BASIC SCIENCE

Part - 1

Standard V

Government of Kerala
Department of General Education

Prepared by

State Council of Educational Research and Training (SCERT), Kerala

2024

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The National Anthem

Jana-gana-mana adhinayaka, jaya he
Bharatha-bhagya-vidhata.
Punjab-Sindh-Gujarat-Maratha
Dravida-Utkala-Banga
Vindhya-Himachala-Yamuna-Ganga
Uchchala-Jaladhi-taranga
Tava subha name jage,
Tava subha asisa mage,
Gahe tava jaya gatha.
Jana-gana-mangala-dayaka jaya he
Bharatha-bhagya-vidhata.
Jaya he, jaya he, jaya he,
Jaya jaya jaya, jaya he!

PLEDGE

India is my country. All Indians are my brothers and sisters.

I love my country, and I am proud of its rich and varied heritage. I shall always strive to be worthy of it.

I shall give respect to my parents, teachers and all elders and treat everyone with courtesy.

I pledge my devotion to my country and my people. In their well-being and prosperity alone lies my happiness.

Basic Science V

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Friends,

This textbook contains fundamental information and a variety of activities for observing deeply and studying the environment in which we live. When you observe in this way, you can understand the features of creatures and things, and the connections among them. The book also provides the opportunity to understand the basic factors that influence human life as a social animal. This book includes many activities that you can do along with your friends. The Basic Science textbook offers occasions for creating knowledge through fun activities including observation, queries, discussions, debates, simple experiments, and projects. We hope that the information given in the textbook will prompt you to seek out further knowledge. Learn and enjoy..

Wishes,

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Contents

Certain icons are used in this textbook for convenience


For further reading
(Evaluation not required)


ICT possibilities for
making concepts clear


Let us assess


Extended activities

THE CONSTITUTION OF INDIA

PREAMBLE

WE, THE PEOPLE OF INDIA, having solemnly resolved to constitute India into a [1]**[SOVEREIGN SOCIALIST SECULAR DEMOCRATIC REPUBLIC]** and to secure to all its citizens :

JUSTICE, social, economic and political;

LIBERTY of thought, expression, belief, faith and worship;

EQUALITY of status and of opportunity; and to promote among them all

FRATERNITY assuring the dignity of the individual and the [2][unity and integrity of the Nation];

IN OUR CONSTITUENT ASSEMBLY this twenty-sixth day of November, 1949 do **HEREBY ADOPT, ENACT AND GIVE TO OURSELVES THIS CONSTITUTION.**

---

1. Subs. by the Constitution (Forty-second Amendment) Act, 1976, Sec.2, for "Sovereign Democratic Republic" (w.e.f. 3.1.1977)
2. Subs. by the Constitution (Forty-second Amendment) Act, 1976, Sec.2, for "Unity of the Nation" (w.e.f. 3.1.1977)

1 THE CHAIN OF LIFE

Figure 1.1

Observe the picture.

Which bird is in the picture?

What is its main food?

Where is this bird usually seen?

What could be the reason for that?

The kingfisher lives in burrows on river banks or near ponds. They mostly choose places near water sources where they can fish.

There are many creatures around us who eat various kinds of food.

What are the different types of food that they eat?

What is the main food of goat?

-
-

Figure 1.2

Which other creatures feed on parts of plant?

Find and write.

- Deer
- Rabbit
-
-

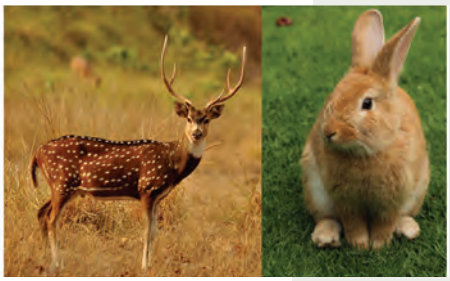


Figure 1.3

Food and habitat

Observe the picture.

Illustration 1.1

Write down the creatures seen in the picture.

Which of these creatures feed on plants?

- Small fishes
-
-

Which creatures feed on small fishes?

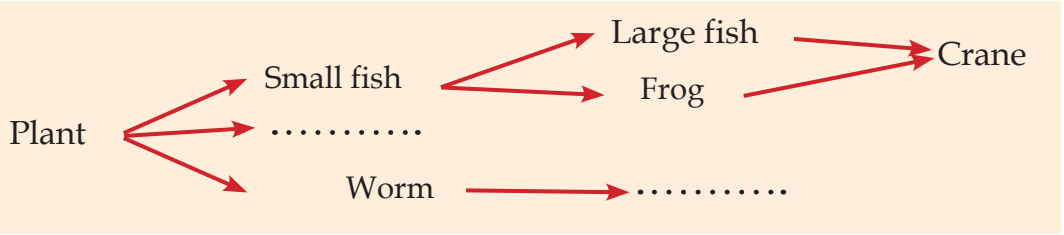
-
-

Every creature in the picture feeds on some other organism.

Small fishes feed on plants.

Large fishes feed on small fishes.

Cranes feed on fishes. Complete the illustration by adding other creatures in the field.



Linked together

Deer, rabbit and grasshopper are plant-eating creatures.

Complete the food relationship by adding other creatures that feed on them.

Present the completed food relationship in the class. Expand the food relationship by adding more organisms and illustrate in the science diary.

Living beings depend on one another for food. This interrelationship among them is the food web.

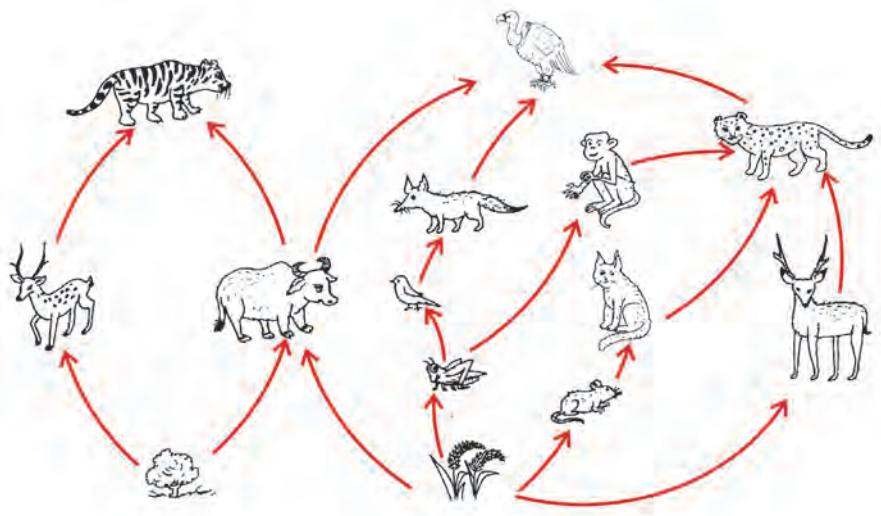


Illustration 1.2

Coexistence at the sea

Have you seen the various food relationships on land?
In this way, the sea also has various food relationships.

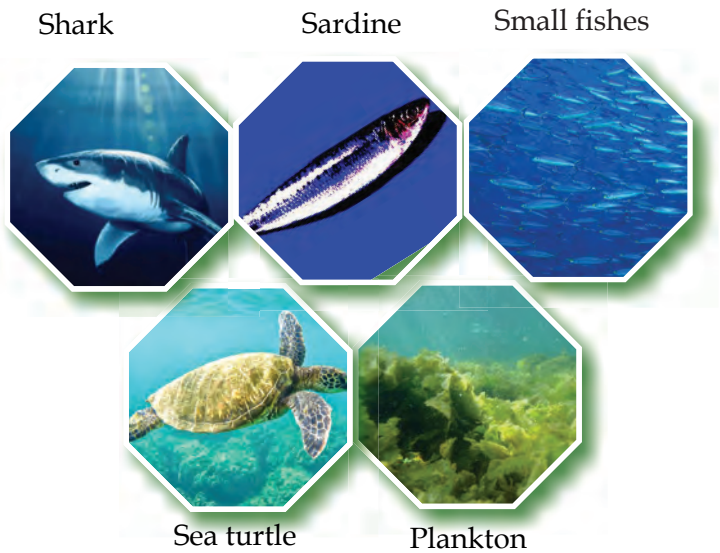


Figure 1.4

Some sea creatures are shown in the picture. Look at the information in the table below and draw a food web that includes these organisms.

Organism	Food
Shark	Squid, fishes, sea turtle
Sardine	Small fishes, plankton
Sea turtle	Plant parts, fishes
Small fishes	Plankton

Table 1.1

Plankton are small plants that flow freely in water bodies. They are the producers in the habitat system of the ocean.

So many food relationships

Observe a tree in your surroundings, continuously for a few days. Draw a food web in your science diary that includes the organisms you observed.

For survival

Observe the picture.

Illustration 1.3

Did you see the fish in the pool?

What components does the fish need to survive?

- Sunlight
- Aquatic plants
-

Don't you think other organisms in the pond also need these components to survive? Categorise and list the components of the pond.

Living things	Non-living things
.....	.....
.....	.....
.....	.....
.....	.....

Table 1.2

The habitat

A paddy field is an environment that contains all the components necessary for the existence of various organisms. Apart from fish, it is also a habitat to many other creatures.

Are there any other habitats like this around us?

Observe the biodiversity garden in your school.

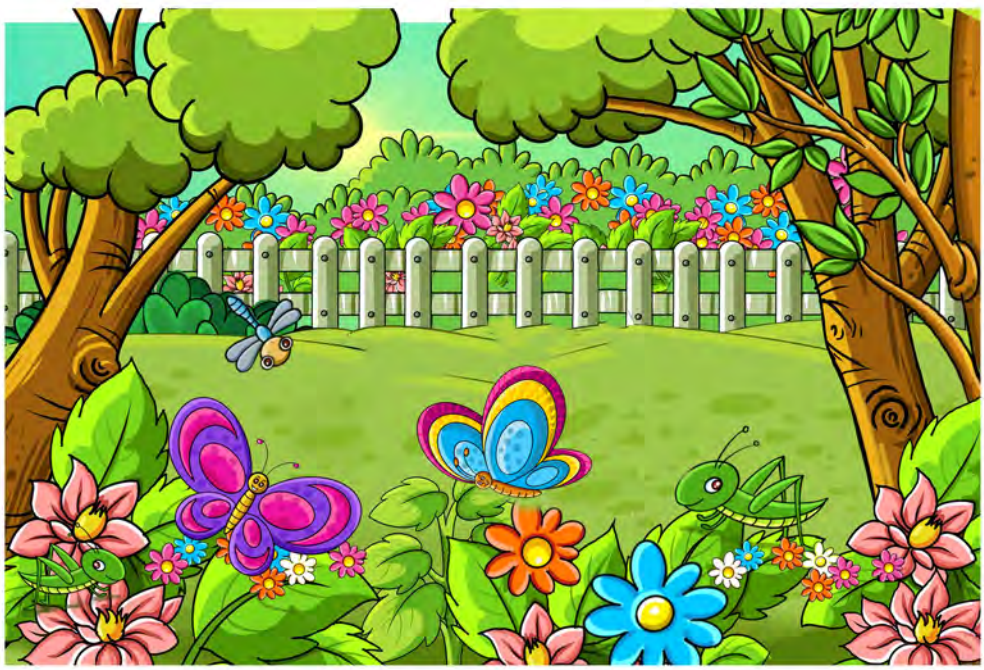


Figure 1.5

The biodiversity garden is a habitat to many creatures. Which are they?

What are the favourable conditions for the presence of the various organisms found in the biodiversity garden?

Observe and prepare notes.

Present a roleplay in your class involving living and non-living things in a biodiversity garden.

Living things can exist only by depending on non-living things.

Do you agree with this statement? Why?

What are the items to be included in the observation note?

1. Aim of observation
2. Materials *(if required)*
3. Conditions of observation *(where, how, when)*
4. Findings
5. Conclusion

Every living thing has a suitable habitat. Discuss with your friends. Can you suggest a suitable definition for habitat?

Observe your surroundings and find different types of habitats.

Observe the figure 1.6. Which are the habitats shown here?

Figure 1.6

- Grasslands
- Desert
-
-

Food card

The food cards of two creatures are shown in the picture.

Creature : Crow
Food : Small creatures, fruits, grains, food waste, remains of dead organisms.

Creature : Goat
Food : Grass, leaves, grains

In this way, prepare the food card of two other creatures.

What happens if the numbers go up or down?

Examine the food web.

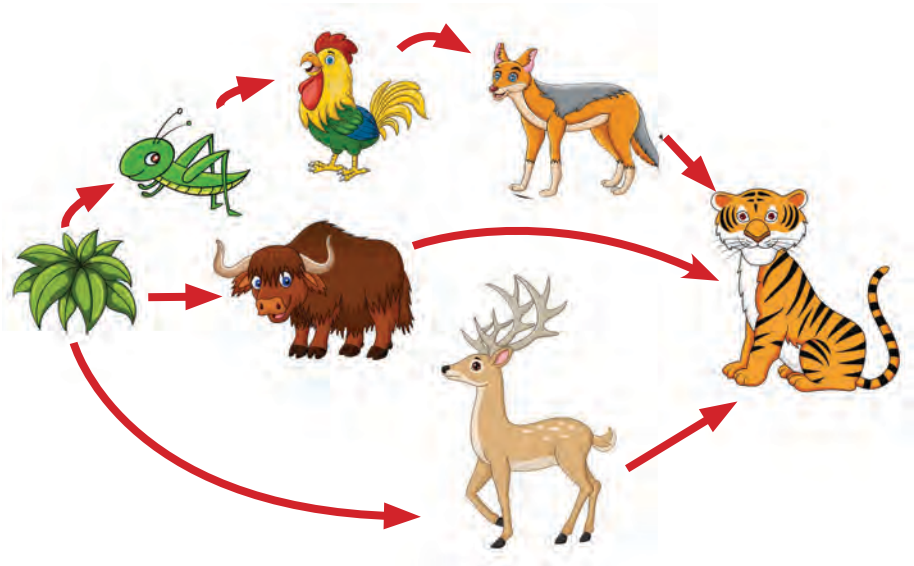


Illustration 1.4

What will happen if tigers disappear from this habitat?

Which organisms will increase in number?

What will happen if the deer population increases?

Why tiger conservation?

The tiger is one among the highest link in the food web. Organisms in each link play a key role in maintaining healthy numbers of herbivores and carnivores in an ecosystem. If some organisms in the lower links of the food web disappear, they may be replaced by other organisms that perform the same function. If there are no other creatures like the tiger, there are no one to perform its functions. Therefore, conservation of high-ranking organisms like the tiger is a priority. By conserving tigers, a larger habitat is being conserved.

The invaders

Figure 1.7

The African catfish is a fish found in the African continent. They grow and multiply very quickly. They are found as an invasive fish in some water bodies of Keralam. The African catfish feeds on native fish in the water bodies. The organisms that feed on the African catfish are not found in our water bodies. What will happen to the habitat if an African catfish reaches into a local pond?

Find out if your locality has any of these invasive organisms. Identify and present what problems they cause to other plants and creatures.

What all information must be collected?

What are the animals?
What are the plants?

Where should the information be collected?

From adults.
From media.
From books and references.
Through observation.

What should the report contain?

Introduction
Aim
Method of study
Data collection
Analysis
Conclusion
Suggestions
Additional information

Food relationships

Look at the food web.

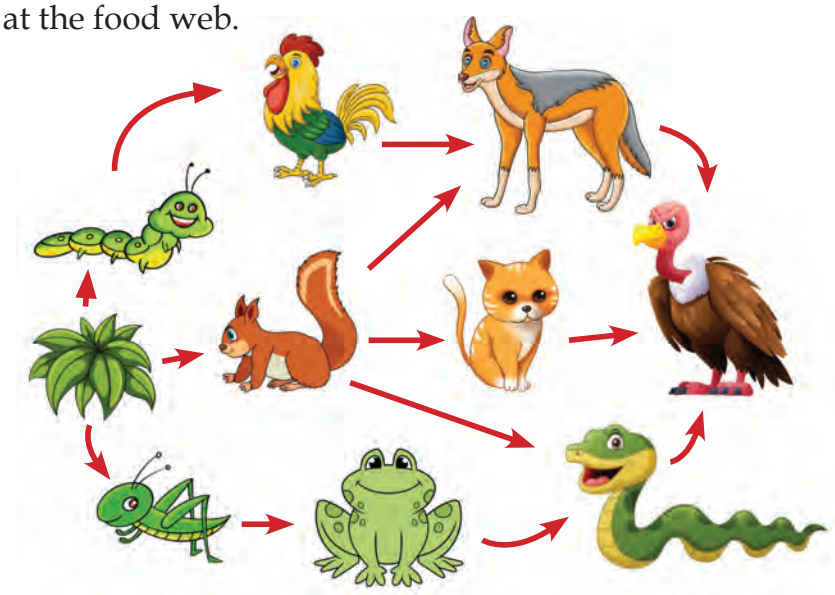


Illustration 1.5

There are various food relationships in the above picture.
The food relationships in a single sequence is given below.

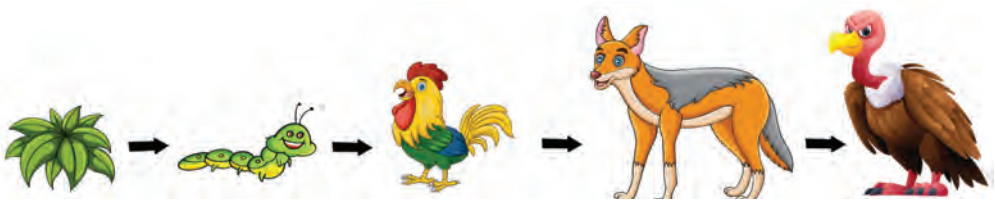


Illustration 1.6

Find out and write more such sequences.

> ***A single sequence of food relationships from the food web is the food chain.***

Compare food chains you have written and list them in your science diary.

First link	Last link
Grass	Vulture

Table 1.3

From which organisms do all the food chains begin?

Don't they also need food for their existence?

Where do they get their food?

Food production in plants

Observe the illustration.

Which are the main components that plants need to make their food?

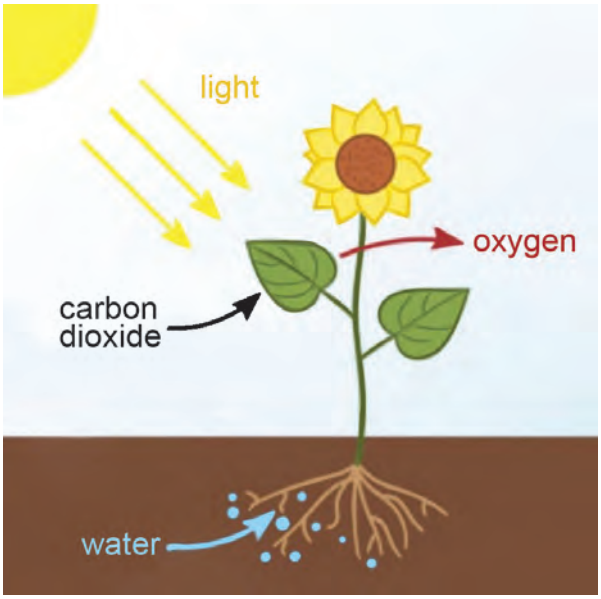


Illustration 1.7

- Carbon dioxide
-
-

Plants make food using carbon dioxide and water. For this, they use the energy from sunlight. So this activity is called photosynthesis. Chlorophyll is a pigment in the leaves that helps plants to produce food. Oxygen is also produced as a result of this activity.

Source of energy

You have seen that sunlight is necessary for food production in plants.

Through which part do plants mainly receive sunlight?

Observe this picture.

Figure 1.8

The leaves of plants are arranged in such a way that they receive maximum sunlight.

Look at the arrangement of the leaves in the following pictures.

Do you find any special features?

Hibiscus

Tulsi

Blackboard tree (Ezhilam paala)

Figure 1.9

Observe the plants in your surroundings and group them according to the similarity in the arrangements of leaves.

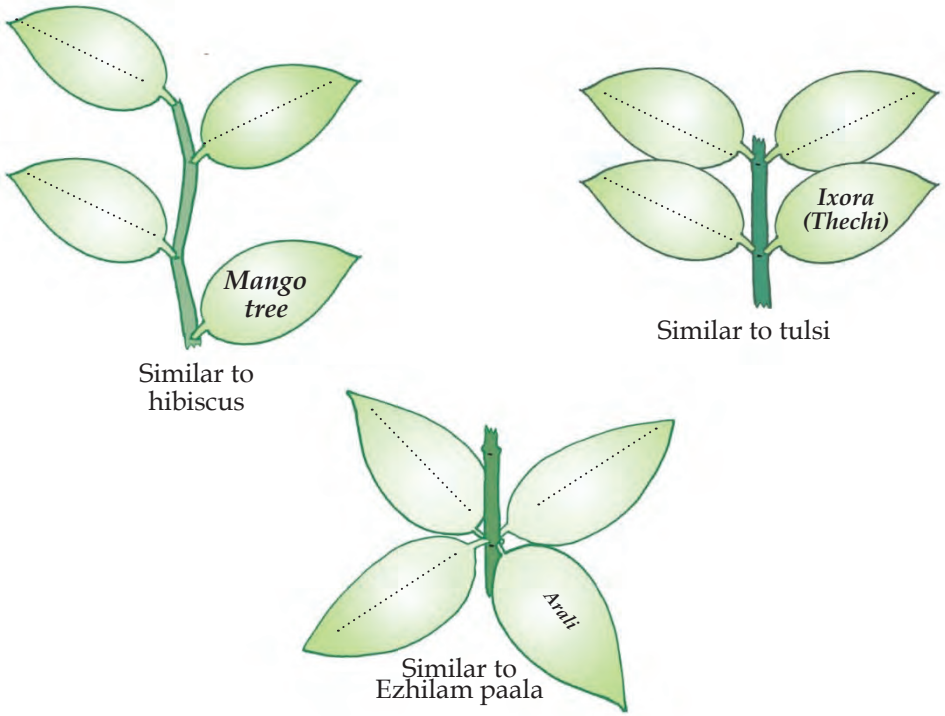


Illustration 1.8

Draw the arrangement of leaves of various plants and prepare an album.

Behind the leafy green

The leaves are green in general. But you must also have noticed multi-coloured leaves. Collect different coloured leaves from your surroundings. Rub the collected leaves on a blotting paper.

Write down your observation in the table.

Name of plant	Colour of the leaf	Colour seen on blotting paper
• Spinach	• Red	•
•	•	•
•	•	•
•	•	•

Table 1.4

Write your findings from the table in the science diary.

Chlorophyll is the green pigment in leaves.

Diversity in colour

Observe the biodiversity garden in your school.

Can't you see flowers and leaves in different colours? You have seen that the reason for the green colour is chlorophyll, haven't you? What are the pigments that cause other colours?

Look at the table and find out.

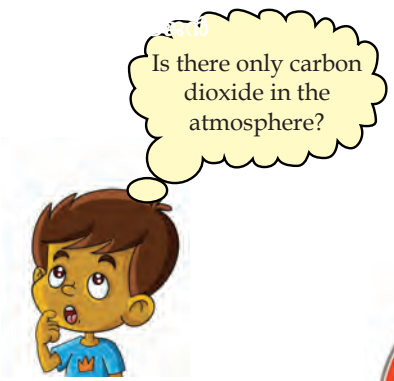
Colour	Pigment
Red	Anthocyanin
Orange	Carotene
Yellow	Xanthophyll

Table 1.5

Gaseous exchange in plants

Did you understand that carbon dioxide is the gas used for photosynthesis?

Which of these gases are used by living organisms for respiration?



Look at the illustration showing the amount of gases in the atmosphere.

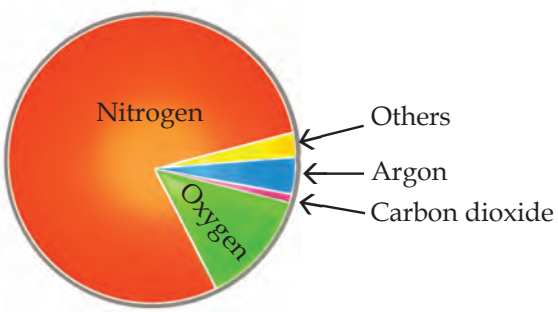


Illustration 1.9

Living things breathe to get energy.

Don't you think that plants also need energy?

Shouldn't respiration take place in plants to obtain energy?

Yes, respiration takes place in plants too. All living beings use oxygen for respiration. As a result, carbon dioxide is produced. Animals release carbon dioxide. Carbon dioxide produced as a result of respiration by plants is used for photosynthesis during day time. Carbon dioxide from the atmosphere is also used by plants for photosynthesis.

Air enters plants through the leaves.

Let us examine whether there is any special part in the leaves for this.

Observe the leaf layer in a microscope and draw it in the science diary.

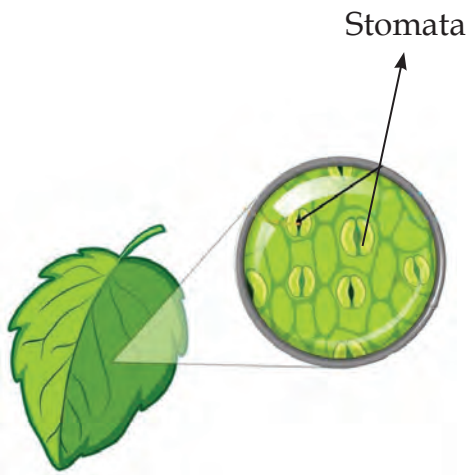


Illustration 1.10

A microscope is an instrument used to magnify things that cannot be seen with the naked eyes.

These microscopic pores in the leaves are known as stomata.

It is through these pores atmospheric air enters the plant.

Oxygen produced as a result of photosynthesis is also released through these pores.

Observe the illustration.

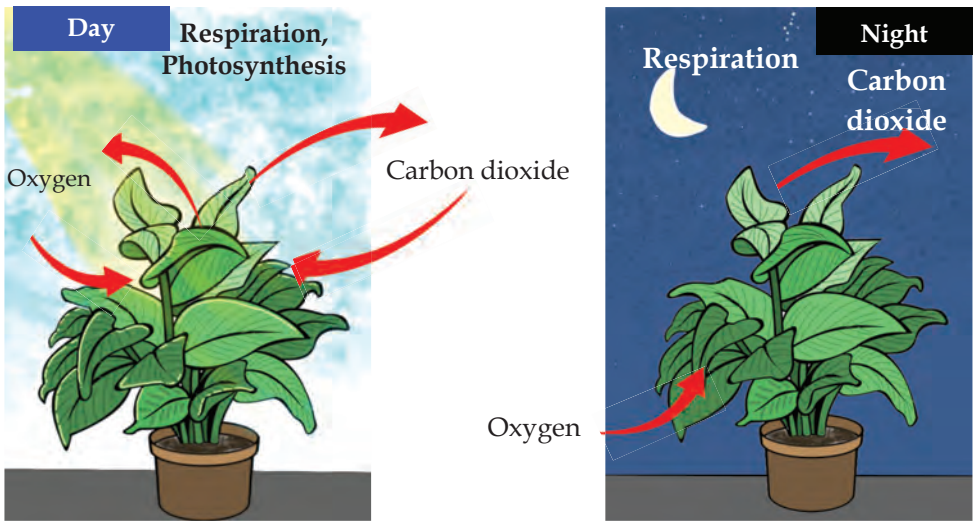


Illustration 1.11

Do plants release only oxygen? Discuss.

Host and guests

Do all the plants make food?

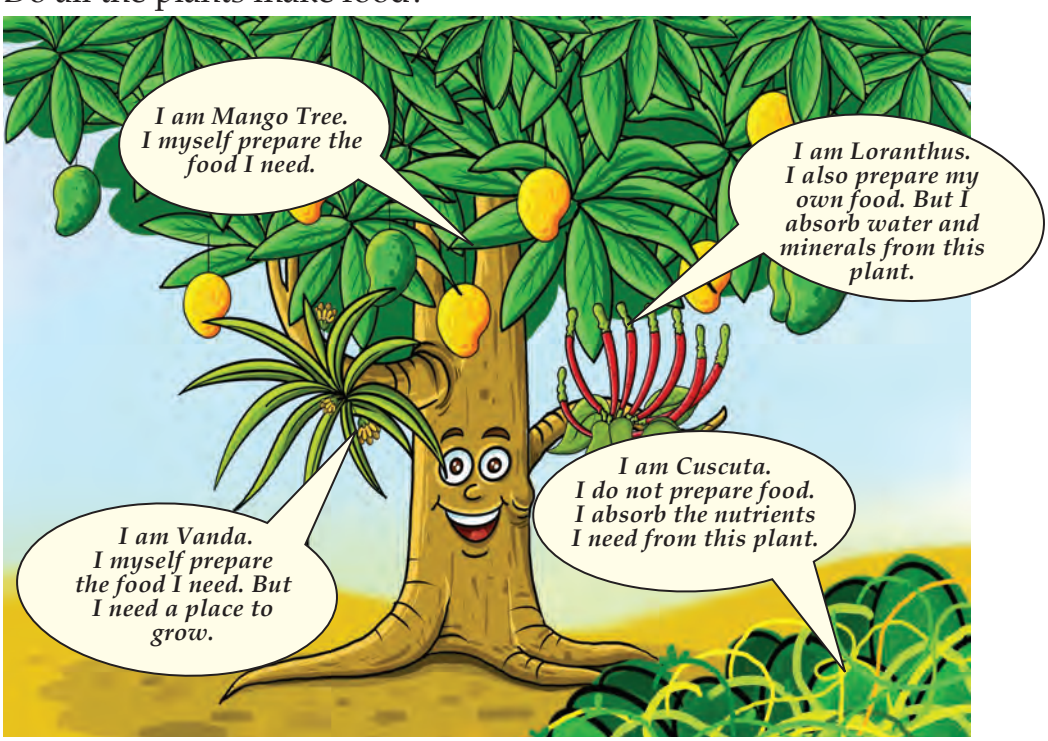


Illustration 1.12

You have observed the conversation among the Mango Tree, Loranthus, Cuscuta, and Vanda, haven't you? Which of these plants prepare their own food?

These plants get the sunlight and carbon dioxide needed for photosynthesis in the same way.

But, how do they get water?

Where does the mango tree get its water from?

How about vanda and loranthus?

Observe the picture of vanda.

Figure 1.10 ***Vanda***

Don't you see two types of roots? What are the functions of these roots?

Where do the thick white roots grow to?

The small roots help the vanda to grow by clinging onto the tree. The thick roots absorb moisture from the atmosphere. They depend on host plants only for habitat. Such plants are called epiphytes. Orchids are examples of epiphytes.

Observe the epiphytes and understand the peculiarities of the roots.

Can the growth of epiphytes harm the host plant?

Observe the picture of the roots of Loranthus

Figure 1.11 ***Loranthus***

Where do their roots grow to?

What is the benefit for Loranthus with their special roots?

> ***Loranthus makes its own food by absorbing water and minerals from the host plant. Therefore, plants like Loranthus are called semi-parasites.***

Observe the Cuscuta spread on the plant.

What colour is it? Do you see leaves?

Can Cuscuta prepare food? Where do its roots grow to?

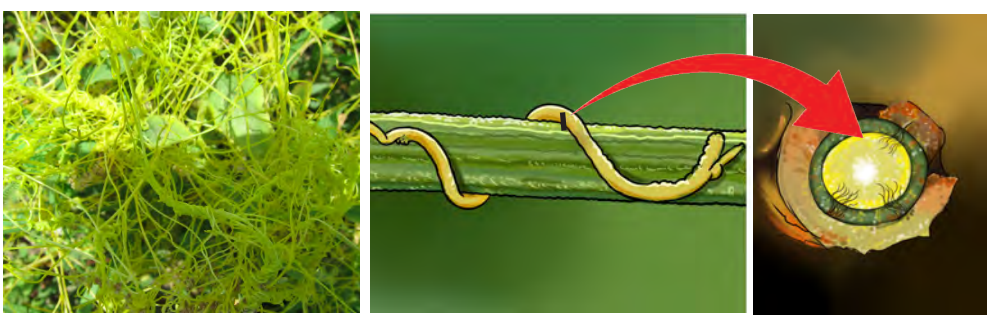


Figure 1.12 ***Cuscuta (Moodillathali)***

> ***Cuscuta plants have roots that can absorb nutrients from the host plant. They are called total parasites.***

Observe the picture.

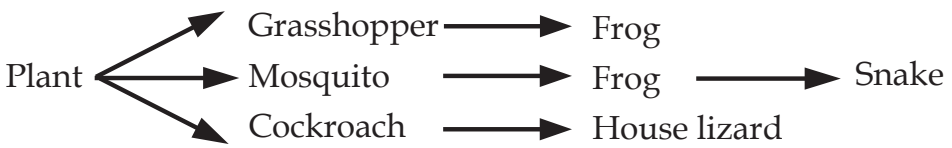
Figure 1.13

Look around and find more examples for the interdependence of living beings. Write down your findings in your science diary.

Let us assess

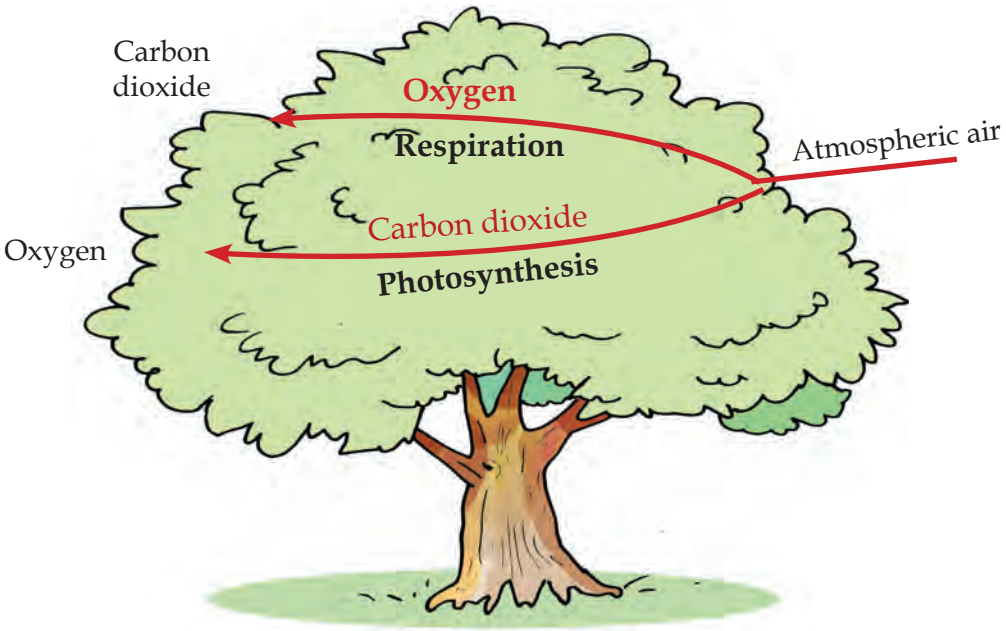
1. 'The plants with red coloured leaves can not prepare food by themselves'. Do you agree? Why?

2



What will happen to this food web if the number of frogs decrease?

3. Observe the illustration and complete the stages of gaseous exchange in plants.



- Atmospheric air enters the plant
- Photosynthesis takes place using the carbon dioxide in the atmospheric air.
-
-

Extended activities

1. Wrap the leaf of a plant with a transparent polythene cover. Observe it the next day. What is seen in the polythene cover? What would be the reason?

2. Observe a pond in your locality and write the maximum food chains. Find out if there is any human activity that destroys the habitat of a pool.

2 AWAY FROM DISEASES

Illustration 2.1

Did you read the conversation? What could be the reason for fever? What should be done to prevent the spreading of the disease to others? Write the names of diseases you know in your science diary. Are they all communicable?

Complete the table by adding more diseases.

Communicable diseases	*Non communicable diseases*
Dengue fever	Cancer
Jaundice	Diabetes

Table 2.1

Communicable diseases are those which spread from one person to others.

Pandemics

When communicable diseases spread to other countries or continents, and affect a large number of people, it is called a pandemic. Smallpox, tuberculosis, plague, Covid-19 etc. are some of the pandemics that we have survived.

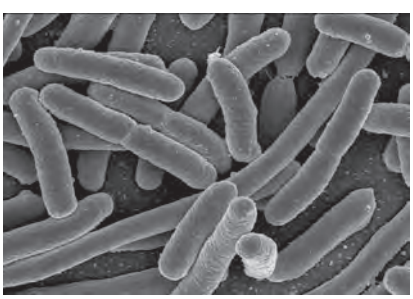
Aren't we more likely to get affected when we come into contact with someone who is sick?

What cause communicable diseases?

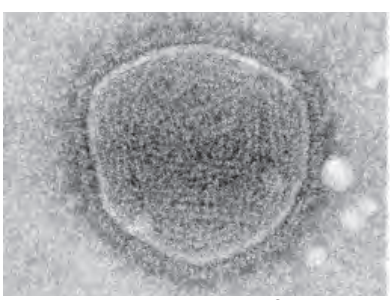
Can we see them?

Pathogens

Most communicable diseases are caused by microorganisms like bacteria, viruses, and fungi that cannot be seen with the naked eyes. They are called pathogens because they cause diseases.



Microscopic view of Bacteria



Microscopic view of Virus

Figure 2.1

Living with the microorganisms

Not all microorganisms are pathogens. There are many beneficial bacteria in our body. They help in the digestion and absorption of our food.

There are many instances where microorganisms can be useful to us. Dosa batter is fermented by certain bacteria. Bacteria and fungi break down organic matter and add it to the soil. Find more instances where microorganisms are beneficial and write them in your science diary.

The world of fungi

We are familiar with bread mold and black mold found on clothes. They are all fungi. Candida, Cryptococcus, and Histoplasma are some of the fungi that cause disease to humans. The world of fungi includes everything from edible mushrooms to those that cannot be seen with the naked eyes.

Figure 2.2

How diseases spread

Observe the illustration and find out the situations in which diseases spread.

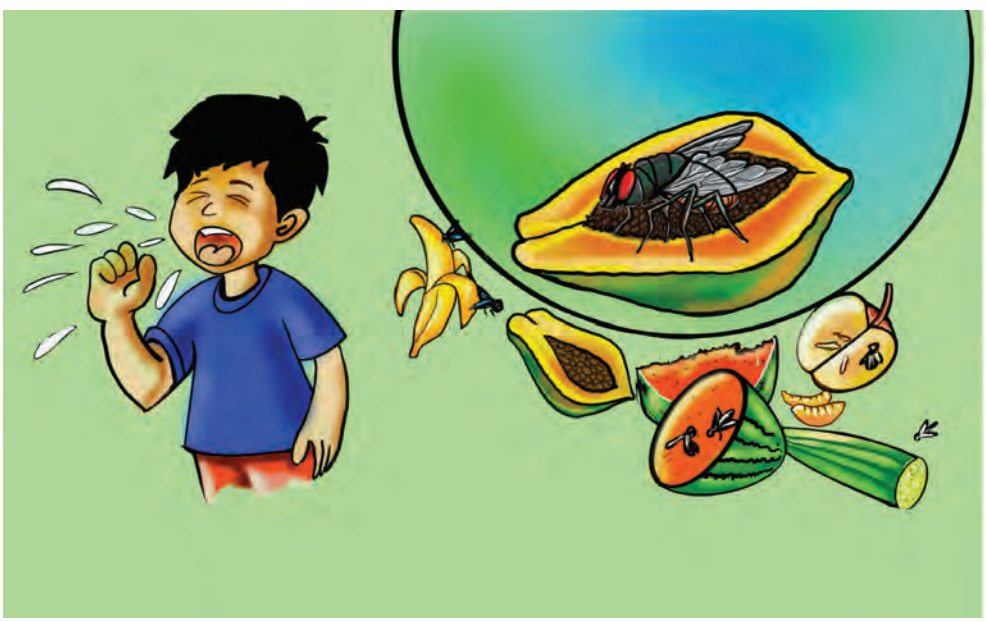


Illustration 2.2

- Why do we cover our nose and mouth with a handkerchief when we cough or sneeze?
- Why do we keep food items covered?

In what ways do disease causing microorganisms enter the human body?

Discuss and complete the idea chart.

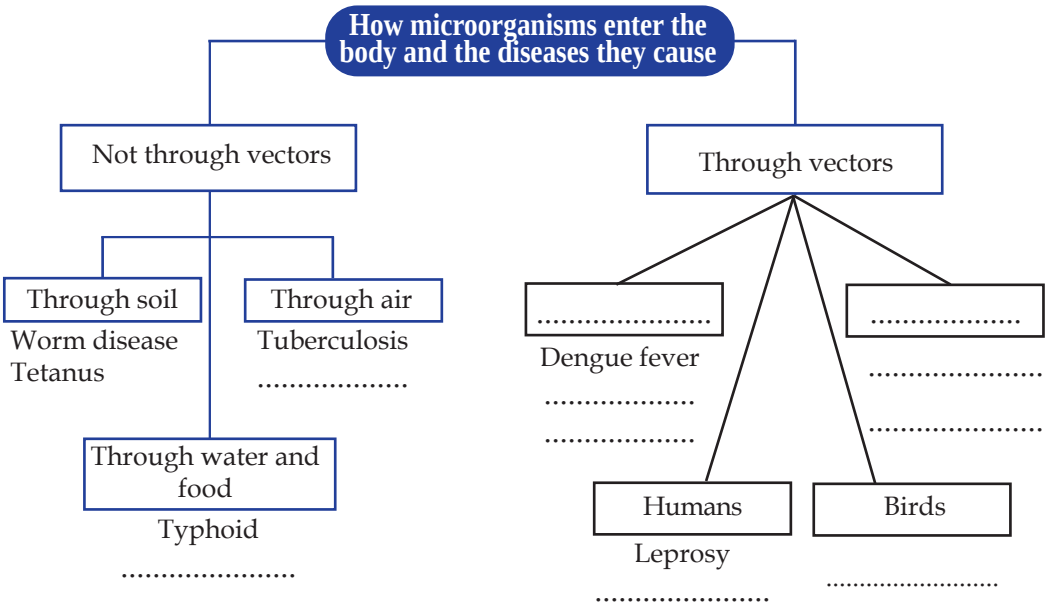


Illustration 2.3

Now you know that diseases spread through various ways.

How many disease-carrying organisms were you able to identify?

Vectors

Vectors are organisms that bring disease-carrying microorganisms into our body. Housefly, rat flea, mosquito, bats, etc. are some of the vector organisms.

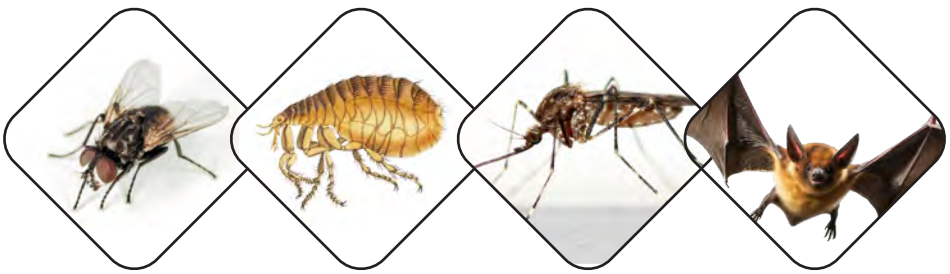


Figure 2.3

When the surroundings become polluted

Observe the illustration 2.4.

Do similar conditions exist in your surroundings?

Illustration 2.4

Write down the conditions in which vectors multiply.

Vectors	Conditions in which they multiply
Housefly	
Mosquito	Mosquitoes breed in discarded plastic bags, bottles, coconut shells and stagnant water.
Rat	

Table 2.2

What can we do to control vectors?

Discuss in the class and write down in the science diary.

Let us control mosquitoes

We can prevent many diseases by controlling mosquitoes. Is it enough to eliminate mosquito breeding conditions only in our home?

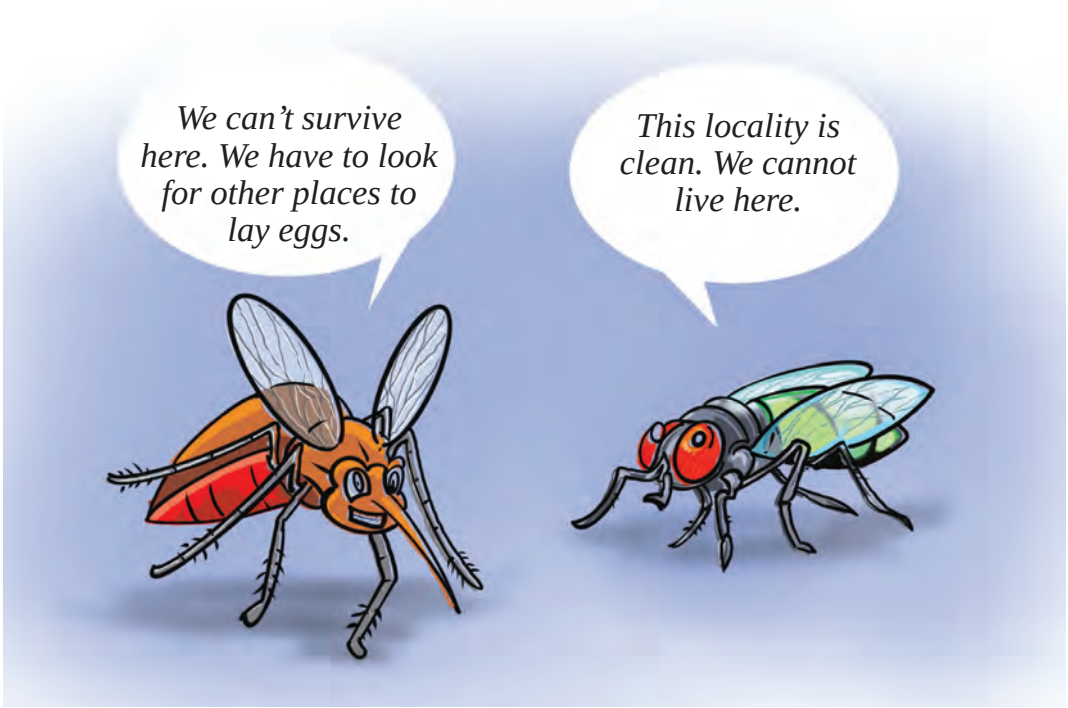


Illustration 2.5

Avoiding water logging, removing grass and weeds around residences, and cleaning drains are a few ways to prevent mosquito breeding.

Observe the illustration.

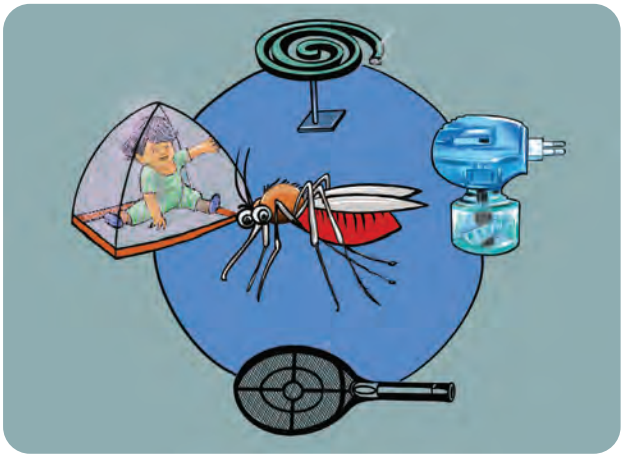


Illustration 2.6

What are the precautions to avoid mosquito bites?

- Keep doors and windows closed in the evening.
-
-
-
-

Will the hygiene of our surroundings be enough to prevent the spread of disease?

Let us see some other things to keep in mind.

Diseases	Things to keep in mind to prevent diseases
Diseases that spread through food and water	Use fruits and vegetables after washing. Keep food items covered. Drink boiled water.
Diseases that spread through air and contact	Avoid contact with the sick person. Don't use the sick person's handkerchief, clothes, etc. Use mask. Maintain personal hygiene.
Diseases that spread through soil and sewage	Use footwear. Prevent wounds in the body from getting into contact with sewage. Wash hands and legs with soap if get dirty.

Table 2.3

What can you do to ensure that your home, school, and washrooms are clean to prevent disease?

Communicable diseases in animals and plants

Do communicable diseases affect only humans?

See the newspaper reports.

Illustration 2.7

Have you observed the plants that have communicable diseases?
See the pictures


Brown leaf spot disease in rice


Mosaic disease in pea plants


Bud rot of coconut

Figure 2.4

Enquire about other diseases that affect plants and organisms. Write them in the science diary.

Hygiene habits

Isn't personal hygiene as important as environmental hygiene for a healthy life? Look at some habits.

Illustration 2.8

Which of these are good health habits? Tick them.

- ☐ Wash hands only after meals.
- ☐ Brush teeth every night after meals.
- ☐ Do not trim the nails of feet and hands.
- ☐ Use footwear when walking outside.
- ☐ Eat fruits that are gnawed by birds.
- ☐ Do not consume snacks and drinks kept open.
- ☐ Spit in public places.
- ☐ Bathe daily.

Prepare and display posters related to personal hygiene and environmental hygiene.

Immunity

Our bodies naturally have the ability to control and fight pathogens once they enter the body. This is called natural immunity. This ability varies from person to person.

The body is unable to develop natural immunity against some communicable diseases such as polio and hepatitis-B. We need to take vaccinations to avoid such diseases. Through this, it will be possible to gain immunity. This is called acquired immunity. It is through vaccines that we have survived many epidemics, such as smallpox, plague and polio, which have threatened the very existence of the human race.

Illustration 2.9

Which diseases should be vaccinated against?

Which are the mandatory vaccines to be taken by the age of 16?

Discuss in class. Collect more information from interviews with health workers. Do you need to prepare a questionnaire to interview the healthcare professionals? Which questions can be included?

Vaccination chart

BCG Bacillus Calmette-Guerin
OPV Oral Polio Vaccine
Hep B Hepatitis B
FIPV Polio Vaccine - Fractional Dose
RVV Rotavirus Vaccine

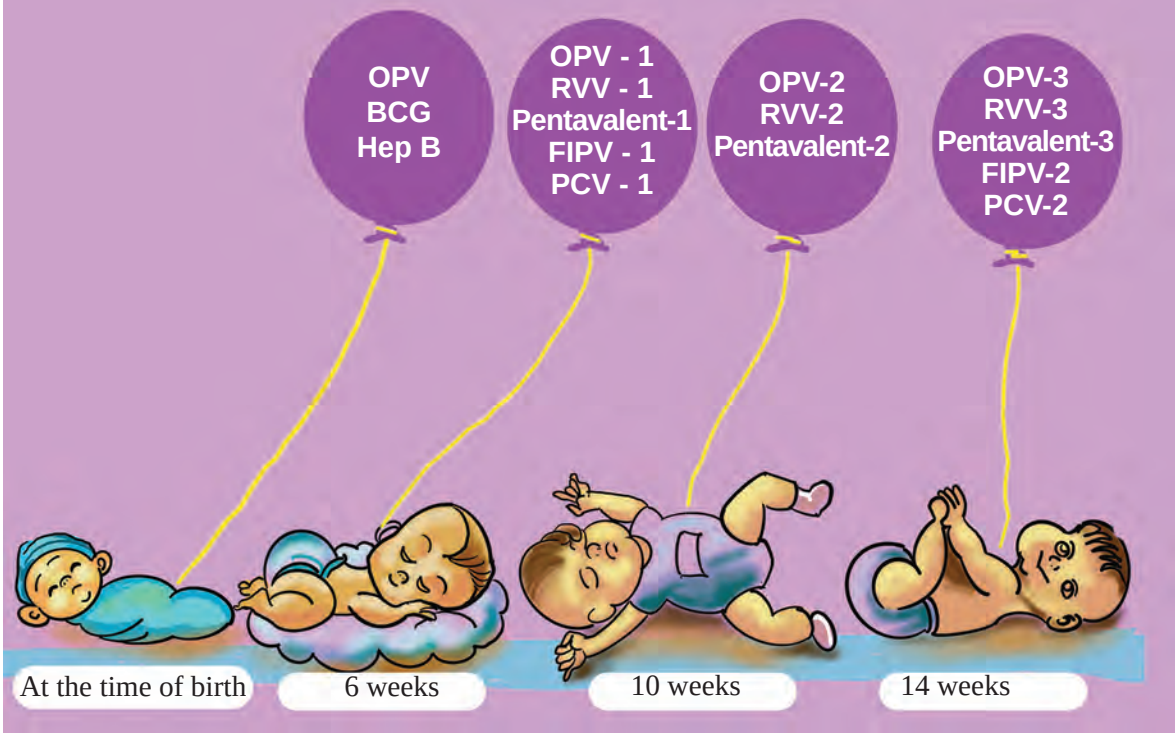


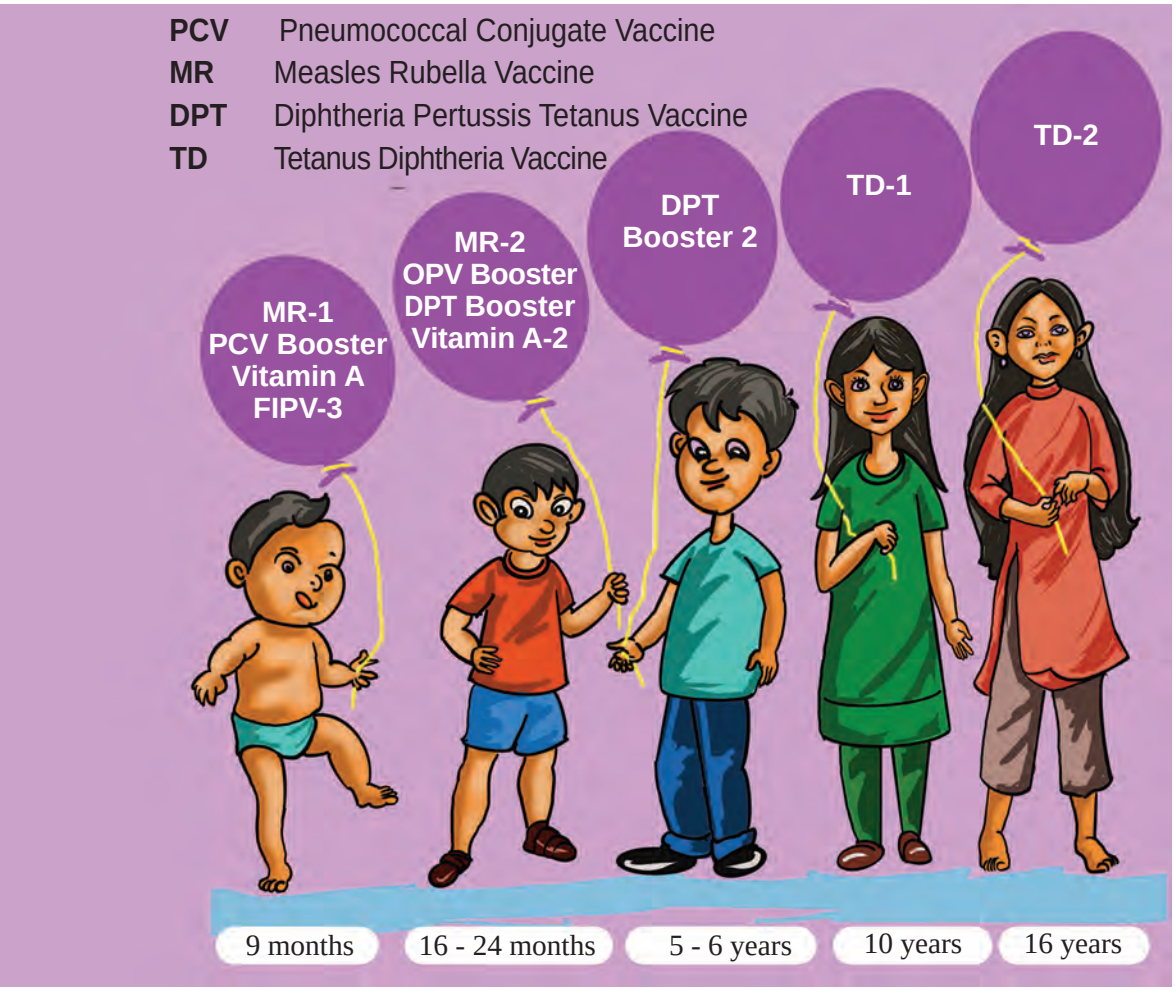
Illustration 2.10

Complete the chart by adding your findings.

Preventive vaccines		
Name of the vaccine	*Age*	*Disease*
Polio vaccine		Polio
Tetanus - Diphtheria vaccine	10 years 16 years	

Table 2.4

PCV Pneumococcal Conjugate Vaccine
MR Measles Rubella Vaccine
DPT Diphtheria Pertussis Tetanus Vaccine
TD Tetanus Diphtheria Vaccine



Proper awareness is to be given to the people regarding the mode of transmission of diseases and the methods of prevention. What can we do for this?

- Drama
- Puppetry
- Cartoon
- Poster
-
-

Diseases can be kept away with proper awareness and preventive measures. Healthy people are the wealth of a nation.

Let us assess

1. Write down five decisions you have taken to maintain personal hygiene.
2. Personal and social hygiene are important in preventing communicable diseases. Do you agree with this statement? Please elaborate.
3. Do you agree with the following precautions that we should take to control vector-borne diseases?
   - ☐ Eliminate conditions that cause sewage accumulation.
   - ☐ Disposal of garbage in public places.
   - ☐ If water retention is unavoidable, breed fish such as Guppy and Gambusia in it.
   - ☐ Food items need not be kept covered.
   - ☐ Use food items only after washing.
   - ☐ Drink boiled water.
   - ☐ Keep the house and surroundings clean.
   - ☐ Practise proper waste disposal at source.

Extended activities

1. Prepare and present a play to educate the public about the circumstances in which communicable diseases spread and the precautions we need to take against them.

2. Prepare a '*Waste Map*' of the school premises. Prepare guidelines for making the school environment litter-free on the basis of the information on the map.

3 WATER AND LIFE

Illustration 3.1

What makes the river say this?

What do we use river water for?

Can river water be used directly for drinking and other domestic purposes?

Analyse the illustration given below.

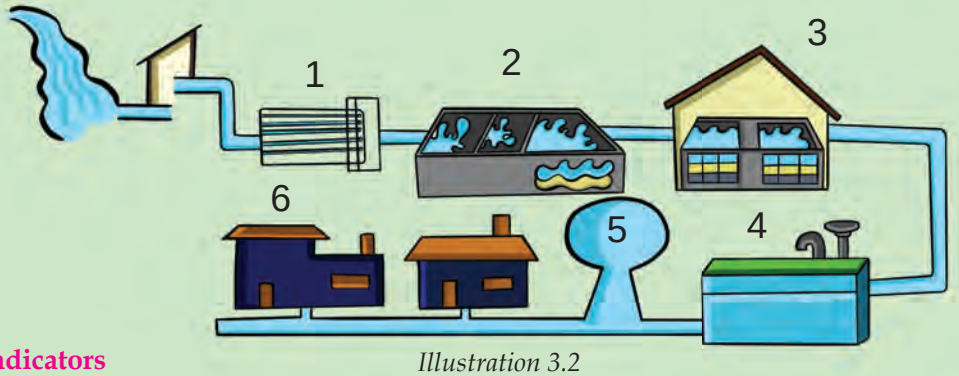


Illustration 3.2

Indicators

Purification stages of river water

1. Filter out large debris.
2. Allow waste to settle.
3. Strain through multi-layered sieves.
4. Disinfect

Distribution stages of fresh water

5. Store in tank.
6. Distribute water to houses.

The river water gets delivered to the houses after it is being purified.
Do you get the water regularly in the same way?

What are the other sources of water you depend on?

Write them down.

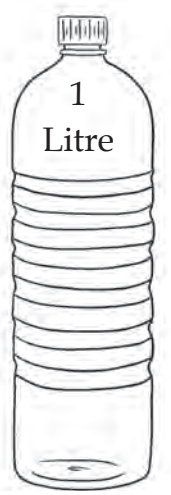
- Well
-
-
-

How many litres of water do you need in a day?
Take a look at the table showing the approximate amount of water used by one person for various purposes.

Approximate daily use of water

Use of water	Quantity (in litres)
To drink	2.5 - 3.5
To cook food	3.0 - 4.0
To wash vessels	6.0 - 8.0
To bathe and to wash clothes	30.0
For sanitation	50.0
For other purposes	30.0
Total	121.5 - 125.5

Table 3.1



Compare your daily use with the usage in the given table.

We have seen the daily use of water, haven't we?
We can control and limit the use of certain things, but not the drinking water.

Increasing demand and decreasing availability

Availability of fresh water is decreasing due to increase in population and increase in the level of water pollution. It is estimated that 200 crore people in the world do not have access to sufficient amount of fresh water. If this situation continues, it is expected that the water shortage will become more severe in the coming years. Millions of people die all over the world every year due to diseases caused by water pollution.

For what purpose do you use the water most? How many litres of water do you use approximately in your home per day? Find out and write it in your science diary.

What is the importance of water in our body?

See the approximate amount of water in our body.

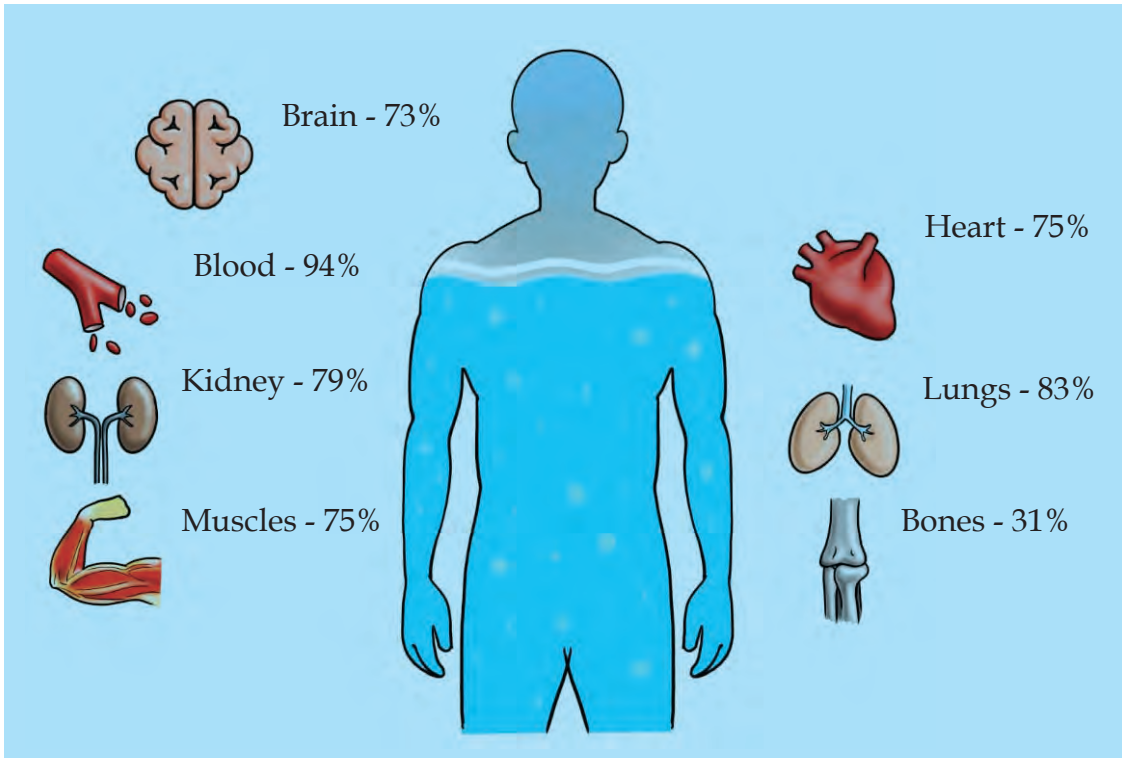


Illustration 3.3

Water is an important component of the human body. Water is essential for all life functions.

Water in plants

Plants also need water.

What are the functions of water in plants?

Look at the illustration.

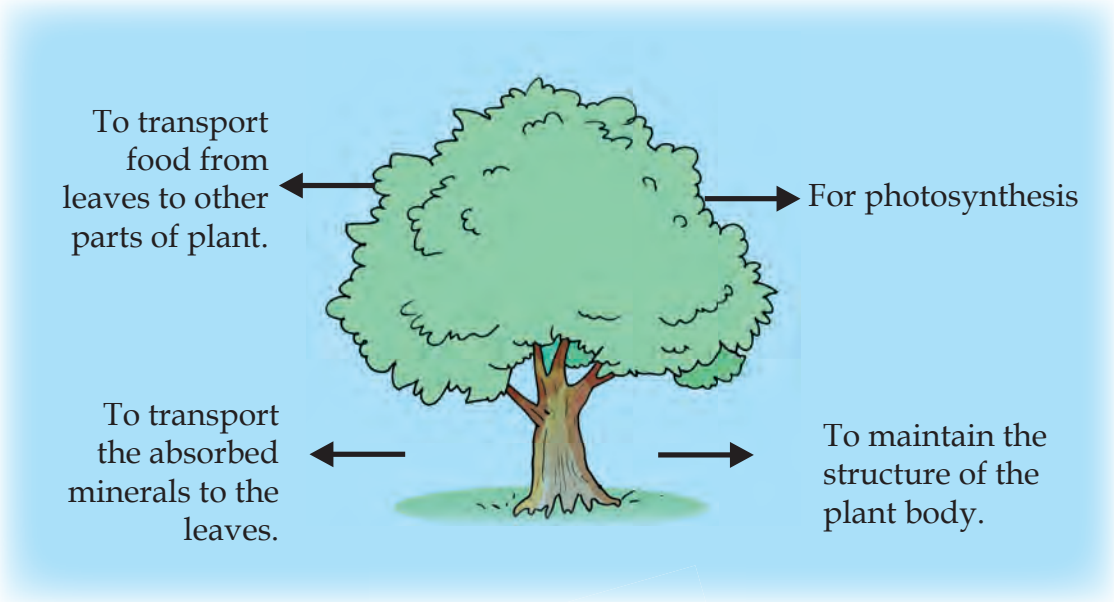


Illustration 3.4

All living beings need water for life functions.

Colour and shape

Illustration 3.5

Did you notice the child's opinion?

Do you agree with this statement?

Some information from water quality testing report is given below.

Tested factor	Presence
Colour	No
Odour	No
Bacteria	Yes

Table 3.2

What is the benefit of testing water like this? Discuss.

Write the definition of pure water.

To find out whether the water you are drinking is clean, take a sample of the water and send it to the quality testing labs in your locality to get a test report.

Does water have a shape?

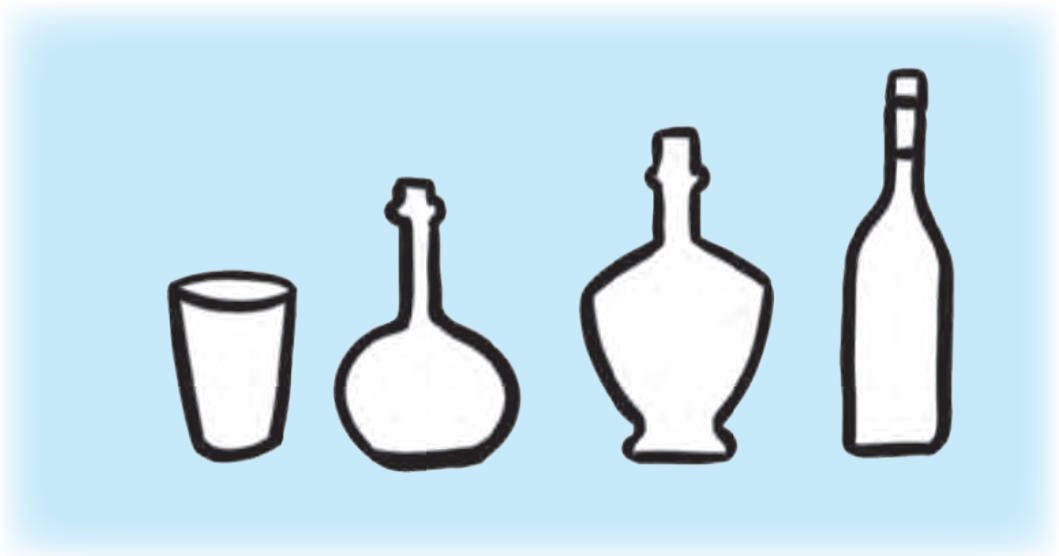


Illustration 3.6

Take water in containers of various shapes. Is there a relationship between the shape of the water and the shape of the container?

Observe the shape of the water in each container and draw it in your science diary.

Sink or float?

Observe the picture.

Illustration 3.7

Did you see the paper boat floating in the water?

Which of the following objects will float in water?

Can you guess?

Check whether the guesses are correct and mark your findings in the table.

Objects	Guess	Finding (✓ / X)
Stone		
Balloon		
Coin		
Wood piece		
Camphor		
Plastic		
Iron nail		
Leaf		
Wax		
Ice		

Table 3.3

We often utilise the ability of objects to float in water, don't we? Write some examples for such situations.

- Rafting
-
-

Soluble and insoluble

Illustration 3.8

Do all substances dissolve in water?

How do we find substances that do not dissolve in water?

Shall we do an experiment using the following items?

Sugar, salt, vinegar, baking soda, detergent, kerosene, coconut oil, wax, camphor, copper sulphate, potassium permanganate

Which of the above substances dissolve in water?

Are there any substances that do not dissolve in water? Write your guesses.

Conduct the experiment and list your findings.

Substance that dissolves in water	*Substance that doesn't dissolve in water*
• Sugar	• Wax
•	•
•	•
•	•
•	•

Table 3.4

You have seen that some solids and liquids dissolve in water.
Do gases dissolve in water? Can you guess.
Look at the picture.

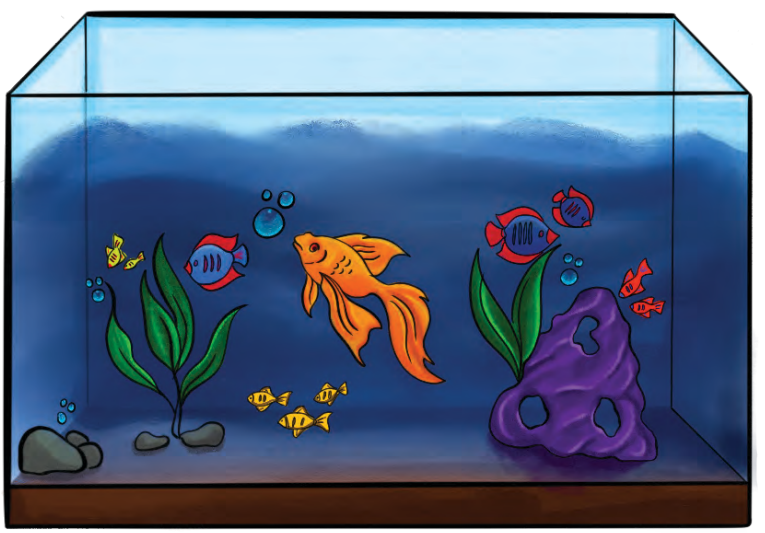


Illustration 3.9

Where do the fishes in the aquarium get oxygen to breathe?

Have you seen the bubbles coming out of the soda bottle when you open it? How is soda water made?

Soda water is made by dissolving carbon dioxide gas in water. The bubbles are caused by the release of carbon dioxide gas when the soda bottle is opened.

What was dissolved when the lemon juice was prepared?
Where did they dissolve in?

A substance that dissolves is called a solute and the substance in which it dissolves is called a solvent. A solution is formed when the solute is dissolved in the solvent.

List the solution, solute and solvent in each of the previous activity.

Solution	*Solute*	*Solvent*
Sugar solution Soda	Sugar	Water

Table 3.5

Find more substances that dissolve in water and expand the table.

How do you remove jackfruit gum and tar if they stick?

Why can't these be washed off with water?

What is the best way to remove ballpoint pen ink on clothes?

Are the substances soluble in water, soluble in kerosene and coconut oil too?

Let's experiment.

Solvent	Solute				
	Sugar	Salt	Baking soda	Copper sulphate	Camphor
Water					
Kerosene					
Coconut oil					

Table 3.6

Analyse the completed table and write down the findings.

Water has the ability to dissolve many substances.
Hence water is called the universal solvent.

Write more examples that take advantage of the dissolving capacity of water.

- To wash clothes
-
-

Do the following experiment using water, sugar and ink.

Situation 1

Take water in two glasses and mix sugar grains in one and powdered sugar in the other.

Situation 2

Take two glasses of water. Dissolve sugar in the first glass with stirring and dissolve the sugar in second glass without stirring.

Situation 3

Take hot water in one glass, cold water in another glass and mix a drop of ink in each.

Is there any difference in the speed at which sugar and ink dissolve?

Find out and write down the factors that affect the speed of dissolution of substances.

Water in many forms

Look at the picture.
How is ice formed?
Ice is the solid form of water.

Figure 3.1

What are the uses of ice?

- To preserve food items from spoiling
-
-

What happens if the ice is left outside for a short time?

What is the reason for this?

Prepare a note by observing changes that happen to ice in different situations.

What are the different steps included in an experiment note?

Aim :

Materials :

Procedure :

Observation :

Inference :

Situations	*Observations*
1. When ice is kept in a vessel	
2. When ice is heated	
3. When the water in the vessel boils	
4. When looking at the bottom of the lid of the vessel, after boiling the water	

Table 3.7

Figure 3.2

Analyse the table and write down your findings.

In many situations we use the ability of water to conduct heat. Which are those situations.

- For cooking rice
-
-
-

Haven't you noticed that when water is heated, it rises up as steam? What happens to the moisture in the wet clothes as they get dry? Discuss.

The spreading of small particles of liquid from its surface to the surroundings is called vapourisation. As the substance heats up, the rate of vapourisation increases. Vapourisation occurs at all temperatures. Water is the only substance that exists in nature in all the three states : solid, liquid and gas.

Water level

Look at the builder who measures the level using the level tube filled with water.

Illustration 3.10

Fill a level tube with water and check the level of different places in your classroom.

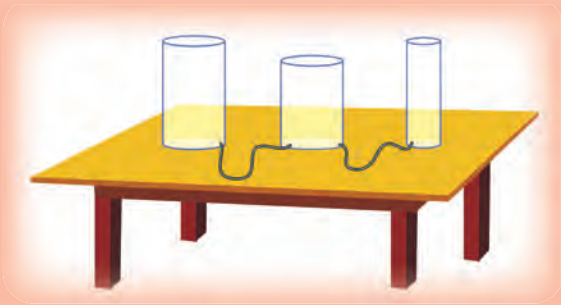


Illustration 3.11

Make the apparatus as shown in the picture. Pour water in any bottle and observe what is happening.

Write your findings in your science diary.

What will happen to the water level in the wells of the nearby houses when water bodies dry up?

Will the uncontrolled use of water by industries affect the availability of water in that area?

Discuss and write down the findings.

Water maintains its level. This is a property of water.

Water sources

Earth is a watery planet.

Observe the pictures. What is the main body of water on Earth?

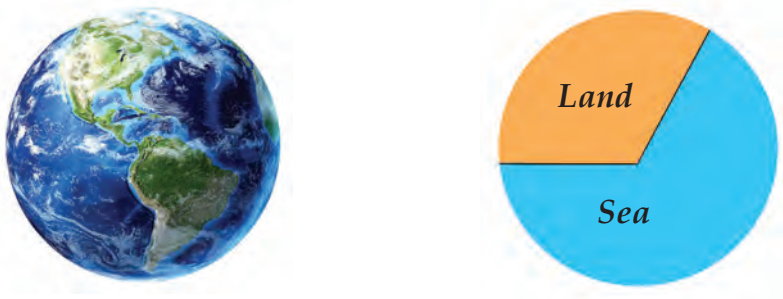


Illustration 3.12

Sea water contains large amount of dissolved salts, so it cannot be used for daily needs.

Write down the sources of fresh water around you.

Water reaches these water sources through rain.

Water drop says..

Living beings cannot live without us. As the water bodies get heated up, we rise into the atmosphere. We then get cooled and turn into rain clouds. Then small particles in the rain clouds combine together as raindrops and fall to earth. Thus we become part of water sources.

Living beings depend on the fresh water available on earth. But some human activities are causing water pollution.

Observe the cases given below.

Figure 3.3

Conduct a class seminar on water pollution and its remedies.

Let us conserve for future

We are in a place that receives large amount of rainfall. But in summer, there is drought in many areas. If we harvest rainwater, we can ensure water availability even in summer.

Take a look at some of the rainwater harvesting methods illustrated.

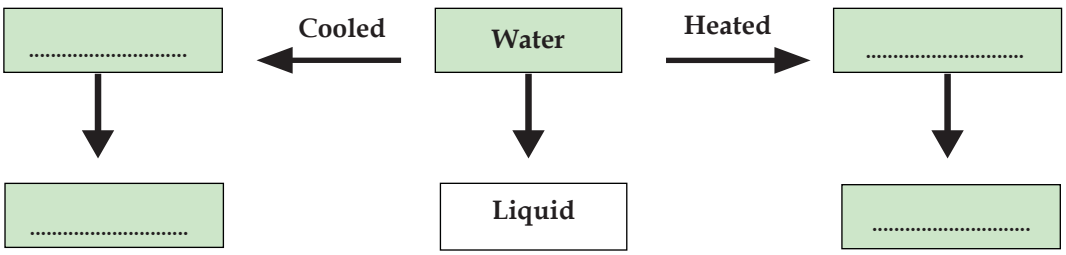
Figure 3.4

What other methods can be used for water storage?
Find out the methods that are being used in your area.

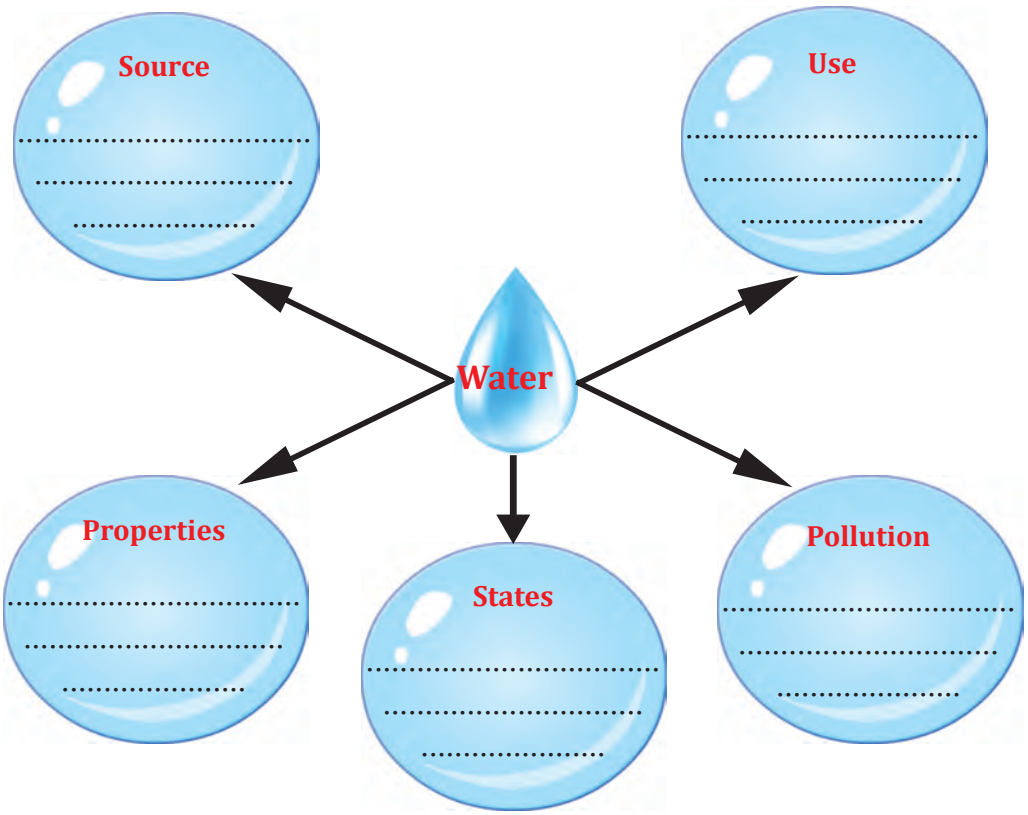
Pure water is precious.
Don't waste it.

Let us assess

The change in state of water is illustrated below. Complete the flowchart by adding appropriate words.



2. Complete the idea chart made on water.



3. Examine the test report on water quality made on three different sources. Analyse the table and write your findings.

Property	*River*	*Pond*	*Well*
Colour	**Muddy**	**Muddy**	**Clear**
Odour	**Foul odour**	**Foul odour**	**No odour**
Organic waste	**Yes**	**Yes**	**No**
Chemical waste	**Yes**	**Yes**	**No**

a) Which source of water is the safest to drink?

b) Can we make river and pond water potable. How?

c) What can we do to prevent pollution of water sources?

4. The properties of water are listed. Find out and complete the table with suitable details from daily life.

Properties of water	*Situation*
Conducts heat	
Maintains level	
Universal solvent	
Ability to vapourise	

Extended activities

1. What is the main source of drinking water in your locality? Let's conduct a survey. Information should be collected about the sources of drinking water in your house and three neighbouring houses.

Drinking water source	*In my house*	*Neighbourhood houses*		
		House 1	*House 2*	*House 3*
Well				
Public water supply system				
Borewell				
Rain water storage tank				
Other sources				

Consolidate the information collected by each one and present the findings in the class.

2. Study and prepare a note on your school's water usage.

Information to be collected

- What are the water sources at the school?
- How much water is used per day?
- For what needs?
- For what purpose water is most used?
- What practical suggestions can you make for reducing water use at present?

3. Design an apparatus to demonstrate experimentally that water maintains its level.

4 SEEDS OF LIFE

One day a wise king felt that he should test the honesty of the children of the country. The king called all the children to the palace. Everyone was given seeds. It was announced that valuable gifts will be given to those who bring this seed after germinating it into a plant after three months. Ping, a farmer boy, was also present in the group of children. He buried the seeds in the soil of the pot and watered them, but the seeds did not germinate. After three months, all the children came to the palace with flowered plants. They all made fun of Ping who came to the palace with an empty pot. The king examined each one's plants. When he reached Ping, the king was happy. The king said, 'This is the winner. Only seeds with life will germinate. The seeds I gave you were lifeless.'

Have you read the story of Ping? Only living seeds germinate,right? Isn't it the life within tiny seeds that grows into even huge trees?

Collect a variety of seeds. Display the seeds in your class and write about their characteristics.

- Name of the plant
- Colour
- Size
- Shape
- Other features

Even though the seeds have life, will all the seeds buried in the soil germinate? Why don't all the seeds germinate?

Let us germinate seeds

What factors are required for germination of the seed? Write down your guess.

- Water
-
-
-

How do you find out if your guess is correct? Let us do the necessary experiment to find it out. Take some wet soil in a glass and put some pea seeds in it. Place it in an area where it will get sunlight. Water should also be given at the required rate to maintain moisture. Observe it every day. What all factors did the seeds get?

Figure 4.1

- Soil
- Water
- Air
- Sunlight

Are all these factors necessary for germination of the seed? How to find it out?

Let us check one by one.

Is soil necessary for the seed to germinate?

How do you find out that soil is necessary for the seeds to germinate? Can't we do it by examining if seeds placed without soil will germinate? Put a wet cotton ball in a glass and place the seeds on it.

Figure 4.2

What factors do the seeds gain?

What factors do the seeds lose?

The factors that the seed gets	The factors that the seed doesn't get
Water Air Sunlight	Soil

Table 4.1

Is water necessary for the seed to germinate?

How do you find out if water is necessary for the seed to germinate?

Which factor should be kept out of the experimenting items?

Plan the experiment.

Figure 4.3

Is sunlight necessary for the seed to germinate?

How do you find out if sunlight is necessary for the seed to germinate?

What factor should be left avoided here?

What changes should be made to the experiment to make this factor left out?

- Steel glass instead of transparent glass.
-

Figure 4.4

Let us do the experiment

Let us try the experiments planned so far. Place green gram seed in a glass so that it receives soil, air, water and sunlight. Place the seeds in the other three glasses, that do not get any one of the following at a time - soil, water and sunlight.

Day	Glass 1 *(Given all factors)*	Glass 2 *(Given all factors except soil)*	Glass 3 *(Given all factors except water)*	Glass 4 *(Given all factors except sunlight)*
One				
Two				
Three				
Four				

Table 4.2

Write each day's observation in the science diary.

Which all factors were found to be necessary for germination of seeds?

Present the findings to the class.

Are there any other factors required for germination of seed? How to find out? Plan and conduct the experiment.

For seed to germinate

Water is necessary for the germination of seeds. But the factors like soil and sunlight are not necessary. Besides water, air and suitable temperature are also necessary for seed germination. Different seeds have different germination times and suitable temperatures.

Life within the seed

Observe the germination of the green gram seed in the illustration.

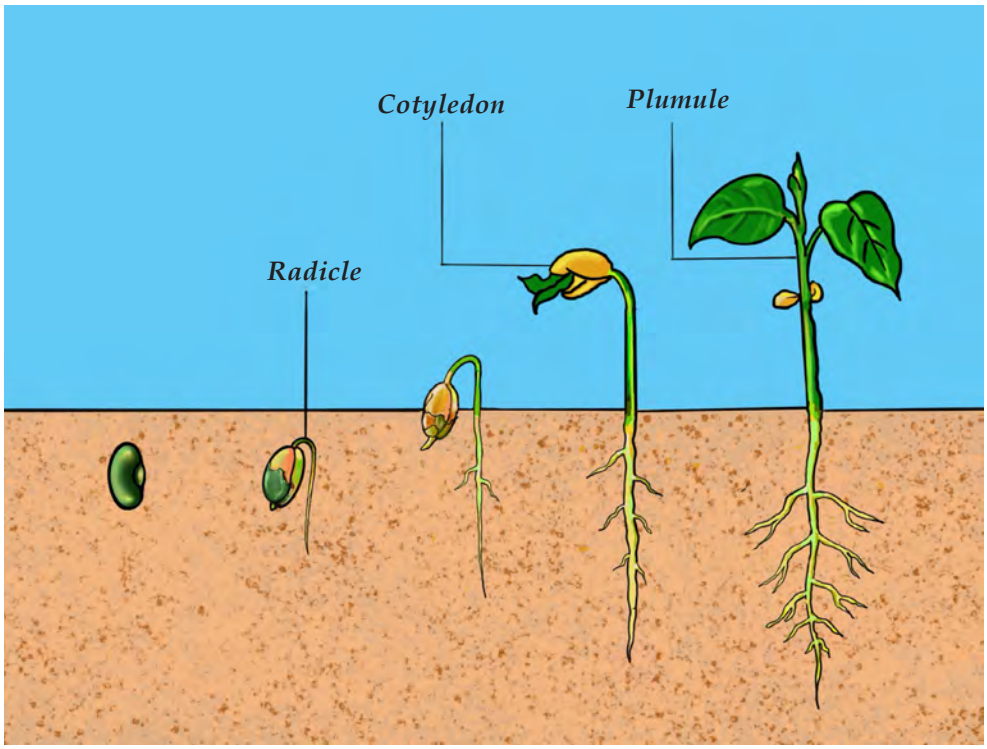


Illustration 4.1

Record the changes that occur in five days in the table.

The change in the seed	First day	Second day	Third day	Fourth day	Fifth day
Size of the seed		The seed becomes soaked and grows bigger			
Outer covering of the seed					
The part which is germinating and growing downwards from the seed (radicle)					
The part which is germinating and growing upwards from the seed (plumule)					
Primary leaf within the seed(cotyledon)					

Table 4.3

Illustrate the recordings in the science diary.

Examine the glasses from previous experiments.

Which plant grows best after germination?

Which factors did the best growing plant receive?

- Sunlight
- Air
-
-
-

Hydroponics

Hydroponics is a new method of growing plants without soil. In this method of cultivation, plants are grown in a nutrient solution instead of soil.

Figure 4.5

Plants make their food in their leaves, don't they?

The food for the plant until the seed germinates and grows a leaf is obtained from the cotyledon. How many cotyledons does a pea seed have?

Have you observed the change in the cotyledon as the plant grows?

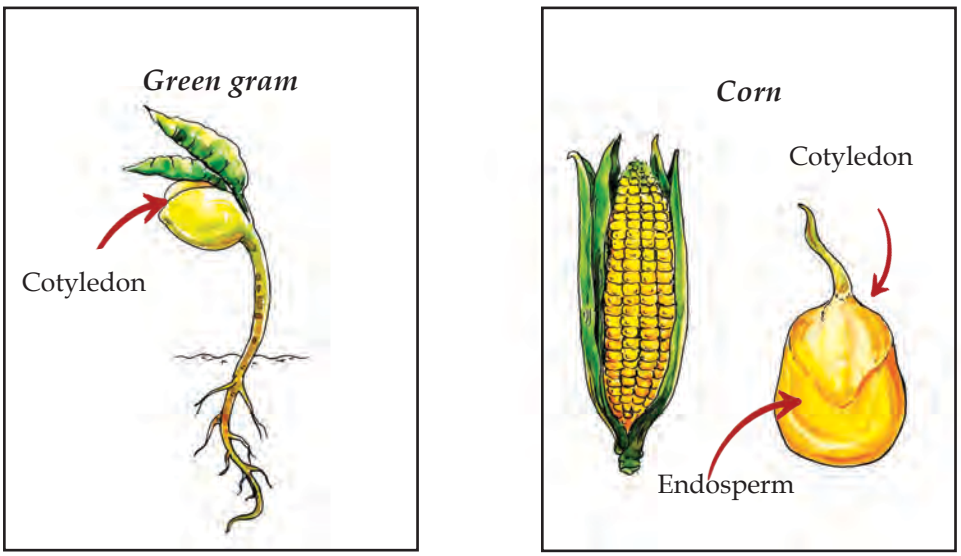


Illustration 4.2

Look at the cotyledon in a corn. Are there two cotyledons in a corn as in pea seeds? There is only one cotyledon in a corn. Endosperm is the part attached to the cotyledon. In plants with only one cotyledon, the food for the plant is obtained from the endosperm, until the seeds germinate and grow its leaves.

Changes that occur during seed germination

Germinate seeds of tamarind, jackfruit, cashew, rice and corn. Observe the changes that the seed undergoes as it germinates.

Illustration 4.3

Carefully observe the germinated seeds using a handlens. Carefully open the seed and draw the cotyledon and endosperm in the science diary.

Seed germination

The seed becomes soaked and the outer shell bursts. First the radicle and then the plumule emerge. The radicle becomes the root of the plant. The plumule becomes the stem and leaf. The growing plant consumes the food stored in the cotyledon or endosperm until photosynthesis is fully functional.

Why do plants store food in seeds?

What seeds do we eat?

Planting without seeds

Are seeds the only planting material used?

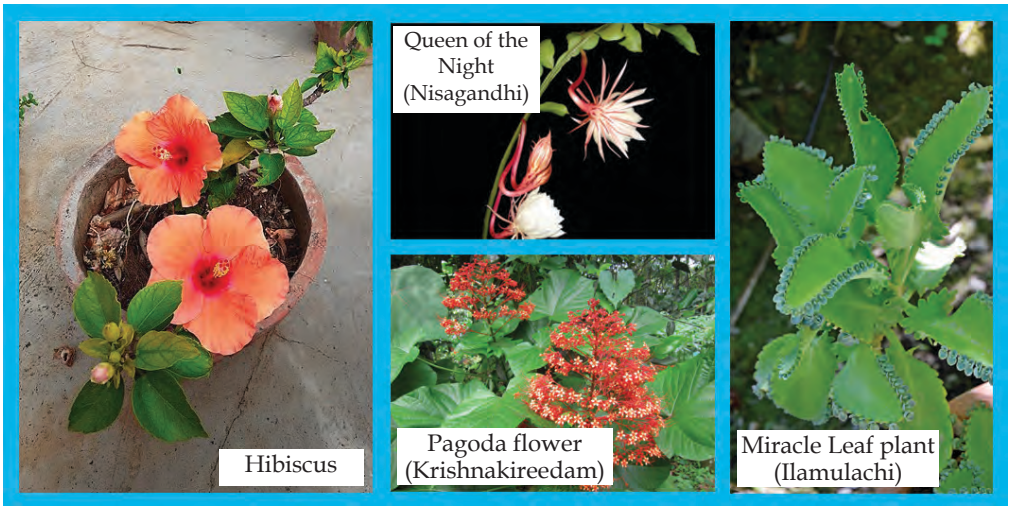


Figure 4.6

Which parts of the plants in the picture give rise to new plants?

Visit the biodiversity garden and collect information. Grow plants other than from seed in the biodiversity garden and record the inferences.

Seeds in many places

See the conversation between the Malabar plum (Njaval) tree and the bird.

Illustration 4.4

Tree : Why are you eating my fruit?

Bird : I am not only eating your fruit and satisfying my hunger. I am also carrying the seeds to many places.

Tree : Even if you are not there, will my seed not fall down and germinate?

Bird : Do you have enough space for so many seeds to grow under you?

What creatures do you know that transport plant seeds to different places like this?

- Squirrel
-
-

What is the role of humans in delivering seeds to different places?

Do organisms alone distribute the seeds? Discuss

Seed dispersal is the process in which seeds from the mother plant reach different locations.

Why seed distribution?

- If all the seeds of a plant fall and germinate at the base of the plant, they will not get the soil, water, sunlight, and minerals they need to grow. So the seeds have to be dispersed to many places.
- This is the reason why different plants are found in one region and one plant is found in different regions.

Adaptations for seed dispersal

How does coconut adapt for flowing through water?

Figure 4.7

- Even if it remains in water for a few days, it will not rot.
- It will float in the water as the husk is filled with air.

What could be the reason behind appooppan thadi's (milkweed pappus) flying in the wind? Look at the picture and find out.

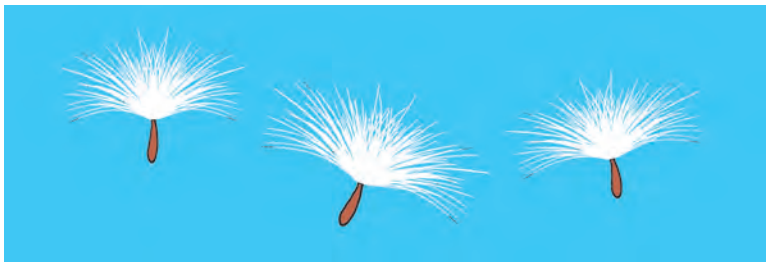


Figure 4.8

What are the fruits around you that animals and birds eat?
What are the features of these fruits for attracting birds?

- Fleshy parts
-
-

Have you noticed that some non-edible fruits have parts that help them stick to other things?

Chaff Flower

Love grass

Figure 4.9

How do these adaptations help in seed dispersal?
What plants do you know that burst and release seeds when they ripen?

Rubber

Balsam

Figure 4.10

Observe your surroundings, find out the methods of seed dispersal in different plants, and write them down.

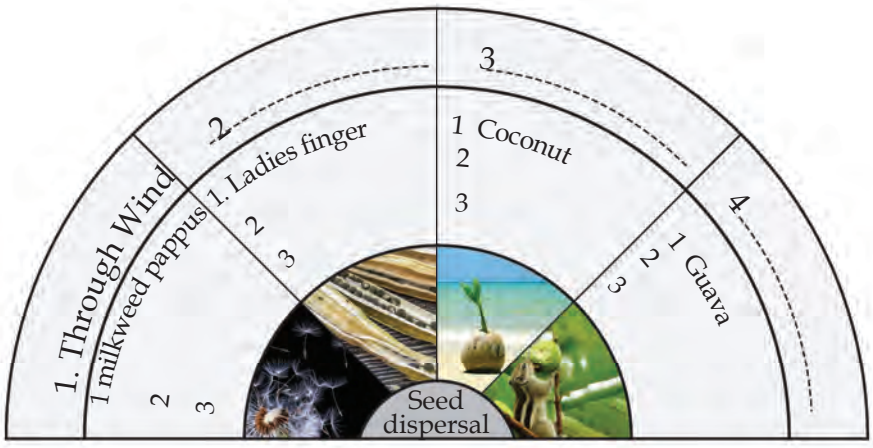


Illustration 4.5

What are the other uses of seeds?

What seedcrafts do you know?

Illustration 4.6

Make various handicrafts using seeds and display them in the class.

Variety in leaves

Observe the pictures

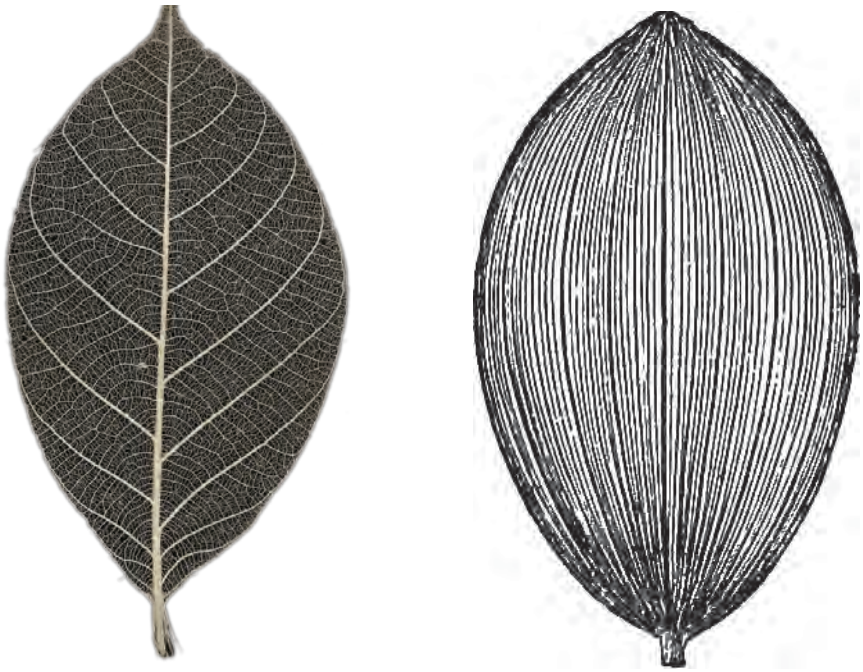


Figure 4.11

What is remaining in these leaves that have lost their green parts? It is through these parts, water is brought to the leaf and food is taken from the leaf. These are the veins of the leaves. Are the veins arranged in the same way in both the leaves? Look at the first picture, you can see in the middle of the leaf, a main vein extending from the node to the tip. Many small branches that come out from it are connected to each other like the links of a net. This is reticulate venation. In the second picture, did you see that all the veins in the leaf start from the node of the leaf and reach the tip in parallel without touching each other? This is parallel venation.

Observe the surroundings and find leaves with these two kinds of venations and write the names of the plants.

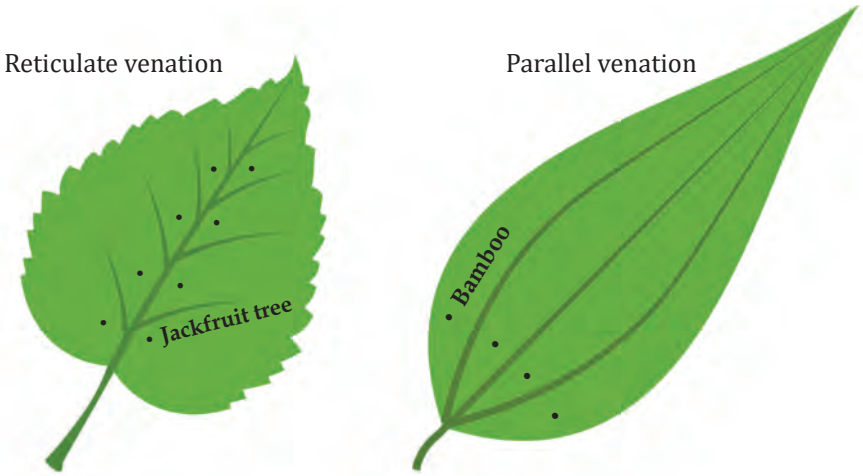
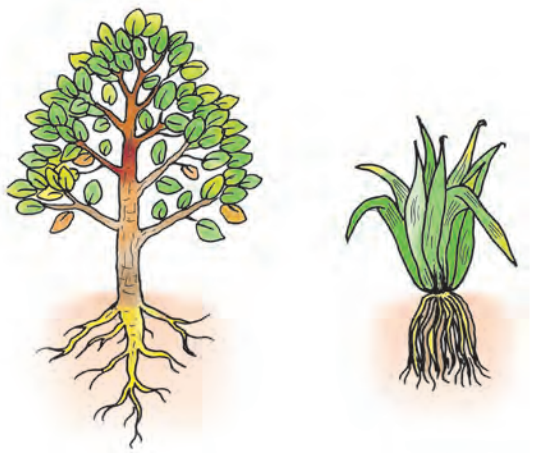


Table 4.4

Is there any relationship between the venation of leaves and the structure of their roots?

Examine and draw the pictures of the roots of a plant with reticulate venation and a plant with parallel venation.

Compare the pictures you drew with the pictures below.



Jackfruit tree Grass plant

Illustration 4.7

Look at the pictures.

What is special about the root of the jackfruit tree?

How is the root of the grass plant different from the root of the jackfruit tree?

Don't you see a large root growing down from the stem in the root system of the jackfruit tree?

This root is the tap root. The other small roots are growing from this root, aren't they?

Is there a large main root in the root system of the grass plant?

A taproot system is a root system consisting of a taproot growing downwards from the base of the stem and branching roots growing from it. You can see the taproot system in mango trees and jackfruit trees. Fibrous root system is one in which many fibre-like roots grow from the base of the stem. Plants belonging to the grass family have a fibrous root system.

Examine the leaves of the plants in your surrounding and list the venation and the root system.

Plant	Venation	Root system
Green gram		
Grass		
Jackfruit tree		
Coconut tree		

Table 4.5

Find out the relationship between the venation and the root system.

Other types of roots

Although roots are usually grown from the radicle, some roots are formed from stems, branches, etc. They are prop root, stilt root, and clinging root. Pneumatophores are a special kind of root found in mangroves. The tips of these roots rise from the soil into the atmosphere. They are known as breathing roots as they help in the exchange of gases.

Prop root

Stilt root

Clinging root

Pneumatophores

Figure 4.12

Monocot plants and dicot plants

Observe the pictures and write the differences in root, leaf, stem, and number of cotyledons in group 1 and of group 2.

Group - 1

Figure 4.13

Group - 2

Figure 4.14

Plant part	Group - 1	Group - 2
Root		
Stem		
Leaf		
Number of cotyledons		

Table 4.6

Plants shown in the figure 4.13, have only one cotyledon. Such plants are called monocot plants. What can we call plants with two cotyledons?

Fibrous roots, unbranched stem and leaves with parallel venation are the characteristics of monocot plants. Dicot plants are characterised by a taproot system, leaves with reticulate venation, along with branched stem.

We can see some plants in our surroundings which do not show any such relationship between root and leaf. Taro and yam are examples.

Find more examples.

To protect from extinction

Look at the pictures of plants, used to be present in many areas and are now decreasing in number.

Indian prickly ash(Mullilam)

Thumba

Figure 4.15

Which plants are in decline in your locality like this?

Make a list of such plants.

Extinction is the reduction in the population of an organism and their disappearance from the earth. Major reason for this is the destruction of the natural habitat of the organism. To save organisms from extinction, their natural habitats must be protected.

Let us assess

1. What is the change in the size of the cotyledon when the seeds begin to germinate? What is the reason for this?

2. Classify the different plants you see around, according to the method of germination from seed, stem, root and leaf.

3. Complete the table given below.

Method of seed dispersal	Adaptations of the seed
	Fleshy parts. Parts that help it cling to other things.
	The weight of the seed is less. Hair-like parts to fly.
Through water	
	When the fruit ripens, the outer shell splits open and the seeds are scattered outside.

Extended activities

1. Collect some seeds of different types of vegetables and germinate them. Observe and record the time difference in germination of the seeds. Plant the germinated seeds.
2. Discuss and find out what actions can be taken to protect plants that are declining in your locality.

Notes

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Notes

Notes

CONSTITUTION OF INDIA

Part IV A

FUNDAMENTAL DUTIES OF CITIZENS

ARTICLE 51 A

Fundamental Duties- It shall be the duty of every citizen of India:

(a) to abide by the Constitution and respect its ideals and institutions, the National Flag and the National Anthem;

(b) to cherish and follow the noble ideals which inspired our national struggle for freedom;

(c) to uphold and protect the sovereignty, unity and integrity of India;

(d) to defend the country and render national service when called upon to do so;

(e) to promote harmony and the spirit of common brotherhood amongst all the people of India transcending religious, linguistic and regional or sectional diversities; to renounce practices derogatory to the dignity of women;

(f) to value and preserve the rich heritage of our composite culture;

(g) to protect and improve the natural environment including forests, lakes, rivers, wild life and to have compassion for living creatures;

(h) to develop the scientific temper, humanism and the spirit of inquiry and reform;

(i) to safeguard public property and to abjure violence;

(j) to strive towards excellence in all spheres of individual and collective activity so that the nation constantly rises to higher levels of endeavour and achievements;

(k) who is a parent or guardian to provide opportunities for education to his child or, as the case may be, ward between age of six and fourteen years.

CHILDREN'S RIGHTS

Dear Children,

Wouldn't you like to know about your rights? Awareness about your rights will inspire and motivate you to ensure your protection and participation, thereby making social justice a reality. You may know that a commission for child rights is functioning in our state called the ***Kerala State Commission for Protection of Child Rights.***

Let's see what your rights are:

- Right to freedom of speech and expression.
- Right to life and liberty.
- Right to maximum survival and development.
- Right to be respected and accepted regardless of caste, creed and colour.
- Right to protection and care against physical, mental and sexual abuse.
- Right to participation.
- Protection from child labour and hazardous work.
- Protection against child marriage.
- Right to know one's culture and live accordingly.
- Protection against neglect.
- Right to free and compulsory education.
- Right to learn, rest and leisure.
- Right to parental and societal care, and protection.

Major Responsibilities

- Protect school and public facilities.
- Observe punctuality in learning and activities of the school.
- Accept and respect school authorities, teachers, parents and fellow students.
- Readiness to accept and respect others regardless of caste, creed or colour.

Contact Address:

Kerala State Commission for Protection of Child Rights

'Sree Ganesh', T. C. 14/2036, Vanross Junction

Kerala University P. O., Thiruvananthapuram - 34, Phone : 0471 - 2326603

Email: childrights.cpcr@kerala.gov.in, rte.cpcr@kerala.gov.in

Website : www.kescpcr.kerala.gov.in

Child Helpline - 1098, Crime Stopper - 1090, Nirbhaya - 1800 425 1400

Kerala Police Helpline - 0471 - 3243000/44000/45000

Online ***R. T. E Monitoring : www.nireekshana.org.in***