

# **ENVIRONMENTAL SCIENCE**

**Part - 1**

**Standard IV**



**Government of Kerala  
Department of Education**

**State Council of Educational Research and Training (SCERT),  
KERALA  
2016**

## 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.

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Typesetting and Layout : SCERT

First Edition: 2015, Reprint: 2016

Printed at : KBPS, Kakkanad, Kochi-30

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*Dear children,*

*Let us embark on a journey.*

*On the way...*

*tiny and big plants, birds,  
the stone and soil, telling stories.*

*the sky sketching the rainbow,  
the charm of the moonlight.*

*How many things around us!*

*Nature is, indeed, a great book of wonders.*

*To sip the honey of this knowledge...*

*Here, you have this book, as your friend.*

*Holding hands together come along....*

*Regards,*

**Dr. P.A. Fathima**

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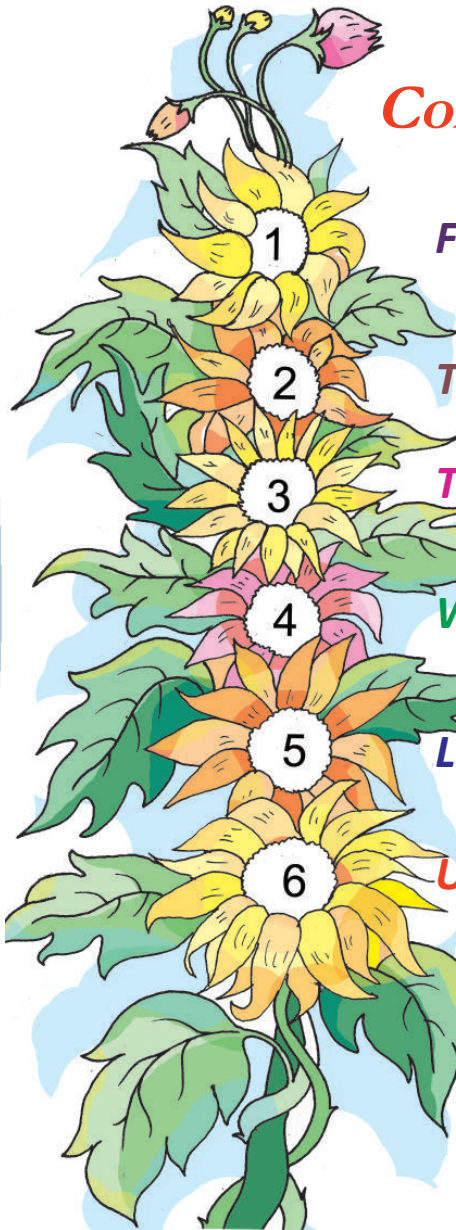
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**Certain icons are used in this  
textbook for convenience**

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**For further reading**  
*(Evaluation not required)*



**Significant learning outcomes**



**Let us assess**



**Extended activities**

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1

# ***Fields and Forests***

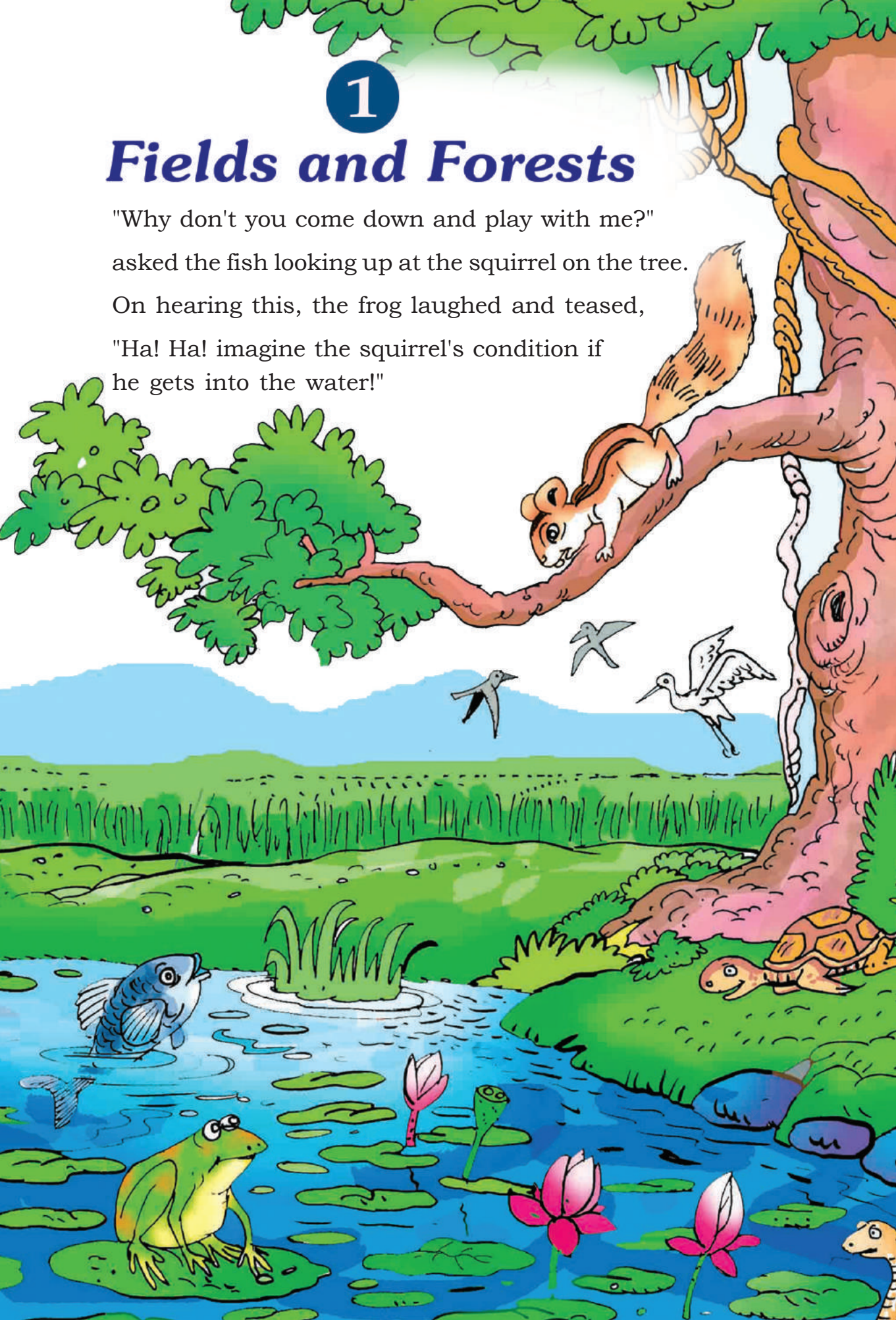
"Why don't you come down and play with me?"

asked the fish looking up at the squirrel on the tree.

On hearing this, the frog laughed and teased,

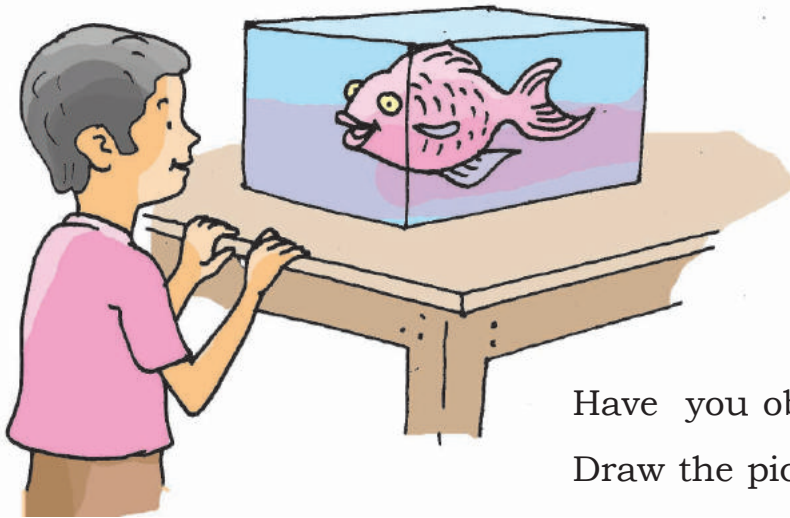
"Ha! Ha! imagine the squirrel's condition if

he gets into the water!"





The squirrel was not ready to give in. He hit back ,  
"Can you climb a tree and jump along its branches like I do?"  
The frog said, "Who can dive and turn in water like the fish?"  
Can a fish live or move on land?



Have you observed a fish?  
Draw the picture of a fish.  
What are its special features?

Examine the pictures given below carefully.



Notice the shape.

Do they have a shape that helps them move swiftly in water?

The boat - like shape with both ends pointed enables the fish to move through water. The fins also help the fish to swim in water.

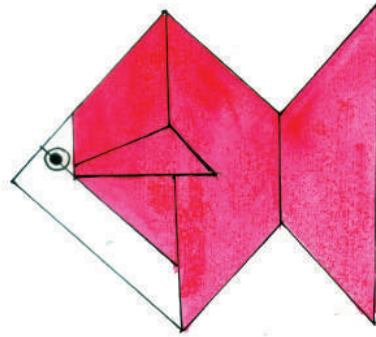
An organism has certain peculiarities that help it to live in its dwelling place. This is called adaptation.

What are the other adaptations of a fish? Discuss.

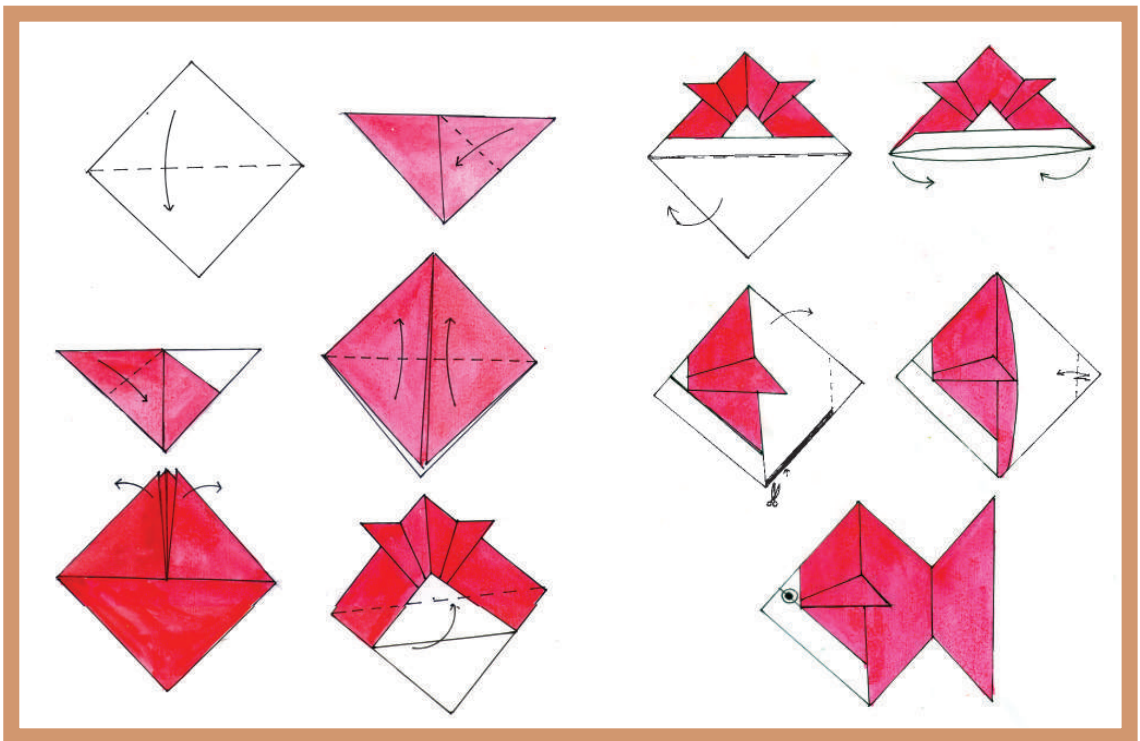
## Paper fish

This is a model of a fish made of paper by Leena.

Can you try making this yourself?



Look carefully at the patterns below and follow the method to make a fish using paper.



## Habitat

Observe a pond and a paddy field in your locality with the help of elders.

What plants and animals did you notice there?

List out their names.

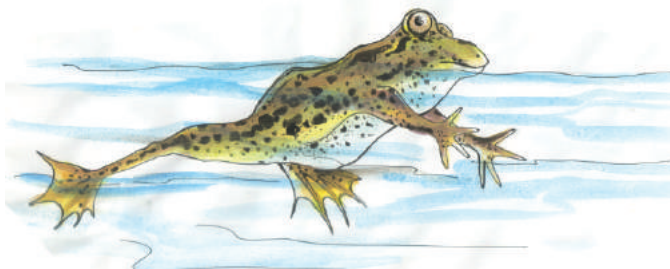
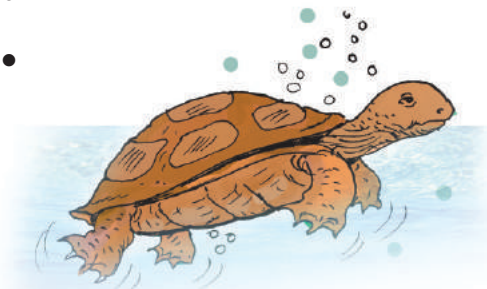
Complete the table below with organisms that live on land and in water.

Living on land	Living in water
• Banyan tree	• Water lily
• Mongoose	• Frog

The water lily and lotus live in water. What adaptations help them to survive in water. Discuss and write them down in your environment diary.

- They don't decay in water

- 
- 



### On land and in water

What are the adaptations that help a tortoise to move on land and in water?

- slimy body
- oar-like legs
- 

Can you add some more features?

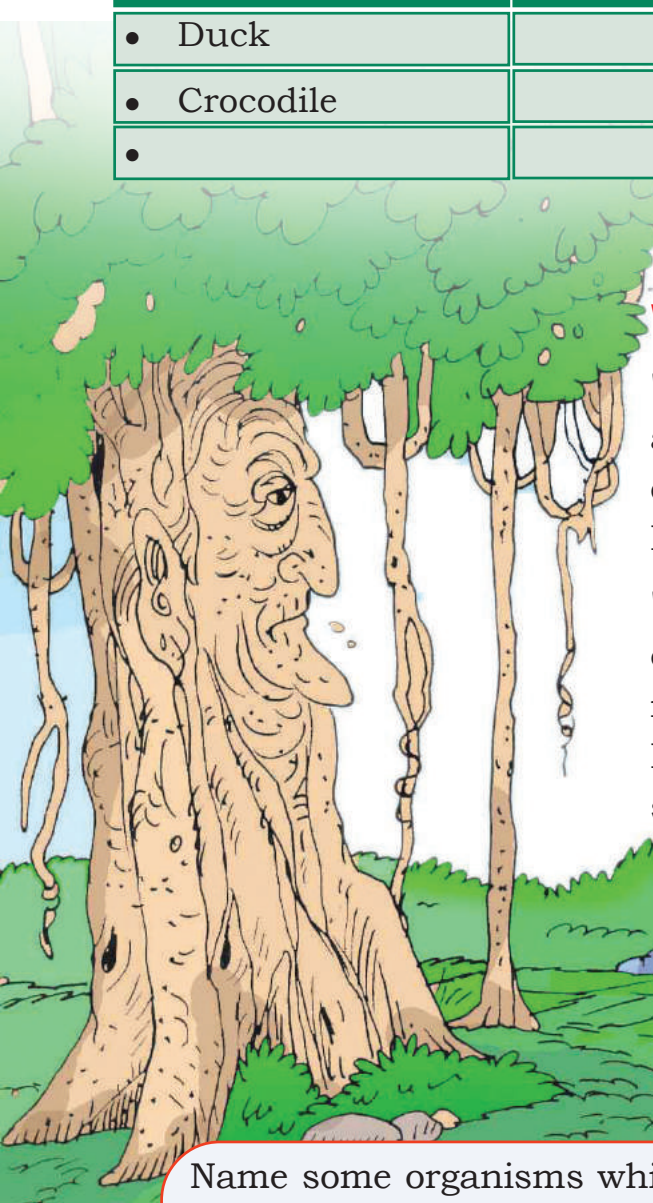
These adaptations help the tortoise to live on land and in water.

Do frogs also have such adaptations?



Which other creatures, do you know, have adaptations to live both on land and in water? List the creatures and their adaptations.

Creatures	Adaptations
• Duck	
• Crocodile	
•	



### Who is smarter?

"I am the one who provides shelter and home to most of the organisms" boasted the grand old Banyan tree.

"Really? Why don't you look around carefully? Almost all organisms live in me. In fact, even you Granny Banyan, dwell in me" claimed the soil.

Name some organisms which live in the soil.  
Many organisms live on rocks too! Write their names down.

- snake
- grass
- 

Make a list of the uses of the banyan tree to organisms.

- fresh air
- 



There are several organisms living in and around ponds, trees and fields. These organisms need air, water, soil and sunlight to live.

Plants and animals help each other to survive.

Living and nonliving things depend on each other.

Living things are biotic factors and nonliving things are abiotic factors.

Can human beings live without air and water?

How do biotic and abiotic factors depend on each other? Discuss.

### Complete the table

Biotic / Abiotic factors	Interdependence
Fish	<ul style="list-style-type: none"> <li>live in water</li> <li>feed on small organisms in water</li> </ul>
Water	<ul style="list-style-type: none"> <li>provides dwelling place for organisms</li> </ul>
Banyan tree	<ul style="list-style-type: none"> <li>makes the soil fertile</li> <li>helps retain water in the soil</li> </ul>
Lotus	<ul style="list-style-type: none"> <li></li> </ul>
Rock	<ul style="list-style-type: none"> <li></li> </ul>
Air	<ul style="list-style-type: none"> <li></li> </ul>
Frog	<ul style="list-style-type: none"> <li></li> </ul>
Water Snake	<ul style="list-style-type: none"> <li></li> </ul>
Light	<ul style="list-style-type: none"> <li></li> </ul>
Tortoise	<ul style="list-style-type: none"> <li></li> </ul>
Soil	<ul style="list-style-type: none"> <li></li> </ul>
Vines	<ul style="list-style-type: none"> <li></li> </ul>

Examine the table and record the general facts you have found out.

We can see that living and nonliving things in an area depend on each other.

An ecosystem includes the mutually dependent biotic and abiotic factors of a particular place.



## Forest - a wealth



How beautiful is the forest!

Why is it so beautiful?

So many diverse organisms like huge trees, tiny plants, animals, birds, insects and many others live in the forest. Butterflies and streams provide charm to the forest. The forest is indeed a world of wonder! How is the forest, which is rich with life, useful to us and other organisms?

Discuss with your friends and prepare notes.

- streams and rivers emerge from forests.
- forest is the habitat of diverse living things.
- 

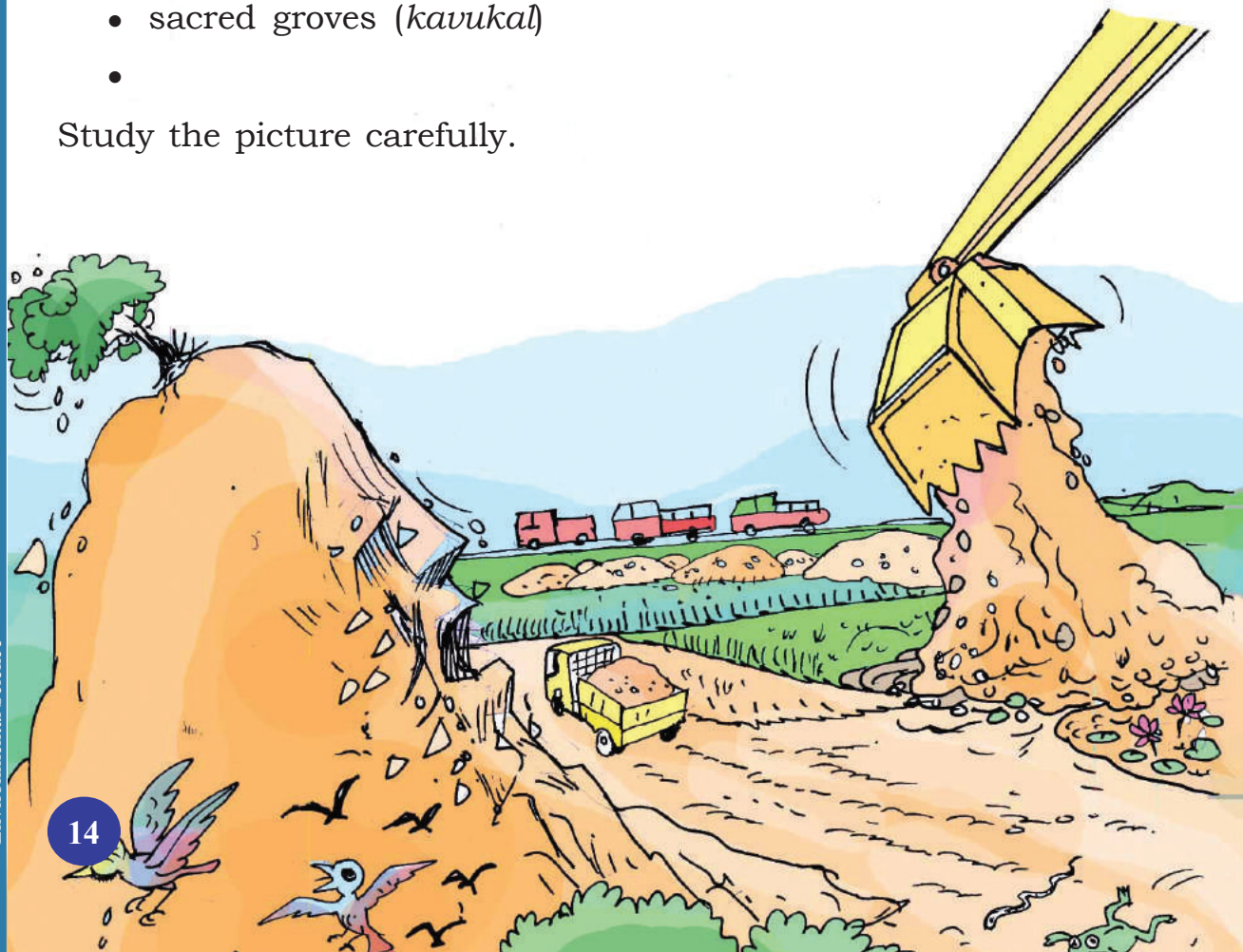
It is very important to preserve the forest, an ecosystem with diversity, for sustaining life on earth.

Have you noticed the different ecosystems in your locality?

Make a list of those ecosystems.

- hills
- bush
- sacred groves (*kavukal*)
- 

Study the picture carefully.





Many activities of human beings harm the ecosystem. Discuss these activities and note them down in your environment diary.

- excessive use of pesticides
- 
- 

Are these activities harmful to man, in turn? If so, how?

Look at Sanimol and her friends.

Discuss what they are doing.

Will these activities help to protect our environment?



What other activities can we do in order to protect and preserve the environment?

Note them down in your environment diary.

We saw that both living and nonliving things depend on each other in an ecosystem. Human beings and other living things can survive only if the ecosystem is sustained. Let us engage in activities that protect our ecosystem.



## Significant learning outcomes

### *The learner*

- classifies living things into those that live on land and those that live in water.
- identifies and explains how the adaptation of aquatic organisms are suitable for life in water.
- lists organisms that live on land and in water.
- finds out the interrelationship between organisms and states them.
- explains, with examples, that living and nonliving things are interdependent.
- identifies the ecosystems in the locality.
- identifies and explains the importance of forests.
- identifies and states human interventions that destroy natural habitats.
- engages in activities that protect environment.



### Let us assess

1. Which of the following peculiarities differentiates the frog from the squirrel?
  - a. eating food
  - b. movement
  - c. living on land and in water
  - d. breathing
2. Which one of the following organisms spends more time in water?
  - a. crocodile
  - b. crane
  - c. elephant
  - d. wild boar

3. How does the shape of the body help a fish?
- to move in water
  - to collect food
  - to breathe
  - to live in all climates
4. Write whether the following statements are true or false:

Statements		True/ false
1	Living things do not depend on abiotic factors like soil, air etc.	
2	The destruction of any of the factors of an ecosystem affects the ecosystem adversely.	
3	The pollution of soil, water and air does not affect organisms.	
4	Application of pesticides is good for the environment.	
5	The levelling of fields and ponds and cutting down of trees help in the sustainable development of our country.	



## Extended activities

- Collect pictures of organisms living on land and in water, and write short notes about those organisms. Note down their adaptations. Make an album.
- Visit a nearby pond, paddy field, hill etc, and understand how they are important to the environment. Discuss how their destruction affects the environment.
- Set up an aquarium in class.



Look at the picture of the 'Eco Park' given above. Create an Eco Park in your school. Ensure aquatic organisms in the Eco Park. Also make sure that you plant the hibiscus, ixora, *krishnakireedam*, citrus plant, mussaenda etc., to attract butterflies.

## The leaf too has to say



Suma teacher and her students are preparing to transplant the vegetable seedlings they had sown.

*“Children, water the pits well and uproot the saplings carefully without breaking their roots” said the teacher to the children.*

The children examined the saplings to check whether the roots were damaged.

*“Teacher, the roots of the vegetable saplings and the muthanga growing between them are not similar, are they?”*

Bibeesh asked.



What are the differences Bibeeesh would have noticed?

Try to write them down.

Go for an 'ecowalk' with your friends.  
Collect different types of plants.  
Examine the plants and observe their roots carefully.

Note down the peculiar features of each of them in your environment diary. Show this to your friends and discuss. Draw pictures too.



### Misna's observation notes

*In one group of plants, a thick main root is seen growing from the base of the stem. Several smaller roots have grown from that root. The thick root is long.*

*In another group of plants, several roots have grown from the base of the stem. All roots are similar. The roots are thin.*

Read the notes.

Compare them with your observation notes.

How many types of roots did Misna observe?

How many types of roots could you identify?

### Tap root system and Fibrous root system



Figure 1

Tap root system

Observe Figure 1.  
Were there similar roots  
among the roots you  
observed?

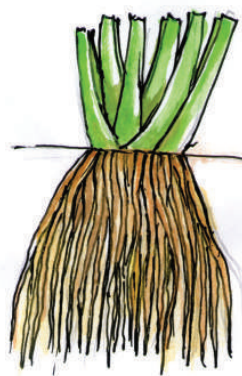


Figure 2

Fibrous root system



What are the differences between the two roots shown in the figure?

Note down the differences in the environment diary. Observe the root system in Figure 1. Don't you see a large root growing down from the stem?

This root is called the tap root. Other small roots grow from this root.

The tap root system consists of the larger tap root and the smaller branches growing from it.

Examine Figure 2.

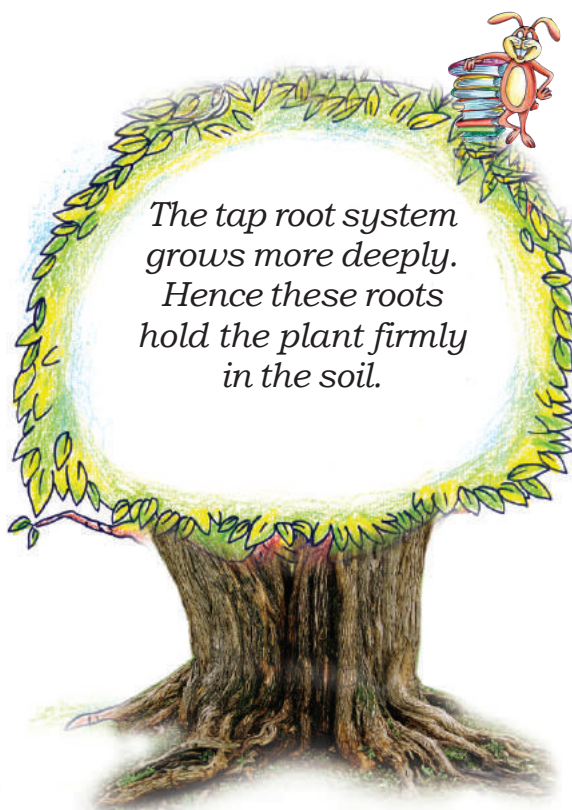
You may have noticed such roots during an ecowalk. How is it different from the tap root system you just read about?

Do you see a thick main root in this root system?

Is there any difference in shape and size between the roots in it?

Observe and find out from where these roots arise.

Record these observations in the environment diary.



The fibrous root system includes a cluster of similar roots growing from the base of the stem.

Let us try to find out some plants that have fibrous root system.



Coconut tree



Arecanut palm



Bamboo

List the differences between the tap root system and the fibrous root system in your environment diary.

Tap root system	Fibrous root system

Draw the picture of the tap root system and the fibrous root system based on your observation.

*"Teacher, the leaves of the plants we observed are also not similar,"* Bibeesh pointed out to Suma teacher.

What differences do you see?

### Let us observe

*"While you observe the shape and size of the leaf, also take note of the peculiarity of their vein – like structures. Don't forget to record the differences in the environment diary,"* said the teacher.



Notice the pattern of the leaves in the picture.

Complete the picture by joining the dots, starting from the leaf stalk.



Figure 3

Figure 4



Can you see the veins of the leaves clearly?

What differences did you notice between the two leaves? Write them down in the environment diary.

Try to tear a mango leaf, a jack tree leaf, a coconut palm leaf and a bamboo leaf into several long pieces downwards from the tip.

Could you tear all the leaves easily without breaking them? Which of these leaves could you tear into long pieces?

Which of them you could not tear into long pieces?

Classify them and write.

Examine the veins of the leaves. Draw the veins in the leaves as they appear, in the environment diary.



## Reticulate venation and parallel venation



Figure 5

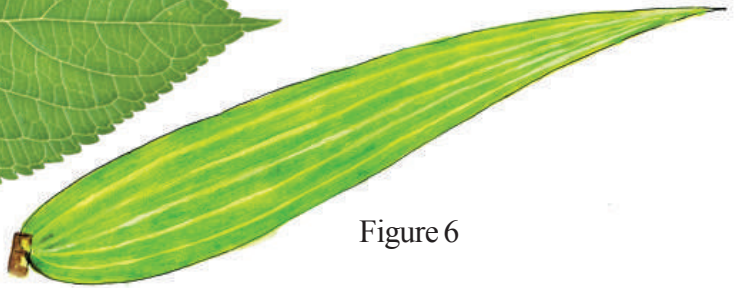


Figure 6

- Did you see the veins lying interconnected in the leaves you observed and the pictures you drew as in Figure 5?

Now look at the main vein in the middle of the leaf, starting from the leaf stalk to its tip. Did you notice many small branches arising from the main vein, connected to one another like a network?



The network - like venation in leaves is called **reticulate venation**.

Were there leaves with veins as in Figure 6, among the leaves you observed?

Notice how the venation in such leaves differs from reticulate venation.

Note down the differences in the environment diary. The veins in the leaves, do not touch one another. Starting from the leaf stalk, they run parallel and join at the tip of the leaf.

The parallel arrangement of veins in leaves is called **parallel venation**.

Note down the differences between reticulate venation and parallel venation in the environment diary.



# Venation and Root system

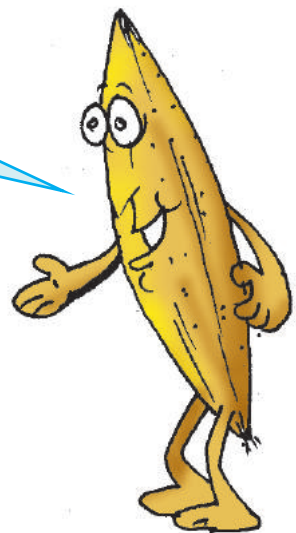
Tabulate the root system and venation of the plants we observed.

Name of the plant	Root system		Venation	
	Tap root	Fibrous root	Reticulate	Parallel
Coconut tree		✓		✓
Mango tree	✓		✓	

Now study the table carefully and find out the relation between root system and venation and write it down. Observe the leaves of the big and small plants around you and record the type of root system of these plants.

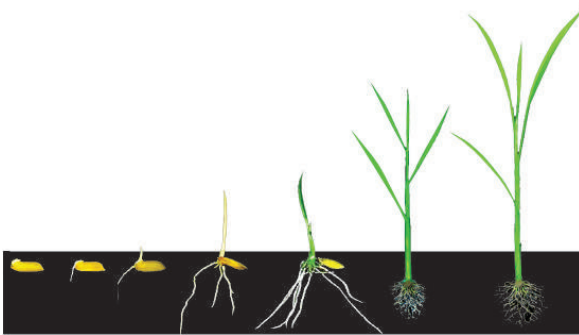
## Autobiography of a paddy grain

*I was born as the daughter of a group of mothers who lived happily. There were many of us on mother's grain stalk. Some of us were eaten by a pest 'Chazhi.' The rest of us grew up strong and ripened. Farmers reaped our mothers, who bore us bright and golden in their hands, threshed and cleaned them. It was from there that I reached Arun's house. When we were laid in the sun on a mat, to dry, I was scattered to a corner in the yard. With the summer rain, I started changing all over.*



What could be the changes that occurred?

Observe the pictures.

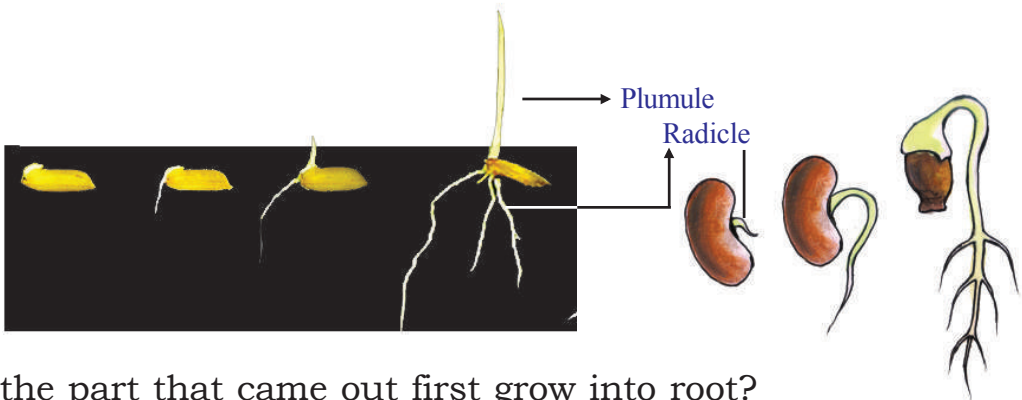


Different stages of germination of a paddy grain.



Different stages of germination of a pea seed.

Which part of a plant comes out first from a germinating seed?  
What did that part which came out first from the seed, form into?  
Observe the pictures and write.



Did the part that came out first grow into root?

The part that comes out first from the seed is called radicle.

The part that comes out after the radicle, becomes the stem of the plant.

Observe the pictures.

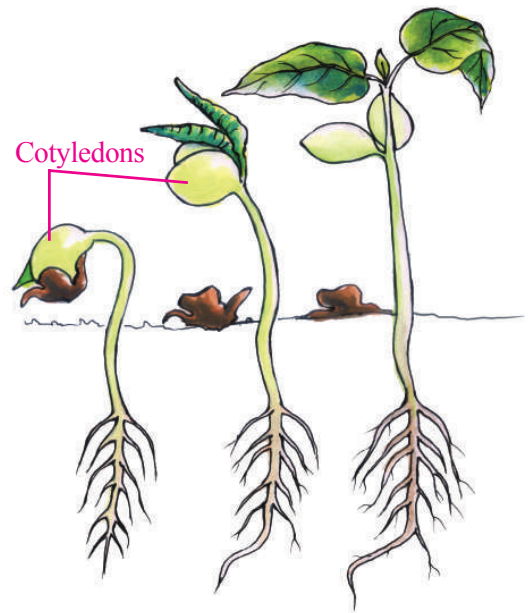


It is the plumule that grew into the stem.

From where did the radicle and the plumule get food to germinate?  
Have you thought about this?

Didn't you see the radicle and the plumule in the picture?  
Which is the part seen besides these?

The thick leaf-like part seen in the plumule of the germinating pea seed is the cotyledon. The food required for a seed to germinate, is stored in the cotyledons.

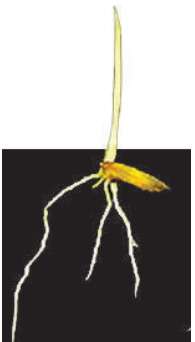


The plant uses the food in the cotyledons. So the cotyledons shrink and decrease in size as the plant grows.

The plant grows using the food in the cotyledons till it prepares its own food.

Do you see two cotyledons in a paddy grain also?

There is only one cotyledon in the paddy grain.



Plants having only one cotyledon are called monocotyledonous plants (monocots).

Plants having two cotyledons are called dicotyledonous plants (dicots).

What are the changes that occur when a seed germinates?  
Don't you want to know this?



Germinate a few seeds of paddy, pea, groundnut, wheat, *thina* (fox tail millet) and maize. Observe them for two weeks.

Note down their changes daily in the environment diary .

Which are the plants that have one cotyledon and those that have two cotyledons?

List them.

Let us now create a table showing the root system, venation and number of cotyledons of the plants we observed.

Plant	Root system	Venation	Number of cotyledons

Study the table carefully and find out the relation between the root system, venation and number of cotyledons of plants. Record it in the environment diary.



## Significant learning outcomes

### The learner

- identifies the peculiarities of the root system of plants and classifies them into fibrous root system and tap root system.
- observes and lists venation of leaves and classifies them into reticulate venation and parallel venation.
- identifies and states the relationship between venation and root system of plants around.
- defines monocotyledonous and dicotyledonous plants.
- engages in simple projects on the relationship between venation in leaves, root system and the number of cotyledons. Prepares project reports accordingly.





## Let us assess

1. Identify the odd one and circle it.
  - a. coconut root, bamboo root, mango root, arecanut root
  - b. banyan leaf, teak leaf, jack tree leaf, paddy leaf
  - c. maize, wheat, cashew, *thina*
2. Match the following

radicle	:	bamboo
monocotyledon	:	root
plumule	:	groundnut
dicotyledon	:	stem
3. Explain the differences between the root system of plants.
4. Observe the leaves of a mango tree, jack tree, bamboo, paddy, teak and coconut tree and classify them into two based on venation.
5. How will you distinguish between monocots and dicots?
6. Give examples of monocotyledons.



## Extended activities

- Collect dried root systems of different kinds of plants and make an album.
- Collect dried leaves that show venation clearly and make an album.
- Write a short note on the diversity among plants, identified by you during your 'ecowalk'.
- Collect seeds and classify them into monocots and dicots.
- Remove the green colour in leaves so that the venation can be seen clearly, and make an album (Discuss with your teacher for details).

# The Road to Independence

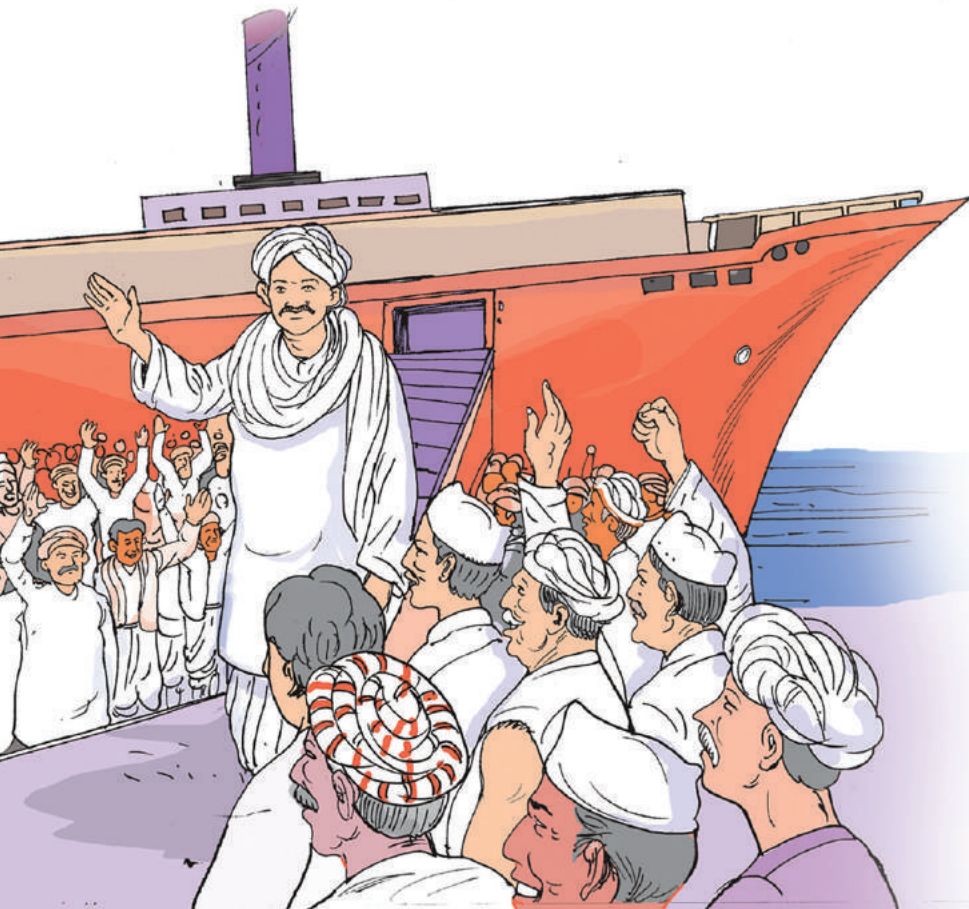
***Ninth January 1915 –morning***

*An unusual crowd has gathered at Apollo Bander harbour, Bombay. People are waiting for the arrival of a foreign ship. An important person is arriving in the ship. All have come there to welcome him. The ship reached the shore. A tall lean man in a long coat and turban, walked out of the ship towards the crowd.*

Who is this great man?

Yes,

He is Gandhiji.



Now look at the condition of India during British rule, when Gandhiji came back from South Africa.

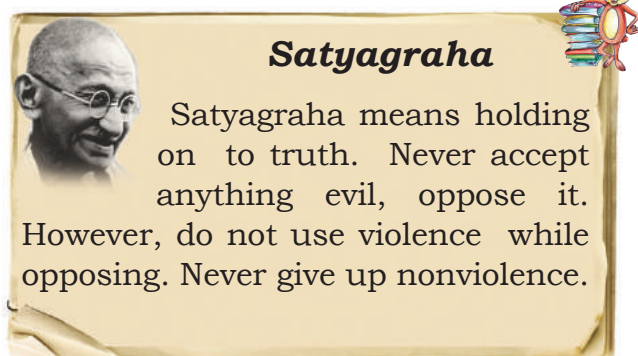


Did you examine the collage?

The British ruled India threatening and killing the Indians. We were forced to obey all their rules. Gandhiji exhorted the people to stand united against the harassment and injustice of the British rulers. He devised new means of protests, like Satyagraha for the fight against the British.

Gandhiji's simple way of life, pleasing speech... this was enough for him to capture the minds of ordinary people. People supported him with great enthusiasm. This mass support raised him to the

leadership of the Indian National Congress. Consequently, the Indian freedom struggle became a constructive mass movement rooted in nonviolence.



## The first struggle for peasants

The peasants of Champaran village in Bihar were in great misery. They were forced to cultivate indigo in most of their fields and sell it at a rate fixed by British landowners. Later these British landowners levied excess taxes too. Thus after each harvest, the farmers became more and more debt-ridden. Hearing about their hardships, Gandhiji and his followers reached Champaran. Then Gandhiji led a Satyagraha struggle against the British and set the peasants free from misery.

### More struggles

Some other struggles led by Gandhiji are the Kheda Satyagraha and the Ahmedabad textile mill strike.

The Kheda Satyagraha demanded that the taxes imposed on peasants should be reduced when the yields are low. The Ahmedabad textile mill strike was for raising wages. All these satyagrahas, led by Gandhiji, were victorious.

**Let's complete the table:**

Struggles	Special Features
Champan Satyagraha	<ul style="list-style-type: none"><li>• misery of peasants</li><li>• Gandhiji's Satyagraha experiment</li><li>• hardship of peasants reduced</li></ul>



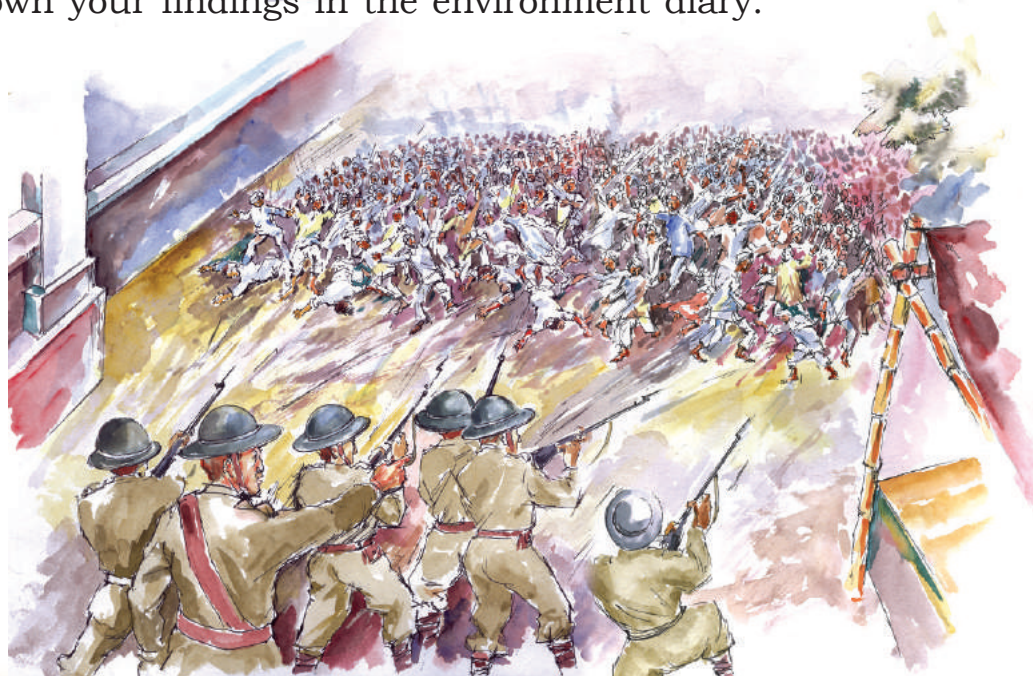


## British cruelty

The British introduced an Act which gave them power to arrest and imprison anyone they wanted without trial for any length of time. They suppressed the peaceful protests led by Gandhiji against this Act and arrested him.

Later the British unleashed much cruelty on the Indians. The place known as Jallianwallabagh in Punjab. A big open ground surrounded by huge buildings, with only one entrance. A meeting was going on there to protest against the injustice of the British. Suddenly gunshots were heard, one after the other... continuously... as if a cracker house was set on fire! The shocked and horrified people ran all around for life. Hundreds of people lost their lives either in the firing or in the rush. And many more people were wounded. This incident, that shocked the Indian mind, took place on 13 April, 1919. On hearing this, Gandhiji wished to reach Jallianwallabagh as soon as possible. But the British army did not allow him to even enter Punjab. This disappointed Gandhiji further more.

How did the British respond to the freedom struggle? Discuss. Note down your findings in the environment diary.



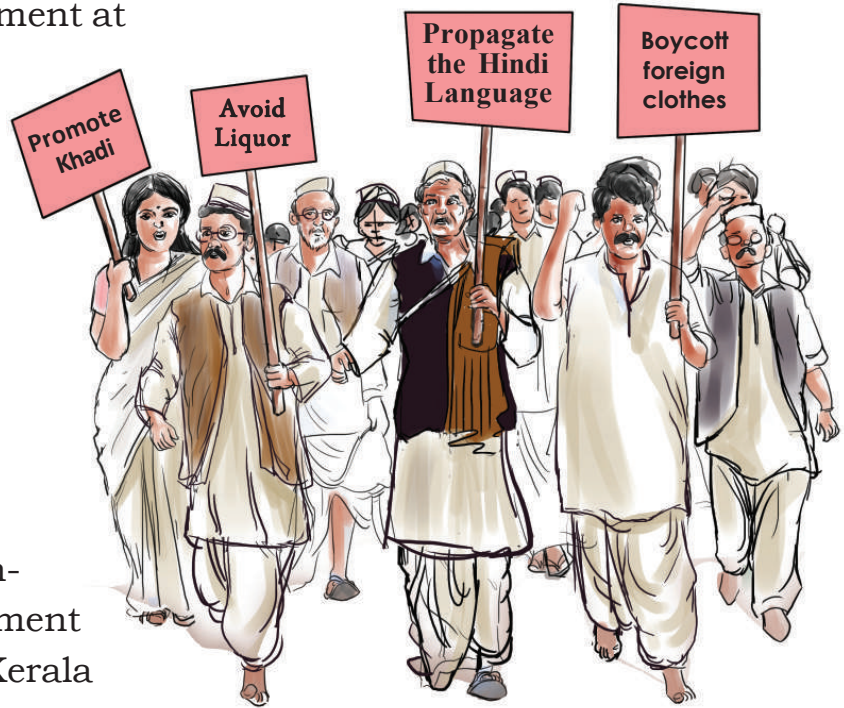
## Non-cooperation Movement

Gandhiji called for a country wide strike after the Jallianwallabagh incident.

It was decided not to cooperate with the British Government at any level.

What were the demands of the Non-cooperation Movement?

Discuss.



## Struggles in Kerala too

As part of the Non-cooperation Movement Gandhiji visited Kerala also.

Gandhiji's arrival provided strength and vigour to the Non-cooperation Movement in Kerala.

*We, Indians, are children of one mother. Our joys and sorrows are the same. Our goal is the freedom of India.*





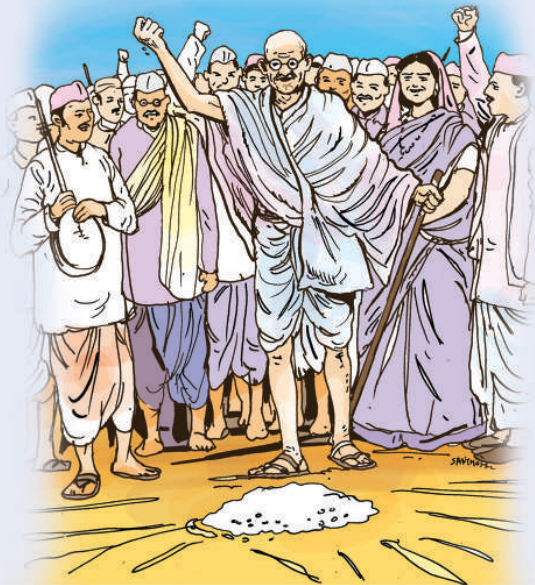
## Salt – a weapon of struggle

Salt is a thing we all need. The British levied taxes on salt which Indians prepared on their own seashores. Those who did not pay taxes could be even imprisoned. This was the law. Gandhiji warned of mass violation of law if the tax on salt was not withdrawn.

### *Dandi March*

#### *Twelfth March 1930 - morning*

Sabarmati Asram woke up earlier that day. Thousands of people including Jawaharlal Nehru, and Sarojini Naidu gathered there. Gandhiji told them, “I will return only if I win, or else I will offer my body to the seas”. Gandhiji and his followers walked a long distance of about 388 kms from Sabarmati to the shores of Dandi, in the hot sun. In front of an onlooking crowd Gandhiji took a handful of salt, and raising his hand, said “This handful of salt is the symbol of strength. This fist may be crushed but the salt will not be given up”. Thus salt became the symbol of strength in the history of the Indian freedom struggle.



The violation of the salt law marked the beginning of the Civil Disobedience Movement in the country.

## Kerala and the Salt Satyagraha

*Varika varika sahajare - valiya sahana samaramai  
Karalurachu kaikal korthu kalnadayku pokanaam!  
Kanthurannu nokuvin - kaikal korthiranguvin  
Kapadakudila bharanakoodamikshanam thakarka naam!  
Britaine virattuvin - chattamokke mattuvin  
Dhushtaneethivishtapathilottume nilachida!  
Vijayamenkil vijayavum - maranamenkil maranavum  
Bhayaviheenamakhilajanavum aagrahichiranganaam.  
Vedikaladikalidikalokke - vannu methukollukil  
Podi thudachu chiri chirichu maarukattinilkanam.  
Uppu naam kurukkanam - aaruvannethirkilum  
Alpavum koduthidaathe kopiyaathe nilkanam.  
Lathiyilla thokkumillayenkilum karangalil  
Rakthamulla naalvare namukku yudhamaadanam.*

*- Amshi Narayana Pillai*



Such songs provided more enthusiasm to the struggle for freedom. Singing these songs, the Satyagrahis set for the Payyanur sea shore in Kannur to violate the law on salt tax. K. Kelappan led the protest in Kerala. Later he came to be known as 'Kerala Gandhi'.

Many leaders including Gandhiji, who took part in the Salt Satyagraha were arrested. They were brutally beaten up by the police.

Identify other similar protests in Kerala related to the freedom struggle.

- Malabar rebellion
- 

### Freedom fighters of Kerala

Besides K. Kelappan, T. K. Madhavan, Mohammed Abdu Rahman, K. P. Kesava Menon, A. K. Gopalan, Akkamma Cherian, Kutty Malu Amma etc., were the main leaders who led the freedom struggle in Kerala.



## Quit India (1942)

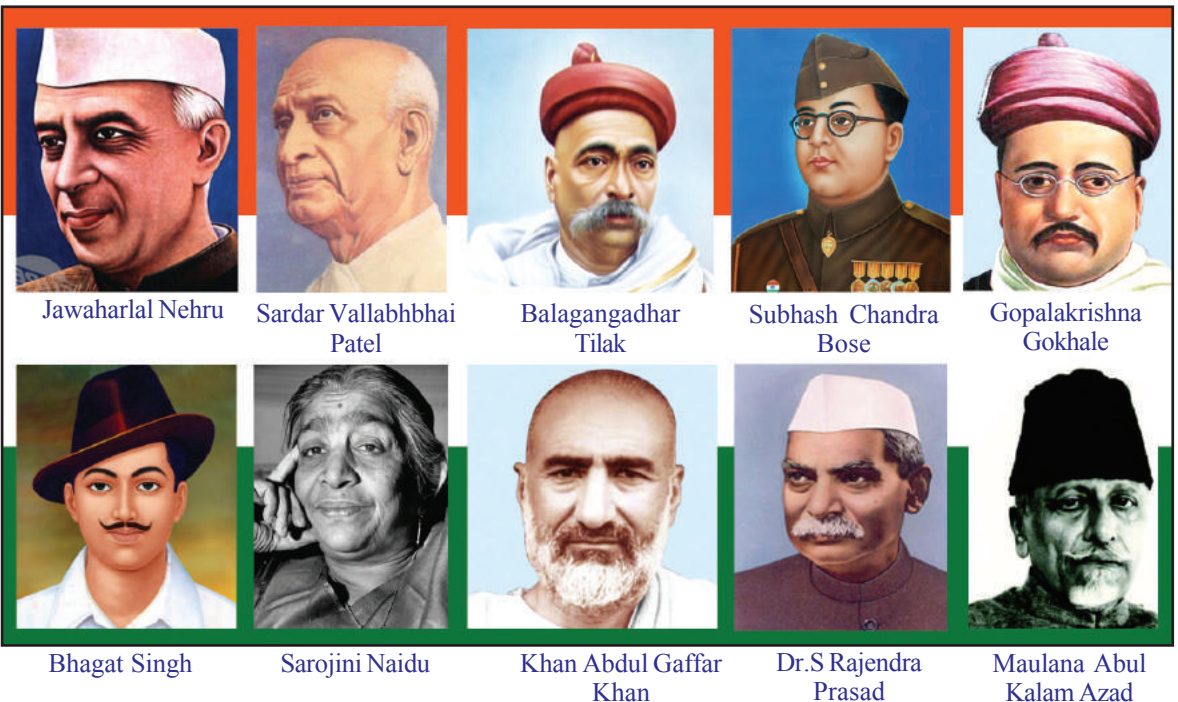
Jawaharlal Nehru presented the Quit India Resolution at the Congress session held in Bombay. Then Gandhiji called for the ultimate struggle for freedom.

“Let us prepare for the ultimate struggle. A strong struggle that excel all earlier struggles. Till now we protested in a peaceful way. Now it is time to finish this up as early as possible”. The slogan ‘Quit India’ (Leave India) added vigour to the struggle. **‘Do or Die’**, the exhortation of Gandhiji was taken up by the masses. Everyone, including students, joined the struggle. We observe August 9 as ‘Quit India Day’.

We have several other leaders who fought bravely for freedom. Let us familiarize them.



*The United Nations has declared October 2<sup>nd</sup>, the day of Gandhiji's birth, as World Non violence Day. This is the world's recognition of Mahatma Gandhi's message of 'ahimsa'*



It was the result of the sacrifice and struggles of several such brave patriots that India became independent on 15 August 1947.



## Significant learning outcomes

### *The learner*

- explains the pitiable condition of India before independence.
- identifies and states the noble character of Gandhiji.
- identifies and mentions major events in the history of the Indian freedom struggle.
- describes the cruelty shown by the British to suppress the Indian freedom struggle.
- identifies and explains the importance of the Salt Satyagraha.
- identifies and prepares note on the importance of the “Quit India Movement.”



### Let us assess

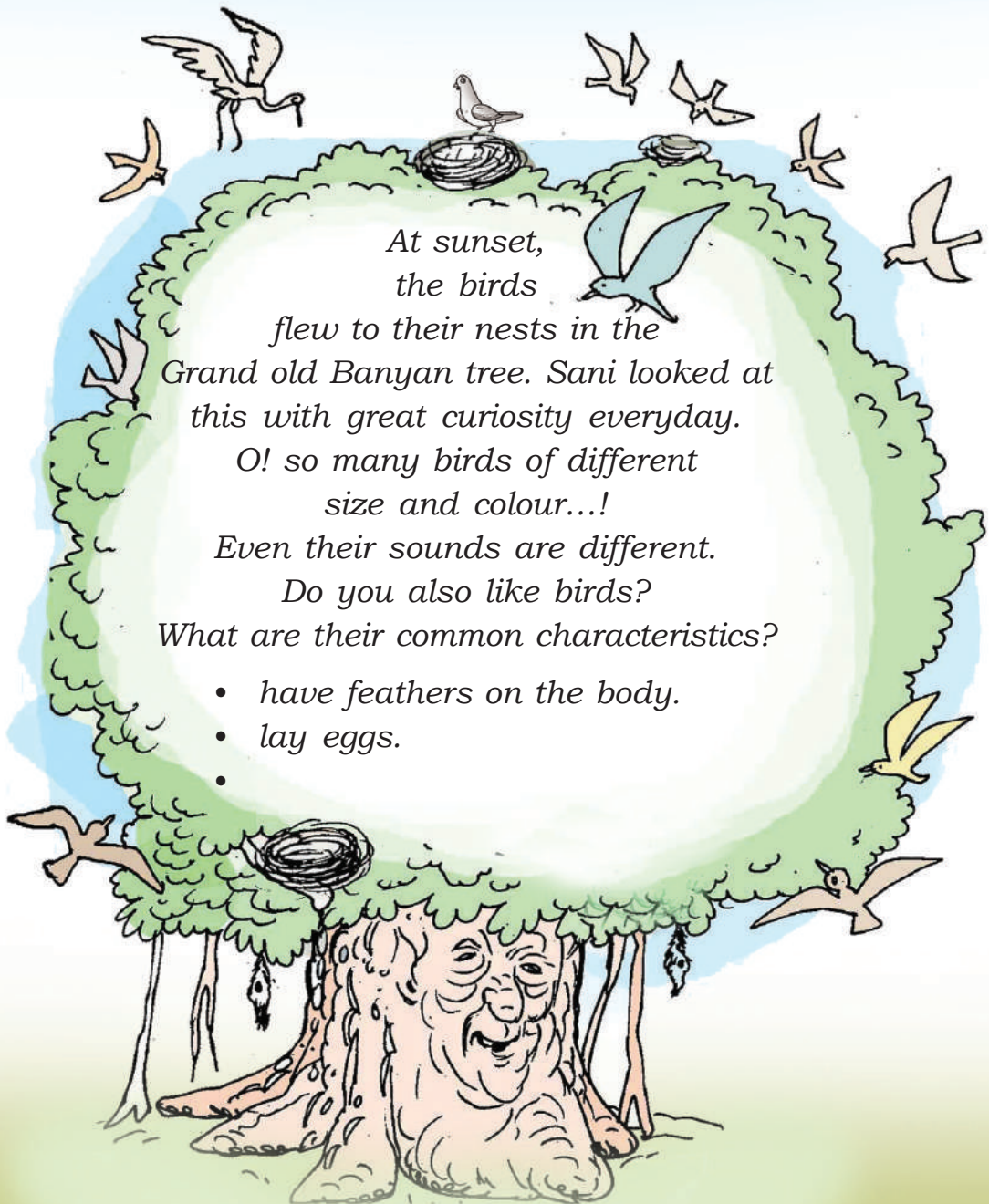
1. Who is known as ‘Kerala Gandhi’?
  - a. K. Kelappan
  - b. E. Moithu Moulavi
  - c. Amshi Narayana Pillai
2. Which one of the following is a part of the Non-cooperation Movement
  - a. Champaran Satyagraha
  - b. Boycott of foreign cloth
  - c. Kheda Satyagraha
3. Quit India Day
  - a. October 2
  - b. August 9
  - c. August 15
4. What was the exhortation of Gandhiji in the ‘Quit India’ Movement?
5. Prepare note on the importance of the Salt Satyagraha.



## Extended activities

- Collect pictures and details of the leaders of freedom struggle in Kerala.
- Collect pictures of the brave patriots who took part in the Indian freedom struggle. Write brief notes.
- Collect songs of the freedom struggle and patriotic songs and sing them.
- Collect the slogans related to the freedom struggle.
- Read the following books to know more about Gandhiji.
  1. *Kuttikalude Mahatma Gandhi*
  2. *My Experiments with Truth*
- Prepare short plays based on the life of Gandhiji and events of our freedom struggle. Enact them during the celebration of our National Days in your school.
- Documentary, Film show on "Freedom struggle", "Gandhiji".

# Wonder World of Birds



At sunset,  
the birds  
flew to their nests in the  
Grand old Banyan tree. Sani looked at  
this with great curiosity everyday.  
O! so many birds of different  
size and colour...!  
Even their sounds are different.  
Do you also like birds?  
What are their common characteristics?

- have feathers on the body.
- lay eggs.
-



## Can you name them?

Mention the names of the birds seen in your locality.

Look at the pictures of some birds...

Write their names in the boxes below the picture.



## Nest makers

Anyone who sees the nests of birds will be wonderstruck. They are so beautiful.

Where do birds build nests?

- in holes on tree trunks.
- in burrows.
- 



Why do birds build nests?

Even birds that build nests do not live in them always.



### ***Those who do not build nests!***

*The cuckoo does not build a nest or look after its young ones. It lays eggs in the crow's nest. Many birds do not have the habit of building nests. Some birds lay eggs in nests left by other birds.*



## Guests

Are all birds seen during all seasons?

Why are they not seen in all seasons?

Have you seen the bird in the picture?

This is the Golden Oriole (*manjakili*).

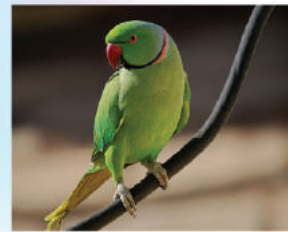
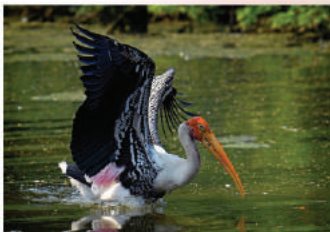
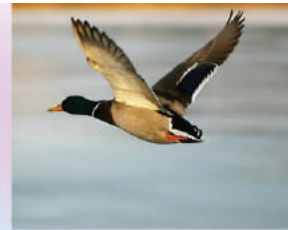
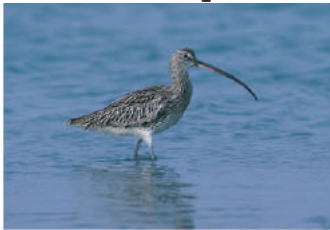
They are visitors who come from far off places. But they return before the monsoon in our country.

Some birds come from far off places in certain seasons. They are known as migratory birds.



## Can travel and catch prey

Look at the pictures of some birds.



What are the physical features which enable these birds to move and to catch prey?

How do shape, size, legs, wings etc., help birds to fly?

Note down the points in your environment diary.

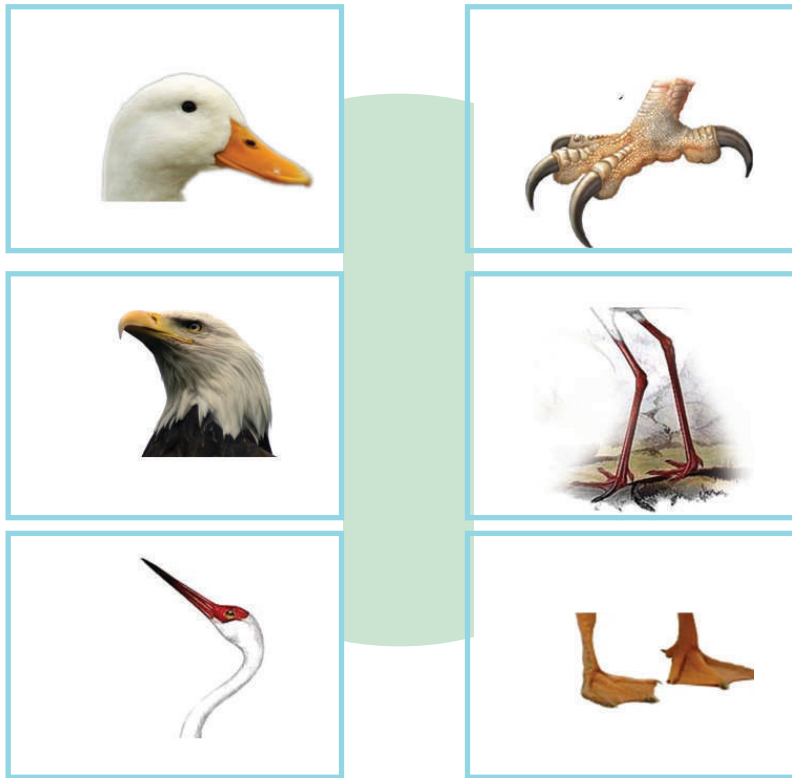
Have you seen the eagle snatch away chicks and other creatures?

What are the peculiarities of the eagle? How do these peculiarities enable the eagle to catch prey?



Observe the pictures.

Match the beaks and the legs.



Note down in the environment diary how beaks and legs help birds in gathering food.

## Birds and the environment

You have learnt the diversity in the world of birds.

Birds add beauty to our surroundings.

They are also useful in many ways. Let's look at them.

- Preying birds like owl and eagle prevent the increase of rats.
- Help in seed dispersal.
- Control pests.
- 





**Isn't it our duty to protect birds?**



**Forest department prepares nests for House sparrow (*Angadikuruvi*)**

Palakkad : The forest department has started a scheme, 'Nest for a Bird', for angadikuruvi, an endangered species of bird.



The number of birds that are beneficial to the environment, is decreasing. What could be the reasons for this?

- excessive use of pesticides.
- 
- 

## While we watch birds...

We come across several amazing facts while watching birds. What are the things to take care of while watching them?

Discuss with your teacher.

Write down your observations in your environment diary. What would you include in the note?

Date: \_\_\_\_\_

Time: \_\_\_\_\_

Name of bird: \_\_\_\_\_

Place where it is seen: \_\_\_\_\_

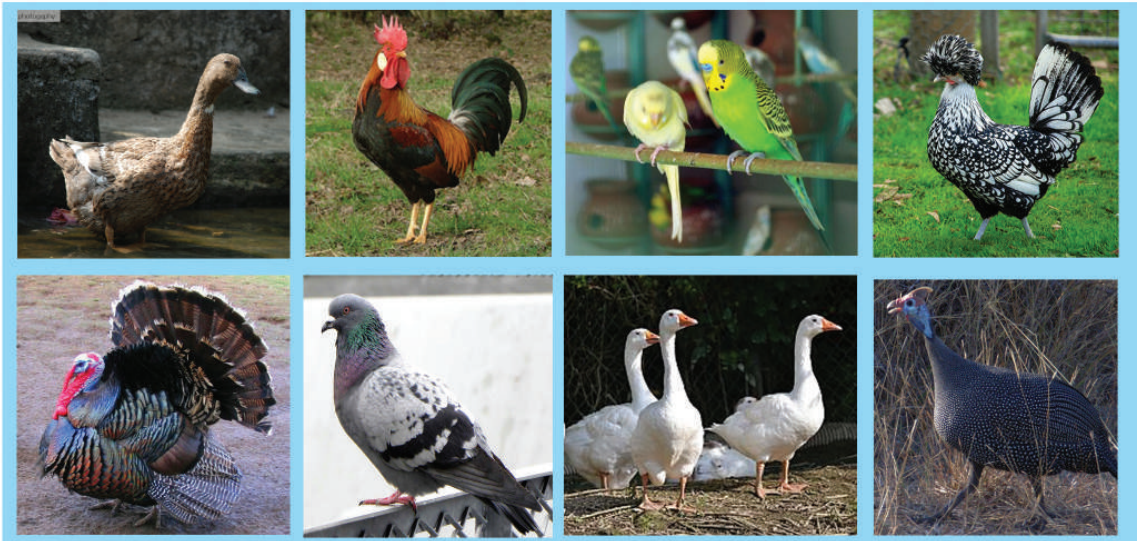
**Peculiarities**

- beak
- leg
- colour
- tail
- 
-



## Birds we rear

Observe the pictures of birds. Name them.



Why do we rear birds in our homes?

- for fancy.
- 
- 

We learned about the diversities in the world of birds. But there are a lot more to explore. Can you think of some more?

Birds make our world so beautiful. Can you imagine a world without birds?



## Significant learning outcomes

*The learner*

- lists common birds in the environment.
- identifies and states the fact that birds show variety in nests and nesting habits.

- identifies and notes down physical peculiarities of birds according to their flight and food gathering habits.
- engages in bird watching.
- identifies and states the importance of birds.
- lists down the uses of birds we rear.



## Let us assess

1. Which among the following statements is more true?  
A bird's claws are seen joined by skin. That bird.....  
a. will be able to fly high.  
b. can swim in water.  
c. can snatch away its prey.  
d. cannot fly.
2. Which is the odd one?  
a. Kingfisher  
b. Crane  
c. King Cormorant (Water Crow)  
d. Sparrow

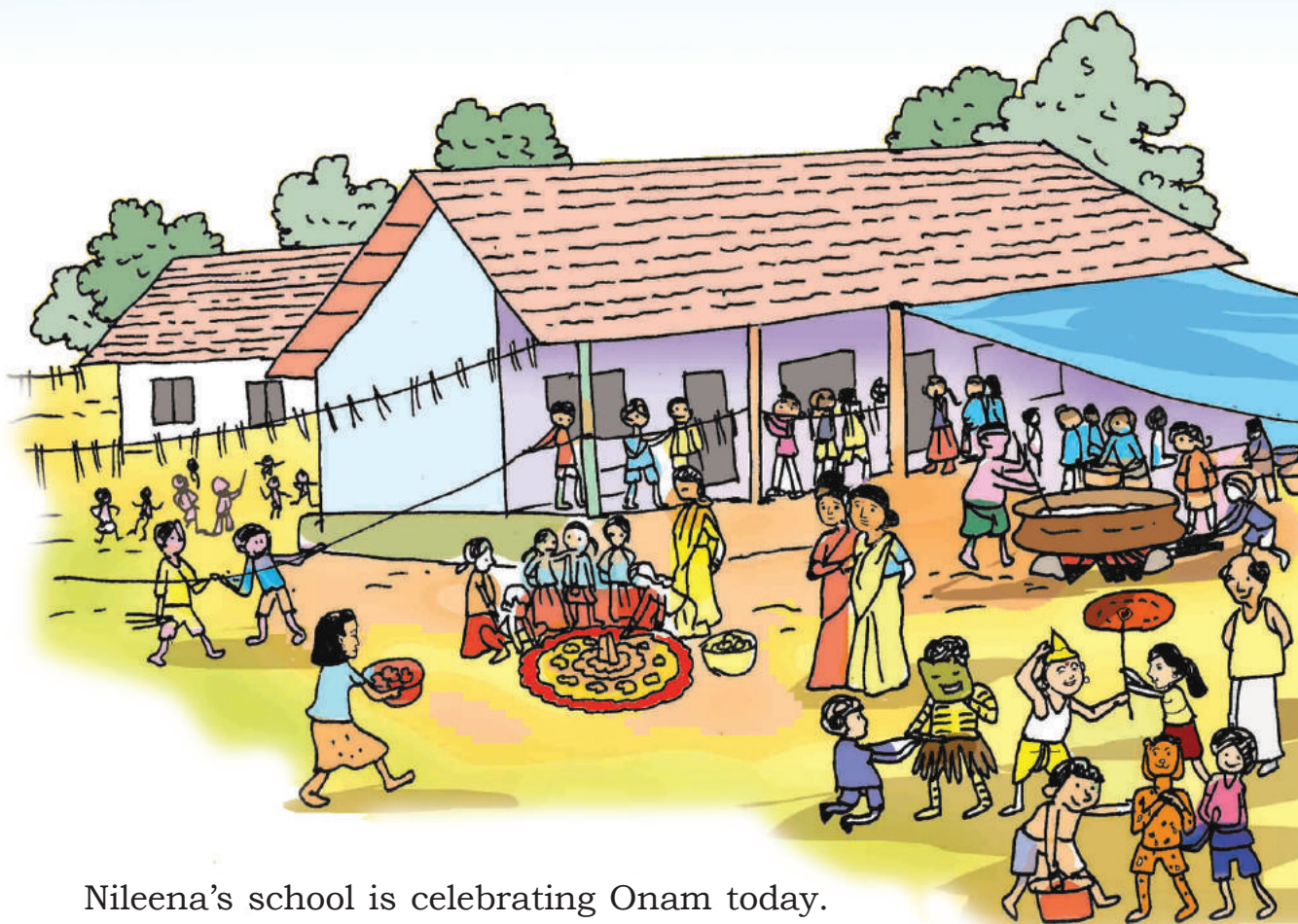


## Extended activities

1. Prepare a picture album of birds.
2. Make models of birds using paper, coconut leaf etc.
3. Interview 'Bird Watchers' and write a report.
4. Write notes on the Bird Sanctuaries in Kerala.
5. Collect information on migratory birds.
6. Create an 'Eco Park' in your school. Make arrangements to attract birds to the 'Eco Park'.



## Land of Arts



Nileena's school is celebrating Onam today.  
She left for school along with her father.

Parents and the public had already reached the school. They started the preparation of the feast and were busy with other arrangements. Nileena and her friends had to make the 'Pookkalam'.

Don't you celebrate Onam at school?

What arrangements do you make? What programmes are organised?

Try to write them down.





## Celebrating togetherness

Onam is our national festival.

Malayalees all over the world celebrate Onam. It is believed that Mahabali, the just king who ruled Kerala, visits Kerala once in every year to see his subjects. Onam is also a harvest festival.

After the 'Onasadya,' Nileena and her friends engaged in various 'Onakkalikal'.

Why is it said that Onam is a celebration of togetherness?

- 
- 





## Folk games

Don't you like playing games? Folk games are the games played in a locality for a long time. Mention the names of folk games you know. Let's now try to know about one such folk game.

### Lahori

Lahori is played between two teams. This is how it is played. Take seven pieces of tiles or similar flat objects. This is called a 'chillu'(slab). Arrange the slabs one above the other with the smaller pieces on top of the bigger ones. Draw a circle around this. Mark another line a few feet away from it. Standing on this line, throw a ball onto the slabs. If the slabs scatter, the team which makes it fall tries to rearrange it. While arranging, the other team tries to hit the players with the ball. If they arrange the slabs without being hit, they win a 'Lahori'. Each player has three chances to throw the ball. If the other team catches the ball, the player who threw the ball will be out of the game.

Think of a folk game in your place and describe how it is played.

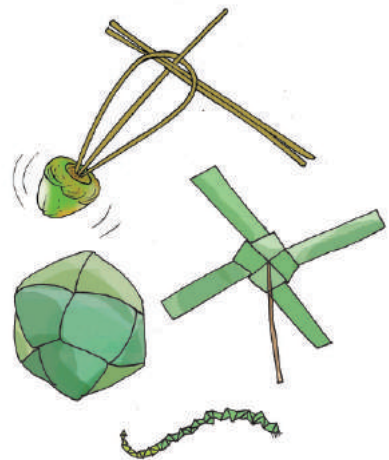
We make several articles to play folk games.

What articles can be made using the coconut leaf?

- ball
- 

Can you make similar articles?

Make them and organize an exhibition.



# Festival scenes



## Nileena's diary

Sun	Mon	Tue	Wed	Thu	Fri	Sat	2015	
6	7	8	9	10	11	12	September	
13	14	15	16	17	18	19	26	
20	21	22	23	24	25	26		
27	28	29	30					

*Went to see the festival with mother today. Palm leaf festoons hung on roadsides. Mango leaves between them. The big 'pandal' in the temple yard. Bulbs of different colours glowing. The procession with elephants with the 'Varnakuda', 'Nettipattam' and 'Venchamaram'. 'Chendamelam' at its peak.....*

What other such scenes have you seen? Make notes.

## Thrissur Pooram



Aren't there festivals in your locality also?

Prepare a note on the important ones.

Prepare a festival calendar including the festivals of your place and their special features.

Month	Festivals	Features

The festivals and celebrations are different from place to place. They are also occasions of togetherness.

Art forms make celebrations more attractive.

## Boat race



Onam is a period of boat races. How beautiful it is to see people sitting in different boats, singing the 'Vanchipattu' and rowing along! The excitement and togetherness of a group can be seen in the boat race.



..... Cultural programmes are conducted during festivals every year. Last year it was 'Kathakali'. This year it is 'Ottanthullal'. It was for the first time that I saw Ottanthullal. My father told me many interesting facts about Ottanthullal.....

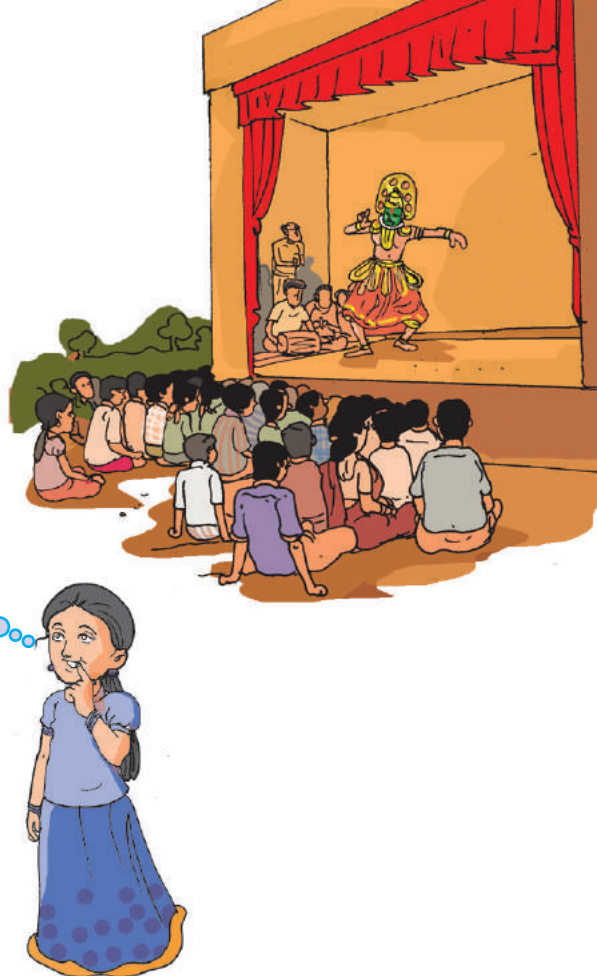
2015  
September | 26



*It was Kunchan Nambiar who founded 'Thullal.' This art form mocks at the evils of society with a pinch of humour. Thullal is of three types- Ottan thullal, Parayan thullal and Seethankan thullal.*



*Father also told me about Kathakali*



Kathakali is an art form of Kerala. In Kathakali, dance, acting, music and the *mudras* are equally important. Kathakali can be learned only through continuous practice. Kathakali is known as the 'King of arts'.

Many of the art forms of our country are part of rituals. Let us try to familiarise some of the art forms.

## Thiruvathirakkali

Women perform dance around a lighted lamp on the day of 'Thiruvathira' in the month of 'Dhanu'. During the Thiruvathirakkali, women wear traditional Kerala costumes, decorate their hair with 'Desapushpam' and clap their hands in tune with specially tuned songs.





## Kolkali

*Kolkali* is an art form where the performers dance in a circle. They sing together and dance to the rhythm of the song, beating the sticks in tune with the song.



You are now familiar with some art forms. Aren't there such art forms in our place also? Try to find facts about the art forms in your locality and write about their peculiarities.

Look at the pictures. They are various art forms of our state. Collect details about these art forms and record them in the environment diary.



**Chakyarkoothu**



**Margamkali**



**Koodiyattam**



**Dufmuttu**



**Theyyam**



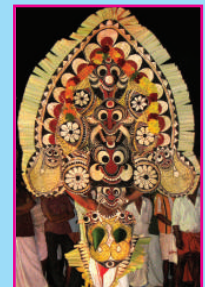
**Kummatti**



**Oppana**



**Mohiniyattam**



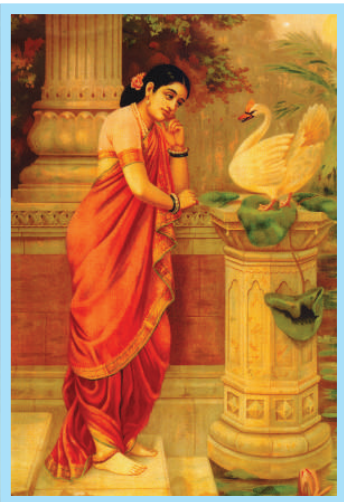
**Padayani**

Collect pictures of other such art forms and prepare an album.

Nileena and her friends came to see an exhibition of painting and sculpture. The beauty of the paintings and sculptures attracted them a lot.



Painting and sculpture are also different types of art forms. Our state has a rich tradition of painting and sculpture. The world famous painter and artist Raja Ravi Varma belongs to Kerala.



Collect copies of the paintings of Raja Ravi Varma.



Raja Ravi Varma

Collect copies of great paintings and conduct an exhibition in your class.

The school is preparing for the Arts festival. Thiruvathirakkali and Oppana are among the items. Nileena likes singing songs. Nileena is taking part in Classical Music, Light Music and Mappilappattu. Let us try to find out some facts about music as we have a great tradition of it.

### Irayimman Thampi



*“Omanathinkal Kidavo  
Nalla Komalathamara puvo”*

Haven't you heard this famous song often? This song was written by Irayimman Thampi. He made valuable contributions to literature and music.

### Swathi Thirunal

Swathi Thirunal was a king, well – versed in music. He has written more than five hundred works in Malayalam, Sanskrit, Hindi, Tamil, Telugu and Kannada.



## Folk songs

Folk songs are songs of a locality that are passed from one generation to another. Folk songs are of different types: those related to farming, handicrafts, entertainments, customs, lifestyles etc.

The knowledge and experiences gathered through generations are seen in folk songs.



## Njattupattu

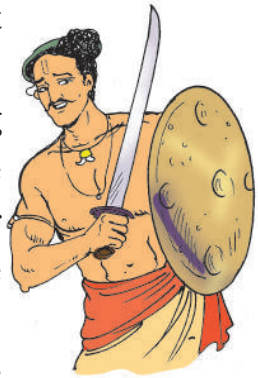
*Punjappadathe poonkuyile  
Punnarappattonnu padamo?  
Akkandam nattu njan Ikkandam nattu njan  
Mele kandathil njaaru nattu.*



Collect other folk songs and present them in class.

## Vadakkanpattu

‘Vadakkanpattu’ are songs that are great contributions to the Malayalam language. There were ‘Kalaris’ to offer military training when the country was ruled by the ‘Naduvazhi’. When there were conflicts or problems that could not be solved, people challenged each other to ‘ankams’ (duels). Skilled ‘Ankache kavars’ (warriors) were appointed on both sides. ‘Vadakkanpattu’ are the songs describing the valour and greatness of famous warriors like Thacholi Othenan, Unniyarcha etc.



## Mappilapattu

‘Mappilapattu’ are poetic forms with unique features. It was Moiyeenkutty Vaidyar who popularised the *Mappilapattu* in Kerala.





## Significant learning outcomes

### *The learner*

- identifies the art forms of Kerala and lists them.
- prepares and presents notes on the festivals of Kerala.
- identifies and explains that art and festivals reflect the culture of Kerala.
- collects folk songs.
- elaborates the music tradition of Kerala in a simple way.
- lists out folk games and makes essential sports articles.



### Let us assess

1. Write note on the art forms you identified.
2. Make a list of local festivals.
3. Which are the art forms that originated in Kerala?
4. Match the following.

King of arts	Swathi Thirunal
Music	Ottanthullal
Art form with humour	Raja Ravi Varma
World famous painter and artist	Kathakali



### Extended activities

- Collect pictures of art forms and exhibit them in school.
- Conduct interview with artists.
- Organise an art exhibition.
- Collect folk songs and present them.
- Make masks of different art forms.

## 6 Up above the Sky



*Ennum njangade maanathooode  
Minnum tharakamodothangane  
Sandhya mayangum nerathingane  
Chandrika thookaan vannooode?*

What does Malu tell the Moon?



## Moonlight

“Wow so interesting! Countless twinkling stars and the moon in all its glory.”

Friends, haven't you seen such marvellous things in the sky?

“Why is the moonlight not hot, Father?” Malu asked.

“The sun is a star that gives out heat and light of its own. But the moon can't do that. It only reflects the sunlight that falls on it,” father said.

## Stars

Stars are heavenly bodies that shine in the sky.

The sun is a star.



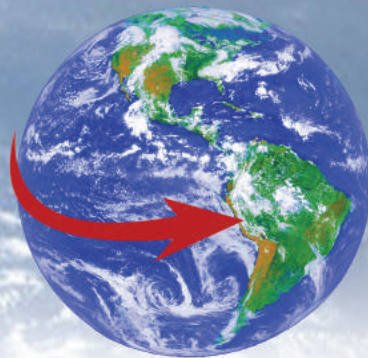
## Planet and satellite

Planets are heavenly bodies in the sky that revolve around the sun along a definite path. The earth is a planet.

Satellites are heavenly bodies that revolve around planets. The moon is the satellite of the earth.

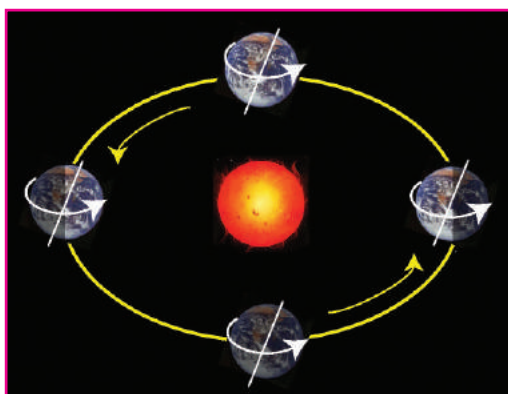
You know that the earth rotates on its axis, and the part of the earth on which sunlight falls experiences day and the other part experiences night.

The spinning of the earth on its own axis is called **rotation**. It takes 24 hours for the earth to complete one rotation. This is one day.

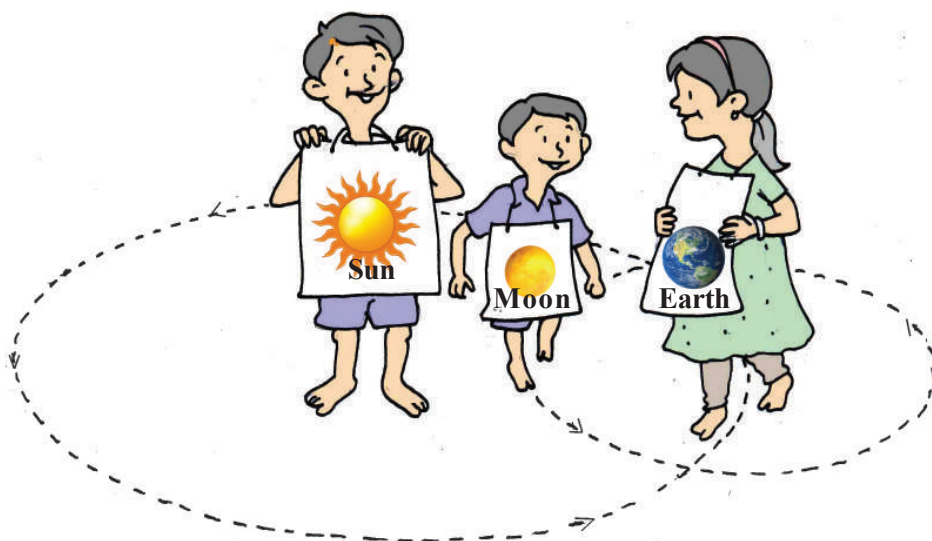


The earth also revolves around the sun, in addition to its rotation.

The movement of the earth around the sun is called **revolution**. The earth takes  $365 \frac{1}{4}$  days to move around the sun once. This is one year.



You can now demonstrate in your class, with your friends, the rotation and the revolution of the earth and the moon.



Notice the position of the sun, the earth and the moon when they come in a straight line.



### New Moon day



Why is the moon fully bright on some nights and not seen on other nights?

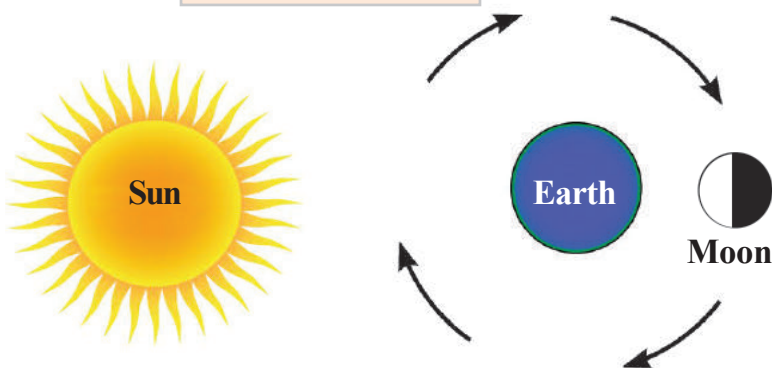
Observe the picture.

Can the part of the moon on which sunlight falls be seen from the earth when the sun, the moon and the earth come in a straight line? Doesn't the part of the moon that faces the earth appear to be dark? The moon is not seen at all when the part of the moon that does not get sunlight faces the earth. This day is called **New Moon day** (*Amavasi* or *Karuthavavu*).

In the picture below, you can see that the sun, the earth and the moon are in a straight line. The part of the moon where sunlight falls faces the earth.

The day on which the illuminated part of the moon is fully visible from the earth is called **Full Moon day** (*Pournami* or *Veluthavavu*).

### Full Moon day





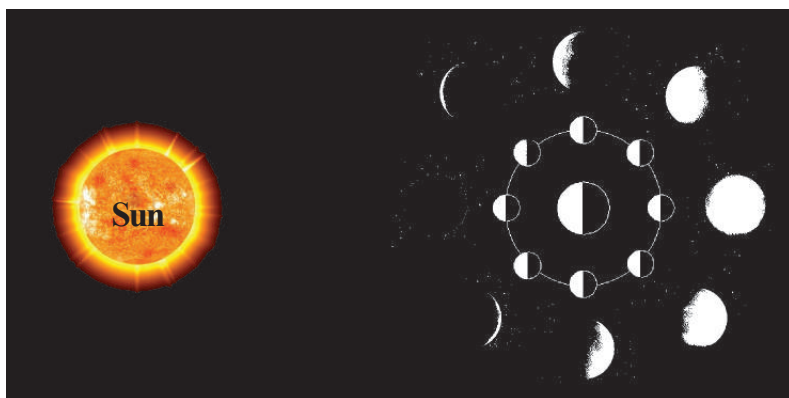
## The growing crescent

Observe the moon from the New Moon day to the Full Moon day and draw the picture of the moon you see on each night.

Present it in your class and also prepare a chart of this.

Days	Time of observation	Shape of the moon
Day 1		
Day 4		
Day 7		
Day 10		

Examine the completed table and note down your findings. Now compare the chart you have drawn with the picture given below with respect to the position and shape of the moon.



The moon as seen from the earth

- How many days are there between one Full Moon day and the next one?
- How many days are there between one New Moon day and the next Full Moon day?

Find out the answer from the calendar.  
Note it down in the environment diary.





## Towards the moon

Friends, look at the moon. Is it the same as it appears to us from the earth?



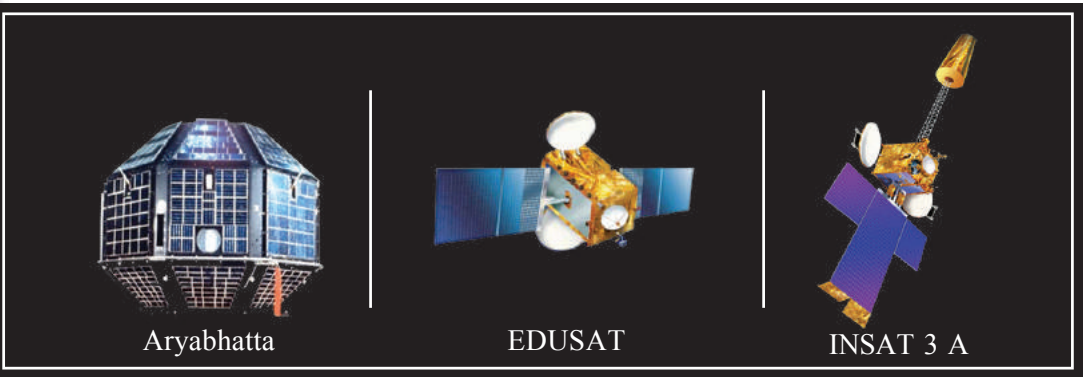
It is full of rocks, pits and hills. Neil Armstrong, the American astronaut, was the first man to land on the moon. Later several people went to the moon and brought soil and rocks from there.



Is there anyone who doesn't wish to go to the moon?

India sent a spacecraft called *Chandrayan 1*, to the moon. It went around the moon and provided us with valuable information. The success of *Chandrayan* is, indeed, a matter of pride for all Indians.

## Artificial satellites



Artificial satellites are satellites made by man and sent to space for various purposes. These satellites are sent to outer space with the help of rockets. Aryabhata, EDUSAT and INSAT are some of the artificial satellites launched by India.

Collect names and pictures of other artificial satellites and prepare an album.

What are the uses of artificial satellites?

- communication
- weather forecast

- transportation
- 
- 

*Thus the wonders of the sky are never ending. Let us step into this world of great amusement and knowledge.*



## Significant learning outcomes

*The learner*

- illustrates rotation and revolution.
- explains that day and night occur due to rotation.
- states that one year is the period that the earth takes to complete one revolution.
- explains and foretells the phases of the moon.
- explains why New Moon and Full Moon happen.
- explains what planets and satellites are.
- defines artificial satellites in a simple way.



## Let us assess

1. 18<sup>th</sup> April 2015 is a New Moon day. When will the next Full Moon day be?
2. If 11<sup>th</sup> November 2015 is a New Moon day, when will the next New Moon day be?
3. Suppose last Sunday was a New Moon day. What would be the shape of the moon today?



## Extended activities

- Organize an exhibition on the wonders of the sky.
- Collect pictures and news of Indian space missions.
- Examine different calendars and collect the names of months included in them.
- Make models of the earth, the sun, the moon and the stars and exhibit them in your class.