As per NEP 2020 and NCF 2023

STEM

Science Connect

Explore the World of Science

For ICSE **Schools**

1

By
Editorial Team
Inventant Education

Features of the Series

As per NEP 2020

- Experiential Learning
- 21st Century Skills
- Picture Based Analysis
- Art-Integration
- Critical Thinking
- Exploration
- Life Skills

As per NCF 2023

- Testimony
- Inference
- Analogy
- Presumption
- Perception
- Non-perception
- Intellectual Development
- Mental Development
- Physical Development
- Development of Life Energy
- Spiritual Development

Online Features

- Animations/Video Lectures
- Interactive Exercises
- E-Book (For Teachers only)

Inventant Education
Present Meets Future

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(A Unit of EDULABZ International)

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Preface

The **SCIENCE CONNECT** series consist of five meticulously crafted books for classes 1 to 5. These books are in accordance with the latest syllabus prescribed by the **Council for the Indian School Certificate Examination**, New Delhi for **Indian Certificate of Secondary Education (ICSE)**. These have been developed in accordance with the guidelines given by **National Education Policy (NEP) 2020** and **National Curriculum Framework (NCF) 2023**.

Throughout this series, students will embark on an exciting journey to uncover the fascinating secrets of nature and the universe. These books provide a variety of engaging activities that encourage active participation and **experiential learning**. These books foster **curiosity**, **observation**, and **critical thinking** in young learners.

Distinctive features of book:

- present the age-appropriate content in a **clear**, **concise** and **logical** manner.
- written in simple, easy to understand language.
- introduces each chapter with an engaging and interactive **Warm-up section** to recall the previous knowledge related to the chapter.
- contains vibrant **colourful illustrations** and **pictures** to captivate students' interest, enhance concept clarity and learning experience.
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- complements the **Teacher's Resource Book** comprising **overview of the lessons**, **lesson plan** to achieve the learning objectives and **answer key** for the textbook questions
- offers **Online Resources** that includes animated videos/video lectures and interactive exercises.

We are sure that **SCIENCE CONNECT** series will make learning science exciting, effective and proactive for the students. We are looking forward to your valuable suggestions.

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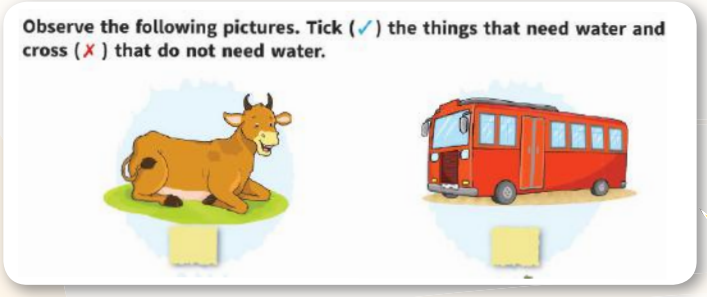
Features of this Series...

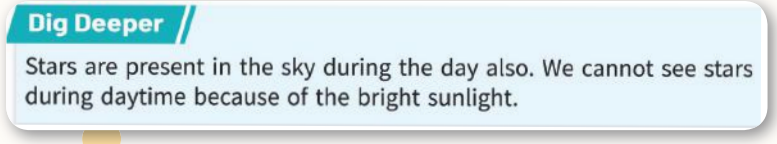
Content Section

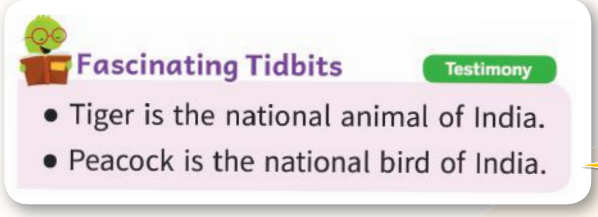
Snapshot
In this section, glimpse of covered topics and concepts in the chapter is provided.



Warm-up
It offers a warm-up exercise for the students in the form of a comic strip, interaction, questions, or an activity to introduce the chapter and connect it with their prior knowledge related to the topic.

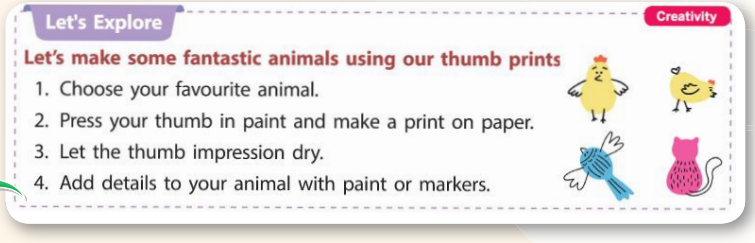
Dig Deeper
This feature gives extra useful information in the form of extended learning.

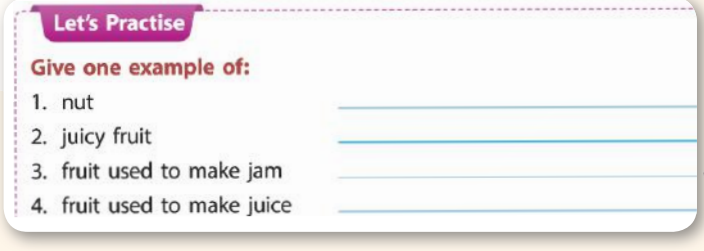




Fascinating Tidbits
This section shares fascinating scientific facts closely related to the chapter.

Let's Explore
Hands-on experiments and activities are provided in this section that aim to foster understanding through learning by doing and experimentation.





Let's Practise
Recall-based exercises in the form of Fill in the blanks, True/False, Right/Wrong statements etc., are given in this section.

Important Terms

The meaning of important terms is given in this section for a quick reference.

Important Terms

Insects : small animals having six legs
Wings : body part that help animals to fly

Let's Summarise

- The sun gives us heat and light and is seen during the day.
- The sun is a star.
- The moon is seen in the night sky. It changes its shape every night.
- Stars are very hot and bright.

Let's Summarise

This feature provides a point-wise summary of the chapter for a quick recap and knowledge retention.

Assessment Section

Oral Questions (Communication)

The students will articulate their thoughts and ideas verbally. This section is designed to strengthen their communication skills and to encourage effective expression.

Answer the following questions orally. **Communication**

1. Name two plants that bear thorns.
2. What two conditions are needed for seed germination?
3. In which fruit, seeds are not present at all?

Critical Thinking

This section require students to engage in brainstorming, think beyond the confines of textbooks and apply concepts they have learned so far.

Think and answer. **Critical Thinking**

1. What will happen if you do not take rest properly?
2. Why is it important to brush the teeth daily?

Creativity

These questions nurture a mindset that values and promotes innovative thinking across various domains.

Creativity

Make a house using an empty shoebox. You can paint doors and windows on it. You can also paint some grass on a chart paper and keep your house on it.

2. Find out your friends' birthdays and write the seasons in which they fall. **Collaboration**

Name of Friend	Date of Birth	Season
1.		
2.		
3.		

Collaboration

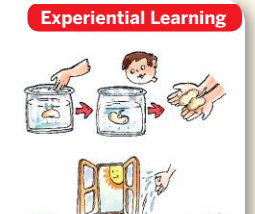
By using these questions, the students learn to work effectively with others and contribute positively to group dynamics.

Experiential Learning

These questions focuses on hands-on, real-life experiences to enhance understanding and knowledge acquisition.

Let us grow small plants. **Experiential Learning**

Soak some bean or pea seeds in water. Next morning take cotton wool in a dish. Place a few bean or pea seeds on it. Sprinkle water on the cotton wool. Keep it wet. Place the dish near a window for two days. You will see a small plant growing out of each seed.



Name the plants to which these leaves belong. **Picture Based Analysis**

Picture Based Analysis (Perception)

Such questions prompt the students to analyse, interpret and draw conclusions from visual information to promote critical thinking.

Art Integration

The students use their creative ideas of making something related to art, craft and poster-making. This section connects science with art and culture.

Draw a crescent moon on a silver paper. Cut it out with scissors. Draw and cut out stars from the same paper. Tie strings of different lengths to the moon and stars. Tie them to a hanger and hang it in your room. **Art Integration**

Life Skills

Tick (✓) the habits you should follow to keep yourself healthy.

1. Use a handkerchief while sneezing. ☐
2. Bite your nails. ☐
3. Do not wash hands regularly. ☐
4. Eat clean and fresh food. ☐
5. Take a bath daily. ☐

Life Skills

This section promotes betterment of life along with environmental awareness and sensitivity relevant to the specific chapter's content. Activities based on Sustainable Development Goals (SDGs) have also been integrated.

Model Test Papers

Two model test papers based on the concepts learned in chapters are given for comprehensive revision.

Model Test Paper-2

(Based on Chapters 8 to 13)

A. Tick (✓) the correct option.

1. Where do you eat your meals?
   (a) Bathroom ☐ (b) Dining room ☐ (c) Bedroom ☐
2. We do not use water for
   (a) cleaning ☐ (b) reading ☐ (c) washing ☐
3. You can find air filled in a
   (a) paper ☐ (b) football ☐ (c) tree ☐

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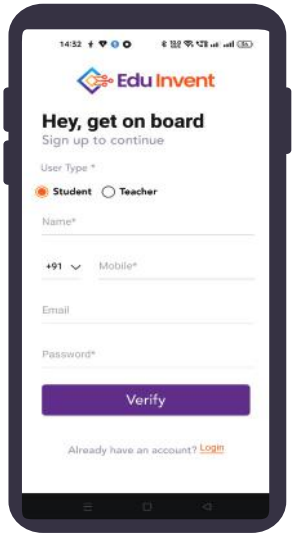
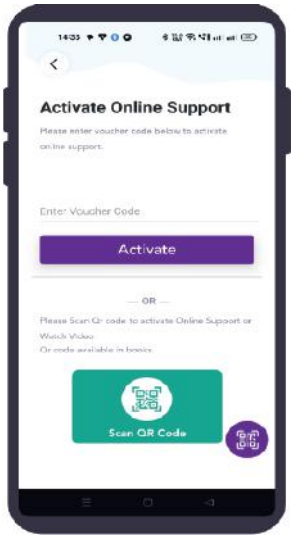
1. For Mobile App Users Edu Invent





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- Go to Google Play Store or Apple App Store.
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- Once installed, tap 'Open' to launch the app.

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- Click 'New User, Register here.'
- Select 'Teacher/Student' in 'User Type.'
- Enter your name, email, mobile number and password.
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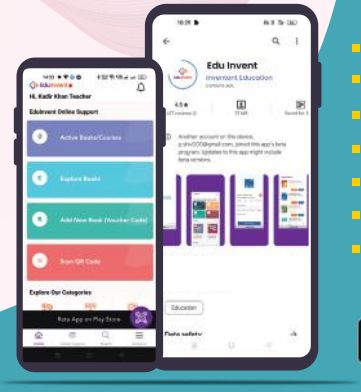

Key Features

- Scan and Learn
- Video Lessons/Animated Lessons
- Online Quiz
- Live Classes
- Webinars
- Study Materials and More
- Interactive exercises

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For any assistance, please reach us at info@inventanteducation.com
website www.inventanteducation.com

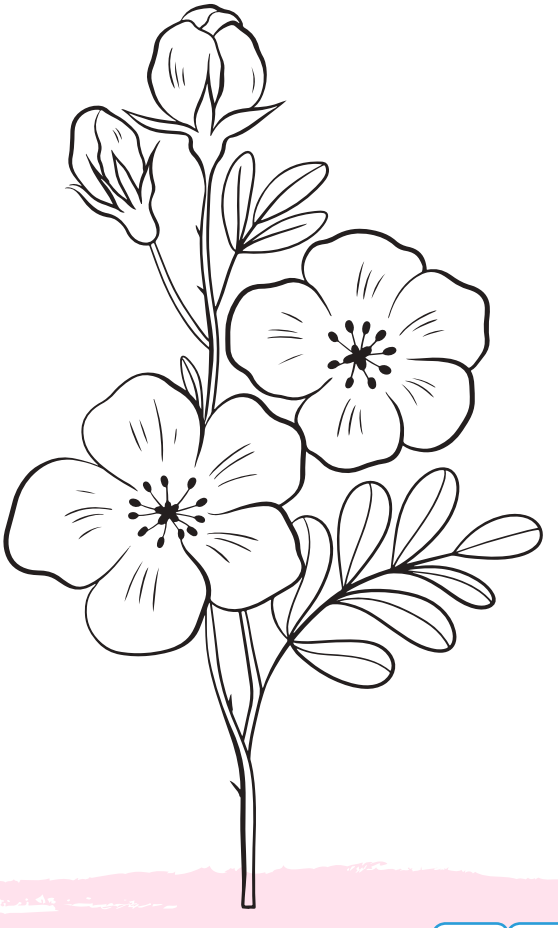
CONTENTS

1 Plants Around Us

Snapshot

- Types of plants
- Different plants in different places

Colour the given picture using the colour code given below.



FLOWER	
LEAF	
STEM	

This picture represents a P _ A _ T

We see plants all around us. Plants are of different shapes and sizes.

Types of plants

There are different types of plants. Some plants are big and some are small. Also, some plants are strong and some are weak.

Big Plants

Some plants are big and strong. They are called **trees**. Trees have many **branches**, **leaves** and **fruits.** Trees have thick, hard and woody stem called **trunk**.

In some trees, trunk is very thick, e.g., Banyan. In some trees, trunk is thin, e.g., Pine.

Let's Practise

1. Name two big trees.

   _____ _____

2. Name two thin and straight trees.

   _____ _____

Fascinating Tidbits

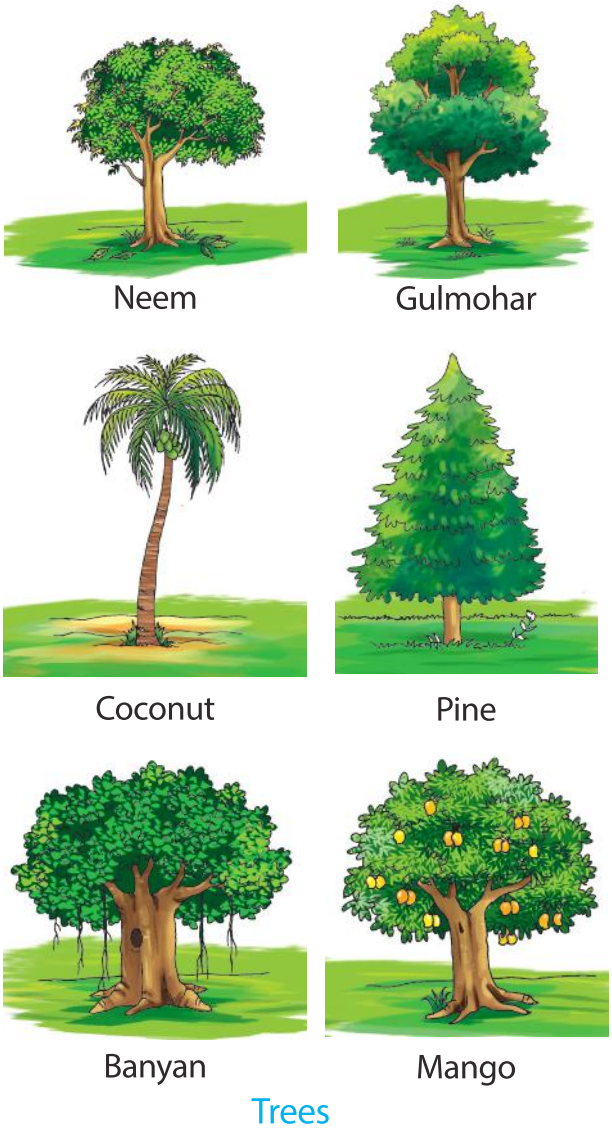
Testimony

The Banyan tree is the national tree of India.

Small Plants

Some plants are smaller than trees. They are called **shrubs**. Shrubs are bushy with many branches. They have strong and woody stem. Rose, *Hibiscus*, *tulsi* and jasmine are shrubs.

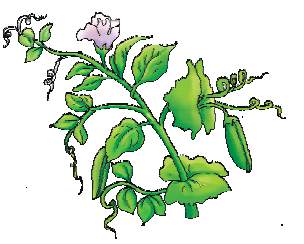
Some plants have soft, green stems and are weak. They are called **herbs**. Coriander, spinach, mint, grasses, etc., are herbs.



Some plants have weak stems. They need a support to grow upright. Such plants are called **climbers**. Grapevine, money plant and pea plant are climbers.

Some plants with weak stems grow along the ground. They are called **creepers**.

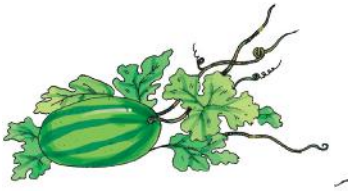
Watermelon and pumpkin are creepers.



Pea plant

Money plant

Climbers



Watermelon

Pumpkin

Creepers

Let's Practise

Write the name of a

1. creeper _____
2. shrub _____
3. climber _____
4. herb _____

Different plants in different places

Plants that grow on land are different from plants that grow in water. Similarly, plants in hilly areas are different from the plants found in desert area. Cactus is found in desert, lotus is found in water and pine is found in mountains.

Desert plant

Plants in hilly area

Water plant

Important Terms

Trees : big, tall and strong plants
Trunk : thick, hard and woody part of a tree
Shrubs : small but strong plants with woody stem
Herbs : small plants with soft and green stem
Climbers : plants that need a support to remain erect and to climb
Creepers : plants that grow along the ground

Let's Summarise

- There are different types of plants – big and small.
- Big, tall and strong plants are called trees.
- Small but strong plants with woody stem are called shrubs.
- Small plants with soft stems are called herbs.
- Creepers and climbers have weak stems.
- Different types of plants are found in different places.

EXERCISES

A. Answer the following questions orally.

Communication

1. What are the hard and woody stems of trees called?
2. How does the stem of mint plant differ from that of jasmine plant?

B. Tick (✔) the correct option.

1. The plants which grow big and tall are called

   (a) herbs ☐ (b) shrubs ☐ (c) trees ☐

2. A thin and straight tree is

   (a) coconut ☐ (b) mango ☐ (c) *neem* ☐

3. Bushy plants are called

   (a) herbs ☐ (b) shrubs ☐ (c) trees ☐

4. Plants which grow along the ground are

   (a) climbers ☐ (b) creepers ☐ (c) shrubs ☐

C. Fill in the blanks by choosing correct words from the brackets.

1. A pea plant is a _____. (climber / tree)
2. *Neem* is a useful _____. (tree / creeper)
3. _____ are weak plants with soft, green stems. (Shrubs / Herbs)
4. Big and strong plants are called _____. (herbs / trees)
5. _____ is a shrub. (Rose / Grass)

D. Collect the leaves of some plants and using the water colours, make the leaf prints in the given space. Write the name of each plant from which you brought the leaf.

Creativity

Name of plant

_____

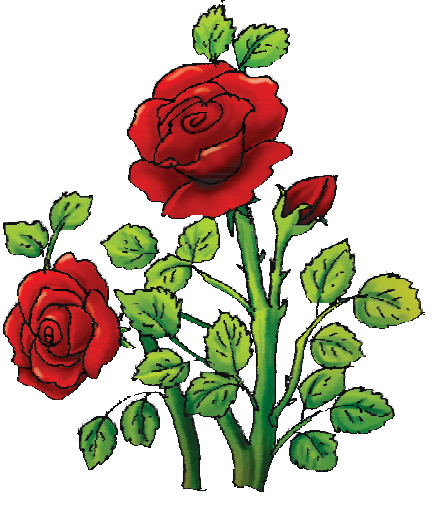
Name of plant

_____

E. Identify the type of plant in each picture. (Herb/Shrub/Tree)

Perception

_____

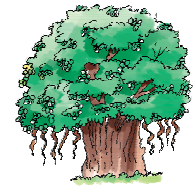


_____

F. Pictures of some plants and fruits are given along side the maze. Go up, down, left or right and find them. Find the names of these pictures. One has been done for you.

Mental Development

P	E	E	P	A	L	P	P	X	P
M	A	N	G	O	B	T	I	E	U
W	B	A	N	Y	A	N	N	L	M
E	I	T	G	R	A	P	E	S	P
C	O	C	O	N	U	T	B	D	K
G	U	L	R	O	S	E	R	A	I
O	A	P	P	L	E	O	T	J	N



G. Make a plant scrapbook.

Experiential Learning

Collect pictures of some plants. Paste them in a scrapbook. Below each picture, write

1. name of the plant.

2. size of plant–big or small.

3. type of plant–tree/shrub/herb/creeper/climber.

H. Answer the following questions.

1. What are trees?

_____

2. State two differences between creepers and climbers. Analogy/Comparison

_____

Life Skills

15 LIFE ON LAND

How do you take care of plants? Tick (✓) the correct options.

1. You keep the plants in sunlight. ☐
2. You water the plants regularly. ☐
3. You pluck flowers and leaves of the plant. ☐

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Features of this Series...

Content Section

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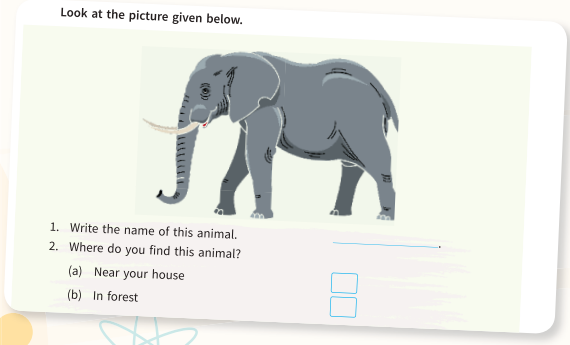
Snapshot
- Parts of a plant
- Types of plants
- Food preparation by plants
- Lifespan of plants



Look at the picture given below.

1. Write the name of this animal. _____.
2. Where do you find this animal?
   (a) Near your house ☐
   (b) In forest ☐

Warm-up
It offers a warm-up exercise for the students in the form of a comic strip, interaction, questions, or an activity to introduce the chapter and connect it with their prior knowledge related to the topic.

Dig Deeper
This feature gives extra useful information in the form of extended learning.

Dig Deeper
- A new born baby has 300 bones in body at the time of birth.
- The thigh bone is the **longest bone** in our body.

Fascinating Tidbits Testimony

We are pretty lucky to have an atmosphere filled with air. The air in our atmosphere protects the Earth from getting too cold or too hot.

Fascinating Tidbits
This section shares fascinating scientific facts closely related to the chapter.

Let's Explore
Hands-on experiments and activities are provided in this section that aim to foster understanding through learning by doing and experimentation.

Let's Explore

Observe that plants release water.
- Take a potted plant.
- Tie a plastic polythene properly to cover the whole plant.
- Place the plant in sunlight.
- After 2-3 hours, observe the plant.
- Small droplets of water appear on the polythene. It shows that plants release water due to evaporation.

Let's Practise

Fill in the blanks by using the words given in the box.

empty breathe blows out

1. When a burning candle is covered with a glass jar, it _____.
2. All plants and animals need air to _____.
3. A football full of air is heavier than an _____ football.

Let's Practise
Recall-based exercises in the form of Fill in the blanks, True/False, Right/Wrong statements etc., are given in this section.

Important Terms

The meaning of important terms is given in this section for a quick reference.

Important Terms

Domestic animals	:	Animals kept at home or in farms.
Pet animals	:	Animals kept at home as a companion.
Tame	:	Trained by human beings.

Let's Summarise

- We should follow safety rules to save ourselves from injury.
- We should follow safety rules at home, on the road, in the swimming pool and in a vehicle.
- Be careful of fire, electricity and sharp things.
- In case you are hurt, immediately tell an adult.

Let's Summarise

This feature provides a point-wise summary of the chapter for a quick recap and knowledge retention.

Assessment Section

Oral Questions (Communication)

The students will articulate their thoughts and ideas verbally. This section is designed to strengthen their communication skills and to encourage effective expression.

A. Answer the following questions orally. **Communication**

1. Which part of the plant contains seeds?
2. Why is the leaf called the 'kitchen of plants'?

H. Cross (×) the odd one out. **Critical Thinking**

1.	Cow	Buffalo	Fish	Goat
2.	Camel	Lion	Horse	Ox
3.	Honey	Beehive	Silk Saree	Bees wax

Critical Thinking

This section require students to engage in brainstorming, think beyond the confines of textbooks and apply concepts they have learned so far.

Creativity

These questions nurture a mindset that values and promotes innovative thinking across various domains.

I. Make a list of eight everyday items that you use, which are derived from animals. Collect pictures of these items and paste them into your scrapbook. Write the names of the items and the animals from which they are derived. **Creativity**

Let's Explore

Make a list of your friends who have pets and fill the details in the table provided below. **Collaboration**

Name of your friend	Pet Type	Name of Pet

Collaboration

By using these questions, the students learn to work effectively with others and contribute positively to group dynamics.

Experiential Learning

These questions focuses on hands-on, real-life experiences to enhance understanding and knowledge acquisition.

I. Divide the class into 5-6 groups. Ask each group to prepare a chart of food which each of them eats in a day. Now observe which group eats healthy food and which one eats unhealthy food.

Experiential Learning

F. Observe the given pictures. Tick (✓) the good postures and cross (×) the bad postures.

Perception

1.  ☐

2.  ☐

3.  ☐

4.  ☐

Picture Based Analysis (Perception)

Such questions prompt the students to analyse, interpret and draw conclusions from visual information to promote critical thinking.

Art Integration

The students use their creative ideas of making something related to art, craft and poster-making. This section connects science with art and culture.

H. Let's make an album of flowers.

Art Integration

Dry the flowers by pressing them. You will need books and blotting paper. Put the flowers between two sheets of the blotting paper. Put heavy books on the top of sheets. Leave it for about 10 days. You will get dried flowers which can be used to decorate a card or bookmark.

Life Skills

Responsible Decision Making

To be safe we must be careful all the day. Keeping the safety rules in mind, complete the statements with the correct word.

1. Do not jump on the _____. (ground / desk)
2. Do not run in the _____. (park / classroom)
3. Do not take _____ on your own. (food / medicines)
4. Always walk on the _____. (road / footpath)

Life Skills

This section promotes betterment of life along with environmental awareness and sensitivity relevant to the specific chapter's content. Reading and activities based on Sustainable Development Goals (SDGs) have also been integrated.

Model Test Papers

Two model test papers based on the concepts learned in chapters are given for comprehensive revision.

Model Test Paper-1

(Based on Chapters 1-6)

A. Tick (✓) the correct answer.

1. The rose plant is a
   (a) tree ☐ (b) shrub ☐ (c) herb ☐
2. We can eat the fruit of the
   (a) money plant ☐ (b) apple tree ☐ (c) coriander ☐
3. Rice, sugar and chapati are
   (a) protective food ☐
   (b) energy-giving food ☐
   (c) body-building food ☐

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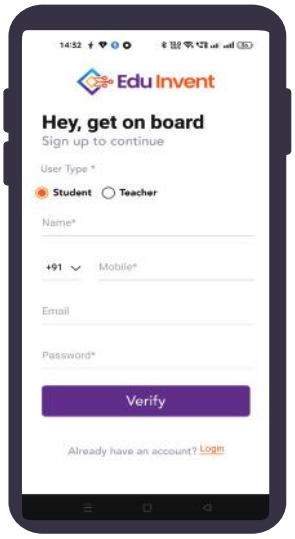

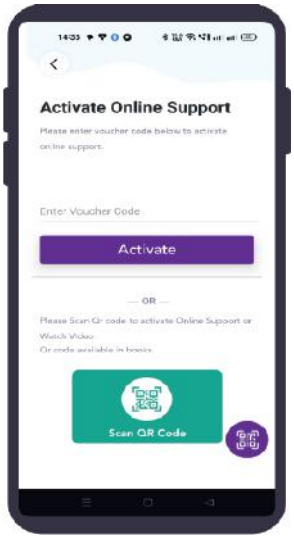

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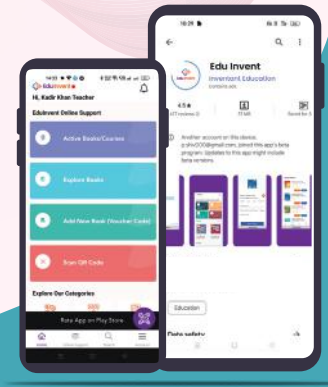

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CONTENTS

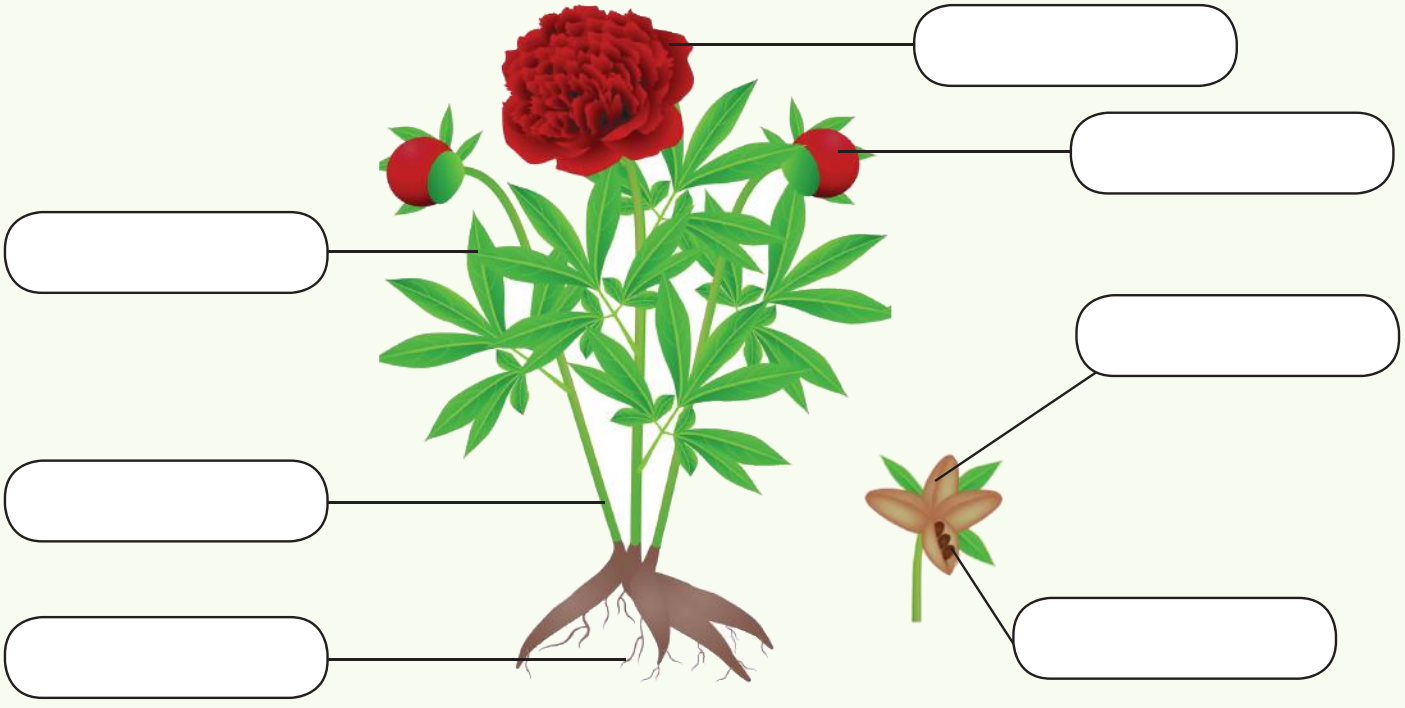
1 Plants Around Us

Snapshot

- Parts of a plant
- Types of plants
- Food preparation by plants
- Lifespan of plants

Label the various parts of the plant using the words provided in the clue box.

Leaf, Stem, Fruit, Seeds, Root, Flower, Bud



Plants around us

There are many kinds of plants around us. They are of different shapes, sizes and colours. They are found in different places. Some plants grow on land and some are found in water.

Parts of a plant

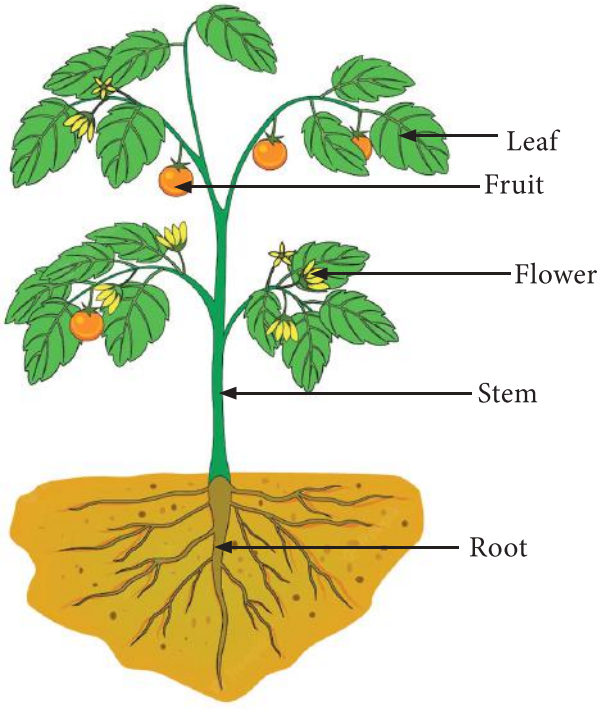
A plant has the following parts:

Root – It fixes the plant to the ground. It collects water and minerals for the plant from the soil. Roots grow under the ground.

Stem – It is the part of the plant above the ground. It bears many branches on which leaves, fruits and flowers are present. It carries water and food to all parts of the plant.

Leaf – It makes food for the plant. So, it is also known as 'kitchen of the plant'.

Flower – It is the most beautiful (colourful) part of the plant. A mature flower changes into fruit. A fruit contains seeds.



Parts of a Plant

Types of plants

In nature, different types of plants are present. On the basis of the size, plants are classified as trees, herbs and shrubs.

Trees

A tree is a **big** and **tall** plant. It has a hard and strong stem called **trunk**.

Mango Tree Banyan Tree

Trees

Trees live for many years.

A few types of trees live for hundreds of years. For example, banyan tree.

Rose Plant

Tulsi

Shrubs

Shrubs

Shrubs are smaller than trees. They have **thin** and **hard** stems and many branches. These branches grow close to the ground. They live for several years.

Heena (Mehandi), china rose (*Hibiscus*), tulsi and rose plants are the examples of shrubs.

Wheat plant

Mint

Herbs

Herbs

Herbs are small plants. They have soft and green stems. Most herbs live for few months only.

Sunflower, paddy, wheat, maize and mint are the examples of herbs.

Let's Practise

A. Tick (✓) those plants which are herbs.

1. Rose plant ☐
2. Wheat ☐
3. Sunflower ☐
4. Neem ☐

B. Which of the following lives for few months only? Tick (✓) the correct option.

☐

☐

☐

Let's Explore

Art Integration

To make a tree

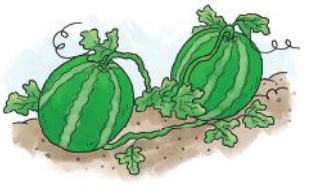
Draw the trunk of a tree on a paper. Take a leaf of neem or mango and dip its lower side in the green water-colour. Now, make the impressions of the leaf all over the tree trunk to make it a neem tree or a mango tree. Then, paste thin wooden pieces at the place of branches. Let it dry. The beautiful green tree is ready.

Money plant

Pea

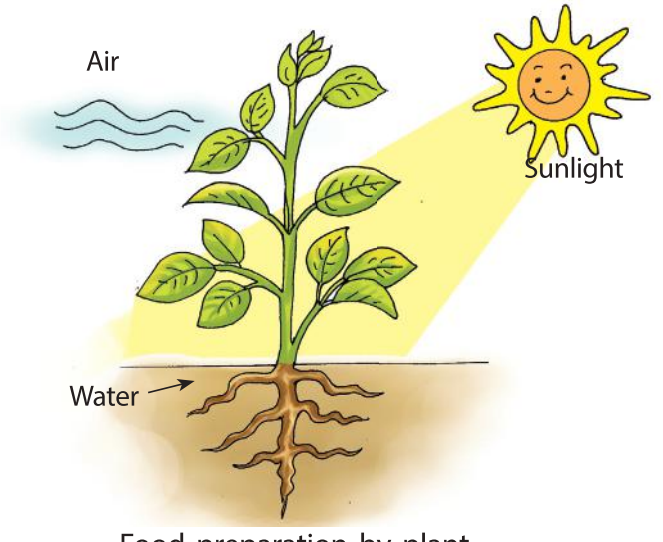
Climbers

Pumpkin



Watermelon

Creepers



Food preparation by plant

Climbers

Some plants have **weak** stems which cannot grow straight or upright. They need the support of another plant or sticks to grow. Such plants are called **climbers**. Bean, money plant, pea and grapevine are climbers.

Creepers

Some plants have weak stems and they grow along the ground. They are called **creepers**. Watermelon and pumpkin are creepers.

Food preparation by plants

Leaves of green plants make food. They need sunlight, air and water for making food. So, leaves are called the '**kitchen of a plant**'. The extra food is stored in different parts of plants like stem, leaf, root and seeds.

Lifespan of plants

Some plants like banyan tree and neem tree live for hundreds of years. Some plants like pea, sunflower and rice live for few months only.

Let's Practise

Which part of the plant is

1. kitchen of the plant ? _____
2. underground part ? _____
3. most beautiful part ? _____

Important Terms

Trees : Big and tall plants with strong, woody stems and trunk.
Shrubs : Small plants with woody stems.
Herbs : Small plants with soft and green stems.
Climbers : Plants that need support to grow upright.
Creepers : Plants that grow along the ground.
Root : The part of the plant under the ground.
Stem : The part of the plant above the ground that carries water and food to all parts of the plant.
Leaf : The green part of the plant that makes food for the plant.
Flower : The beautiful (colourful) part of a plant that changes into fruit.

Let's Summarise

- Plants have different parts–root, stem, leaves and flowers. Each part has a specific function.
- There are many kinds of plants.
- Trees are tall plants having strong stems.
- Shrubs are smaller than trees and have hard stems.
- Herbs are small plants with green and soft stems.
- Climbers have weak stems that need support to climb up.
- Creepers have weak stems and they grow along the ground.
- Plants have different lifespans.

A. Answer the following questions orally.

Communication

1. Which part of the plant contains seeds?
2. Why is the leaf called the 'kitchen of plants'?

B. Tick (✓) the correct option.

1. Which of the following is a herb?

   (a) Banyan ☐ (b) Coconut ☐ (c) Mint ☐

2. Plants are generally _____ in colour.

   (a) black ☐ (b) red ☐ (c) green ☐

C. Choose the correct words and fill in the blanks.

1. Trees have _____ stems. (hard / soft)
2. Shrubs have _____ branches. (many / few)
3. _____ have green stems. (shrubs / climbers)
4. Herbs have _____ stems. (soft / hard)
5. A _____ lives for a few months only. (sunflower plant / neem tree)

D. Match the following parts of the plant with their functions.

Critical Thinking

Column A	Column B
1. Leaf	(a) the beautiful part of a plant that changes into a fruit.
2. Stem	(b) absorbs water and minerals.
3. Root	(c) makes food for the plant.
4. Flower	(d) carries food and water to all parts of the plant.

E. State whether the following statements are true (T) or false (F).

1. Trees live for about six months. ☐
2. Herbs have hard stems. ☐
3. Pea is a climber. ☐
4. Shrubs are tall and strong plants. ☐
5. Creepers have weak stems. ☐
6. Shrubs are smaller than trees. ☐

F. Unscramble the letters to find the names of different parts of a plant.

Intellectual Development

1. TORO _____
2. FELA _____
3. REOLWF _____
4. MEST _____

G. Answer the following questions.

1. Name the plants which are big and tall. Give two examples.

_____

_____

2. Name any four parts of a plant.

_____

_____

3. Which type of stem is found in herbs?

_____

_____

4. Which part of a plant grows underground?

_____

_____

5. How are creepers different from climbers?

6. What is the difference between a shrub and a herb? Analogy/Comparison

H. Most of the creepers have big and broad leaves. How are these big leaves useful for them? Presumption

I. Visit your school garden and classify the plants into herbs, shrubs, trees, creepers, and climbers. Also try to identify their different parts. Experiential Learning

J. How would the absence of sunlight affect plant life? Non Perception

Life Skills

Spiritual Development

Ask your father or mother about a plant. Ask if they ever planted any tree. If yes, learn about the things they got from that plant. You also plant some useful trees such as mango, neem, tulsi, etc. and water them regularly.

Now, make a list of the things, you will get from these plants.

Try to find out other benefits of plants. Also, note down the precautions you should take while caring for the plants.

As per NEP 2020 and NCF 2023

STEM

Science Connect

Explore the World of Science

For ICSE Schools

3

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Preface

The **SCIENCE CONNECT** series consist of five meticulously crafted books for classes 1 to 5. These books are in accordance with the latest syllabus prescribed by the **Council for the Indian School Certificate Examination**, New Delhi for **Indian Certificate of Secondary Education (ICSE)**. These have been developed in accordance with the guidelines given by **National Education Policy (NEP) 2020** and **National Curriculum Framework (NCF) 2023**.

Throughout this series, students will embark on an exciting journey to uncover the fascinating secrets of nature and the universe. These books provide a variety of engaging activities that encourage active participation and **experiential learning**. These books foster **curiosity**, **observation**, and **critical thinking** in young learners.

Distinctive features of book:

- present the age-appropriate content in a **clear**, **concise** and **logical** manner.
- written in simple, easy to understand language.
- introduces each chapter with an engaging and interactive **Warm-up section** to recall the previous knowledge related to the chapter.
- contains vibrant **colourful illustrations** and **pictures** to captivate students' interest, enhance concept clarity and learning experience.
- provides topics and sub-topics accompanied by **in-text activities** (both recall-based and **hands-on experiments**) that encourage experiential learning and inquisitive approach.
- contains extra useful information to enhance students' knowledge.
- features comprehensive questions that target various cognitive levels and **21st Century Skills** in alignment with **NEP 2020 and NCF 2023**.
- integrates **Life Skills** that enhance students' overall development.
- promotes **Environmental Awareness** among students, aligning with the **Sustainable Development Goals (SDGs)**.
- aims to inculcate **inventiveness**, **passion for learning** and **competence** in students.
- complements the **Teacher's Resource Book** comprising **overview of the lessons**, **lesson plan** to achieve the learning objectives and **answer key** for the textbook questions
- offers **Online Resources** that includes animated videos/video lectures and interactive exercises.

We are sure that **SCIENCE CONNECT** series will make learning science exciting, effective and proactive for the students. We are looking forward to your valuable suggestions.

With best regards,
Inventant Education

Features of this Series...

Content Section

Snapshot
In this section, glimpse of covered topics and concepts in the chapter is provided.

Snapshot

- Living and non-living things
- Natural and man-made things
- Features of living things

Look at the pictures of birds given below.



Can you identify them? Write their names.

_____

Name the bird that talk like us._____

Warm-up
It offers a warm-up exercise for the students in the form of a comic strip, interaction, questions, or an activity to introduce the chapter and connect it with their prior knowledge related to the topic.

Dig Deeper
This feature gives extra useful information in the form of extended learning.

Dig Deeper

If we cut the roots of a plant, the plant will not get water and nutrients. Finally, the plant will die.

Fascinating Tidbits
This section shares fascinating scientific facts closely related to the chapter.

Fascinating Tidbits

Elephants express sympathy towards each other and show empathy like humans.

Let's Explore Experiential Learning

To show that living things grow.

Material's Needed- A few seeds of pea, a few pebbles, two pots containing soil.

What to do- Take a pot A containing soil. Sow 4-5 seeds of pea in it. In the same manner sow 3-4 pebbles in another pot B containing soil. Water the pots daily. After 2-3 days you will see small seedling in the pot A. After 10-15 days the seedlings become taller in pot A but there is no change in pot 'B'. Why?

Let's Explore
Hands-on experiments and activities are provided in this section that aim to foster understanding through learning by doing and experimentation.

Amazing Indian Science
This section helps students to understand and appreciate the significant contributions of India in science within the curriculum.

Amazing Indian Science

- **Yoga — Our Body's Exercise:** Yoga is like our body's exercise class. It helps us to keep our bodies and minds strong and healthy. Many people in India practise it every day.
- **Ayurveda — Our Traditional Health Wisdom:** Ayurveda is like a wise old book. It teaches us how to keep our bodies in balance and well by using herbs and natural remedies.
- **Spices — Our Flavourful Friends:** India is famous for tasty spices like turmeric, cumin, and coriander. They make our food delicious and also help our bodies stay healthy.

Let's Practise

Fill in the blanks with suitable words given in the box.

leaf blade stomata many leaf

1. Watermelon has _____ seeds inside it.
2. On the lowerside of the leaf, there are tiny openings called _____.
3. The flat and broad part of a leaf is called _____.
4. The _____ is called food factory.

Let's Practise
Recall-based exercises in the form of Fill in the blanks, True/False, Right/Wrong statements etc., are given in this section.

Important Terms

The meaning of important terms is given in this section for a quick reference.

Important Terms

Photosynthesis : the process in which green plants make their own food in the presence of water, sunlight and carbon dioxide.

Reproduction : to produce young ones of its own kind.

Let's Summarise

1. The different parts of a bird are head, beak, claws, tail and wings.
2. A bird has a boat-shaped body. Its bones are hollow and filled with air. Hence, it can fly easily.
3. Many materials, such as grass, twigs, feathers and wool are used by the birds to build their nests.
4. Different kinds of birds make their own kinds of nests in different places.
5. The parent birds take care of their young ones by feeding them, keeping them warm and protecting them from the enemies.

Let's Summarise

This feature provides a point-wise summary of the chapter for a quick recap and knowledge retention.

Assessment Section

Oral Questions (Communication)

The students will articulate their thoughts and ideas verbally. This section is designed to strengthen their communication skills and to encourage effective expression.

A. Oral Question. Communication

1. Name the organs of circulatory system.
2. Give the sequence of digestive organs starting from mouth.
3. How many bones are present in human body.

Critical Thinking

This section require students to engage in brainstorming, think beyond the confines of textbooks and apply concepts they have learned so far.

E. Use the internet to explore and create a presentation about birds from fifteen different countries, include pictures and information about their habitats. Critical Thinking Based

Creativity

These questions nurture a mindset that values and promotes innovative thinking across various domains.

H. Let's make a food chain art Creativity

Create a visual representation of a simple food chain with drawings or cut arts of animals and their prey.

Collaboration

By using these questions, the students learn to work effectively with others and contribute positively to group dynamics.

J. Suppose you are on a field trip to a local park. Record the different plants and animals in group of two, along with your classmate. Share your findings in a class. Collaboration

Experiential Learning

These questions focuses on hands-on, real-life experiences to enhance understanding and knowledge acquisition.

Let's Explore Experimental Learning

Aim : To show that soil contains water

Materials Required : Soil, spirit lamp and a metal can with lid

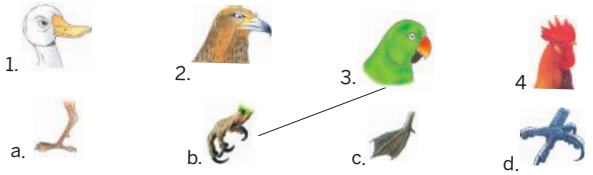
Method : Take a little quantity of soil in a metal can. Cover it with a lid. Ask an adult to heat the can. Take off the lid. You will find drops of water on the lid. This shows that soil contains water.

Picture Based Analysis

Such questions prompt the students to analyse, interpret and draw conclusions from visual information to promote critical thinking.

F. Look at the pictures given below and answer. Picture Based Analysis

(i) Match the birds with their claws. One has been done for you.



(ii) Name the bird having broad and flat beak.

(iii) Name the bird having strong, sharp and hooked beaks.

Art Integration

The students use their creative ideas of making something related to art, craft and poster-making. This section connects science with art and culture.

D. Create a collage using pictures of various birds. Label each bird with its name and try to arrange them in order of size, from the smallest to the largest. Art Integration

Exploration

This section is an active learning approach that helps the students to learn through curiosity, enquiry and it promotes brain development.

Let's Explore Exploration

Visit a zoo and paste pictures of animals that you see there on a chart paper. Classify these as Herbivores, Carnivores and Omnivores

Assertion and Reason

This section enhances the analytical thinking abilities of the students.

F. In the questions given below, there are two statements marked as Assertion (A) and Reason (R). Read the statements and choose the correct option. Inference

(a) Both Assertion (A) and Reason (R) are correct and Reason (R) is the correct explanation of Assertion (A).

(b) Both Assertion (A) and Reason (R) are correct but Reason (R) is NOT the correct explanation of Assertion (A).

Case Study

Such questions foster critical thinking and decision-making skills. They promote the practical application of knowledge.

D. Read the passage given below and answer the questions that follow. Case Study based

Both plants and animals including human beings are interdependent on each other for many reasons. Here, plants consume decayed material from the soil for their nourishment. The plants (grass) are consumed by plant-eating animals (herbivores) for their survival. The carnivores then consume the herbivores for their nutrition and survival.

1. The most important thing that plant gives animals is

(a) Fruits and vegetables (b) Oxygen

(c) Shade (d) Wood

Life Skills

Life Skills SDG-13- Climate Action

We should not pollute or destroy natural things such as air, water, soil, plants, animals, etc. Dirty air and water are harmful for us. List some specific ways by which we can reduce our impact on environment and protect our natural resources.

Life Skills

This section promotes betterment of life along with environmental awareness and sensitivity relevant to the specific chapter's content. Reading and activities based on Sustainable Development Goals (SDGs) have also been integrated.

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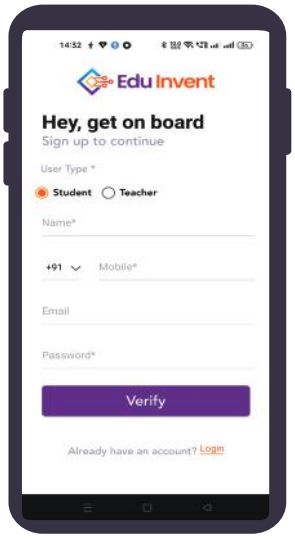

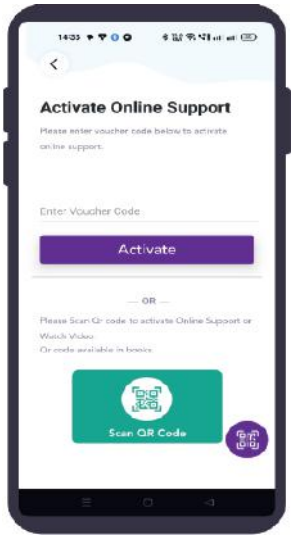

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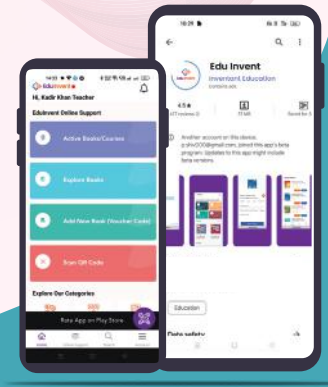

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CONTENTS

1

Living and Non-living Things

Snapshot

- Living and non-living things
- Natural and man-made things
- Features of living things

Look at the picture given below. There are many things in it.

Name few things that are made by human beings.

_____

Can you name some non-living things? _____

Living and Non-Living Things

ICODE-HIDi

There are many things around us. Some are living and some are non-living. Some are natural and some are made by human beings. All animals, plants and human beings are living things. Things such as bat, ball, chair, table, fan and van are non-living and man-made things.

Natural things

Natural and Man-Made Things

Things such as plants, animals, sun, moon, water, rocks, air, etc., have been provided by nature. Thus, they are **natural things**. All living things are natural but all natural things are not necessarily living. Natural things such as plants and animals are **living things**. Things such as air, water, rocks and soil are **non-living natural things**.

Man-made things

Vehicles, battery and cellular phones are made by **humans**. They are called **man-made** things. All living things are natural but non-living things are both natural and man-made. Natural things are living and non living both while man-made things are all non-living things.

Features of Living Things

ICODE-N1Ms

Living things need food, water. They grow, move, feel, breathe, reproduce and die. Let us discuss these features.

Living Things Move

Living things such as horses, humans, birds, fish, insects, etc., move on their own from one place to another.

Plants do not move from one place to another, but they show some movement in a special way. For example, a sunflower always faces the sun. It changes its direction with the sun.

Running hourse

Sunflower facing the sun

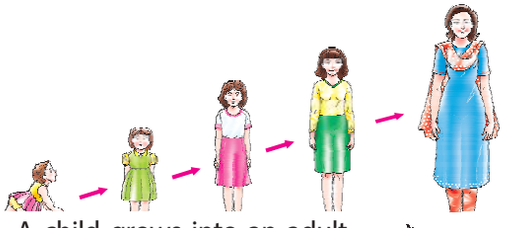
Have you seen books moving on their own? They move when you move them. Thus, we can say that non-living things do not move on their own.

Living Things Need Food To Live

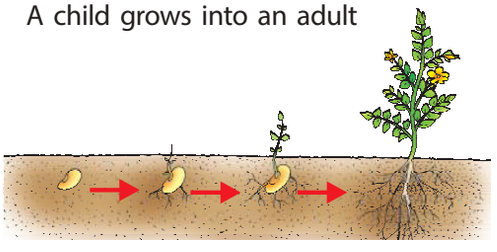
All living things need food to work and grow. Food gives them energy. Most plants make their own food with the help of air, water and sunlight. Different living things need different types of foods.

Human beings depend on both plants and animal for their food. Cows, buffaloes, deer, horses, etc., eat grass. Birds eat grains, insects and fruits. Non-living things do not need food.

Living things need food to live



A child grows into an adult



A seed grows into a big plant

Living Things Grow

A human baby grows into a child. A child grows into an adult. Similarly, a seedling (baby plant) grows into a big plant.

Does table, house, your car, etc., grow into something big? No. Why? It is because they are non-living things.

Let's Explore

Experiential Learning

To show that living things grow.

Material's Needed- A few seeds of pea, a few pebbles, two pots containing soil.

What to do- Take a pot A containing soil. Sow 4-5 seeds of pea in it. In the same manner sow 3-4 pebbles in another pot B containing soil. Water the pots daily. After 2-3 days you will see small seedling in the pot A. After 10-15 days the seedlings become taller in pot A but there is no change in pot 'B'. Why?

Human beings breathe through lungs

Plants take air through stomata

Fish breathe through gills

Living Things Breathe

All plants, animals, humans, cannot live without breathing. They need air to live. Animals breathe with the help of their lungs, gills or air-tubes. Insects breathe with the help of tiny pores called spiracles. Plants take in air through the pores (stomata) present on the leaves. Non-living things do not breathe.

Let's Practise

Intellectual Development

Choose the correct option.

1. All living things need food to grow/ feel.
2. A seedling grows into a baby/big plant.
3. Sunflower always faces the moon/sun/water.
4. The non-living things do not shine/breathe.
5. Air, water, rock, plants, animals, etc., are living/ non-living/natural things.

Let's Explore

Direct Perception

To feel the process of breathing

1. Put one hand on your chest and the other hand on the upper part of your tummy.
2. Breathe in deeply. You will feel your chest and tummy become bigger.
3. Now you breathe out, both the chest and the tummy become normal.

Touch-me-not plant folds its leaves

A girl feels pain when pricked by a thorn

Living Things Feel

All living things can feel. The sense of feeling is very small in case of plants as compared to the animals. A 'touch-me-not' plant folds its leaves when someone touches it.

On feeling the prick of a thorn, the girl pulls away her hand quickly.

A toy does not cry, when we pinch it. Non-living things do not show feelings.

Living Things Reproduce

All living things produce young ones of their own kind. Plants give seeds which grow into new plants. Some plants can reproduce through their stems, roots and leaves.

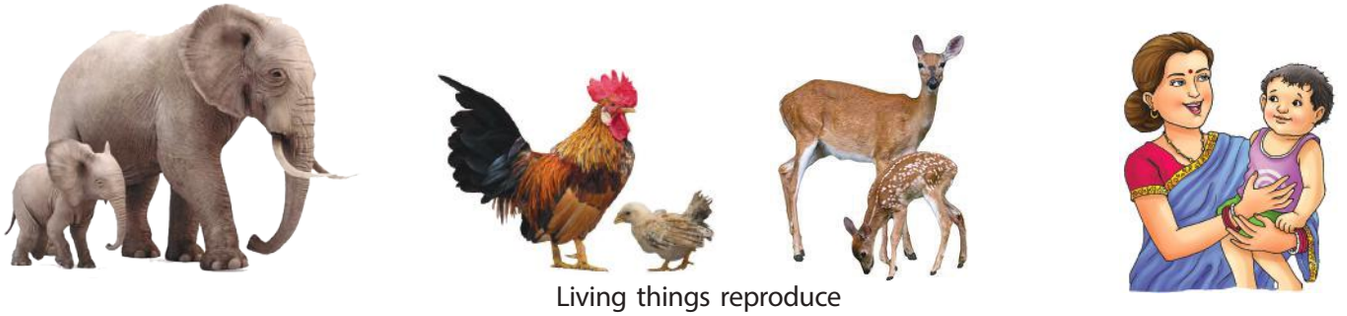
Animals lay eggs or give birth to their young ones. Human beings and some animals such as deer and lion give birth to their babies.

Fascinating Tidbits

1. Bamboo shoot is the main food for Giant Panda.
2. Blue whales live in water but, they breathe through lungs.

Have you seen books or tables producing their babies? Non-living things, cannot reproduce.

Now on the basis of the features, we can find the difference between living and non-living things.



Living things reproduce

Let's Practise

Mental Development

Choose the odd one out.

1. Lungs, gills, air-tubes, tongue
2. Skin, eyes, ears, teeth
3. Human, deer, hen, lion
4. Book, table, cotton cloth, iron nail

Important Terms

Reproduction : producing young ones of their own kind by the living beings.

Seedling : a baby plant found inside a seed, after germination which grows into a big plant or tree

Let's Summarise

1. Living things include human beings, all kinds of animals and plants.
2. Non-living things include books, tables, chairs, cars, etc.
3. All living things are natural but non-living thing are both natural and man made.
4. All living things move, grow, feel, eat, breathe and reproduce.
5. All living things need air to breathe in.

EXERCISES

Communication

A. Oral Questions.

1. What are natural things?
2. What are man-made things?
3. What are the organs used for breathing of a plant? Where are they found?

B. Tick (✓) the correct option.

1. Which one of the following is a living thing?
   (a) Table ☐ (b) Plant ☐ (c) Bus ☐
2. Which one of the following is a non-living thing?
   (a) Plant ☐ (b) Dog ☐ (c) Car ☐
3. Which is a man-made thing?
   (a) Soil ☐ (b) Cat ☐ (c) Car ☐

C. Fill in the blanks. Choose the correct words from the given box.

food	stomata	kind	touch-me-not	egg

1. Plants take in/out air through _____ present on their leaves.
2. All living things need _____ to grow.
3. All living things produce their own _____ .
4. Young birds hatch out of an _____ .
5. Some plants like _____ have a sense of touch.

D. Match the following:

Mental Development

Column A	Column B
1. Egg	a. Non-living
2. Soil	b. Tree
3. Seed	c. Make their own food
4. Plants	d. Fish
5. Gills	e. Lungs
6. Human	f. Chick

E. Look at the picture and answer.

Picture Based Analysis

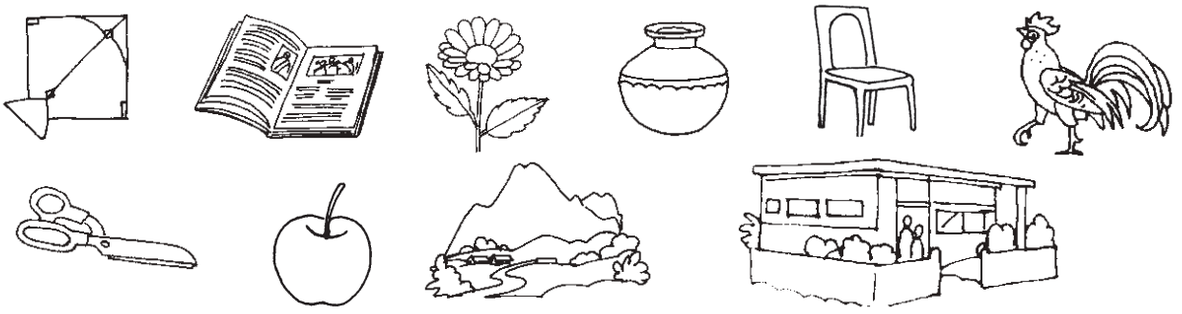
1. Name the picture. _____
2. Does it grow? _____
3. Is it a living thing? _____
4. Does it prepare its own food? _____
5. Can it move from one place to another on its own? _____

F. Think and answer.

Critical Thinking

1. Some non-living things are made up of living things. Give two examples.
2. Write three man-made things, you carry to school.

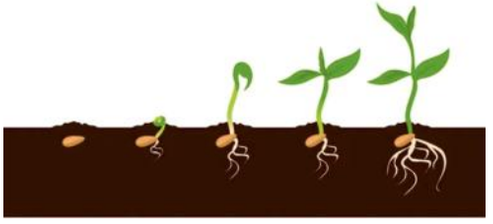
G. Look at the following pictures. Some are natural and some are man-made things. Draw all the pictures. Colour the natural things only. Art Integration



H. Let's investigate. Experiential Learning

Take a small plant. Water the plant daily. Observe how it grows and record the growth of plant over several weeks.

I. Refer to the image below and answer the questions that follow. Case Study based



1. What is not required to grow plants?

   (a) Air (b) Seed (c) Water (d) Glass

2. All the parts of a plant grow upwards except

   (a) stem (b) leaves (c) branch (d) root

3. Plants require energy from _____ to make their own food.

   (a) water (b) sunlight (c) soil (d) air

J. In the questions given below, there are two statements marked as Assertion (A) and Reason (R). Read the statements and choose the correct option. Inference

(a) Both Assertion (A) and Reason (R) are correct and Reason (R) is the correct explanation of Assertion (A).

(b) Both Assertion (A) and Reason (R) are correct but Reason (R) is NOT the correct explanation of Assertion (A).

(c) Assertion (A) is true, but Reason (R) is false.

(d) Assertion (A) is false, but Reason (R) is true.

1. **Assertion (A):** Living things cannot live forever.

   Reason (R): All living things die.

2. **Assertion (A):** Plants make their own food.

   Reason (R): Plants need sunlight for making their food.

K. Answer the following questions.

Comparison

1. Enlist two characteristics that distinguish living things from non-living things.
2. How do living things reproduce? Give two examples.
3. Provide an example of a non-living thing that can be harmful to the environment.
4. Give an example of a living thing that can move on its own.

Life Skills

SDG-13- Climate Action

We should not pollute or destroy natural things such as air, water, soil, plants, animals, etc. Dirty air and water are harmful for us. List some specific ways by which we can reduce our impact on environment and protect our natural resources.

Amazing Indian Science

- **Dr. Satyendranath Bose** was a scientist who made rules for tiny particles. They tell us how they move, whether in living or non-living things.

Dr. Satyendranath Bose

Dr. C.V. Raman

- **Dr. C.V. Raman** was also known as the light wizard. Dr. Raman was a light magician. He explored how light interacts with the world, both living and non-living, through his ground-breaking experiments.

As per NEP 2020 and NCF 2023

STEM

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4

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- Critical Thinking
- Exploration
- Life Skills

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Preface

The **SCIENCE CONNECT** series consist of five meticulously crafted books for classes 1 to 5. These books are in accordance with the latest syllabus prescribed by the **Council for the Indian School Certificate Examination**, New Delhi for **Indian Certificate of Secondary Education (ICSE)**. These have been developed in accordance with the guidelines given by **National Education Policy (NEP) 2020** and **National Curriculum Framework (NCF) 2023**.

Throughout this series, students will embark on an exciting journey to uncover the fascinating secrets of nature and the universe. These books provide a variety of engaging activities that encourage active participation and **experiential learning**. These books foster **curiosity**, **observation**, and **critical thinking** in young learners.

Distinctive features of book:

- present the age-appropriate content in a **clear**, **concise** and **logical** manner.
- written in simple, easy to understand language.
- introduces each chapter with an engaging and interactive **Warm-up section** to recall the previous knowledge related to the chapter.
- contains vibrant **colourful illustrations** and **pictures** to captivate students' interest, enhance concept clarity and learning experience.
- provides topics and sub-topics accompanied by **in-text activities** (both recall-based and **hands-on experiments**) that encourage experiential learning and inquisitive approach.
- contains extra useful information to enhance students' knowledge.
- features comprehensive questions that target various cognitive levels and **21st Century Skills** in alignment with **NEP 2020 and NCF 2023**.
- integrates **Life Skills** that enhance students' overall development.
- promotes **Environmental Awareness** among students, aligning with the **Sustainable Development Goals (SDGs)**.
- aims to inculcate **inventiveness**, **passion for learning** and **competence** in students.
- complements the **Teacher's Resource Book** comprising **overview of the lessons**, **lesson plan** to achieve the learning objectives and **answer key** for the textbook questions
- offers **Online Resources** that includes animated videos/video lectures and interactive exercises.

We are sure that **SCIENCE CONNECT** series will make learning science exciting, effective and proactive for the students. We are looking forward to your valuable suggestions.

With best regards,
Inventant Education

Features of this Series...

Content Section

Snapshot
In this section, glimpse of covered topics and concepts in the chapter is provided.

Snapshot

- Adaptation to the habitat
- Adaptation for food
- Adaptation for protection
- Migration

Warm-up

Look at the picture.

What is a baby dog called? _____

Do the dogs lay eggs like hen?

Warm-up
It offers a warm-up exercise for the students in the form of a comic strip, interaction, questions, or an activity to introduce the chapter and connect it with their prior knowledge related to the topic.

Dig Deeper
This feature gives extra useful information in the form of extended learning.

Dig Deeper

Most of the snakes lay eggs. But, some snakes such as boas, rattle snakes and garter snakes give birth to live young. That means the baby snakes develop inside the mother's body.

Fascinating Tidbits
This section shares fascinating scientific facts closely related to the chapter.

Fascinating Tidbits

Enamel is the hardest known substance in the human body. It protects the tooth against decay.

Experiential Learning

Let's Explore

Visit a pond or any other water body. Observe some plants. Touch and feel whether they are spongy or hard, heavy or light. Observe leaves of those plants closely. Write down your observation

Let's Explore
Hands-on experiments and activities are provided in this section that aim to foster understanding through learning by doing and experimentation.

Amazing Indian Science
This section helps students to understand and appreciate the significant contributions of India in science within the curriculum.

AMAZING INDIAN SCIENCE

Ancient Indian text, including Ayurvedic literature, touched upon aspects of animal health and breeding. Ayurveda, the traditional system of medicine in India, included information on the care and management of animals, which could indirectly impact their reproductive health.

Let's Practise

Name the following.

1. Microbes that cause diseases such as common cold and polio _____
2. The microbes that cause malaria and amoebic dysentery _____
3. The microbe used to make bread soft and spongy _____

Let's Practise
Recall-based exercises in the form of Fill in the blanks, True/False, Right/Wrong statements etc., are given in this section.

Important Terms

The meaning of important terms is given in this section for a quick reference.

Important Terms

Disinfectant : a substance that destroys germs and is used for cleaning
First Aid : the immediate physical and medical attention needed by an injured person before proper medical aid arrives
Stale : No longer fresh

Let's Summarise

1. Animals that give birth to young ones are called mammals.
2. Some animals are egg-laying, i.e., their young ones hatch from the eggs.
3. Some insects such as butterflies and moths pass through a few stages in their life cycle (eggs, larva, pupa and an adult).
4. Only birds and mammals display a great sense of parental care.
5. Some animals give more parental care to their young ones than others do.

Let's Summarise

This feature provides a point-wise summary of the chapter for a quick recap and knowledge retention.

Assessment Section

Oral Questions (Communication)

The students will articulate their thoughts and ideas verbally. This section is designed to strengthen their communication skills and to encourage effective expression.

A. Answer the following question orally. Communication

1. Name the mammal that lives in water.
2. What is the process of producing young ones called?
3. Name the young one of an insect which is different from its parent.

Critical Thinking

This section require students to engage in brainstorming, think beyond the confines of textbooks and apply concepts they have learned so far.

E. Think and answer. Critical Thinking

1. What would happen if condensation stops in nature?
2. Why is it necessary to purify the water before drinking?

Creativity

These questions nurture a mindset that values and promotes innovative thinking across various domains.

I. Make a giant ladybird. You can take help from parents or elders. Creativity

Materials Required : Newspaper, glue, balloon, paint

Method: Cover a round balloon with paper-mâché (a mixture of paper, water and glue). Leave it to dry overnight and then cut the balloon shape in half. Mark your ladybird's head, thorax and wing cases and then paint it with bright colours. Use one of the pictures to help you. Cello tape on some pipe cleaner as legs. You can use the other half of your balloon to make a beetle or a woodlouse. By using the same method and different shaped balloons you can make all sorts of model minibeasts.

Collaboration

By using these questions, the students learn to work effectively with others and contribute positively to group dynamics.

Collaboration

K. While your mother is preparing your lunch discuss with her what type of plant and its parts are used in the kitchen.

Experiential Learning

These questions focuses on hands-on, real-life experiences to enhance understanding and knowledge acquisition.

H. Make an experiment to show that cotton, silk and wool fibres absorb different amounts of water and take different time to dry.

Take your silk kurta, cotton shirt, and a full-sleeved sweater. Dip them in three different buckets containing equal water. Which has absorbed more water? See the water level in three buckets. Now hang them on a rope in open area in sunlight. See which one dries first. Experiential Learning

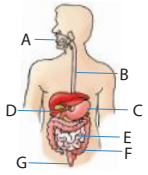
Picture Based Analysis

Such questions prompt the students to analyse, interpret and draw conclusions from visual information to promote critical thinking.

G. Observe the diagram carefully and choose the incorrect option. Picture Based Analysis

(i) The process of digestion starts in the A.
(ii) Food passes directly to C from mouth through food pipe.
(iii) F is known as small intestine.
(iv) E absorbs water from the undigested food.

(a) I and II (b) II and III
(c) III and IV (d) I and IV



Art Integration

The students use their creative ideas of making something related to art, craft and poster-making. This section connects science with art and culture.

E. Collect the information about different types of organisms and their type of reproduction. Make a scrap by pasting picture of organisms with their young ones and write the way of reproduction. Art Integration

Exploration

This section is an active learning approach that helps the students to learn through curiosity, enquiry and it promotes brain development.

Exploration

I. Observe the different types of nests and eggs of birds. Watch the parental care of birds and their nesting behaviour.

Assertion and Reason

This section enhances the analytical thinking abilities of the students.

Assertion and Reason

G. In the questions given below, there are two statements marked as Assertion (A) and Reason (R). Read the statements and choose the correct option.

(a) Both Assertion (A) and Reason (R) are correct and Reason (R) is the correct explanation of Assertion (A).

(b) Both Assertion (A) and Reason (R) are correct but Reason (R) is NOT the correct explanation of Assertion (A).

Case Study

Such questions foster critical thinking and decision-making skills. They promote the practical application of knowledge.

F. Read the passage given below and answer the questions that follow. Case Study Based

Camel is a useful animal which is domesticated by man for thousands of year. It is mainly found in the desert area of Africa, Middle east Asia, etc. It can easily walk on the sand where no vegetation and water exists. It is also known as the "Ship of desert".

1. Why is camel known as the "Ship of desert"?
   (a) They act as carrier for goods in deserts.
   (b) They are used for riding.

Life Skills

Life Skills

Sun is very important to all of us. Tick (✓) the points what it gives us.

1. It gives us solar energy.
2. It gives us light and heat.
3. It gives energy to plants.

Life Skills

This section promotes betterment of life along with environmental awareness and sensitivity relevant to the specific chapter's content. Reading and activities based on Sustainable Development Goals (SDGs) have also been integrated.

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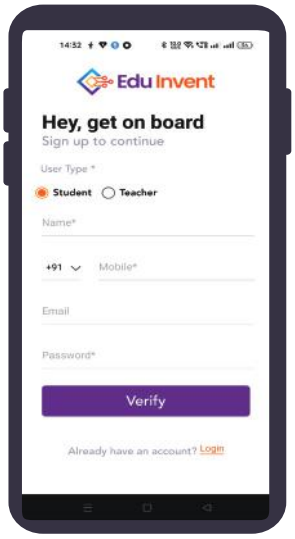

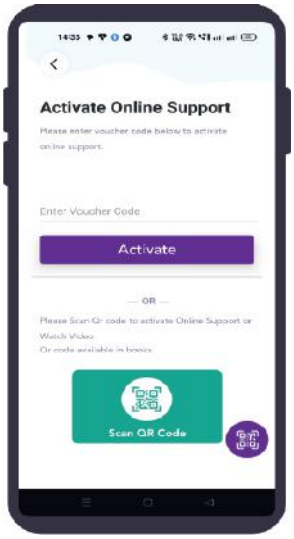

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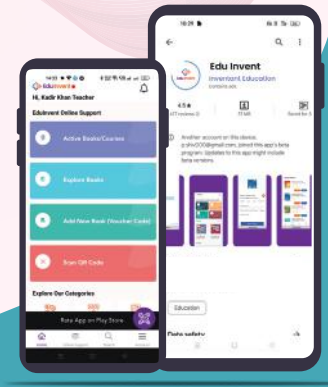

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CONTENTS

1 Plant Life

Snapshot

- Food making
- How plants use food
- Storage of food in plants
- Interdependence between plants and animals
- Balance in nature

Warm-up

Look at the picture. Children are observing different parts of a plant.

Do you know the parts of a plant and their functions?

_____

How does the plant get water to live? Which part is involved in this process?

_____

Coleus leaf

Banyan leaf

Different types of leaves

We see different kinds of plants around us. They are necessary for life on the earth. Plants are the basic source of food for all living things. They can prepare their own food with the help of green leaves.

Let us discuss about leaf.

Structure of a Leaf

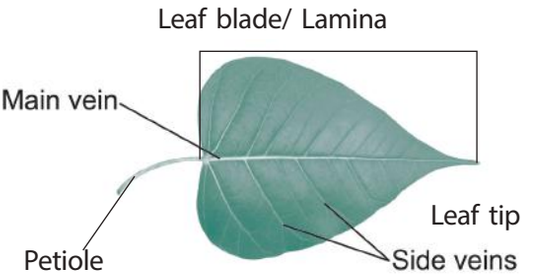
ICODE-CiyE

Most of the plants have broad and flat leaves. We can identify the plants with the help of their leaves.

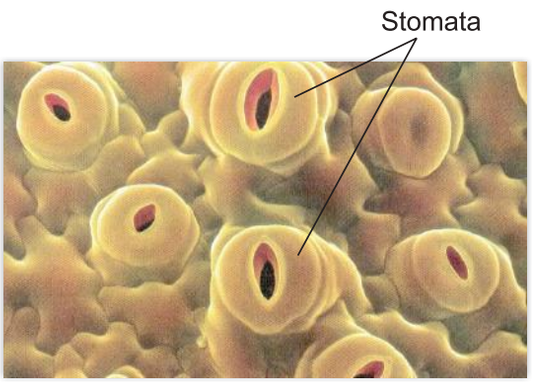
Take a fresh leaf and face it towards the sun. Try to see through its surface. You will see a main vein running through the middle of the leaf and a large number of side veins emerging from the main vein. The broad flat part of a leaf is called the **leaf blade** or **lamina**. The stalk of the leaf is called **petiole**.

The veins carry water and minerals to the leaves. The food prepared in the leaves is also carried by veins to different parts of the plant.

If we look carefully at a section of a leaf under a microscope, we see many layers of cells. These cells contain many tiny packets containing a green pigment called **chlorophyll**. Chlorophyll has the power to absorb sunlight. If you turn the leaf under the microscope, you can see many minute openings surrounded by bean-shaped cells called **stomata**.



Structure of a leaf



Stomata in a leaf

Fascinating Tidbits

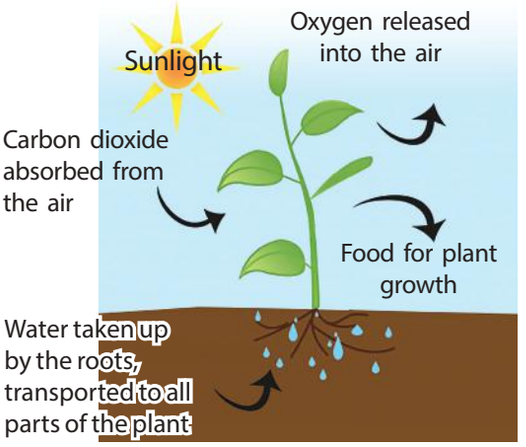
1. Plants do not breathe like animals. They do not have specific organs for breathing.
2. Like animals, plants also need oxygen to get energy during breakdown of food.

Food Making

ICODE-UPEc

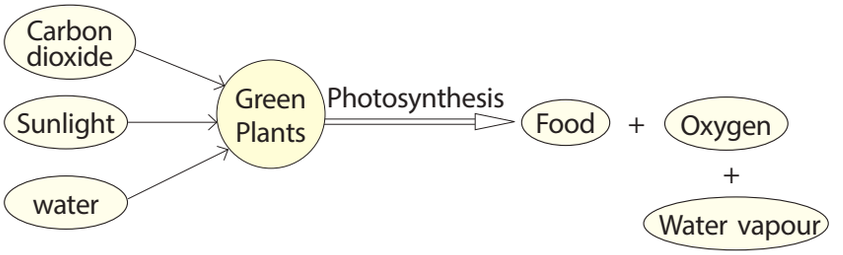
Leaves carry out the important work of food making in plants. The roots of plants absorb water and minerals from the soil. The stem carries these minerals to the leaves. Leaves also take carbon dioxide gas from the air and light energy from the sun to make food.

So, carbon dioxide, water, chlorophyll and sunlight are required by leaves for making food. The food prepared by leaves is a kind of **sugar**. Light is necessary for making food by leaves. Photosynthesis is derived from two Greek



Photosynthesis

words '**Photo**' and '**synthesis**' meaning '**putting together with light**'. Photosynthesis is defined as the process in which green plants make their own food with the help of chlorophyll, carbon dioxide, water and sunlight. Since leaves prepare food for the plant, they are called '**food factories**'.



ICODE-HcTC

How Plants Use Food

The food prepared by the plant is a kind of sugar. This sugar is utilised by the plants in different ways such as :

(i) to produce new cells and to repair old cells.

(ii) to produce energy for growth.

(iii) to store food in different parts of a plant such as roots, stem and leaves which are consumed by animals.

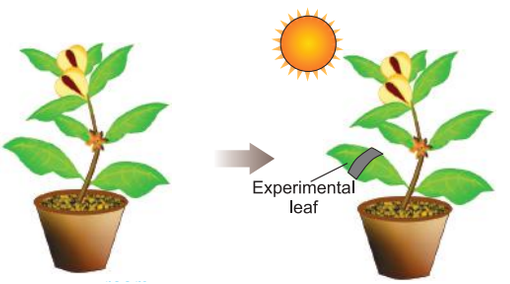
Let's Explore

Inference

Aim: To show that sunlight is necessary for photosynthesis

Materials Required : A healthy potted plant, beaker with water, bunsen burner, iodine solution, alcohol, black paper, watch glass, and dropper

Method : Take a healthy potted plant and keep it in a dark room for 24 hours. After 24 hours, cover one of its leaves on the upper and lower sides with black paper pieces and put the plant in sunlight for 3-4 hours. Pluck this leaf and remove the black paper piece from it. Now boil this leaf in water to bleach it.



In dark room *In sunlight*

After boiling in water, again boil it in alcohol. Then wash the leaf in cold water and place it in a watch glass. Now pour some drops of iodine solution over it with the help of dropper.

What happens? The leaf which has been exposed to sunlight will turn blue. There is no change in the colour of the covered part.

What does this show? This shows that sunlight is necessary for photosynthesis.

We have already read that only green leaves (containing chlorophyll) are responsible for the preparation of food. Let us confirm.

Let's Explore

Presumption

Aim : To show that chlorophyll is necessary for photosynthesis

Materials Required : Coleus or croton plant, beaker with water, bunsen burner, iodine solution, alcohol, watchglass and dropper

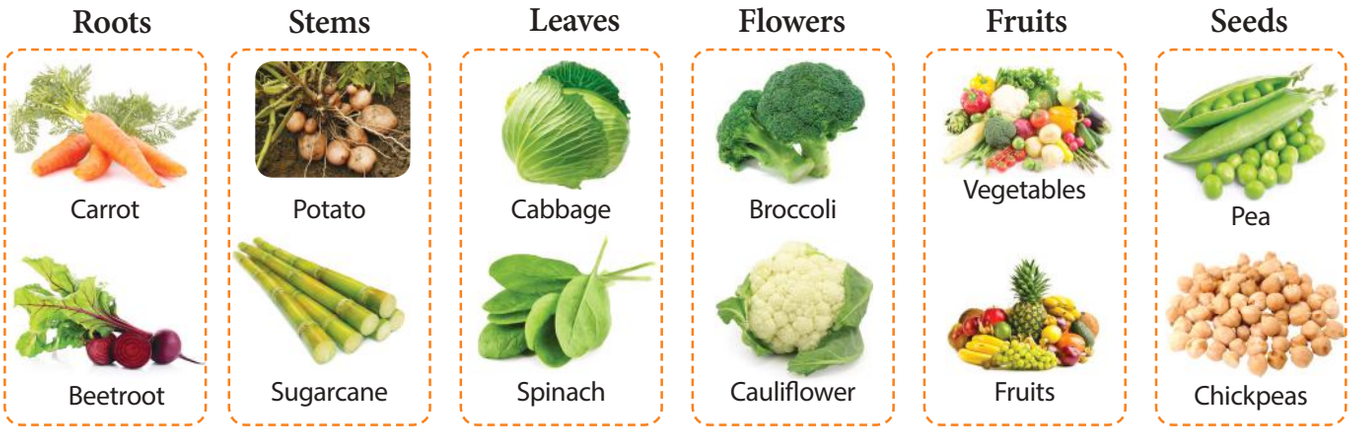
Method : Place the Coleus plant in a dark room for 48 hours. Then place it in sunlight for 6 hours. Now, pluck a leaf from the Coleus plant. Coleus leaf contains both green and non-green areas. Draw its outline on a sheet of paper. Mark the green and non-green areas carefully. Now bleach the leaf by boiling it in water and then in alcohol. Wash this leaf in cold water and place it in a watchglass. Now pour some drops of iodine solution over it with the help of dropper.

Now compare the leaf with the drawing you made earlier.

What do you observe? Only those areas of the leaf become blue which were marked as green. This shows that chlorophyll is necessary for photosynthesis.

Storage of Food in Plants

Food in plants is prepared by leaves and stored in them in the form of starch. This food is stored in different parts of the plant such as root, stem, leaves, flowers, fruits and seeds. We eat that part of a plant where food is stored.



Let's Explore

Non–Perception

Aim: To see the presence of starch in potato

Materials required: A potato slice, dropper and iodine solution

Method: Put a few drops of Iodine solution on the potato slice. Observe the change in colour. You will observe the colour of the potato slice turns brown to blue, black. This shows that starch is present in potato.

Let's Practise

Fill in the blanks by choosing the correct word from the box.

chlorophyll **plants** **photosynthesis** **starch** **food**

1. The _____ are the basic source of food for all.
2. All the animals depend upon plants for _____.
3. The process of making food by the plants is called _____.
4. The leaves contain a green pigment called _____.
5. The food prepared by leaves is stored in the form of _____.

Dig Deeper

The leaves of some plants such as croton and coleus may have a dark reddish colour. They contain coloured substances that hide the green chlorophyll. But since the leaves have chlorophyll, they still carry on photosynthesis.

Coleus plant

Croton Plant

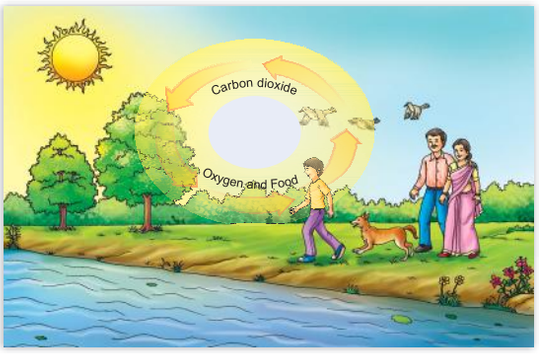
Interdependence between Plants and Animals

ICODE-33MR

Plants Provide Energy That Supports Life

For doing all activities we need energy. This energy comes from the food. Plants prepare this food by the process of photosynthesis. Humans and animals utilise this energy by taking in food prepared by the plants.

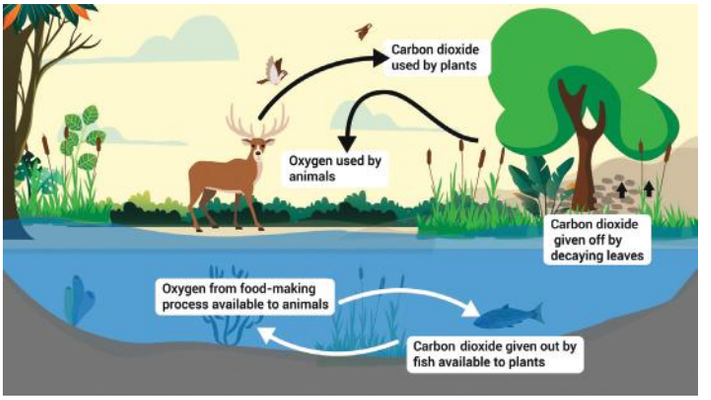
Both plants and animals need oxygen all the time to get energy. However, plants in the day time, during the process of photosynthesis, need carbon dioxide and give out oxygen. Thus, plants recycle the air and supply oxygen or fresh air for us and animals to breathe.



Interdependence between animals and plants

Animals play important role in the seed dispersal. They may eat fruits and then excrete the seeds in a different locations, helping plants to spread in new area.

Many plant depends on animals especially insects like bee for pollination. Pollination is essential for the reproduction of many plants including the production of fruit & seed. Hence plants & animals depends upon each other.



Balance in Nature

Balance in nature is very important at this time when world's population is increasing day by day. What happens if the number of animals increase more than the plants? Plants may not be able to supply enough oxygen and food. To prevent it, new sources of food and oxygen must be found. Alternatively, we should increase the number of plants to maintain the balance in nature. It is important to grow new plants. Programmes, such as **Vanamahotsava** and **Chipko Movement** make people aware of the harm caused by cutting down of trees. These movements promote the planting of new trees. Some animals also help in planting of new trees by eating the fruit of plants and then dropping out the seeds at some other place. So, it is very important to protect animals and plants to maintain balance in nature.

Let's Practise

Name the following.

1. Two leaves that are not green _____ _____
2. Two things for which animals depend on plants _____ _____
3. Two food items prepared from sugarcane _____ _____
4. A programme which makes people aware of the value of trees _____

Fascinating Tidbits

The bottle tree has a trunk shaped like a bottle.
This stores water in the trunk and is found in the desert.

Important Terms

Lamina : broad part of a leaf

Stomata : the tiny holes present on the underside of a leaf

Chlorophyll : a green substance present in leaves to trap sunlight

Photosynthesis : the process of food making by leaves using water and carbon dioxide in presence of sunlight

Let's Summarise

1. All green plants prepare food.
2. Leaves are known as the food factories of plants.
3. The leaves contain a green pigment called chlorophyll.
4. The leaves prepare their food with the help of water, carbon dioxide and energy from sun in the presence of chlorophyll. The process of food preparation by green plants is known as photosynthesis.
5. The food prepared by the leaves is sent to the different parts of the plant.

EXERCISES

A. Answer the following question orally.

Communication

1. What is stomata?

2. What do you understand by photosynthesis?

3. What is the structure of leaf?

B. Tick (✓) the correct option.

1. The stalk of the leaf is called

(a) stomata ☐ (b) veins ☐ (c) lamina ☐ (d) petiole ☐

2. For making food, the plants get energy from

(a) carbon dioxide ☐ (b) water ☐ (c) sunlight ☐ (d) chlorophyll ☐

3. Green leaves of the plants are called

(a) food factory ☐ (b) stomata ☐ (c) cells ☐ (d) chlorophyll ☐

4. In which part, extra food is stored by the plants?

(a) Leaf ☐ (b) Stem ☐ (c) Roots ☐ (d) All of these ☐

5. The word 'photo' in the photosynthesis means

(a) Sunlight ☐ (b) Leaf ☐ (c) Oxygen ☐ (d) Put together ☐

C. Match the following:

Column A	Column B
1. Petiole	a. Openings on the leaves
2. Stomata	b. Green substance present in leaves
3. Food factories	c. Green leaves
4. Chlorophyll	d. Leaf stalk

D. Tick (✓) the right and cross (✗) the wrong statements.

1. Plants produce their own food in their roots. ( )

2. Food is stored in the plants mostly in the form of starch. ( )

3. Oxygen is given out during photosynthesis. ( )

4. Broad part of the leaf is called petiole. ( )

E. Draw a picture of photosynthesis process. Colour and label it.

Art Integration

F. Give reason for the following.

Critical Thinking

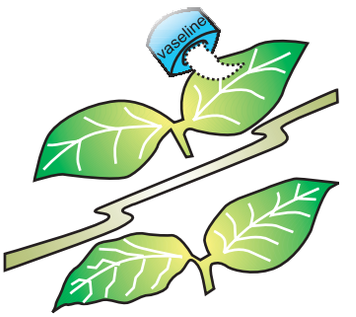
1. Why do desert plants have thick leaves?

2. Do plants use oxygen during day time?

G. Do and observe.

Experiential Learning

- Take some leaves from any plant.
- Apply vaseline on the surface of some of the leaves.
- Leave the other leaves without applying vaseline.
- Expose all the leaves to sunlight.
- Now find out which of these leaves wilt more quickly. Why?



The leaves without the vaseline coating wilt more quickly.
The coating of vaseline prevents water from escaping.

H. Read and answer the following.

Case Study Based

Soha went to the park with her friends to play. While playing in the park she observed fallen leaves on the ground. She tried to know about it and name the parts of a leaf.

1. The broad flat part of the leaf is

(a) lamina (b) mid veins (c) side vein (d) stomata

2. The vein that runs through the centre of the leaf is known as

(a) mid vein (b) side vein (c) leaf blade (d) lamina

3. The stalk of the leaf is called _____.

I. In the questions given below, there are two statements marked as Assertion (A) and Reason (R). Read the statements and choose the correct option. Inference

(a) Both Assertion (A) and Reason (R) are correct and Reason (R) is the correct explanation of Assertion (A).

(b) Both Assertion (A) and Reason (R) are correct but Reason (R) is NOT the correct explanation of Assertion (A).

(c) Assertion (A) is true, but Reason (R) is false.

(d) Assertion (A) is false, but Reason (R) is true.

1. **Assertion (A):** Leaf is known as "Food factory" of the plant.

   Reason (R): Leaf makes food for the plant.

2. **Assertion (A):** Croton plants does not have chlorophyll.

   Reason (R): Leaves of croton plants appear red because red substance hides the chlorophyll.

J. Answer the following questions.

1. What is photsynthesis?
2. How will you prove that starch is present in the leaves?
3. What is the function of leaves?
4. Name the different parts of a plant in which food is stored.
5. How do stomata help the plants?

K. While your mother is preparing your lunch discuss with her what type of plant and its parts are used in the kitchen. Collaboration

L. How are plants dependent upon animals? Show the interdependence of plants and animals. Postulation

M. Unscramble the following: Intellectual Development

1. AEFL _____
2. AAOSTTM _____
3. HPLCHORLLYO _____

Life Skills

The surroundings of your home must have some trees and plants. Do you take care of them? Tick (✓) the statements which show what you do for the healthy environment of your surroundings.

1. Water the small plants.
2. Pluck the leaves and flowers.
3. Damage the stem of trees by throwing stones.
4. Never throw the garbage on plants.
5. Plant a tree on every birthday.

As per NEP 2020 and NCF 2023

STEM

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5

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Preface

The **SCIENCE CONNECT** series consist of five meticulously crafted books for classes 1 to 5. These books are in accordance with the latest syllabus prescribed by the **Council for the Indian School Certificate Examination**, New Delhi for **Indian Certificate of Secondary Education (ICSE)**. These have been developed in accordance with the guidelines given by **National Education Policy (NEP) 2020** and **National Curriculum Framework (NCF) 2023**.

Throughout this series, students will embark on an exciting journey to uncover the fascinating secrets of nature and the universe. These books provide a variety of engaging activities that encourage active participation and **experiential learning**. These books foster **curiosity**, **observation**, and **critical thinking** in young learners.

Distinctive features of book:

- present the age-appropriate content in a **clear**, **concise** and **logical** manner.
- written in simple, easy to understand language.
- introduces each chapter with an engaging and interactive **Warm-up section** to recall the previous knowledge related to the chapter.
- contains vibrant **colourful illustrations** and **pictures** to captivate students' interest, enhance concept clarity and learning experience.
- provides topics and sub-topics accompanied by **in-text activities** (both recall-based and **hands-on experiments**) that encourage experiential learning and inquisitive approach.
- contains extra useful information to enhance students' knowledge.
- features comprehensive questions that target various cognitive levels and **21st Century Skills** in alignment with **NEP 2020 and NCF 2023**.
- integrates **Life Skills** that enhance students' overall development.
- promotes **Environmental Awareness** among students, aligning with the **Sustainable Development Goals (SDGs)**.
- aims to inculcate **inventiveness**, **passion for learning** and **competence** in students.
- complements the **Teacher's Resource Book** comprising **overview of the lessons**, **lesson plan** to achieve the learning objectives and **answer key** for the textbook questions
- offers **Online Resources** that includes animated videos/video lectures and interactive exercises.

We are sure that **SCIENCE CONNECT** series will make learning science exciting, effective and proactive for the students. We are looking forward to your valuable suggestions.

With best regards,
Inventant Education

Features of this Series...

Content Section

Snapshot
In this section, glimpse of covered topics and concepts in the chapter is provided.

Snapshot

- Reproduction in plants
- Dispersal of seeds
- Germination of seeds
- Agriculture

Warm-up

Look at the pictures below. We know about different kinds of food and their group. Write names of the food group related to each picture.

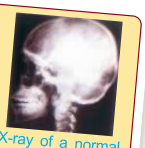
Food is one of the basic need for life. To keep our body fit and healthy, we should eat proper food and drink sufficient water.

Warm-up
It offers a warm-up exercise for the students in the form of a comic strip, interaction, questions, or an activity to introduce the chapter and connect it with their prior knowledge related to the topic.

Dig Deeper
This feature gives extra useful information in the form of extended learning.

Dig Deeper

Doctors and dentists use X-rays to take pictures of broken bones and growing teeth inside your body. Doctors also use much stronger X-rays to treat cancers.



X-ray of a normal human skull

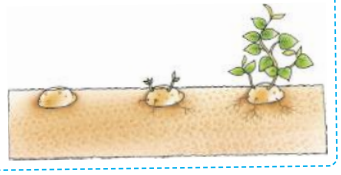
Fascinating Tidbits
This section shares fascinating scientific facts closely related to the chapter.

Fascinating Facts Testimony

The total length of all the nerves present in the body of an adult human being is about 72 km (45 miles).

Let's Explore Inference

Aim : To show the reproduction from stem
Materials required : A potato, knife and damp soil
Method : Cut a potato into many parts, so that each part has a bud or 'eye'. The 'eye' should be facing upwards. Cover these parts in damp soil. After a few days, new plants grow from the cuttings.



Let's Explore
Hands-on experiments and activities are provided in this section that aim to foster understanding through learning by doing and experimentation.

Amazing Indian Science
This section helps students to understand and appreciate the significant contributions of India in science within the curriculum.

AMAZING INDIAN SCIENCE

Sir Jagadish Chandra Bose conducted experiments to demonstrate that just like humans, plants too have feelings.

Let's Practise

Write (T) for True and (F) for False statements.

1. Mango seed is an example of dicot seed. _____
2. Hiptage seed is dispersed by water. _____
3. In jasmine plant we can grow new plant by layering process. _____
4. Onion is an example of underground root. _____
5. Xanthum and tiger claw seeds are dispersed _____

Let's Practise
Recall-based exercises in the form of Fill in the blanks, True/False, Right/Wrong statements etc., are given in this section.

Important Terms

The meaning of important terms is given in this section for a quick reference.

Important Terms

Seedling	: a small baby plant coming out of a seed
Dispersal	: scattering things over a wide area
Grains	: small and hard seeds of cereals such as wheat, rice and oats
Insecticides	: chemicals used to destroy harmful insects on plants

Let's Summarise

- Reproduction in plants brings more and more plants on the earth.
- Seeds are covered with a seed coat and have two seed leaves and a baby plant inside them.
- The process of development of a seed into a seedling is called germination.
- The conditions necessary for germination of seeds are air, water, sunlight and suitable temperature.
- The scattering of seeds far away from the mother plant is called dispersal of seeds.
- Dispersal of seeds occurs mostly by wind, water and animals.
- Plants must be protected from insects, birds, animals and some microbes.

Let's Summarise

This feature provides a point-wise summary of the chapter for a quick recap and knowledge retention.

Assessment Section

Oral Questions (Communication)

The students will articulate their thoughts and ideas verbally. This section is designed to strengthen their communication skills and to encourage effective expression.

A. Answer the following questions orally.

1. Name two vegetables which grow well in a cool climate
2. Which type of soil condition is required for growing paddy (rice) crops?
3. Name two seeds which are dispersed by explosion.

F. Think and answer. Critical Thinking

1. When we enter a movie hall which is dark inside, we are not able to see anything. But after sometime, we can see the steps or seats. Why?
2. While skating you must wear a skating helmet. Why?
3. When you go for swimming, you wear swimming glasses. Why?

Critical Thinking

This section require students to engage in brainstorming, think beyond the confines of textbooks and apply concepts they have learned so far.

Creativity

These questions nurture a mindset that values and promotes innovative thinking across various domains.

J. Breathing polluted air is harmful to our body. We should support the preserved of clean air. Make a poster with a catchy slogan to create awareness. Creativity

I. Seed Study Collaboration

Divide the class into two groups. One group will be given dry rice with husk and other group will be given soaked rajma seeds.

1. Find out differences between a monocot seed and a dicot seed.
2. Also, find out differences between a dry seed and a soaked seed.

Collaboration

By using these questions, the students learn to work effectively with others and contribute positively to group dynamics.

Experiential Learning

These questions focuses on hands-on, real-life experiences to enhance understanding and knowledge acquisition.

F. Observe how a seed grows. Experiential Learning

Materials required : Glass jar, glass funnel, blotting paper, soil, bean seeds and water.

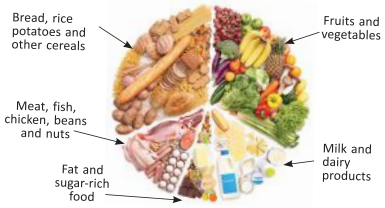
Method : Clean the jar and glass funnel. Make a cone from a blotting paper and fix it in the funnel. Fill up the funnel with soil.

Place 10 seeds of bean in the blotting paper funnel. Pour water into the soil. Observe seeds growing day-by-day.

Picture Based Analysis

Such questions prompt the students to analyse, interpret and draw conclusions from visual information to promote critical thinking.

I. The given diagram shows the components of a balanced diet. Picture Based Analysis



Components of a balanced diet

Art Integration

The students use their creative ideas of making something related to art, craft and poster-making. This section connects science with art and culture.

G. Prepare a chart showing Do's and Don'ts of preventing the spread of communicable diseases. Art Integration

Exploration

This section is an active learning approach that helps the students to learn through curiosity, enquiry and it promotes brain development.

I. Visit a water treatment plant near your home or school. Explore the purification techniques being used there in order to provide drinking water supply.

J. Answer the following questions. Exploration

1. Why should drinking water be purified?
2. What is distillation?
3. What is sedimentation?
4. Differentiate between decantation and filtration.
5. List any two sanitary measures by which water can be kept free from germs.

Subject Integration

These questions helps students to see the interconnectedness of different subjects, making learning more meaningful and practical.

K. Research about crops and their cropping pattern in different states of India. Make a power point presentation and discuss with peers. Subject Integration

Assertion and Reason

This section enhances the analytical thinking abilities of the students.

Assertion and Reason

K. In the questions given below, there are two statements marked as Assertion (A) and Reason (R). Read the statements and choose the correct option.

(a) Both Assertion (A) and Reason (R) are correct and Reason (R) is the correct explanation of Assertion (A).

(b) Both Assertion (A) and Reason (R) are correct but Reason (R) is not the correct explanation of Assertion (A).

(c) Assertion (A) is true, but Reason (R) is false.

Case Study

Such questions foster critical thinking and decision-making skills. They promote the practical application of knowledge.

G. Read the passage given below and answer the questions that follow. Case Study Based

Agriculture is the practice of growing plants on a large scale for food and other purposes. Plants of one kind grown on a large scale in a particular area during a particular season are called crops. Farmers grow different crops in different seasons. Crops such as rice and maize that are grown in summer season and are harvested at the end of monsoon season are called *kharif* crops. Crops like wheat and gram that are grown in winter season and harvested in the spring are called *rabi* crops.

1. Agriculture is the practice of
   (a) spraying chemicals on crops

Life Skills

This section promotes betterment of life along with environmental awareness and sensitivity relevant to the specific chapter's content. Reading and activities based on Sustainable Development Goals (SDGs) have also been integrated.

Life Skills

Development of Life Energy

Celebrate your birthday by buying a potted plant or by planting a sapling in your garden every year. Take care of the plant by pouring water and manure (like used tea leaves) at a regular interval. Check the growth of your plant and your own growth. Compare and find out who is growing faster, you or your plant? Name your plant and love your green friend.

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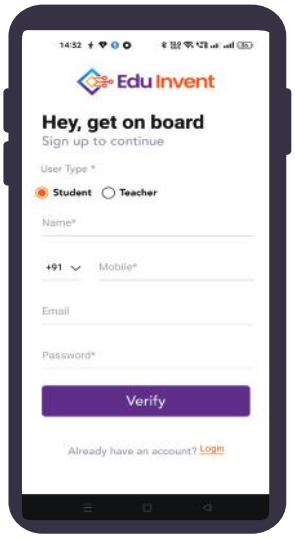

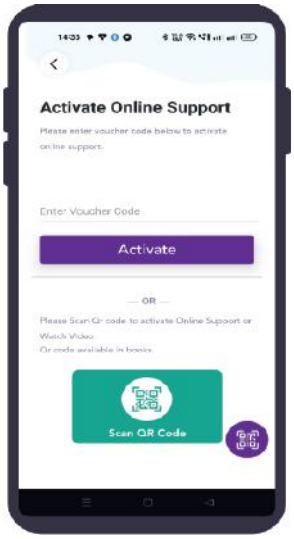

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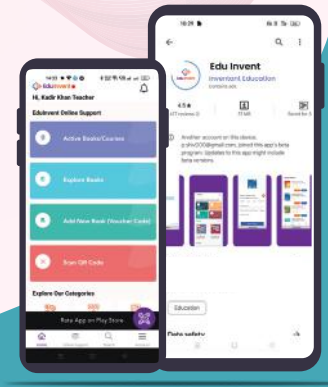

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CONTENTS

1 Reproduction in Plants

Snapshot

- Reproduction in plants
- Dispersal of seeds
- Germination of seeds
- Agriculture

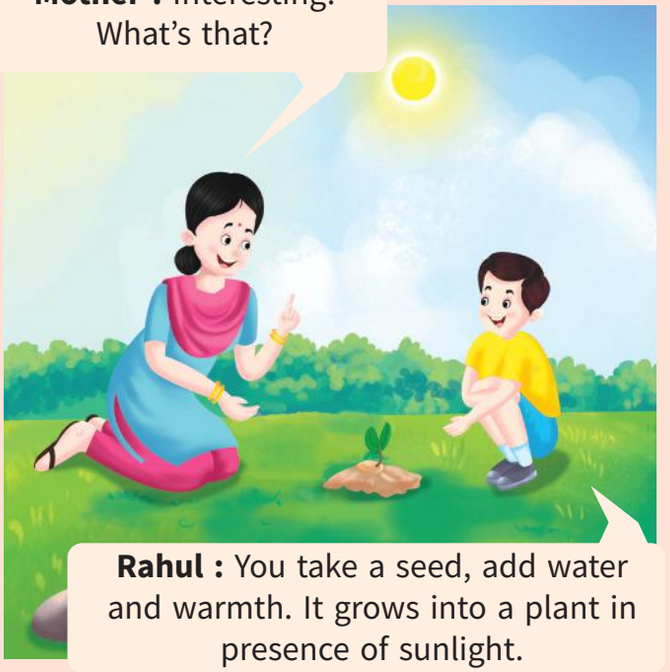
Warm-up

Rahul and his mother are walking in a garden.

Mother : How was your school today?

Rahul : Good, mom. We learned about seed germination.

Mother : Interesting! What's that?



Rahul : You take a seed, add water and warmth. It grows into a plant in presence of sunlight.

Look at the picture and answer the questions that follow.

i. Give one caption for the given picture.

_____

ii. What are the conditions required for the process shown in given picture?

_____

Plants play a very important role in our lives. Life on the earth cannot exist without plants.

- Plants give us food, wood, fibres and many other things.
- They supply oxygen for the survival of all living organisms.
- They make our earth beautiful.

Since, plants play a major role in our lives, it is necessary for us to grow new plants.

Plant products

Reproduction in Plants

ICODE-gGyR

We can grow new plants from different parts of plants such as spores, seeds or by vegetative parts.

Reproduction is a process by which new plants are grown from the parent plant, e.g., from mango seeds, mango trees are grown.

Reproduction from Spores

Spores are very tiny seed like structures.

Plants, such as ferns and moss reproduce from spores. In fern plants, groups of spores are found in the form of **sori**, in the leaves.

Group of spores (sori) on ferns

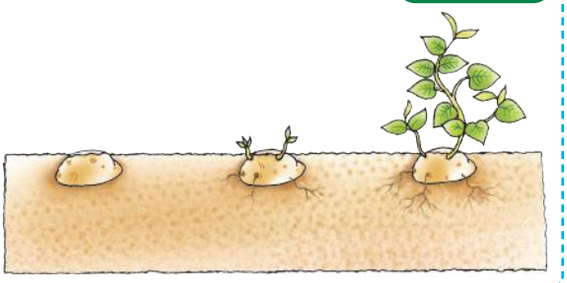
Let's Explore

Inference

Aim : To show the reproduction from stem

Materials required : A potato, knife and damp soil

Method : Cut a potato into many parts, so that each part has a bud or 'eye'. The 'eye' should be facing upwards. Cover these parts in damp soil. After a few days, new plants grow from the cuttings.



Tiny plants from buds

Potato, ginger and onion

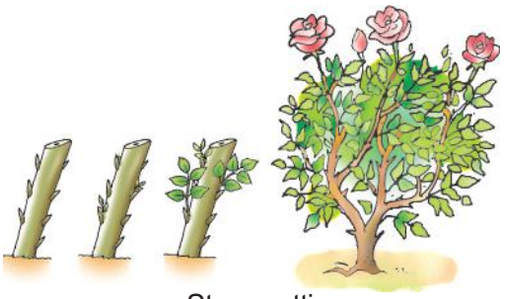
Reproduction from Underground Stems

Onion, ginger and potato are underground stems. New plants can be grown from their stems.

Take a potato and observe it. You will find small buds on it. New plants grow from them.

Ginger grows from the buds on the ginger stem.

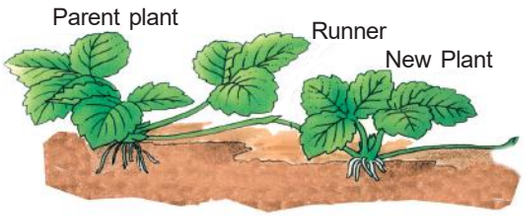
Onion is a bulb-shaped structure containing fleshy leaves to store food and underground stem. New plants grow from these bulbs.



Stem cutting

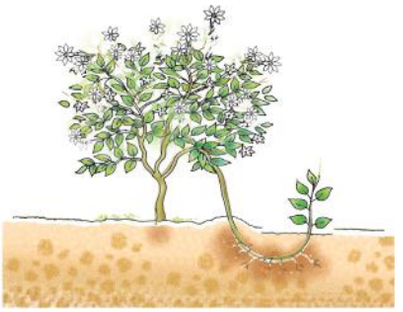
Reproduction from Stem Cuttings

We can reproduce some plants by taking a cutting from the stem and planting it in the soil. After a few days, this cutting will grow into a new plant. Rose, *Bougainvillea*, cactus, *Hibiscus* and sugarcane can be grown from stem cuttings.



Runner in strawberry plant

In case of strawberry, long stems along with buds grow over the soil surface and are called **runners**. Buds which are present on the stem grow into new plants.



Layering in jasmine plant

To get a jasmine plant, the lower branch of the stem is bent, so that a part of the stem is buried under the soil. This process is called **layering**.

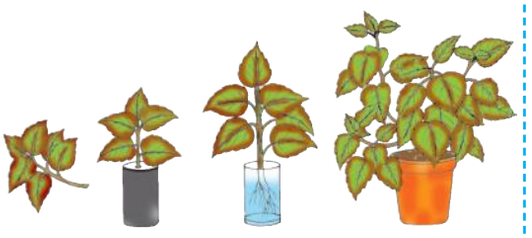
The growing tip remains above the soil surface. After some time, roots grow from the part of stem buried in the soil. Now this new plant can be cut from the parent plant and planted as a new independent plant.

Let's Explore

Direct Perception

Aim : To grow a *Coleus* plant in the classroom by planting a stem cutting

Materials required : *Coleus* plant, flower pot and a glass of water



Method : Cut the stem of the *Coleus* plant. Put this cutting in a glass of water. Cover the glass from outside with a dark-coloured paper. Put the glass in sunlight. After a week, take off the dark paper. You will see the roots growing from the stem cutting. Plant this stem cutting in a flowerpot. Water it regularly. You will get a new *Coleus* plant.

Roots

Reproduction from Roots

Roots of some plants such as sweet potato, carrot, turnip and radish not only store food in them but also produce new plants. They are known as **tuberous** roots. These roots are planted in the soil to grow new plants.

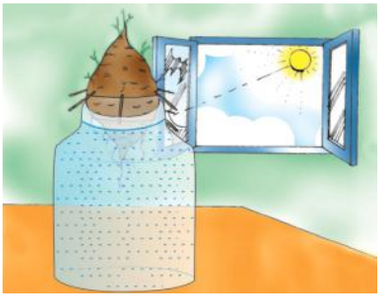
Intellectual Development

Let's Explore

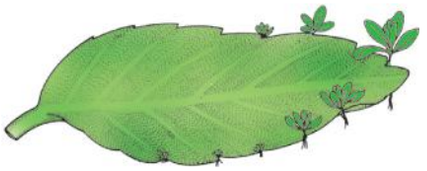
Aim : To show the reproduction from roots

Materials required : A sweet potato, a bottle full of water and toothpicks

Method : Take a sweet potato. Place it in a bottle full of water using toothpicks. Take care that the lower part of the sweet potato is in the water. Put the bottle on a window-sill, so that it gets sunlight and fresh air. After a few days, you will see a plant growing out of it.



Sweet potato



Bryophyllum leaf

Fascinating Tidbits

Tissue culture is the growth of tissues or cells separated from the organism. 'Tissue culture' commonly refers to the culture of animal cells and tissues, while the more specific term 'plant tissue culture' is used for plants.

Reproduction from Leaves

Some plants have leaves which grow buds along its edges. New plants grow from these buds and later separate from parent plant, e.g., *Bryophyllum* and *Begonia* plants.

Growing Plants from Seeds

Most flowering plants grow from seeds. Seeds are found within fruits, and fruits are formed from flowers. A plant produces many seeds. But all the seeds do not grow into plants. Some seeds are eaten up by animals and birds, some seeds get destroyed by heat, rain etc; and some others do not get proper light, water and air to grow. Thus, only a few seeds grow into new plants.

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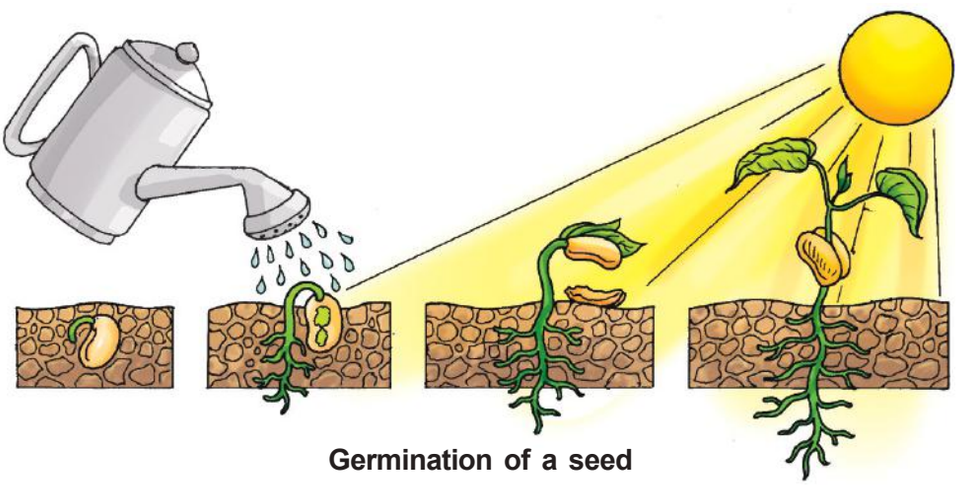
Germination of Seeds

When we cut open the fruits, we find seeds in them. Some fruits have many seeds such as watermelon and some have only one seed such as mango. Have you ever observed a seed carefully? Let us do an activity for seed. When seeds get enough water, air and warmth they grow into new plants. The growth of a baby plant or a seedling from a seed is called **germination**.



Germination of a seed

Parts of a Seed

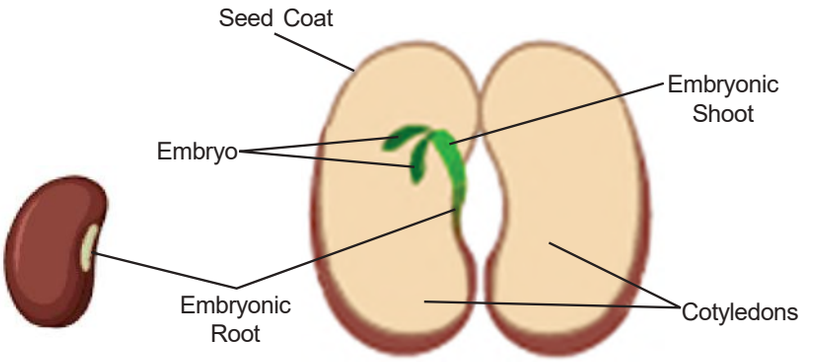
The following are the parts of a seed :

(1) **Seed coat:** The external covering of a seed is termed as a **seed coat**. It protects the embryo from injury and drying . Its colour varies from plant to plant.

(2) **Seed leaves or cotyledons:** When we remove the seed coat, we get cotyledons. They store food for the baby plant inside.

(3) **Embryo or Baby plant:** It is present in between the cotyledons. It grows a new root system and a shoot system and develops into a new plant.

(4) **Endosperm:** It is seen around the embryo and provides food supply to the developing embryo.



Growing plants from seeds

Depending on the number of cotyledons seeds are of two types :

- **Monocotyledonous :** The seed which has only one cotyledon is known as monocotyledonous seeds. E.g., rice, wheat, maize, etc.
- **Dicotyledonous :** The seed which has two cotyledons is known as dicotyledonous seed. E.g., kidney bean, pea, mango seed, etc.

Monocotyledonous seed

Dicotyledonous seed

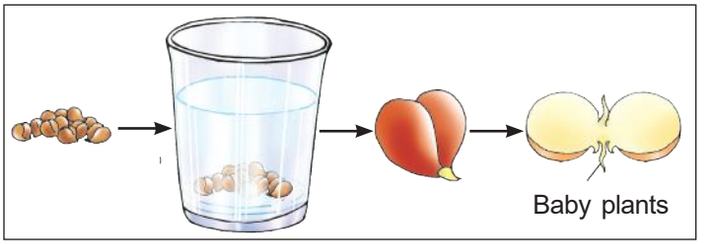
Let's Explore

Direct Perception

Aim : To show a seed and its parts

Materials required : Seeds of gram or bean and a glass half filled with water.

Method : Take some gram seeds and soak them in water for 2-3 days. Take one of these seeds. You will observe that it has an outer covering. This outer covering is called **seed coat**. Seed coat protects the baby plant inside the seed.

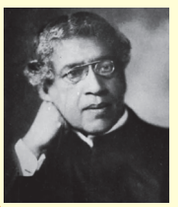


Now remove the **seed coat**. You will find two seed leaves. These are called **cotyledons**. Open them and you will find a baby plant. Seed leaves store food for the baby plant. The baby plant is also known as **seedling**.

Fascinating Tidbits

Squirrels bury seeds to eat during the winter. Sometimes squirrels forget where they had buried these seeds and the forgotten seeds may sprout during the following spring.

AMAZING INDIAN SCIENCE



Sir Jagadish Chandra Bose conducted experiments to demonstrate that just like humans, plants too have feelings.

Dispersal of Seeds

If all seeds simply fall from the parent plant to the ground, many seedlings would die because they would all be competing for the same limited space, supply of water, light and minerals. To avoid this competition, seeds are dispersed by various means.

The process of spreading seeds to different places is called **dispersal** of seeds.

Dispersal of seeds by wind

Dispersal of coconut by water

Dispersal of seeds by animals

Dispersal of seeds by explosion

Agents of Dispersal

Dispersal takes place by the following agents.

(1) Wind

Seeds which are dispersed by wind have wings or tufts of hair on them. *Madar*, hiptage, dandelion and cotton seeds are dispersed by wind.

(2) Water

Some seeds are dispersed by water, eg. lotus and coconut. The coconut has a fibrous outer coat. Hence, it is easily carried away by water.

(3) Animals

Some seeds such as Xanthium, *Datura*, and tiger claw have hooks or spines that stick to the body of an animal. They are carried away and fall in another place, where these seeds grow. Human beings and animals eat certain fruits and throw away their seeds. In this way they help in dispersal of seeds.

(4) Explosion

Some of the fruits explode on drying. The force of explosion disperses their seeds. Pea, poppy, honesty seeds, etc. get dispersed by explosion.

Let's Practise

Write (T) for True and (F) for False statements.

1. Mango seed is an example of dicot seed. _____
2. Hiptage seed is dispersed by water. _____
3. In jasmine plant we can grow new plant by layering process. _____
4. Onion is an example of underground root. _____
5. Xanthum and tiger claw seeds are dispersed _____

Agriculture

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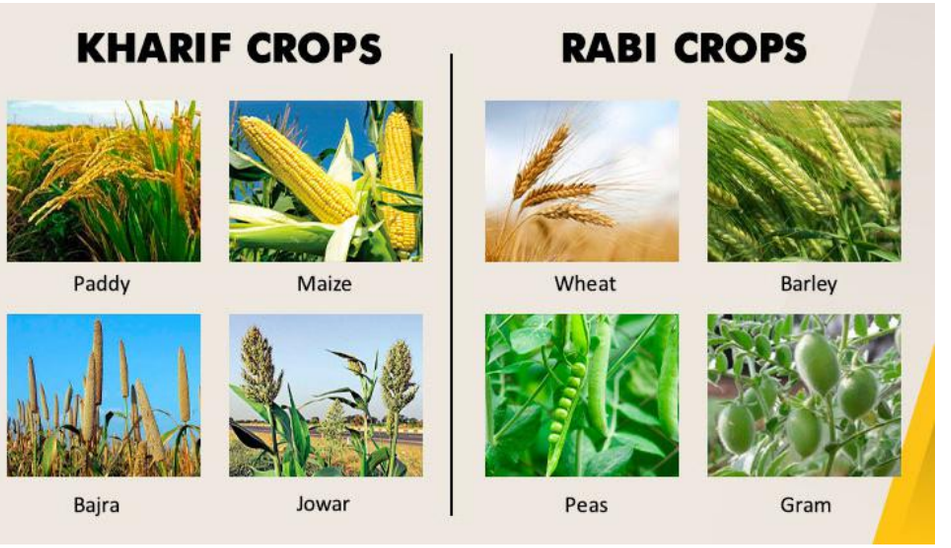
The practice of growing crops and rearing animals on a large scale for food or another purpose is termed as **agriculture**. Same kind of plants when grown at a particular region at a particular time are known as **crops**. Crops can be vegetables or cereals, pulses, beverages.

- Crops, such as rice and maize that are grown in summer season and harvested at the end of monsoon season are called ***kharif* crops**.
- Crops, such as wheat and gram that are grown in winter season and harvested in the spring season are called ***rabi* crops**.



Seasonal and Soil Diversity in Crops Cultivation

Vegetables grow best in the soil containing enough minerals.

Vegetables, such as cabbage, peas, cauliflower, carrot and radish need a cool climate to grow well.

Vegetables, such as brinjal, pumpkin and lady finger need a warm climate.

- Paddy grows in wet and clayey soil.
- Wheat grows best in well-drained soil in the temperate regions.
- Cotton grows best in the black lava soil and jute grows in light alluvial soil in a hot and wet climate.
- Tea and coffee plants grow well on the hilly slopes because they need plenty of heat and water that does not remain standing for a long time near the roots.

Ploughing is done for loosening of soil

Steps of agriculture

- Ploughing
- Sowing of seeds
- Protection of crops from insects and pests
- Gathering of crops and storage
- Addition of manure and fertilisers
- Irrigation of field
- Harvesting of crops

How are crops protected?

The crops get damaged, if proper care is not taken. So we need to protect our crops against :

(a) insects such as grasshoppers, locusts and caterpillars

(b) diseases

(c) grazing animals such as buffaloes, cows and goats.

We can protect the crops in the following ways:

1. Insecticides and pesticides are sprayed on crops, as they protect them from being destroyed by pests. But they should be used in very small quantity.
2. The fungicides can be used to kill the microbes which are responsible for diseases in plants.
3. Grazing animals can be kept away by proper fencing.
4. Birds can be kept away from crops by using a 'scarecrow'.
5. The best way of protecting the grains is to store them in water-proof, insect-proof, airtight, sealed plastic containers.

Spraying of pesticides and insecticides

Important Terms

Seedling : a small baby plant coming out of a seed
Dispersal : scattering things over a wide area
Grains : small and hard seeds of cereals such as wheat, rice and oats
Insecticides : chemicals used to destroy harmful insects on plants

Let's Summarise

- Reproduction in plants brings more and more plants on the earth.
- Seeds are covered with a seed coat and have two seed leaves and a baby plant inside them.
- The process of development of a seed into a seedling is called germination.
- The conditions necessary for germination of seeds are air, water, sunlight and suitable temperature.
- The scattering of seeds far away from the mother plant is called dispersal of seeds.
- Dispersal of seeds occurs mostly by wind, water and animals.
- Plants must be protected from insects, birds, animals and some microbes.

EXERCISES

A. Answer the following questions orally. Communication

1. Name two vegetables which grow well in a cool climate.
2. Which type of soil condition is required for growing paddy (rice) crops?
3. Name two seeds which are dispersed by explosion.

4. Which type of seeds are present in mangoes?
5. Which vegetative part of a plant is used to grow a potato?

B. Tick (✓) the correct option.

1. The thick outer covering of the seed which protects the baby plant is called

   (a) germination ☐ (b) seed coat ☐ (c) spores ☐ (d) seed leaves ☐

2. Plants give us

   (a) fibres ☐ (b) foods ☐ (c) oxygen ☐ (d) all of these ☐

3. The process by which a seed produces a baby plant is called

   (a) growth ☐ (b) dispersal ☐ (c) germination ☐ (d) harvesting ☐

4. Part of the seed that contains food for the baby plant is

   (a) cotyledon ☐ (b) germination ☐ (c) seed coat ☐ (d) spore ☐

C. Fill in the blanks by choosing correct words from the box.

microbes wet vegetable clayey root baby plant wings

1. Seeds dispersed by wind have _____ on them.
2. You can see a very small _____ between the seed leaves.
3. Fungicides are used to kill _____ .
4. Paddy grows well in a _____ and _____ soil.
5. Carrot is a _____.

D. Put a (✓) mark against the correct and (✗) against the wrong statements.

1. Coconut is dispersed by water. ☐
2. Potato grows from a stem cutting. ☐
3. Seeds grow immediately after they land on the soil. ☐
4. Plants scatter their seeds over a wide area for their healthy growth. ☐

E. Match the following.

Column A	Column B
1. Rose	a. It has baby plant inside
2. Seed	b. Store food for baby plant
3. Seed leaves	c. Dispersal by explosion
4. Seed coat	d. Small baby plant coming out of seed
5. Honesty seeds	e. Thick outer covering of the seed
6. Seedling	f. Grows from stem cutting

F. Observe how a seed grows.

Experiential Learning

Materials required : Glass jar, glass funnel, blotting paper, soil, bean seeds and water.

Method : Clean the jar and glass funnel. Make a cone from a blotting paper and fix it in the funnel. Fill up the funnel with soil.

Place 10 seeds of bean in the blotting paper funnel. Pour water into the soil. Observe seeds growing day-by-day.

G. Read the passage given below and answer the questions that follow.

Case Study Based

Agriculture is the practice of growing plants on a large scale for food and other purposes. Plants of one kind grown on a large scale in a particular area during a particular season are called crops. Farmers grow different crops in different seasons. Crops such as rice and maize that are grown in summer season and are harvested at the end of monsoon season are called *kharif* crops. Crops like wheat and gram that are grown in winter season and harvested in the spring are called *rabi* crops.

1. Agriculture is the practice of

(a) spraying chemicals on crops ☐

(b) cutting and gathering a crop ☐

(c) growing plants on a large scale for food and other purposes ☐

(d) watering an area of land through pipes or channels ☐

2. _____ and _____ crops are grown in monsoon.

(a) Rice, maize ☐ (b) Rice, wheat ☐

(c) Wheat, gram ☐ (d) Maize, gram ☐

3. _____ and _____ crops are harvested in spring season.

(a) Rice, maize ☐ (b) Rice, wheat ☐

(c) Wheat, gram ☐ (d) Maize, gram ☐

4. The crops grown in summer season and harvested at the end of monsoon season are called

(a) zaid crops ☐ (b) seasonal crops ☐

(c) *kharif* crops ☐ (d) *rabi* crops ☐

H. In the questions given below, there are two statements marked as Assertion (A) and Reason (R). Read the statements and choose the correct option.

(a) Both Assertion (A) and Reason (R) are correct and Reason (R) is the correct explanation of Assertion (A).

(b) Both Assertion (A) and Reason (R) are correct but Reason (R) is NOT the correct explanation of Assertion (A).

(c) Assertion (A) is true, but Reason (R) is false.

(d) Assertion (A) is false, but Reason (R) is true.

1. **Assertion (A):** Field is ploughed before adding manures and chemical fertilisers.
   Reason (R): With the help of plough, the soil becomes loose and air quantity increases.
2. **Assertion (A):** Fencing keeps the bigger animals away.
   Reason (R): Scarecrows protect the crop from birds.

I. Seed Study

Collaboration

Divide the class into two groups. One group will be given dry rice with husk and other group will be given soaked rajma seeds.

1. Find out differences between a monocot seed and a dicot seed.
2. Also, find out differences between a dry seed and a soaked seed.

J. Answer the following questions.

1. What is germination?
2. What is meant by dispersal of seeds?
3. How can plants be protected against insects, animals and diseases?
4. What is layering?
5. How can a farmer get a high yield of crops?
6. What are the conditions required for the germination of seeds?

K. Research about crops and their cropping pattern in different states of India. Make a power point presentation and discuss with peers.

Subject Integration

L. Make a kitchen garden at home. Learn some gardening skills with the help of your parents and eat organic vegetables.

Life Skills

Development of Life Energy

Celebrate your birthday by buying a potted plant or by planting a sapling in your garden every year. Take care of the plant by pouring water and manure (like used tea leaves) at a regular interval. Check the growth of your plant and your own growth. Compare and find out who is growing faster, you or your plant? Name your plant and love your green friend.