FOREWORD

The Jammu and Kashmir State Board of School Education initiated the process of review and revision of school curriculum to put it on what the demands of the society are. School curriculum derives its contents from social curriculum and it the classroom curriculum that in its turn adds to the contours of social curriculum. Since the social curriculum is as dynamic as living a concept as any living organism, so there is a need to modify the contents of the school curriculum continuously to keep it as updated as is required.

The subject of Environmental Studies is being taught extensively and has been incorporated at primary stage, where the study intends to familiar and inculcates zest in the children about the concept of environmental studies. As a matter of fact, the essence of the subject has tremendous inclination following outcome of the contemporary atmosphere. The course is meant to develop the child's skills, values for promoting the quality of his/her and concurrently that of community.

This textbook for class V has been developed and made available in your hands by virtue of vigorous efforts of subject experts, by the outcome of series of workshops. More importantly, the textbook has been developed/constructed and based on National Curriculum Framework (NCF) - 2005, wherein, contextualization has been done.

The present textbook has been visualized under 21 chapters based on child's day to day and surrounding situations. Besides, the budding scholars have been furnished/offered the concept of environmental knowledge to sensitize them towards his neighborhood, nature, society and about the planet earth stands on. Chapters dealing with plants and animals not only develop among them the interest but also assist them to recognize the importance of each other. Environment saving has become part of the world agenda. What has been put in this textbook is subject matter of debate and deliberation. I frequently appeal the stakeholders to come up with suggestions for the improvement of this textbook which I assure will be very valuable for us and if found genuine will be incorporated in the next edition.

I place on record my gratitude for all those who have helped us in the development of this textbook. I also record my appreciation for Academic and Curriculum Development Research Wing, particularly Dr. Sheikh Bashir Ahmad, Secretary BOSE, Mr. S.M. Mahajan, Deputy Director (Academics)-J.D and Dr. Yasir Hamid Sirwal, Academic Officer. I am also thankful to NCERT, New Delhi that extended helping hand in sparing the copyrights for the use of their textual material.

(Prof. (Dr.) Desh Bandu Gupta)
Chairman
J & K State BOSE

ACKNOWLEDGEMENT

At the outset it is indeed laudable to mention the assistance and insightful inputs/contribution offered by the subject experts for framing the present Environmental Studies book. As the same has been developed in a lucid and exhaustive expertise to enable the students to comprehend all the topics unambiguously.

It is opt to record that while dedicating this textbook of class 5th to the pupil of State, I acknowledge with gratitude the contribution provided by the experts of the respective subject, and extend their whole hearted support like :

1. Dr. Sapna Sharma Lecturer, GHSS, Jhandrah, Jammu
2. Dr. Jyoti Malhotra,Lecturer, GHSS, Jhandrah, Jammu
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11. Mr. Naseer Ahmad, Central Academics, JK State BOSE
12. Mr. Zameer Ahmad , Central Academics, JK State BOSE
13. Mr. Jameel Ahmad, Central Academics , JK State BOSE
14. Mr. Shakeel Ahmad, Central Academics, JK State BOSE

I am highly thankful to the Academic Division/CDR Wing for their contribution in preparing this book of Environmental Studies. I also place on record my profound appreciation for the contribution made by S.M. Mahajan, Dy. Director, (Academics)-JD and Dr. Yasir Hamid Sirwal, Academic Officer in preparing and processing this Environmental Studies book and making available locale specific materials for the children of the state.

Every effort has been made to keep this book error free. As there is always scope for improvement, any comment and suggestion will be gratefully acknowledged.

(Dr. Sheikh Bashir Ahmad)
Secretary
J & K State BOSE.

CONTENTS

CHAPTER - 1

SUPER SENSES

Has this ever happened to you?

You were eating in the playground, an eagle flew down and took away your roti.

As you walked softly past a sleeping dog, its ears shot up at once.

You dropped something sweet on the ground and within minutes many ants collected around it.

Why does it happen? Think and tell

Animals have different senses. They can see, hear, taste, smell and feel. Some animals can see their prey from far away. Some can hear even the faintest sound. Some animals can find their friends by their smell. The animal world is full of examples of amazing senses!

How did the ant recognise a friend?

An ant was going along on the ground. It saw a group of ants coming from the other side. The first ant quickly came back to its hole. The ant guarding the hole recognised it and let it in.

Tell

- How did the ant know that the other ants were not from its group?
- How did the guard ant recognise this ant?

Try this and write

Drop some sugar, jaggery or anything sweet on the ground. Wait until the ants come there.

- How long did it take for the ants to come?

_____

- Did one ant come first or a group of ants came together?

_____

- What did the ants do with the food?

_____

- Where do they go from there?

_____

- Do they move in a line?

_____

Now carefully, without harming the ants, block their path for a while with a pencil.

- Now observe, how do the ants move?

Many years ago a scientist did many experiments like this.
He found out that as the ants move, they leave a smell on the ground.
The other ants follow the smell to find the way.

- Now can you guess why the ants behaved like that when you blocked their path?
  Some male insects can recognise their females by their smell.
- Have you ever been troubled by mosquitoe ?.
  Just think, how do they know where you are?
  Mosquitoes can find you by the smell of your body. They also find you by the smell of the sole of your feet and the heat of your body.

I am a silk worm. I can find my female worm from many kilometres away by her smell.

- Have you seen a dog sniffing here and there? What do you think it is trying to smell?

Dogs mark out their own area on the road. They can make out if another dog has come into their area by the smell of its urine or potty (latrine).

Write

- In what ways do human beings make use of this special sense of smell of dogs?

_____

- When do you find your sense of smell helpful to you? List some examples. Like – to know by its smell that food has gone bad or that something is burning.
- Name the animals that you would be able to recognise only by their smell, without seeing them?

_____

_____

- Write the names of five things whose smell you like and five things whose smell you do not like.

I like the smell of	I do not like the smell of
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

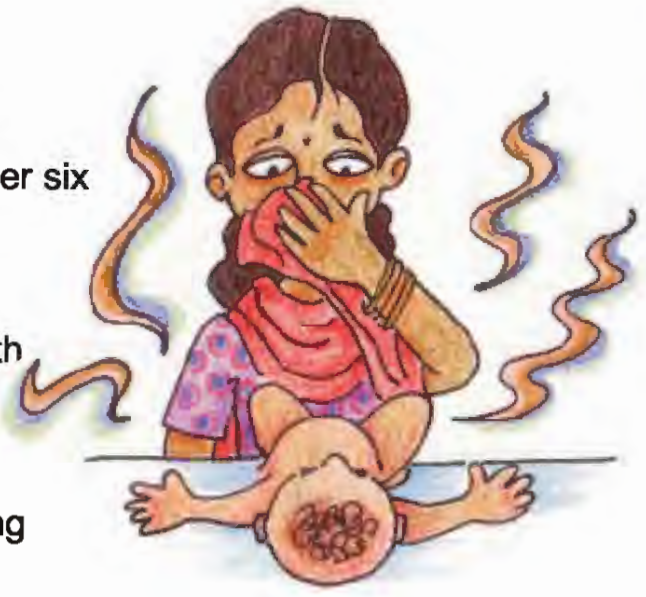
- Do you and your friends have similar answers?

Do and find out

- From the smell of the clothes of your family members, can you say whom do they belong to? Try to recognise the clothes of any two members of your family in this way.

Why so?

Today Afia had to go out for some important work. She had to leave her six month old son Atif with her sister Saima. Saima also has a baby of the same age. It was funny that both the babies did potty at the same time. She happily cleaned her daughter but when she was cleaning her sister's son Atif, she covered her nose with her dupatta (scarf).



Think and discuss

- Saima covered her nose when she cleaned Atif's Nappy, but not when she cleaned her daughter. Why do you think she did this?
- How do you feel when you walk near a heap of garbage? Think of the children who spend the whole day picking things from such garbage.
- Is a smell 'good' or 'bad' for everyone in the same way? Or does it depend on how each one feels about it?

Let's see

- Write the name of a bird which has eyes in front of its head (like in humans).
- Write the names of some birds which have eyes on either side of the head. What is the size of their eyes as compared to the size of their head?

Most of the birds have their eyes on either side of the head. Their eyes can focus on two different things at a time. When they look straight ahead, both their eyes focus on the same object.

You must have seen birds moving their neck very often. Do you know why? In most of the birds, eyes are fixed and cannot move. So birds have to turn their heads to see around.

Looking with one or both eyes

Close your right eye or cover it with your hand. Tell your friend to stand to your right, at some distance, and ask him to do some action (wave hand, shake head, etc.)

Could you see your friend's action, without moving your neck?

Now try to look at your friend's action with both your eyes open but without moving your neck.

What was the difference on looking with one or both eyes?

- Now toss a small ball or a coin and try to catch it. Try this with both your eyes open. Then close one eye and try to catch it. When was it easier to catch?
- Imagine how it would be to have your eyes in place of your ears? What would you be able to do then, which you cannot do now?

Some birds like kites, eagles, vultures can see four times as far as we can. These birds can see things from a distance of eight metres what we can see from a distance of two metres.

- Now can you guess from what distance can an eagle in the sky can see a roti on the ground?

Do animals see colours?

Animals cannot see as many colours as we can.
See how
things in these pictures will be seen by some animals.

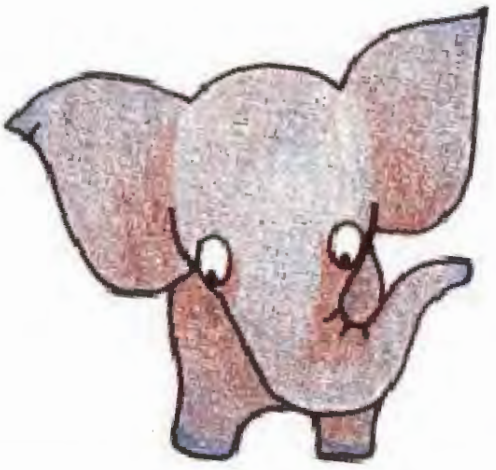
It is believed that animals that are awake in the daytime can see some colours. Those animals that are awake at night can see things only in black and white colours.

Sharp ear

In Class IV, you read that we cannot easily see birds' ears. Their ears are small holes covered with feathers.

Write

- The names of ten animals whose ears can be seen.
- The names of some animals whose ears are bigger than our ears.



Think

- Is there some link between the size of Animal's ears and their hearing?

Try this

For this activity find a quiet place in your school. Tell one of your friends to stand at a short distance and ask him to say something softly. The rest of you should listen carefully. Then all of you put your hands behind your ears, as shown in the picture. Let the same child say something again as softly as before. In which case was the sound sharper? Ask your friends too.

Put your hands over your ears and say something.

- Can you hear your own voice?

- Sit near a desk. Tap the desk once with your hand. Listen carefully. Now put your ear on the desk as shown in the picture. Tap on the desk once again with your hand. Listen again. Was there any difference in the sound of the tap ?

This is how snakes hear. They do not have external ears (which you can see). They only feel the vibrations on the ground.

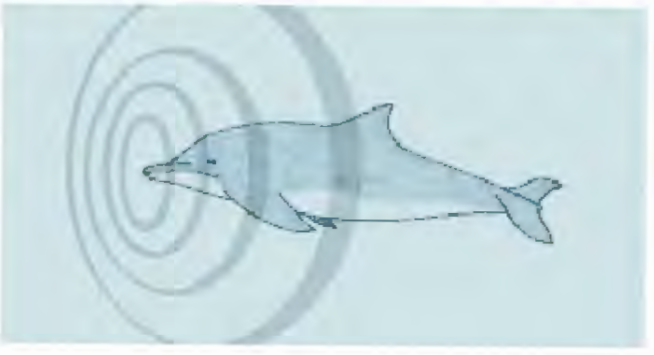
Sounds send messages

High up on a tree, a Langur warns others of dangers like a tiger or leopard. The Langur does this by making a special warning call. Birds also give alarm calls to warn about the danger. Some birds even have different sounds for different kinds of dangers. For example, there is a different warning call if the enemy is coming from the sky or if the enemy is on the ground. When any animal gives the warning call, all the animals in that area understand the danger signal.

Some animals start behaving in a different way when an earthquake or storm is about to come. People who live in forests and can observe such behaviour of animals come to know of the danger.

In December 2004, few tribes that live in the forests of the Andaman Islands noticed the animals behaving in a different manner. They guessed some danger. So they Moved away to a safer part of the island. Soon after, the islands were hit by the tsunami but these people were saved.

Dolphins also make different sounds to give messages to each other. Scientists believe that many animals have a special language of their own.



Write

Can you understand the sounds of some animals?
Which animals?
Do some animals understand your language?
Which ones?

Say it with sounds

Just like birds and dolphins you can also make your own language of sounds for giving messages. Remember you have to talk to your friends with only sounds and no words. How and when will you need to give an alarm call? For example, when the teacher is coming to the classroom!

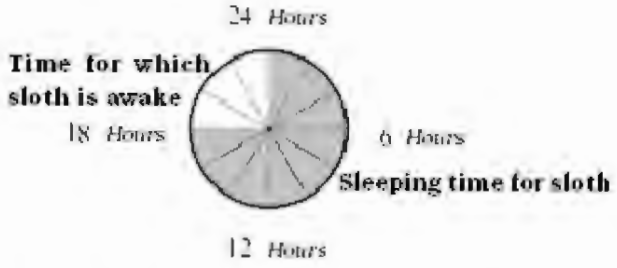
Sleeping-waking

Some animals go into a long, deep sleep in certain seasons. Then they are not seen for many months.

Have you noticed that during the cold season you cannot see any lizard in the house? Where do you think they have gone?

Sloth

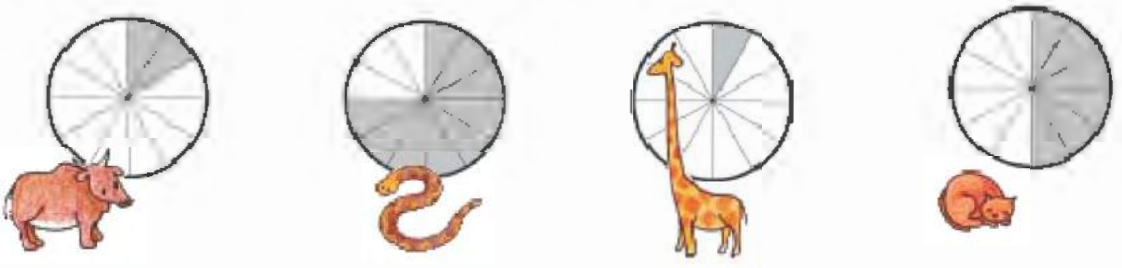
It looks like a bear but is not. It is a sloth. It spends almost 17 hours a day sleeping while hanging upside down on a tree branch. The sloth eats the leaves of the same tree on which it lives. It hardly needs anything else. When it has eaten enough leaves from that tree, it moves to the nearby tree. Sloths live for about 40 years and in that time they move around only eight trees. Once a week it comes down from the tree to relieve itself.



If you were to show a sloth's daily routine (sleeping and waking) in a 24-hour clock, this is what the clock would look like.

How will you show the clock for a house-lizard in winters?

Given here is the sleeping time of some animals. Below each picture write for how many hours a day that animal sleeps.



*Cow*_____ *Python*_____ *Giraffe*_____ *Cat*_____

When you see different animals, do you have any questions about them? Make a list of ten such questions.

The tiger is one of the most alert animals. And yet, today tigers are in danger.

- What do you think are some of the dangers to tigers in the jungle?
- Can human beings also be a threat to animals? How?

Do you know that today many animals are killed and their parts are sold? Elephants are killed for their tusks, Rhinoceros for its horn, Tigers, Crocodiles and Snakes for their skins. Musk deer are killed just to make a little scent from its musk. People who kill animals are called hunters and poachers.

A Tiger can see six times better at night than most of us humans.

A Tiger's sense of hearing is so sharp that it can make out the difference between the rustling of leaves and the sound of an animal moving on the grass. The ears of the Tiger can move in different directions and this helps to catch the sounds from all around.

The Tiger's whiskers are very sensitive and can sense the movements or vibrations in air. They help the Tiger move in the dark and find its prey.

Each Tiger has its own area which may cover several kilometres. Tigers mark their area with their urine. A Tiger can at once come to know if there is another tiger in its area by the smell of the urine. A Tiger will avoid going into another Tiger's area.

Tigers make different sounds for different purposes like when it is angry or to call out to a Tigress. It can also roar or snarl. It's roar can be heard upto 3 kilometres away.

The number of tigers and many other animals in our country is reducing. There is a danger that some of them will soon disappear. To protect the animals, our government has made some forests as protected areas. Some of them are the Jim Corbett National Park in Uttrakhand and 'Ghana' in Bharatpur district of Rajasthan. In these areas nobody can hunt animals or destroy the jungle.

Find out

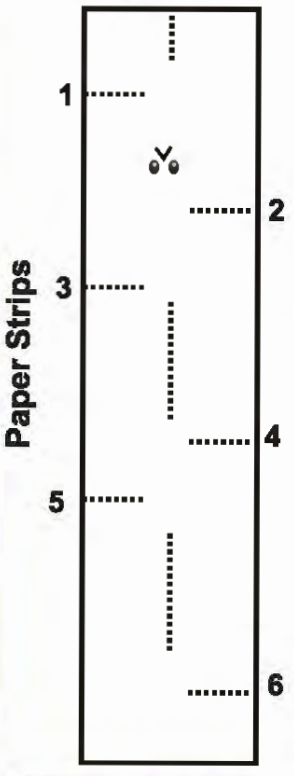
- Where are other such National Parks in India?
- Collect information on these and write a report.

What we have learnt

- Have you noticed that sometimes singers put their hand on their ear when they sing? Why do you think they may be doing this?
- Give examples of animals that may have a very strong sense of sight, hearing or smell.

Let's make a paper dog

For this you need: thick paper, pencil, scissors, sketch pen.



- Cut a long strip of thick paper. Mark the strip as shown here.
- Make small cuts on the lines marked 1 to 6.
- Hook together the cuts on the number 1 and 2 (see picture a).
- In the same way, hook together 3 in 4, and 5 in 6 (see picture b and c)
- Make a cut in the mark on the leg (see picture c).
- Turn down the corners of the strip on top of the head, to make the ears (picture d)
- Mark the eyes and nose with a sketch pen.

Wasn't that fun!

CHAPTER - 2

FROM TASTING TO DIGESTING

Different tastes

Madhu ran into the kitchen and caught hold of her mother saying, "Ma, I am not going to eat this bitter karela (bittergourd). Give me gur (jaggery) and roti." Ma smiled and said, "You ate roti and sugar in the morning." Radha teased Madhu, "Don't you get bored of only one kind of taste?" Jhumpa replied quickly, "Do you get bored with licking imli (tamarind)? I bet your mouth is watering just by hearing the word imli." "Sure I love the sour imli. But I eat sweet and salty things too. I even eat karela," said Radha and looked at her mother. They both laughed heartily.

Radha said to Madhu, "Let's play a game. You close your eyes and open your mouth. I will put something to eat in your mouth. You have to tell what it is." Radha took a few drops of lemon juice in a spoon and put them in Madhu's mouth. "Sour lemon," Madhu replied quickly.

Radha then picked up a small piece of jaggery. Her mother suggested, "Crush it, otherwise she will know what it is?" Radha crushed the jaggery but Madhu easily guessed it. They played the game with different food items. Madhu could tell the fried fish even before tasting it. Radha said, "Now close your nose, and tell me what this is?" Madhu was confused, "It is a bit bitter, a little salty and somewhat sour. Give me one more spoonful."Radha took another spoonful of the cooked karela, uncovered Madhu's eyes, and said, "Here it is, eat!" Madhu laughed, "Yes, give me more."

Discuss and write

- Radha's mouth started watering when she heard the word imli. When does your mouth water? List five things you like to eat and describe their taste.

- Do you like only one kind of taste or different ones? Why?
- Radha put a few drops of lemon juice in Madhu's mouth. Do you think we can make out the taste with just a few drops?

- If someone were to put a few seeds of saunf (aniseed) on your tongue, would you be able to tell with your eyes closed? How?

- How did Madhu make out the fried fish? Can you guess the names of certain things only by their smell, without seeing or tasting them? What are these things?
- Has anyone ever told you to hold your nose before taking a medicine? Why do you think they tell you to do this?

Close your eyes and tell

Collect a few food items having different kinds of taste. Play a game with your friends like Madhu and Radha did. Tell your friend to taste the food and ask–

- How did it taste? What was the food item?
- On which part of the tongue could you get the most taste – in front, at the back, on the left or right side of the tongue?
- Which taste could be made out on which part of the tongue? Mark these parts on the picture given.
- One at a time put some things to eat in other parts of your mouth – under the tongue, on the lips, on the roof of the mouth. Did you get any taste there?

Use a clean cloth to wipe the front part of your tongue so that it is dry. Put some sugar or jaggery there. Could you taste anything? Why did this happen?

- Stand in front of a mirror and look closely at your tongue. How does the surface look? Can you see any tiny bumps on the surface?

Tell

- If someone asks you to describe the taste of amla or cucumber, you might find it difficult to explain. How would you describe the taste of these – tomato, onion, saunf, garlic. Think of words that you know or make up your own words to describe the taste.

- When Madhu tasted some of the things, she said "Sssee, sssee, sssee..." What do you think she may have eaten?

- Why don't you make sounds that describe some tastes? From your expressions and sounds ask your friends to guess what you might have eaten.

Chew it or chew it well: What's the difference?

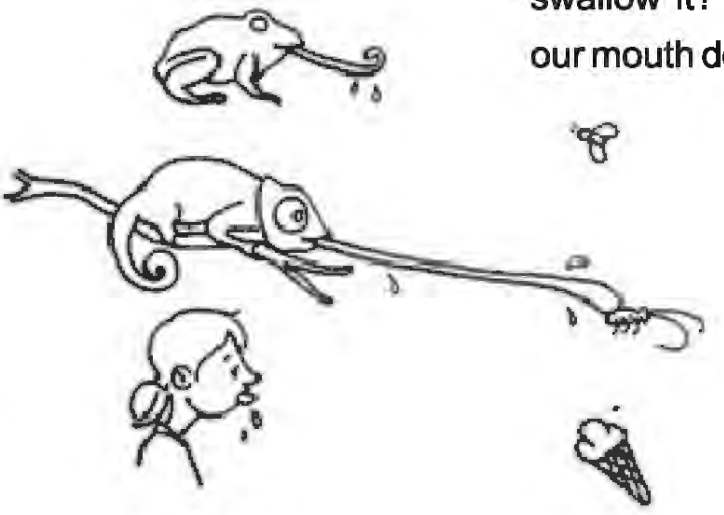
Try this together in class:

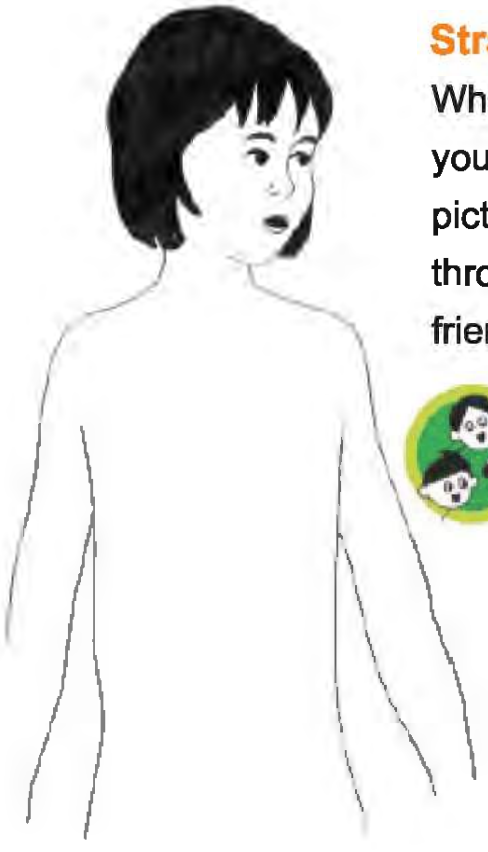
- Each of you take a piece of bread or roti or some cooked rice.

- Put it in your mouth, chew three to four times and swallow it.
- Did the taste change as you chewed it?
- Now take another piece or some rice and chew it twenty to twenty-five times.
- Was there any change in the taste after chewing so many times?

Discuss

- Has anyone at home told you to eat slowly and to chew well so that the food digests properly? Why do you think they say this?
- Imagine you are eating something hard like a green guava. What kinds of changes take place in it–from the time you bite a piece and put it in your mouth to when you swallow it? Think what does the saliva in our mouth do?





Straight from the heart

Where do you think the food must be going after you put it in your mouth and swallow it? In the picture given here, draw the path of the food through your body. Share your picture with your friends. Do all of you have similar pictures?

Discuss

- How do you feel when you are very hungry? How would you describe it? For example, sometimes we jokingly say, "I am so hungry I could eat an elephant!"
- How do you come to know that you are hungry?

- Think what would happen if you do not eat anything for two days?
- Would you be able to manage without drinking water for two days? Where do
- you think the water that we drink goes?

Nitu was given a glucose drip

Nitu was very sick. All day she was vomiting and she also had loose motions. Whatever she ate, she vomited. Her father gave her sugar and salt solution. By evening Nitu was feeling weak and dizzy. When she got up to go to the doctor she fainted. Her father had to carry her to the doctor. The doctor said that Nitu should get admitted in the hospital. She needs to be given a glucose drip. Hearing this, Nitu got confused. She knew that during the games period in school, the teacher sometimes gave them glucose to drink. But what was a glucose drip? Doctor aunty explained, "Your stomach is upset. Your body is not keeping any food and water and it has become very weak. The glucose drip will give you some strength quickly, even without eating."

Talk and discuss

Nitu's father made a solution of sugar and salt and gave it to her. Why do you think this is given to someone who has vomiting and loose motions?

- Have you heard the word 'glucose', or seen it written anywhere? Where?
- Have you ever tasted glucose? How does it taste? Tell your friends.
- Have you or anyone in your family been given a glucose drip? When and why? Tell the class about it.
- Nitu's teacher used to tell the girls to have glucose while playing hockey. Why do you think she did this?
- Look at Nitu's picture and describe what is happening. How is the glucose drip being given?

Martin's Window

Here's an old story
it seems so funny!
There was a window
in Martin's tummy!

Actually by mistake
Martin was shot.
Right in the stomach
it bled a lot!

The wound slowly healed
and was covered by skin.
But the hole was still there
you could peep right in!

Oh! what a chance
for doctors to study.
What happens to the food
inside the body!

The story seems odd
but it is really true.
The secret of Martin's stomach
helped us all - me and you!

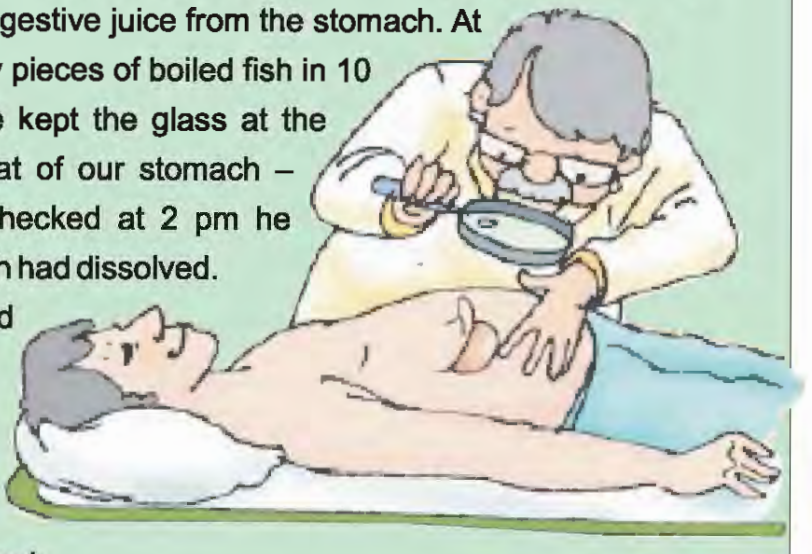
– Rajesh Utsahi
Chakmak, August 1985
(Translated by Anupa Lal)

Story – A Stomach with a Window

In the poem, you read about a soldier called Martin. In 1822, he was eighteen years old and was very healthy. When he was shot, he got seriously hurt. At that time Dr. Beaumont was called to treat him. Dr. Beaumont cleaned the wound and put the dressing. After one and a half years, the doctor found that Martin's wound had healed except for one thing. He had a big hole in his stomach. The hole was covered with a loose flap of skin, like the washer in a football. Press the skin and you could peep into Martin's stomach! Not only that, the doctor could also take out food from the stomach by putting a tube in the hole. Dr. Beaumont felt he had found a treasure. Can you guess how much time he spent on doing different experiments on this stomach? Nine years! During this time Martin grew up and got married.

At that time scientists did not know how food was digested? How does the liquid (digestive juices) in the stomach help? Does it only help in making the food wet and soft? Or does it also help in digestion?

Dr. Beaumont took some liquid (juices) out of the stomach. He wanted to see what would happen to a food item kept in a glass filled with it. Would it get digested on its own? For this he did an experiment. With the help of a tube, he took out some digestive juice from the stomach. At 8.30am he put twenty tiny pieces of boiled fish in 10 millilitres of the juice. He kept the glass at the same temperature as that of our stomach – about 30°C. When he checked at 2 pm he found that the pieces of fish had dissolved.



Dr. Beaumont tried this experiment with different food items. He gave Martin the same food at the same time and then compared how long it took for food to be digested in the glass and in Martin's stomach. He recorded his observations in a table.

Here is a part of his observation table:

No.	Food item	Time taken for digestion	
		In the stomach	In the glass with digestive juices
1.	Unboiled milk	2 hours 15 minutes	4 hours 45 minutes
2.	Boiled milk	2 hours	4 hours 15 minutes
3.	Full boiled egg	3 hours 30 minutes	8 hours
4.	Half boiled egg	3 hours	6 hours 30 minutes
5.	Raw egg, beaten	2 hours	4 hours 15 minutes
6.	Raw egg	1 hour 30 minutes	4 hours

So, what does our stomach do?

Dr. Beaumont did many experiments and found out many secrets about digestion. He found that food digests faster in the stomach than outside. Did you notice this in the table?

Our stomach churns the food to digest it. The doctor also saw that the food did not digest properly when Martin was sad. He also found that the juice in our stomach is acidic. Have you heard of anyone talking about acidity – especially when that person has not eaten well or the food is not digested properly.

Dr. Beaumont's experiments became famous across the world. After this many scientists did many such experiments. What did you say? No, they did not shoot people in the stomach. Nor did they wait for a patient with a hole in the stomach. They used other scientific ways to look inside our bodies.

Did you like the story of Martin or, should we say, the story of our own stomach?

- Anita Rampal
Chakmak, August 1985

Think and discuss

Imagine if you had been in place of Dr. Beaumont, what experiments would you have done to find out the secrets of our stomach? Write about your experiments.

Good food, good health

Dr. Yasir has two patients – Rashmi and Kailash.
Dr. Yasir talked to them to find out more about them.
Read what the doctor found.

Rashmi, 5 years
She looks about 3 years old. She has very thin arms and legs and a pot belly (stomach like a balloon). She often falls sick.
She always feels tired and cannot go to school regularly. She does not have the strength even to play.
Food : She is lucky if she can get a little rice or one roti to eat in the whole day.

Kailash, 7 years
He looks older than his age. His body is fat and flabby. He has pain in his legs. He is not very active. He goes to school by bus and spends many hours watching TV.
Food : He does not like to eat home- cooked food like dal-rice, vegetables and roti. The only thing he finds tasty are chips, burger, pizzas and soft drinks from the market.

Dr. Yasir measured the height and weight of both the children. Then she told them, there is only one treatment for both problems – proper food!

Discuss

- Why do you think Rashmi could eat only one roti in the whole day?
- Do you think Kailash would like games and sports?
- What do you understand by 'proper' food?
- Why do you think that the food of Rashmi and Kailash was not proper?

Find out

Talk with your grandparents or elderly people and find out what they ate and what work they did when they were of your age. Now think about yourself – your daily activities and daily diet. Are these similar or different from what your grandparents did and ate?

Proper food – every child's right?

You have read about two children. One is Kailash who does not like home-made food. The other one is Rashmi who does not even get one proper meal a day. About half the children in our country are like Rashmi. They do not get enough food that they need to grow and develop properly. These children are weak and sick (often ill, in poor-health). But it is the right of every child to get proper food.

Gomti is thirty years old. Gomti works in the fields of a rich farmer. For all her hard work, she is paid very little. So little that she cannot even buy enough rice to feed her family. Some months she does not get any work at all. Then she has to eat leaves and roots from the jungle. Gomti's children are weak because of hunger and are always sick. Few years ago her husband died of hunger.

Most rice grows in Kalahandi district. Rice is even sent to other states from here. Many times the rice that keeps lying in the godowns gets spoiled. In the same Kalahandi, there are many poor people like Gomti. Why do people die of hunger in such a place

◄ Read about this story in Kalahandi district in Orissa.

Think and discuss

- Do you know any child who does not get enough to eat in the whole day? What are the reasons for this?
- Have you ever seen a godown where a lot of grain has been stored? Where?

What we have learnt

- Why can you not taste food properly when you have a cold?
- If we were to say that "digestion begins in the mouth", how would you explain this. Write.

CHAPTER - 3

SEEDS AND SEEDS

Ghulama was waiting for his mausi's (Rhalla's) family to visit them. They will be coming the next day for their holidays. He was thinking about all the fun and nice food that he would have with his cousins. Just then his mother called out, "Ghulama, before you sleep, remember to soak two small bowls (katoris) of chana (gram) ." She was going to his Bua's (Phoophi's) house and would return only in the morning.

As he was soaking the chana, Ghulamal thought, "How will two small bowls of this be enough for eight persons?" So he soaked another two bowls of chana. When his mother returned the next morning, she saw that the chana were overflowing from the vessel. "How much did you soak?" asked his mother. "How did that happen!" wondered Ghulama.

"You soaked too much! Anyway it is good, now I will cook half of them, and leave the other half to sprout. I can send these to your aunt. The doctor has told her to eat sprouts", mother said. She tied half of the soaked chana in a wet cloth, and hung them up to sprout.

Discuss

- What things are soaked before cooking in your house? Why?
- What things do you eat after sprouting? How are they sprouted? How much time does it take?
- Has the doctor or someone you know ever told you to eat sprouts? Why?

Do this and find out

- Take some chana and three bowls.
- Put five chana in the first bowl and fill it up with water.
- Put a damp piece of cloth or some cotton wool in the second bowl. Now keep the same number of chanas in it. Make sure that the cotton wool or cloth remains wet.
- Put the same number of chanas in the third bowl. Do not put anything else in it. Cover all the three bowls.

Observe after two days and note the changes in the bowls.

	Bowl 1	Bowl 2	Bowl 3
Are the seeds getting air?	No	Yes	Yes
Are the seeds getting water?			
What changes did you see?			
Have the seeds sprouted?			

Tell and write

- In which bowl did the seeds sprout? What difference did You see between this bowl and the other bowls?
- Why did Gopal's mother tie the chana in a damp cloth?

Draw

- Look carefully at your sprouted chana and make its drawing?

Project : Plant your seeds

Take a clay pot or a tin can with a wide mouth. Make a small hole at the bottom of the can. Fill your can with soil. Put four or five seeds of the same kind in the soil and press them gently. Different group can plant different kinds of seeds, such as mustard (sarson), fenugreek (methi), sesame (til) or coriander (dhania).

Write

Name of the seed : _____

The date on which you planted them: _____

The day you observe something coming out of the soil, start filling the table:

Date	Height of the plant (in cm)	Number of leaves seen	Any other change

Find out

- How long did it take for the plant to come out from the soil?
- What was the difference in the height of the plant on the first and second day?
- On which day did the height of the plant increase the most?
- Did new leaves come out of the plant every day?
- Was there any change in the stem of the plant?

Discuss

- Which seeds took the most number of days for the stem to come out of the soil?
- Which seeds took the least days to come out of the soil?
- Which seeds did not grow at all? Why?
- Did anyone's plant dry up or turn yellow? Why did this happen?
- What would happen if the plants do not get water?

Straight from your heart

- What is inside the seed?
- How does a big plant grow from a tiny seed?

Think and imagine

What would happen if plants could walk? Draw a picture.

Find out

Do some plants grow without seeds?

Plants which hunt!

There are some plants which trap and eat frogs, insects and even mice. The Pitcher plant (Nepenthes) is one such plant. It is found in Australia, Indonesia and Meghalaya in India. It has a pitcher-like shape and the mouth is covered by a leaf. The plant has a special smell that attracts insects to it. When the insect lands on the mouth of the plant, it gets trapped and cannot get out. What a clever way to hunt!

So many seeds!

How many types of seeds can you collect? Where will you find them? Each of you should try to collect as many different types of seeds as you can. After that, put all the seed collections together. Now observe these seeds carefully – their shapes, sizes, colours, textures (smooth or rough). Make a seed chart to put up in the class. You can start with a table like this.

Name of the seed	Colour	Shape (draw)	Texture
Rajma	*Reddish brown*		*Smooth*

Think

- Did you keep aniseed (saunf) and cumin (jeera) in your list?
- Which was the smallest seed and which was the biggest seed in your collection?

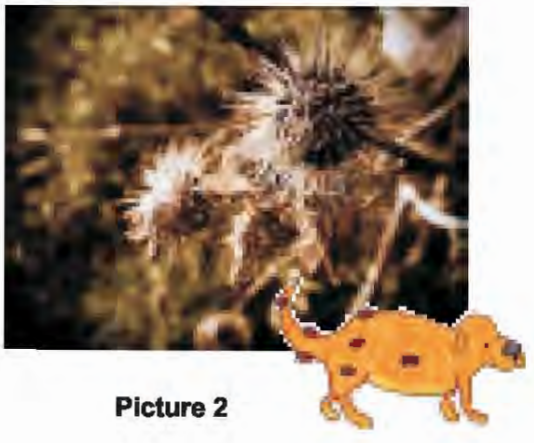
Make lists of :

- Seeds that are used as spices in your home.
- Seeds of vegetables.
- Seeds of fruits.
- Light seeds (check by blowing them).
- Seeds which are flat.
- Make more groups. How many groups of seeds did you make?
- Do you know any games that you can play with seeds?
- Discuss with your friends.

Wandering seeds

Plants cannot move around. Once they grow, they remain in the same place. But their seeds are great travellers! They can reach far and wide. Look at picture 1 and see the flying seeds.

Picture 1



Picture 2

- Have you ever seen any seed that can fly?
- What is it called in your area?
- Look at your seed collection. Guess how many of those could have travelled by flying.

Look at picture 2. This seed cannot fly, but it can still travel by sticking on to the fur of animals or on our clothes. In this way it gets a free ride! Did you get any new idea from these seeds? Read how the idea of Velcro came to George Mestral.

This happened in 1948. One day George Mestral came back from a walk with his dog. He was amazed to find seeds sticking all over his clothes and on his dog's fur. He wondered what made them stick. So he observed these seeds under a microscope. He saw that the seeds had many tiny hooks which got stuck to clothes or fur. This gave Mestral the idea of making Velcro. He made a material with similar tiny hooks that would stick. Velcro is used to stick together many things – clothes, shoes, bags, belts and many more. What a way to take inspiration from nature!

Look at the pictures given below and guess how the seeds travel and reach different places.

- Some plants spread their seeds over long distances. When the soyabean pods are ripe, they burst and the seeds are thrown out. Have you ever heard their sound?
- Think what would happen, if seeds did not spread and remained at one place only.
- Make a list of the different ways by which seeds are spread.

Who came from where?

Have you included human beings also in your list? Yes, we also carry seeds from one place to another, knowingly or unknowingly. We bring the seeds of plants that we find beautiful or useful, to grow them in our garden. Later the seeds of these plants spread to other places. Many years later people may not even remember that these plants did not grow here earlier. They were brought from somewhere else. Do you know from where chillies came to our country? These were brought to India by traders coming from South America. Today we cannot think of food without chillies!

Read this poem to know which plant came from where.

Did you know this?

From South America
long ago,
came a *tomato*,
a *potato*,
and a *green chilli*.

Do you know this?

A *cabbage* came
from Europe,
and also a *pea*.
From Africa
came a *coffee bean*,
and a *green lateral*.

They crossed the land.
They crossed the sea.

Did you know this?

A mango sang,
'Come in! Come in!'
An orange smiled
inside its skin.
'Welcome to India,'
a banana said,
the *methi* and *spinach*,
brinjal and *radish*,
nodded its head.

Did you know this?

...

–Rajesh Utsahi
Chakmak, May-June 2002
(Translated by Anupa Lal)

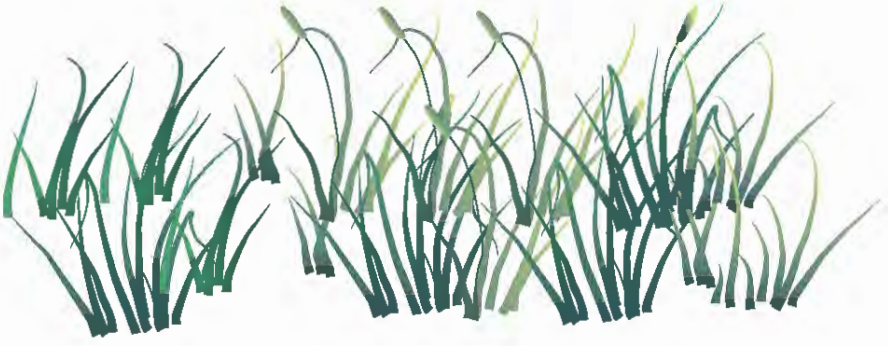
Bhindi is also called okra, and *methi* is called *fenugreek*

What all was grown in India long ago? Were mangoes and bananas grown here? What came from other countries? Imagine food without potatoes or tomatoes!

What we have learnt

Reena has drawn this picture of the seed sprouted by her. What do you think the seeds need for sprouting? Write in your own words. How would Reena's seeds look if they did not get the things needed. Show by drawing a picture.

How do seeds spread to far off places? Write in your own words.



CHAPTER - 4

EXPERIMENTS WITH WATER

What floats – what sinks?

Ayesha was waiting for dinner. Today Ammi was making her favourite food – puri and spicy potatoes.

Ayesha watched as her mother rolled out the puri and put it in the hot oil. She saw that at first the puri sank to the bottom of the pan. As it puffed up, the puri came up and started floating on the oil. One puri did not puff up and did not float like the others. On seeing this, Ayesha took some dough and rolled it into a ball. She flattened it and put it in a bowl of water. Alas! it sank to the bottom and stayed there.

Think what would happen if

- Ayesha put a puffed puri in a bowl of water. Would it sink or float?
- You put a steel plate on water. Would it sink or float? What would happen to a spoon?
- Would the cap of a plastic bottle sink or float on water?

In the evening Ayesha went for a bath. She had just come out when her mother called, "Ayesha, you have dropped the soap in the water again. Take it out and put it in the soap case." Ayesha was in a hurry and the soap case fell out of

her hands. It started floating on water. Ayesha gently put the soap in the soap case. She saw that the case continued to float, even with the soap in it.

Have you seen that some things float on water while others sink? Think how this happens! The poem here raises such questions.

Why, Oh Why?

A wooden boat
in water will float.
But a needle will sink!
Why does this happen?
Let me think...
An iron ship
will also float,
though its' much heavier
than my boat!

But a needle,
light as a leaf,
thin as a pin,
will sink right in!

Why does this happen?
Let me think...

– Shishir Shobhan Ashthana
Chakmak, December 1985
(Translated by Anup

Do this and find out

Do this experiment in groups of four friends. Each group will need a big pot filled with water and the things listed in the table. Put each thing one-by-one in water and observe.

Mark [✓] for the things that float. Mark [x] for those that sink.

Things to be put in water	I guessed, before I did it	I saw, when I did it
(a) Empty bowl (katori) (b) After putting in 6-7 small pebbles, one-by-one		
Iron nail or pin		
Matchstick		
(a) Empty plastic bottle with its lid closed (b) bottle half-filled with water (c) Bottle full of water		
Aluminium foil (from medicine packing) (a) open and spread out (b) pressed tightly into a ball (c) in a cup-like shape		
(a) Soap cake (b) Soap cake on a small plastic plate		
A piece of ice		

Find out from the other groups which things floated and which sank in the water?

After doing the experiment, fill in the blanks.

1. The iron nail _____ in water but the katori _____. I think this happened because _____
2. The empty plastic bottle _____ on water. The bottle filled with water _____ because _____
3. The aluminium foil _____ when it was spread out. When pressed tightly into a ball it _____. This may have happened because _____

Is it magic?

When Ayesha woke up in the morning, *Ammi* had fever. *Abbu* made some tea and went to give medicines to *Ammi*. He told Ayesha, "You boil eggs. Also put some salt in the water." Ayesha took water in a pot. By mistake she put too much salt in the water. She saw the eggs at the bottom of the pot come up a little and start to float in water!

- Take some water in a glass. Put a lemon in it. Now keep putting salt in the water, half-a-spoon at a time. Were you able to float your lemon in water?
- What do you think, the lemon floated in salty water, because.....

Dead Sea

All oceans and seas have salty water. The saltiest of all is the Dead Sea. How salty? Imagine 300 grams of salt in one litre of water! Would you be able to even taste such salty water? It would be very bitter. Interestingly, even if a person does not know how to swim, she would not drown in this sea. She will float in water, as if lying down on it! Remember the lemon you floated in salty water?

What dissolved, what did not?

On Sunday Ayesha's cousin brother Hamid came to her house to play. As soon as he came he asked his aunt to make his favourite shakkarpara (a sweet dish). Ammi said, "Let me come back from the market, then I will make some for you. Why don't you help me? Take two glasses of water and put a bowl of sugar in it. Mix it till it dissolves." Hamid thought, "Let me finish this work fast. Then I will watch TV".

- Suggest some ways to Hamid for quickly dissolving sugar.

Do this experiment

Make groups of four friends. For the experiment you will need 4-5 glasses or bowls, spoons, water, and the things listed in the table. Take some water in each glass. Now try to dissolve one thing in one glass. Observe what happens and note in the table.

Things	Did it dissolve or not?	What happened after keeping for 2 minutes?
1. Salt	_____	_____
2. Soil	_____	_____
3. Chalk powder	_____	_____
4. 1 spoon milk	_____	_____
5. Oil	_____	_____

Tell

- Could you see the salt after it dissolved in water? If no, why?
- Does that mean that now the water does not have salt? If it has, then where is the salt?
- What difference did you see – in the water with salt, and the water with chalk powder – after keeping for sometime?
- Which of the two would you be able to separate from the water by straining with a cloth – salt or chalk powder?

While doing the experiment Ayesha and Hamid had an argument. Ayesha felt that after stirring it, the oil dissolved in water. Hamid did not agree. He said, "Look, the tiny yellow oi drops can still be seen in the water". Ayesha said, "Let's wait for sometime and then see."

- Do you think the oil got dissolved in the water? Why do you think so?

Racing drops

Ayesha put two drops of oil on the lid of her tiffin box. Next to that she put two drops of water and two drops of sugar solution. She tilted the lid. She saw some drops slid down quickly, while some were left behind.

- You also try to do the same and then tell – which drop went ahead? Why did it slide faster?

Where did the water go?

One day Ayesha's mother put some water to boil on the stove for making tea. She got busy with something and forgot about it. When she remembered and came to check, she found only a few drops of water left in the pan.

- Think where did the water go?
- Why did Chittibabu and Chinnababu keep their mango jelly in the sun?
- At your house, what things are made by drying in the sun?

Dandi March

This incident took place in 1930, before India became independent. For many years the British had made a law that did not allow people to make salt themselves. They had also put a heavy tax on salt. By this law people could not make salt even for use at home. "How can anybody live without salt?" Gandhiji said, "How can a law not allow us to use freely what nature has given!" Gandhiji, with several other people, went on a yatra (long walk) from Ahmedabad to the Dandi seashore in Gujarat, to protest against this law.

Do you know how salt is made? The sea water is collected in shallow beds dug in the sand. Water is allowed to dry in the sun. After the water dries the salt remains on the ground.

What we have learnt

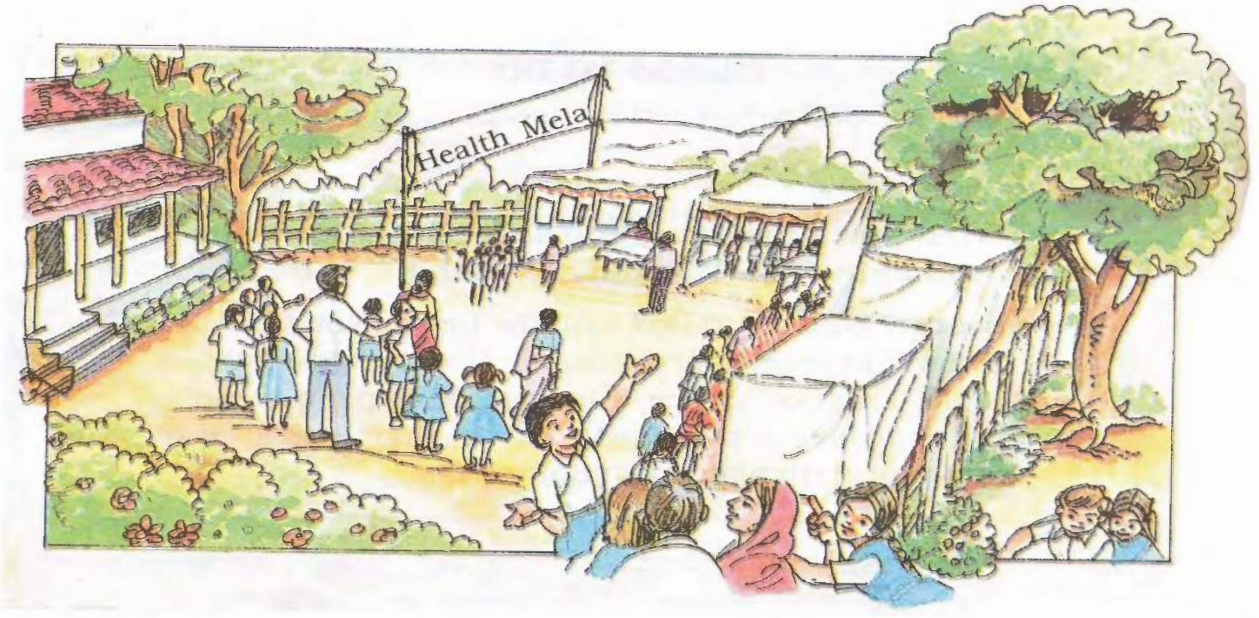
- You have washed your handkerchief and you want to dry it quickly. What all can you do?
- What things do you put in water to make tea? Which of those things dissolves in water?
- You have been given some *mishri* pieces (lumps of sugar). Suggest some ways to dissolve them quickly.

CHAPTER - 5

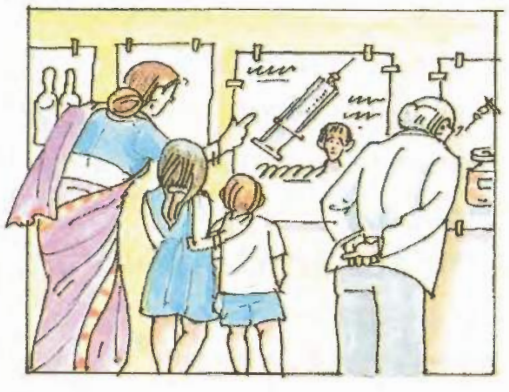
OUR HEALTH SERVICES

World Health Day is celebrated on 7th April every year throughout the world. This year we also celebrated this day in our school. Preparations were going on for many days. Our teacher had given some responsibility to every child in the class.

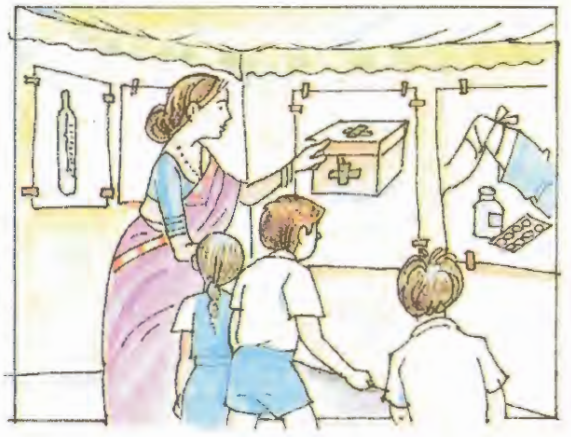
In the morning hours a Health Mela was organised. Many stalls were put up. In one of the stalls, information was given about communicable diseases and how we can protect ourselves from them



In other stall, information was displayed through posters about



vaccination against some diseases. In another stall, posters on how to keep the environment clean were put up.

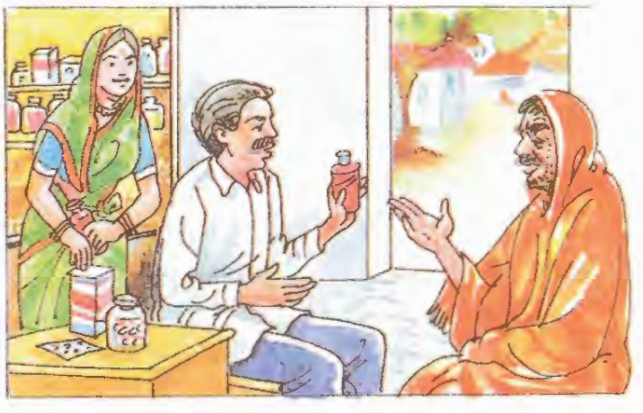


Elsewhere a First Aid Box was displayed and its uses were being demonstrated.

Our teacher had already informed us in advance that a doctor had been invited to the school on that day. All the children were very excited and ready with their queries.

The doctor arrived exactly at 2 O'clock. First of all he met the children of Class V. As the teacher welcomed the doctor, Rohit raised his hand When the doctor signalled, he stood up and said, "Doctor, my maternal uncle lives in a village. These days he is in our town for my maternal grandfather's medical treatment in the hospital. Are health facilities not available in the villages?"

"Of course, there are medical facilities in the villages," said the doctor. "In our country, the central and state governments provide health facilities for all. These facilities are available at all levels such as the village-level, block-level, district-level, smaller cities and metropolitan cities. But these facilities are not the same everywhere. As compared to villages, cities have better and more up-to-date medical facilities."



"What kind of health facilities are available in villages?" asked Seema.

"In places where the population is about 5000, there is a Primary Health Sub-Centre. But in hilly or far-flung areas this facility is provided

even for a population of about 3000. In every primary health sub-centre, there is one male and one female health worker. Both of them, together, look after health-related activities such as providing information regarding the health of mother and child, family planning, vaccination, etc. Thus, they play an important role in providing health education to the community. They also look after the work related to national health schemes such as eradication of diseases like malaria, tuberculosis and polio."

"Are there no doctors to treat people in the villages?" Seema asked again.

"Yes, it is correct. The services of doctors are not available in primary health sub-centres. The health workers can give first aid and treat simple ailments. They are trained for this type of work."

"I have a two-year old sister who is not ill. Yet my mother takes her to the health centre for vaccination from time to time. She has a health card too. Why is it so ?" asked Chameli.

Vaccination helps in developing resistance against diseases. By vaccination, children can be protected against certain serious diseases like whooping cough, diphtheria, tetanus, measles, etc.

Write the name of a disease which has been eradicated by vaccination worldwide.

Polio vaccination is done by oral vaccine drops.

Primary Health Centres have been opened in rural areas with a population of about 30,000. In hilly, tribal or backward areas, Primary Health Centres have been opened where the population is about 20,000.

In every primary health centre, there is a doctor, a nurse, and a technician. There is a small laboratory also in the Centre.

"What is done in the laboratory ?" asked one child.

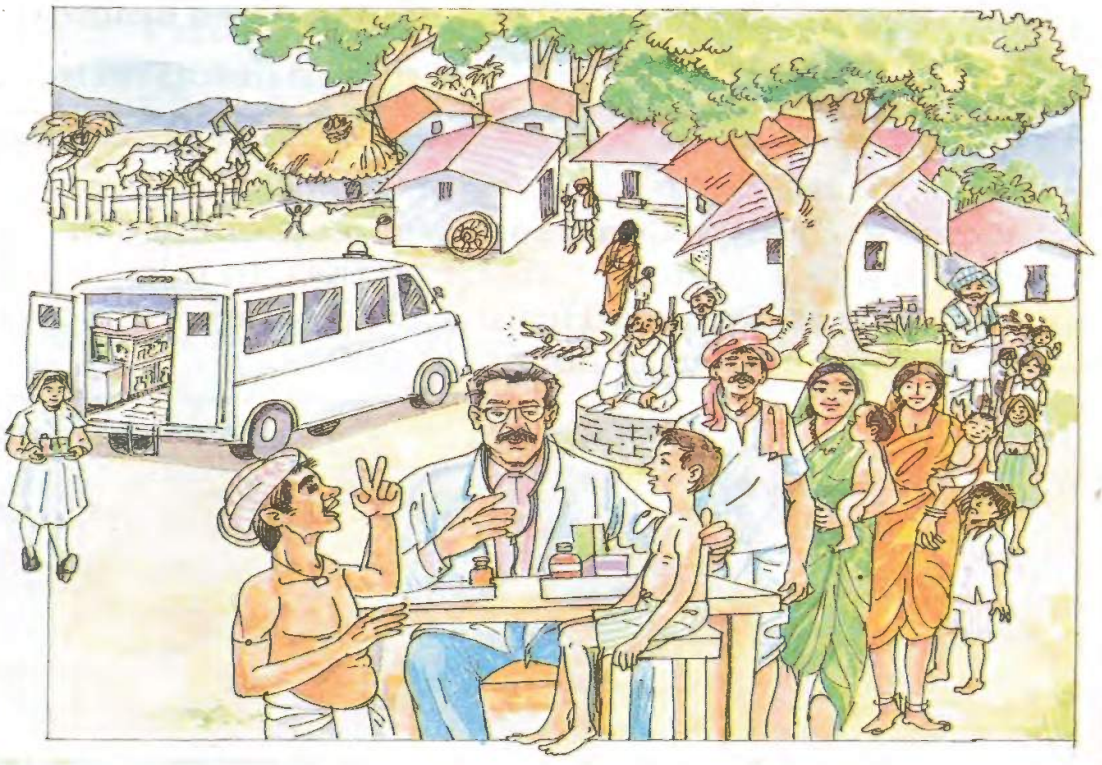
"The urine, stool, sputum and blood of patients are tested in these laboratories. These tests help in diagnosing the disease and its proper treatment."

Each primary health centre also looks after the duties assigned to the primary health sub-centres. Besides the above, it also organises

- Eye camps
- Camps for patients suffering from tuberculosis, leprosy, etc.

"From where do they get money for all these activities ?" Sanjna asked.

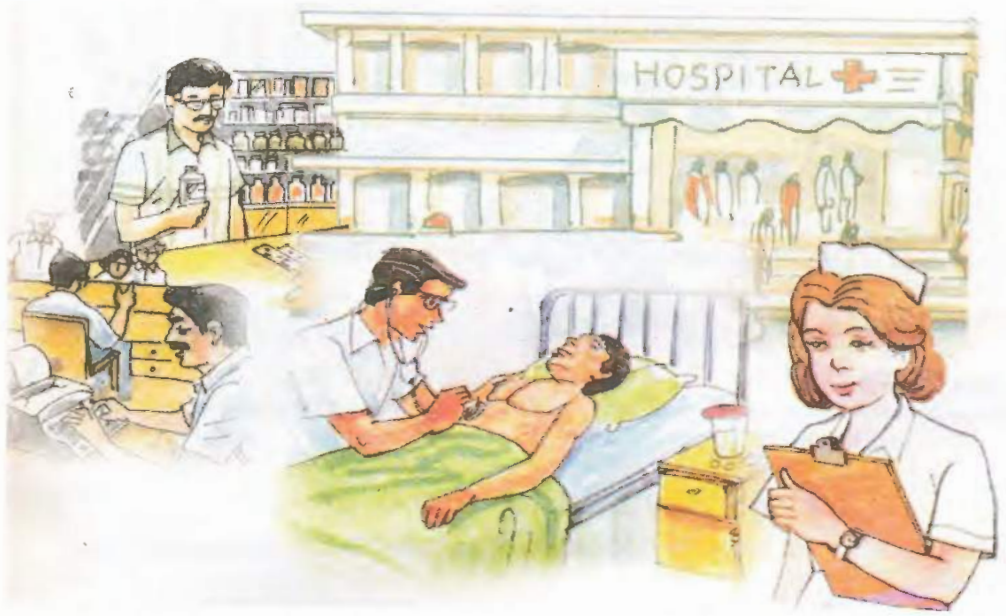
"The government bears the cost of all these facilities," said the doctor.



In areas where the population is around one lakh, community health centres have been opened. The staff in a community health centre includes a medical specialist, a nurse and other workers. All kinds of health programmes like vaccination, health camps, child health and welfare schemes are conducted here also.

In cities and highly populated areas there are big hospitals which provide facilities for

- Operations;
- diagnosis and treatment of all kinds of diseases;
- ambulance services for patients;
- beds for patients.



Health services are also provided through mobile vans in some areas.

A child asked. "What is a mobile van ? I have never seen it!"

"The mobile van is like a small hospital that moves on wheels. It is also the means of providing health services. Medical equipment and medicines for the treatment of patients are also available in mobile vans. A doctor also accompanies the van. Health facilities

through mobile vans are provided at places where there are no health centres. These provide health services in far flung areas where the population is very small or where no medical facilities are available. Sometimes medical facilities are also provided through mobile vans in health camps."

Do you know that the Red Cross Society is a voluntary organisation. It provides medical aid at the international level. There are branches of this organisation in all states of our country. Its main functions are:

- working towards improving health standards of the people, protecting them from diseases.
- providing relief during natural calamities such as epidemics, earthquakes, floods, droughts, etc.
- improving the maternal and child health care facilities.

After an accident sometimes, the victim loses a lot of blood. The victim may require blood immediately.

"From where can we get the blood?" asked Sameer.

"You have asked a good question. Everybody should know this. Blood can be arranged from the Blood Bank.

All big hospitals have Blood Banks. In case of an emergency like an

accident, major operation, or serious ailment, when we need blood, we can procure it from the Blood Banks."

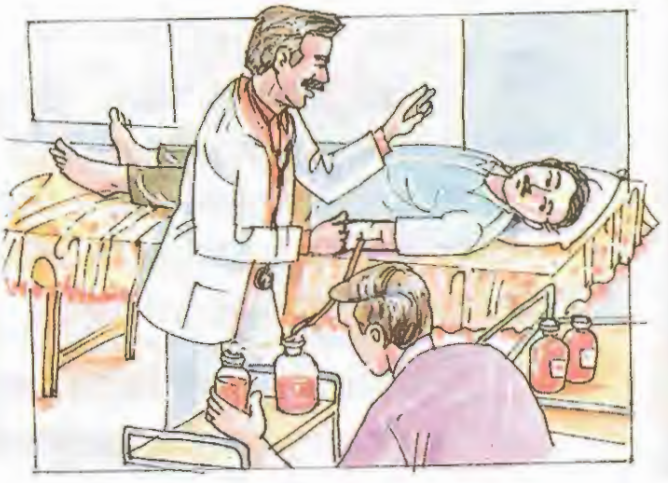
"But from where does the Blood Bank get blood?" Sameer asked again.

"Many people donate blood voluntarily".

"Doctor, can everybody donate blood?" asked Harpreet.

The Blood Bank is a place where blood of all the different groups is stored and made available when required.

"No, people of all age groups cannot donate blood. Children and old people are not permitted to donate blood. Similarly, weak and ill persons also cannot donate blood. Only a healthy person can donate blood."



"Is there any risk to the health of a person who donates blood?" Asked a child.

"No, there is no risk in donating blood. Some people think that giving blood may cause weakness. But it is not true. Our body keeps making blood all the time. A person can donate only 200 ml blood at a time."

Find out about the Blood Bank facility available in the hospital or health centre in your neighbourhood. Visit the Blood Bank with one of your family members. Get your blood tested to find out your blood group.

All the children were benefitted from the doctor's talk. In the end, the class monitor thanked the doctor, on behalf of the class. He also assured him that they would share the information they got with their family members and friends.

In this lesson We Have Learnt

- In our country, the central and state governments provide health services for all the people.
- These services are available at all levels - village, block, district, towns, small cities and metropolitan cities.
- The health services are not the same everywhere. In towns/cities the facilities are more than those in villages.
- Vaccination helps in protecting people against serious diseases.
- The Mobile Van is an arrangement to provide medical facility to those areas where such facilties do not exist.
- A Blood Bank is a place where blood of different groups is stored. This blood in the Blood Bank is collected through donations from healthy persons.

What Have We Learnt ?

I. Oral Work

1. What precautions should we take to keep ourselves healthy ?
2. Tell the difference between a Primary Health Sub-Centre and a Primary Health Centre ?
3. When is World Health Day observed ?
4. What is the utility of a Mobile Van ?
5. Name any three diseases against which vaccines are given to children ?
6. Why do we need health education ?

II. Written Work

1. What facilities are available at Primary Health Sub-Centres ?
2. Where are blood and sputum tested and who tests them ?
3. Write two differences between a Mobile Van and a hospital ?
4. Write five sentences on Blood Bank ?

5. Match the names in Column A with the statements in column B.

Column A	Column B
Primary Health Sub-Centre	Hospital on wheels
Primary Health Centre	Place to procure blood
Laboratory	Availability of doctors
Blood Bank	Testing of blood and sputum
Mobile Van	Population of 5000

6. Write three sentences on each of the following:

(a) Community Health Centre

_____

(b) Vaccination

_____

(c) Doctor

_____

7. What health - related information would you like to give to your family members ?

III. Things to Do

- Visit a local health centre with your teacher. Prepare a report on the basis of the information you collect. Discuss it with your friends.
- Collect information related to the Blood Bank. Find out the blood groups of your family members and yourself. Note down this information in a diary.
- What role can you play in a vaccination campaign ? Discuss with your friends.
- Play the roles of a doctor and a nurse in your class.

CHAPTER - 6

A TREAT FOR MOSQUITOES


Misbah

Blood test

Rajat is back at school today. He had been absent for many days. "How are you now?" asked Aarti. "I'm alright," Rajat replied softy.

Misbah: You must have played a lot while you were at home.


Rajat

Rajat : Who wants to play when you have fever! On top of it I had to take a bitter medicine! I even had a blood test.

Misbah: A blood test? Why? It must have been very painful.

Rajat: Actually, when the needle pricked my finger, it felt like an ant bite. They took 2-3 drops of blood, and Sent it for testing. That's how we came to know that I had malaria.


Nancy

Nancy: But you get malaria when a mosquito bites you.

Rajat: Yes, but we find out by the blood test.

Misbah: There are a lot of mosquitoes in my house these days, but I did not get malaria.


Aarti

Nancy: Who says that every mosquito bite causes malaria? Malaria spreads only by the disease carrying mosquitoes.

Aarti: All mosquitoes look the same to me.

Rajat: There must be some difference.

Taking the blood on the glass slide for test

Dr Maryam looking at the blood slide under the microscope. This miscroscope makes things look thousand times bigger. The details inside the blood can be seen clearly. There are some miscroscopes which make things look even more bigger than this one.

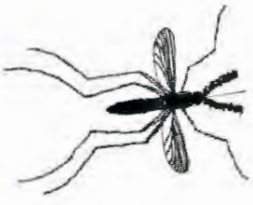
Nancy: Did they take the blood from the place where the mosquito had bitten you?

Rajat: Of course not! How do I know when and where the mosquito bit me?

Nancy: But how could they find out that you had malaria by your blood test? Do you think they could see something in the blood?

Find out

- Do you know anyone who has had malaria?
- How did they find out that they had malaria?
- What problems did they have on having malaria?
- What other diseases can be caused by mosquito bites?
- In which season is malaria more common? Why do you think this happens?
- What do you do in your house to protect yourself from mosquitoes? Also find out from your friends about what they do.



क्लीनिकल विकृति रिपोर्ट
CLINICAL PATHOLOGY REPORT
केंद्रीय सरकार स्वास्थ्य योजना
Central Govt. Health Scheme

18/08/2007

नाम/*Name*.....Rajat..... आयु/*Age*.....11.....स्त्री या पुरुष/*Sex*.....Male.....

रोग की पहचान/*Diagnosis*.....Fever with Chills and Rigors.....
(ठंड लगकर कंपकंपी के साथ बुखार)

Malarial Parasite Found in Blood Sample
(खून में मलेरिया के जीवाणु पाए गए)

Pathologist

- Look at the report of the blood test given here. Which words in the report help us to know that the person has malaria?

Medicine for Malaria

From early times, the dried and powdered bark of the Cinchona tree was used to make a medicine for malaria. Earlier people used to boil the bark powder and strain the water which was given to patients. Now tablets are made from this.

Anaemia–What's that?

Aarti: You know, I also had to get a blood test done. But they took a syringe full of blood. The blood test showed that I had anaemia.

Rajat: What is that?

Aarti: The doctor said that there is less 'haemoglobin' or iron in the blood. The doctor gave some medicines to give me strength. He also said that I should eat jaggery, amla and more green leafy vegetables, because these have iron.

Nancy: How can there be iron in our blood?

Jaskirat: There was something about this in the newspaper yesterday.

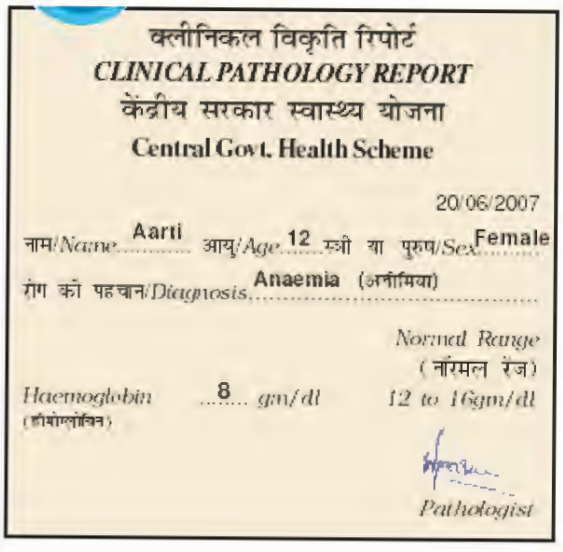
Rajat (laughing) **:** So then you ate iron or what?!

Aarti: Silly! This is not the iron used to make these keys. I don't know exactly what it was. After I ate a lot of vegetables and whatever the doctor had said, my haemoglobin went up.

Anaemia common in Delhi school

17 November, 2007 - Thousands of children studying in the Municipal Corporation schools in Delhi suffer from anaemia. This is affecting both their physical as well as mental health. Due to anaemia, children do not grow well, and their energy levels are low. This also affects their ability to study properly. Now health check ups are being done in the schools and health cards are being made for all the children. Anaemic children are also being given iron tablets.

Tell



क्लीनिकल विकृति रिपोर्ट
CLINICAL PATHOLOGY REPORT
केंद्रीय सरकार स्वास्थ्य योजना
Central Govt. Health Scheme

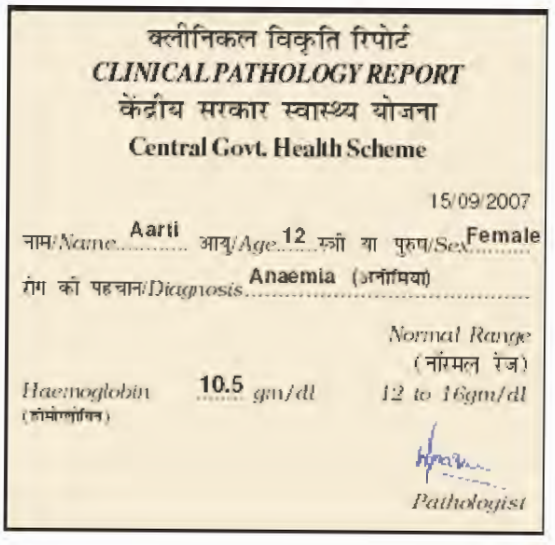
20/06/2007

नाम/*Name* Aarti आयु/*Age* 12 स्त्री या पुरुष/*Sex* Female

रोग की पहचान/*Diagnosis* Anaemia (अनीमिया)

		Normal Range (नॉरमल रेंज)
Haemoglobin (हीमोग्लोबिन)	8 gm/dl	12 to 16gm/dl

Pathologist



क्लीनिकल विकृति रिपोर्ट
CLINICAL PATHOLOGY REPORT
केंद्रीय सरकार स्वास्थ्य योजना
Central Govt. Health Scheme

15/09/2007

नाम/*Name* Aarti आयु/*Age* 12 स्त्री या पुरुष/*Sex* Female

रोग की पहचान/*Diagnosis* Anaemia (अनीमिया)

		Normal Range (नॉरमल रेंज)
Haemoglobin (हीमोग्लोबिन)	10.5 gm/dl	12 to 16gm/dl

Pathologist

- Look at Aarti's blood report and find out the minimum required haemoglobin?
- How much did Aarti's haemoglobin go up and how long did it take for that?
- What does the newspaper report say about the problems caused by anaemia?
- Have you or anyone in your family ever needed to get a blood test? When and why?

What was found out by the blood test?

Have you had a health check up in your school? What did the doctor tell you?

Find out

Ask a doctor or elders about the food items which contain iron.

Baby mosquitoes

Misbah: There is a poster on malaria just outside our class. (Everyone goes out to look.)




Are you inviting mosquitoes?

BEWARE!

They Spread Malaria, Dengue, Chikungunya!

- **Don't let water collect around you. Fill up the pits.**
- **Keep the water pots, coolers and tanks clean. They should be dried every week.**
- **Put fish in the ponds, so that they eat the mosquito larvae.**
- **Use mosquito nets to protect yourself.**
- **Spray oil if water has collected at some place.**

Rajat: The poster says something about larvae. What are those?

Nancy: They are baby mosquitoes. But they don't look like mosquitoes at all.

Aarti: Where did you see them?

Nancy: There was an old pot lying behind our house. It was full of water for some days. When I looked there I saw some tiny thread-like grey things swimming. I was surprised when Mummy told me that these had come out of the eggs which mosquitoes lay in water. They are called larvae. I also heard something about this on the radio.

mosquitoes's larvae

Rajat: What did you do?

Nancy: Papa immediately threw away the water. He cleaned and dried the pot and kept it upside down, so that no water would collect.

Misbah: Shazia aunty told me that even flies spread diseases, especially stomach problems.

Rajat: But flies don't bite. Then how do they spread diseases?

larvae seen through hand lens

Find out and tell

- Have you seen any poster like this put up anywhere?
- Who do you think puts up such posters, or gives ads in the newspapers?
- What are some of the important points given in the poster?
- Why do you think pictures of a tank, cooler and pits are shown in the poster?

Think

- Why do you think it talks about putting fish in the tank?
- What do you think the fish eats?

  What will happen when oil is spread on the water?

Find out

- Which diseases are spread by flies and how?

Mosquito check

Divide your class into two or three groups. Each group will go around to check one area in school or around it. It must carefully note if water has collected anywhere, and mark ✓ where it finds stagnant water.

Pot ☐ Cooler ☐ Tank ☐ Any open space in the school ground ☐ Gutter ☐ Any other place_____

- Since how many days has water collected there?
- Has it caused any problem in the area?
- Who is responsible for keeping these places clean?
- Who is supposed to get the gutters and drains repaired?
- Can any larvae be seen in the collected water?

Make a poster

- In your group, make a poster with a message to keep the cooler, tank, drains and the area clean (wherever water collects). Put up your poster in and around your school.
- Find out who is responsible for keeping the area around your school clean. Write a letter from your class, reporting your findings and suggestions. Find out to whom the letter should be written and to which office it should be sent.

Survey report

Some children did this survey. Here are some of their reports.

Group 1

We found something green around the taps in our school which is called algae. It was also slippery there. The algae spreads a lot during the rainy season. We think that they are some kind of small plants that grow in water.

Group 2

There is a pond near the school. At first you cannot see the water in the pond as it is completely covered with plants. One aunty told us that these plants have grown themselves in water. Around the pond there are pits full of water. We also saw some larvae in the water. As we moved around, lots ofmosquitoes flew from the plants growing around. Jaskirat feels that there are so many mosquitoes in her house because of this dirty pond nearby.

Tell

Is there a pond or river around your house or school? Go and look around and observe these things:

- Can you see algae in or around the water?
- Where else have you seen algae?
- Are there plants growing on the side or in water? Find out their names. Draw some of these in your note book.
- Do you think these were planted by someone or did they grow on their own?
- What else can you see in water? Make a list.

A scientist peeps into a mosquito's stomach

Ronald Ross

This interesting incident took place almost a hundred years ago. A scientist found out that mosquitoes spread malaria. Let's read about this discovery in his own words.

"My father was a general in the Indian Army. I studied to become a doctor, but what I really liked was reading stories, writing poetry, music and drama. In my free time I enjoyed doing all this.

In those days, thousands of people used to die from a disease that we now call malaria. The disease was found in areas where there was a lot of rain, or in swampy places. People thought that the illness was caused by some poisonous gas that came from the dirty swampy areas. They gave it the name 'malaria' which means 'bad air'. One

doctor had seen tiny germs in the blood of one of the patients, when he observed it under a microscope. But he could not understand how these had got into the patient's blood.

My professor had some ideas about this. "I think that these may be carried by some kind of mosquito." As his student, I spent all my time chasing mosquitoes, to catch and observe. We used to carry empty bottles and chase mosquito after mosquito. Then we would put the mosquitoes into a mosquito net in which there was a patient of malaria. The mosquitoes would have a feast, biting these patients. The patients were paid one anna for allowing one mosquito to bite them.

I will always remember those days at the hospital in Secundrabad – how we used to cut open the mosquito's stomach and peep into it. I would spend hours and hours bent over the microscope. By night my neck would be stiff and my eyes could not see clearly! It used to be very hot but we dared not fan ourselves, as all the mosquitoes would fly off in the breeze! Once I also fell ill with malaria.

I spent months like this with the microscope, but could not find anything. One day we caught a few mosquitoes that looked different. They were brownish with spotted wings. When I looked into the stomach of one of the female mosquitoes, I saw something black there. I looked closer. I saw that these tiny germs looked just like the ones that were found in the blood of malaria patients. At last we had the proof! Mosquitoes did spread malaria!"

In December 1902, Ronald Ross got the highest award for his discovery—the Nobel Prize for medicine. In 1905, even as he lay dying, Ross's last words were, "I will find something, I will find something new."

What we have learnt

What can you do so that mosquitoes do not breed in your house, school and neighbourhood?

- How can you find out if someone has malaria?

CHAPTER - 7

FIRST AID

On hearing the sound of falling down and a scream of Yuaan from the kitchen. Tahoora came running. She saw a jar of sugar lying on the kitchen floor. Yuaan had fallen down while trying to get the jar from the shelf.

"Didi, look I am bleeding. I am in pain too," said Yuaan. Tahoora was upset for a moment because their parents were not at home. Suddenly she recalled what her teacher had advised about how one should remain calm in case of an accident. She had also told that one should face the situation with courage. Tahoora consoled her younger brother and brought her First Aid Box quickly. She washed her hands then cleaned the bruises with a piece of cotton soaked in clean water. She applied an antiseptic lotion on the bruises on the knee and bandaged it. After a while the bleeding stopped, but Yuaan was still crying. She soothed him and put him to rest on the bed. When their parents returned after some time, the brother and sister narrated the whole incident to them.

On hearing their account the mother hugged Tahoora and said, "How sensible has my daughter become!" The father said "I will take Yuaan to the

doctor for a tetanus injection." Next day, Yuaan went to school limping with a bandage on his knee. He was walking with difficulty. When the teacher saw the bandage knee. She asked about his injury. Yuaan told the whole incident.

"Such incidents happen often in our life. We should always be prepared to face such situations," the teacher said. "Incidents like this happen suddenly. These can happen due to many reasons, like begins in a hurry or working carelessly. Such incidents can happen any where - at home, on the road, on the playground or at school. We need some immediate help in situations like this. This kind of help is called first aid," the teacher said.

"Today, let us learn more about first aid. We shall move to the health room for a discussion. There we have a First Aid Box. This box is of great help in minor injuries due to accidents," said the teacher.

The First Aid Box contains all the things required for immediate help to the accident victim.

These include a bandage, cotton wool, gauze, a pair of scissors, blade, potassium permaganate (Lal dava), antiseptic solution, spirit, thermometer, etc. These things can be used in case of accidents.

A person who to give first aid, must keep the following points in mind:

- She/He must have full knowledge of the materials available in the First Aid Box.
- She/He should also know how to handle the materials in the box.
- She/He should not panic on seeing the victim.

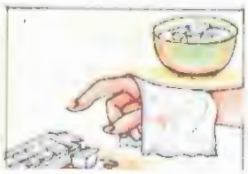
No time should be lost in providing first aid to the victim. Sometimes a little delay can be very dangerous.

There are many occasions when we need to provide first aid. Let us know about some of these situations.

Burns

Sometimes, boiling water or oil falls on a part of our body accidently. Many times, we touch a hot object by mistake. Such incidents burn our skin. The intensity of the burn depends on the level of heat of the object, the kind of clothes we are wearing or the kind of weather, etc.

In case of burns what should be done immediately?

	Do's	Don'ts
	☞ Pour cold water immediately on the burn till the burning sensation stops.	☞ Do not apply ghee, oil, etc on the burn.
	☞ You can keep an ice or cold water pack on the burn.	☞ Do not cover the burn with thick cloth.
	☞ If a persons's clothes catch fire, make the person roll on the floor.	☞ Do not wrap a blanket around a person whose clothes have caught fire.
	☞ Protect the burn from dust, dirt, files, etc. Cover it with a thin and light cotton cloth.	☞ Do not tie a cloth tightly. Do not use a dirty cloth.
	☞ If the burn is severe, go to a doctor	☞ Do not go to a unqualified person.

What precautions should we take while using a gas stove at home? Write any three of them.

1. .....

2. .....

3. .....

Heat Stroke

During the months of May and June, it is very hot in some northern parts of our country. We experience very hot and strong winds called "loo" in those days. Due to the heat, the temperature outside is also very high. If we remain out in the sun during this period for a long period, we feel giddy, tired and get a headache. These are the symptoms of a heat stroke.

What first aid should be given to victim of a heat stroke?

Do's	Don'ts
☞ Make the patient lie down in a shady place	☞ Do not crowd around the patient.
☞ In case of high fever, a cold sponge is helpful	☞ Do not cover the patient with any cloth, especially woollen cloth.
☞ Give the patient a solution of salt, sugar and lime. You can also give the juice of an unripe mango	☞ Do not give hot tea or coffee to the patient.

Let us find out

Which are the hottest months in the place where you live?

.....

What is the unit of measuring temperature?

.....

Record the daily maximum temperature for a week from the newspaper during the month of may in your notebook. Calculate the average temperature at the end of the month and write here.

.....

Bleeding Nose

Sometimes when it is very hot, there may be bleeding from our nose. We call it **bleeding nose**. Let us find out what first aid should be given in such a situation.

Do's	Don'ts
☞ Make the patient lie down with his head in a lower position than the body.	☞ Do not put a pillow under the patient's head.
☞ Pour cold water on the patient's head.	☞ The patient must not put his finger in the nose.
☞ A cold pack can be put on the nose.	☞ The patient must not blow his nose too often.

Insect Bite

Insects like a bee, a wasp, etc., are commonly found around us. These insects sometimes sting us, which can be very painful. Sometimes a sting can cause swelling in that part of the body.

We should not tease insects. It is only when we tease them they usually sting us.

What should we do in such a situation.

Place a piece of ice or pour cold water on the affected area. We can also apply ammonia or lime water on the area.

Wounds

Very often while playing, we hurt ourselves on or knees, ankles, elbows, etc.

What should we do in a such a situation?

Do's	Don'ts
☞ Wash the wound with clean water then clean the wound with an antiseptic solution.	☞ Do not apply any oil or grease on the wound.

Sprain

Sometimes when we run very fast or when our foot twists, it can cause a sprain.

It happens because of a tear in the muscles. The affected area can be very painful. There can be a swelling also.

What should we do in such a situation.

Do's	Don'ts
☞ Give sufficient support to the affected area especially hands and legs.	Do not massage the affected area.

☞ Put a cold water pack on the affected area.

Do not give fomentation to the affected area Immediately.

☞ After 24 hours of the sprain put some salt in lukewarm water and give fomentation,

Do not go to a unqualified person.

☞ Continue the support to be affected area, especially hands and legs, till the sprain is cured.

Do not put any pressure on the affected area till the swellings reduces.

Burns, heat strokes, insect bites, sprains, etc., are some of the accidents that occur in our daily life.

We must take some precautions to avoid accidents. These are:

- ☞ Do not try to put a pencil or eraser into your nose, ear or mouth. Do not put coins, marbles into your mouth. These can get stuck in your throat.
- ☞ Do not put your finger into a plug point.
- ☞ Do not touch naked wires.
- ☞ Do not play with scissors, knives, screw drives, nails or nails or any sharp objects or put them in your mouth.
- ☞ Do not work on a gas stove in the absence of an adult.
- ☞ Do not play with burning matchsticks or candles.
- ☞ Do not disobey traffic rules while walking on the road.

When an accident happens, only first aid is not enough. If it is major accident, where should we take the patient immediately?

All the children shouted, "To the doctor". At that moment the bell rang and the class dispersed.

What have we learnt?

I. ORAL WORK

1. If your friend gets hurt while playing, what will you do?
2. Mention any three items kept in a First Aid Box.
3. Why should we wear cotton clothes instead of nylon, when working in the kitchen?
4. What first aid should be given to a victim of bleeding nose?
5. What is a heat stroke?
6. What would have happened if Tahoora had not given first aid to Yuaan?

II. WRITTEN WORK

1. What should be done immediately, if hot water falls on you?
2. Why is first aid necessary?
3. What are the reasons of road accidents?
4. What is a First Aid Box ? Make a list of objects to be kept in the box ?
5. What should we do when

(a) Hot oil falls on one's hand

.....

.....

(b) Someone gets a heat stroke/

.....

.....

(c) The nose bleeds?

.....

.....

(d) A bee bites?

.....

.....

6. Choose the correct answer and put a mark (✓) against it.

(i) If a person's clothes catch fire, we must immediately

(a) Wrap the person in a blanket.

(b) Wrap the person in cotton cloth.

(c) Make the person roll on the floor.

(d) Take the person to a doctor.

(ii) If a person gets hurt while playing, we should

(a) Ask the reason.

(b) Contact the doctor on telephone.

(c) Scold the victim.

(d) Give first aid.

THINGS TO DO

- What precautions will you suggest to your younger brother n order to avoid accidents?
- Prepare a first aid box with the help of your teacher. Show it to your elder at home. Use it when required.
- Make a list of all the things to be kept in mind in order to avoid accidents. Write them on a chart paper and display it in your class.

CHAPTER - 8

ROCKS AND MINERALS

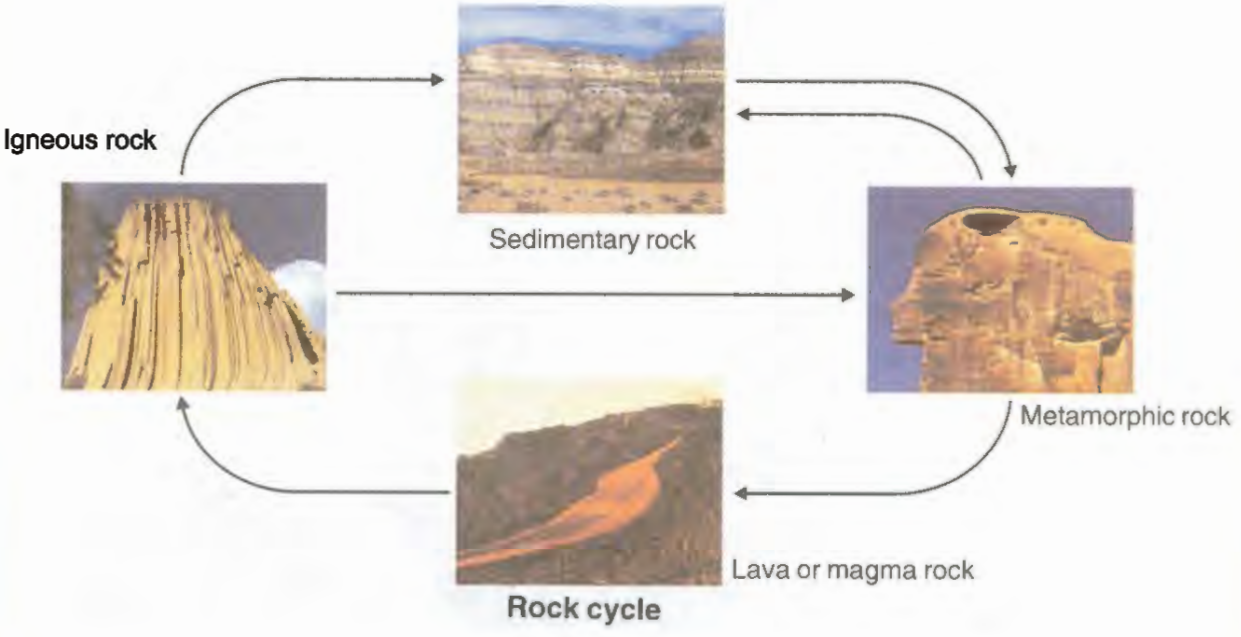
The ground we walk on, build on and grow gardens on is made up of rocks. All the rocks in the world are made up of chemicals called minerals. Granite, sandstone, chalk, marble and slate are all different types of rocks. The pebbles you find on the beach are rocks that have been worn down and smoothed by the action of the sea. The stones that are used to build structures from small cottages to magnificent cathedrals are rocks. All rocks are not hard. Clay is a type of soft rock.

A rock may be defined as any natural mass of mineral matter that makes up the earth's crust.

Types of Rocks

There are three main types of rocks:

1. Igneous 2. Sedimentary and 3. Metamorphic.



Rock cycle

Igneous rocks


Formation of igneous rocks

You know that deep down inside the earth, it is still very-very hot. The fiery hot substance inside the earth is called magma. In a volcano, the magma pores out in a molten stream. The molten magma, when cools and solidifies, forms a rock. Such rocks which are formed from fiery-hot magma are called igneous rocks. Igneous means fire-formed.

Magma is a mixture of different minerals. These minerals occur in different proportions. So, igneous rocks contain different minerals. Such as granite and basalt.

Granite : Granite is an intrusive igneous rock. There are several types of granite, but all are light coloured because of the light coloured minerals within them. Many temples in south India have been made of granite.

Basalt : Basalt is a typical extrusive igneous rock formed from lava. It is dense and dark because of the minerals it contains. It is fine grained because of its quick cooling.

Igneous rocks tend to be very hard. When broken up, they make a good, strong road surfacing material especially when coated with tar.

Sedimentary rocks

Igneous rocks are slowly broken down by wind, rain and water. In due course, they crumble into tiny bits.

Rivers carry these tiny bits of rocks into the sea. The rocky material along with sea shells and skeletons of tiny sea animals settles in layers upon


Formation of sedimentary rocks

the sea bottom. These materials are called sediments. As the time passes by, new layers are laid over the old ones. The weight of the sea water and top layers squeezes the layers into solid rocks. Such rocks are called sedimentary rocks.

The layers of sedimentary rocks may not always be levelled. Some layers are tilted or folded. Sandstone, limestone, shale and rock salt are examples of sedimentary rocks. Chalk is also a sedimentary rock. It is nothing but soft limestone.


Sandstone

Sandstone : Sandstone is made from layers of sand in deserts, or on sea beaches, which have been naturally cemented together. The redrock of Devon, England is a typical sandstone. Sandstones are commonly used as building material. The Red Forts at Delhi and Agra are made up of red sandstones. Many buildings in Jaipur are built of sandstones and so Jaipur is also known as 'Pink City'.

Limestone : Limestone is a biogenic rock. It is made up of living material. The shelly limestone is made up of broken sea shells. Other examples of biogenic sedimentary rocks are reef limestone and coal. Limestone is also a hard rock and is, commonly, used as a building material.


Shelly limestone


Shale

Shale : Shale is formed of compressed mud, silt and clay, mostly due to pressure. Shale rock is made up of parallel layers which readily split into pieces.

Rock Salt : Sea water contains dissolved minerals. When an area of sea dries out, these minerals are deposited as a layer in the bottom. Rock salt is a typical chemical sedimentary rock.

Chalk : Chalk is made up of millions of tiny calcium carbonate (lime) skeletons.

Fill in te blanks :

a) Limestone is a _____ rock.

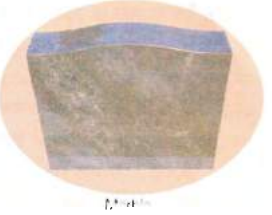
b) Shale is formed of _____, _____ and _____.

c) Sandstones are commonly used as _____.

Metamorphic Rocks

Metamorphic rocks are changed rocks. The intense heat and pressure inside the earth changes the igneous and the sedimentary rocks into metamorphic rocks. Metamorphosis means change. The characteristics of the changed rock are different than the parent rock due to the changes in the mineral contents of the rock. Shale and marble are the main examples of metamorphic rocks. **Gneiss** and coal are other examples of metamorphic rocks.

Slate : Slate is a dark grey and shiny rock. It is formed by the metamorphosis of shale. It splits easily into thin slices. Slate is used as a roofing material and a chalkboard surface.



Marble : Marble is a type of thermal metamorphic rock, formed when heat is applied on limestone. It is a smooth rock. It is an attractive building and sculpting material. It is also used in making statues, table tops and various other items. Its colour can vary from white to white streaked with brown, red, green or grey.

Gneiss : Gneiss pronounced 'nice' is the highest grade of regional metamorphic rock. It is a rock with a coarse texture and has parallel light and

dark streaks and bands of minerals next to each other. It is found in grey, pink, black and red colours.

Coal : Coal is a rock formed by the metamorphosis of the remains of plants under the earth. Heat and pressure expel out moisture, gases and other matter from these remains of plants, leaving behind carbon in different amounts. Superior quality of coal has more carbon, while low quality coal contains less carbon in it. Coal is black because of presence of carbon in it.

Coal is used as a fuel in powerhouses to produce electricity, in the extraction of iron and in many refineries. Coal gives us many useful products such as coal tar, coal gas ammonia and coke. Coal tar is used for constructing roads.

Minerals

Minerals are the building blocks of rocks. All the rocks, igneous, sedimentary or metamorphic, are composed of minerals.

A mineral is a chemical compound that occurs naturally. Each different mineral is made up of crystals of a particular chemical. Minerals can be identified by their hardness, colour, the way they reflect light, the way they break and their density.

Minerals making up igneous rocks include quartz, plagioclase and olivine. Augite is found in metamorphic rocks. Dolomite makes up limestone sedimentary rocks. Quartz is a very common mineral.

How Minerals are Formed ?

All minerals are originally formed from hot magma. When the magma cools, crystals of minerals appear. These crystals first may sink in the magma so that the composition of the magma changes with depth. Thus, a sequence of minerals is formed in the rocks as the magma cools. Lighter minerals occur

above the denser minerals. If the crystals form slowly, they may form gemstones.

Ores and Gemstones

Many useful metals are formed in rock or mixed with loose rock materials. Such mixtures are called metallic ores. Metals like iron, zinc, copper and aluminium are extracted from their ores. Gold is formed as a native metal. Thus, the treasure of different metals is hidden in rocks.

A gemstone is a mineral which is especially beautiful and rare. Gems and precious stones like diamonds and rubies are also found in rocks. Diamond is the hardest known naturally occuring substance. Talc is one of the softest minerals.

Apart from all these, the rocks contain other useful minerals. These minerals make the soil fertile. Minerals like nitrates, phosphates, sulphates and potassium salts are used as fertilizers. They ensure a good yield of crops.

Petroleum

Petroleum is a valuable mineral oil found in rocks underground. Huge petroleum oils are found under the sea.

It is believed that petroleum was produced millions of years ago by the bacterial decomposition of animals and plants which were buried underground to great depths in the earth's crust.

From petroleum, we get petrol, kerosene oil, diesel oil, paraffin wax, vaseline and lubricating oils.

New Words

Basalt	:	Type of dark rock of volcanic origin.
Cathedral	:	Main church of a district
Chalk	:	Type of soft white rock used for burning to make lime.
Gemstone	:	Precious or semiprecious stone before cutting into shape.

Gneiss	:	Coarse grained rock of quartz, feldspar and mica.
Granite	:	Hard, usually grey, stone used for building.
Igneous rock	:	Rock formed when molten magma cools and solidifies.
Limestone	:	Type of rock, especially composed of the remains of prehistoric plants and animals.
Magma	:	Liquid molten rock in the earth's mantle and crust
Marble	:	Type of hard limestone used, when cut and polished for building and sculpture.
Metamorphic rock	:	Rock that has been changed by great heat and pressure underground.
Mineral	:	A naturally occurring substance formed of plant or animal material; for example, rock and metal.
Ore	:	Rock, earth, mineral, etc.,from which metal can be obtained easily and economically.
Pebbles	:	Small stones made smooth and round by the action of water.
Quartz	:	A hard mineral, especially crystallized silica.
Rock-salt	:	Common salt as mined in crystal form.
Sandstone	:	Rock formed of compressed sand.
Sediment	:	Matter that settles to the bottom of a liquid.
Sedimentary rock	:	Rock formed when fragments of material settle on the floor of a sea or lake in layers and are cemented together over time.
Shale	:	Type of soft rock that splits easily into thin flat pieces.
Slate	:	Type of blue grey rock that splits easily into thin flat layers.

RECAP

- A rock is a natural mass of mineral matter that makes up the earth's crust.
- Rocks are of three kinds: igneous, sedimentary and metamorphic.
- Igneous rocks are formed by the cooling of lava on the surface of the earth.
- Sedimentary rocks are formed by the deposition of sediments on the beds of seas and oceans.
- The intense heat and pressure inside the earth changes the igneous and sedimentary rocks into metamorphic rocks.
- All rocks contain many useful minerals.
- Many useful metals are found in rocks or mixed with loose rock materials. Such mixtures are called ores.
- Metals are extracted from ores.
- Coal is formed by the metamorphosis of remains of trees and plants under the earth.
- Petroleum is a valuable mineral found in the rocks underground.
- Diamond is the hardest known naturally occurring substance.

Think and Answer

I. Fill in the blanks. Choose the right word/words from the box:

Sandstones	shelly	sedimentary
petroleum	marble	magma

1. _____ Rocks contain skeletons of sea animals.
2. Vaseline is obtained from _____.
3. _____ is used in making statues.
4. The fiery hot substance inside the earth is called _____.
5. Many buildings in Jaipur are built of _____.
6. The _____ limestone is made up of broken sea shells.

II. Name the following

1. Two igneous rocks.
2. Two sedimentary rocks
3. Two metamorphic rocks
4. Three useful minerals contained in granite.
5. Useful substances obtained from petroleum.
6. Metamorphic rocks which are formed from shale and limestone.
7. The hot, liquid rock found under the earth.

III. Classify the following rocks into igneous, sedimentary and metamorphic rocks:

Slate	marble	shale	sandstone	limestone
Granite	Basalt	Gneiss	rocksalt	chalk

IV. Answer the following questions :

1. How are igneous rocks formed?
2. How are sedimentary rocks formed ?
3. How are metamorphic rocks formed ?
4. What is an ore ?
5. How is coal formed ?
6. How was petroleum formed ?
7. State one use each of :

   Quartz , granite and marble.

Do and Learn

Make a collection of different rocks.
Try to identify them.

CHAPTER - 9

UP YOU GO!

2nd February 1984

Mountaineering Camp

Nehru Institute of Mountaineering, Uttarkashi

We were at the mountaineering camp and were very excited. Twenty of us were teachers from Kendriya Vidyalayas. There were other women from banks and other institutions. Today was the second day of the camp. In the morning as I got out of bed and put my foot down, I screamed in pain. I remembered yesterday's 26 kilometre walk with the heavy rucksack on my back. I was afraid to go back to that steep climb and the rough narrow path.

With tears in my eyes I started walking slowly towards the room of Brigadier Gyan Singh, the Director of our adventure course. I was thinking of what I would say to excuse myself from that day's trek. Suddenly, I heard his deep voice from behind.

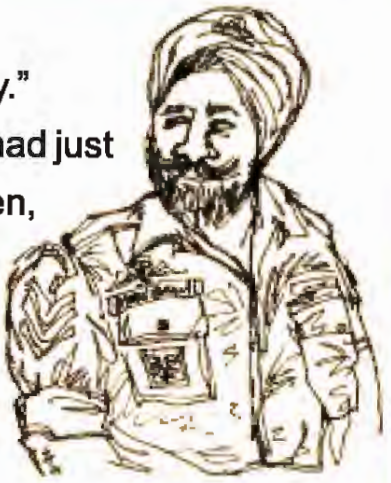
"Madam, what are you doing here at breakfast time? Hurry up! Otherwise you will have to trek on an empty stomach."

"Sir, Sir....," I could not say any more.

"You have come to tell me that you have blisters on your feet, that you cannot walk, isn't it?"

"Yes, sir."

"That is nothing new. Now get ready quickly."



I hung my head and rushed back to get ready. I had just turned when I heard his voice again, "Listen, madam. You will lead group number 7. You will have to help any member who has difficulty in climbing the mountain. You have already been told about the responsibilities of a group leader in the mountains."

Tell

- Have you ever seen the mountains? Have you also climbed a mountain? When and where?
- How far have you walked at one time? How far can you walk?

Imagine

- What do you think about the paths on the mountains? Draw a picture.

A big responsibility

I started thinking about what a leader must do:

– Help others in carrying their bags.
– Let the group go ahead and keep to the last.
– Help those who cannot climb properly.
– Find a good place to stop and rest.
– Look after those who are not well.
– Arrange for food for the group.

The most important thing is to be ready to be punished even when some one else may have made a mistake.

I realised that there was a special kind of discipline here. I wondered whether the camp will still be fun!

Group no. 7

Group No. 7 included girls from Assam, Manipur, Mizoram, Meghalaya and Nagaland. I was the only teacher from Kendriya Vidyalaya in this group. I was happy to meet my new group members. Most of them could not speak Hindi well. I still feel bad that after being together for 21 days, I could not talk even once with Khondonbi from Mizoram. She spoke only Mizo. But in our hearts we grew close to each other.

Tell

- What do you think about the responsibilities of a group leader?
- How would you feel if you were made a leader in such a camp?
- What does a monitor in your class have to do?
- Would you like to be the class monitor? Why?

Crossing the river...

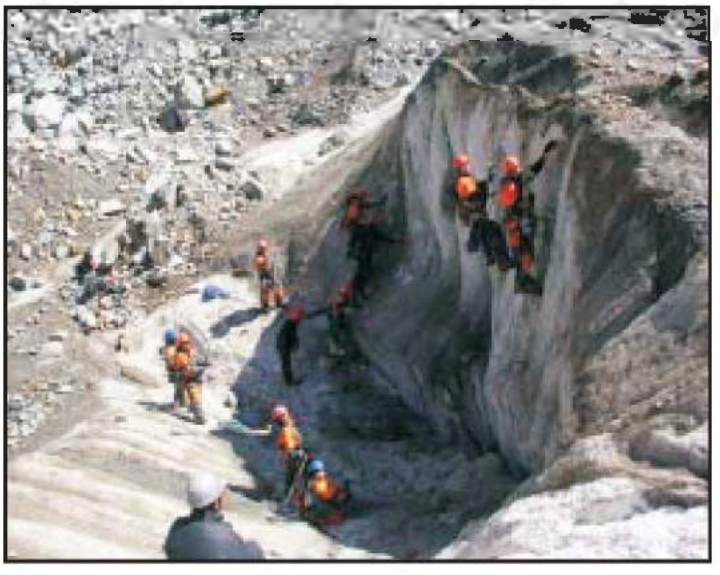
5 February 1984

We got vitamin C, iron tablets and hot chocolate milk with our breakfast. These were given for strength and to keep us warm in the cold. Every morning there would be a medical check up. We tied our bandages and counted the days left!

After an eight kilometre trek we reached a river. There was a thick rope tied across the river, from one bank to the other. The rope was tightly fixed to pegs or 'pitons' on both the sides. I was feeling nervous. I started thinking what would happen if the rope came out. I was trying to estimate how wide the river was.

Our instructor tied a rope around his waist and put a sling (type of hook) in it. He then put the sling on the thick rope tied across the river. Walking through the icy water, he went to the other side. No one was ready to step into the fast flowing river. Everyone was pushing each other to go first. I stood last in the line hoping that no one would see me. Just then our instructor came near me with the sling and rope in his hands. I knew there was no escape now. I was ready, but did not have the courage. Sir could guess my fears. He called out loudly, "Three cheers for Sangeeta madam!" And before I knew it, someone had gently pushed me into the water.

I felt as if my feet were frozen. I started shivering, my teeth were chattering. I caught hold of the rope and started putting my feet firmly on the river bed. As I walked further in, the river got deeper and slowly the water reached upto my neck. In the middle of the river I lost my balance and started slipping. I was so scared and felt so cold, that the rope slipped from my hands. I started shouting for help.



I was sure I would be carried away by the river. But no, I found that I was tied with the rope to the sling. "Hold the rope! Hold the rope", I could hear the shouts. I somehow managed to get hold of the rope and pull myself forward. Slowly, with some courage, I reached the river bank. I felt a special kind of happiness as I came out of the water. Happiness on finishing a challenging task. Now, standing on the bank, I was calling out to the others to hold the rope tightly. I knew that this confidence was a result of facing a challenge with courage.

Find out and write

- What kinds of tools are needed for climbing mountains?
- Have you ever seen a hook and rope being used for anything else? Where?
- What else can we use if we want to cross a river in the mountains?
- Why do we need extra energy on the mountains?
- Have you ever heard of anyone who has done something adventurous? What?
- Have you ever done anything adventurous? If yes, tell your class. Write about it in your own words.

Rock climbing

10 February 1984

We had to climb 15 km to reach Tekla village. It was at a height of 1600 metres. Our rucksacks had all that we may need – food packets, water bottle, rope, hook, plastic sheet, diary, torch, towel, soap, windcheater, whistle, glucose, jaggery, chana and some other snacks. We could see fruits and vegetables growing in the step fields. We saw Colonel Ram Singh standing on a 90 metres high flat rock with pegs and ropes.

We had been told to first observe the rock carefully and identify holds – places where we can put our hands and feet. Today I was not going to back out. I stood first in the line. Our instructor tied a rope around his waist. He put the sling, and held the thick rope which was hanging. He started climbing as if he was running up. I also put my

sling. But as I took my first step, I slipped. And there I was – swinging from the rope!

"Keep your body at an angle of 90° while climbing," I heard. "Keep your back straight. Do not bend."

Keeping this in mind, I imagined the rock as flat ground and started to climb up. Again while coming down we had to use the rope, in a special way called 'rapling.' I did this with the same fearlessness.

Tell

- Have you ever climbed a tree? How did you feel? Were you scared? Did you ever fall?
- Have you ever seen someone climb a small wall? What do you think is the difference between climbing a wall and climbing a high rock?

A funny incident

14 February 1984

It was evening. Khondonbi was feeling hungry. We did not have anything to eat. She jumped over the fence and got into a field. She quickly plucked two big cucumbers and came back. Just then a woman came from behind and caught hold of her bag. She started saying something to Khondonbi in her own language. We could not understand what she was saying. Khondonbi was trying to explain in her Mizo language which we could not understand. I tried to explain in Hindi but neither of them could understand it. Finally, I folded my hands to say that we were sorry.

By then our group had gone far ahead. It was already dark. I thought we had lost our way. Now we were really scared. We could not see anything even with our torches. I started sweating even though it

was cold. I tightly held Khondonbi's hand. I called out loudly, "Where are you all? Can you hear me?" My voice echoed in the mountains. We both started to whistle loudly and flashed our torches. Probably the group had noticed that we were missing. We heard some whistles at a distance. I understood the signal. We held each other's hand tightly and waited. Khondonbi felt that we should keep talking. She started singing a Mizo song loudly. After some time, we saw them coming towards us. At last! We were with the group again.

Tell

- Is there anyone in your class whose language you do not understand, or who does not understand yours?
  What do you do in such a case?
- Have you ever lost your way? What did you do then?
- Why do you think Khondonbi would have sung loudly?
- Have you ever seen someone doing something special to get over their fear? What and when?

Try

- Ask your friend for a book without speaking. Try to explain something to the class in the same way.

A special guest

15 February 1984

After dinner we met a special guest – Bachhendri Pal. She had just been selected as a part of the team to climb Mount Everest. She had come to seek the blessings of Brigadier Gyan Singh. It was a happy evening – we were all singing. Bachhendri also joined us in singing and dancing on the famous Pahadi song ' Bedu Pako, bara masa, kafal pako chaita, meri chhaila.' At that time we had no idea that Bachhendri would become the first Indian woman to reach Mount Everest and create history.

Camp in the snow

18 February 1984

We were standing at a height of 2134 meters. We were to spend the night there. Everyone was busy trying to put up the tent. We used double layered plastic sheets for the tent and for the ground. The air between the layers would help to keep us warm. We put in the pegs and began to put up the tent. As we tied it from one side, the wind flew the tent from the other side. After quite a lot of pulling and tugging, we managed to get the tent up. Then we dug a drain around the tent.

We were feeling very hungry. We collected some firewood and stones to make a chulha and cooked some food. After the meal, we collected all the waste in a bag to clean the camp site. Soon we got into our sleeping bags. I was not sure if I would be able to sleep in it. Would it be comfortable? Would I not feel cold? But the bags were filled with soft feathers, which help in keeping us warm. We were all very tired. So very soon we fell asleep.

The next morning we woke up and found that it was snowing. White soft fluffy snowflakes were gently falling. Wow! It was so beautiful ! The plants, the trees, the grass and the mountains – everything looked white. Today we were to climb higher, to 2700 metres. We walked carefully on the snow with the help of sticks. It was difficult because we kept slipping. By afternoon we had reached

snow covered mountains. We enjoyed throwing snowballs at each other and making a big snowman.

Last day at camp

21 February 1984

We were getting ready for the camp fire. Each group presented a programme. We were enjoying – telling jokes and laughing, singing and dancing around the camp fire. Soon it was midnight. Brigadier Gyan Singh got up and called me. I thought, "Oh, no! what have I done this time?" But when Sir announced my name for the 'Best Performance Award' I stood still. He blessed me and tears of joy rolled down my face.

Discuss

- Why do you think a drain was dug around the tent?
- Besides mountaineering,what are other activities that can be called adventurous? Why?

Imagine and Write

- You are on a mountain. How do you feel there? What can you see? What do you feel like doing there?

Alone on the mountain top

A twelve-year old girl living in the mountains was out on a school picnic. She climbed a mountain peak of 4000 metres with her friends. The girls had done this for fun and adventure. Soon it was dark and they could not come down. It was also cold and scary. They were alone without any food and it was a long night. This happened to Bachhendri Pal, when she was a young girl.

Bachhendri grew up in Nakuri village in the Garhwal area of Uttarakhand. When she grew older, she joined Nehru Institute of Mountaineering, Uttarkashi. Her guide was Brigadier Gyan Singh. Bachhendri did very well in her training. She started to train women in mountaineering courses. In 1984, Bachhendri was selected as a team member to climb the Mount Everest.

Snow storm

There were seven women in that 18 member team. On the night of 15th May the team was very tired after having reached a height of 7300 metres. The team put up their tents and went to sleep. Around midnight they heard a loud sound and then a bang. Before they were fully awake, the tent flew off and something very heavy hit them. There was a terrible snow storm. Bachhendri was almost buried under the snow and was hurt on the head. Many of the team members were also injured. The others used snow-picks and axes to dig out those who had been buried under the snow.

The rest of the team members returned to base camp but Bachhendri went ahead, climbing slowly but steadily towards the peak. It was seven minutes past one o'clock in the afternoon of 23th May when Bachhendri Pal stepped onto the peak of 8900 metre high Mount Everest also called Sagarmatha in Nepal. There was another team member with her. There was no space for two people to stand on the top at the same time. One slip and they would fall straight down-thousands of feet below! Bachhendri and her team-mate dug into the snow and pitched their axe firmly in the ice. Using this as a hook, they tied themselves to it with a rope. Only then two of them could stand there. She was shivering with cold but filled with the warmth of achievement. She bowed her head, pitched the national flag and took photographs. She spent 43 minutes on the highest peak in the world.

Bachhendri Pal became the first Indian woman and the fifth woman in the world to reach the peak of Mount Everest.

Think

- Why did Bachhendri put up the Indian flag on the peak?
- When have you seen our national flag being hoisted?
- Have you seen the flag of any other country? Where?
- Make groups of 6-8 children. Design a flag for your group. Explain why you chose that design.

What we have learnt

- Explain why it can be adventurous and challenging to climb a mountain. How would you prepare if you were to climb a mountain? What would you take with you? Write in your own words.

CHAPTER - 10

A SHELTER SO HIGH!

A traveller's tale

I am Gaurav Jani and this is 'Loner ' – my partner – my motorcycle. But, Loner is never lonely. We are together all the time.

I and my motorcycle wait for a chance to get away from the busy, crowded and noisy city of Mumbai. We like to travel to different parts of this wonderful country. Let me tell you about our amazing journey on the highest roads in India.

Getting ready

This journey took about two months. I had to carry everything on my motorcycle. I had to plan and collect all the things I needed. I packed a small tent, sleeping bag, plastic sheet, warm clothes and food that would remain fresh for some days. I also took my camera and extra cans for petrol. Loner and I left Mumbai, passing through small villages and towns of Maharashtra, Gujarat and Rajasthan to reach Delhi.

It took me three days to cover 1400 kilometers from Mumbai to Delhi. I was hoping to see something new and different in Delhi. But Delhi looked just like Mumbai! I was tired of looking at the same kinds of houses, made of cement, bricks, glass and steel. I was looking forward to my journey ahead. I was excited that I would be able to see wooden houses, houses

with sloping roofs and those covered in snow. I had seen pictures of such houses in many books.

I packed more things in Delhi and continued. In two days we were in Manali. It was so refreshing to be in the mountains and breathe the clean air! Now the real journey was to begin. We had to travel through difficult roads of the state of Jammu and Kashmir to reach Leh in Ladakh.

Find out

- Check in your map, which states would one pass through while travelling from Mumbai to Kashmir?
- Gaurav Jani passed through several states while going from Mumbai to Delhi. Find the capital cities of these states. Was there any other big town on his way?
- Is Manali a plain or a hilly area? In which state is it?

New home

Loner and I were covering long distances each day. All I needed was food and a tent to protect myself from the cold night air. My nylon tent was so small that I could just about fit in it to sleep.

Loner stood guard outside the tent. The breeze and the sound of the birds woke me up to see the sunrise.

Tell

- Have you ever stayed in a tent? Where? What was it like?
- Imagine that you were to stay alone in a small tent for two days and could take with you only ten things. Make a list of those ten things.

- What are the different types of houses that you have seen? Tell your friends about it. Make drawings too.

Cold desert

At last Loner and I reached Leh. For the first time I saw such an area – high, dry and flat called a cold desert. Ladakh gets very little rainfall. Here there are high snowcapped mountains and a cold, flat ground.

In Leh, I found myself in a quiet street with beautiful white houses. As I rode slowly, I found that I was being followed by a group of children. They called out 'jule, jule', meaning 'welcome, welcome'.

They were all amazed to see my 'Loner'. Everyone wanted me to come to their home.

At home with Tashi

Tashi dragged me to his home. It was a building with two floors. The house was made of stones which were kept one over the other. The walls were coated with a thick layer of mud and lime. The house looked like a shed from inside with a lot of hay stored there. We took the wooden steps and reached the first floor. "This is where we stay," explained Tashi. "The ground floor is for our animals and for storing necessary things. Sometimes when it gets too cold, we also move downstairs." I noticed that the ground floor had no windows. Thick treetrunks were used to make the roof strong.

Tashi then took me to the roof of his house. What a view! I could see the same flat roofs all around. On some red chillies were, laid out to dry and on some there were orange pumpkins and golden yellow corn. Some had stacks of paddy and on some cow dung cakes were laid out to dry.

"This is the most important part of our house," said Tashi. "During summer season we dry many fruits and vegetables. We store them for winters when we do not get fresh fruits and vegetables."

As I stood there with Tashi I could see how every part of the house was built specially to suit the needs of his people. I could understand how the thick walls, a wooden floor and a wooden ceiling protected them from the cold.

Write

- During winters, Tashi and his family live on the ground floor. Why would they be doing so?
- What is the roof of your house like? What all is the roof used for?

People living on top of the world

Now was the time to climb higher. Loner had a tough time zigzagging along narrow, rocky mountain roads. At many places there were no roads at all.

I was moving towards the rocky plains of 'Changthang'. This place is at a height of almost 5000 metres. It is so high that it is difficult to breathe normally. I had a headache and felt weak. Then I slowly got used to breathing in such air. For many days we kept wandering in this area with not a single human being in sight. No petrol pumps, no mechanics! Only clear blue sky and many beautiful lakes around.

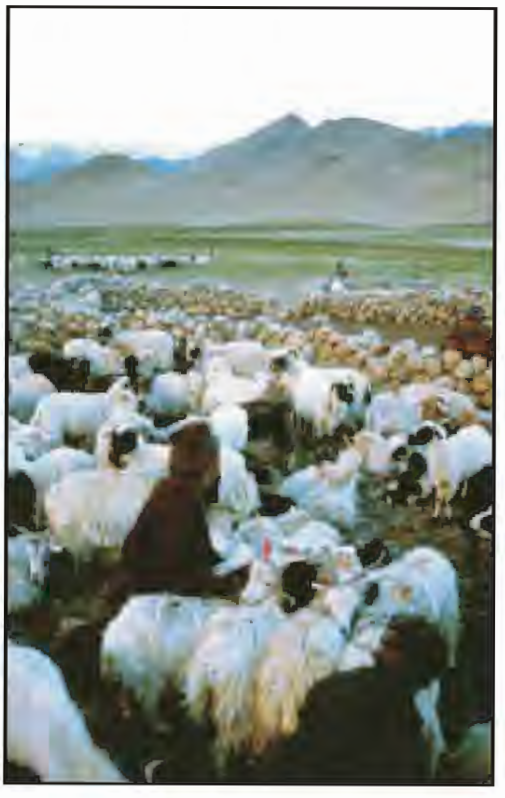
Many days and nights passed. Loner and I kept moving ahead. Suddenly one morning I saw before me flat grassy land. Many sheep and goats were grazing there. Far in the distance I saw some tents. I wondered who lived there and what they were doing in this far out place.

Find out

- At what height is the place where you live?
- Why did Gaurav Jani say - "This place is so high that it is difficult to breathe normally?"
- Have you ever been to a hilly place? Where?
  At what height was it? Did you have any difficulty in breathing there?
- Which is the highest place you have been to?

The Changpa

There I met Namgyal and came to know about the Changpa – a tribe living on the mountains. The Changpa tribe has only about 5000 people. The Changpas are always on the move with their goats and sheep. It is from these that they get all that they need – milk, meat, skin for tents and wool for coats and sweaters. Their goats are their only treasure. If a family has more animals it is considered more rich and important. From these special goats they get wool for making the world famous pashmina wool. The Changpa graze their goats at higher and colder places so that the goats have more and softer hair (fur). They stay high up on these mountains in very difficult conditions because that is where these goats can live. This is their life and their livelihood.



I was carrying very little of my belongings on my motorcycle. But the Changpas carry everything that they own on their horses and yaks. It takes them only two and a half hours to pack everything and move ahead. Within no time they put up their tents at the chosen place, the luggage is unpacked and their homes are ready.

"You are most welcome into our home," said Namgyal as he led me to the big cone-shaped tent. They call their tent Rebo. Yak hair is woven to make strips which are stitched together. These are strong and warm and protect them from the icy strong winds. I saw that the strips were tightly tied with nine sticks. The ground is dug about 2 feet deep. The tent is then put up Around this on the higher part of the ground.

The world famous pashmina

It is believed that a pashmina shawl is as warm as six sweaters! It is very thin yet very warm. The goats from which the soft pashmina wool is collected, are found on very high altitudes of 5000 metres. In winter, the temperature heredrops below 0°C (–40°C). A coat of warm hair grows on the goat's body which protects it from extreme cold. The goats shed some of their hair (fur) in summer. This hair is so fine that six of these would be as thick as one hair of yours!

The fine hair cannot be woven on machines and so weavers of Kashmir make these shawls by hand. This is a long and difficult process. After almost 250 hours of weaving, one plain pashmina shawl is made. Imagine how long it would take to make a shawl with embroidery.

As we stepped into the tent I realised that I could stand up straight. It was not like my tent. I also saw that the Rebo was as big as a room of my flat in Mumbai! It was held up by two wooden poles in the middle. There was an opening to let out the smoke from the chullah. Namgyal told that, the design of this tent is more than a thousand years old.

Rebo

The tent protected the Changpas from extreme cold.

How cold must it be? In winters the temperature drops many degrees below zero! The wind blows at 70

kilometres per hour. Imagine–if you were on a bus which was going at this speed, how far from your house would you reach in one hour?Near the Rebo there was a place to keep sheep and goats. Changpas call this lekha. The walls of a lekha are made with stones. Each family puts a special mark on their own animals. The women and young girls count and take the animals out of the lekha. They count them again everyday when they bring them back in the evening.

– For the Changpas their animals are a very important part of their life. Is any animal part of your life? For example, as a pet, or as helpers in farming. List five ways in which different animals are a part of your life.

Find out

- You read that in Changthang the temperature drops below 0°C. Look at newspapers on the TV to find cities in India or abroad where the temperature drops below 0°C. In which months do you expect to see this?

Towards Srinagar

I spent a few days with the Changpas but, sadly, it was time to move on. My return journey would take me away from this special part of the world, towards towns which looked like a totally different world. This time I took a different route from Leh. I was going towards Srinagar via Kargil. I saw many more amazing buildings and different houses.

I stayed in Srinagar for a few days. I was amazed by the houses there. They took my heart away! Some houses are on the mountains, while some are on water. I took many pictures of these. See my photo album.

Houses of Srinagar – My photo album

Tourists who come to Srinagar love to stay in houseboats. Houseboats can be as long as 80 feet and around 8 to 9 feet wide.

Many families in Srinagar live in a 'donga'. These boats can be seen in Dal Lake and Jhelum river. From inside the 'donga' is just like a house with different rooms.

Beautiful carving on wood can be seen on the ceiling of houseboats and some big houses. This design is called 'khatamband', which has a pattern that look like a jigsaw puzzle.

In villages of Kashmir, houses are made from stones cut and kept one on top of the other and coated with mud. Wood is also used. The houses have sloping roofs.

Some old houses have a special type of window which comes out of the wall. This is called 'dab'. It has beautiful wood pattern. It is wonderful to sit here and enjoy the view!

The old houses here are made of stone, bricks and wood. The doors and windows have beautiful arches (mehraab).

When I started my journey, I had not imagined that in one state I would see so many different kinds of houses and lifestyles. I had a wonderful experience of living on the mountains in Leh and another of living on water in Srinagar. I saw how both the houses in these areas were made to suit the climate.

Tourists enjoy the Shikara ride on the dal lake.

Return journey

Again it was time to move on. In Jammu I saw houses like I have been seeing in Mumbai. The same– cement, brick, steel and glass. These houses are very strong. But they are not as special as the houses I was lucky to see in Leh and Srinagar. After a long journey Loner and I were about to reach Mumbai. Myheart felt heavy. I also felt that my motorcycle did not want to come back. I was happy that I had learnt and experienced so many new things. I had also brought back some memories in my camera. And of course, this was not the end! Next time when Loner and I get bored of the city, we will again set out for a new journey!

Can you tell what is shown in this picture? Every lane in Kashmir has a bakery. Kashmiri people don't cook roties in their homes, they buy it from such bakeries.

Tell

The houses in different parts of Jammu and Kashmir are made to suit the climate and the needs of the people there.

- Are there different types of houses in the place where you live? If yes, think about the reasons.

- Think of your own house. Is there something special in it – like a sloping roof as it rains a lot, or a courtyard where you can sleep when it is hot or where things are kept in the sun (for drying, etc.)? Make a drawing.
- What are the materials used for making your house? Is it mud, brick, stone, wood or cement?

Discuss and write

- Look at this picture. Can you see any houses in the picture? These houses are made of stone and mud. Nobody lives here in winter. In summer, the Bakarwal people live here when they bring their goats to higher lands for grazing.
- Can you guess the similarities and differences in the life of Bakarwal people and the life of the Changpas.

What we have learnt

You read about different kinds of shelters in Jammu and Kashmir – some on high mountains, some on water, some with beautiful designs in wood and stone, and some mobile shelters that can even be packed and carried to another place.

- Describe how these shelters suit the needs of the people who live there.
- How are these different from the house you live in?

CHAPTER - 11

THE EARTH

Of all the planets that have been discovered so far, the earth is the only planet that contains life. Seen from the space, the earth looks like a mass of land, sea and air.

What make our earth unique are its atmosphere and its water. Together, these make possible a rich variety of animal and plant life.

Although the earth is almost 4 to 5 billions years old, no rocks as old as this have ever been found.

The study of the earth is going on. The study of the earth is called **Geology.** All the sciences that deal with the earth are known as Earth Sciences.

Formation of the Earth

Once it was thought that the earth developed from a rotating body of hot gases in space. These gases cooled and the other bodies were formed.

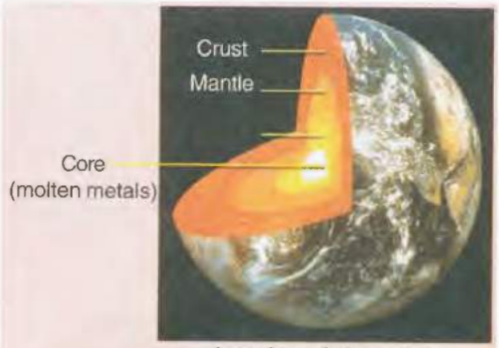
Later, in about 1900, it was suggested that the earth developed out of material from the sun.

Some scientists believe that the earth may have been very hot during the early part of its formation. At first, it was a fiery mixture of boiling rock and poisonous gases. As millions of years went by, the earth grew cooler and a thin crust formed on its surface which sealed in the heat.

Inside The Earth

The earth is organised into three main layers:

1. Crust, 2. Mantle and 3. Core.



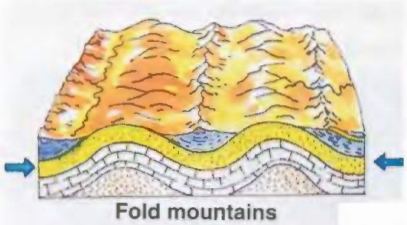
Interior of the earth

1. Crust : The outermost layer of the earth is called the crust. The thickness of the earth varies from place to place, Under continents, its thickness ranges from 35 to 60 kilometres. Under oceans, it is thinner and is only 6 kilometres.

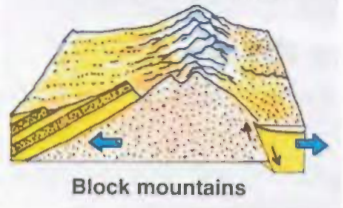
2. Mantle : The region between the crust and core of the earth is called mantle. Nearly 2,900 km thick, the mantle is made up of hot rocks. Temperature and pressure here are lower than in the core. Even so, much of the mantle rock is semi-molten.

3. Core : The innermost part of the earth is called its core. The core is made up of iron and nickel. In the outer region of the core, the metals are present in the molten state. The inner region of the core is a solid ball.

How Mountains are Formed ?

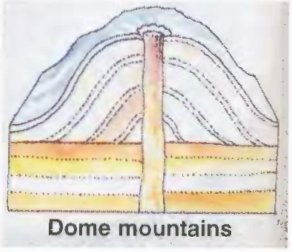

Fold mountains

Mountains are formed by the movement in the earth's curst and it takes millions of years to form. Sometimes, the earth's crust got squeezed and formed fold mountains.


Block mountains

Block mountains are formed when the earth's crust splits and one side is pushed up.

Dome mountains are formed when melted rock below the earth's crust slowly forces the land upwards.


Dome mountains

Volcano


A volcano

Volcanic action is one of the ways through which mountains are formed.

Hot, liquid rock often has been forced through cracks in rocks. If it comes to the surface, it may flow out, or be blown out. The melted rock, steam and ashes that are forced through a hole in the surface, may form a mountain called a volcano.

From time to time, some volcanoes pour out hot liquid rock called lava. Usually, the flow of lava from a volcano causes a little harm.

However, there have been times when whole cities near active volcanoes have been damaged, or destroyed. Some cities have been completely covered by lava.

Earthquake


An earthquake can damage buildings

Earthquakes occur when large masses of rock slip past each other suddenly. Great trembling and vibrations are often felt. These shocks can be so strong that they destroy buildings and do great damage. However, some earthquakes are so mild that they are not noticed.

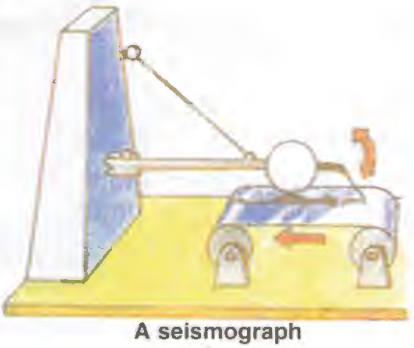
In 1923, Japan suffered an earthquake in which 1,50,000 lives were lost and some 5,70,000 buildings collapsed.

In 1988, Armenia, suffered an earthquake in which 25,000 people died and several towns and villages were buried.

In 2001, India suffered an earthquake

in which over 90 percent of the buildings of Bhuj city of Gujarat state were damaged. In 2005, our state J&K suffered mild earthquake and not much damage was done.

The shocks of earthquakes may be recorded on an instrument called a ***Seismograph.*** The instrument is so sensitive that it can detect vibrations too mild to be felt by man. By studying the strength of vibrations, scientists are able to locate the areas in which earthquakes occur.



A seismograph

The Movements of the Earth

Day and Night

The spinning of the earth on its axis is called rotation and it takes 24 hours to complete one rotation. The earth spins very fast on its axis. Different parts of the earth spin at different speeds. At the poles, the earth spins at 480 kilometres per hour but at the equator, it spins at 1,600 kilometres per hour. This happens because the parts near the equator make a bigger round.

Formation of days and nights

The rotation of earth on its axis causes day and night.

At any time of the day, half of the earth will receive light from the sun and will have day. The other half will be in darkness and will have night (The half that faces the sun has day, the half that is away from the sun has night).

However, as the earth spins on its axis, the side which was in darkness and had night will move into sunlight and will have day and the other side which had light will move into darkness and will have night.

The sun seems to rise in the east and set in the west. This is because the earth rotates from west to east.

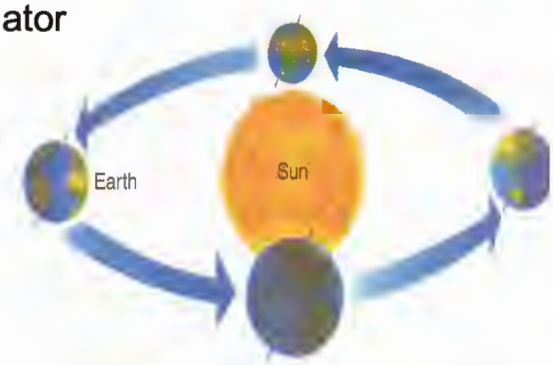
Seasons

While the earth spins on its axis, it also moves round the sun. The part in which the earth travels around the sun, is oval in shape.

The movement of the earth around the sun is called ***revolution***. The earth takes 365¼ days to complete one revolution. This is called the solar year.

Seasons are caused by te tilt of earth's axis and revolution of earth around the sun.

The sunrays fall directly on the Equator throughout the year and, therefore, the days and nights are equal at the Equator. This part receives the same amount of sunlight all the year round. It has summer throughout. Days and nights are of about 12 hours each.



Regions near the Equator have same seasons

As the earth revolves round the sun, the seasons go on changing and we get the four seasons of summer, winter, spring and autumn.

The two factors which cause seasons are: 1. The tilted axis of the earth and 2. The revolution of the earth.

Effects of Seasons on Life

In Summer, when it is very hot outside, we do not like to go out during the daytime. The sun is very hot in summer. We like to spend our time indoors. We like to wear thin cotton clothes with light colour because they help to keep the heat outside, away from our bodies. We use electric fans, desert coolers and air-conditioners to make our homes cool. We also like to drink plenty of water, sherbets and other cold drinks.

In winter, we feel more energetic and like to spend our time outdoors sitting and playing in the sun. We use dark-coloured clothes, blankets and quilts to protect ourselves from severe cold. These clothes prevent the body heat from escaping. We keep our houses warm with the help of fires, or electric heaters. We drink hot milk, tea or coffee and eat plenty of nuts to keep ourselves warm.

Like human beings, animals are also affected by seasons. Animals which have thick hair, or fur, can withstand the cold but others, like frogs and snakes, burrow themselves underground so as to keep themselves warm. They undertake 'winter sleep'. Some birds migrate from colder to warmer regions in order to avoid the extreme cold. When it becomes very hot, then also animals have to change their way of life.

Plant life also respond to the changes in seasons. Many small plants bloom and dry up before summer.

The autumn season comes just before winter. Some trees shed their leaves during autumn to protect themselves from approaching winter. Some other plants shed their leaves just before summer. Some plants (mostly herbs) flower during winter, others (mostly shrubs and trees) flower only during summer. You should carefully observe the changes in the plants and animals around your according to the change in seasons.

Thus, people, animals and plants are affected by the seasons. They adapt themselves to the surrounding climate.

Eclipses

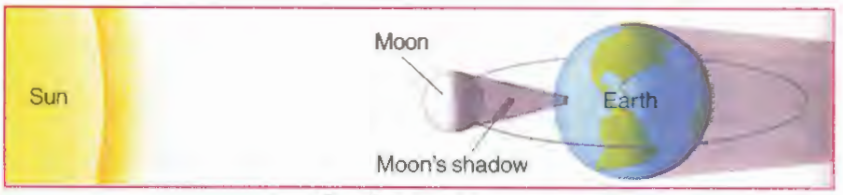
You know that earth moves around the sun, and moon revolves round the earth. So, due to this revolving their positions keep on changing. This leads to the formation of eclipses.

An eclipse is nothing but it is the partial or complete hiding of one heavenly body by another by its shadow.

There are two types of eclipses : solar eclipse and lunar eclipse.

Solar Eclipse

The moon usually does not come between the earth and the sun. When it does, the moon blocks some sunlight from the earth, and a solar eclipse takes place. The moon makes a small shadow on the earth. From this shadow, the sun appears to get covered slowly.



A solar eclipse

Lunar Eclipse

As the moon revolves around the earth, the earth usually does not come between the sun and the moon. Notice in the picture what happens when the earth does come between the sun and the moon. The moon passes through the earth's shadow, which causes a lunar eclipse.

A lunar eclipse

What do you think the moon looks like from earth during a lunar eclipse ?

New Words

Atmosphere	:	The layer of gases that surrounds a planet.
Axis	:	Imaginary line through the centre of a rotating object.
Billion	:	One million million.
Core	:	The innermost part of the earth.
Crust	:	The outermost layer of the earth.
Earthquake	:	Sudden violent movement of the earth's surface.
Equator	:	Imaginary line around the earth at an equal distance from the North and the South Pole.
Fiery	:	Like or consisting of fire.

Flod	:	A band of rock layers
Geology	:	Scientific study of the earth's crust.
Lava	:	Hot liquid rock that comes out of a volcano.
Mantle	:	The region between the crust and the core of the earth.
Orbit	:	Path followed by a planet, star, moon, etc., round another body.
Revolution	:	Movement of the earth around the sun.
Rotation	:	Spinning of the earth on its axis.
Seismograph	:	Instrument for detecting earthquakes and recording how strong they are and how long they last.
Space	:	Universe beyond the earth's atmosphere in which all other planets and stars exists.
Volcano	:	Mountain or hill with an opening or openings through which lava, etc., come up from below the earth's surface.

RECAP

- Seen from the space, the earth looks like a mass of land, sea and air.
- The study of the earth is called Geology.
- The earth is organised into three main layers - crust, mantle and core.
- Mountains are formed by the movements in the earth's crust.
- One of the way in which mountains are formed is through a process of volcanic action.
- Earthquakes occur when large masses of rock slip past each other suddenly.
- Seismograph is an instrument for detecting earthquakes.
- The axis of the earth is tilted.
- The rotation of the earth on its axis causes day and night.
- Seasons are caused by tilt of the earth's axis and the revolution of the earth round the sun.

- The days and nights are equal at the Equator.
- Seasons affect the lives of plants, animals and mankind.
- Eclipses of the moon and the sun occur due to the shadows cast by the earth and the moon respectively.

Think and Answer

I. Fill in the blanks. Choose the right word/words from the box :

Core geology	volcano	mantle	crust mountains
Rotation	equal summer	earthquake	tilted equator

1. The study of the earth is called _____.
2. The earth is organised into three main layers :_____, _____ and _____.
3. _____ are formed by the movement in the earth's crust.
4. The spinning of the earth on the axis is called _____.
5. A mountain with an opening through which lava comes up from below the earth's surface is called a _____.
6. Sudden violent movement of the earth's surfaces is called an _____.
7. The axis of the earth is _____.
8. Days and night are _____ at the Equator.
9. Days are longer in _____.
10. The imaginary line that divides the earth into two equal halves, is called the _____.

II. State whether True or False for each statement:

1. The study of the earth is called Geology.
2. The outermost layer of the earth is called Mantle.

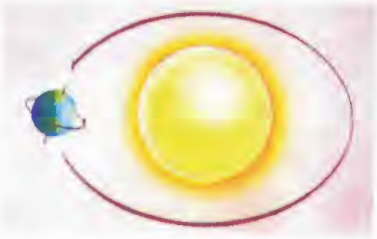
3. Block mountains form when the earth's crust slowly forces land upwards.
4. From time to time, some volcanoes pour out hot liquid rock called Lava.
5. The shocks of earthquakes may be recorded on an instrument called a Seismograph.
6. When moon comes in between the sun and the earth, lunar eclipse occurs.

III. Answer the following questions:

1. How did the earth form ?
2. What are the three main layers of the earth ?
3. How mountains are formed ?
4. Write short notes on :

(i) Volcano (ii) Earthquake (iii) Solar eclipse (iv) Lunar eclipse.

5. What is meant by the 'rotation' of the earth ?
6. What do you understand by the 'revolution' of the earth ?
7. Name the four imaginary lines on a globe.
8. What is the Equator ? Why is it hot near the Equator ?
9. What causes day and night ?
10. What causes change in the seasons ?
11. What is an eclipse ?



Do and Learn

Draw the figures of the earth and the sun showing the formation of day and night.

CHAPTER - 12

WHEN THE EARTH SHOOK!

A bad dream

Help! Help! Save me! Aaahhh! Oooooww... There was screaming and shouting everywhere. The ground was shaking and people were running all around.

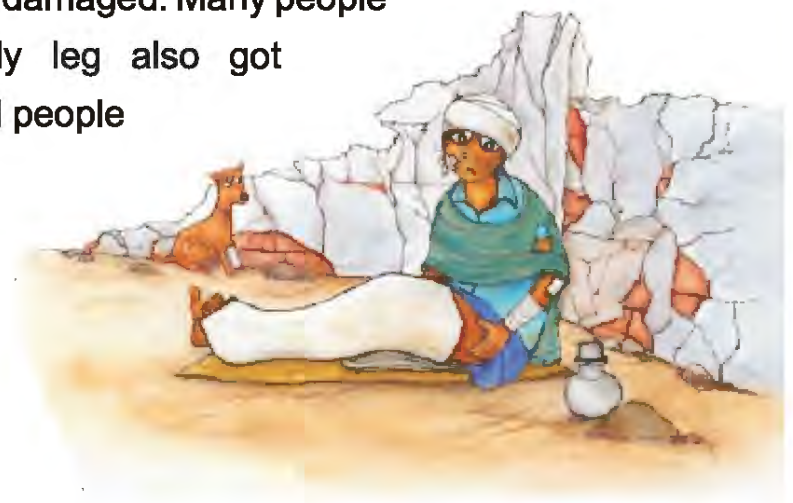
Screaming loudly I got up. On hearing me my mother also woke up. She came running and held me tight. It was the same bad dream! It has been more than six years now since the earthquake. But in my sleep I still feel the earth shaking and trembling.

I am Jasma. I live in the Kutch area of Gujarat. I was eleven years old when there was an earthquake.

It was 26 January, 2001. Everyone from the village – children and old people – had gathered in the ground of the school to watch the parade on TV. Suddenly the ground was shaking. People were scared and started running here and there. No one knew what was happening and what to do. There was total panic!

In a few minutes, our village was flat on the ground. All our things – clothes, pots, grains and food – were trapped under the stones, mud and wood from the fallen houses. At that time everyone thought of two things – to save the people who were trapped and to treat the injured.

The village hospital was also damaged. Many people were seriously injured. My leg also got fractured. The doctor treated people with the help of the villagers.



Six people of our village died. My grandfather (Nana) was also buried under the houses. My mother wept all the time. Seeing my mother, I also cried. The entire village was sad and disturbed.

House of Motabapu who is the sarpanch of our village was not much damaged. He gave rice and wheat to everyone from his godown. For many days, the village women cooked food together at Motabapu's house and fed everyone.

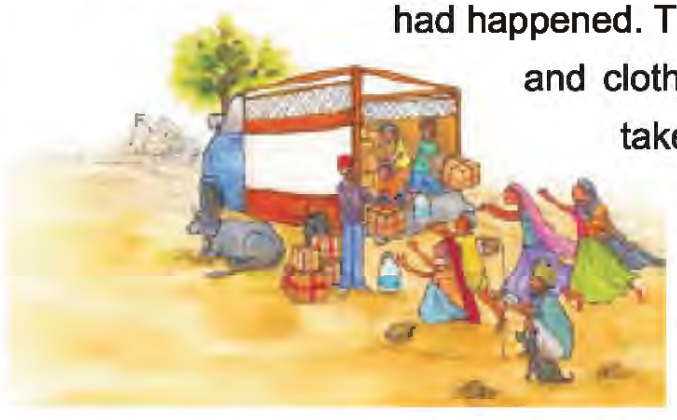
Imagine, being without a house in the cold winter! Fear and the cold kept us awake in the nights. All the time we were worried that there may be another earthquake.

Discuss and write

- Have you or anyone that you know ever faced such difficulty?
- Who all helped at such a time? Make a list.

Help arrives

For some days after that, people from the cities kept coming to see what had happened. They came with food, medicines and clothes. Everyone used to rush to take these things. The clothes that we got were very different. We had never worn such clothes before.



People from different

groups from the city, helped us to put up the tents. Staying in these plastic tents in the cold winter months was very difficult.

Some of these people were scientists. They tried to find out which areas have more chances of having an earthquake. People from our village talked to them many times. They had suggestions about building our houses again. Engineers and architects showed us some special designs for houses. They said that with this design, houses would not get damaged much in an earthquake. But our people were a little afraid. They thought if these people build our houses, our village will not look like our old village. So, the villagers thought they would build their own houses with their help. The groups would build the village school.

We all worked together to rebuild our village. Some people dug and brought the clay from the pond. We mixed the clay with cow dung and made large cakes. We put these on one another to make the walls. We whitewashed the walls and decorated them with beautiful designs and small pieces of mirrors. We put up the thatched roof. Now our house shines like a diamond in the dark night!

Discuss

- A lot of people from other places came to Jasma's village. Who were these people? In what ways would they have helped the villagers?

- People in Jasma's village rebuilt their houses with suggestions from the engineers. Will these houses be safer than before in case there is an earthquake again? Why?
- Think, if there were an earthquake where you live, would your house be in danger? What kind of damage could take place?

Write

- Compare your house with that of Jasma. List in your notebook what materials were used in making both the houses.

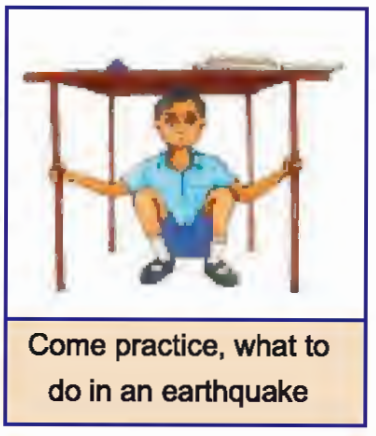
Jasma's House	Your House
_____	_____

What will you do?

People from the groups also made children in Jasma's school practice what they should do in case there is an earthquake.

This is what they said:

- If possible leave the house and go to an open ground.
- If you cannot go out of the house, lie down under a strong thing like a table and hold on tightly, so that it does not slip away. Wait until the shaking stops.



Come practice, what to do in an earthquake

- Have you been told in your school or anywhere else about what to do in case of an earthquake?
- Why do you think one should go under a table during an earthquake?

Who helped?

Read this TV report on the Bhuj earthquake.

Ahmedabad, January 26, 2001

At least a thousand people are feared dead in the earthquake that struck Gujarat this morning. Many thousands have been injured. Army jawans have been called in to help.

At least a hundred and fifty buildings have fallen in the city of Ahmedabad. In these, there are a dozen multi-storeyed buildings. By this evening, around 250 bodies have been removed from these buildings. It is feared that several thousand people may still be trapped. Rescue efforts are on. There is perhaps no building in the city which has not developed cracks.

The situation in Bhuj is even worse. People are running around in shock and panic. Within an hour of the earthquake the fire engines had reached and started work along with the local people. Offers to help are coming from all corners of the country and abroad.

Write

- According to the TV report, thousands of people were injured and some died in Gujarat. If the buildings had been made in a way that they would not fall in the earthquake, would the damage have been different? How?
- At times like this, when people have lost their homes and all their belongings, what kind of help would they need?
- In such situations whose help would be needed and for what? Write in your notebook as shown here.

Whose help will be needed	How will they help
1. Dog	To smell out where people are lying trapped
2. _____	_____

Discuss

- Have you ever seen people in your area helping each other? When?
- Why do people live together in a neighbourhood?
- Imagine living in a place where there were no other houses or people around. How would it be? For example, whom would you play with? With whom would you celebrate festivals and special days? Would you be scared?
- People face a lot of difficulties when they lose people from their family, or their houses and belongings. In newspapers of the last one month, look for news related to such disasters – earthquakes, floods, fire, cyclones, etc., in different parts of the world. Collect these news reports and paste them in your notebook.

Your news report

- Make your own report which mentions the following:
  - Cause of the disaster, date and time
  - What kind of damage did it cause – to lives, belongings, livelihoods?
  - Which people came forward to help? Which government offices or other groups?
- If there is no rain, crops can fail and there can be a **drought**. But food for people can be brought from other places so that there is no **famine**, which means people don't have to stay hungry, and they don't die of hunger.
- Have people in your area ever got affected by famine or drought? Find such reports of different countries from newspapers. Make your own report.
- You may need some help from these in case of an accident or emergency. Find out and write their addresses and phone numbers. Add more names to this list.

	Address	Phone Number
Fire Station	_____	_____
Nearby Hospital	_____	_____
Ambulance	_____	_____
Police Station	_____	_____

Difficult times

Write a report with the help of the following words:

floods, river water, injured people, food packets, rescue work, camps, dead bodies, dead animals floating in water, houses under water, aerial survey (to see the scene of disaster from a plane), sad people, diseases spread by dirty water, homeless people, trapped people.

What we have learnt

What type of difficulties are faced by people during floods? Look at the picture, what kind of a school have the children come to after the flood? Write down what people had to do to make their life normal again after the flood.

CHAPTER - 13

ACROSS THE WALL

Stars in her eyes (Indian Express, 2007)

Just 13 years old, Afsana Mansuri has already jumped over the wall. The wall between her jhuggi and the local basketball court. The wall made by society, for a girl who washes utensils for a living. The gender wall her mother had put up for her. Today, Afsana herself has become a strong wall of NBA, the Nagpada Basketball Association of Mumbai.

Today, she is the source of strength for five other girls who have come to the basketball court, leaving behind the problems of their everyday lives. Today, she is the star of a young team. This team has managed to surprise some of Mumbai's club teams. With a lot of guts and courage, the team has reached the semi-finals of a district-level tournament.

Meeting the team

We read in the newspaper about Afsana and the Nagpada basketball team. We thought of meeting these girls and introducing them to you.

We took the train and got off at Mumbai's Victoria Terminus Station (railway station). From there we walked towards Nagpada. It took us just twenty minutes to reach there.

There we met Afsana and the other girls of the Nagpada Basketball Association. Read the interview with the team members.

Meet this special team!

Meet Afsana, Zarin, Khushnoor and Afreen. At first the girls were quiet, but once they started, they just did not stop!

Zarin began, "My house is just in front of this ground. My brother used to play here. I would stand in my balcony and watch the boys play. I was in Class VII at that time. Whenever the boys played a match, many people came to watch. The winning team got a lot of praise. Everyone cheered the players. On seeing all this, I wished I could also play. Would I too get a chance to show my talent? I asked the coach, but was afraid. He is a good friend of my father. The coach said, "Why not? If you bring some more girls, you can make a team. Then I will teach you."

Find out

- Is there any place to play near your house?
- What do people play there? Who plays there?
- Do the children of your age also get a chance to play there?
- What other things happen at this place?

We asked – Was is it easy to make a beginning?

Khushnoor: At first my parents refused. But when I insisted they agreed.

Afsana: My mother works in the flats and sends us to school. I also help her. When I told her about my plans to play basketball, Ammi got angry. She said, "Girls do not play basketball. Do your work, go to school and study hard. No need to go to the ground to play." But when my friends and Coach Sir talked to her, Ammi agreed.

Afreen : We were not allowed, because we are girls. My grandmother gets very angry with all of us. But still, we three sisters

come here to play. Grandmother scolds us and even scolds our Coach Sir! She tells us, "You need proper equipment to play. You need to have a lot of milk for strength. Where will the money for all this come from?" But daddy understands our feelings. He even teaches us some special moves used in the game. My daddy also used to play on this ground when he was young. He did not have proper shoes or clothes. He used to practice with a plastic ball.

Daddy tells us that Bacchu Khan was the coach when he used to play. He saw my daddy playing once. He realised that the boy played very well and that he should be trained properly. He gave proper shoes and clothes to my daddy. My daddy could have become a very good player. But because of his responsibilities at home, he left the game and took up a job. So he wants us to play and become good players.

Tell

- Has anyone ever stopped you from playing some games? Which games?
- Who stopped you and why? What did you do then?
- Did anyone help you and encourage you to play?

We asked – Tell us about your team

One girl: We felt a bit strange in the beginning. We were the first girl"s team here. People used to come and watch us practicing. They were curious to see how girls would play basketball. Now people are no longer surprised. They have begun to accept that we girls can also play well.

Afsana: I was eleven years old when we first started playing. At that time we were not allowed to go anywhere else to play a match. It has been two years since then. Now we go to other places also for matches. But all this could happen only because of our hard work

and Sir's coaching.

Another girl : Yes, we really work hard. Sir is also very strict. We first jog together and then do our exercises. Sir teaches us how to play the game well. We practice how to keep the ball with us, to dodge the players of the other team, how to throw the ball in the basket, to score a goal, to pass the ball well, and to run fast on court.

Afreen: Sir says, "While playing, don't think you are girls. Play like a player. Keep playing even if you get a little injured." We support each other and say – Come on, get up, you will be fine!" Now our game has improved a lot. Everyone says that we play as well as the boys' team.

One girl: We also play with boys' teams. We want them to play with us as equals. They should not be lenient because we are girls. Sometimes we get angry when the boys imitate us. But we take it as a challenge and correct our mistakes. If the boys try to cheat, we scold them!

Discuss Do girls and boys play different types of games in your school or neighbourhood? If yes, then which games do the boys play and which do the girls play?

Do you think that there is any difference between the games and the way they are played by boys and girls?

Should the games for boys and the girls be different? What do you think?

We said – Tell us more about your team.

One girl : Our team is very special. Our team is united. Even if we quarrel, we quickly make up and forget about it. Here we have learnt how to stay and play together. Some of the girls from our team got a chance to play as part of the Mumbai team. The match was at Sholapur.

Zarin : When we went to Sholapur we found that the team had girls from different parts of the state. They did not talk to us nicely and treated us like juniors. They would not even give us a chance to play properly. We felt very bad. There was no cooperation at all in that team.

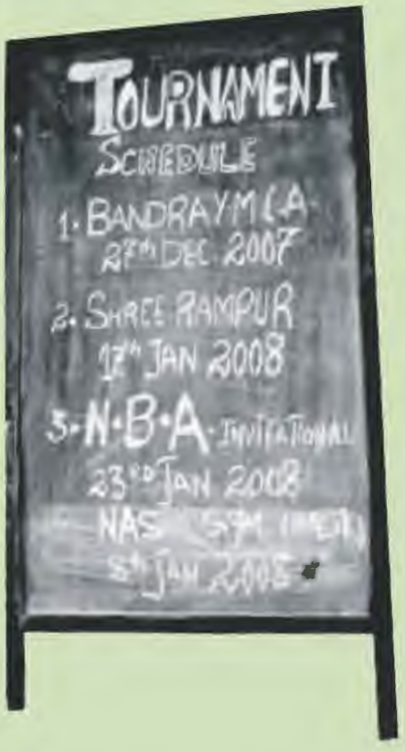
During the match I threw the ball to one of the team members. But she could not catch it. In turn, she started scolding me, blaming me for the mistake. In all this misunderstanding we lost the match. But this never happens in our own team. If we do miss a basket because of someone's mistake, we do not get angry. We say, "Never mind, next time we will do better!" It is most important to support each other, because we are all part of a team.

Afreen: After playing in Sholapur we realised what was special about our team. Cooperation between us is our strength. We understand and support each other well. Even if every player is excellent, the team can lose a match if all do not play together as a team. To play as a team it is important to understand each other's strengths and weaknesses.

Write

- Have you ever played as part of a team of your class, school or neighbourhood? Whom did you play with? What game did you play?
- What is the difference between playing for yourself and for the team?
- While playing in a team would you like to play for yourself or for the team? Why?
- Is your team like the team Afsana played with at Sholapur or like the Nagpada team? How?

We said – You have done so much. What next?



Afsana: We have been playing well. So we have got a chance to go to many places. We have played for our city and our state. We hope to work hard and play for our country some day.

Yes, then we will also be popular like the cricketers!

We all want to play well. We should bring glory to our area and our country. We want to show that the Indian girls team can win a gold medal! We will make this happen.

Discuss

- Have you ever taken part in some game or competition from your school or area? How did you feel?
- Did you go to some other place to play? What was that place like? How did you like going to that place?
- Have you seen matches being played between India and other countries? Which ones?

We all know about the cricketers of India, and we all like them. Do people also know and like the Indian players who play some other games? (Yes or No). What do you feel about it? Do you know the players of the Indian football or kabaddi team?

We asked – Did you face some other difficulties?

Khushnoor: To tell the truth, we have not got all this very easily. As girls, even to be able to start playing was difficult. We had to convince our families. Sometimes we even had to fight. Even today not many girls can play like this. Forget games, earlier some people did not even allow girls to study. My mother wanted to do many things, but she never got a chance. So my mother encourages me to take part in all activities – like games, swimming and drama.

Afsana: Even now, we are supposed to go home as soon as we finish playing. The boys go here and there, and can chitchat till late. No one says anything. After coming from school, I help my mother with the cleaning work in two or three houses, do my studies and then come here to play. I also help at home. If my brother wants tea and he makes it for himself, then mother says, "He has three sisters. Yet, he has to work."

One girl : Now, just look at Zarin's younger brother. He is only five years old but he says, "Mummy, why do you send didi to play? She does not look nice playing like that on the ground." Ask him if he will play and he says, "I am a boy, of course I will play!"

Afsana: But it is good for everyone to play. We have now realised, how much we benefit from playing. I want to be such a good player that other girls and boys would wish to be like me.

Discuss

What would happen if girls are not allowed to play games, to study or do some other work of their choice?

How would you feel if you were not allowed to take part in some game or drama?

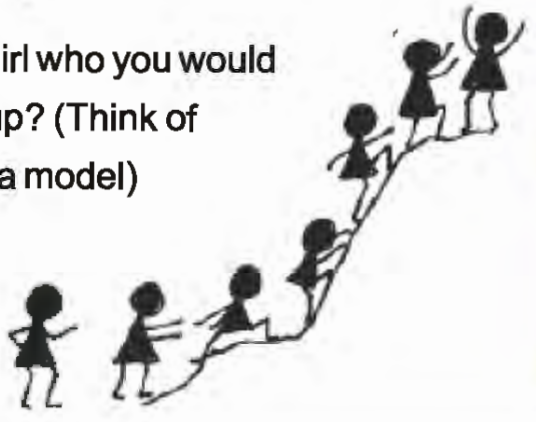
Have you heard of any women players? Name them and the games they play.

In which areas other than sports have you heard of women getting recognition?

Are these women less known than men? Why?

How would you find the world to be, if girls never got a chance to take part in games, drama or dance? How would you feel if such a thing happened to boys?

Do you know of any woman or girl who you would want to be like when you grow up? (Think of names other than a film actor or a model)



What next?

Afreen: I just want to say that if you have some dreams for yourself, give your best to fulfil them.

Khushnoor: If you have a wish or a dream, have courage to speak about it. If you don't do this now, you may regret later.

We said – The newspaper wrote about all of you. Now students will read about you in this book. How do you feel?

Afreen: We are so happy about it that we have no words to explain our happiness. We now feel we must play even better, to make our area and our country famous.

All Girls : Yes, this is our wish too.

Coach Sir

The coach, who made this team, Noor Khan told us – "This part of Mumbai is very crowded.

This is the only playground in this area. This is our small 'Bacchu Khan playground.' A person named Mustafa Khan used to live in our area. Everyone was afraid of him. But children were very fond of him, so everyone started calling him Bacchu Khan. There was no ground then, it was just muddy land. Bacchu Khan used to train children to play. We were among those children. It is because of Bacchu Khan's devotion and training that players from this area are able to compete with the teams of other countries. Like Bacchu Khan, I have trained the children of this area. Today our team has some who play at the international level. Some have even won the Arjuna Award."

Noor Khan continued –"In the last few years we have also prepared a girls team here. Our girls play for the Maharashtra State team. They practice well with good discipline. Our girls and boys come from different types of families. Some are from poor homes, some from richer. Some study in Urdu medium and some in English. But once they come here, they all make a team."

Think and write

- The newspaper report said, "Afsana has jumped over the wall. The gender wall that her mother had put up for her." Think and write in your own words, what was this wall? What do you understand by 'gender bias'?

What we have learnt

- Should games for boys and girls be different? Think and write what you feel.
- If you are made the leader of a team, how will you prepare your team?

CHAPTER - 14

A SEED TELLS A FARMER'S STORY

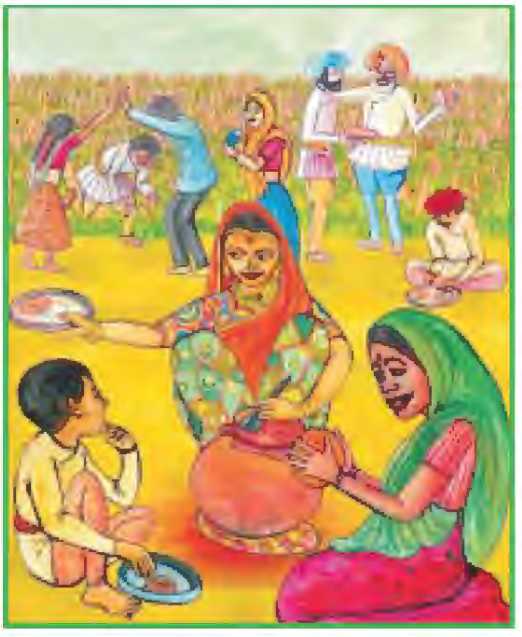
I am a small seed!

I am a small bajra seed. I have stayed in this beautiful wooden box since 1940. I want to tell you my story. This is a long story – but not mine alone. It is also the story of my farmer Damjibhai and his family. If I do not tell my story now, it might be too late!

I was born in Vangaam in Gujarat. That year there was a good bajra (millet) crop. There was a festive mood in the village. Our area was famous for its grain and vegetables. Each year Damjibhai kept aside some seeds from a good crop. This way our bajra family went on from one generation to another. Good seeds were stored in dried gourd (lauki) which was coated with mud. But that year Damjibhai himself made a strong wooden box to store us. He put in neem leaves to protect us from insects. He put different seeds in different compartments of the box. That was our beautiful home!

In those days Damjibhai and his cousins lived together. It was a large family. Everyone in the village helped each other, even in farming. When the crop was ready and harvested, everyone celebrated together. Oh! Those wonderful days! With big feasts and lots to eat!

In the winter, it would be time to enjoy the undhiya (a kind of stew). All the vegetables were put into a clay pot, along with fresh spices. The pot was sealed and kept between hot coals. The vegetables cooked slowly in this special cooker, on the fields.



Oh, I forgot, the pot was placed upside down! That is why the dish was called undhiya or "upside down" in Gujarati. Undhiya would be eaten with bajra rotis, freshly cooked on the chulha. Oh, what an earthy delicious flavour! Along with that, home-made butter, curd and buttermilk was served.

Farmers would grow many different kinds of crops – grains and vegetables – according to the season. The farmers kept enough for their needs and sold the rest to shopkeepers from the city. Some farmers also grew cotton. At home, family members spun cotton on a charkha (spinning wheel) to make cloth.

Tell

☞ Are rotis made in your home? From which grains are they made? Have you eaten roti made from bajra or jowar? Did you like these?

Find out and write

✍ In your house what is done to protect grains and pulses from insects?

✍ Which are the different festivals related to farming, celebrated in different seasons? Find out more about any one such festival and write in your notebook –

The name of the festival, in which season is it celebrated, in which states of India, what special foods are made, is it celebrated only at home with the family, or together with many people.

✍ Talk to the elders in your family and find out if there were some special foods cooked earlier that are not cooked any more?

Find out about the crops – cereals, vegetables, pulses – that are grown in your area. Of those, is there anything that is famous across the country?

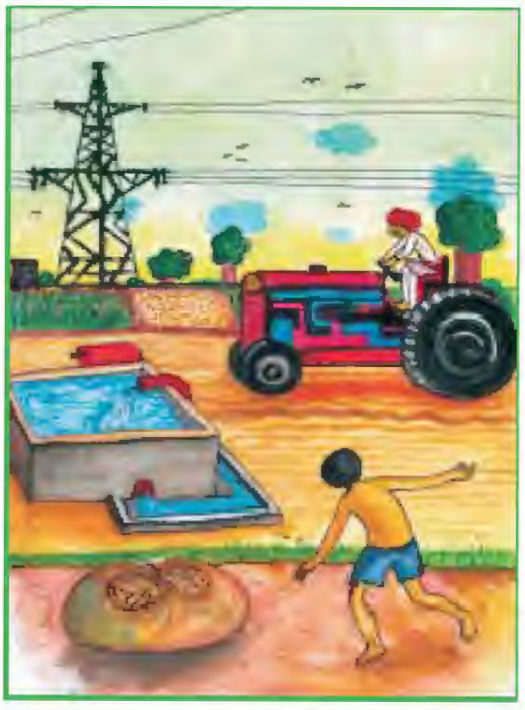
Can you recognise these grains?

When times changed

Over the years, many changes took place in the village. Some places could get water from the canal. They said the canal brought water from far away – where a dam had been built on a big river. Then electricity came. Switch on the button and there was light! People found that only one or two crops, like wheat and cotton, got better prices in the market. So most farmers began to grow only these. Soon we – old friends bajra and jowar, and also vegetables – were forgotten and dismissed, even from Damjibhai's fields! Farmers even began to buy seeds from the market. People said they were new kinds of seeds. So farmers did not need to store seeds from the old crop.

Now people in the village cooked and ate together only on very special days. As they ate, they would remember how tasty the food used to be in the past – fresh from the fields. When the seeds have changed, how could food ever taste the same!

Damjibhai was getting old. His son Hasmukh looked after the fields and the family. Hasmukh was making a lot of money from farming. He rebuilt the old house. He brought new machines for farming. He used an electric motor to pump water. He bought a motorcycle to go to the city easily and also a tractor to plough the field. The tractor could do in a day, what the bullocks would take many days to do.



Hasmukh would say, "Now we are farming wisely. We grow only what we can sell in the market at a good price. With profits from our fields we can improve our life. We can make progress."

Lying forgotten in the wooden box, I and the other seeds had our doubts. Is all this really progress? There is no longer any need for seeds like us, and animals like the bullocks. After the tractor has come, even people who worked on the fields, are no longer needed. How will they earn money? What will they live on?

Discuss

- ☞ The bajra seed saw differences in the way Damjibhai and Hasmukh did farming (for example, in irrigation, ploughing, etc). What were these differences?
- ☞ Hasmukh said, "With profits from our fields, we can progress." What is your understanding of 'progress'?

Write

- ✍ What kind of progress would you like to see in your area?

More and more expenses

The next twenty years saw even more changes. Without cows and buffaloes, there was no cow dung, to be used in the fields as fertilizer. Hasmukh had to buy expensive fertilizer. The new kinds of seeds were such that the crops were easily affected by harmful insects. Medicines had to be sprayed on the crops to keep away the insects. Oh, what a bad smell these had, and how expensive they were!

The canal water was not enough for the new crops. All the farmers used pumps to lift water from deep under the ground. To meet all these

expenses, loans had to be taken from the bank. Whatever little profit was made, was used to repay the loan.

But there was little profit! Everyone was growing cotton, so the cotton prices were not as high as before. The soil itself was no longer the same. Growing the same crop over and over, and using so many chemicals, had affected the soil so much that now nothing could grow well there. It was becoming difficult to earn a living by farming alone.

Hasmukh too changed with the times. He is often tense and angry most of the time. His educated son Paresh did not want to do farming. He now started work as a truck driver. After all, the bank loans still had to be repaid. Often Paresh doesn't come home for days. At times he is away for a week. Two days back when he came home, Paresh started looking for something. " Ba", he asked his mother, "Where is Dadaji's wooden seed box? It will be useful to keep the screws and tools for the truck." Now do you understand why I told you my story?

Discuss and think

- What can happen to Hasmukh's farm after some years?
  Damjibhai's son Hasmukh chose to become a farmer like her father.
- Hasmukh's son Paresh is not a farmer, but a truck driver. Why would he have done so?
- The seeds were not sure that what Hasmukh was talking about was really progress. What do you feel?
- Have there been any changes near your area, which may be difficult to call 'progress'? What changes are these? What are the different opinions about them?

Read the report from a newspaper and discuss it.

Tuesday, 18 December 2007, Andhra Pradesh farmers in Andhra Pradesh have been sent to jail for not being able to pay back their loans. They had suffered a big loss in farming. One of these farmers, Nallappa Reddy, had taken a bank loan of Rs. 24,000. To repay the loan, he had to take another loan from a private moneylender, at a very high rate of interest. Even after repaying Rs. 34,000, Reddy could not repay the entire loan. Reddy says, "The bank sends farmers to jail for not paying back small loans. But what about the big businessmen? They take loans of crores of rupees. Nothing happens to them when they do not return the money!" Nallappa Reddy's story is shared by thousands of farmers in India who are suffering huge losses. The situation is so bad that many farmers see no way out of this except to commit suicide. According to government figures 1,50,000 farmers have died like this between 1997 and 2005. This number may be much higher...

Project

- What questions come to your mind about farmers and farming? Write some questions in your group and ask a farmer. For example, how many crops do they grow in a year? Which crop needs how much water?
- Visit a farm near your area. Observe and talk to the people there. Write a report.

Read the report on page 180 by a group of Class V students who went to visit Bhaskarbhai's farm.

Bhaskarbhai's Farm (Dehri village, Gujarat)

As we entered his farm, we were surprised. There were dead leaves, wild plants, and grass everywhere! Some of the tree branches seemed so dry, as if eaten by insects. At places we saw some plants with colourful leaves. Why these? Bhaskarbhai said they were croton plants which gave him a signal when the soil became dry. We were surprised! How? He explained that the roots of the croton do not go deep in the ground. So when the top layer of the soil becomes dry, the croton leaves bend and become limp. This signal tells Bhaskarbhai which part of his farm needs to be watered.

We found the soil soft and crumbly. We could see tall coconut trees, full of fresh coconuts. We thought he must be using some special fertilisers. Bhaskarbhai said he does not buy fertilisers made in factories. His soil is fertile because of all the dried leaves which slowly rot and mix with it. He dug the soil a little and told us to look. We saw thousands of earthworms! "These are my soil's best friends", he said. The earthworms soften the soil as they keep digging underneath to make tunnels. This way air and water can easily get into the soil. The earthworms also eat the dead leaves and plants, and their droppings fertilise the soil.

Pravin told us about his uncle in the city, who has dug a pit in his garden. He puts dried leaves in the pit, along with all the kitchen waste – peels of vegetables and fruits, and leftover food. He also has earthworms in the pit. They turn the waste into compost (a natural fertiliser). So his uncle gets good fertiliser without spending extra money.

We all had some fresh coconuts from the farm. They were really tasty! We also learnt so much about a new way of farming!

Group members : Praful, Hansa, Krutika, Chakki, Praveen, Class–5C

Journey of a *bajra* seed–from a field to a plate

What can you see in each picture on the next page?

In picture 2 you can see the bajra cobs in the mortar (okhli, used for crushing). The cobs are crushed with a pestle (moosli) and The seeds are separated from the cob. You can see the separated seeds in picture 3. Now this work is also done by big machines, like threshers. We call both these as different 'technologies' – using our hands or big machines – to crush the seeds.

☞ What technology could have been used to cut the stem in picture 1? What do you think is being done in the grinder (chakki) in picture 4? What ways (technologies) would have been used to do the work shown in picture 5 and 6? You can see that the dough is ready in picture 6. When do you think a sieve (chhalni) would have been used? Discuss each step in detail, in **any language** you wish to use.

What we have learnt

- There have been many changes over time, in our food. What can this mean? Use the seed story and what you know from your elders to explain.
- What would happen if all the farmers were to use only one kind of seed and grow only one kind of crop?

CHAPTER - 15

WHOSE FORESTS?

Daughter of the jungle

Look at the picture. Where do you think these children are off to, with little bundles on their sticks? When you find out you too would want to go with them!

The children are going to the forest. There they jump, run, climb trees and sing songs in their language called Kuduk. They pick the fallen flowers and leaves, to weave them into necklaces. They enjoy the wild fruits. They look for birds, whose calls they imitate. Joining them in all this fun is their favourite didi – Suryamani.

Every Sunday Suryamani takes the children to the forest. As they move around, she shows them how to recognise the trees, the plants, and animals. Children enjoy this special class in a forest! Suryamani always says, "To learn to read the forest is as important as reading books." She says,"We are forest people (adivasis). Our lives are linked to the forests. If the forests are not there, we too will not remain."

Discuss

- What do you think is a forest?
- If someone grew lots of trees close to each other, would this become a forest?

Find out and write

- Other than trees what all is there in a forest?
- Do all forests have similar types of trees? How many trees can you identify?
- Suryamani says, "If the forests are not there, we too will not remain." Why so?

Growing Up

Suryamani loves the forest since she was a child. She would not take the direct road to school, but would choose the path through the forest. Suryamani's father had a small field. Her family used to collect leaves and herbs from the forest and sell these in the bazaar. Her mother would weave baskets from bamboo or make leaf plates out of the fallen leaves. But now no one can pick up a single leaf from the forest.

That is since Shambhu the contractor came there. The people of Suryamani's village were afraid of the contractor except Budhiyamai. She would say, "We the people of this forest have a right over it. We look after our forests, we don't cut trees like these contractors. The forest is like our 'collective bank' – not yours or mine alone. We take from it only as much as we need. We don't use up all our wealth."

Suryanani's father could no longer support the family on the small land. He moved to the town in search of work. But things did not improve. Sometimes there would be no food in the house. At times Maniya Chacha (uncle) would send some grain from his small shop to Suryamani's house.

Chacha tried hard and got admission for Suryamani in the school in Bishanpur. Here they would not have to pay for the fees, uniforms and books. Suryamani would have to stay there and study. Suryamani didn't

want to leave her village and forest. But Maniya Chacha was firm. "If you do not study, what will you do? Go hungry?" Suryamani would argue, "Why should I go hungry? The jungle is there to help!" Chacha tried to explain, "But we are being moved away from our forests. Even the forests are disappearing – in their place mines are being dug, dams are being built. Believe me, it is important for you to study, to understand about the laws. Maybe then you can help to save our forests". Young Suryamani listened, and tried to understand some of what he said.

Think and write

- Do you know anyone who loves the forest?
- The contractor did not allow Suryamani's people to go into the forest. Why?
- Is there any place around your area which you feel should be open to everyone, but where people are not allowed to go?

Discuss

- Who do you think the forest belongs to?
- Bhudhiyamai said –"Forest is our 'collective bank' – not yours or mine alone." Are there other things which are our collective wealth? So if someone uses more, everyone would suffer?

Suryamani's journey

Suryamani was filled with joy on seeing the school at Bishanpur. The school was near a thick forest. Suryamani studied hard and passed her B.A. after getting a scholarship. She was the first girl in the village to do this. While she was in college she met Vasavi didi, a journalist. Suryamani soon joined her to work for the Jharkhand Jungle Bachao Andolan (Movement to Save the Forests of Jharkhand).

This work took Suryamani to far off towns and cities. Her father did not like this. But Suryamani continued her work. Not only that, she also started to fight for the rights of the village people. Her childhood friend Bijoy helped her in this work.

Suryamani had another friend 'Mirchi', who stayed with her day and night. Suryamani would share all her thoughts and dreams with Mirchi. Mirchi would listen and say "Keee Keee."

Suryamani had a dream. for her Kuduk community. She wanted all her people to feel proud of being adivasis trivals

- Do you have a friend with whom you can share everything?
- Some people have moved so far away from the forest, that they can't understand the lives of forest people. Some even call them 'jungli'. Why is it not correct to say this?
- What do you know about how adivasis live? Write and draw a picture.
- Do you have an adivasi friend? What have you learnt about the forest from her.

Suryamani's Torang

Suryamani was 21 when she opened a centre, with the help of Vasavi didi and others. She called it 'Torang', which means jungle in the Kuduk language. Suryamani wanted that on festivals people should sing their own songs. They should not forget their music and should enjoy wearing their traditional clothes. Children should also learn about herbs, medicines, and the art of making things from bamboo. Children should learn the language of school but must link it with their own language (mother tongue). All this happens in the

'Torang' centre. Many special books about the Kuduk community and other adivasis have been collected. Flutes and different types of drums are also kept there.

Whenever something is unfair, or if someone is afraid that his land and livelihood would be taken away, they turn to Suryamani. Suryamani fights for everyone's rights.

Suryamani and Bijoy have got married and work together. Today their work is praised by many people. She is invited, even to other countries, to share her experiences. People of her area are also raising their voice for a new forest law.

Right to Forest Act 2007

People who have been living in the forests for at least 25 years, have a right over the forest land and what is grown on it. They should not be removed from the forest. The work of protecting the forest should be done by their Gram Sabha.

Think

- Do you know of any one who works to save forests? What is your dream? What will you do to make your dream come true?
- Collect reports about forests from newspapers. Did you find any news about how the cutting down of forests affects the weather?
- In 'Torang' Suryamani does a lot to keep the Kuduk music, dance and traditions alive. Would you like to do something like this for your community? What would you like to keep alive?

Read and tell

☞ Sikhya, a Class X girl in Orissa, wrote a letter to the Chief Minister. Read a part of the letter.

A forest is everything for us (adivasis). We can't live away from the forests even for a day. Government has started many projects in the name of development – dams and factories are being built. Forests, which are ours are being taken away from us. Because of these projects, we need to think where the forest people will go and what will happen to their livelihood? Where will the lakhs of animals living in the forests go? If there are no forests, and we dig out our lands for minerals like aluminium, what will be left? Only polluted air, water, and miles and miles of barren land...

☞ Is there any factory or some construction work going on in and around your area? What type of work?

☞ Due to the factory is there any effect on the trees and land? Have the people in that area raised this issue?

Look at the map and write

✍ What all is shown in the map?

✍ You have read Sikhya's letter. Look for Orissa in the map.

✍ Is there a sea close to Orissa? How did you find out?

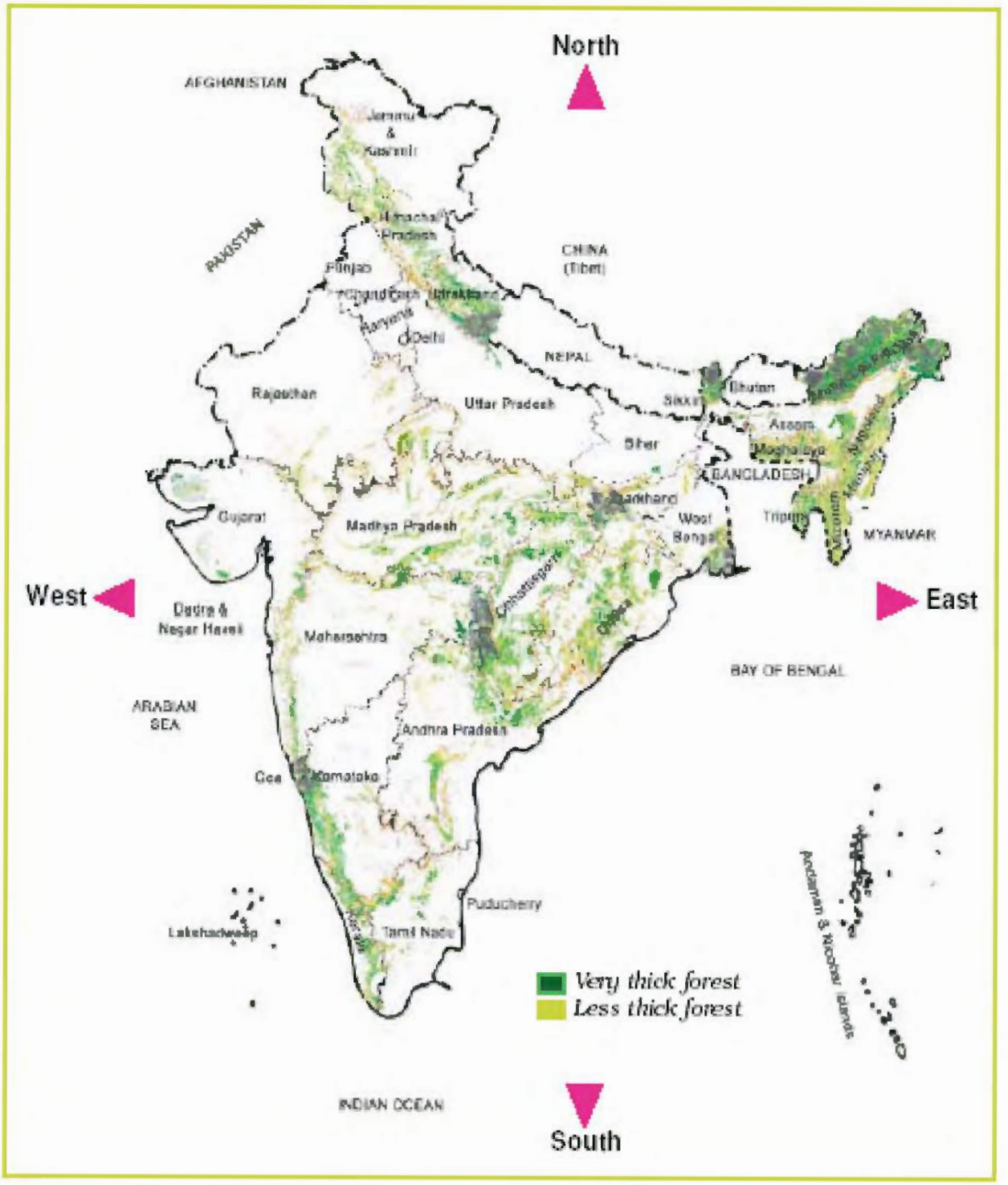
✍ Which are the states which have the sea on one side?

✍ Where is Suryamani's state Jharkhand on the map?

✍ Where are forests on the map? How will you find these?

✍ How can you find out which states have very thick forests and which have less thick forests?

✍ For someone in Madhya Pradesh, in which direction would the country's thickest forests be? Name those states.


North
West
East
South
AFGHANISTAN
PAKISTAN
CHINA
(Tibet)
NEPAL
BHUTAN
BANGLADESH
MYANMAR
Jammu & Kashmir
Himachal Pradesh
Punjab
Uttaranchal
Haryana
Delhi
Rajasthan
Uttar Pradesh
Sikkim
Arunachal Pradesh
Assam
Nagaland
Meghalaya
Bihar
Jharkhand
West Bengal
Tripura
Mizoram
Manipur
Gujarat
Madhya Pradesh
Chhattisgarh
Orissa
Dadra & Nagar Haveli
Maharashtra
BAY OF BENGAL
ARABIAN SEA
Andhra Pradesh
Goa
Karnataka
Puducherry
Lakshadweep
Tamil Nadu
Andaman & Nicobar Islands
Very thick forest
Less thick forest
INDIAN OCEAN

Lottery for farming in Mizoram

You read about the forests of Jharkhand in Suryamani's story. Now read about forests on the hills of Mizoram. See how people live there, and how farming is done.

Ding, Ding, Ding.... As soon as the school bell rang Lawmte-aa, Dingi, Dingima picked their bags and hurried home. On the way they stopped to drink water from a stream in a cup made of bamboo which was kept there. Today not only the children, even 'Saima Sir' was in a hurry to get back. Today there would be a special meeting of the Village Council (Panchayat). At the meeting there would be a lottery to decide which family will get how much land for farming. The land belongs to the whole village, not to separate people. So they take turns to do farming on different parts of the land.

A beautiful pot made of bamboo was shaken well. One chit was taken out. Saima Sir's family got the first chance. He said, "I am happy that my family gets to choose first. But, this year we cannot take more land. Last year I had taken more and was not able to farm it well. After my sister Jhiri got married and went away it is difficult to manage farming alone."

Saima Sir asked for 'three tin' of land. Little Mathini asked, " What is three tin of land? Chamui explained, "The land on which we grow one tin of seeds is called one tin of land." One by one, the village families got their piece of land for farming.

Find out

- Which are the states around Mizoram?
- Chamui said that they measure land using tin. Which are the other ways of measuring land?
- Returning from school, children drank water in a bamboo cup. Who do you think would have made this cup and kept it in the forest? Why?

☞ Have you ever seen anything which people are free to use, with no one there looking after it?

Jhoom farming

Jhoom farming is very interesting. After cutting one crop, the land is left as such for some years. Nothing is grown there. The bamboo or weeds which grow on that land are not pulled out. They are cut and burnt. The ash makes the land fertile. While burning, care is taken so that the fire does not spread to the other parts of the forest. When the land is ready for farming it is lightly dug up, not ploughed. Seeds are dropped on it. In one farm different types of crops like maize, vegetables, chillies, rice can be grown.

Weeds and other unwanted plants are also not pulled out, they are just cut. So that they get mixed with the soil. This also helps in making the soil fertile. If some family is not able to do farming on time, others help them and are given food.

The main crop here is rice. After it is cut, it is difficult to take it home. There are no roads, only hilly paths. People have to carry the crop on their backs. This takes many weeks.

When the work is over the entire village celebrates. People get together to cook and eat, sing and dance. They do their special 'cheraw' dance. In this dance people sit in pairs in front of each other, holding bamboo sticks on the ground. As the drum beats, the bamboos are beaten

to the ground. Dancers step in and out of the bamboo sticks, and dance to the beat.

- Find out more about the 'cheraw' dance. Do it in your class. But be careful and don't hurt yourself.

About three-fourth people in Mizoram are linked to the forests. Life is difficult but almost all children go to school. You can see some of them here, playfully blowing their leaf whistles! You too have made many such whistles, haven't you!

What we have learnt

- What is similar and what is difference between jhoom farming and Bhaskerbhai's way of farming?
- Explain in your own words why forests are important for the people living in forests?
- Did you find something interesting in jhoom farming? What is it?

CHAPTER - 16

LIKE FATHER, LIKE DAUGHTER

Aaa chhee!

Ashima was sitting near the window and reading. It was windy and there was a lot of dust in the air. Suddenly Ashima sneezed loudly—aaa chhee! Ashima's parents were sorting out vegetables in the kitchen. Her mother said, "She sneezes just like you do. If you were not here, I would have thought it was your sneeze."

☞ Fill in the table

Ashima sneezed just like her father. Do you have any such habit or trait which is similar to that of someone in your family? What is it? Whom is it similar to?

Your special habit or trait	Whom is it similar to?
_____	_____
_____	_____

Tell

☞ Does your face or anything else look similar to that of someone else in your family? What is it?

- Did someone tell you this or did you find it out yourself?
- How do you feel when people compare you with someone else in your family? Why do you feel so?
- Who laughs the loudest in your family? Laugh like that person.

Who is whose aunt?

Nilima had gone to the house of her *nani* (mother's mother) in the school holidays. She saw someone coming and went to tell her mother, "Amma, a *mausi* (mother's sister) has come to meet you." Her mother came out to see who had come. She told Nilima, "No, this is not your *mausi* ! She is your sister Kiran. You know your eldest *nani* ? Kiran is the daughter of her elder son. Kiran is your cousin sister. In fact, you are her cute son Samir's *mausi* !"

- Make a list of all the family members from Nilima's *nani* to little Samir. How are they all related to Nilima? Write.

Find out

- In your family are there any such examples of uncle-nephews or brother-sisters, where there is a big difference in the age? Find out from your elders.

How we are all related!

Nilima started playing with Samir. Her mother called Kiran and said, "See, my Nilima's hair is a lot like yours – thick, curly and black. It's good she does not have hair like mine – straight, limp and brown!" Nilima's *nani* laughed and said, "Yes, isn't it strange? We sisters had thick curly hair and now our second generation has similar hair." Nilima was listening to all this. She thought, "We are called 'distant' relatives, but, how closely related we are in many ways!"

Find out and write

Does Nilima have curly hair like her *nani's* ? Now you look for some special trait in your sister or brother (could also be cousins). Like the colour of eyes, dimples in cheeks, height, broad or sharp nose, voice, etc. See if this trait comes from the father's side or the mother's side. Make this table in your notebook and fill it. An example is given.

Special trait	Whom does it resemble?	From whose side? Mother's	Father's
Nilima's Curly hair	her *nani* . (grandmother)	✓	

- Have you seen a very young child in your (or any other) family? Whom does the child's eyes, nose, hair or fingers look like in the family? Write their names.
- Nimila's hair is like her *nani's* – thick and curly. Nilima's mother has straight, brown and limp hair? What type of hair do you have – black or brown, oily or dry?

- What is the colour of your hair? Measure and write the length of your hair.
- Is your hair like that of anyone else in your family? If yes, then name the person.
- Measure the hair of other members of your family.
- Who has the longest hair in your family?
- How many people do you know whose hair is longer than one metre? Does having long hair run in their family?

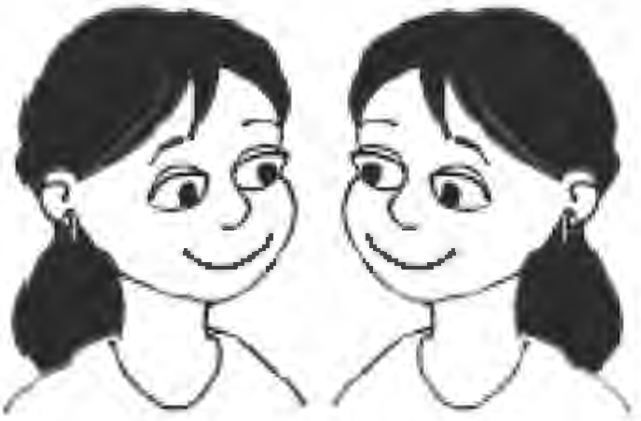
- Do you know how to measure your height? Measure yourself from head to toe and write how tall you are.
- How tall do you think you will be when you grow up? Is anyone else in your family of the same height?
- Measure the height of your family members and wrote it down.

Is this a mirror?

Look at the next page. Is Saroja standing in front of a mirror? No, this is her twin! Did you get confused? Their mother's brother (*mama*) also gets confused when he sees them together. At times Saroja gets scolded for mischief done by Suvasini. Sometimes Suvasini tricks her *mama* and says, "Suvasini has gone out." But now *mama* has learnt a trick. He says – Sing a song in *Marathi*! Why this funny trick? Read about them and you will understand.

The sisters were just two weeks old when Saroja's father's

brother's wife (*chachi*) adopted her and took her to Pune. Everyone in *chachi's* house is very fond of music. Mornings begin with music in the house. Saroja knows many songs in both languages – Tamil and Marathi. At home everyone speaks Tamil and at school most children speak in Marathi.



Suvasini stays with her father in Chennai. Her father is a karate coach. Since she was there, Suvasini started doing karate with the other children. On holidays, both father and daughter start practicing in the morning.

Saroja and Suvasini look alike but are also quite different. Do you now know why *mama* has his way of finding out who is who?

Discuss

- What is similar between Saroja and Suvasini? What is different?
- Do you know any twins? What is similar in them? How are they different?
- Do you know of twins who don't look the same?

Saroja and Suvasini look a lot like each other yet are different. For example, Saroja knows two languages. If Suvasini's family also talked in two languages she could also learn both. We learn many things like language, music, love for reading, or knitting, when we get a chance and an environment to do so.

This from the family

Do this interesting survey in your class. Write how many children can do this :

1. Without touching your teeth fold your tongue towards the back of your mouth.
2. Roll your tongue by lifting it from the sides.

3. Open all the toes of your feet. Now without moving the others, move the little toe.

4. Touch the thumb to your wrist.
5. Make a 'V' by separating two fingers of your hand to each side.
6. Move your ears, without holding them.

Those children who could do any of these should ask their family members also to do so. So, how many children have got this trait from their family?

But not this from parents...

Satti was only a few months old when one of her legs was affected by polio. But she never let this come in the way of her work and her life. Walking long distances and climbing many stairs has been a part of her work. Now Satti is married. Some people tell her not to have any children. She is also worried that her children may also get polio. She spoke to a doctor about this.

Have you read or heard anything about polio? Where?
Have you read or heard any news about 'pulse polio'? What?
Do you know of anyone who has polio?

Experiments with peas – rough or smooth?

Gregor Mendel was born in a poor farmer's family in Austria in 1822. He was very fond of studies but the very thought of examinations made him nervous (Oh! you too feel the same!). He did not have money to study at the University so he thought of becoming a 'monk' in a monastery. He thought from there he would be sent to study further. Which he was. But to become a science teacher he had to take an exam. Oh no! he got so nervous that he kept running away from the exam, and kept failing!

But he did not stop doing experiments. For seven years he did experiments on 28,000 plants in the garden of the monastery. He worked hard, collected many observations, and made a new discovery! Something which scientists at that time could not even understand! They understood it many years after his death, when other scientists did such experiments and read what Mendel had already written.

What did Mendel find in those plants? He found that the pea plant has some traits which come in pairs. Like the seed is either rough or smooth. It is either yellow or green, and the height of the plant is either tall or short. Nothing in between.

The next generation (the children) of a plant which has either rough or smooth seeds will also have seeds which are rough or smooth. There is no seed which is mixed – a bit smooth and a bit rough.

He found the same with colour. Seeds which are either green or yellow give rise to new seeds which are either green or yellow. The next generation does not have seeds with a mixed new colour made from both green and yellow. Mendel showed that in the next generation of pea plants there will be more plants having yellow seeds. He also showed that the next generation will have more plants with smooth seeds. What a discovery!

Some from the family, some from the environment

From a distance Vibha knows that her *nana* (grandfather) is coming – from his loud laughter. *Nana* also talks loudly and hears with difficulty.

- ☞ Are there people in your house who talk loudly? Is it their habit, or they cannot also hear very well?
- ☞ Are there times when you do not talk loudly in front of some people? When? With whom? Why? When can you speak loudly?
- ☞ Some people use a machine in their ear to help them hear better. Some use a stick or spectcles to help them in other ways. Do you know someone who does so?
- ☞ Talk to people who cannot hear very well. Find out if they had this problem from birth. When did they start to have a problem with hearing? What difficulties do they face?

We have seen that some traits or habits we get from our family. Some things and skills we learn from our environment. At times our abilities change because of some illness or old age. All these together make us what we are!

What we have learnt

What do you think – what all is a part of you that you got from your mother's side?

CHAPTER - 17

ON THE MOVE AGAIN

Dhanu's village

Today all the relatives have come to Dhanu's house to celebrate Dushera. They have come with their luggage in their bullockcarts. Dhanu's father is the eldest in the family. So all the festivals are celebrated at their house. Dhanu's mother (*aai*), mother's brother's wife (*mami*) and father's brother's wife (*khaki*) are busy making *puranpoli* (sweet *rotis* made from jaggery and gram). Alongwith this a spicy *kadi* dish is also made.

The day passes in laughing and chatting. But by evening everyone's mood changes. The women and children begin to pack their luggage. The men sit down with the *mukadam* (agent who lends money) for the meeting. The *mukadam* gives the details of the loan taken by each family.

Then the talks for the next few months begin. The *mukadam* explains to the villagers in which areas they would go for the next six months. He

also gives them some money as loan, for their expenses. Ever since Dhanu remembers, this has been the routine. Families like Dhanu's work on the lands of big farmers till Dushera, before the rainy season. Many other

families also work on such lands. They earn just enough money to keep them going through these months.

But how to manage the remaining six months, when there is no rain, and no work in the fields? So, everyone borrows money from the *mukadam*. To pay back this money, they have to work for the *mukadam*. *Mukadam* is an agent for sugarcane factories. He helps them to find work in sugarcane fields.

Tell

- Did all the farmers in Dhanu's village have their own land?
- During what time of the year did Dhanu's family get work in the village? During what time did they not have work?
- Do you know of any families like Dhanu's, who have to leave their villages for months in search of work?

Think and find out

- If people in Dhanu's village did not leave the village in search of work, what difficulties would they face in their own village?
- In Dhanu's village, there can be no farming when there is no rain. Do you think farming can be done even without rain water? How?

In the next few months, Dhanu, his parents, his *kaka* (father's brother) and his two elder children, his *mama*, *mami* and their two daughters, and forty-fifty other families from the village will stay away from home. In these six months, Dhanu and many children like him will not be

able to go to school. Dhanu's old grandmother, aunt who cannot see, and two-month old cousin sister would stay back in the village.

In other homes too the old and the ill people stay behind. Dhanu misses his grandmother a lot. Dhanu always keeps wondering – who will take care of his grandmother! But, what can Dhanu do?

Think

- Dhanu's family and many others from the village go far away for work but some people stay back in the village. Why does this happen?
- When Dhanu and other children leave the village for six months, what happens in the village school?
- What arrangements are made at your home for old and unwell family members when everyone goes for work?

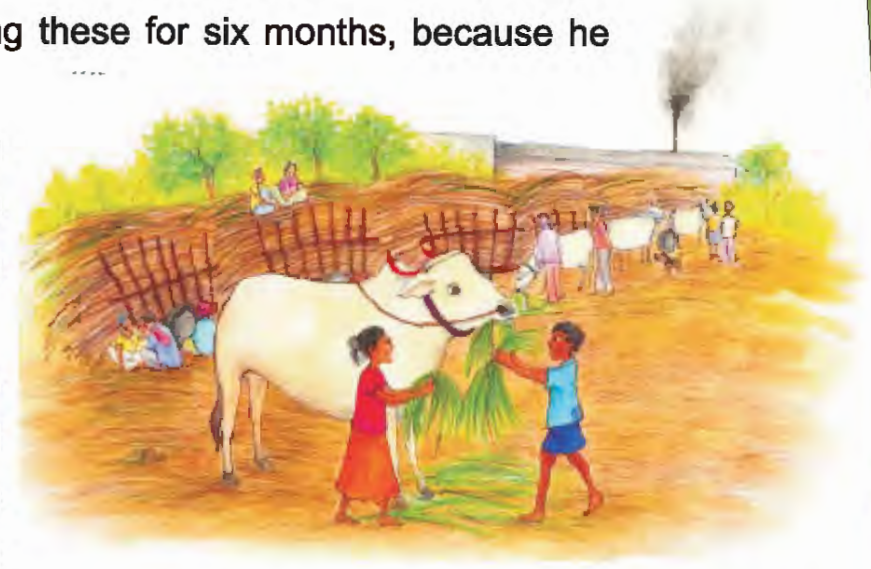
After Dushera

The *caravan* of these families would now settle near the sugarcane fields and sugar factories. For six months they would stay in their huts made of dry sugarcane and its leaves. The men will get up early in the morning and go to cut sugarcanes in the fields. The women and children tie the bundles of sugarcane. Then the bundles are taken to the sugar factory. Dhanu often goes with his father. Sometimes, they spend nights outside the factory on bullock-carts. There, Dhanu plays with the bullocks and wanders around.

At the factory, Dhanu's father gets the sugarcane weighed and takes a receipt (a note to say how much sugarcane they have given). They show this receipt to the agent who then keeps an account of their loan. The agent

also gives them some money for the next week's expenses. Then Dhanu's *aai* and *mami* take the children to the nearby village market, to buy *atta* (flour) and oil for the next week. Sometimes *mami* buys *laddoos* or some sweets for the children. She also buys pencils, an eraser and a notebook for Dhanu. After all he is *mami's* favorite!

But Dhanu won't be using these for six months, because he won't be going to school.



Mami wants Dhanu to study and become somebody in life. She does not want Dhanu to move around with his family like this. *mama* and *mami* tell Dhanu's parents, "Next time when we leave our village after Dushera we will leave Dhanu with his *dadi* and *chachi.* He will go to school like the other children in the village. He should continue his studies. He should study further and become somebody."

Think and tell

- Why does Mami wish that Dhanu should go to school for the whole year and study?
- What happens when you are not able to go to school for a long time?

Discuss and write

- Dhanu has to go with his village people to other places. Can there be some arrangements during that time so that Dhanu continues his studies? What kind?
- Do you know of any jobs/work for which people have to stay away from their families for many months? Look for examples from this book and write.
- What are the similarities and differences in the lives of different kinds of farmers?

What we have learnt

You have read about many kinds of farmers in different lessons in this book. Fill the table.

Name of the farmer	Owns land (✓ or X)	What do they grow (✓ or X)	What difficulties do they face	Any thing else
1. Damjibhai (Lesson....)				
2. Hasmukh (Lesson....)				

CHAPTER - 18

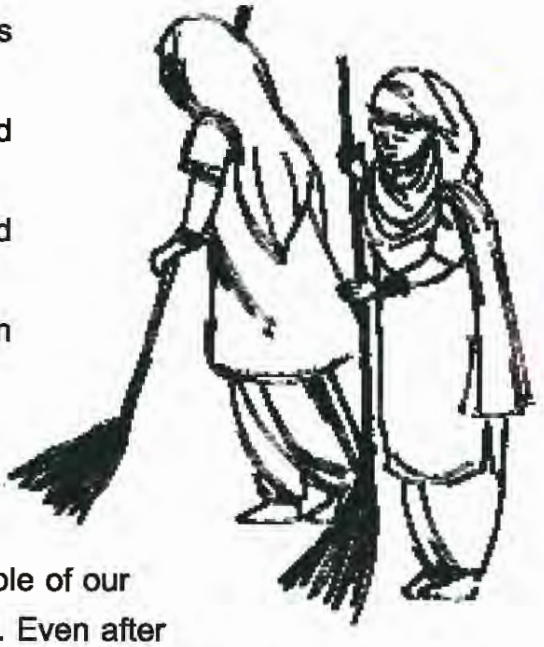
WHO WILL DO THIS WORK ?

Have you seen such scenes around you?

Have you ever thought of people who do this work? Can you imagine how they would feel?

Why do you think people need to do this kind of work?

Our friends spoke to some staff who do cleaning jobs. Here are some of the things they told us.



Q. Since when have you been doing this work?

A. About twenty years. Since I completed my studies.

Q. Why did you not study further? You could have got some other job?

A. You need money for studies. And even after that most of our people continue to do this kind of work.

Q. What do you mean?

A. Since our great grandfathers' times... or even before that, most people of our community have been doing this work. Even after getting a college degree, our people do not get any other kind of job. So they have to do this work.

Q. Why is that so?

A. That is the way it is. In the entire city, all the people who do this kind of work are from our community. It has always been so.

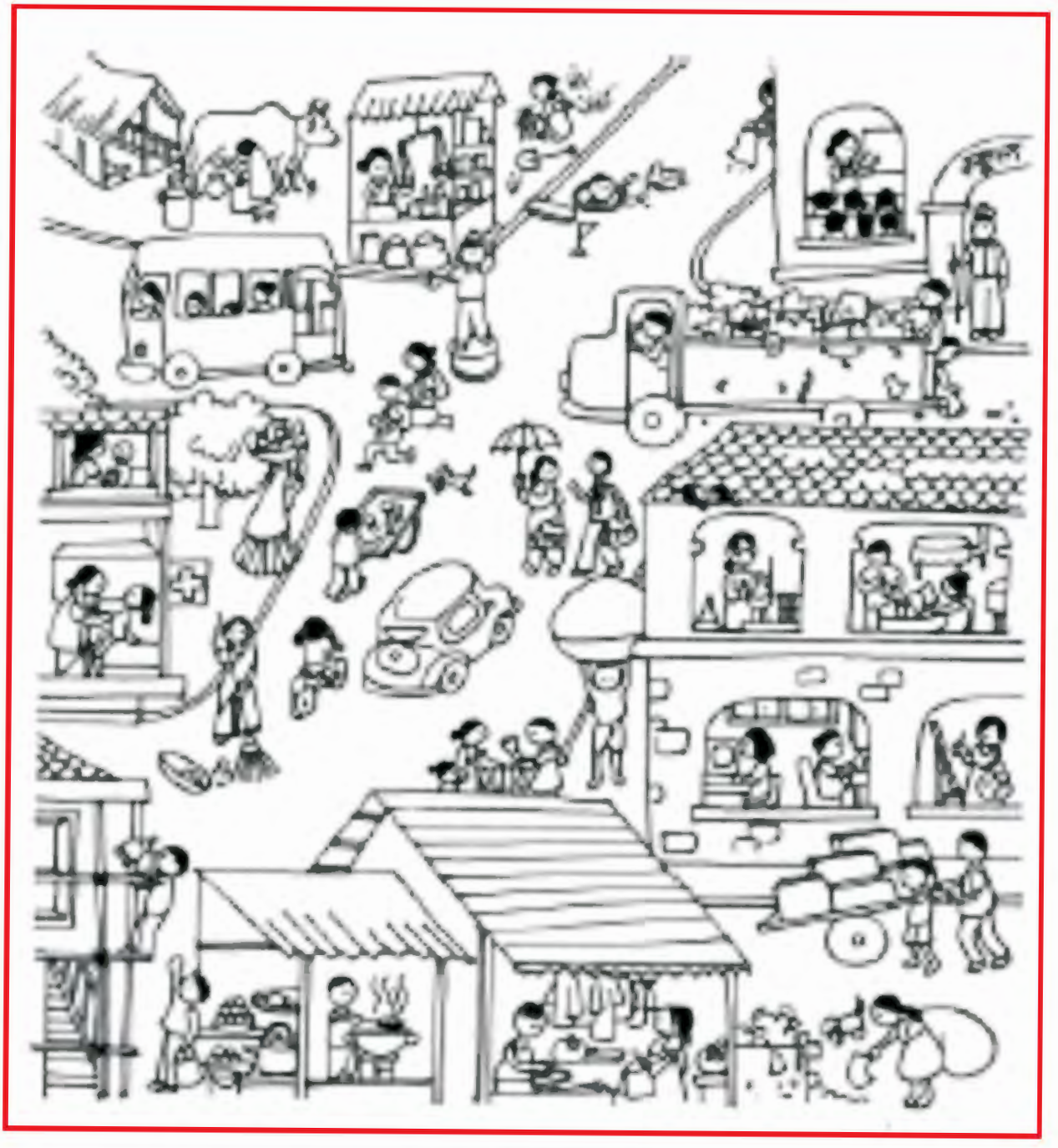
Interview (adapted) from the documentary film 'India Untouched' by Stalin. K.

Write

Talk with people who do the cleaning job around your house and school.

- Since when have they been doing this work?
- How much have they studied?
- Have they tried to look for some other work?
- Did the elders in their family also do this work?
- What kind of difficulties do they face in doing this work?

✍ What are the different kinds of work being done in this drawing? List any five of these.



✍ If you were asked to do any five jobs shown in this picture, which would you choose?

✍ Which five jobs would you not choose? Why?

Discuss

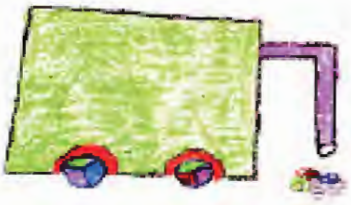
- What kinds of work or jobs do people not want to do? Why?
- So, who does this kind of work? Why do people do this kind of work that others do not want to do?

Imagine

- What would happen if nobody did this work? If nobody cleared the garbage lying outside your school or your house for one week, then what would happen?

Think of some ways (machines, or other things) so that people would not have to do the work they don't like to do. Draw a picture of what you thought.

(These pictures are also made by children)



Do you think that anyone has ever tried to change this situation? Yes, many people have tried. People are trying even today. But it is not easy to change this. One such person was Mahatma Gandhi. Gandhiji had a friend Mahadevbhai Desai. Mahadevbhai's son Narayan also stayed with Gandhiji when he was young. This incident is from Narayan's book.

Remembering those days

When Narayan (Babla) was about 11 years old, he was staying in Gandhiji's Sabarmati Ashram. Like everyone else in the Ashram, he had to do various kinds of work. One of his jobs was to teach the guests how to clean the toilets. In those days, the toilets were not what we know today. There used to be holes under which baskets were kept. People sat on the holes. Later the baskets had to be lifted by hand, to be emptied.

It was the usual practice that people from a particular community would do this work. But in Gandhiji's Ashram, every person had to carry the basket to the compost pit and empty it there. No one was excused from this task - not even the guests. Narayanbhai remembers how some people used to try and avoid this work. Some even left the Ashram because of this.

Some years later Gandhiji went to stay at a village, near Wardha in Maharashtra. Gandhiji, Mahadevbhai and others started to clean the toilets in the village. They did this for some months. One morning a man coming from the toilet, saw Mahadevbhai. He pointed to him and said "There is a lot of dirt over there. Go and clean that!" When Babla saw this, he was very angry. He thought, the villagers felt that this was not their work. This was for Gandhiji and his team to do. He asked Gandhiji why this was so. Gandhiji replied, "Untouchability is a serious matter. Lot of hardwork will be required to change this."

Narayan knew that the people who usually did this work were thought to be untouchable. He asked "What is the use if the village people do not change their thinking? They have become used to someone else doing this work for them."

Gandhiji replied, "Why"? Don't you think the people who clean also benefit from it. They also learn a lesson. To learn something is like learning a new skill. Even if it is a cleaning job."

Little Narayan was not convinced. He again argued, "Those who make a place dirty but do not clean it should also learn lessons." Gandhiji and Narayan continued to argue about this. But when he grew up Narayan always followed the path shown by Gandhiji.

From the book in Gujarati by Narayanbhai Desai – Sant-Charan-Raj, Sevita, Sahaj

Tell

- Why did Gandhiji and his team start doing the job of cleaning. What do you think about this?
- Do you know any such people in your area who try to help others in solving their problems? Find out.
- Guests at Gandhiji's Ashram had to learn this work also. If you were one of these guests, what would you do?

- What are the toilet arrangements in your house? Where is the toilet? Inside the house, or outside? Who cleans the toilet?
- How did the man who was returning from the toilet behave with Mahadevbhai? Why did he behave like this?
- How do people generally behave with those people who clean toilets and drains? Write.

A childhood story

This story is almost a hundred years old. Seven-year old Bhim went to Goregaon in Maharashtra with his father to spend his holidays. He saw a barber cutting the long hair of a rich farmer's buffallo. He thought of his own long hair. He went to the barber and asked for a hair cut. The barber replied, "If I cut your hair both my razor and I will get dirty." Oh, so to cut human hair can be dirtier than cutting an animal's hair, wondered little Bhim.

Later this little Bhim was known as Bhim Rao Baba Saheb Ambedkar. He became very famous across the world. Baba Saheb fought for justice for people like him. After India's freedom the Constitution was prepared under the leadership of Baba Saheb.

Narayan and Gandhiji discussed all this many years ago. Have things changed now?

A conversation in school - the reality today

Hetal : I am Hetal, and this is Meena. We both study in Class III.

Q: What all do you do in school?

Meena: We clean the ground.

Q: Do all children clean?

Hetal : No, not all.

Meena : We also have to clean the toilets. We do it on different days. I clean on Monday, she does on Tuesday, and she on Wednesday ... All the children from our community do this.

Hetal : We have to carry twenty buckets of water for this. We have to sweep and wash.

Q : Why only you? Why not all the children?

Hetal : Only we have to. If we don't we get beaten.

Interview (adapted) from the documentary film 'India Untouched' by Stalin. K.

Tell

- Who does the cleaning in your school? What all has to be cleaned?
- Do all children like you help in this? If yes, how? If all do not help, why not?
- Do all children do all kinds of work?
- Do they sometimes have to miss classes to do this work?
- Do the girls and boys do the same kinds of work?
- What all work do you do at home?
- Is the work done by boys and girls, men and women the same?
- Would you like to bring some change? What kind?

Discuss

- Do people look at different kinds of work in the same way? If not, why is this so? Why is it important to bring change?

What we have learnt

- Gandhiji used to say that every person should do every kind of work. What do you feel about this? If everyone followed this, what are the things that would change?
  What are some changes that will happen in your own house?

CHAPTER - 19

SUNITA IN SPACE

Straight from the heart

What do you think the earth looks like? Make a drawing of the earth in your notebook. On your drawing show where you are. Take a look at your friends' drawings too.

What is our earth really like?

Uzaira and Shahmir are playing with the globe. While they play they are talking to each other.

Uzaira: Do you know that Sunita Williams is visiting our school tomorrow? I have heard that she has spent more than six months in space.

Shahmir: (looking at the globe) Hmm... look here is America, Africa. Hey, where is space?

Uzaira: The sky, stars, sun and moon, they are all in space.

Shahmir: Yes, I know. Sunita Williams went in a spaceship. I saw on TV that she could see the earth from there.

Uzaira: Yes, from there the earth looked like this globe.

Shahmir: If our earth looks like this globe, then where are we? (Uzaira takes a pen and places it on the globe.)

Uzaira : Here we are. This is India.

Shahmir: If we were here like this, we would all fall off. I think we must be inside the globe.

Uzaira: If we are inside, then where is the sky, the sun, the moon and the stars? We must be on the globe. And all the seas and oceans must also be on the globe.

Shahmir: (pointing towards the lower part of the globe) You mean to say

that no one stays here?

Uzaira: People live here too. Brazil and Argentina are here.

Shahmir: Are the people there standing upside down? Why don't these people fall off?

Uzaira: Yes, it looks strange, isn't it? And this blue part must be the sea. Why doesn't the sea water fall off?

What do you think?

- If the earth is round like a globe, how is it that we do not fall off?
- Do the people in Argentina stand upside down?

Talking with Sunita

When Sunita Williams came to India, thousands of children like Uzaira and Shahmir got a chance to meet her. Sunita says that her friend Kalpana Chawla wanted to come to India and meet children. She came to India to fulfil Kalpana's dream.

Sunita's experiences of living in space!

- We could not sit at one place. We kept floating in the spaceship from one end to another.
- Water too doesn't stay at one place. It floats around as blobs. To wash our face or hands we had to catch these blobs and wet paper with them.

- We ate very differently there. The real fun was when all of us would float into the dining area of the spaceship and catch the floating food packets!
- In space there was no need to use a comb. My hair kept standing all the time!
- Not being able to walk, we had to get used to floating around.

We had to learn to do simple things differently. To stay at one place, we had to strap ourselves there. Papers also had to be stuck to the wall of the spaceship. It was a lot of fun living in space but it was also difficult.

Look at the photographs and write

Can you think why Sunita's hair was standing?

Look at Sunita's photographs and the dates written on each of them. Write what all is happening and when?

Classroom becomes a spaceship

- Close your eyes. Imagine that your class is a spaceship. Zooo...m – in 10 minutes you have entered in space. Your spaceship is now going around the earth. Now say:
  - Are you able to sit at one place?
  - What about your hair?
  - Oh, look ... Where are your bags and books going?
  - And what is your teacher doing? Where is her chalk?
  - How did you eat your food during the break? How did you drink water? What happened to the ball that you threw up?
- Act out or draw the scene.

We take off (9-12-2006)

Our feet don't stay on the floor! (11-12-2006)

Where is this food flying away? (11-12-2006)

Look, my hair is standing, no problem while working (13-12-06)

Sunita outside the spaceship, really inspace! (16-12-06)

Courtesy : NASA

Isn't it amazing?

On the earth when we throw something up, it comes down. When we throw a ball up in air, it falls back. We are able to catch it. On the earth, we don't keep floating around. When we fill a glass or bucket with water, it stays there. It doesn't float around in blobs as Sunita Williams says. It is something special about the earth that makes this happen! The earth pulls everything towards itself.

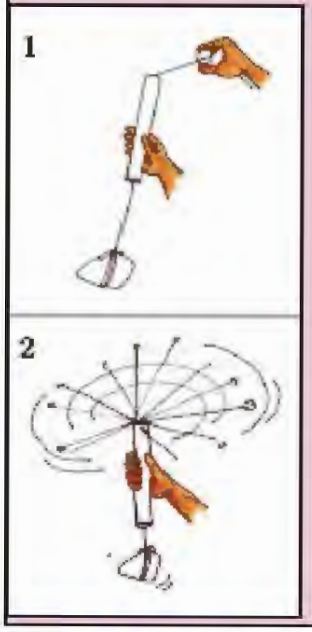
Sunita Williams went 360 kilometres away from the earth, in the spaceship. Think how far this would be! Find out which town or city is located about 360 kilometres away from where you live. This is how far Sunita Williams went away from the earth.

- Can you now say why Sunita's hair kept standing?
- Think why water flows downwards on any slope. On mountains too water flows downwards, not upwards.

Magic 1 – A tiny paper races a coin

Take a 5 rupee coin and a small piece of paper. The paper should be about one-fourth the size of the coin.

1. Hold the coin in one hand and the paper in the other. Drop them at the same time. What happened?
2. Now place the tiny paper on the coin and drop them. What happened this time? Surprised!



Magic 2 – A mouse lifts an elephant!

To play this you will need a small stone, a bigger stone (lemon-sized), a thick roll of paper (which can be made with layers of papers), mouse and an elephant made of paper.

- Take a string about 2 feet long.
- At one end of the string tie the small stone. Stick or tie the mouse to the stone.
- Put the string into the roll of paper.
- At the other end of the string tie the bigger stone and stick the elephant.
- Hold the roll of paper and move your hand to rotate the small stone.

Who is pulling whom? You will be surprised! The mouse lifts the elephant! How did this magic happen?

Where are the lines, really!

Sunita describes her view of the earth from the spaceship: "The earth looks so beautiful and amazing. We could watch it for hours, from the window of the spaceship. We could clearly see the curved shape of the earth."

Look at this photograph of the earth, taken from a spaceship. From such photographs today we know what the earth looks like. But thousands of years ago, people could only imagine what the earth looked like. Scientists tried hard to find out – how big is the earth, how does it go around?

Look at this photograph and tell

- Can you see India?
- Can you recognise any other place?
- Where is the sea?
- Do you find anything similar between the globe and this picture of the earth? In what ways are they different?
- Do you think Sunita could make out Pakistan, Nepal and Burma separately, when she saw the earth from space?

Look at a globe in your school

- Can you find India?
- Where all do you find the sea?
- Which countries can you see?
- Can you see some of the countries with which India plays cricket matches? For example: England, Australia, Pakistan, Bangladesh and South Africa.
- What else can you see on the globe?

Uzaira: See, there are lines between the different countries on this globe. Are such lines also there on the earth?

Shahmir: There must be. They are there on the map of India in this book. See, there are lines between the different states too.

(Uzaira and Shahmir are looking at different countries on the globe.)

Uzaira: If we go from Delhi to Rajasthan, would we find such lines made on the ground?

Look at the map given in this book and tell

- Can you find the state in which you live? Write its name on the map.
- Which are the states next to the state you live in? - Have you been to any other state?
- Shahmir thinks that there are lines drawn on the ground between the states. What do you think?

When Sunita saw the earth from space she found the earth very beautiful. Many thoughts came to her mind. As she describes it, "From so far away, one can only make out the land and the sea. One cannot see the different countries. Division into countries has been done by us. All the lines on the maps are made by us, they are in our minds. I wish we all think about this. Where are the lines, really?"

Look at the Sky

Shahmir: (He closes one eye and moves the coin back and forth while looking at the moon.) Look, I can hide the moon behind this coin.

Uzaira: Wow! Imagine hiding such a big moon behind such a small coin.

Why don't you try to do the same with a coin? How many centimetres away from the eye did you keep the coin to hide the moon?

Think

Do you think the moon is flat like the coin or round like a ball?

Have you ever looked carefully at the sky at night? Don't the twinkling

stars look magical! And sometimes the moon is silvery and bright, while sometimes it is nowhere to be seen in the black sky.

- Look at the moon tonight and draw what it looks like. Look and draw again after one week, and then after 15 days.

Today's Date	Date after a week	Date after 15 days

Find out

- When is the next full moon? At what time will the moon rise on this day? What does the moon look like on this day? Draw it.
- What are the festivals related to the moon?
- At night look at the sky carefully for 5 minutes.
  – What could you see?
  – Did you see anything moving in the sky? What do you think it could be? A star or a shooting star or a satellite (satellites are used for the TV, telephones and for weather reports). Find out more about this.

Look at the table and tell

Given below are the times at which the moon rises and sets in Delhi (on the given days).

Date	Time of moonrise (hours : minutes)	Time of moonset (hours : minutes)
28-10-2007	19:16	08:50
29-10-2007	20:17	10:03
30-10-2007	21:22	11:08
31-10-2007	22:29	12:03

- On 28 October the moon came out at ___ minutes past ___ o'clock.
- On 29 October the moon came out at ___ minutes past ___ o'clock.

On 29 October there was a difference of ___ hours and ___ minutes in the time of the moon rise (as compared to 28 October).

If you saw the moon rising at 7 pm today, would you see it at the same time tomorrow?

On 31 October the time of setting of the moon is given as 12:03. Have you ever seen the moon at 12 in the afternoon? Why don't we easily see the moon or stars during the day?

The poet is also raising such questions in this poem.

Twinkling stars

Stars are twinkling
in the sky.
Why do they twinkle?
Tell me why.
How many can you see?
Some seem near
and some seem far.
Is there a name
for every star?
How many can you see?
They shine so bright
in the dark of night!
Why do they hide
in the morning light?
How many can you see?
Some shining stars
we know so well.
But every star
has a tale to tell!
How many can you see?

- Anware Islam
Chakmak, December 2003
(Translated by Anupa Lal)

An interesting photograph!

A spaceship went to the moon. This photograph of the earth was clicked from the surface of the moon.

See how the earth is looking. Can you see the surface of the moon? Do you have some questions after looking at this picture? Write down those questions and discuss them in the class.

Do your best and things will work out!

When Sunita was five years old she saw pictures of Neil Armstrong landing on the moon. In 1969, Neil Armstrong was the first man to walk on the moon. Like any other child, Sunita was also fascinated. Sunita says that when she was a young girl she really loved sports, especially swimming. She was never too interested in studies. After high school Sunita wanted to become a diver. But she could not get into that course. Instead, she became a helicopter pilot. One day she found out that if she studied and trained for it, she could join the Space Mission. And that is what she did! In 2007 Sunita Williams set a new record for the longest space flight by a woman.

Sunita often gives her own example to tell children, "If you want something, but you get something else, do not give up. Do your best, and things will work out!"

When Sunita was asked by a child what would she like to do in the future, she answered, "I want to become a school teacher!" So that she could make children understand how science and maths are closely linked to our lives.

What we have learnt

- Why do children always slide down the slide and not slide up? If this slide were there in Sunita's spacecraft, would children slide like this? Why?

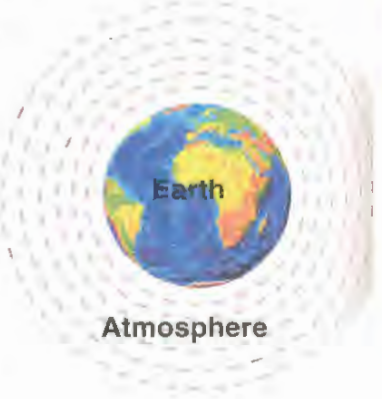
- Why do we see stars mostly at night?
- Looking at earth from the space, Sunita said, "Different countries cannot be seen as separate from here. These lines are on paper. They are made by us." What do you understand by this?

CHAPTER - 20

AIR : ITS USES AND POLLUTION

The earth is surrounded by an envelope of air, called the atmosphere. It extends up to a few hundred kilometres above the earth.

Air is a mixture of gases like nitrogen, oxygen, carbon dioxide, argon, hydrogen, helium, neon, etc. All living things use oxygen in the air for breathing. Without air, life would be impossible on the earth.



The atmosphere is most dense at sea level

The density of atmospheric air decreases with altitude (height).

Air Exerts Pressure

Air is a matter and, therefore, has weight. Air exerts pressure because it has weight. Several kilometres high column of air above us, exerts a tremendous pressure on us. We do not feel this pressure because it acts equally in all directions. We can prove that air exerts pressure by the following activities.

ACTIVITY

Take a glass tumbler and fill it completely with water. Cover the tumbler with a thick cardboard with your right hand. Hold the tumbler with the other hand and carefully turn the tumbler upside down.

What do you see ?

Does the cardboard fall down ?

Does water go out ?

Air exerts pressure

You will see that cardboard does not fall down.

It is because that air exerts an upward pressure on the cardboard and so the cardboard and water do not fall.

Thus, from the above activity, it is clear that air exerts pressure.

Activity

Take a narrow tin can. Put some water in it. Heat the water till it starts boiling.

Let the water boil for a while. After that close the mouth of the can tightly. Allow the can to cool.

What do you find after some time ?

You will find that the sides of the can crumble. The water vapour produced by the boiling water drives away the air contained in the can. When the can is allowed to cool, the vapour condenses to water and a partial vacuum is created inside the can. Now the pressure of the outside air acts on the can and crumbles it.

Atmospheric pressure deforms the can

The above activity shows that for seeing the effect of air pressure, we have only to remove air from a container.

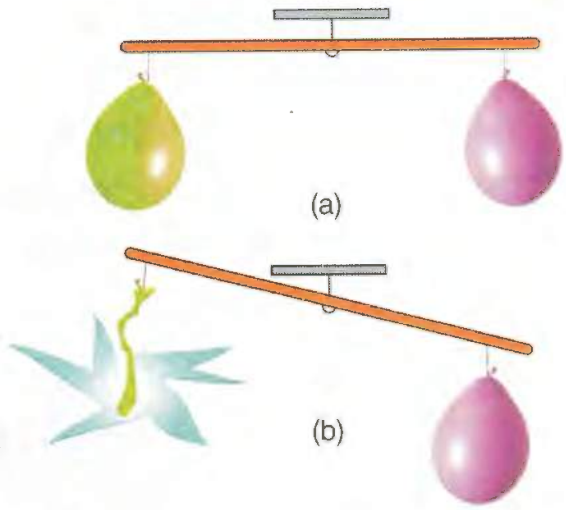
Air Occupies space and has weight

To show that air occupies space and has weight, let us perform the following activity:

ACTIVITY

Take a thin straight stick, two balloons of the same size, a string and a pin. Tie the string to the middle of the stick. Fill both the balloons with air so that both of

them are equal in size. Tie the mouths of the two balloons with strings of the same size. Hand the balloons one on each side of the stick as shown in fig. (A). Hold up the string at the centre.



The stick remains horizontal and the balloons are balanced. Now prick one of the balloons with the pin and allow air to escape. This end will go up and the other end will come down as shown in fig. (B).

The balloon filled with air is heavier than the balloon which has no air. This shows that air occupies space and has weight.

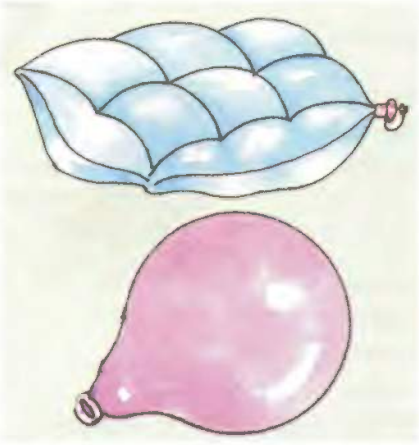
The uses of Air

The properties of air like 1. air occupies space, 2. air has weight and 3. air exerts pressure help us to perform some of our day-to-day activities.

1. Air can expand certain bodies

Since air occupies space and exerts pressure, it is therefore used to inflate (expand) things like balloons, air pillows and mattresses.

Balloons and pillows are elastic in nature. When air is filled in them, the pressure of air expands their bodies.



Air can be used to inflate a football bladder or a cycle tube. The football will bounce well because of the pressure of the air inside the bladder.

Air is also used to inflate tubes of cycle, car, bus

and lorry tyres.

Due to the air pressure on the inner walls of the tyre-tube, the bicycle and the other vehicles run smoothly on the road.

2. Air pressure can move liquids

Air pressure is used to draw liquids up in straw, an injection syringe, a medical dropper, an ink-filler, a fountain pen, and the common lift pump.

We use a straw to draw cold drink from a bottle. One end of the straw is kept in the drink and is sucked through the other end. Owing to this, some air is removed from the straw tube and the air pressure inside it is reduced. Now the outside pressure acting on the surface of the drink forces it up into the straw and then into the mouth.

Atmospheric pressure help in sipping drink

Atmospheric pressure presses liquid medicine into the syringe

An injection syringe works with air pressure. The doctor introduces the syringe into the liquid medicine and pushes the piston down pushing the air out. Then he pulls the piston up. The outside air exerts pressure on the surface of the medicine and forces the liquid into the syringe.

Atmospheric pressure presses the liquid into the medicine dropper. The open end of the dropper is dipped into the liquid medicine and the rubber bulb is pressed. The air from the tube of the dropper is forced out and the air pressure inside it reduced. The outside air pressure presses the liquid medicine into the tube of the dropper. The liquid contained in the dropper can now be emptied.

Atmospheric pressure presses liquid into the dropper (filler)

The fountain pen also works on the same

principle. The medicine dropper can also be used as ink-filler.

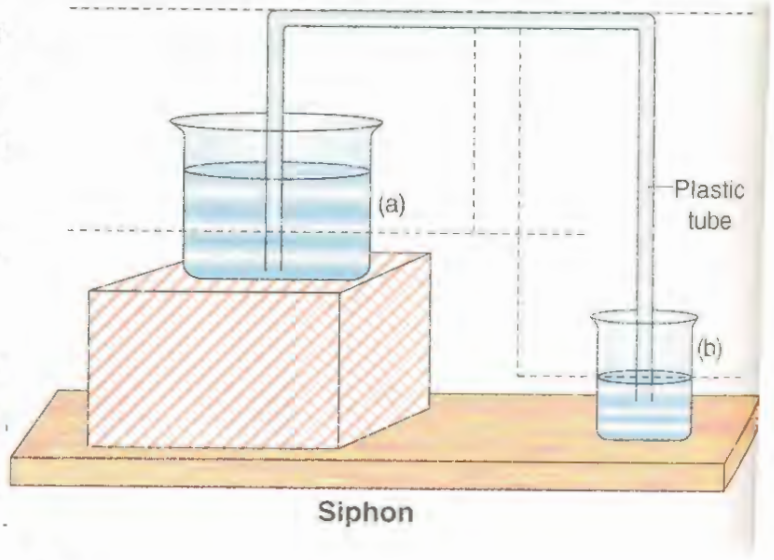
The common lift pump works on the same principle as a syringe and it helps to draw water up.

There are two valves in a lift pump which open only upward and prevent water from going down.

If you are asked to transfer the kerosene oil from a big container into a beaker. How will you do it ?

Take a plastic tube and fill it completely with the kerosene. As shown in the siphon figure, let one end of the rubber tube be dipped in the kerosene and the other end be kept in the beaker. Kerosene will flow speedily and get collected in the beaker.

In this way, the kerosene from the container can be emptied into different beaker. Care should be taken to see that the level of kerosene in the container is higher than that in the beaker. The higher the level of the container from which the liquid is transferred, the faster will be the flow of liquid. There should not be any air leakage in the siphon tube.



Siphon

A siphon is a simple arrangement usually made of glass, or plastic, or rubber tube which provides an easy transfer of liquid from a higher level to a lower level.

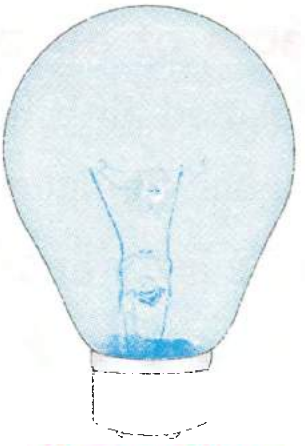
A siphon is, generally, used if the container is too heavy to be lifted, if the container is fixed to a part of a machine or if the container contains a liquid sediment.

3. Various constituents of air

* **Nitrogen** : It is the main constituent of air. It is required for the normal growth and development of plants. It is an inactive gas, so it serves to dilute the highly active gas, oxygen. Now-a-days, fertilizers are prepared from the nitrogen of air. Fertilizers increase crop yield.

* **Oxygen** : It is the active constituent of air. All living things depend on oxygen for respiration. No life can exist on earth without oxygen. It is also essential for burning.

* **Carbon dioxide** : It is present in air in very small amount. In the presence of sunlight, green plants prepare their food by using this gas.



Krypton and Argon user of the Bulb.

* **Water vapour** : Water varpour in air is the cause of the dew, clouds, rain, snow and hail.

* **Rare gases** : Helium, neon, argon, krypton and xenon are known as 'rare gases' of air. They are very inactive. Helium is used for filling balloons. Argon and krypton are used for filling electric bulbs. Neon is used inside the brightly coloured advertising lights (neon signs).

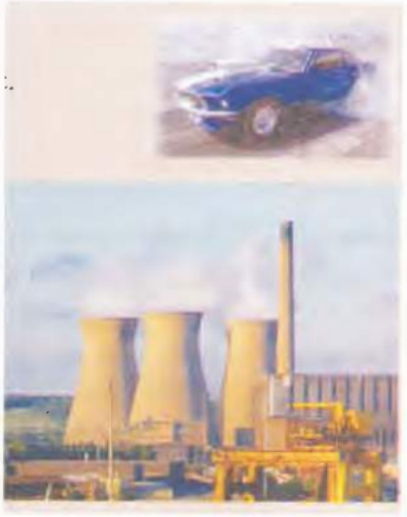
Air Pollution

Air is most important for our existence. It is essential for respiration of both animals and plants. Therefore, air has to be, as far as possible, pure. When poisonous gases and harmful substances mix with the air and make it impure, the air is said to be polluted.

Air gets polluted by smoke, dust and coke emitted by running automobiles and chimneys of factories.

Some common air pollutants which pollute the air are gases like carbon monoxide, carbon dioxide, dust, sulphur dioxide, etc.

Sources of Air Pollution



Various sources of air pollution are :

Burning coal, wood, kerosene, petrol, diesel, etc.

Exhaust gases from automobiles.

Smoke from factories.

Smoke Dirt and dust raised by heavy traffic.

Dirt and dust from certain mines.

Decaying animal and plant matter in garbage.

Effect of air pollution

Polluted air is harmful and injurious to human health. Some of the harmful effects of inhaling polluted air are:

*Redness and irritation of eyes.

* Chocking sensation in the throat.

* Difficulty in breathing, bronchitis.

* Cough.

* Sneezing.

Do you know that Tokyo is the most polluted city of the world and Delhi is the most polluted city of India ? Other most polluted cities of India are Kolkata, Mumbai and Kanpur.

Control of air pollution

The pollution of air can be controlled by the following ways:

1. By using smokeless sources of energy, like solar energy, wind energy etc.
2. By installing very tall chimneys in the factories.
3. By growing more trees.

New Words

Expand	:	Cause something to become greater in size.
Garbage	:	Waste material, especially domestic waste, agricultural waste.
Inactive gas:		One of the constituents of air that dilutes the highly active gas, oxygen.
Matter	:	A physical substance in general. Substance, material or thing of a specified kind.
Pollution	:	Unfit condition of air, water or land resulting by addition of pollutants.
Pollutants	:	Substances which pollute the air, water or land.
Pressure	:	Force, or weight of something pressing continuously on, or against, something that it touches.
Siphon	:	Pipe, tube, etc., in the form of an upside-down, used for making a liquid flow; for example, from one container to another, using atmospheric pressure.
Vacuum	:	The space that is completely empty of all matter, or gases.
Weight	:	Degree of heaviness of a thing, especially as measured on a balance.

RECAP

- Air has weight and exerts pressure.
- Air pressure can move liquids.
- Air ink-fillers, common lift pumps and siphon operate by using air pressure.
- Air can expand certain bodies.
- Air contains many gases useful to man.
- Living being breathe in oxygen. Oxygen is needed for combustion.

- Nitrogen is needed for the manufacture of fertilizers.
- Carbon dioxide is needed for the plants to prepare their food.
- Air gets polluted by smoke, dust and coke.
- Polluted air is harmful to human health.

Think and Answer

I. Fill in the blanks. Choose the right words from the box:

harmful air exerts pressure nitrogen space
oxygen mixture no weight

1. Air has _____ shape of its own.
2. Air is a _____ of gases.
3. The major constituents of air are _____ and _____.
4. Air occupies _____ and has _____.
5. Pichkari works on the principle that _____.
6. Polluted air is _____ to health.

II. Give scientific reasons:

1. Air exerts pressure but we do not feel it.
2. Air is a mixture of gases but to us it appears to be a single gas.
3. Air has no shape of its own.

III. State whether True or False for each statement:

1. Air is a mixture of gases. [ ]
2. Air does not occupy space. [ ]
3. Air exerts pressure. [ ]
4. Air takes the shape of the container. [ ]
5. Carbon dioxide is needed for green plants to prepare their food. [ ]
6. Polluted air is suitable for breathing. [ ]

IV. Tick (✓) the correct answers :

1. Air consists of :

(a) oxygen only (b) Nitrogen only

(c) Carbon dioxide only (d) all the above gases.

2. Fertilizers are prepared from :

(a) nitrogen (b) oxygen

(c) carbon (d) rare gases.

3. A gas used in brightly coloured lights is:

(a) argon (b) krypton

(c) neon (d) helium

4. The gas used in filling balloons is :

(a) oxygen (b) helium

(c) nitrogen (d) carbon dioxide

5. Pollution of air is due to :

(a) carbon dioxide given out by human beings and animals.

(b) smoke given out by automobiles, factories, etc.

(c) cutting of the green plants.

(d) growing less trees and plants.

V. Answer the following questions :

1. Mention two properties of air pressure ?
2. Describe an experiment to prove that air has weight ?
3. Describe an experiment to prove that air exerts pressure ?
4. State the names of five rare gases in the air ?
5. Cite some examples which are based on the principle that air exerts pressure?
6. How does medicine dropper work ?
7. Name the gadgets in daily use which make use of air pressure?

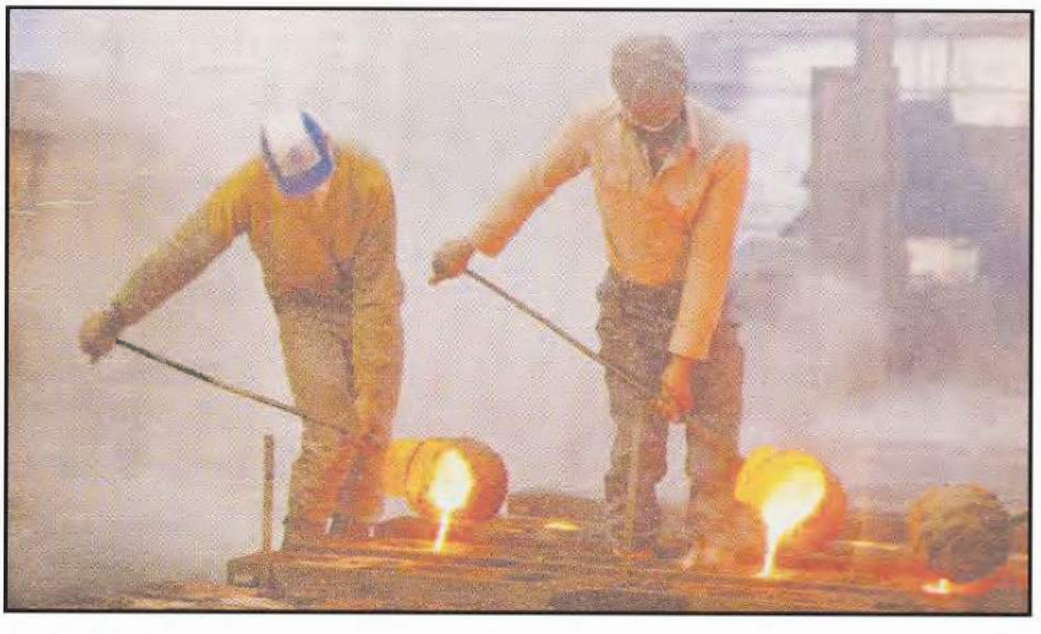
8. Give an experiment to show how air pressure helps to push down or lift the liquid up in the straw.
9. How do you feel the air around you?
10. State the uses of nitrogen and oxygen?
11. State the uses of carbon dioxide?
12. State two uses of siphon?
13. What is air pollution ?
14. What are the different causes of air pollution ?
15. List some ways to control air pollution.

DO AND LEARN

1. Bring a tumbler up to your mouth. Suck air out of the tumbler. See what happens. Why does it get stuck to your mouth ?
2. To find out whether the air that you breathe in is pure, carry out some activities at home:

(i) With the help of your parents clean the blades of a ceiling fan observe it after a week, especially in summers when it is in use.

(Ii) Take a potted plant and wash its leaves with water. Keep the plant in the open. Observe it for 3-4 days.



CHAPTER - 21

CLOTHING AND CULTURE

Our country India is a vast country. It has many diversities. There is diversity in dresses, cultures, languages, food habits etc. This diversity is due to the geographical conditions. Our country has mountains, plains, valleys and coastal areas. In these places the life style of people varies in accordance with the climate and available resources.

North Indian food

South Indian food

Food in other regions

Different dishes are made in different regions. Similarly, the dresses of the people also varies in different parts of the country. In this lesson we will study about the various dresses and cultures of various states of India.

Jammu & Kashmir

Kashmir Division has a very cold climate. The people here need to wear dresses which completely cover their bodies. For this, they wear long loose coats called phirans and salwars. This woolen fabric protects the Kashmiri people from the cold. The women wear veils and the men wear fur caps. Ladies wear a lot of silver jewellery. The Kashmiri people love to

A Kashmiri couple

sing and dance. Their special dance is Rouf. They like to eat rice, fish, meat and rajma. In Kashmir most formed meal is "Wazwan" and is a must for all special occasions and no ritual is complete without serving Wazwan. They prefer to drink Kahwa. The Jammu Division of the state has moderate climate. The people living in and around Jammu city are called Dogras. The men wear long kurta, chudidar pyjama and pagri. The women wear salwar and kurta called Dogri suits. Their special folk dances are Dhamachda, Kud, Fumani and folk songs are Bhakhan, Suhag, etc. They like to eat babbar, malpude, rajma and rice, chatneys, madhras, ambal, kalari and khatta meat.

Himachal Pradesh

As the name suggests, the state also has cold weather so people wear warm clothes. The warm coats the people wear here are known as cholas. Beautifully embroided caps of men and scarves of women are known as dhazu. They also love to sing and dance.

Dress of Himachal Pradesh

Uttar Pradesh

Generally the climate of this state is of normal temperature. The traditional dress of Uttar Pradesh is dhoti or kurta-pyjamas and caps for men and saree-blouse for women. Men also wear trousers and shirts. Salwar-suits are also worn by women. Village women wear colourful ghagra-choli. The usual diet of people includes roti, rice, dals and vegetables.

Dress of Uttar Pradesh

Punjab

The Punjabi men wear lungi or kurta-pyjama and a head gear pagdi or safa. Most women wear salwar-kurta or salwar-kameez with duppatta. The people of Punjab prefer to wear colourful clothes. The most popular dances of Punjab are Bhangra and Gidda.

Dress of Punjab

Their staple food is roti. Chhole-bhature is also very famous. They prefer to take a lot of curd and drink lassi. They are also fond of non-vegetarian food like chicken, fried dish, etc.

Delhi

Being the capital of India, people from almost all the states, cities and towns come here and stay. Here men like to wear trousers and shirts. Women wear salwar-suits, sarees, skirts and even trousers. Since people of different states live here, food habits vary and are also changing. The habit of non-vegetarian food is also very common here.

Haryana

It is a neighbouring state of Delhi. Most of the people live in villages. The men wear dhoti or pyjama with kurta or kamri. The women wear ghagra-kurta or salwar-kameez with odhni.

Their main food is roti and dal with butter or ghee. They also take a lot of curd. They all like lassi and milk.

Dress of Haryana

Kerala

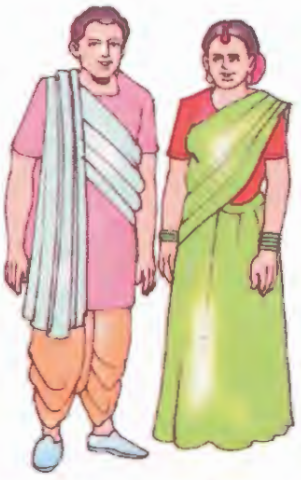
The traditional dress of Kerala is mundu and shirt for men. Ladies wear mundu and blouse. The women of Kerala love to wear cream coloured handloom sarees with golden border on them.

They are also fond of music. The famous dance of Kerala is Kathakali which is based on Ramayana and Mahabharata.

Rice is the main food of Kerala. They also like to eat fish curry. The famous dishes of Kerala are idli, dosa, utappam, sambhar, aviyal, etc. Since it is a coastal state, people prefer to take a lot of sea food.

Kathakali Dance

Dress of Kerala



Dress of Tamil Nadu

Tamil Nadu

People here prefer to wear cotton clothes as there is hot and humid climate. Men wear dhotis called veshtis or lungi and shirts. A cotton towel or thundu is also placed over the shoulders. Young girls wear 'pavada' and blouse which is similar to lehanga. Ladies generally wear sarees.

Bharatnatyam

The main dance form is Bharatanatyam and Kolattam (folk dance like the Dandiya of Gujrat). The favourite dishes are dosa, vada, upma, rasam and sambhar. Rice is the staple diet of the people.

Karnataka

The women of Karnataka wear sarees and blouses called kupsas. They like to wear flowers in their hair. Young girls wear Pavadas. The men of Karnataka wear shirts and dhotis. They put a cloth called angavastra over shoulders.

The traditional folk dance of Karnataka is called yakashagana. The people are mainly rice eaters. Idli, dossa, sambhar, upma, rasam, etc., are also very famous dishes of Karnataka.

Kuchupudi

Andhra Pradesh

The people of Andhra Pradesh prefer to wear cool cotton clothes. Men wear dhotis and shirts and women wear sarees. Andhra Pradesh is the home of Kuchipudi dance. The people are fond of music, dance and drama. The main food are chapatis, dosa, idli, fish and meat. They use a lot of tamarind and chillies and their favourite dish is Arattu.

Arunachal Pradesh

A large number of tribal people are seen here. They prefer to wear colourful clothes and have their own customs.

Dress of Nagaland

Nagaland

It is also mainly a tribal state. There are fourteen tribes. Out of them, some important tribes are Angami, Chang, Konyak and Ao. Each tribe is identified by the special design on their shawls. Shawl is a very important part of their dress. The Nagas are very fond of singing and dancing. They eat rice and meat. They drink a kind of beer namely zu.

Assam

The Assamese women wear long skirts called mekhala, alongwith riha and a duppatta called chadar. The Assamese men wear dhoti and kurta. They are fond of eating rice, fish, chapati and vegetables.

Dress of Assam

Mizoram

Here also, there are many tribes. These tribes have their own dresses. Most of the people are Christians and are fond of singing and dancing. Their famous dance is bamboo dance.

Meghalaya

The people of Meghalaya belong to three ancient tribes - the khasis, the garos and the Jaintias. They wear colourful dresses. Each tribe has its own cultures and customs, etc.

Sikkim

The men of Sikkim wear pretty handwoven clothes. The women wear long skirts called baku. They also wear colourful jewellery. The people are of three groups - lepchas, bhutias and nepalese.

Orissa

Men wear dhotis and kurtas. The women wear sarees and blouses. Ladies of Orissa wear a lot of silver jewellery. The Odissi is the classical dance of Orissa. People prefer to eat rice, pulses, vegetables, fish and meat. The tribals of this place live inside the deep forest.

Odissi

Dress of West Bengal

West Bengal

The men of West Bengal wear dhoti and kurta whereas woman wear sarees. The tribals of the state like santhals have their own dresses and cultures. Bengalis are very fond of music. They have a blend of poetry also. Fish and rice are staple food of Bengalis. Sweet dishes like rasogolla and sandesh are very famous.

Bihar

The people of Bihar wear dhoti-kurta (men) and sarees (women). The favourite dishes are rice, chapati, dals, vegetables and fish. Thekua, the sweet dish and madhubani painting of Bihar are famous.

Dress of Bihar

Dress of Maharashtra

Maharashtra

The men of Maharashtra wear dhotis, kurtas and caps of turbans. The women wear sarees tied in a special way. They wear flowers in their hair. When they wear sarees it comes up

to their knees and not to the ankles or feet.

Maharashtrians enjoy the folk dance called 'Tamasha'. Bakri, chapatis made from wheat or jowar, vegetables and curd is the popular food in Maharashtra. Bhelpuri and pavbhaji are also very popular.

Madhya Pradesh

The central part of India, Madhya Pradesh, is very simple towards it dress. People wear simple light clothes as there is not too cold or too hot weather. Men wear dhoti-kurta or pyjama-kurta and women wear saree-blouse and ghaghra-choli. Rice, dal, chapatis and vegetables are the staple food.

Goa

The dress of men is trousers and shirts. The women wear skirts, blouses and sarees. In some parts, men wear lungis and shirts.

Rice, vegetables, sea food and meat are their favourite dishes. The Goans like to sing and dance and lead a happy life.

Dress of Goa

Dress of Rajasthan

Rajasthan

People in Rajasthan wear their own particular dresses. Men wear pajami and kurta or churidar trousers with achkan or angarkha and coloured turbans. The women wear ghaghra-choli called kachli and odhani. The people like to have roti, dal and vegetables. People there like to drink camel's milk.

Gujrat

As Gujrat is situated on the bank of Arabian Sea, people wear light clothes. The Gujarati men like to wear Dhoti-Kurta and Gandhi cap. Some wear churidhar payjamas with jackets and colourful turbans. The woman wear sarees, lehengas, cholis and odhnis.

The most famous dances of Gujrat are the Garbha and the Dandiya Ras. Gujrati peopl like to eat rice, puri, dals, vegetables, curd and pickles. Their most famous dish is dhokla.

Dress of Gujrat

Garbha Dance

Dandiya Ras

In this chapter, we can conclude that saree is a popular dress all over India among ladies. Some popular brands of sarees are Banarasi from Varanasi, the Patola from Andhra Pradesh, the Chanderi from Madhya Pradesh and Kancheevaram from Tamil Nadu. Among men dhoti, kurta-pyjama, trouser-shirt, etc.,are very common.

Revision Points

* India is a vast country which has many diversities.
* Different dishes are famous in different regions of India.
* In cold regions, people wear warm dresses.
* Dresses and cultures of different states are different.
* Saree is a popular dress all over India for women.
* Men prefer to wear dhoti, kurta-pyjama, trouser, shirt, etc.

Exercises

I. Fill in the blanks

1. India is a ..... Country.
2. Jammu & Kashmir has very ..... Climate.
3. The special dance of Jammu is .....

4. Dhazu is worn by ladies of .....

5. The headgear that Punjabi men wear is .....

II. Answer the following questions.

1. In which two states are milk and lassi popular drinks ?
2. Name the famous dance form of Kerala.
3. Which state is famous for Bharatanatyam ?
4. Name the folk dance of Tamil Nadu.
5. What is the special name of blouses worn by women of Karanataka ?
6. Which is the famous dance of Andhra Pradesh ?
7. Name the state where most of the people are Christians.
8. Name the classical dance of Orissa.
9. Which is the folk dance of Maharashtra ?
10. In which state Gandhi cap is very famous ?

III. Write the name of clothes worn by the people of following states.

1. Tamil Nadu
2. Kerala
3. Jammu & Kashmir
4. Gujrat
5. Orissa

IV. Match the following.

A	B
1. Churidar trousers with achkan	(a) Assam
2. Mekhala	(b) Nagaland
3. Shawl with special designs for identification	(c) Karnataka
4. Angavastra	(d) Jammu & Kashmir
5. Bhakhan and Suhag	(e) Rajasthan

V. Write (T) for true (F) for false against the following statements.

1. Phiran is used in colder regions.
2. Kud and Rauf are the famous dances form of Jammu and Kashmir
3. The most famous dish of Gujrat is Dhokla.
4. Tamasha is the folk dance of Rajasthan.
5. Light clothes are worn in regions where there is moderate temperature.

VI. Classify the following dresses into men and women.

Kurta-Pyjama, Saree-blouse, Lehenga, Gaghra-choli, Odhani, Achkan, Salwar, Mundu, Coat, Skirt.

Men	Women

Projects

1. Collect pictures of different dresses of various states and paste them in your scrapbook
2. Collect the pictures/photographs of various dances of India.