

# VASUDHAIVA KUTUMBAKAM - IV

We, Our World

ENVIRONMENTAL STUDIES

PART 1



NAME \_\_\_\_\_

SCHOOL \_\_\_\_\_

# Vasudhaiva Kutumbakam

– We, Our World



**EVS – TERM I**



# **‘Vasudhaiva Kutumbakam – We, Our World’**

*Second Edition published in 2024*

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# Preface

पृथिव्यापस्तेजो वायुराकाशमिति भूतानि । (Nyaya Darshanam,1.1.13)

Vedic knowledge states that everything in this universe, including our body, is made of five basic elements, also known as the Pancha bhoothas - Prithvi (Earth), Aapa (Water), Teja (Fire / Energy), Vayu (Air) & Aakasha (Space). We therefore need to understand the environment around us in our eternal journey of self-discovery.

Numerous teachers with their rich and vast experience have compiled the existing knowledge on above aspects, in this series, “Vasudhaiva Kutumbakam- We, Our World” to help the students understand the world holistically. The content has been carefully curated, so that it reflects the rich cultural diversity of our motherland Bharat enabling the children to intuitively understand the unifying values that bond the citizens of this great land together. The book, thus, will help children gain skills required for the 21<sup>st</sup> century and be a universal citizen with a passion for following the Indian values.

The text book has been written in such a way that it builds curiosity, a spirit of experimentation and discovery. Formal descriptions and definitions have been kept to the minimum. The lessons proceed as conversations & stories to sensitise children to aspects of communication and build empathy. Also, assessment modules have been consciously kept to the minimum to encourage teachers to frame questions that suits the perspective of the students. It is also suggested that the evaluation be continuous and comprehensive. Children should be credited not only for the answers that they give to the questions asked, but also for the thoughtful questions that they raise in the class room in the context of the lesson, and the activities that they engage themselves in, to apply their learning.

There is no copyright on the content of this book. One can seek permission and print all or only certain chapters of the book. However, no unauthorized modification is permitted in any chapter. Considering the social orientation of the organisation, we have consciously kept the cost affordable without compromising on quality of paper/ print. Also, the e-copy of the entire book will also be downloadable for free from our website, [davchennai.org/publications/](http://davchennai.org/publications/)



This is the first edition of the book and could have not only omissions, but also areas of improvement. We request the reader to excuse us for the omissions, but please do bring to our notice any feedback for correction and improvement in subsequent editions. We will remain grateful to you for your support and feedback.

Lastly before signing off, we would like to express our profound gratitude to the Almighty for the guidance and encouragement in this endeavor. As it is rightly said, “We do not inherit the Earth from our ancestors, we borrow it from our children”. Hence let us teach our children to be grateful for all that we have, empathise with God’s creations and accept the responsibility of preserving it well for the future generations.

“Earth is my mother and I am her child”. (Atharva Veda 12.1.12)  
माता भूमिः पुत्रोऽहं पृथिव्याः ।

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**Secretary**  
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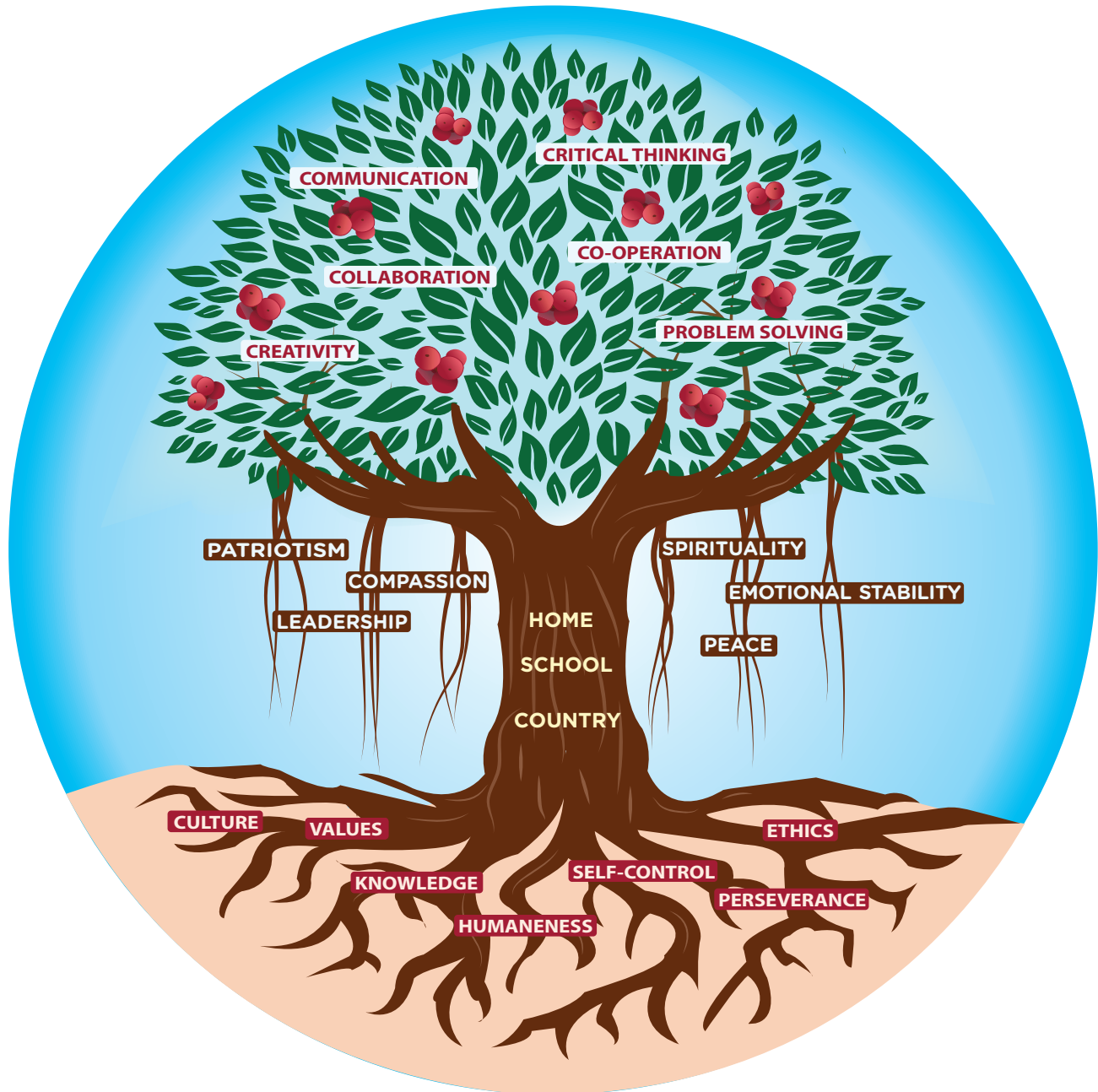
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# The Learning Tree



# Contents

**Chapter 1 – First Aid**

**1-10**



**Chapter 2 – Plants**

**11-21**



**Chapter 3 – India, that is Bharat**

**22-31**



**Chapter 4 – Shelter**

**32-39**



**Chapter 5 – Animals**

**40-53**





**Chapter 6 – Water**

**54-64**



**Chapter 7 – Air**

**65-76**



**Sample paper**

**77**



# 1

# First Aid



## Expected Learning Outcomes

### Students...

**know** the need to observe safety rules, the contents of a first aid kit, if medicines can be part of a first aid kit, the symptoms of a fracture, the dos and don'ts while administering first aid for a burn, the safety rules to be followed (a) at home, (b) in school, (c) on the road.

**know the meaning of** first aid, laceration and fracture.

**understand** the dos and don'ts during Diwali celebrations, the rule of the RICE and its procedure, first aid to be provided when there is a (a) minor laceration (b) deep wound (c) fracture (d) ligament tear (e) minor burn.

## LET'S TRY

Arrange the given statements in sequence. Use the first letter of every line to get the term about which you will discuss in this lesson.

## TRAFFIC SIGNS IN INDIA



STOP



NO ENTRY



NO PARKING



HORN PROHIBITED



SCHOOL ZONE AHEAD



NO U-TURN



ONE - WAY TRAFFIC



NO LEFT TURN



## FIRST AID: AN ACROSTIC POEM

And by doing so, you can be of great help  
Relearn and relearn first aid  
It is one thing one should not take for granted  
To equip yourself with life saving skills  
Do it now, learn first aid  
In the society, and in your family  
So that you can help people  
First and foremost safety is one of the best policies  
- Anonymous



Namya, a student of class IV is happy. She is awaiting the arrival of her mamaji and mamiji (mother's brother and his wife in Punjabi) for Diwali celebrations. She has got a new dress in her favourite colour. People around are also in a festive mood, greeting each other a happy and safe Diwali, wherever they meet. While Namya understands why Diwali greetings always carries a "safety" aspect also, she wants to discuss about this with her friends and also get more clarity from her teachers.



The class teacher enters the class for the day. Children greet her with a warm namaste.



*Fire and Rescue Operations personnel*

**Acharya:** Namaste. Please be seated.

After the attendance is marked, the acharya informs the class that there would be a demonstration by the officers from the Fire and Rescue Operations department about how to celebrate a safe Diwali, which is done every year. Namya is happy that her doubts are going to be cleared that day.

**Namya:** Acharya, when it is time for celebration, why should we think negatively and work on the dos and don'ts without planning for the celebration?

**Acharya:** Children, do you know the proverb: "Prevention is better than cure"?

**Children (together):** Yes acharya. But that is to keep one healthy. We need to eat a balanced diet, exercise adequately, practice good hygiene to stay healthy.

**Acharya:** Yes. One can suffer pain and agony even when we meet with an accident. It is important to know how we can prevent accidents to avoid such suffering. Diwali is the festival of lights. We light lamps all over our house and also burst crackers to express our joy.

**Vinay:** I am looking forward to it acharya. It would be great fun to play and have delicacies to eat.

**Acharya:** True. We need to follow certain safety rules when we burst crackers, so that we do not get injured during the process. The fire men are invited every year to school to help us understand the precautions. They also demonstrate as to what is to be done in case of a fire accident.

**Kumar:** When we follow all safety precautions will accidents happen?





**Acharya:** Accidents can also be caused by others' errors. It is important to know what we need to do in case of certain common accidents. During Diwali, since we light diyas and burst crackers, chances of a fire accident is relevant. The department also educates people, especially children to avoid accidents as much as possible.



Use sparkler to light a cracker

Children are thrilled to see the huge red vehicle slowly entering the school campus.

**Think about...**  

**Why is a fire engine red in colour? Find out and discuss.**

**Raji:** Acharya, the fire engine has arrived. Shall we go?

**Acharya:** Quickly form a line, move one behind the other while moving down the stairs and watch your step.

As soon as all the children assemble, the firemen share a few dos and don'ts to be followed while lighting crackers.

| Dos  | Don'ts  |
|--|---|
| <ul style="list-style-type: none"> <li>• The smoke from burning crackers may affect those having a respiratory problem. So such people should stay away from the site of bursting crackers.</li> <li>• Keep a bucket of water or sand nearby while bursting crackers.</li> <li>• Wear proper footwear while bursting crackers.</li> <li>• We should wear only cotton clothes. See that the clothes worn remain close to your body.</li> <li>• Cracker should be lit from a safe distance using only an agarbatti or sparkler.</li> <li>• Crackers must be kept away from other combustible materials.</li> <li>• Fireworks should be purchased only from licensed sellers.</li> <li>• Open space is the ideal place to burst crackers.</li> <li>• Pour water to diffuse the cracker that had not burst.</li> </ul> | <ul style="list-style-type: none"> <li>• Don't light crackers near or inside an automobile.</li> <li>• Do not keep your hair open while bursting crackers.</li> <li>• Don't burst crackers without adult supervision.</li> <li>• Do not use matches or lighters for lighting crackers.</li> <li>• Do not wear silk and synthetic clothes while bursting crackers.</li> <li>• Crackers should not be kept near a source of fire.</li> <li>• Crackers should not be burst near electric poles.</li> <li>• Crackers should never be lit while in hand.</li> <li>• Do not burst crackers inside a container.</li> </ul> |

There was a demonstration of how various types of fires can be put out by firemen. The children walked back to the class happy that they have learnt something. A few of them had some more doubts, which they noted down to clarify with the teacher.





Dousing large flames with water



Fire extinguisher of CO<sub>2</sub> to douse electrical flames



Firefighter robot



Different types of fire extinguishers



### Enrichment

We should not use water extinguisher or a wet chemical extinguisher to put out electrical fire as it may lead to an electric shock.

After they reach the class

**Vidya:** Acharya, I could not hear clearly when the crew explained “first aid”. Please explain it a little more acharya.

**Acharya:** The immediate help given to an injured person, before medical help arrives is called first aid. Accidents can happen anywhere and to anyone. So, it is important to have a first-aid kit handy.

**Vidya:** Is that why we have a first-aid box in the infirmary, chemistry lab and in the PT room acharya?

**Acharya:** Good to know that you have observed it. We have 3 first-aid kits. Can you list the things that we need to have in each of them?

**Preeta:** A cotton roll, gauze, an antiseptic cream...

**Acharya:** Visit the P.T room, take a look at the contents of the first-aid box there and list the items. You will get to know the items that need to be present in it.

**Babu:** Acharya, can we have some tablets and medicines in the first-aid box?

**Acharya:** We generally do not administer any medicines as first aid, unless the injured or the sick has a medical condition and directs the first aid provider to give the medicine. Arranging for medical help is an important component of first aid, especially if the injury is severe or if the patient is extremely sick.



**Bijoy:** Do we have a procedure to follow acharya? I have seen our teachers follow different ways on different occasions to provide first aid.

**Acharya:** That is a good observation. Many a times you would have seen your friends fall down while playing and bleed on their knee or elbow.

**Chiranth:** Yes acharya. In such cases, the teacher instructs us to wash the wound thoroughly with clean water. She then applies an antiseptic cream and advises us to rest for a while.

**Acharya:** That is the best way to treat a laceration. You may apply a thin bandage, to prevent yourself from hurting again.

**Dinesh:** But once, I have seen them rush my friend to a doctor?

**Acharya:** If the wound is deep and if bleeding does not stop after washing and application of pressure over the bleeding area, the person needs to be shifted to medical care. In such cases, it is important to keep the injured part above the level of the heart, to prevent excessive bleeding.

**Elango:** Once, a friend of mine suffered a fracture. My teacher told her not to move her broken arm. She put a sling around it to make the arm immobile.

- List of items in a first-aid box**
1. Gauze roll and pads
  2. Instant cold pack
  3. Crepe bandages
  4. Antiseptic wipes
  5. Scissors
  6. Tweezers
  7. Gloves
  8. Thermometer
  9. Safety pins
  10. First-aid manual
  11. Antiseptic ointment
  12. Cotton roll



First-aid box



Different types of slings

**Farhan:** But, how did the teacher know it was a fracture?

**Govind:** When there is a fracture, the pain is immense, close to being unbearable. The affected part swells up very quickly and it also feels warm.

**Acharya:** I am happy that you are well informed Govind. Sometimes there is no fracture, but the ligaments (muscular fibres connecting the bones at the joints) are injured. In such cases we follow the rule of the RICE.

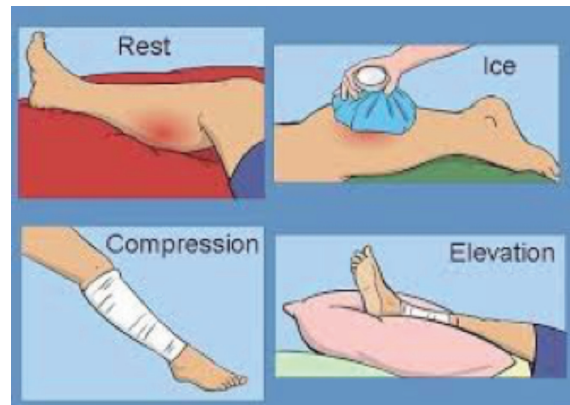
**Hari:** What is RICE, acharya?



**Acharya:** It is Rest, Ice, Compression, Elevation. Rest as you know is to make the part immobile, so that the injury is not aggravated. When an ice pack is applied, it constricts the blood vessel and helps to reduce pain. Compression is generally provided by applying a bandage. This helps in reducing swelling and pain. Elevation is keeping the injured part above the level of the heart, to help reduce pain again.

**Imran:** That is a nice way to remember. It's Diwali. Tell me more about what should be done if we get hurt due to fire.

**Acharya:** That's very thoughtful. If it is a minor burn, wash the burnt area with water at room temperature gently till the stinging pain reduces. Apply an antibiotic cream after removing the wetness by patting. Do not apply pressure on the injured part. If the burn is severe, wash the injured part with water at room temperature gently and seek medical help at the earliest. There are some don'ts that we need to remember for burn injuries:



### Do not

1. apply ice on the burnt part
2. apply oil or fat on the injured area
3. try to remove pieces of anything that is stuck to the burnt part
4. try to apply a bandage
5. burst blisters.

**Bijoy:** That was very useful ma'am. But can't we avoid accidents acharya?

**Acharya:** Following safety rules helps us reduce the chances of an accident. However, accidents cannot be totally prevented. Let us look at a few safety rules to be followed at home in school and while on the road.

### At Home

1. Keep the floor dry as much as possible. A wet floor is slippery.
2. Never leave your toys and other things on the floor. You or others at home can stamp or trip on them and get hurt. If it is something that can roll or slide, the fall can also result in a fracture.
3. Never leave a flame unattended in the kitchen.
4. Try to keep the windows of the kitchen open.





5. Do not pick up hot objects.
6. Never play with objects made of glass. They can hurt you if they break.
7. Do not touch switches or electrical gadgets with wet hands.
8. Do not play with electric switches, plug points and appliances.
9. Do not take medicines, unless administered by your parents.
10. Do not eat stale food.

### **In school**

1. Do not run around the class, corridors or staircase.
2. Follow the queue to use facilities in the school
3. Do not swing your bag, while moving in a queue.
4. Do not play a rough game.
5. Do not carry sharp instruments to school.

### **On the road**

1. Follow traffic rules always.
2. Cross only at the zebra crossing
3. Look to your left, then to your right and again to your left and cross the road only when it is clear.
4. Never cross the road from behind a parked vehicle.
5. Walk on the extreme right of the road, facing the oncoming traffic.
6. Wear the seatbelt while travelling by car.
7. Put on your helmet and advise your parents too to put on their helmets while riding two wheelers
8. The strap of the helmet should be securely fastened.
9. Do not play on the road.

**Jana:** Thank you acharya.

**Acharya:** Have a very happy and safe Diwali children. Remember the safety rules and put your knowledge to good use.





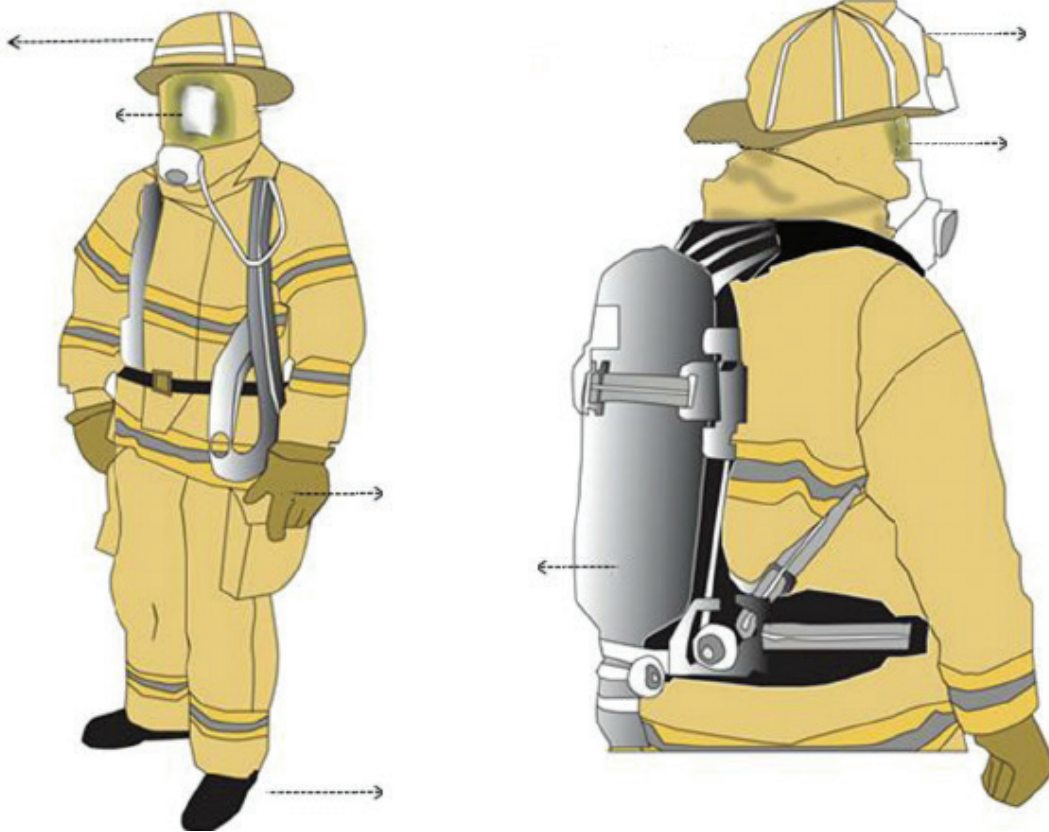
## SUMMARY

- Following safety rules helps us to reduce the chances of an accident.
- Accidents can be caused not only by our errors, but also due to the errors of others.
- The immediate help given to an injured person, before the medical help arrives is called first aid.
- The important items in a first-aid kit are :- gauze roll and pads, instant cold pack, crepe bandages, antiseptic wipes, scissors, tweezers, gloves, thermometer, safety pins, first-aid manual, antiseptic ointment and cotton roll.
- Follow the rule of the RICE in case of ligament injury.  
R – Rest, I – Ice, C – Compression, E - Elevation
- Do not operate switches or electrical gadgets with wet hands.
- Arranging for medical help is an important aspect of first-aid, especially if the injury is severe or if the patient is extremely sick.



**Check your Understanding**

I. Label the accessories marked on the fire and rescue personnel using the list given below.



- BOOTS
- HOOD
- GLOVES
- FACE MASK
- BREATHING APPARATUS



## II. Fill in the blanks:

1. In case of fracture, the affected person should put a \_\_\_\_\_ around the fractured arm to make it immobile.
2. When the ligaments get injured, the rule of \_\_\_\_\_ should be followed, so that the injury is not aggravated.
3. It is better to wear clothes made of \_\_\_\_\_ fabric while bursting crackers.
4. You should cross the road only at the \_\_\_\_\_ crossing.
5. In case of medical emergency you can dial \_\_\_\_\_ for an ambulance.
6. We should not use \_\_\_\_\_ or \_\_\_\_\_ type extinguisher to put out electrical fire.
7. A crack or breakage of bone is called a \_\_\_\_\_.

## III. Answer the following:

1. What is first aid?
2. Why should we have a first aid kit handy?
3. List the mandatory items in a first aid box.
4. List any four safety rules to be followed at home.
5. Mention four safety rules to be followed in school.
6. Write any four safety rules to be followed while you walk on the road.
7. What will you do as first aid if a person suffers a?
  - i. minor burn
  - ii. major or severe burn
8. List the various types of fire extinguishers.
9. Describe the best way to treat laceration.
10. What are ligaments?
11. Expand: RICE. Explain the various steps involved in RICE.



# 2

# Plants



## Expected Learning Outcomes

### Students...

**know** the conditions necessary for safe storage of harvest, that packaged foods have an expiry date, different species of plants have different life spans.

**know the meaning of** natural and synthetic pesticides, horticulture, minimum support price, silos, humidity, rodent and preservatives.

**understand** the concept of mechanised farming, the ways of allocating harvest, the process of preparing boiled rice, **why** different parts in different plants are edible, **what** annual, biennial and perennial plants are and **how** plants make their own food.

**understand the need for** (a) storage to be free from humidity, rodents and pests (b) cold storage.

**analyse the differences between** perishable and non-perishable goods, gardening and horticulture, dicots and monocots, tap root and fibrous root.

**locate** state/s, capital/s, rivers, tributaries and other geographical divisions on a map of India - mentioned in the lesson.



## A FEW FACTS ABOUT PLANTS

1. Flowering plants are known as angiosperm. Nonflowering plants, namely, pines, spruces, firs, junipers, etc. are called gymnosperms.



2. Coast redwood is the world's tallest tree. It grows in California, along the Pacific coast



3. A sunflower is not one large flower. Each head is made of hundreds of tiny flowers called florets.



Anand and Aarti are travelling by train with their father to Kerala for summer vacation to their **mama's [mother's brother in Tamil]** house.

**Aarti:** (Looking outside the window) Wow! What a beautiful scenery!

**Anand:** Yes, these lush green fields are a pleasant sight. I am waiting to spend time in the garden and the fields.

**Appa (father in Tamil):** I appreciate your liking for the scenery and green plants. If you understand farming, gardening and horticultural practices that help us provide food to the growing population, you would appreciate the hard work of our farmers.

**Aarti:** Yes appa, please tell us more about them. I know the words farming and gardening. But what is horticulture?

**Appa:** Horticulture is the practice of growing flowers, fruits and vegetables on a large scale.

**Aarti:** Then what is a garden?

**Appa:** We usually grow vegetables, herbs, flowering plants etc., in a garden. A garden is much smaller than a field or a grove. Hence the yield from it is less.

**Aarti:** (looks outside the window) I think we have reached our destination, appa.

(Mama had come to receive them.)

**Aarti and Anand (together):** Namaste mama! We are happy to be here.

**Mama:** Namaste Aarti and Anand! Good to have you all with us. Let's go home.

As they enter their village home, Aarti and Anand rush to the inner rooms to meet their **thatha (grandfather in Tamil) and paati (grandmother in Tamil).**

**Thatha:** Our blessings, dear children. Hope you had a comfortable journey.

**Anand:** Yes thatha it was exciting as always.

**Aarti:** Paati, last time when we visited you, we were inspired by your garden and we started raising a kitchen garden. Now appa was talking about horticulture. I want to know more about plants and the process of growing them on a large scale.

**Thatha:** Your enthusiasm and energy are contagious. Freshen up first, have your lunch and we shall go to the fields to know more.

**Anand:** I see gunny bags stacked in a room. I also see some huge vessels which look like those that can store a lot of grains and pulses. In the city, we buy provisions in small quantities every month.

**Mama:** We grow rice and pulses in our fields. What we have stored in those huge vessels are the produce from our fields. We sell a large portion of our produce, we have enough to feed us all and to help the needy till the next harvest season.





**Aarti:** Oh! In the city, I always wonder how we get food grains from farmers.

**Mama:** That is a good question. During every harvest season, the government fixes a minimum price for the crops that are to be harvested. This is called the minimum support price. The government and private agencies buy our produce, store them in suitable places and then distribute it to the public.

**Anand:** That looks like a long process. Where are they stored? I see rats eat them away, even when stored in small quantities.

**Paati:** In villages, most of us have silos in which we can store our produce. What you see here are some such silos.

**Thatha:** Food grains, pulses and oilseeds can be stored for one or two seasons, if the storage is free from humidity, rodents and pests.

**Aarti:** Can you please explain about that in detail thatha?.

**Thatha:** Sure, I will. Humidity is the amount of moisture in the air. The storage space should not be humid as it can lead to growth of fungi. This can harm the quality of grains and pulses. They become unfit for consumption.

Rodents are nothing but rats. They breed in large numbers and eat away huge quantities of food, thus depriving us of our produce.



*Silos*



### **Enrichment**

**Pesticides are chemicals that kill the pests that harm our crops and stored grains.**

Pests are insects that pose a threat to the quality and quantity of harvested produce. The harvested grain has to be protected from them using suitable storage bins to prevent their entry. Use of natural pesticides like neem oil is better than synthetic pesticides.

**Anand:** That is quite a job! The farmer not only works on the field to get a good yield, but has to be watchful of his harvest and protect them against a number of dangers.

**Aarti:** I have now understood to some extent, about how food grains are stored. If this is so tough how do we get our fruits and vegetables? They have to remain fresh till they reach our table.

**Mama:** Your thinking is very logical. Food grains, pulses and oil seeds are non-perishables while flowers, fruits and vegetables are perishable agricultural produce.



They are also harvested in huge quantities to feed the population. Have you seen cold storage trucks children? Perishable goods are transported in cold storage enabled trucks and stored in warehouses equipped with cold storage to remain fresh for a longer period.

**Anand:** Milk is also transported in vehicles with cold storage facilities.

**Thatha:** Very true! Cold storages and cold storage enabled transport vehicles have to a large extent helped the producer, the farmer, and the consumer.

The farmer is able to transport his produce and earn a reasonable living. The consumer on the other hand gets food that has not lost much of its nutritive value.

**Anand:** Let us have our breakfast! It is getting cold.

**Paati:** Thank God! You remembered that.

**Aarti:** Nice fluffy idlis. I have heard amma say that she uses boiled rice for idlis. But I have never seen her boil the rice before soaking. But I have seen that the raw and boiled rice look and feel different.



*Cold storage truck*



### **Enrichment**

Foods that will decay or perish, if not stored appropriately, thereby becoming unsafe to consume are perishable goods. (eg.) Milk and milk products should be refrigerated to prevent spoiling.



*Boiled rice*



*Raw rice*

**Paati:** I am happy that you are so observant. Parboiled rice is partially precooked rice. The paddy is soaked, then cooked by using steam or boiling water, dried and dehusked. The rice thus prepared has more vitamin B and fibre. Boiled rice also improves our gut health as it helps good bacteria to grow.

Now does it ring a bell as to why we prefer a porridge of boiled rice when we are sick.





## Enrichment

Dehusking is the process of removing the husk from the grain. The husk removed is called chaff.

**Aarti:** Maybe because it is already half-cooked and easy for digestion.

**Thatha:** Good! Your ability to think has increased by leaps and bounds.

**Anand:** Shall we go to the fields now? I am waiting to see the crops.

They walk from home to reach the field. They see modern equipment like the tractor, harvester, etc. parked in the driveway of their mama's house.



Tractor



Cultivator



Harvester

**Aarti:** How green and fresh the fields are! It is breathtaking for children like us who only see a lot of concrete structures in the city.

**Anand:** It has been a long walk. I feel thirsty already. How I wish there was a shop here to get some cool drinks.

### FACT FILE

Our stomach and intestines have a large colony of bacteria which help us to maintain good health.

### FACT FILE

Tractor helps the farmer work with ease on a larger area of land. Mechanised farming, i.e., using tractors, cultivators, harvester, etc. helps the farmers complete their work within a short time efficiently.

**Thatha:** Since we know you were all coming, we have not harvested all the tender coconuts. Let me get a few of them for you.

**Anand:** (awestruck) Can you climb a coconut tree thatha?

**Thatha:** I used to. But now I don't do it.

They drink the tender coconut water that thatha gets them with the help of a farmhand.

**Aarti:** These are tastier than the ones that we get in tetra packs in the supermarkets.

### Think about...

Have you seen someone climbing a coconut tree to harvest coconuts?

Have we devised some technique to do it more easily and safely?





**Thatha:** Those in tetrapacks are processed. Maybe some preservatives are added to keep it fit for consumption days after they have been harvested from the tree.

**Anand:** What are preservatives?

**Thatha:** They are substances that are added to packaged foods to increase shelf life.

**Aarti:** Do all packaged foods have preservatives added?

**Paati:** Most of them have. Have you noticed that they also have a date of expiry or expiry date printed on it? Can you tell me what it means?

**Aarti:** Should I check for the expiry date every time I buy a packaged item?

**Paati:** Yes, it is important to check the expiry date of all processed foods, medicines. Buy them only if you are sure you will use them before the date of expiry. Tell me what expiry date means.

**Aarti:** I am not sure paati.

**Paati:** It means that the particular packaged item has to be consumed before that date. If consumed after the date specified, it can be harmful or it may not give the desired effect.

As they walk, they enjoy the tender coconut.

**Aarti:** Thatha, I want to share the meaning of a Tamil poem that I have learnt.

**TASK**

Look at the pack of jams and sauces and list the preservatives used.

|  |
|--|
|  |
|  |
|  |
|  |

It is a poem in “Moothurai” by Avvaiyar. It says that good people always remember the help they receive and try to reciprocate many times more like the coconut tree that gives tender coconuts to the farmer who watered it.

**Anand:** That’s right Aarti. Paati I see the roots of the coconut tree spreading wide.

**Mama:** That is a good observation. Coconut trees, grass, rice are a few plants that have **fibrous roots**. They do not have a main root and several lateral roots like the taproot.



### Enrichment

Shelf life is the duration for which an edible item remains fit for consumption

The expiry date is the date until which the packaged item can be safely consumed.



### Enrichment

The tender coconut water is rich in vitamins, minerals and electrolytes. It relieves thirst and refreshes us.



**Anand:** Taproot?

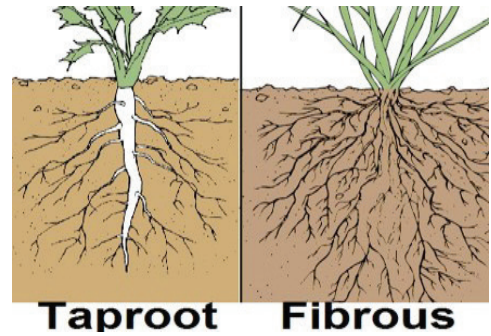
**Mama:** Radish, carrot and sweet potato are some plants that have a **taproot** system. They have a main root and several smaller roots emerge from it.

The fibrous roots do not run very deep into the soil instead spread mostly on the top soil and absorb water from there.

The taproot system runs deep into the soil.

**Aarti:** That is so interesting. I thought all plants were the same. We eat different parts of different plants. Why?

**Thatha:** Plants prepare their food with the help of sunlight, water, carbon dioxide and chlorophyll by the process of photosynthesis. They store the excess food that they prepare in some of their parts. The part of the plant that has a lot of food stored becomes our food or the edible part of the plant.



**Edible roots**

**Edible stems**

**Edible leaves**



*Carrot and Beetroot*



*Banana stem and Sugarcane*



*Spinach and Cabbage*

**Anand:** Paati, please tell whether my observation is correct. Trees live for a long period while small plants live only for a shorter one.

**Paati:** I appreciate your observation. Plants also have a life span.



**Enrichment**

Potato and onion are underground edible stems



**Enrichment**

Root is the part of the plant that is underground. It helps the plant absorb water and nutrients from the ground and helps the plant to stay fixed to the soil.

The stem carries water and minerals absorbed by the roots to different parts of the plant. It also transports food from the leaves to other parts of the plant





Some plants like wheat, rice, and coriander grow and provide us yield in the same season. Such plants are called **annuals**. Most herbs are annuals.

Some plants grow in one season and give us yield in the next season. They are **biennials**. They live for two seasons. Example: lady's finger, brinjal, cabbage, rose etc.

Some plants take a very long time to grow, but give us yield for many seasons. Such plants are called **perennials**. Example: coconut tree, mango tree, neem tree.

**Aarti:** That's a lot to know. Talking so much about vegetables and fruits I wish I had something to munch.

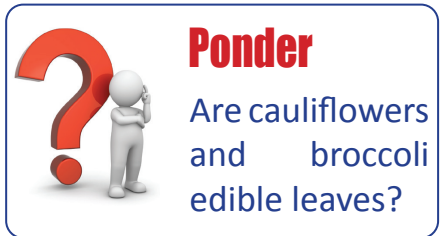
**Paati:** I know you will need it. That's the reason I have brought some roasted groundnuts.

**Aarti:** Thank you paati. I love them.

**Anand:** I do too. Let me have my share.

As they remove the covering, it splits into two equal halves.

**Anand:** Paati, I have seen green gram also split into two equal halves when the seed swells up. Groundnut also splits into two halves. Do such seeds have a special name?



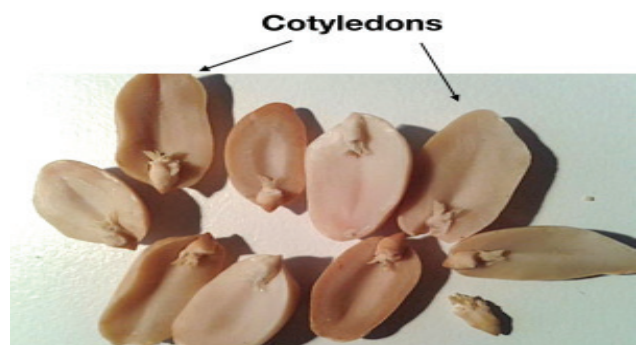
**Paati:** Yes. Do you remember how baby plants get their food, before they are able to prepare their own food?

**Aarti:** I know, they get it from seed leaves. My teacher also told me that the seed leaves are called... (She searches for the word in her mind).

**Anand:** Cotyledons.



*Monocot seed*



*Dicot seed*

**Paati:** Excellent. When the seeds have two cotyledons like the mango, green gram, channa, cashew, etc. they are called **dicots**.

When they have only one cotyledon like rice, maize, wheat they are called **monocots**.

**Mama:** I could see thatha, patti loving to share their knowledge with you. It was time



well spent. Let us go home for a delicious meal and after that discuss more on other kinds of plants.



### Enrichment

In olden days kumbha in temples were used to store grains. Kumbha means the crown of the temple which is usually placed at the top of the temple tower. The kumbha is filled with good quality grains that can be used as seeds. When a natural disaster of extremely large magnitude occurs, food crops might be destroyed. In such dire circumstances, the seeds placed in the kumbha can be used to revive agriculture.



### SUMMARY

- Food grains, pulses and oil seeds can be stored in silos, for one or two seasons.
- Perishable goods require cold storage to remain fresh for long periods.
- The modern agricultural equipment help the farmers work with ease on a large areas of land.
- Tap roots have one main root while several smaller roots emerge from them.
- Plants store the excess food they prepare in some of their vegetative parts like stems and roots.
- Annuals are the plants that grow and provide us yield in the same season.
- Biennials are the plants that take one season to grow and give us yield in the next season.
- Perennials are the plants that take a very long time to grow but give us yield for many successive seasons.
- Monocots are the seeds that have only one cotyledon while dicots have two cotyledons.





**I. Fill in the blanks:**

1. The practice of growing flowers, fruits and vegetables on a large scale is known as \_\_\_\_\_.
2. The amount of moisture in the air is \_\_\_\_\_.
3. Partially pre-cooked rice is known as \_\_\_\_\_.
4. Boiled rice improves our gut health as it helps \_\_\_\_\_.
5. Use of natural pesticide like \_\_\_\_\_ is better than synthetic pesticide.
6. The seeds that have two cotyledons are called \_\_\_\_\_.

**II. Choose the correct answer:**

1. The plant that has taproot  
(a) Grass (b) Rice (c) Coconut tree (d) Carrot
2. Examples of non-perishable items  
(a) Fruits (b) Vegetables (c) Flowers (d) Oil seeds
3. An example of Monocot seed  
(a) Cashew (b) Mango (c) Maize (d) Channa
4. This is a biennial plant  
(a) Coconut tree (b) Neem tree (c) Coriander (d) Cabbage

**III. Answer the following:**

1. How is pre-cooked rice prepared?
2. What are preservatives?
3. What is 'expiry date'? Mention the effects of consuming an expired product.
4. Differentiate between taproot system and fibrous root system.
5. Draw and label the two types of roots.
6. What is photosynthesis?
7. Explain the three types of plants based on their life span. Give two examples each.





# 3

# India, that is Bharat



## Expected Learning Outcomes

### Students...

**know about** the narratives on establishment of Vijayanagar Kingdom, Krishnadevaraya's reign – his influence on literature, the administration of Vijayanagar Empire, trade – imports and exports, status of women in the kingdom, Hampi – the prosperous capital of Vijayanagar kingdom.

**understand** the cause of the battle of Raichur, the significance of conquering Raichur, secularism during this period, **why** Krishnadevaraya was considered a good administrator, **how** the Muslims of Deccan ruined Hampi.

**analyse** Krishnadevaraya as a model ruler, secularism as part of our civilization.

**appreciate** the inclusiveness of all religions by the kings of Vijayanagar empire, that a good administrator always brings prosperity to the country.

**locate** state/s, capital/s, rivers, tributaries and other geographical divisions on a map of India - mentioned in the lesson.



## Tenali Rama and the Great Pandit

One day, a great scholar came to the court of Krishnadevaraya. The scholar was confident because he thought that he had mastered all literature that was existent during that period. Having won many scholars in a battle of wit across India, he assumed that there was none in India who can defeat him.

With this confidence he challenged Sri Krishnadevaraya and his ashta dig gajas for a verbal duel. The king accepted the challenge. The poet defeated all who debated with him and his







confidence was turning into arrogance. It was Tenali Rama's turn next. He took out a book covered in a beautiful red silk cloth and humbly said, *"Oh Scholar! You seem to be the most knowledgeable. I would be happy, if we can debate and throw light on this work, 'Thilakashta Mahisha Bhandhanam'"*

The pandit was astounded because, he had not come across this book among the thousands of books that he has read in several languages. Ashamed, he left the court.

Sri Krishnadevaraya felt elated as Tenali Rama had saved the reputation of his court. At the same time, he was curious to know more about the book and requested Tenali to elaborate on the book. Rama removed the silk cloth, for everyone in the court to see the literary piece. To the surprise of all, it was not a book, but a bundle of twigs tied with a rope to appear like a book. The king was amused.

Rama went on to explain, *"Oh great king, 'til' means sesame; 'kastha' is dried twigs, and 'tilakastha' means twigs of sesame plants; the rope when used to tie a buffalo, makes it 'mahisha bandhana' as 'mahisha' means buffalo and 'bandhana' means to bind with a rope."*

*"I just used the Sanskrit names of all these, and the pandit got scared thinking that this was a piece of literature that he had not mastered."*

The whole court burst out laughing, and Krishnadevaraya praised Tenali Rama for his wit and presence of mind.

### **MORAL OF THE STORY**

Write two sentences on the wit of Tenali Rama



Jigyaasa's **maa (mother in Oriya)** enters the house in the evening. She sees Jigyaasa busy doing something at her desk and is surprised.

**Maa:** You seem to be so engrossed with something. What is it Jigyaasa?

**Jigyaasa:** Maa, this term's history project is to know about the ruins of Hampi and talk about it in class. My friends and I are puzzled that we have been asked to do a project on ruins.

We went to the library and found a few history books with the help of our librarian for the project. We found something very interesting in them.

**Maa:** Oh... What is it that fascinated you so much?

**Jigyaasa:** Maa, we found information about one of the glorious periods of our Indian history and a kingdom that has contributed a lot to our heritage. Do you know about the Vijayanagar Empire maa?

**Maa:** Not much Jigyaasa. I would love to hear from you. I will freshen up and join you. Meanwhile, you can either complete your work or go out to play with your friends for a while. We can then discuss and put your project together.

**Jigyaasa:** I like that idea maa. I will go out to play for some time and we shall do it.



Hampi Ruins

Jigyaasa comes home after her evening play, freshens up and sits with her mother for sharing her learning and also to complete her project.

**Maa:** Tell me more about the cause of your excitement little one.

**Jigyaasa:** Maa... There are two narratives about how the Vijayanagar Kingdom came into existence. One narrative says that its founders Harihara and Bukka were cowherds. They were identified by a Guru, Vidyaranya under whose tutelage they established the Vijayanagar Empire.

The other narration is that Harihara and Bukka were two of the five sons of Sangama. They were ministers in the state of Kampili. When Muhammad Bin Tughlaq conquered Kampili, they were imprisoned and forced to convert to Islam. When they were sent to suppress a revolt in Kampili, Saint Vidyaranya encouraged them to embrace Hinduism and liberate people from Muslim domination.

**Maa:** That is interesting. When did they form the kingdom?

**Jigyaasa:** It was around 1336 CE, they formed the kingdom. I wish to share something that I loved knowing.





Harihara and Bukka

**Maa:** Waiting to hear my dear.

**Jigyaasa:** Harihara conquered the state of Kadamba and defeated the Sultan of Madura. After Harihara, Bukka became the ruler. Both Harihara and Bukka refused to assume the title of the King. In fact, Bukka assumed the title “Vedamarga-pratishtapaka” which means the establisher of the path of the Vedas.

Jainism, Buddhism, Islam and Christianity, were equally respected and people were free to practice their religion in Vijayanagar.

**FACT FILE**

Secularism means individuals are free to practice their religion without fear of discrimination



**Enrichment**

A historian is a person who specialises in the study of history.



Krishnadevaraya

**Maa:** That seems to be a model state!

**Jigyaasa:** Amongst the kings of the Vijayanagara empire, Krishnadevaraya’s reign is the most cherished by many historians.

**Maa:** Do you remember the story where a child wanted an elephant to be put in a pot?

**Jigyaasa:** Yes maa.

**Maa:** Do you know who penned these stories?

**Jigyaasa:** Thank you for reminding maa. They were written by Tenali Rama, one of the **ashta dig gajas** in the court of Krishnadevaraya. He was known for his wit and humour. Children of present day are also fascinated by his stories.

Among the ashta dig gajas, Allasani Peddana was considered to be the greatest ever Telugu poet who was also known as the Andhra Kavita Pitamaha (the father of Telugu poetry).



Allasani Peddana







## Enrichment

Krishnadevaraya had in his court a group of eight scholars and poets who were known as Ashta dig gajas.

Krishnadevaraya himself was fluent in many languages. He patronised Sanskrit, Tamil, Kannada and Telugu literature. Kannada poets like Chatu Vittalanatha and Mallanarya, the Tamil poet Haridasa were a few poets that Krishnadevaraya patronised. Jambavati Kalyana, Satyavadu Parinay and Madalasa

Charita are few of the several books that Krishnadevaraya has authored.

Being an ardent devotee of the Lord Venkateswara at Tirumala, he has offered numerous priceless items to the temple.

**Maa:** You seem to know a lot Jigyasa. Do you know that Krishnadevaraya was a great warrior and administrator?

**Jigyasa:** Yes maa. He has valiantly fought many battles and won them. His kingdom extended to Sri Lanka and Burma too.

He inflicted heavy defeats on the five Deccan Sultanates and also brought a large part of India under his rule.



Tirumala Venkateswara temple

One of the wars that tells us about the valour and strategic planning of Krishnadevaraya is the Battle of Raichur.

### FACT FILE

The **Deccan sultanates** were five Islamic kingdoms—namely Ahmadnagar, Berar, Bidar, Bijapur and Golconda.

The war became imminent when a dishonest merchant Syed Marikar, fled to Bijapur kingdom with 40,000 gold coins that were given to him for buying horses from the Portuguese in Goa. Krishnadevaraya wanted Bijapur to hand over the guilty merchant. The sultan of

Bijapur refused. Krishnadevaraya thus had to declare a war with Bijapur.

In the battle that ensued the sultan had to flee Bijapur. Thus Krishnadevaraya won the control of the fertile Raichur doab. The doab was not only fertile, but also rich in minerals like iron. It also had diamond mines.

Maa, what fascinated me the most was the fact that we were so advanced in various fields of science. We knew that minerals were available and also their



Gold, silver and copper coins



uses. My teacher told me that gold was not only used for making jewellery but also to make coins. It is interesting to note that they used coins made of silver and copper too. We had the system of using money, even a long time ago. I am very proud to be an Indian.

**Maa:** Very well said Jigyaasa. The Vijayanagara kings fought to save their kingdom and also to protect the Hindu culture in the south. They succeeded in their efforts for a very long time. You told me about their arts and army, let me tell you about their administration.

The king was the head of the state, supreme commander of the army and the head of the judicial system. There was a council of ministers. The king was bound to listen to and act according to the advice of them. Besides ministers, there were a number of officials too. The governance was guided by “Dharma”.

The empire was divided into 6 provinces. Each province in turn was divided into Nadu, Sthal, Kottam, Village.

**Jigyaasa:** That’s quite interesting. It is similar to what we have now. Our country is divided into states and union territories. Each state in turn is divided into districts and each district is further divided into villages (Panchayat) or wards for administration.

**Maa:** Correct. They also had a system of taxation. There was a tax on agricultural produce also import and export duties.

**Jigyaasa:** Oh... That means they had trading outside of our country too?!

**Maa:** The empire traded with Malaya, Burma, China, Arabia, Africa, Portugal to name a few countries.

A few commodities that were traded are diamonds, rubies, silk, cinnabar, camphor, pepper and sandal wood. The empire had a good fleet of navy. Goods were transported by land and also by sea.

Women were educated and respected in the society. There were many women in government service. They not only learnt fine arts but were also trained in wrestling and weapons of war. Scholarly women were also part of the king’s court.

**FACT FILE**

Raichur doab is the fertile region of land lying between the Krishna river and its tributary, the Tungabhadra river.



**Enrichment**

Import means to bring in products, goods, etc. from another country for sale or trade. Export means to send products to another country for sale or trade.

**Jigyaasa:** Wait maa.... I thought empowerment of women was a new concept. Please continue.

**Maa:** The citizens of Vijayanagara were prosperous. There was no scarcity of any commodity. There was enough food grains saved in the granaries for any emergency.





## TASK

Name a few exports and imports of modern India.

**Jigyaasa:** Now I will share with you about Hampi maa. Please let me know whether my understanding is correct.

Hampi was the last capital of Vijayanagar empire. The ruins still have forts, sacred complexes, pillared halls, memorial structures, gateways, defence check posts, stables and water structures. It has signs of bazaars, residential areas and tanks. There are indicators for having had wide streets, through which chariots could make their way with ease.

All these show the economic prosperity and political importance that once existed indicating that a highly civilized society had lived there. The city has been immortalized by many travellers as one of the most beautiful cities.

**Jigyaasa:** It should have been like a metropolitan city of present days. What happened to it then?

**Maa:** It was conquered by the Deccan Muslim kings in 1565. The city was robbed by using violence and force for 6 months after the battle of Talikota and then abandoned.



### Think about...

Hampi was one of the cities, that attracted traders from around the world. Give any one reason.

**Jigyaasa:** That's sad. But I understand that had we not been under the rule of foreigners, we would have been more prosperous and our forefathers would not have faced many hard ships.

Maa, I promise that I would play my part to bring glory to my motherland Bharat.



Remains of Hampi



## SUMMARY

- Harihara and Bukka established the Vijayanagar empire under the tutelage of their guru Vidyananya around the year 1336 CE.
- Bukka followed the path of Vedas and was referred to as “Vedamarga pratishtapaka”.
- Under Bukka’s rule, Vijayanagar was a model state where the people of all religions like Jainism, Buddhism, Islam and Christianity were respected and treated alike.
- Krishnadevaraya encouraged literature in various languages-Sanskrit, Telugu, Kannada, Tamil literature.
- Krishnadevaraya’s empire consisted mainly of the present day Karnataka, parts of Sri Lanka and Burma.
- Krishnadevaraya was a great warrior. He defeated the five Deccan sultanates and brought a large part of India under his rule.
- Battle of Bijapur happened due to the dishonesty of merchant Syed Marikar who fled to Bijapur, after cheating the Vijayanagar Kingdom of 40,000 gold coins.
- Krishnadevaraya was a great administrator and was the head of the judicial system, He had a council of ministers for advice. The governance was guided by “Dharma.”
- He had a good system of taxation. He collected taxes on agriculture produce imports and exports.
- Vijayanagar empire traded with countries like Malaya, Burma, China, Arabia, Africa, Portugal. The goods that were traded were diamonds, rubies, silk, cinnabar, camphor, pepper and sandal wood.
- There were women in Government service in Krishnadevaraya’s empire. Women were trained in wrestling and weapons of war. Scholarly women were also a part of king’s court.
- Hampi was conquered by the Deccan muslim kings in 1565, was robbed by violence and force and then abandoned.
- Hampi was the last capital of Vijayanagar empire. The ruins of Hampi are its forts, temples, pillared halls, memorial structure gateways, defence check posts, stables, water structures, tanks and bazaars, indicating they had wide streets.
- The ruins of Hampi show that it had economic prosperity and political importance and that a civilized society lived there.





### I Fill in the blanks

1. Krishnadevaraya had a group of eight scholars and poets in his court who were known as \_\_\_\_\_.
2. When we bring in products from another country for sale or trade, it is known as \_\_\_\_\_.
3. In the Vijayanagar empire, they used coins and jewellery made of gold, \_\_\_\_\_ and \_\_\_\_\_.
4. Allasani Peddana was considered to be the greatest Telugu poet who was also known as the \_\_\_\_\_.

### II Choose the correct answer:

1. The provinces in Vijayanagar kingdom were divided into
  - a. nadu, town, municipalities, cities
  - b. wards, municipalities, panchayats and towns
  - c. cities, towns, villages and streets
  - d. nadu, sthal, kottam and village
2. Hampi was
  - a. the capital of Vijayanagar and an underdeveloped city
  - b. a poor town in Vijayanagar kingdom
  - c. the capital of Vijayanagar and one of the richest cities
  - d. a town where only Hindus lived.

### III Give one word for the following:

1. Syed Marikar, the dishonest merchant fled to the kingdom of \_\_\_\_\_ to escape from punishment for cheating.
2. When we send products to another country for sale or trade - \_\_\_\_\_.



3. The Tamil poet of Krishnadevaraya's empire - \_\_\_\_\_.

**IV Answer the following:**

1. Explain how Krishnadevaraya encouraged literature during his reign.
2. Describe in detail Krishnadevaraya's administration.
3. Elaborate on the status of women in Vijayanagar kingdom.
4. List the commodities the Vijayanagar kings traded with other countries.
5. How do we know that Hampi had economic prosperity and political importance?
6. Why did Krishnadevaraya declare a war on Bijapur?
7. How was the war on Bijapur beneficial to Krishnadevaraya?

**V Map**

- a. Mark the following on a Political map of India.
  1. Karnataka
- b. Mark the following on a River map of India.
  1. River Krishna





# 4 Shelter



## Expected Learning Outcomes

### Students...

**know** about Eskimos and Bedouin tribes **what** tents, caravans, igloos and trailers are

**understand why** we need a house, tents are erected using certain materials, Bedouins prefer a nomadic life, caravans were used by travellers, disinfectants must be used in toilets, floods occur, **how** caravans of today are different from the earlier ones, a home is different from a house, citizens can be prepared in case of flooding.

**appreciate** use of dry and clean toilets, active participation in Swachh Bharath Mission.

**locate** state/s, capital/s, rivers, tributaries and other geographical divisions on a map of India - mentioned in the lesson.



### HOME

A home can be made of sticks and mud  
Or great big blocks of snow  
A home can be twenty storeys tall  
Or in the ground below  
A home can be way up on a hill  
Or next to the ocean wide  
A home can have a mill above  
Or a chimney on its side  
A home can be where you're safe and sound  
Or with family, friends and more  
A home can be where you have your heart  
And all that you adore

- Nancy Vandenberg



Shyam and Sita are siblings studying in the same school. While Sita is in Class VIII, Shyam is a student of Class IV. One pleasant rainy evening Sita and Shyam sit for a friendly chat. Sita shares her happiness about the advent of the rainy season. She had shared with him how they generally have a vacation like holiday, when it rains heavily in the city. She had also shared with him, as to how their house got flooded the previous monsoon. Sita also added that their parents reconstructed the house, after the incident, as a house should protect its occupants from adverse climatic conditions and social disturbances.

**Shyam:** Yes **jija (elder sister in Rajasthani)**. My teacher told me about people living in very cold regions making their house of ice or snow. I forgot the name of house.

**Sita:** I think you are talking about igloos in which Eskimos live.

**Shyam:** Who are Eskimos, jija?

Sita: They are people who live in the very cold regions of the world like Greenland and Alaska.

**Shyam:** Is the temperature so low, that the land is filled with ice?

**Sita:** Yes, it is. That is why their houses are made of snow. They have a very small entrance, so that the warmth of the house is maintained. But the inner portion is spacious and can accommodate upto 20 of them.



Igloo

 **Think about...**  
Do Eskimos use a refrigerator?

**Shyam:** That is exciting. We have a refrigerator at home to keep our food fresh. Eskimos may not need one in their homes.

**Sita:** That's an interesting thought Shyam. I am not sure but I am curious to know. We can ask our teacher for clarity. Come let us read about some more kinds of houses from your book, before our **mataji and pitaji (mother and father in Rajasthani, respectively)** return from work.

**Shyam:** Ok jija. Look at this picture. It says 'tent'. Tell me about it.

**Sita:** Here, I will tell you about the NCC (National Cadet Corps) camp that I attended earlier this year. We stayed in small groups in tents made by ourselves, using poles, canvas and supporting ropes that we carried with us.



Tent



FACT FILE

What are  
A) Scouts B) Guides

**Shyam:** How did you know to make the knots jija?

**Sita:** We were taught during our guides and NCC classes. You will also learn if you join scouts and then NCC.

**Shyam:** Are tents used only during NCC camp! Are they not used otherwise?

**Sita:** Let us read what is given in your book regarding tents.

Tents are temporary houses that are made of a thick cloth called canvas. It can be folded and carried anywhere. The canvas is draped over poles and tied with ropes to pegs that are dug into the ground.

When people go to hot and dry places such as deserts, they make tents and stay there for a while. People who migrate from one place to another on foot also make tents and stay in them for a few days.

Bedouin are a tribe who move from one place to another. The arid desert of the Middle East is their home. They traditionally do not live in one place, but move as nomads from one place to another frequently.

**Shyam:** Why do they move from one place to another often?

**Sita:** They do not settle down in one area because resources are scarce in a desert. They do not want to exhaust the resources in a particular area.

**Shyam:** I have learnt in my 3<sup>rd</sup> standard that deserts have extreme weather conditions.

**Sita:** Yes, Shyam. See it is given here that the fur of animals is used to insulate the tent, so that the dwelling unit is cool during the day and warm at night.

**Shyam:** Jija, my friend Ram's father is an actor. He says his father spends most of his time in a caravan. What is that jija?

**Sita:** I have also read about it Shyam. Let us look at the encyclopedia that we received from kaki (mother's younger sister in Rajasthan) last year.

They open the book and move on to the page on caravan.

Look at this interesting piece on caravan Shyam. Let me read it aloud for you.

In the earlier days caravan was a group of people who travelled together for trade expeditions. The travellers carried a huge merchandise.

Hence, they travelled together in large numbers to keep bandits and wild animals at bay. They followed the same practise when the group had to move through deserts and through Silk road/routes.



Nomad's tent





The Silk road served as route for exporting goods such as silk, spices, precious metals, minerals, handicrafts, architecture and paintings. It also helped in cultural exchange. Since people moved in large numbers religious philosophies, culture and practices were also exchanged.

## TASK

Draw a caravan of earlier days.



Caravan of present days

### FACT FILE

What is Silk road/route?

**Shyam:** But what is a caravan in the present days?

**Sita:** Now a days, caravan is a motor vehicle, which is also a living quarter for the traveller. People who spend most of their time on road like actors use a caravan as their dwelling and travelling unit.

Similarly trailers are also dwelling units which are designed to move and can be driven on public highways and streets. They are equipped with an undercarriage as an integral part.

**Shyam:** Though there are different kinds of houses our grandpa's house in Kota is the one I love the most.

**Sita:** The house is plastered with mud to keep it cool in summer. I love the beautiful pictures of animals and plants on the walls to decorate the house.



Village home

**Shyam:** Jija, the only problem is that the toilet is far away from the house.

**Sita:** In villages we have enough space. So, toilets are kept away from the house.

Wherever the toilets are, we have to keep them clean. We have to flush the toilet before and after use.

Toilets should be washed daily. Disinfectants should be used to keep off flies and germs. We should always keep the toilets dry.

**Shyam:** Sure jija. I observe you and pitaji cleaning our toilets regularly. I must thank both of you for that.





**Sita:** When you talk about toilets, I am sure you understand that they are an integral part of any household.

But there are some households that do not have toilets. People living in such houses have to use the community toilets nearby. There are villages where there are no toilets. People in such places relieve themselves in the open.

**Shyam:** Is that so jija? That should be very difficult for them.

**Sita:** That is why the government has launched the Swachh Bharat Mission Gramin (SBM-G) to help all village households have a toilet, so that people do not use the open as toilet.

**Shyam:** Jija I am happy that we are in a house that has basic facilities. I thank God for it. But jija, I have not understood what a flood is?

**Jija:** When water from dams, lakes and rivers overflow into the nearby areas, we call it a flood. In 2015, it rained very heavily in Chennai. The lakes around the city had to be opened, leading to flooding of the city.

Flood can lead to loss of life and property. It can also lead to shortage of food.

**Shyam:** Jija, all these are informative and interesting. I am happy and grateful that we live in a safe home. Can we prevent floods jija?

**Sita:** Floods can be prevented to some extent by strengthening the bunds of lakes and rivers before monsoon. It can also be prevented by cleaning the lakes periodically and keeping the path of the rivers free from obstruction. But when the flood happens due to cloudburst or due to sudden influx of water into rivers due to very heavy rains or melting of glaciers, it cannot be prevented.

**Shyam:** I watched a video on the Kedarnath flood tragedy that happened in 2013. It looked very scary. Can you tell me more about it jija?

**Sita:** In the early hours on 16th June 2013, a flash flood struck the already overflowing banks of Chorabari lake in Uttarakhand.



### Enrichment

A flash flood is caused by heavy rainfall in a short period of time.

The rivers are flooded and tear through riverbunds washing away everything that come their way.

Remember, the northern parts of our country receive abundant rainfall in the months of June and July, from the south-west monsoon.

Though the Indian Meteorological Department had predicted heavy rains, wide publicity was not given to its prediction.

Thus a large number of residents and pilgrims were caught unawares and lost their lives.

**Shyam:** Could we have prevented this jija?



**Sita:** As I said earlier we cannot prevent a cloudburst. However, had we not built so many structures around the lakes and river banks we would not have lost so many lives.

**Shyam:** Now I understand how structures that hinder the natural course of water pose danger during floods.



Floods in Chorabari Lake

**Sita:** Yes Shyam. When there is a flood, we also need to be aware of the warnings issued by the government and follow the guidelines.

Drinking water can get contaminated during natural calamities. We need to drink only boiled water during such times. We should not move out of our homes unnecessarily. We also need to get ourselves vaccinated against water-borne diseases, as per the advise of the government.



### Enrichment

**Natural calamity** is the natural disaster caused by natural phenomena like storms, forest fires, etc.



### Enrichment

**Cloudburst** is a sudden heavy rainfall in a locality. It can create floods.

**Shyam:** For me, “Our home is the sweetest place”. I shall work when I grow up to help every family have a secure home.

**Sita:** Yes Shyam. Today my teacher was teaching about “a house and a home”. She said “Your house can be anywhere, but your home is the place

where you live happily with people whom you love” .

### Project

Discuss in class about “house” and “home”. Pen down your understanding of them and share with your teacher.

If you know some one who does not have toilet in his/her house you would \_\_\_\_\_ him/her.

a) empathise with b) stay away from c) talk ill about d) tease

What could be the reason for the person not having the basic facility?



## SUMMARY

- Eskimos live in igloos in places like Greenland and Alaska.
- Tents are temporary houses that can be folded and carried anywhere. It is used mainly by people who migrate from one place to another, while travelling through hot and dry places such as desert. Materials used for making tents are canvas, poles and supporting ropes.
- Bedouin tribes mainly live in the arid desert of middle-east countries.
- They are nomads, they do not live in one place but keep moving to different places as the resources are scarce in desert.
- In deserts, fur of animals is used to insulate the tent to keep it cool during the day and warm at night.
- In olden days groups of people travelled in large numbers together for trade expeditions and to keep wild animals and bandits at bay. They were referred to as caravan.
- Silk route was used for exporting goods such as silk, spices, precious metals, minerals, handicrafts, paintings and also for cultural exchange.
- Trailers are used as dwelling units. It can be driven on public highways and streets and supports an under carriage.
- Swachh Bharat Mission Gramin Project helps all village households to have a toilet constructed so that people do not use open areas to defecate.
- Floods are caused due to excess rainfall leading to the overflowing of dams, lakes and rivers into the nearby areas.
- Floods can cause loss of life and property and shortage of food.
- Contamination of drinking water can happen due to natural calamities.



### I Fill in the blanks

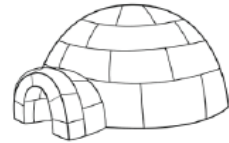
1. Dwelling units which are designed to move and can be driven on highways and streets are \_\_\_\_\_
2. When water from dams, lakes and rivers overflow into the nearby areas, it can cause \_\_\_\_\_



3. Tents in deserts use animal fur to \_\_\_\_\_
4. The cloth used for making a tent is called \_\_\_\_\_
5. Houses plastered with \_\_\_\_\_ are cooler than the ones plastered with cement.

**II Name the following**

1. Identify the picture given. \_\_\_\_\_
2. The people who live in such houses are called as \_\_\_\_\_.
3. Name two countries where you find such types of houses?



\_\_\_\_\_

4. Give a neat description of the house given in the picture.

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

**III Answer the following:**

1. Name a few things required to erect a tent
2. What is a cloud burst?
3. What is a flash flood?
4. Who are Bedouins? Why do the Bedouins move from one place to another?
5. What are caravans?
6. How are floods caused? List the effects of flood. How can floods be prevented?

**IV Mark the following on a political map of India:**

1. Tamil Nadu
2. Uttarakhand
3. Rajasthan





# 5 Animals

## Expected Learning Outcomes



### Students...

**know** places of interest in Jabalpur (marble rocks, Dhuandhar falls and Bargi dam), the parental behavior of koel, the location of Kanha National Park, different animals have different kinds of ears (birds and mammals)

**know about** Project Tiger, diurnal and nocturnal animals, amphibians, a buffer and a core zone in a national park

**understand** the five practices taught through Panchatantra stories, transpiration in plants, parental care in birds, breathing of amphibians on land and in water, adaptations in fishes, **why** barasingha is the jewel of Kanha National Park, pangolin, platypus and bats are special mammals, some birds are flightless. **how** birds and mammals reproduce (laying eggs and giving birth young ones)

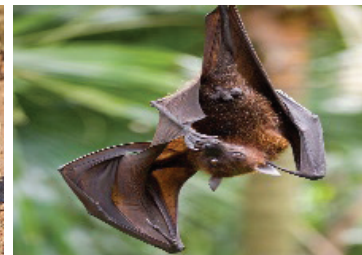
**analyse the difference between** warm blooded and cold blooded animals, amphibians and reptiles, tortoise and turtle

**appreciate** the beauty of the natural world and **the importance of** conserving tigers and other animals too

**get interested in fables.**

**locate** state/s, capital/s, rivers, tributaries and other geographical divisions on a map of India - mentioned in the lesson.

## Activity



Pangolins, platypus, and bats are mammals but each has a special feature, which other mammals do not have. Identify the special feature and share it with your friends.





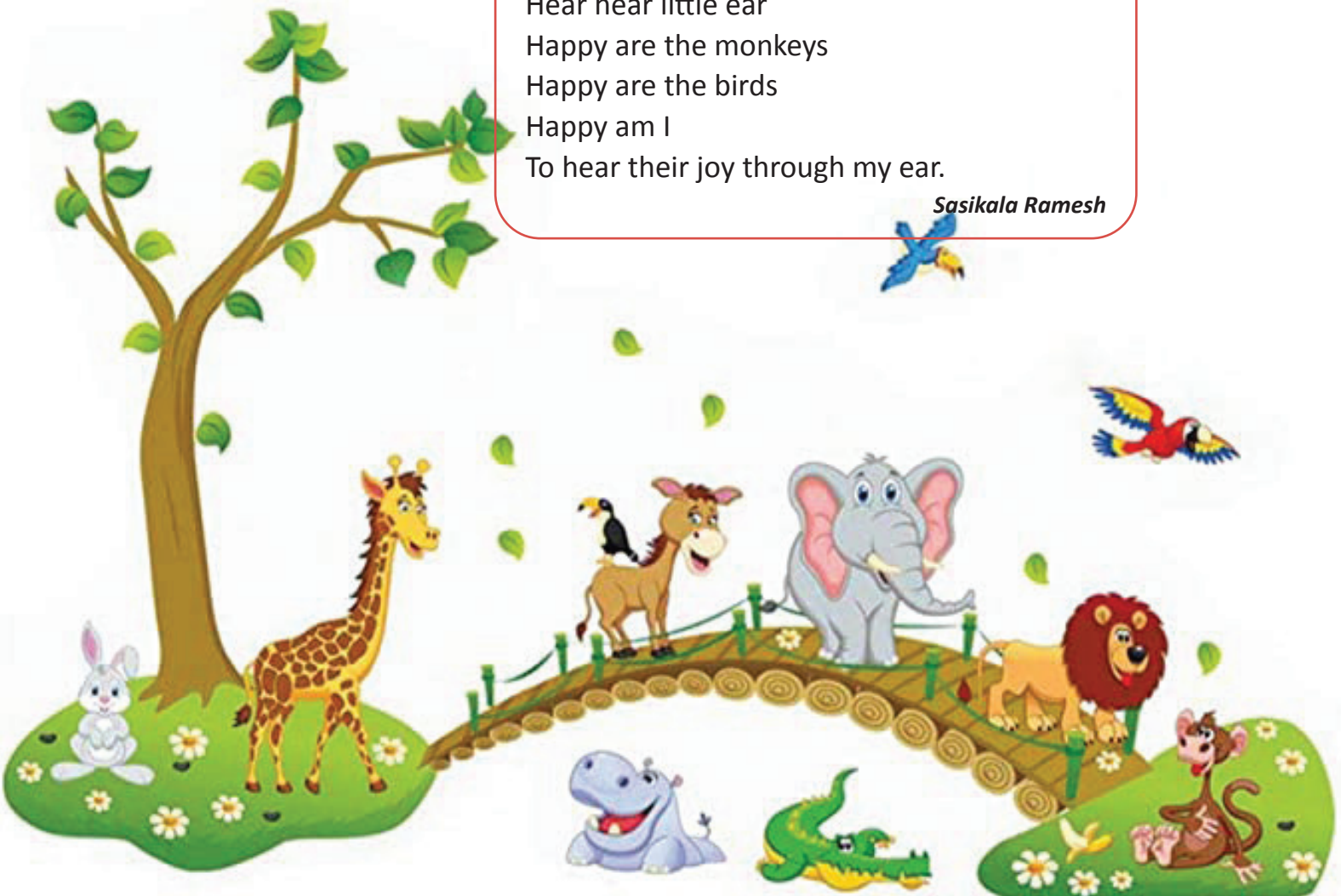
Hear hear little ear,  
The cuckoo singing all through the year,  
The monkeys chattering full of cheer,  
These wondrous sounds loud and clear.

Hear hear little ear  
Where is the babbling brook,  
Far or near?  
The rustle of the pages in a book,  
Pleased or not? Tell me my ears.

The pitter patter of rain drops  
The swishing of field crops  
All of which I hear  
Through my lovely ear.

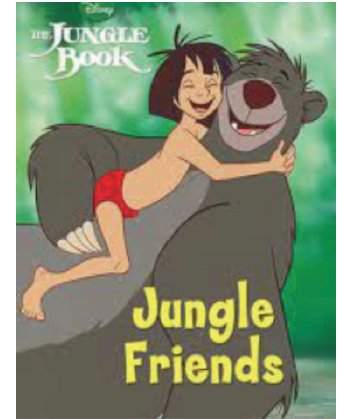
Hear hear little ear  
Happy are the monkeys  
Happy are the birds  
Happy am I  
To hear their joy through my ear.

*Sasikala Ramesh*



Suchitra, a seven-year-old was in bed one night listening to her father reading the the story “The Jungle Book” by Rudyard Kipling. She was so interested and engrossed that she did not want her father to stop even though it was past her bedtime.

**Suchitra:** Thandhe (father in Kannada) I feel as though I am in a jungle among the pack of wolves like Mowgli. I wish I too had a friend like Bagheera. Imagine how my friends will feel if I introduce a panther to them as my friend. Is it a real story? Were there such stories earlier too?



**Thandhe:** Of course, my dear, I am glad you are so engrossed in the story. We also have stories with animals as characters that have become a part of our culture, like the one with the monkey and crocodile. I am sure you can recollect it.

**Suchitra:** Ha. The story where the crocodile wants to eat the heart of the monkey and the monkey escapes by its thoughtful action.



**Thandhe:** Exactly, that one is from Panchatantra.

**Suchitra:** I know many stories from Panchatantra that are as interesting as this. Who is the author of such fascinating collection thandhe?



**Thandhe:** I will tell you about the author and how Panchatantra came into existence. But before that can you guess why these stories were written?

**Suchitra:** To enjoy reading of course!!

**Thandhe:** These stories make a good read. At the same time, they also teach us a lot of practical things about life.

It is believed that a king had three sons who were not interested in learning the ways of the world. The worried King asked his council of ministers about what could be done to make these princes become more responsible. The ministers suggested to the king that he approach Vishnu Sharma, a scholar among teachers. When the king requested Vishnu Sharma to educate his children, Vishnu Sharma suggested that the princes be sent with him for listening to stories for about a year. They were sent with him. He taught them Pancha (five) Tantra (Practices) for personal enrichment by narrating stories.





**Suchitra:** What are the five practices that are taught in it thandhe?

**Thandhe:** They are Mitra-bheda (separation of friends), Mitra-laabha (gaining of friends), Kaakolkiam (war and peace), Labdha-pranaasam (loss of gains), Apari-ksita-kaarakam (thoughtful actions vs wrong deeds).

**Suchitra:** Oh! During which period was it written thandhe? From what I read in newspapers, teaching children through stories and games is happening only now.

**Thandhe:** Panchatantra is the oldest Indian fable written possibly around 200 BCE. However when the system of gurukula was followed, worldly wisdom was taught not by lectures or through textbooks, but through storytelling and experiential learning. But when we switched over to the western ways of education, we lost touch with these practices. But I am happy that we are looking at those traditional practices as modern and bringing them back into our fold.

**Suchitra:** Has this Jungle Book anything to do with the Panchatantra thandhe?

**Thandhe:** No Suchitra. It is a story that Rudyard Kipling brought out inspired by the ambience of the Kanha National Park in Madhya Pradesh.

**Suchitra:** Inspired by a National Park in our country?! I am proud again. Tell me more about the park thandhe.



A tiger reserve

**Thandhe:** Kanha National Park is nestled in the Maikal range of the Satpura hills in Madhya Pradesh. It is a tiger reserve housing a significant number of Bengal tigers, Indian leopards, several species of birds, mammals, reptiles and insects.

**Suchitra:** What is a tiger reserve thandhe?

**Thandhe:** A tiger reserve is a protected area for the conservation of the striped big cats. There are 52 tiger reserves in India that are managed under “Project Tiger”.

**Suchitra:** “Project Tiger...?”

**Thandhe:** During the days of the British rule in India the forests were declared as hunting grounds. The British rewarded those who killed tigers. This led to a drastic reduction in the number of tigers and made it an endangered species. To revive

the number, “Project Tiger” was launched by the Government of India in 1973.

T A S K

Have you visited a national park? If so, list out all the animals and birds that you saw on your trip to the national park.





**Suchitra:** Can we visit the park thandhe? My winter vacation has just started. Would it be possible for us to visit the park this year?

**Thandhe:** The park is open for public only from mid-October to the end of June. Even then they may keep it closed for visitors if weather conditions are not favorable. So, let me check on it and try to book tickets for our travel after discussion with **tayi** (mother in Kannada).

**Suchitra:** Thank you thandhe! I wish we can make it.

**Thandhe:** I too am looking forward. You go to sleep now. We will continue the discussion in the morning.

**Suchitra:** Ok! I am so excited.

In the morning Suchitra gets up wondering if her parents were able to organise the trip.

**Suchitra:** Tayi, did thandhe speak to you about visiting the Kanha National Park, during this vacation?

**Tayi** (smiles): Suchitra, I am going to give you a happy news. Thandhe has booked tickets for us to Madhya Pradesh. We are leaving tomorrow on a five-day trip.

**Suchitra:** I can't believe this. I am going to be among many animals shortly. I am really excited. How would we reach Kanha tayi?

**Tayi:** We will fly to Jabalpur and we shall proceed to Kanha by road.

**Suchitra:** Are we going to visit some places in Jabalpur tayi?

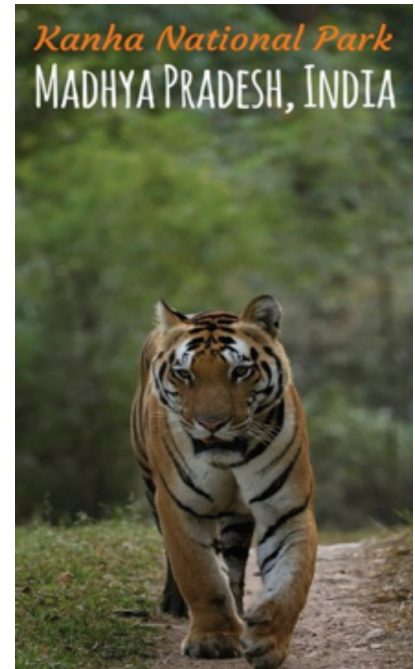
**Tayi:** We shall try to.

**Suchitra:** What are the places of interest in Jabalpur tayi?

**Tayi:** For a brief history of the place, Jabalpur was intermittently ruled by the Mughals and the Maratas, before it was annexed by the British. Today it is the head quarter of West Central Railway and the Army Headquarter of central India (Madhya Pradesh, Chhattisgarh, Orissa, Bihar and Jharkhand).

The Gun Carriage Factory is situated there. We will try to visit the huge marble mountains and the beautiful waterfall there.

The following day the family visits Bedaghat, where river Narmada makes its way through the marble rocks, narrows down and plunges in a waterfall known as Dhuandhar which means a smoke cascade. Suchitra is fascinated by the roar that she hears from a long distance.



### Think about...

To conserve animals and birds do we cage them in zoos or help them live in a protected place like a national park? Discuss.





Marble rocks



Dhuandhar falls

**Suchitra:** What is the roar all about? I have not heard such a sound before!

**Thandhe:** It is the plunge of Narmada into a waterfall. The volume of water and the force with which it flows creates this loud noise.

**Tayi:** How poetic it is. How I wish that I could capture the beauty of sight and sound and remember them forever.

They also visit the Bargi dam one of the 30 dams on River Narmada. Bargi dam is important to Jabalpur because it is the source of water to them and the surrounding areas. They enjoy watching birds like mynah, sarus crane, and the local kali gauriya.

**Tayi:** Suchitra, this sets the tone for our visit to Kanha National Park.

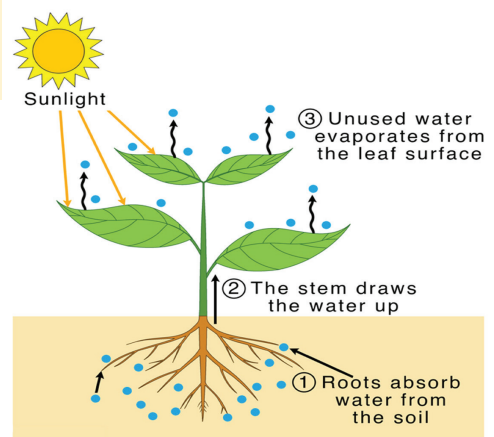
**Suchitra:** I have heard thandhe say that India is diverse. But I am happy that I am able to experience it. Thank you thandhe.



Bargi dam

They drive down to the Kanha National Park to be there early in the morning. Chances of spotting animals like tigers in their natural habitats are high early in the morning.

**Thandhe:** There are a few gates through which we may enter the park. We are lucky to have got tickets to enter through the one that has the maximum animal population. In such places, the chances of spotting them also becomes higher.



Transpiration



They are greeted at the gate by officials from National Tiger Conservation Authority (NTCA). After checking their tickets and identity they are allowed to proceed further. They are instructed not to speak loudly, nor carry food, or mobiles. They are also advised to strictly adhere to the instructions of the forest guard for their own safety and peace of the wild life.

From now on the family communicates with each other either in whispers or in sign language.

**Suchitra:** How cool the forest area is! I am reminded of transpiration which my teacher taught us, while doing the lesson on plants.

**Thandhe:** What is it Suchitra?

**Suchitra:** **Transpiration** is the process by which water continuously evaporates from the surface of the plants. Because evaporation is a cooling process, the places which have a canopy of trees are cooler than buildings.



Barasingha

**Thandhe:** That is an amazing piece of information, another reason for not cutting down trees.

(The forest guard points to a deer that was passing by.)

**Guard:** You are lucky. Did you notice a deer wisp pass? That is barasingha, the jewel of Kanha National Park. Do you know that barasingha means twelve tines?

**Suchitra:** What does it mean?

**Guard:** It means that they have twelve branches in their antlers. But mature stags have 20 too. They use them for self-defense. But they are also hunted for them. Though in India, hunting is banned.

The Kanha National Park is special as we can find valleys, plains, meadow areas, some hilly terrains and water bodies. The part that you are in now has it all.

The stags are mainly found in the meadow areas, where they find sufficient grass to graze. Look at their body colour. The colour ranges from dark brown to white, because of which they camouflage behind the grass.

**Suchitra:** How beautifully nature has tuned itself to protect all her species!

**Thandhe:** Sir, I hear a lot of birds chirping.

**Guard:** If you remain very quiet, you will hear and see a lot of birds around. You can spot a few close by if you are lucky enough.





Birds do not have external ears. They have tiny holes on their heads which are covered with feathers. Sound travels through these holes or in other words, these holes act as ears for the birds.



Ears of Birds

**Suchitra:** That's an interesting piece of information. I see that the shape of ears of animals are different.

**Guard:** Among animals, mammals have external ears. Look at the deer, a mammal, grazing there. Their ears look like leaves. See how the ears go up and stand straight when they hear a sound. Their ears are located on the sides of their face.



A Deer

**Suchitra:** Yes, I have seen that the animals that have external ears also have hair on their body.

**Guard:** These animals also give birth to young ones and feed them with the milk secreted by the mammary glands. Such animals are called mammals.

As they move on to the core area, they go near a water body.

**Suchitra:** Wow, there are so many birds in the water and also around on the trees here. What are those white birds in water sir?

**Guard:** They are storks. Look at their long legs and webbed feet. Their long legs help them to wade through water. Their webbed feet help them to swim. Apart from aquatic birds we also find partridges, teals, quails, peafowl, eagles and kites. You also find nocturnal birds like owls and night jars.



Stork



Partridge



Owl





**Suchitra:** What are nocturnal birds sir?

**Guard:** Some animals and birds are active during the night than the day. They are called nocturnal animals, e.g., owls, bats, foxes.

They have a highly developed sense of hearing and smell. Their eyes are adapted to see in dim light.

**Suchitra:** So, what are animals that are active during the day called?

**Guard:** They are called diurnals, e.g., humans, deer, dogs.

As they move into the forest in the safari jeep, they come across an ostentation of peafowl. Two of them are sitting in the lowest part of the tree.

**Suchitra:** Sir, I just now saw a peahen flying, but looks like it does not like to fly high. Is it so?

**Guard:** You are right my child. Peafowls can fly only shorter distances and lesser heights. Can you guess why?



**Suchitra:** I am so excited, that I am not able

**FACT FILE**

A group of peafowl (male and female peacock) is called an ostentation or a pride of peafowl.

to think. Please tell me.

**Guard:** When you make a toy aeroplane, do you use a light paper or a thick cardboard?

**Suchitra:** I will use a light paper, only then it can fly. A cardboard would be heavy.

**Guard:** Exactly, a bird's body has to be light to fly. Peafowls are heavy birds and cannot fly great heights or distances. Some birds like ostriches, emus and moas are flightless birds. They are heavy and have very small wings too.

**Suchitra:** Are wings and feathers the same?

**ACTIVITY**

Give examples

| Warm blooded animals | Cold blooded animals |
|----------------------|----------------------|
|                      |                      |
|                      |                      |
|                      |                      |





Hen incubating eggs

**Tayi:** The feathers cover the bird's body like how a mammal's body is covered with hair. The feathers and hair help to maintain a constant body temperature irrespective of the temperature of the surroundings.

Hence, they are warm blooded animals, whereas the body temperature of reptiles, amphibians and fishes change depending on the surrounding temperature. Such animals are cold blooded animals.

**Suchitra:** Mammals reproduce by giving birth to young ones.

Birds reproduce by laying eggs. Am I correct?

**Thandhe:** Yes, you are. Birds lay eggs. Most of the birds incubate their eggs. The father and the mother bird take turns to do this.

**Suchitra:** What do you mean by incubate?

**FACT FILE**

Koel is considered a lazy bird, as it lays its eggs in the nest of a crow. The crow incubates and helps them hatch.



Crow feeding a young koel

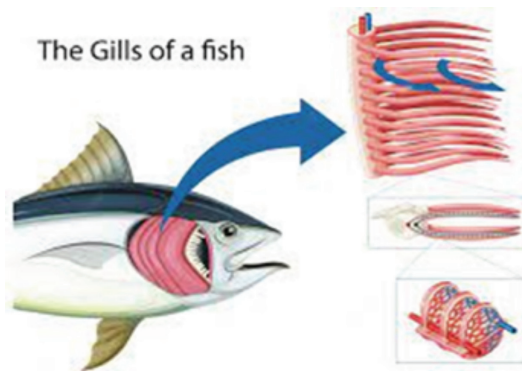
**Thandhe:** The parent birds provide warmth to the eggs by sitting on the eggs for a period of time. This process is called **incubation**. When the young birds hatch out of their eggs the parent birds feed the young ones, till they are capable of taking care of themselves. It is a marvel that birds and animals show good parental care.

As they move further, they see a river.

**Suchitra:** Is this a river? What is its name?

**Guard:** It is the Banjar river, a tributary of Narmada River. Tributaries are streams that join a bigger river. The other tributaries of Narmada are Gomti, Kosi and Mahananda. Tributaries of River Cauveri are Kabini, Bhavani, Herangi, Hemavathi and Swarnawati. Purna, Prahita, Indravali are the important tributaries of River Godavari. Banjar river is home to several pisces, amphibians and reptiles.

**Suchitra:** Are pisces fishes?

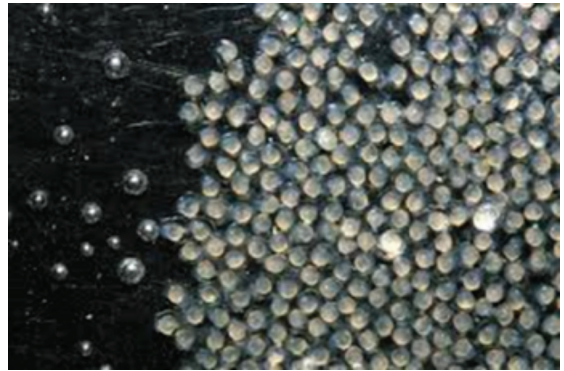


**Guard:** Yes. Look into the clear water. You will see many of them. Look at their body scales and fins. Fish move in water with the help of their fins. The fins on their body help them to swim and stay afloat in water. The tail fin helps them to change the direction of motion. Look at the fish carefully. You can see their gills.

Gills help the fish to breathe. Look at the shape of their body.

**Suchitra:** What is special about their shape?

**Guard:** The body is streamlined to help them steer through water. They lay eggs to reproduce.



Fish eggs

**Suchitra:** Do they show parental care?

**Guard:** No. They do not. Look at the army of frogs there. They are amphibians.

**Suchitra:** What are amphibians?

**Guard:** They are animals that can live both on land and in water. Eg. frog, newt, toad.

**Suchitra:** Are crocodiles, turtles, tortoises, snakes, lizards, also amphibians?



Snake





Garden lizard



House lizard

**Guard:** No dear. They are reptiles. Amphibians are those animals that have organs to breathe in water and also on land. They also lay their eggs in water. For example, frogs breathe through their moist skin while in water and through lungs when on land. Whereas, crocodiles that are reptiles cannot breathe in water. They put their snout out of water, to take in air to breathe.

Amphibians like frogs lay their eggs in water, whereas reptiles lay their eggs on land and the young ones move to the water nearby when they hatch.

| TORTOISE   | TURTLE  |
|--|---|
| <p>Tortoises have short and sturdy feet to crawl on land</p>  | <p>Turtles have webbed feet or flippers.</p>  |





**Suchitra:** That is a bit of good learning for me. Thank you so much sir. Do they have external ears?

**Guard:** They do not have external ears. They have a hole or a slit close to their eyes which act like ears for such animals.

Suchitra gives a shrill cry on seeing a tiger. Everyone is happy, excited, terrified and amazed on seeing a tiger sitting on the bank of the river. The guard advises them to be cautious and remain in absolute silence, enjoying the moment. They are silent as they are scared, awestruck and a lot more.



Tiger resting by the river

The tiger slowly gets up, majestically walks to the water, drinks water and quietly moves out of their sight. They are relieved and also ecstatic to have spotted the animal that they had travelled to see.

**Guard:** You are very lucky. A national park is a natural habitat where animals have the freedom to move around. So, there is no assurance that you will spot animals, especially animals like tiger every day. There are times when we do not spot one for days together and the visitors go disappointed. Share the moment with your friends, motivate them to visit, so that they also experience what you experienced just now.

**Suchitra:** Definitely I will do so. Learning about animals while watching them in their natural habitat is much more than exciting. We all thank you for guiding us on this safari

## SUMMARY

- Panchatantra is the oldest Indian fable, which teaches us a lot of practical things about life..
- Kanha National Park is nestled in the Maikal range of the Satpura hills in Madhya Pradesh. It is a tiger reserve housing a significant number of Bengal tigers, Indian leopards, etc.
- There was a drastic reduction in the number of tigers during the colonial rule due to inhumane hunting. To revive the number, “Project Tiger” was launched by the Government of India in 1973.
- Mammals have external ears whereas birds do not.





- Animals and birds which are more active during the night than the day time are called nocturnal animals. Animals active during the day are called diurnals.
- Incubation is the process in which birds sit on the eggs for a period of time in order to provide warmth for the egg.
- Transpiration is the process by which water continuously evaporates from the surface of the plants.
- Fishes use their fins to swim and stay afloat in water.
- Amphibians are animals that live both in water and on land.
- Frogs can breathe in water while crocodiles snout out of water to breathe.



**I. Fill In the blanks:**

1. The oldest Indian fable written possibly around 200 BCE is \_\_\_\_\_.
2. Kanha National Park is nestled in the state of \_\_\_\_\_.
3. The protected area for the conservation of the striped big cats is \_\_\_\_\_.
4. The jewel of Kanha National Park is \_\_\_\_\_.
5. The fish uses \_\_\_\_\_ to change the direction of motion.
6. The natural habitat where animals have the freedom to move around is called as \_\_\_\_\_.
7. Bargi Dam is built across the river \_\_\_\_\_.
8. Storks use \_\_\_\_\_ to wade through water and \_\_\_\_\_ to swim in water.
9. Turtles use \_\_\_\_\_ to swim in water.
10. B C E means \_\_\_\_\_.

**II. Match the following:**

- |            |   |                  |
|------------|---|------------------|
| 1. Diurnal | - | Amphibian        |
| 2. Newt    | - | Streamlined body |
| 3. Fish    | - | External ears    |
| 4. Mammals | - | Dogs             |



### III. Answer the following:

1. Why was 'Project Tiger' launched in India?
2. Name the animals that can be spotted in Kanha National Park.
3. Expand NTCA.
4. Define 'transpiration'
5. How do birds hear?
6. What are the characteristic features of mammals?
7. Differentiate between Diurnals and Nocturnals with two examples each.
8. What is 'Incubation'?
9. Draw a labelled diagram of transpiration in Plants.
10. Write a short note on Jabalpur.
11. What are amphibians? Give examples.

### IV. Map:

1. Mark the following on a political map of India.

States of Central India

- a. Madhya Pradesh
  - b. Chattisgarh
  - c. Orissa
  - d. Bihar
  - e. Jharkhand
2. States through which river Narmada flow.
    - a. Madhya Pradesh
    - b. Gujarat
    - c. Maharastra



# 6 Water



## Expected Learning Outcomes

### Students...

**know** the expansion of ICAR, NRRI, the various types of Indian rice, Bogibeel bridge, the path of river Brahmaputra, the places of interest in Majuli islands, the major rivers of south India and their origins, the rivers that join the Arabian sea, various sources that feed the rivers, the organs of respiration in aquatic animals, **the origin of** River Ganges and Yamuna

**know the meaning of** Jol Pan, Komal Saul, head water, glacier, estuary, river island

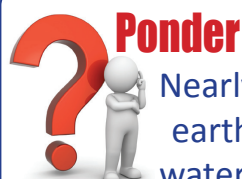
**understand** the functions of National Rice Research Institute of India, the major causes of water pollution, the process of respiration in aquatic animals **how** valleys and deltas are formed, **why** River Brahmaputra is “mighty”, dams are built across rivers.

**understand the role of** river Brahmaputra in supporting agriculture, rivers in human civilisation, whales in maintaining the balance in aquatic eco system.

**get an insight into** the life in Majuli islands.

**appreciate** the importance of preserving marine life by adopting water pollution restrictive practices

**locate** state/s, capital/s, rivers, tributaries and other geographical divisions on a map of India - mentioned in the lesson.



### Ponder

Nearly 70 % of the earth's surface is water. But most of it cannot be used for drinking. Why?





Water, lakes and waterway,  
Protect we must in every way.  
For happiness of all living beings,  
Conserve water in every way please.  
Pure water is everyone's need,  
Protection of water is essential indeed.  
Without food live we can,  
But without water survive none can.  
Drinking even a little water,  
Drives the pain of thirst away.  
Loss (of water) causes cries of horror,  
Treasuring water is the way proper.

*- Anonymous*





Sumaya, Bhavish and Jahnu aged about 10, 8 and 5 years, respectively, live with their parents in Patna, the capital city of Bihar. It is their vacation time and the parents have planned a trip to Guwahati, a city in Assam. They are excited about meeting their grandparents and their uncle's family.

The family is busy packing things needed for the trip.

**Deuta** (father in Assamese): Sumaya, Bhavish, Jahnu, hurry up! Have you double checked the packing with the check list we made yesterday?

**Sumaya:** Yes deuta, we have done it.

They boarded the train and the exciting journey to Guwahati started. Sumaya and Bhavish noted down the names of all the stations and different landforms that crossed the way.



### Think about...

What is a check list?  
List a few occasions where you should have one.



On reaching **aaita's** (grandmother in Assamese) house, the children take the blessings of the elders.



### Think about...

What is a jol pan?

**Aaita:** Let all your dharmic wishes come true my dear children. Have a bath and we shall have jol pan(snacks). Today, I have made Komal Saul for you all.

**Sumaya:** Komal Saul aaita, I have not heard of it, please explain.

**Aaita:** It is a unique kind of rice from Assam that can be eaten raw. It is soaked in water for a short while and is eaten with milk, curd or yoghurt or just as it is.

**Sumaiya:** A unique kind of rice? Aaita, you mean to say that we have a variety of rice?

**Aaita:** Yes, Sumaiya, we have a National Rice Research Institute in Cuttack.



Jolpan made with Komal Saul



### Enrichment

Indian Council of Agricultural Research (ICAR) co-ordinates and guides researches on agriculture.

They conduct research on rice varieties that would suit our land forms and climatic conditions. They have released 154 varieties of rice, from 1968 to 2019.

**Sumaya:** That sounds like a massive research. I never knew that varieties of grains are created according



to the conditions of the place. It looks like becoming an agricultural scientist would be helpful to the society, while we also have an exciting job.

**Jahnu:** I saw a huge expanse of flowing water while coming home from the station. Was it a river?

**Koka (grandfather in Assamese):** Yes, it is Brahmaputra. We live close to the river.



Bogibeel bridge

on the lower deck and a 3-lane road on the upper deck. The roads in the upper deck have footpaths on both sides.

**Bhavishh:** I wish we could go on the bridge again! My teacher told me that Brahmaputra is known as the “Mighty” Brahmaputra. I was wondering why it is so.

**Koka:** It is a huge river running across our neighbouring countries also. In some places its width spans up to 18km. Do you know that there are 6 bridges across the river?

**Bhavishh:** Where does it originate borta?

**Borta:** Brahmaputra originates in the Kailash ranges of Himalayas. It flows through Tibet and Bangladesh. It also has catchment areas in Bhutan.



Brahmaputra

FACT FILE

Indian rice varieties cultivated widely are basmati, joha, jyothi, navara, ponni, pusa sonamasuri, jaya, kalajiri, boli, palakkad matta, himalayan red rice, matta rice, kattamodan, kairali, jyothy, bhadra, asha, rakthashali, red kaimi, kaivara samba, mappilai samba, kuruvaikar, poonjai.

**Bhavishh:** We also crossed a long bridge. **Borta (father’s elder brother in Assamese)** told us that it was the longest rail cum road bridge in India and the second largest in Asia.

**Borta:** It is the Bogibeel bridge. It is about 5km long. It connects upper Assam and Arunachal Pradesh. It is a double decked bridge with two broad gauge railway tracks

FACT FILE

Catchment areas that are generally areas bound by hills from which water flows into rivers.

**Aaita:** The mighty Brahmaputra makes the fields here fertile by bringing in rich alluvial soil. The soil is fit for growing a variety of crops like rice, jute, sugarcane, tea, pulses, coconut, cotton etc. Thus, it supports agriculture. Rice is our staple



food as it is grown in large quantities.

**Borta:** Let's have a sumptuous Assamese lunch. Today, we are planning to visit Majuli. That would be an interesting and exciting place for you.

**Bhavish:** What is Majuli, borta? Is it a theme park?

**Borta** (smiling): It is an island. Do you know what an island is?

**Sumaya:** I know. It is a piece of land surrounded on all sides by water. How will we reach there borta?



Majuli Island

### TASK

Make a list of all the birds that you see in your local river or pond.

**Borta:** Majuli is a river island. It means an island in a river. Imagine how huge Brahmaputra is, if it can have an island, in which people live! The island, however is now shrinking in size, because of both man-made and natural causes. It is important to maintain such places as they are

unique landforms and have inhabitants with specific skills, flora and fauna that cannot be seen in other places.

Now let me tell you how to reach that place. We will reach Jorhat and take a ferry. Once we reach the island, we can take a cab or a bus from the Kamlabari ghat, where we will land.

**Bhavish:** I am waiting to be there. Let's leave quickly.

They travel in a ferry enjoying the scenic beauty around. In Majuli islands they see people living in bamboo huts and making handicrafts. They get an opportunity to see a wide variety of birds like storks, kingfishers, egrets, etc. They also visit places like Kalambari Satra, Auniate Satra, Tengapania and know about their rich culture and heritage.



Melting glaciers

**Sumaya:** How beautiful and quiet! The city that we live in is very noisy and we see only buildings all over. It is very serene and tranquil here. Aaita, tell me more about rivers. You told me that the mighty Brahmaputra originates in the Himalayas. Where does River Ganga and Yamuna, which we have read about originate from?





**Aaita:** All rivers have a starting point from where they begin to flow. This is called the head water. It can come from the rainfall or from a glacier.

**Bhavish:** What is a glacier, aaita?

**Borta:** Glaciers are huge bodies of slow moving ice. Our Himalayas is a huge store of glaciers that feed our rivers namely Ganges, Indus, Brahmaputra and also a few rivers that flow through China, Bhutan and Tibet.

The Gangotri glacier is the origin of river Ganga, while the river Yamuna originates from Yamunotri.

**Sumaya:** Do all the rivers originate from the Himalayas?

**Borta:** Not all rivers originate from the Himalayas. However, most rivers have their origin high up in the mountains and hills.

Rain on the mountains soak to the ground. The rest runs and collects in pools, then trickles down the hill due to force of gravity. Small streams thus formed get bigger, and join with the other streams. This increasing stream flows down carving out valleys and other landscapes. As it progresses towards the sea, it carries with it everything that it finds on its path. It deposits all that it had brought down before it joins the sea.

Estuary is the place where the river meets the sea. The fresh water of the stream and the salt water of the sea mix here and form a different eco-system, which helps certain kinds of plants and animals to thrive. The place where a river enters a lake, a larger river, or an ocean is called its mouth.

When a large amount of fertile soil called the alluvial soil is deposited, a delta is formed.

**Bhavish:** It is indeed a long journey for the rivers.

**Deuta:** Godavari, Krishna and Kaveri are a few major rivers of south India.



Godavari




Krishna



Cauvery

Godavari originates from Trimbakeshwar in Nashik, Maharashtra. Krishna originates from the north of Mahabaleshwar in Maharashtra and Cauvery from Thalacauvery in Kodagu, Karnataka.

All these rivers flow into the Bay of Bengal irrigating vast areas of fertile land on its way. Do you know the two rivers that flow into the Arabian Sea?



**Think about...**  
Which is the longest bridge in your city?  
Compare it with Bogibeel.





**Bhavish:** No deuta.

**Deuta:** Narmada and Tapi are the two major rivers that join the Arabian Sea.

**Sumaya:** That is very interesting deuta. Since most of the substances that the rivers carry are deposited at the mouth, the seas and oceans should have less of debris deposited by rivers.

**Borta:** That is a good guess Sumaya. Marine water does not get polluted by the deposits that the rivers bring. The major pollutants of the seas and oceans are brought into by human beings.

**Deuta:** We have learnt the art of navigating through high seas, using our sophisticated ships. However, when we travel across oceans for long periods, we dump our garbage and sewage into the oceans thus polluting them. However, there are clear guidelines that have been issued by the government and followed by companies for safe disposal of wastes in oceans.

Sometimes there is an accidental spill of pollutants like an oil spill that can affect marine life and the quality of water. Such incidents are to be avoided.

**Bhavish:** I remember learning that dams are built across rivers to store water to be used for irrigation, generation of electricity and also drinking purposes. Can we store all the water of rivers in dams so that there is no wastage of water?

**Deuta:** It is not possible to stop all water from flowing into the sea, even when we build dams.



Indus Valley Civilisation



Nile Valley Civilisation



Mesopotamian Civilisation



Rivers have always played a major part in the lives of human beings. Our ancestors settled down on river banks, as the soil there was fertile to practice agriculture and water was available in plenty for irrigation. Rivers also were used for transportation of goods and people. Thus, all our ancient civilisations, the Indus valley, Nile valley, Mesopotamian civilisation flourished on the river banks.



Fish

**Bhavish:** That's a lot of fascinating information on water, especially rivers. How I wish I could soak in water for long. Deuta, my mother would scold me if I say I would like to be in water always. But it is difficult for me to hold my breath under water for a long time. I don't know how aquatic animals do it always.



### Think about...

Name a few rivers that serve as transportation channels even today.

**Borta** (laughing): They don't hold their breath in water, they breathe in water. I am sure you have learnt that animals like fish have special structures called gills through which they breathe.



Dolphin

When water flows over the gills, they take in oxygen and give out carbon-di-oxide.

But dolphins and whales are mammals. They breathe through their lungs. They cannot breathe in water. They come to the surface, put their snout out, take in oxygen and give out carbon-di-oxide. The Ganges river dolphin also known as "Susu" is the National Aquatic Animal of India.

**Sumaya:** Whales are the largest animals in the world. They eat away the smaller fish in the sea. Don't they?

**Aaita:** Yes, Krills, a kind of fish, is their staple food. It is sad that the blue whale population has dropped drastically due to commercial hunting of whales for their blubber and oil that can be extracted.

**Sumaya:** Do people hunt in the seas and oceans too?

**Aaita:** Yes. But now hunting of blue whales is banned. We have understood that the excreta of whales is rich in nitrogen and phosphorous. Aquatic plants thrive using these nutrients. Without whales we may not have enough aquatic plants.



Blue Whale



When whales die a natural death, and the body falls to the ocean floor, it is called the whale fall. It provides a bounty of nutrients for the deep water creatures. Thus, whales support the marine ecosystem.

**Bhavish:** That is a lot of interesting information on whales.

**Aaita:** Yes, nature has provided us with an abundance of resources and ways to balance and maintain them. We, human beings need to take care of nature by using the resources judiciously and also by reducing pollution.

**Deuta:** To add on, we have reduced many of our rivers into industrial and sewage dumps, which needs to be avoided.

**Borta:** Water pollution is thus a threat and needs to be reduced, though we may not be able to fully avoid it.

**Bhavish:** It's past evening now. Let us go for dinner now and visit the places in the island tomorrow.



### Enrichment

Effluent is waste from industries that flows into the water bodies, like rivers, sea, lakes, etc.

## SUMMARY

- National Rice Research Institute in Cuttack conducts research on rice varieties. They have released 154 varieties of rice from 1968 to 2019.
- Komal Saul is a unique kind of rice from Assam that can be eaten raw.
- Bogibeel Bridge is the longest rail cum Road Bridge in India and the second largest in Asia.
- Brahmaputra originates in the Kailash ranges of Himalayas
- Majuli is a river island which is now shrinking in size, because of both man-made and natural causes.
- Glaciers are huge bodies of slow moving ice.
- Estuary is the place where the river meets the sea.
- The place where a river enters a larger river, a lake or an ocean is called the river mouth.
- A delta is formed where a large amount of alluvial soil is deposited.
- Fishes have gills through which they take in oxygen from water and release carbon dioxide.
- Mammals such as dolphins and whales have lungs. So they come up to the surface and put their snout up to breathe since they can't breathe in water.
- Blue whale hunting is banned since their excreta is rich in nutrients which helps the aquatic plants to thrive.





**I Name the following:**

1. A unique kind of rice from Assam that can be eaten raw is \_\_\_\_\_.
2. Bogibeel bridge is the longest rail cum road bridge in India that connects \_\_\_\_\_ and \_\_\_\_\_ states of India.
3. Brahmaputra originates in the \_\_\_\_\_ ranges of Himalayas.
4. An example of river Island is \_\_\_\_\_.
5. Dolphins and Whales breathe through their \_\_\_\_\_.
6. Narmada and Tapi are the two major rivers that join the \_\_\_\_\_.
7. River Yamuna originates from \_\_\_\_\_.
8. The largest animals in the world are \_\_\_\_\_.
9. Huge bodies of slow moving ice are called \_\_\_\_\_.

**II Classify the following sources of energy as Renewable Energy and Non-Renewable Energy:**

(Wind, Petrol, Water, Diesel, Solar Energy, Coal)

**III Match the following:**

|                  |                                  |
|------------------|----------------------------------|
| Gangotri glacier | Mahabaleshwar                    |
| Head water       | Staple food of Whales            |
| Godavari         | Kodagu                           |
| Gills            | Trimbakeshwar                    |
| Excreta of whale | Origin of river Ganga            |
| Krishna          | Starting point of the river      |
| Kaveri           | Fish use this to breathe         |
| Krills           | Rich in nitrogen and phosphorous |

**IV Answer the following:**

1. Why is the river Brahmaputra referred to as the “Mighty Brahmaputra”?
2. Name a few major rivers of South India.
3. Write a short note on “Estuaries”.





4. How does marine water get polluted?
5. How do dolphins and whales breathe in water?

**V Circle the odd one**

1. a) River Krishna    b) River Godavari    c) River Cauvery    d) River Tapi
2. a) Estuary            b) Delta                    c) Head water            d) Island
3. a) River Ganga    b) River Yamuna    c) River Brahmaputra    d) River Cauvery

**VI Activity**

Below are some causes and effects of water pollution and some possible solutions to the problem. Sort and place them in the correct column:

- a. Oil spills and leaks
- b. Leaking sewage pipes
- c. Contaminated drinking water
- d. Destroying river habitats
- e. Animal waste washing into rivers
- f. Using renewable energy
- g. Using chemical fertilizer for crops
- h. Collecting and disposing of plastic waste
- i. Stopping industries and factories dumping waste in rivers
- j. Making human sick

| Causes | Effects | Solutions |
|--------|---------|-----------|
|        |         |           |
|        |         |           |
|        |         |           |
|        |         |           |

**VII Map**

1. Mark the following on a political map of India
  - a) Assam
  - b) Bihar
  - c) The states where River Godavari, River Krishna and River Cauvery originate.
  - d) Two states through which the Bogibeel bridge has been built.
2. Mark the following on a river map of India
  - a) River Brahmaputra
  - b) River Ganga



# 7

# AIR



## Expected Learning Outcomes

### Students...

**know** the parts of the human respiratory system, the causes of flooding, the causes and consequences of acid rain, ways to use energy judiciously, the diseases caused by viruses and bacteria, the function of stomata.

**know the meaning of** wind, spiracles, air pollution, renewable and non-renewable sources of energy, respiration, and airborne diseases.

**know how** greenhouse gases are formed.

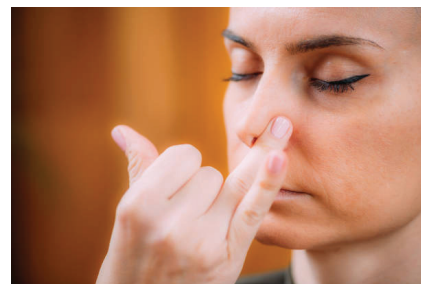
**understand** the need for pollution free atmosphere, the functions of human respiratory system, the effects of air pollution on our respiratory system.

**understand how** fossil fuels such as coal and petroleum are formed, energy is generated from wind and water.



### Try Alternate Nostril Breathing

1. Sit straight in a comfortable position. Ensure that your spine is erect and close your eyes gently.
2. Bring your left thumb and index finger together. Rest the back of your left hand on your left knee.
3. Bend your right index and middle finger into your palm. Close your right nostril with your right thumb. Exhale completely, through the left nostril. Inhale through your left nostril.
4. Close your left nostril with your ring finger. Release your thumb and exhale completely through your right nostril. Inhale through your right nostril.
5. Close your right nostril with your thumb. Release your ring finger and exhale completely through your left nostril. This is one round.
6. Try this cycle 5 times.



Sridhar, a boy of Class IV enters his house after his evening games. He is drenched in sweat, hence switches on the fan only to realise that there was no power supply. He is upset and calls out for his mother.

**Sridhar:** Mata (mother in Hindi), it is so sultry and there is no power. How do I get rid of this sweat?

**Mata:** Don't worry. Let us use a hand fan. Pick it up from the Pooja room and use it to get some breeze.

**Sridhar:** Thank you for the idea mata.

**Mata:** Open the windows and you will get some fresh air. Go to the terrace. You might get some breeze.

**Sridhar:** Mata. There is air all around us but sometimes, we do not feel its presence though we continue to breathe in and breathe out. Why is it so?

**Mata:** Moving air is called wind. We feel the wind blowing. The electric fan and the hand fan help in moving the air around and hence we are able to feel it.

## ACTIVITY

Collect pictures depicting how we tried to keep ourselves comfortable on warm, humid days before the invention of electric fans.

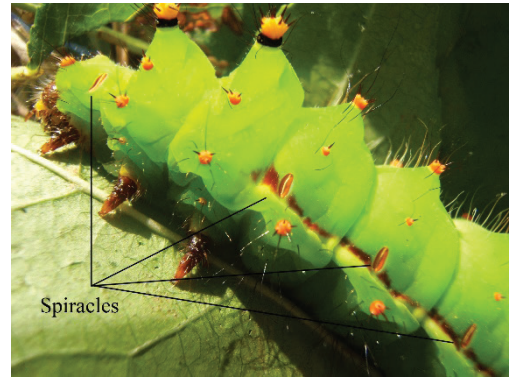
**Mata:** Yes Sridhar. You too have learnt in your class III that plants breathe through small pores on their leaves called...

**Sridhar:** (hurriedly): Stomata. Mata, today she showed us stomata through a microscope.

**Mata:** That's nice Sridhar.

**Sridhar:** She told us that even very small organisms called microorganisms breathe.

**Mata:** So, you understand how important air around us is. It is therefore vital to keep air as pollution free as possible. Do you know what air pollution is?



Spiracles on an insect



## Enrichment

There are a few microbes that do not breathe in oxygen. They are called anaerobes.

**Sridhar:** Ok...today in our EVS class, my teacher taught us about how a few organisms breathe. I was amazed to know that insects have tiny holes on their body called spiracles through which they breathe. Mata, are you aware that plants also breathe?



## Ponder

People who lived a few centuries ago did not have electric fans, leave alone air conditioners. Do you think they would have felt uncomfortable during summers like how we do now? Justify your yes/no.



**Sridhar:** When air contains harmful substances it is polluted. My teacher says that the vehicles emit pollutants, thus adding to pollution. Do they mata?

**Mata:** The vehicles that use petrol or diesel emit carbon dioxide. Carbon dioxide is a gas that can cause global warming.

**Sridhar:** What is global warming mata?

**Mata:** It is a process by which the average temperature of the earth is increasing slowly. It not only makes us feel warmer and uncomfortable, it can also bring about drastic changes like very severe thunderstorms, increase in forest fires etc. leading to harmful effects on human beings and nature.



Stomata



### Enrichment

A microorganism, or microbe, is a living thing that can be seen only through a microscope.



### Enrichment



A microscope is a laboratory instrument that is used to look at objects that are too small to be seen by the naked eye.

We observe that we receive heavy spells of rain within a short span of time. This can lead to flooding. The floods in Mumbai which occurred on 26<sup>th</sup> July 2005, was a result of about 100cm of rainfall overnight; Chennai received about 40cm of rainfall on October 26-27, 2005 leading to floods.

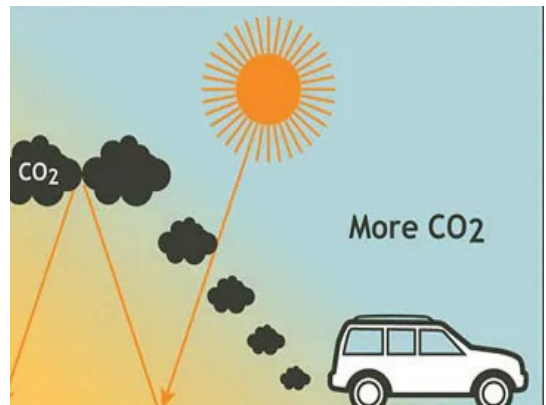
Global warming has also resulted in quick melting of glaciers. This leads to a huge influx of water into the rivers, thereby flooding the area on the bank of such rivers.

**Sridhar:** But can't water be conserved and used later?

**Mata:** The water that we receive in a short span is extremely large to be put to use in a controlled manner.

**Sridhar:** I don't understand.

**Mata:** Glaciers melting at a rapid rate result in water flowing down with great force, leading to landslides. Thus they cannot be put to use as effectively as how we would have used it had we got it in expected volumes. When such large volumes of water reach the sea, level of the sea increases, leading to inundation in coastal areas. The fresh water that is available in the glaciers would also be lost soon.



Global warming





**Sridhar:** That's really a situation which we need to avoid. How do we do that?

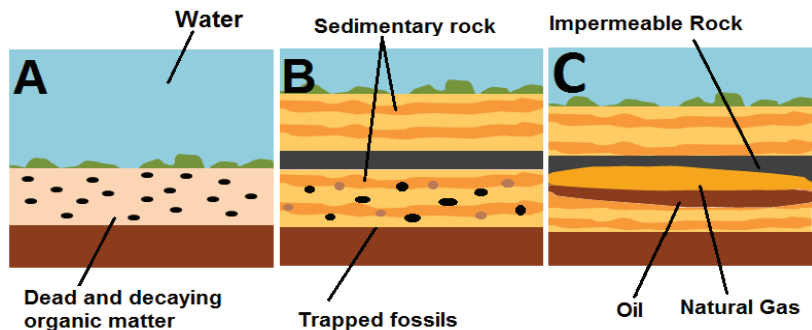
**Mata:** One way, as your teacher said, is reducing the usage of fossil fuels.

**Sridhar** (intervening): Mata, my teacher said, use automobiles less. You say, fossil fuels. What are fossil fuels?

**Mata:** Good. You are paying attention to the details. Vehicles normally run on petroleum products like petrol or diesel. They are obtained from ...

**Sridhar:** I know. From crude oil that is also known as petroleum. Animals, trees and plants that got buried under the earth due to

various natural phenomena millions of years ago have been converted to petroleum due to the heat and pressure exerted by the earth.



**Mata:** The petroleum thus obtained is refined or distilled to obtain various products like petrol, diesel, LPG, kerosene, bitumen(tar), wax etc. This refining process by itself, is highly polluting. Petrol and diesel further pollute air by emitting harmful gases when used in vehicles.



Air pollution

**Sridhar:** Now I understand why my teacher said we need to use automobiles less. Is petroleum the only fossil fuel?

**Mata:** Coal is also a fossil fuel. Coal predominantly contains carbon, oxygen and hydrogen. When it is burnt it releases carbon di oxide, which is a greenhouse gas. Thermal power stations use coal to produce electricity. Hence, if we conserve electricity, we can reduce air pollution. We also have a large number of industries that let out gases into the atmosphere, that cause pollution thereby harming us. But we are trying to reduce that too by adopting measures to curb the emissions.

**Sridhar:** Why are the gases that cause global warming called the greenhouse gases?

**Mata:** Some gases like carbon dioxide, methane and water vapour trap the earth's heat and do not allow it to escape. Such gases are known as **greenhouse gases**. Green plants are tended to in enclosures to protect them from pests, insects and for prolonged photosynthesis. Since it is an enclosed space the heat is trapped and the place remains warmer than the rest of the garden. Similarly when carbon di oxide



envelops the earth the heat of the sun does not escape from the earth resulting in global warming. Hence it is known as greenhouse effect.

**Sridhar:** Going back to fossil fuels again, is carbon dioxide the only pollutant emitted while we burn them?

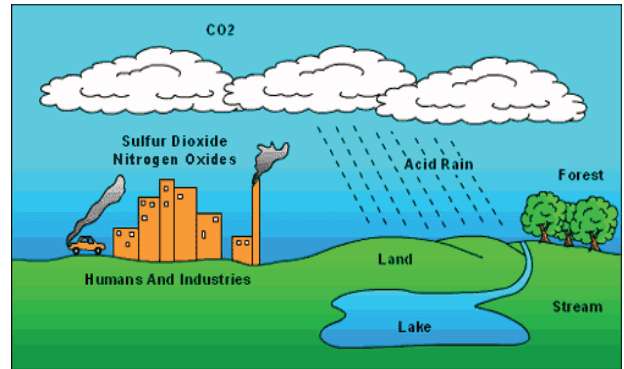
**Mata:** Not only that Sridhar, as you have learnt earlier when fossil fuels are burnt, they also release sulphur di oxide and nitrogen di oxide. These gases when they come in contact with rain water, make it acidic, causing acid rain. When the acidic rainwater reaches the water bodies, aquatic organisms cannot survive. Acid rain can also destroy buildings and monuments.

**Sridhar:** Will air pollution affect us directly also mata?

**Mata:** Yes Sridhar. We see that air in our capital New Delhi, gets so polluted during a particular time every year that people are not able to breathe. Educational institutions are shut down and some organizations advise their employees to work from home. Hospitalization due to respiratory illness increases during that time. In fact, some industries like the cement and glass industries emit harmful substances into the environment, that might cause permanent damage to the respiratory organs.



Greenhouse



Acid Rain



### Enrichment

The introduction of machines, to produce goods, instead of by hand in the late 18th and early 19th century is known as industrial revolution. It made large scale production simpler, easier, and more economical.



### Enrichment

Thermal power stations convert heat energy generated by burning coal or natural gas into electrical energy.

**Sridhar:** Can we close all industries?

**Mata:** That is not possible. In an industrialised world, we cannot stop pollution completely, but we can reduce it considerably. We need to treat the gases that are released into the atmosphere, so that they harm us less.

**Sridhar:** So, from now on I will walk to school, instead of asking you to drop me at school, by car. I will also switch off electrical appliances, when not required to conserve electricity and to do my bit to save the earth.

**Mata:** That is a good decision. If everyone starts taking such measures, air around us would be less polluted, our roads less congested and we would have fossil fuels to use for a longer time too.



**Sridhar:** Mata, you mean to say, otherwise we would not have fossil fuels for long?

**Mata:** Yes Sridhar. Since we obtain it from fossils (from deeply buried plants and animals), they would be available only in limited quantity and it takes millions of years for them to be formed. Hence, they are known as non-renewable sources of energy.

**Sridhar:** Mata, you mean to say there are renewable sources of energy too?



Windmill

**Mata:** Yes Sridhar. Wind, water, energy generated from the sun are renewable sources of energy. Do you remember the windmills that we saw when we travelled to Tirunelveli?

The energy of the wind is used to generate electricity, this is much less polluting. We need not worry about wind getting exhausted over a period of time.

**Sridhar:** Then why do not we have it in all the places Mata?

**Mata:** That is a good question, Sridhar. We do not have the required wind speed in all the places. As you have also experienced, there is no continuous wind at all times too. Hence, we cannot rely on wind energy for large scale production of electricity.

**Sridhar:** I think I know how energy is generated from water. My teacher told me we generate electricity from flowing water. We use the energy of water when it flows from a higher level to lower level to rotate a turbine and hence generate electricity.



Hydro electric power plant

**Mata:** Great Sridhar. You are right. Flowing water is again a renewable source of energy.

Rain is the primary source of fresh water. But water is a limited resource. Our requirement for water, increases day by day due to the ever-increasing population.

**Sridhar:** My teacher also told us that when we need to produce electricity from water, we need to build dams. When we build dams, we destroy a large area of forest, thus making a large number of animals and birds homeless. People living deep in such forests have to move to other places and are not happy about it.

**Mata:** Yes Sridhar. True. What do you think we should do to reduce pollution and at the same time not harm nature and people around?

**Sridhar:** To reduce pollution, we have to use alternate sources of energy. Even for vehicles we use electricity as fuels. I have seen e-vehicles. My teacher said that







## Enrichment

Fuel efficiency is the ability of the engine to produce a large energy using less fuel. E.g., CNG, a gaseous fuel is more efficient than petrol, a liquid fuel.

CNG is a better fuel than petrol as it helps reduce pollution and is also fuel efficient.

**Mata:** We are now trying to explore the energy from the sun, known as solar energy in a big way.

**Sridhar:** Like how plants trap the energy from the sun to make food.

**Mata:** To some extent, yes. We are making solar cells or batteries, which can trap the energy of the sun, so that it can be used when the sun is not up too. For a country like ours, where we have abundant sunlight throughout the year, this should be the most viable option in the long run. If we tap such alternate sources of energy and also use the ones that are available judiciously, we are going to be a prosperous and healthy nation.

## FUTURE OF ELECTRIC VEHICLE



**Sridhar:** What is judicious use mata?

**Mata:** Using the minimum that is required and not wasting a resource in any form is known as judicious use. For example, switch off fans and lights when you don't need them.

If you can walk the distance, walk or cycle to the place.

Use public transport as much as you can.

Adopt carpooling if you have to use a car to reach your school or workplace.

**Sridhar:** What is carpooling?

**Mata:** If two or three of us living in the same locality have to reach almost the same destination, we can travel together, thus taking turns to use our cars. That way, each of us get to use our car only once in 3 or 4 days. So, the fuel used is less. It also reduces the number of vehicles on the road and the traffic can flow smoothly. It can also reduce global warming as the amount of carbon di oxide that is released is less.

**Sridhar:** I am sure that this will help me be a better friend for my neighbour as we will be going together to school everyday.



Solar power plant





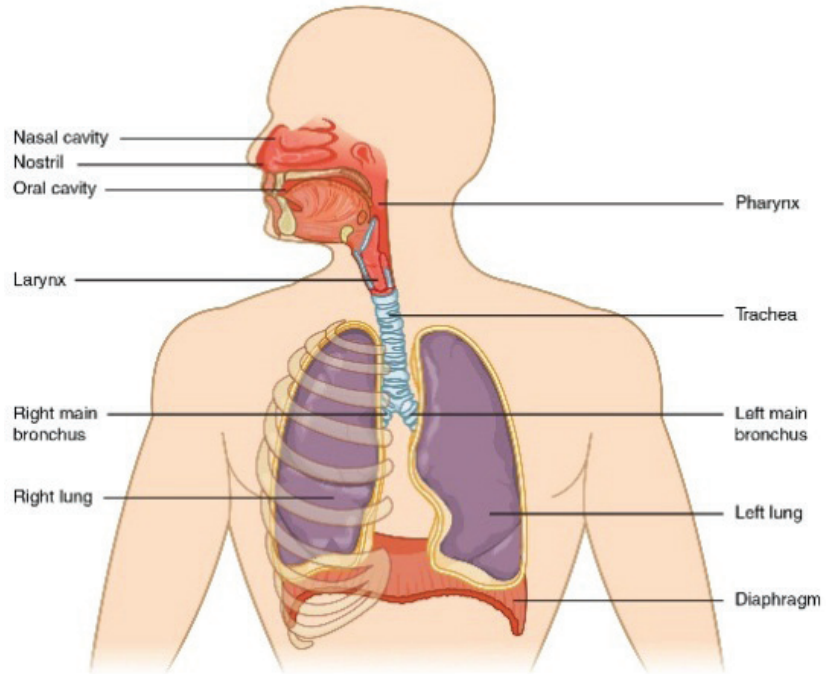
**Mata:** Good Sridhar. You have started thinking in the right direction. You should also motivate your friends to do the same. All of us together can definitely make the world a better place. If we can do something to reduce air pollution, it would also lead to reducing diseases that affect the respiratory organs.

**Sridhar:** What are all the respiratory organs mata? I know that I take in air through my nostrils.

**Mata:** We inhale, that is breathe in and exhale that is breathe out through our nostrils. Can you guess why we have hair in our nostrils?

**Sridhar:** I am not able to guess. Please tell me.

**Mata:** The hair helps to trap some impurities and organisms that might be present in the air. It also brings the air that we breathe in to our body temperature. The air that we breathe in then moves through the windpipe or trachea. The trachea branches out into two bronchi. Each bronchus ends in a lung.



Respiratory system

**Sridhar:** I have heard that we have two lungs.

**Mata:** True. We have a pair of lungs. Inside the lungs we have small air sacs called alveoli. In the alveoli, exchange of gases takes place. Oxygen rich air is taken in and carbon dioxide rich air moves out for exhalation.

**Sridhar:** You mean to say that we only inhale and exhale through our nostrils and exchange of gases takes place in the alveoli.

**Mata:** You are absolutely right Sridhar.

**Sridhar:** Thank you Mata. I understood respiration.

**Mata:** What we discussed now is breathing and not respiration. Respiration is a process where the digested food combines with oxygen to release energy.

Nostrils, trachea, bronchi, lungs and alveoli form the respiratory system.



**Sridhar:** Mata, the two years I have been hearing that the COVID virus affects our lungs, do we have any other virus that can affect our respiratory system?

**Mata:** Common cold, which spreads through air, is also caused by a virus. The common cold is also an example of a viral disease. It is also an airborne disease.

**Sridhar:** What is an airborne disease?

**Mata:** Diseases that spread through air are called **airborne diseases**. The pathogen that causes such diseases enters our body through the respiratory system. Examples of airborne diseases are tuberculosis, chicken pox, measles, mumps and common cold.

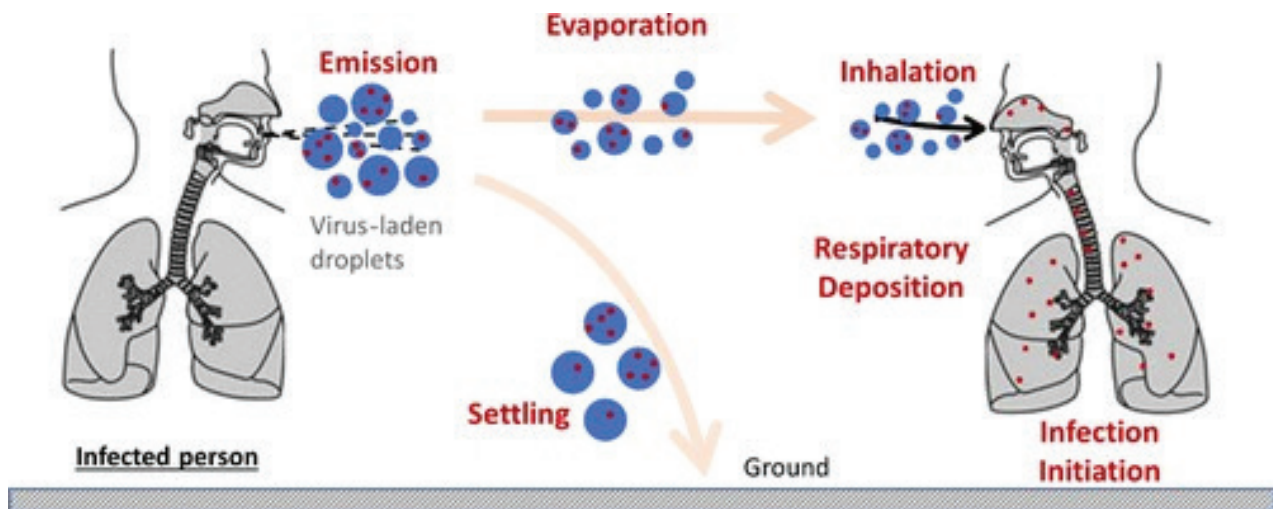


### Enrichment

A pathogen is an organism that causes a disease.



Spread of airborne disease



## SUMMARY

- The breathing organs in plants and insects vary. Insects breathe through tiny pores on their body called spiracles and plants use tiny spores called stomata.
- The phenomenon by which the average temperature of the earth is rising slowly is known as global warming. This leads to melting of glaciers resulting in rising of sea level.
- Plants, animals and trees that got buried under the earth millions of years ago got converted to petroleum due to the heat and pressure exerted by the earth and other natural phenomena.
- Petroleum is distilled to obtain various products like petrol diesel, LPG, kerosene, bitumen, wax etc.
- Gases like carbon dioxide, methane and water vapour traps the earth's heat and do not allow it to escape to the atmosphere. Such gases are known as greenhouse gases.
- When sulphur di oxide and nitrogen di oxide come in contact with rain water they make the rain water acidic. It causes water pollution and destroys buildings and monuments.
- Fossil fuels such as coal ,crude oil and natural gas are available in limited quantities as it takes millions of years for them to be formed.
- The different forms of renewable energy sources such as wind energy and solar energy are less polluting and does not get exhausted over a period of time.
- We must reduce the usage of fossil fuels to protect our planet Earth.
- For a country like ours where we have abundant sunlight throughout the year solar energy is the most viable option.
- Carpooling helps to reduce fuel use and also causes less pollution to the environment.
- Human respiratory system, air borne diseases.



### I Name the following:

1. The tiny pores through which insects breathe.
2. The gas released by the vehicles that run on petrol and diesel.
3. The phenomenon of the rise in the temperature of the Earth.



- Sources of energy that are limited in quantity and takes millions of years to be formed.
- The gaseous fuel which is more efficient than petrol.
- Air sacs inside our lungs.

**II Classify the following sources of energy as Renewable Energy and Non-Renewable Energy:**

Wind, Petrol, Water, Diesel, Solar Energy, Coal

**III Match the following:**

|                |                              |
|----------------|------------------------------|
| Insects        | Stomata                      |
| Plants         | Spiracles                    |
| Fossil Fuels   | Lungs                        |
| Greenhouse gas | CNG (Compressed Natural Gas) |
| Humans         | Carbon Dioxide               |
|                | Wind                         |
|                | Coal                         |

**IV Circle the odd one:**

- spiracles, heart, stomata, lungs
- carbon Dioxide, water vapour, oxygen, methane
- petrol, diesel, sunlight, kerosene
- nostrils, alveoli, food pipe, lungs
- common Cold, tuberculosis, diabetes, chicken Pox

**V Answer in one or two sentences:**

- What are the causes for air pollution?
- What is global warming?
- How is acid rain formed? What are the effects of acid rain?
- What is carpooling?
- What is an airborne disease? Give two examples

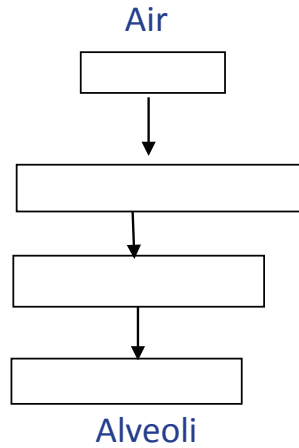
**VI Answer in detail:**

- What causes inundation in coastal areas?
- How is petroleum formed?





3. What is greenhouse effect?
4. How is electricity generated using water?
5. Complete the Flow chart that represents the pathway of air inside our body



6. a) What are these structures called ?
- b) Where can we see these structures in Tamil Nadu ?
- c) What is the purpose of these structures ?
- d) What form of energy do they produce?

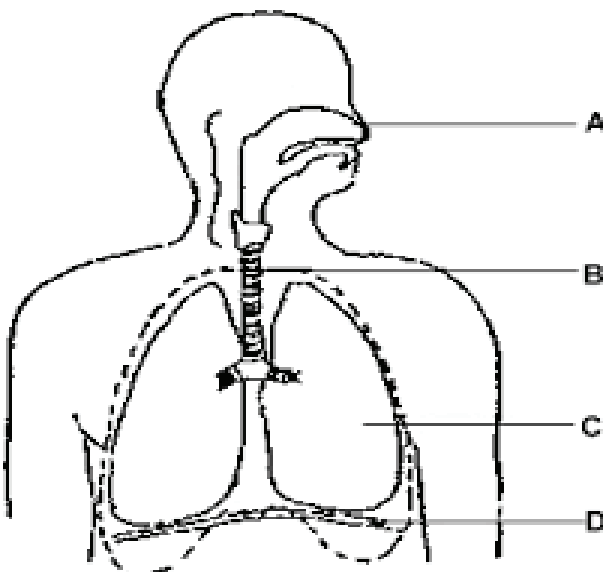


**VII Activity**

Prepare a talk for the school assembly on “Importance of carpooling”.

Make a chart on vehicles that run on electricity and fossil fuels.

Label the Parts Marked in the Diagram



## TERM 1 – SAMPLE PAPER

Max Marks : 80

Time : 2 hours

**I Fill in the blanks:** (6 x 1 = 6)

1. The practice of growing flowers, fruits and vegetables on a large scale is called \_\_\_\_\_.
2. We should not use \_\_\_\_\_ extinguisher to put out electrical fire.
3. A person who specializes in the study of history is called as \_\_\_\_\_.
4. Tribes who live in the arid desert of the Middle East are \_\_\_\_\_.
5. A protected area for the conservation of the striped big cats is called as \_\_\_\_\_.
6. Brahmaputra originates in the \_\_\_\_\_ of Himalayas.

**II Match the following:** (5 x 1 = 5)

|    |                 |  |                       |
|----|-----------------|--|-----------------------|
| 7  | Turtles         |  | Chaff                 |
| 8  | Effluent        |  | Ashta-diggajas        |
| 9  | Raichur doab    |  | Waste from Industries |
| 10 | Removed husk    |  | Flippers              |
| 11 | Krishnadevaraya |  | Diamond mines         |
|    |                 |  | Gills                 |

**III Choose the correct answer:** (5 x 1 = 5)

12. This is considered as the jewel of Kanha National Park  
(a) Partridge (b) Barasingha (c) Bengal Tiger (d) Indian Leopard
13. National Aquatic animal of India  
(a) Gold Fish (b) Blue Whale (c) Dolphin (d) Turtle
14. Air sacs inside our lungs  
(a) Trachea (b) Alveoli (c) Nostrils (d) Gills
15. Who among the following is the Tamil poet patronised by Krishnadevaraya?  
(a) Chatu Vittalanatha (b) Mallanarya (c) Allasani Peddana (d) Haridasa
16. An edible underground stem  
(a) Radish (b) Carrot (c) Beetroot (d) Potato



**IV Observe the following pattern and write the answer: (4 x 1 = 4)**

- 17.Import: Bring in products from another country :: \_\_\_\_\_ : Send products to another country.
- 18.Birds: Lay eggs :: \_\_\_\_\_ : Give birth to young ones.
- 19.Arabian sea: Narmada :: \_\_\_\_\_ : Godavari.
- 20.Water: Renewable source of energy :: Petrol: \_\_\_\_\_

**V Correct the underlined words / names and rewrite the sentences: (4 x 1 = 4)**

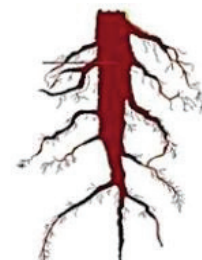
- 21.Plants breathe through spiracles.
- 22.The book “Madalasa Charita” was written by Tenali Rama.
- 23.A flash flood is a sudden heavy rainfall in a locality.
- 24.Condensation is a process by which water continuously evaporates from the surface of plants.

**VI Name the following: (4 x 1 = 4)**

- 25.Chemicals that kill the pests which harm the crops and foodgrains.
- 26.The administrative division of a state.
- 27.The date until which a packaged item can be safely consumed.
- 28.A mobile dwelling unit with an undercarriage.

**VII Answer in short: (7 x 2 = 14)**

29. a) Name the type of root system shown in the picture given.  
b) Give any two examples of plants with this type of root system.



- 30.What first aid should be given in case of a severe burn sustained by a person?
- 31.List any two ways to maintain a clean toilet.
- 32.Name the various products that are obtained when petroleum is refined.
- 33.How is parboiled rice prepared?
34. Enumerate the effects of floods.
- 35.How were the provinces of Vijayanagara empire divided for administrative purpose?



**VIII Answer in brief :**

**(6 x 3 = 18)**

36. Write any three precautions to be followed while you bursting crackers.
37. Why are dams built across the rivers?
38. "Hampi was economically prosperous and politically important". Justify.
39. Mention the characteristic features of mammals.
40. List any three effects of global warming.
41. Write a short note on igloo.

**IX Answer in detail :**

**(4 x 4 = 16)**

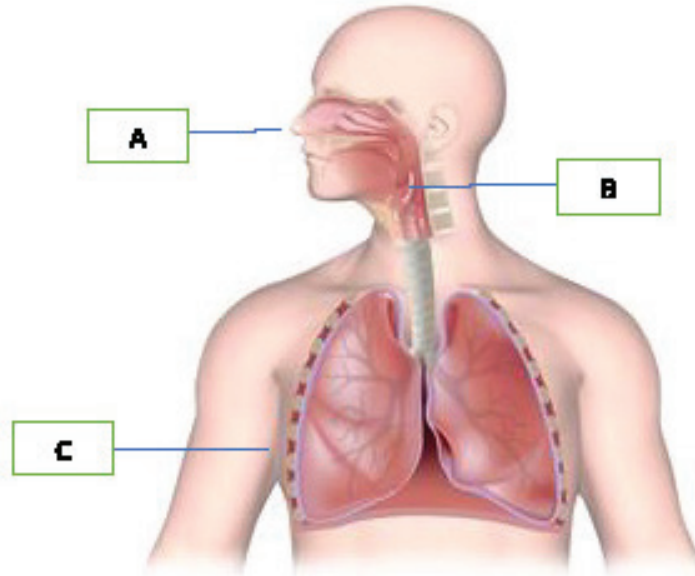
42. Explain the various steps involved in RICE.
43. (a) Identify the animal shown in the picture given below:  
(b) Why is it important for marine eco-system?



44. (a) What is an amphibian?  
(b) Describe the bodily features of a frog as an amphibian.







45. (a) Identify the system shown in the picture.  
(b) Name the parts (A), (B) and (C)  
(c) Name the gases that are exchanged in this process.  
(d) Where does this exchange take place?

**X. Mark the following on a Political Map of India:**

**(4 x 1 = 4)**

- (a) Tamilnadu      (b) Karnataka      (c) Rajasthan      (d) Assam



# Political map of India



# Map showing the major rivers of India







अयं निजः परो वेति गणना लघुचेतसाम्।  
उदारचरितानां तु वसुधैव कुटुम्बकम्॥

This is mine, that is his, say the narrow minded  
The wise believe that the entire world is a family.

