



# Growing Plants

## LEARNING OUTCOMES

Students will be able to:

- define vegetative propagation and germination
- list and describe the various ways by which plants reproduce
- list and describe the different modes of dispersal of seeds
- state the condition required for germination

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[Digital Learning — NEP Guidelines]

Like all living beings, plants produce their own kind. Let us take a look at how young plants are produced and how they grow.

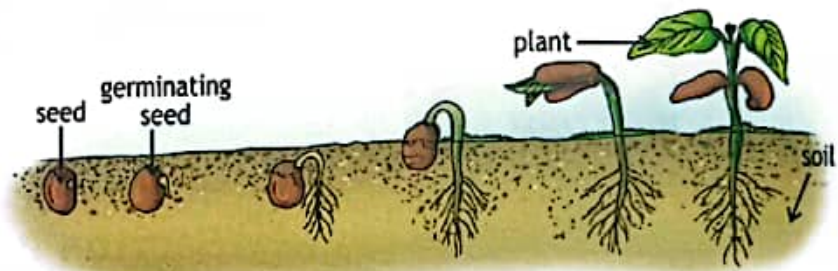
## Reproduction In Plants

Plants produce young plants. This process is called reproduction.

- Most plants reproduce through **seeds**.
- Some plants reproduce through **spores**.
- Some plants reproduce through **parts of their body**.

### A. New Plants From Seeds

We know that seeds are found in fruits. Most plants bear flowers. Flowers wither and change into fruits. Fruits have seeds inside them. Seeds germinate and grow into new plants.



New Plant From Seed

As you know, plants cannot move on their own. So, nature has developed ways to scatter their seeds. The scattering of seeds away from the parent plant is known as **dispersal of seeds**. Seeds are dispersed by agents such as **wind, water, birds, insects** and **animals**. These agents are called **agents of dispersal**.

**1. Wind:** Some seeds are light and have special tufts of hair or wings, that help them to be carried away by the wind from one place to another. For example:

- Cotton, dandelion and madar seeds have tufts of hair around them.
- Hiptage, maple and sycamore seeds have wings attached to them.

a seed with hair all around it



cotton (seed)

a seed with a tuft of hair



madar (seed)

a winged seed



hiptage (seed)

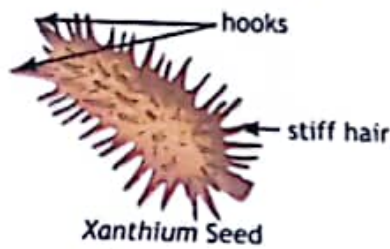
Seeds Dispersed By Wind.



**2. Water:** Water helps in dispersal of seeds of plants living in water or a place near it. The lotus fruit has a spongy part and the coconut fruit has a thick fibrous coat. These special parts enable the lotus and coconut fruits to float on water. So, when a coconut falls from the tree into water, it floats and travels with the water to far off places.

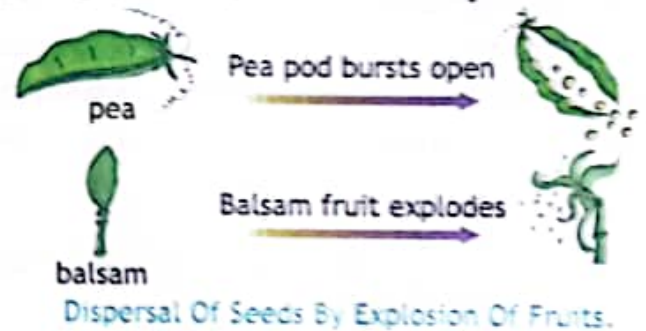
**3. Animals:** Seeds are also dispersed by birds, animals and humans.

- Humans and animals eat juicy and fleshy fruits like **mango, apple and watermelon** and throw away their seeds.
- Seeds of plants like **Xanthium, tiger nail** and **spear grass** have hooks or spines. They stick to the hairy skin of animals or clothes of humans and are carried away.



- Some seeds are eaten by birds and animals. These seeds have a tough seed coat so that they do not get digested. So, when birds and animals swallow them, they come out intact in their waste materials (droppings). Thus, seeds are dispersed to other places.

**4. Explosion of Fruits:** Some fruits burst open or explode when they become dry. The force of explosion helps the seeds to scatter away. The dispersal of pea pod, geranium and balsam seeds takes place by explosion.



Match the following seeds (Column A) with their agents of dispersal (Column B) by choosing the correct option. (Logical Thinking)

Column A	Column B
I. lotus seeds	(i) wind
II. cotton seed	(ii) water
III. Xanthium seed	(iii) through explosion
IV. pea pod	(iv) animal
(a) I-(i), II-(ii), III-(iii), IV-(iv)	(b) I-(iii), II-(iv), III-(iii), IV-(i)
(c) I-(ii), II-(i), III-(iv), IV-(iii)	

## B. New Plants From Spores

Some plants, such as fern and moss, do not have flowers. They do not produce seeds. They produce tiny spores. Each spore grows into a new plant.



Plants That Produce Spores

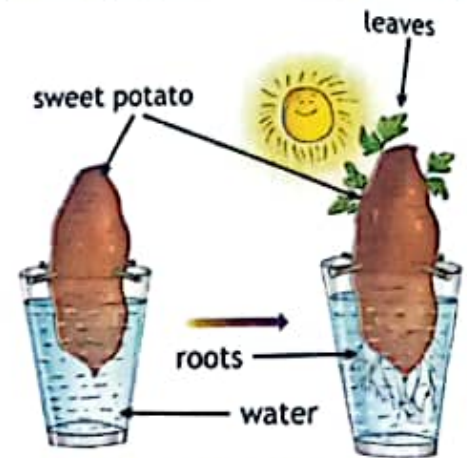


## C. New Plants From Other Parts Of The Plant

Besides seeds, new plants can also be grown from the parts of their body. The method of obtaining new plants from the leaves, stems and roots of the parent plant is called vegetative propagation.

**1. New Plants from Roots:** Take a sweet potato, (which is a part of its parent plant) and insert toothpicks in it on all its four sides. Take a glass filled with water and place the sweet potato on the mouth of the glass in such a way that the lower part of the sweet potato remains immersed in water. Put this glass at a place where it gets fresh air and sunlight.

After a few days, roots come out of the sweet potato. Soon a small plant grows out of it. Here, we see the root of a plant producing a young plant. Roots of plants like dahlia and asparagus also reproduce through their roots.

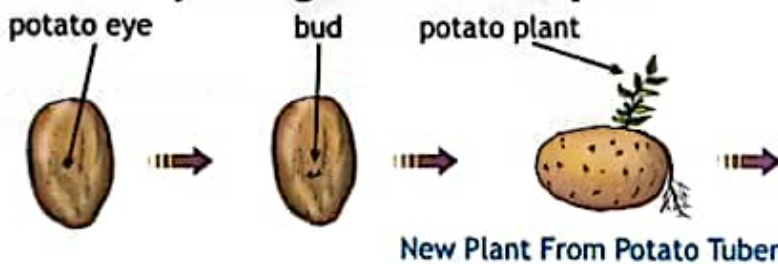


New Plant From Roots

### 2. New Plants from Underground Stems

Potato, ginger and onion are underground stems. Food is stored in these stems.

- Potato and ginger have buds on their surface. Under suitable conditions, each bud grows into a new plant. The buds of a potato are called eyes. Any piece of a potato with an eye can grow into a new plant.



New Plant From Potato Tuber

- New plants of onions grow from bulbs when they are planted in the soil.



New Plants From Underground Stems

### DO YOU KNOW?

The underground stem of ginger is called rhizome.

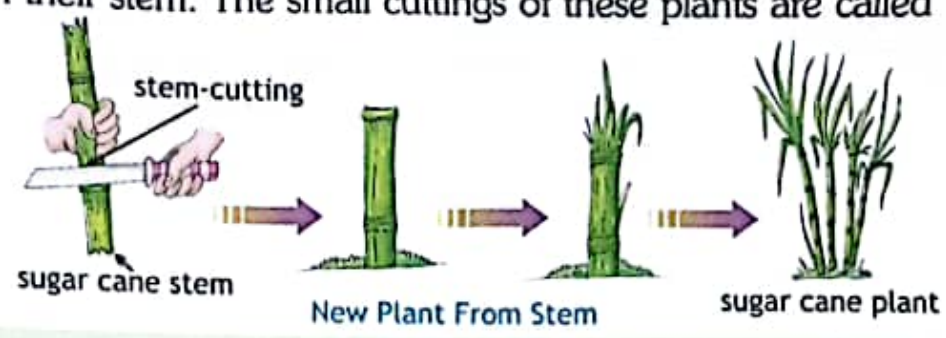
**3. New Plants from Leaves:** The *Bryophyllum* plant has buds on the edges (margins) of its leaves. When these buds fall on moist soil, they produce new plants.



New Plant From Leaf



**4. New Plants from Stems:** Some plants like **rose, hibiscus, bougainvillea, sugar cane** and **cotton** have buds on their stem. The small cuttings of these plants are called **stem cuttings**. When we plant a stem cutting, that has one or two buds, into the soil, after a few days, the stem cutting grows into a new plant.



**Fill in the blanks.**

1. Ferns produce new plants through .....
2. Potato and ginger are ..... stems.

(Remembering)

**Germination Of Seeds**

The growth of a baby plant from a seed is called **germination**. We know that a single plant produces many seeds. But only a few of them germinate.

Let us look at the conditions required for germination.

Activity	Conditions seeds get	Conditions seeds do not get	Observations about germination of seeds
Put some dry bean seeds in bowl 1 and place the bowl in the sun or a place that is warm enough.	air + sunlight (warmth)	water	Seeds will not germinate.
Put some soaked seeds in bowl 2 and keep it inside a refrigerator.	air + water	warmth	Seeds will not germinate.
Put some soaked seeds in bowl 3 and fill it with water. Then cover it with a layer of oil. Place the bowl in the sun.	water + sunlight (warmth)	air	Seeds will not germinate.
Put some soaked seeds in moist soil in bowl 4 and put the bowl in the Sun.	water + air + sunlight (warmth)	—	Seeds will germinate. young plant

**Conclusion :** Water, air and sunlight (warmth) are necessary for germination of a seed.



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## EXERCISES

[According to NEP Guidelines]

(Use Cordova Smart Class Software on the smart board in class to do these exercises.)

### SECTION A

#### Competency Based Discussion: Ways of Reproduction in Plants

##### A Oral Question:

(Remembering)

Name two seeds that are dispersed by animals.

##### B Multiple Choice Questions (MCQs):

(Remembering, Understanding)

Tick (✓) the correct answers:

1. In the *Bryophyllum* plant, buds are present on the

(a) leaves

(b) stem

(c) roots

2. What does a seed need for germination?

(a) air, water

(b) air, sunlight

(c) air, water, warmth

### SECTION B

##### A Very Short Answer Question:

(Remembering)

Define germination.

##### B Short Answer Questions:

(Remembering, Reasoning)

1. What is vegetative propagation?

2. Name two plants each that reproduce through (a) roots (b) underground stems (c) spores

3. Why are all seeds not dispersed by wind? Give two reasons.

##### C Long Answer Questions:

(Remembering, Understanding)

1. What is 'dispersal of seeds'? List the agents of dispersal.

2. How are seeds dispersed by (a) wind, (b) water, (c) animal and (d) explosion?

3. Describe how plants propagate through (a) leaves (c) roots.

##### D Application Based Question:

(Applying)

How does rose plant propagate by stem cutting?



### ENRICHMENT ACTIVITY

Put some gram seeds in two pots. Place one pot in the dark and the other in the sun. Make a progress chart to compare the growth of seeds in both the pots in terms of height and number of leaves, on every consecutive day. Discuss your observation in class. [Experiential Learning]