- * Most of the plants grow from their seeds.
- * Some other plants can grow from their stem, leaves and roots.
- * The process by which a seed produces a new plant is called germination.
- * The food for the early stages of a baby plant is stored in the cotyledons of a seed.
- * Air, water, light and right amount of warmth is essential for a seed to grow up into a baby plant.
- * Some factors that help the seeds in dispersing are air, water and wind etc.
- * The process of growing and harvesting the crops is called agriculture.

Words to Know

- Seedling** : A baby plant
Seed coat : The hard outer covering of the seed
Cotyledons : The leaf like parts of a seed which store food for the early stages
Germination : The process of seed growing into a new plant
Dispersal : Seeds get scattered far away from the parent plant
Agriculture : The practice of growing and harvesting crops
Crops : A lot of plants grown in a particular region in a particular season

Exercise

A. Tick (✓) the correct answer :

- At early stage, a baby plant gets its food from its :
(a) roots (b) cotyledons (c) leaves (d) water
- A new pea plant grows from :
(a) seed (b) root (c) leaf (d) stem
- Factors essential for a seed to grow are :
(a) warmth (b) water (c) air (d) All of these
- Which is the most important thing for growing a good crop?
(a) Manure (b) Water (c) Healthy seeds (d) All of these
- Poppy seeds get dispersed by.
(a) water (b) animal (c) wind (d) explosion

B. Fill in the blanks :

- A seed needs proper amount of _____, _____ and _____ to grow.
- A baby bryophyllum plant grows from the _____ of the mother plant.
- We get _____ to breathe from plants.
- The outer covering of a seed is called _____ that protects the baby plant inside the seed.
- The process of cutting and collecting the ripened crops is called _____.

C. Write T for True and F for False :

- Plants are primary producers on the earth.
- Baby plant is contained in a seed.
- All the seeds of a fruit germinate.

- Terrace farming is done on the terrace of building.
- Some fruits scatter their seeds by exploding.



D. Match the following :

Column A

- Rose plant
- Baby plant
- Cotton
- Turnip
- Tea plants

Column B

- wind dispersal
- step farming
- from roots
- seedling
- stem cutting

E. Answer the following briefly :

- What are cotyledons?
- What do you mean by germination?
- What is a seedling?
- What do you mean by agriculture?
- How does dandelion get dispersed?

F. Answer the following in detail :

- Why do all the seeds not get the chance to germinate? What are the essential factors for germination of a seed?
- Write the different ways of seed dispersal?
- Describe different ways in which a new plant grows. Give example for each.
- What are the stages of germination?
- What do you mean by agriculture? Write a described note on agriculture.

Practice Time

G. Your Turn

Objective : To display that water is required for germination in a seed.

Things needed : A plastic bowl, some cotton and bean seeds.

Process : Lay two layers of cotton in the plastic bowl and sprinkle some water on it. Now place a few bean seeds between the layers of cotton. Seeds must get wet. Now place the seeds in a warm place. Do not let the cotton get dried, sprinkle water after some time again. What do you observe throughout your experiment, write in your practical note book.

H. Take some bean seeds and soak them in water. After 24 hours, pour water and tie them in a wet cotton cloth for next 12 or 24 hours. Observe tiny seedlings coming out of the seed. These seedlings are rich in digestible energy, minerals and vitamins. These seedlings can be eaten as breakfast. Ask your mother what these seeds are called?

- I. Go to a nearby village. Talk to a farmer and try to know how does he grow various crops. Categorise the crops according to the method they are grown. Ask the farmer about the methods of watering the plants also.

Have Fun

- ❖ In following words search grid, find six terms used in this chapter :

T	D	I	S	P	E	R	S	A	L	S	G
E	A	A	E	O	U	U	E	H	E	I	E
R	V	N	E	I	N	J	E	A	A	P	R
R	I	D	P	M	A	H	D	P	R	T	M
A	G	K	A	I	L	O	L	T	C	E	I
C	U	I	K	L	V	K	I	E	H	J	N
E	L	S	S	G	E	O	N	R	G	M	A
F	T	H	H	A	R	H	G	S	R	S	T
A	G	R	I	C	U	L	T	U	R	E	I
R	K	R	R	A	A	D	R	T	D	A	O
M	U	E	M	G	K	U	A	R	H	G	N
I	M	T	A	H	D	L	L	S	A	T	O
N	A	Y	G	J	B	H	H	G	T	T	B
G	C	O	T	Y	L	E	D	O	N	S	E