

NATURE WORLD

Environmental Studies

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Class
5



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Preface

"Earth provides enough to satisfy every man's needs, but not every man's greed." To teach about these environmental situations, EVS has become an integral part of education and curriculum. On the whole, **Nature World** series, serves the purpose of all types of NCERT syllabus taught in various Public or Convent schools.

Nature World is a series of 5 books for classes 1 to 5th, designed to enrich the school students from primary level with brainy skills in a systematic manner.

The salient features of the series are :

- Simple language is used to understand easily.
- Enriched with colourful illustrations that give the feel of learning environment in the classroom.
- 'Teacher's Tip' will help teacher to make understand the students each topic in detail.
- 'Wrap up' is the collection of short lines of important topics that makes the learning easy.
- Time to work, Creative Activity, Life Skills, etc. are the exercises that will help the teacher to know the caliber of each and every student.

Though all efforts have been done in designing and developing an authentic book, but your valuable suggestions are always welcomed to improve this book further in the interest of the students.



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Reproduction in Plants

Living things make young ones like themselves. Most mammals give birth to babies, birds and reptiles lay eggs. Plants are also living things. They also reproduce like other living things. In this chapter we are going to have a look at how plants produce their own kinds.

REPRODUCTION

Reproduction is the process by which plants make young ones like themselves. There are two ways in which a plant can reproduce:

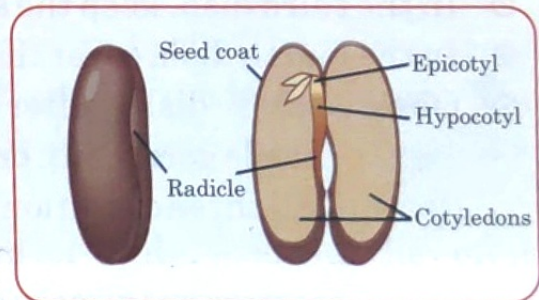
1. Reproduction through seeds
2. Reproduction through different body parts

REPRODUCTION THROUGH SEEDS

The flower is the reproductive organ of a plant. Many plants form seeds inside their flowers.

Structure of a seed

The outer covering of a seed is called the **seed coat**. The seed coat helps to protect the embryo from injury and also from drying out. The seed coat can be thin and soft as in beans or thick and hard as in coconut. Endosperm, a temporary food supply, is packed around the embryo in the form of special leaves called **cotyledons** or **seed leaves**. These generally are the first parts visible when a seed germinates. The seed leaves (cotyledons) store food for the baby plant.



Structure of a seed

Plants are classified in two groups based upon the number of seed leaves (cotyledons).

Monocot: A plant that has only one cotyledon. Examples : wheat, rice, maize, grass and corn.

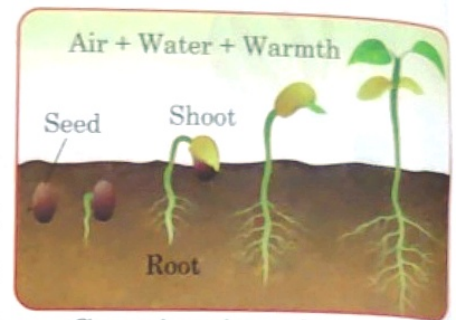
Dicot: A plant that has two cotyledons. Examples : bean, rajma and pea.



Germination of seeds

Germination happens when a baby plant is growing. The baby plant is in between the cotyledons.

A seed needs the right amount of water, air and warmth to germinate. The conditions needed for germination may not be suitable at all times. So seeds wait for some time before they germinate. This waiting period is called **dormancy**.



Germination of a seed

Conditions necessary for germination

After germination, seedlings need air, water, sunlight, nutrients to develop into a new plant.

Let us see what happens if one of them is missing.

Activity

You need: Some seeds of bengal gram or pea, four similar dishes, cotton and water.

Method

- ⊙ Put about 10 seeds in each dish.
- ⊙ In the first dish, cover the seeds with moist cotton and keep it at room temperature.
- ⊙ Keep the second dish without water at room temperature.
- ⊙ In the third dish, keep the seeds covered with water at room temperature.
- ⊙ In the fourth dish, cover the seeds with moist cotton in an ice box.
- ⊙ Observe these dishes after 4-5 days.

Result: Seeds germinate only in the first dish.

Reason: All three conditions were met only in the first dish.

When a seed starts to grow, we say it germinates. The cotyledons store food for the baby plant inside the seed. When the seed starts to germinate, the first thing to come out is the main root. The skin starts to split and the tiny shoot straightens, carrying the cotyledon with it. The main root gets bigger. The side roots appear and so do the leaves.

SCATTERING OF SEEDS

People plant some seeds, but most plants do not rely on people. Plants rely on animals, wind and water to scatter their seeds.



If the seeds simply fell and grew beneath the parent plants, they would be too overcrowded and would be starved of nutrients. So it is important that the seeds must be scattered over a wide area where they find the conditions to grow.

Scattering by birds and animals

Animals disperse seeds in several ways.



Scattering by birds

- Some plants have juicy fruit that animals like to eat. The animals eat the fruit but only the juicy part is digested. The stones and pips pass through the animal's digestive system and are excreted to form new plants. This can be far away from the parent plant. Blackberry, cherry and apple seeds are scattered in this way.
- Birds also like to eat fruit and they help to disperse seeds to other areas through their droppings.
- Mistletoe has sticky fruits which are attractive to birds. The sticky seeds stick to the bird's beak. They then run their beaks on the bark of trees. The sticky seeds are left on the bark to grow into new mistletoe plants. Mistletoe is a parasitic plant.
- Squirrels collect nuts like corns and bury them for winter food, but they often forget where they have buried them and these grow into new trees.

Scattering by wind

The seeds which are dispersed by wind are smaller that have structures like wings or hair or feathers.

These seeds are very light. The seeds of orchid are almost as fine as dust.

Any hairy growth on seeds acts like little parachutes and carry the seeds far away from the parent plant. The seeds of dandelion are carried by the wind.

The seeds of the thistle are also carried away by the wind. Both the dandelion

and the thistle have hairy growths at the top of the seed to carry the seeds far away from the parent plant.



Cotton seeds



Thistle seeds



Dandelions

Seeds are scattered by wind

Scattering by water

Many aquatic plants and plants that live near water have seeds that can float and are carried by water. Plants living along streams and rivers have seeds that float down stream, and therefore germinate at new sites. The size of the seed is not a factor in determining whether it can float. Some very large seeds like coconuts can float. Some small seeds also float.

Scattering by explosions

Some plants have pods that explode when ripe and shoot out the seeds. Lupines, gorse and broom scatter their seeds in this way.

Pea and bean plants also keep their seeds in a pod. When the seeds are ripe and the pod has dried, the pod bursts open and seeds are scattered.



Milkweed seeds

Some plants dry and burst

Scattering by fire

Plants cannot run away from a fire so some plants have developed a way to help their seeds survive. There are some species of pine trees that require the heat from a fire before their cones will open and release seeds. Banskias, eucalyptus and other Australian plants also rely on fire.

REPRODUCTION BY DIFFERENT PARTS OF PLANTS

Many plants are not produced by seeds. Instead, a new plant grows from a vegetative part, usually a stem, root or leaf. This is called **vegetative reproduction** or **asexual reproduction**. The resulting plants are clones, that is they are exactly the same as the parent plant.

Reproduction through stems: Many plants develop roots through their stems

and then grow into adult plants. In rose, duranta, sugarcane, the stem cuttings from the plant are put into moist soil. They develop adventitious roots and buds at the base which develop into new plants. In tamarind root cuttings are used for vegetative propagation.



Rose plant is grown by stem

Reproduction through roots: In some plants many roots develop when they are kept in water. These roots develop shoots and become new plants. Examples: Money plant, dahlia.



Bryophyllum plant grown by leaves

Reproduction through leaves: The bryophyllum plant also known as air plant or 'mother of thousands' can grow many new plants from its leaves.



Money plant grown by roots

New plants from spores

Non-flowering plants are some of the oldest plants on earth.

Some famous non-flowering plants are ferns and horsetails. You can often see horsetails growing as weeds in gardens and fields.

Do you know how non-flowering plants reproduce?

Non-flowering plants do not have flowers. They have to reproduce in other ways.

Non-flowering plants grow from spores and not seeds.

Have a look at the underside of a fern leaf.

Ferns have leaves with breathing pores on the underside. They also have little light coloured pods on the undersurface of the leaves. These pods are called **sori**. The sori protect the cell cases from the weather.



Pods on fern leaf

Inside the cases the protoplasm divides into many tiny cells and each cell becomes a spore. As the weather becomes warm the case dries and ripens.

The spores spurt from the case and are carried away in the air to form new plants.

STORY OF TEA

This story began in ancient China over 5,000 years ago. According to legend, the Shen Nong, an early emperor was a skilled ruler, creative scientist, and patron of the arts. His far-sighted edicts required, among other things, that all drinking water should be boiled as a hygienic precaution.

One summer day while visiting a distant region of his realm, he and the court stopped to rest. In accordance with his ruling, the servants began to boil water for the court to drink. Dried leaves from the near by bush fell into the boiling water, and a brown liquid was infused into the water. As a scientist, the Emperor was interested in the new liquid, he drank some, and found it very refreshing. Therefore, according to legend, tea was created.



The History of Tea Drinking In India



Tea stall on a railway station in India

Tea drinking has evolved in different ways over the years in India and differs from region to region. First thought of as the drink of the Royals, tea has now become the favourite of the common man as India leads the world in tea drinking.

From the humble roadside tea stalls and the railway platforms to the boardrooms of corporate India, tea is easily available. The cup of sweet and refreshing chai available in teashops or train stations to the masala teas

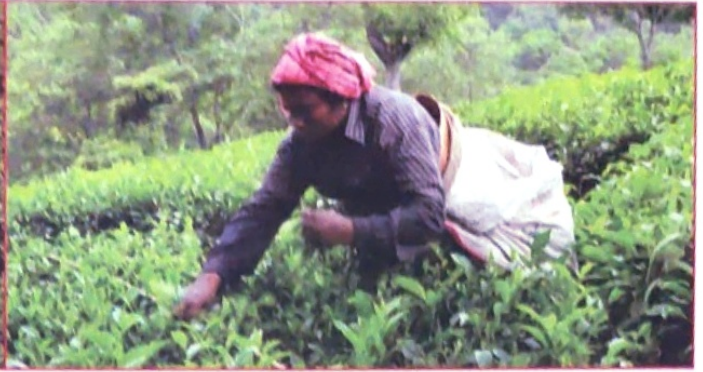
of North India, the variety of brews available is numerous. As per the history of tea drinking in India, local people used to brew and drink tea using the leaves of the wild native tea plants.

Since that time different varieties of tea have emerged; the most famous among them is the Darjeeling tea. The commercial production of tea in India was started by the British East India Company and vast tracts of land have been exclusively developed into tea estates which produce various types of tea.

The first Tea Garden was established by the British East India Company by the end of the 19th century after the Company took over tea cultivation in Assam, a region in the North Eastern part of India.



Tea cultivation in India



Woman plucking tea leaves



WRAP UP

- Reproduction is the process by which plants make young ones like themselves.
- The flower is the reproductive organ of a plant.
- A seed needs the right amount of water, air and warmth to germinate.
- Many plants are not produced by seeds, instead a new plant grows from a vegetative reproduction.
- Non-flowering plants grow from spores and not seeds.



Time to Work

A. Tick (✓) the correct answer.

1. _____ is the reproductive part of a flower.

Flower

Leaf

Stem

None of them

2. _____ plant has only one cotyledon.

Dicot

Monocot

Annual

None of them



3. In _____ plants reproduction occur through stem.

banana

money plant

brinjal

tomato

4. In _____ stem cuttings are used for vegetative reproduction.

rose

potato

tomato

spinach

5. In India first tea garden was established in _____.

Jaipur

Delhi

Assam

Mumbai

B. Define the following.

1. Germination
2. Dispersal of seeds
3. Vegetative reproduction
4. Dormancy
5. Reproduction

C. Give two examples of each.

1. Plants that reproduced by seeds _____
2. Plants that have one cotyledon _____
3. Seeds dispersed by explosion _____
4. Plants reproduced by stems _____
5. Plants reproduced by spores _____
6. Plants reproduced by roots _____

D. Answer the following questions.

1. What are the different ways in which plants can reproduce?

2. What are the conditions necessary for germination?

3. How do animals help in seed dispersal?

4. How does seed disperse by (a) wind (b) water?

5. What is vegetative reproduction?



HOTS

Why do most plants produce a large number of seeds?



Creative activities

These lilies are made from a child's handprint (on paper) stapled to a straw. You can also make lilies.

Materials

- Construction paper
- Pencil
- Scissors
- Green pipe cleaners (or straws)
- Tape or glue
- Stapler

Method:

1. Trace a child's hand on the construction paper. Cut the tracing out.
2. Curl each of the fingers around a pencil.
3. Using the palm of the handprint, form a cone (with the fingers curling outwards). Glue or tape the cone together.
4. Staple the flower to a pipe cleaner or a drinking straw.
5. Draw some leaves on green construction paper, then cut them out.
6. Staple or tape the leaves to the straw.



Life Skills

Decorate your house with seedless plants.

With the tops of a few vegetables like carrot, turnip, onion and potato you can make your own indoor garden.

1. Put the tops in a deep dish, leaving some space between them.
2. Pour water into the dish till the vegetables are about half centimetre in water.
3. Add some water every 2-3 days to keep the water level.

After a week or two you will observe little seedlings coming out of the vegetable tops. Plant them in pots and decorate your house.

Let us meet

M S Swaminathan is an Indian agriculture scientist. He is known as the 'Father of the Green Revolution in India'. He successfully introduced and further developed high-yielding varieties of wheat. He was honoured with the first World Food Prize by the United Nations in 1987.

