



Unit 1: Food

Growing Plants for Food

Warm Up

Write the major nutrients contained in these plant foods we eat.



Rice _____



Lentil _____



Oil _____



Wheat _____

You know that living things grow and reproduce. Animals give birth to their young ones in various different ways. A dog gives birth to puppies and a cat gives birth to little kittens. Hens and ducks lay eggs. Small chicks develop inside the eggs and come out of it in a few week’s time by breaking open the eggshells.

Plants are also living things. Like animals, they too grow up and reproduce plants of their own kind.

Plants reproduce in various ways.

- From seeds
- From spores
- From different parts of plants

New Plants from Seeds

Most plants bear flowers. Flowers grow into fruits. Fruits contain seeds inside them. Some fruits have only one seed in them, while some others have a large number of seeds.



Flowers



Fruit



Seeds



Formative Assessment

A. Name any two fruits that have one seed in them.

1. _____ 2. _____

B. Name any two fruits that have many seeds in them.

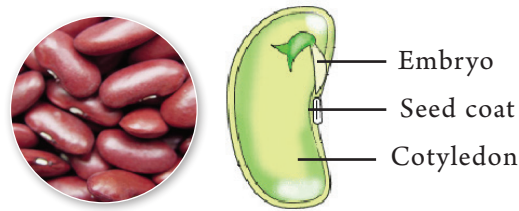
1. _____ 2. _____

What is inside a seed?

A seed has a baby plant safely housed inside it. Let us see how a seed keeps the baby plant safe inside it, till it finds the right conditions to develop into a new plant.

Activity

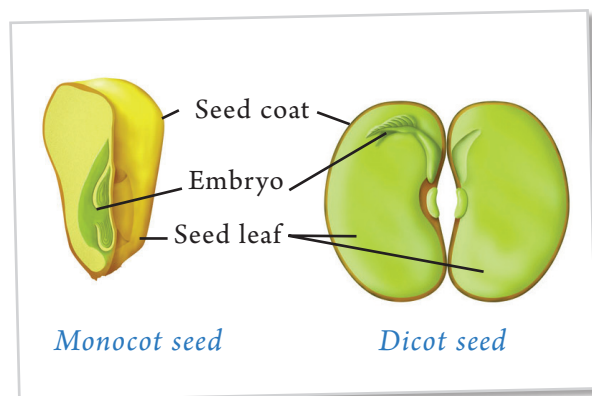
Take a few dry bean seeds. You will notice that the seeds have a hard covering. It is called the **seed coat**. It protects the seed from being damaged. Soak the seeds overnight. Observe the soaked seeds in the morning. You will find that the seed coat has become soft. Remove the seed coat. You will see two thick **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 stored food is used by the baby plant till it grows its first green leaves.

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

The embryo has a **shoot** and a **root**. The shoot later on grows out of the ground into the stem and the roots spread under the ground.



Seed germination

The growth of a plant from a seed is called **germination**. It depends on number of factors like temperature, water, air, light, etc.

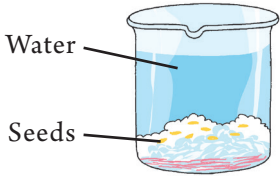
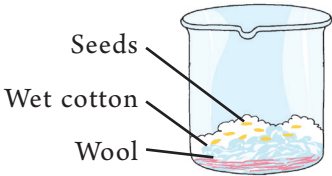
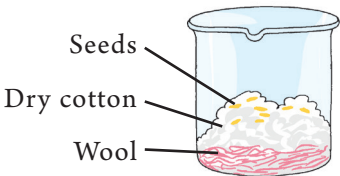
Most plants grow from seeds. But all the seeds do not grow into plants. Only ripe and healthy seeds which get all the favourable conditions grow into new plants.

A seed needs good soil which is rich in nutrients. It needs air, warmth and water. Air is needed by the seed to breathe. Warmth makes the seed active. Water softens the food inside. Water also softens the seed coat so that the baby plant can break open the seed coat and come out.



Activity

Take three open glass containers or beakers. In the first one, keep a few seeds on dry cotton wool. In the second beaker, keep a few seeds over wet cotton wool. Ensure that the cotton wool does not dry up. In the third beaker, keep a few seeds completely submerged inside water.



Observe the seeds for a day or two. In which container did you find the seeds germinate into plants? Why?

Stages of germination



1. *The embryo root pushes through the seed coat and grows downwards into the soil*



2. *The roots start growing and the cotyledons are pulled upwards*



3. *The baby plant called seedling starts coming out of the cotyledons*



4. *The stem grows longer and the first leaves start developing*



5. *The leaves develop completely and the cotyledons fall off*

The process of germination is thus completed.

Formative Assessment

Write True or False.

- 1. A seed tied in a plastic bag will sprout into a new plant. _____
- 2. A seed will grow into a plant if it gets enough air, water and sunlight. _____
- 3. A seed kept in a refrigerator will germinate. _____
- 4. A seed kept in dry soil will germinate. _____



Dispersal of seeds

As you have understood by now, seeds germinate when they get suitable conditions of soil, air, water and temperature. If all the seeds fall on the ground near the parent plant, they will not get enough food, water and sunlight to grow.

So, seeds have to be spread out in a large enough area so that at least some of the seeds will get suitable conditions and grow up into adult plants.

The carrying away of fruits and seeds to distant places from their mother plants is known as **dispersal**. To ensure dispersal, seeds and fruits of many plants have developed special features. Forces of nature like wind, water, and animals also help in dispersal of seeds. They are called **agents of dispersal**.

Dispersion by wind: Seeds which are dispersed by wind are either light or have hair or wings. This help the seeds to be carried away with the winds.



Dandelion seed has hair



Maple seed has wings

Dispersion by water: Coconut trees are generally found near sea coasts.

The coconut fruits have a hard but light and waterproof covering which enable them to float on water. The waves carry the fruits and deposit them on the shores of far off lands.



Coconut float in water

Dispersion by animals: Some seeds have hooks or spikes which stick to the body of animals and get carried away. The fruits of cocklebur have hooked tips that stick to animal fur and get deposited at a distance.

Many fruits are tasty to eat. Human beings and animals eat the fleshy parts of these fruits and throw away the seeds on the ground. Many birds and animals eat the fruits along with the seeds. The seeds pass out undigested through their waste or droppings and reach the ground.



A bird eating a fruit



Cocklebur fruit with hooks

Self dispersion: Some fruits like the pea disperse by exploding. The pods containing the seeds burst open when they are dry and the seeds scatter around.



Pea pod

New Plants from Other Parts of Plants

Most plants grow from seeds. But some plants grow from other parts of plants.

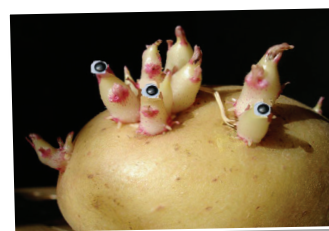
From stems

Plants like rose, hibiscus and sugar cane are grown 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. Other plants which grow out of their stems are *Colocasia* and *Gladiolus*.



Rose stem cuttings



Potato with eyes

From roots

Plants like sweet potato and dahlia develop from buds present in their roots.

From leaves

Leaves of *Bryophyllum* (sprout leaf plant) give rise to new plants from buds present in their margins.



Roots of sweet potato



Bryophyllum leaves with buds

New Plants from Spores

Some plants like ferns, mosses and mushrooms do not bear flowers. So, they do not produce seeds. 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



Formative Assessment

Give one example of each of the following.

1. Plant whose seeds are dispersed through animals.

2. Plant which grows from stem cuttings.

3. Plant which produces spores.

Crops

Crop is a cultivated plant which is harvested to bear products for human consumption. Different plants need different conditions for their growth. The type of soil, minerals, moisture, climate and temperature required by different plants to grow is also different. Some need plenty of water while some can grow in dry conditions. Some plants need lots of sunshine while some others need plenty of shade to grow.

Farmers know about the different conditions in which different plants grow well. Accordingly, they choose the seasons and soils to grow different crops.

Summer and winter crops

Crops like wheat, lentils, mustard and gram are sown in winter season and harvested in spring season. This crops are called **rabi crops** or **winter crops**. They are grown from November to April.

In summer (and rainy season), farmers grow crops like rice, maize, *jowar* and *bajra*. Such crops grown in summer or rainy season are called **kharif crops** or **summer crops**. They are grown from June to October.

Crops in dry and wet conditions

Tea plants grow in moist conditions. Therefore, huge plantations of tea are seen in hilly areas where it rains a lot. Plants like dates grow in very dry conditions.



Wheat



Mustard

Rabi crops



Bajra



Rice

Kharif crops



Tea garden



Date palm tree

Types of soil for different crops

Different plants need different types of soil. Rice needs clayey soil whereas wheat grows well in sandy and irrigated soil. Sorghum (*jowar*) and pearl millet (*bajra*) grow in sandy soil. Coconut grows in sandy soil near the coasts. Cotton needs black soil.



Wheat in sandy, irrigated soil



Jowar in sandy soil



Coconut in sandy soil along the coast



Rice in clayey soil



Cotton in black soil

Growing vegetables

Vegetables need a lot of constant care. They have to be watered regularly. Many vegetables grow throughout the year. But vegetables like cauliflower, carrot, green pea and radish grow well in winter. On the other hand, vegetables like gourd, brinjal and lady's finger are mostly grown in summer.



Agriculture

The practice of farming or cultivating crops is called **agriculture**. To get a good crop, the farmer has to follow a number of steps like ploughing, sowing, watering, harvesting and storing the crops.

Ploughing

Ploughing is the digging up of soil to prepare it for growing crops. Ploughing loosens the soil. It breaks the hard soil and uproots weeds growing in it. Ploughing is done with the help of a **plough** which is drawn either by animals or by tractors.



Ploughing

Weeding

Then the weeds are removed with the help of a rake. A **rake** is a tool with a long handle and a row of long teeth at one end. The soil is broken down into lumps and smoothened with the help of a **harrow**.



Rake



Harrow



Sowing

Once the soil is ready, different crops are grown. Healthy and ripe seeds of the best variety are selected and sown. There are many scientifically developed seeds which give more crops or grow faster.



Sowing

Watering

Crops grow well if they get the right amount of water at the right time. Watering can be done by several ways.

In some fields, water is simply released into the field. It is known as **field irrigation**. In some others, crops are grown in rows and narrow channels or furrows are made between the rows. Water is released into these rows. It is known as **furrow irrigation**.

In some fields, water is lifted by a pump, led to the plants through pipes with sprinklers and sprayed on the crops. This method is called **sprinkler irrigation**.

In some fields, the pipes have holes through which water drips in the soil. This method is called **drip irrigation**. These methods of irrigation help to irrigate land with less amount of water and there is no wastage of water in these methods.



Field irrigation



Furrow irrigation



Sprinkler irrigation



Drip irrigation

Fertilising

The soil is made more fertile by adding manure or fertiliser into it. Manure is obtained from animal and plant wastes. Sometimes chemical fertilisers like **urea** are used along with natural fertilisers.

Crop protection

Protecting the growing crops against diseases and harmful insects is done by spraying insecticides and pesticides.



A farmer spraying pesticide



Fencing keeps animals away from the crops



A scarecrow in the field

Growing crops are protected from grazing animals by building walls and fences. Scarecrows are placed at different places to scare away birds.

Storing

It is very important to store the harvested crop properly. The grains are dried and then stored.

Moulds grow easily in cold and damp places. So grains are always stored in dry and well-ventilated rooms. Pesticides are sprayed in and around the place before storing, to prevent insects and rats from eating the grains.



Grains stored in a godown

Do You Know?



Many farmers are unaware of the risks they face while handling pesticides. They do not use protective gear like gloves, goggles, masks, shoes and clothing to cover their body. Sometimes, they even blow on the nozzle of the sprayer with their mouth when it is blocked. Pesticides are poisonous and can harm when they find their way into our body.

Green Tips



Extreme weather condition affects the growth of plants. Make sure your plants are not exposed to harsh weather condition. Protect them from too much sunlight and make sure they get adequate water.

Points to Remember

- Our life depends on plants.
- The growth of a plant from a seed is called germination.
- Plants grow from seeds, different parts of a plant or spores.
- A seed needs air, warmth and water to germinate.
- Different plants need different type of soil, minerals, moisture, climate and temperature to grow.
- There are two types of crops — rabi crops and kharif crops.
- Practice of growing crops is called agriculture.

New Words

Monocot: a seed with single seed leaf

Dicot: a seed with two seed leaves

Seedling: a young plant grown from a seed

Germination: sprouting of a plant from a seed



Dispersal of seeds: spreading of seeds
Rabi crops: crops grown in winter season
Kharif crops: crops grown in summer or rainy season
Agriculture: the practice of farming for food
Irrigation: the act of supplying water to land or crops



Formative and Summative Assessments

A. Fill in the blanks with the correct option.

- 1. Seeds which have two seed leaves are called _____ seeds. **monocot / dicot**
- 2. New plants grow from _____ leaves. **Gladiolus / Bryophyllum**
- 3. Crops grown in winter season are called _____ crops. **rabi / kharif**
- 4. Practice of growing crops is called _____. **agriculture / germination**
- 5. Watering the fields through holes in pipes is called _____ irrigation. **sprinkler / drip**

B. Tick (✓) the correct option.

- | | | | |
|--|--------------------------|-----------------|--------------------------|
| 1. During germination, the first part that emerges | | | |
| a. grows downward | <input type="checkbox"/> | b. grows upward | <input type="checkbox"/> |
| | | c. falls off. | <input type="checkbox"/> |
| 2. Coconuts are dispersed through | | | |
| a. insects | <input type="checkbox"/> | b. wind | <input type="checkbox"/> |
| | | c. water. | <input type="checkbox"/> |
| 3. Which one of the following is a seed? | | | |
| a. Coconut | <input type="checkbox"/> | b. Potato | <input type="checkbox"/> |
| | | c. Mushroom | <input type="checkbox"/> |
| 4. Grains are stored in a dry place to protect them from | | | |
| a. rats | <input type="checkbox"/> | b. snakes | <input type="checkbox"/> |
| | | c. moulds. | <input type="checkbox"/> |
| 5. Pipes used in drip irrigation have | | | |
| a. holes | <input type="checkbox"/> | b. sprinklers | <input type="checkbox"/> |
| | | c. funnels. | <input type="checkbox"/> |

C. Match the following.

- | | |
|---------------------|------------------------------------|
| 1. cotyledons | a. self dispersion |
| 2. kharif crop | b. found in ferns |
| 3. underground stem | c. seed leaves |
| 4. pea pod | d. grows in summer or rainy season |
| 5. spores | e. wind dispersal |
| 6. dandelion | f. water dispersal |
| 7. coconut | g. ginger |