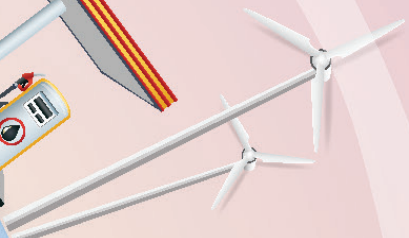
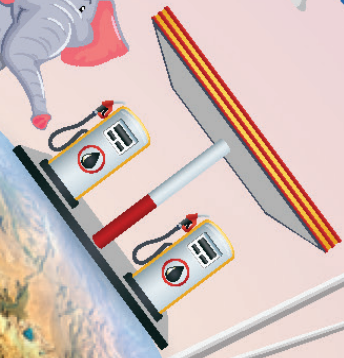


VASUDHAIVA KUTUMBAKAM - IV

We, Our World

ENVIRONMENTAL STUDIES

PART 2



NAME _____

SCHOOL _____

Vasudhaiva Kutumbakam

– We, Our World



EVS – TERM II

‘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 21st 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/



This edition of the book 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 God 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.

माता भूमिः पुत्रोऽहं पृथिव्याः ।

“Earth is my mother and I am her child”. (Atharva Veda 12.1.12)

Chennai | June 2024

Secretary
Tamil nadu Arya Samaj Edu. Society



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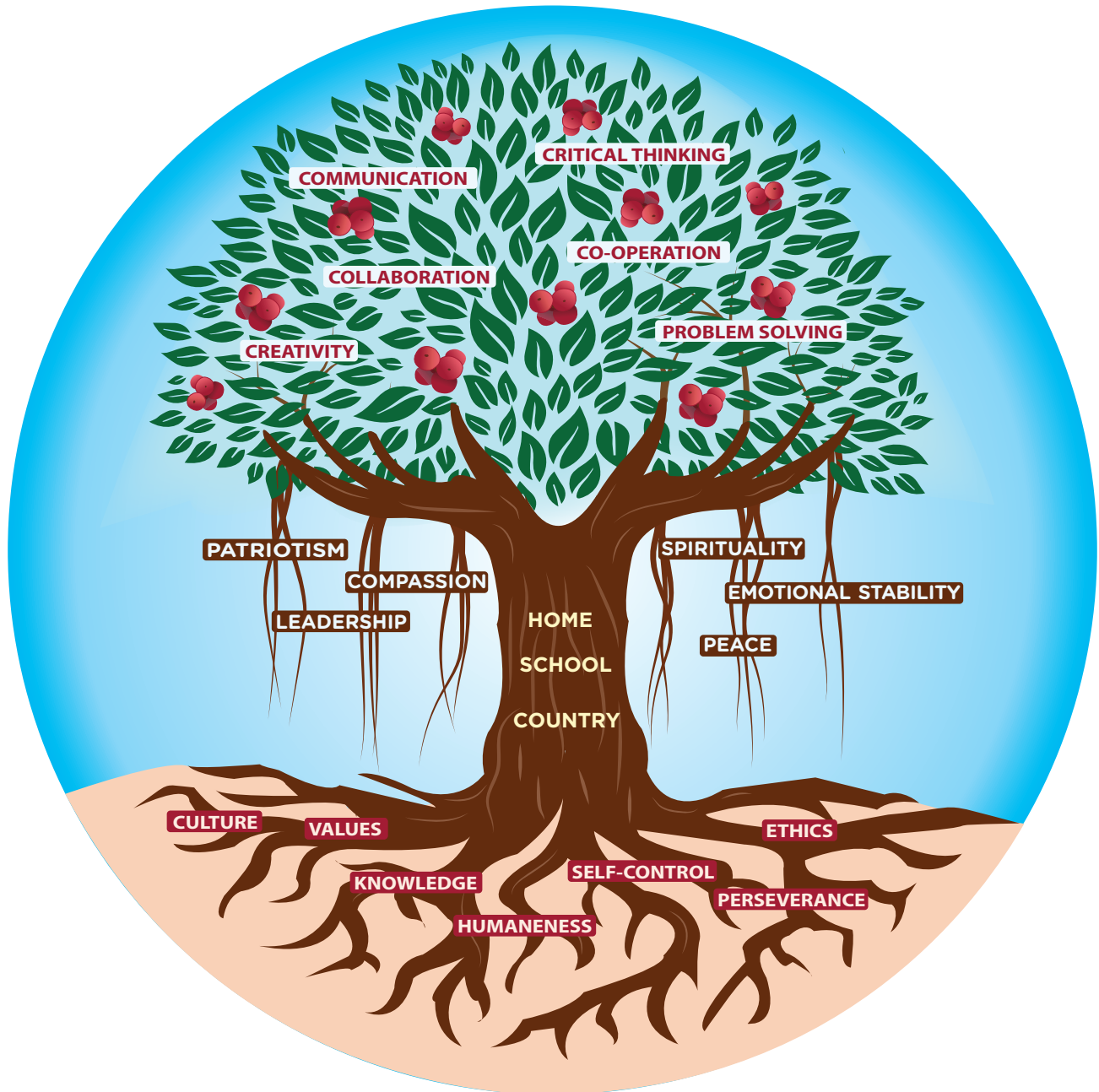
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The Learning Tree



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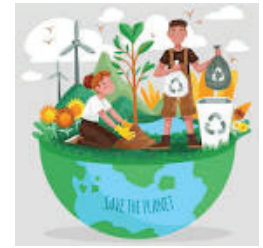


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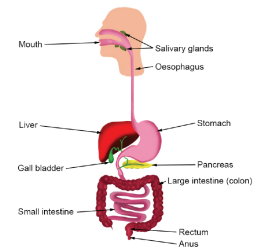
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OUR ENVIRONMENT – The Inevitability of Interdependence

8



Expected Learning Outcomes

Students...

know the contributing factors to water pollution, the food chains in various ecosystems, the components of a food chain

know the meaning of environment, classification, bio-degradable and non-biodegradable substances, biotic and abiotic components of environment, natural and artificial ecosystems, acid rain, producers, consumers in a food chain (primary, secondary, tertiary, apex), food web

understand the importance of each element of the food chain to maintain a balance in ecosystem, the **difference between** bio-degradable and non-biodegradable substances, the **impact of** polluted air and water on humans, **why** natural farming should be practised

understand how an ecosystem is formed due to an interaction between biotic and abiotic component, kitchen waste can be converted into manure, waste can be managed by the concept of the three Rs.



ACROSS

1. I am a flower

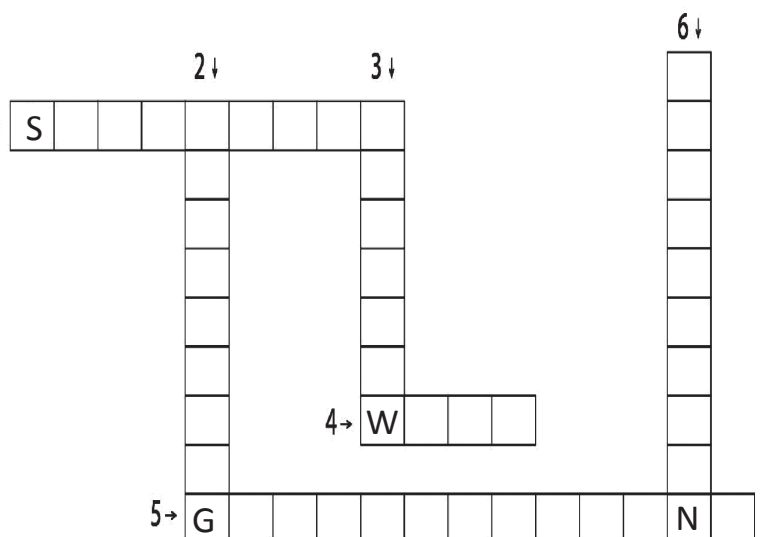
I look up to the only celestial body that's 1→ visible during the day.
What am I?

4. I rise and fall in the sea

I make an attempt to touch the full moon
What am I?

5. Because of me, ice caps melt;

But I also change the climate on earth.
What am I? (2 words)



DOWN:

2. I touch the earth, I touch the sky
But pray that I don't touch you.
It could be shocking. What am I?

3. You can see me when it drizzles
and shines at the same time.
What am I?

6. I am huge
I'm red with black seed embedded
I can quench your thirst
What am I?



Kitchen Garden

Kavin and Sumita were tending to their kitchen garden. They always apply whatever they learn in school to their everyday living. Their cousins Srinath and Mugil have come from Gujarat. Kavin and Sumita are very happy to take them around their garden to show how they have put their learning to action. Let us also walk through their garden to understand more.

Srinath: Kavin, the environment you have created here is soothing.

Kavin: Thank you for the compliment, Srinath. But I don't understand what the word environment means. I hear it quite often.

Srinath: Environment is nothing but your surroundings. For instance, when you look around this place, you see a number of things. Try to pen down all that you see and we shall discuss to understand them better.

(Enlist what you see in your house, school and school garden.)

| List of things in the environment | | |
|-----------------------------------|--------|---------------|
| House | School | School garden |
| | | |
| | | |
| | | |
| | | |



Mugil: Kavin has prepared a long list of what is around him. It is mind boggling to see the number. Srinath, how will we understand so many things?

Srinath: Good, you raised that point. When we have to make sense with a large number of things at a time, we classify them to make better sense.

Kavin: I know, we have to group them for better clarity.

Srinath: Grouping of things based on a common characteristic is called **classification**. For example, we can classify things based on their ability to allow light to pass through them.

TASK

Make a list of plants in your school garden.

Kavin: Yes, they can be classified as transparent, translucent and opaque objects.

Srinath: That is right. Now, we will classify all that you saw around you as biotic and abiotic.

Mugil: But what is biotic and abiotic?

Srinath: The living components of the environment are called **biotic** and the non-living components are the **abiotic**.

Classify what is seen around you, as biotic and abiotic and fill in the table.

| S.No. | Biotic | Abiotic |
|-------|--------|---------|
| | | |
| | | |
| | | |
| | | |
| | | |

Srinath: Now take a closer look at the biotic and abiotic components to find out how they interact with each other.

Sumita: Interact? How would they?

Kavin: That's right. How would they interact?

Srinath: Now, let us look at it this way. Are we living?

Sumita: Of course! We are.

Srinath: Do we not depend on the abiotic components of the environment?

Kavin: I don't understand.



Enrichment

When we breathe in air it is **inhalation**. **Exhalation** is the process by which we breathe out. The air that we breathe out has a large amount of carbon dioxide.



Mugil: Don't we inhale and exhale? Air around us is an abiotic component of the environment.

Sumita: Water is another abiotic component essential for life forms.

Srinath: Excellent. Plants, another biotic component interact with the abiotic components of the environment such as air, water and soil. They also interact with biotic components like insects, birds and human beings.

Mugil: The biotic components interact with each other and also with the abiotic components. Such interactions between the components of the environment form the **ecosystem**.

Sumita: That is interesting. Please tell me more.

Srinath: The garden that we are in now was made by you or did it exist in nature?

Kavin: We had some place and we decided to raise a garden.

Srinath: Good. So, you created this garden. This is an artificial ecosystem.

Kavin: Now I understand. Aquarium, zoo, are examples of **artificial ecosystems**. The ocean, forests, rivers, ponds are examples of **natural ecosystems**.

Mugil: Very good Kavin. You seem to be a quick learner. Since the biotic and abiotic components are in constant interaction, the changes that happen in one directly impacts the other.

Sumita: Explain that a little more Mugil. I need more clarity, to understand better.

Mugil: Last time when we met we spoke about water pollution. Water gets polluted, when something undesirable mixes with it. Water bodies get polluted due to sewage and industrial effluents that are let into them.

Sumita: Yes. I remember learning about it. Aquatic life in these water bodies are also affected by polluted water.

Srinath: Thus, we see that when an abiotic component like water is affected, it in turn can affect the biotic component such as the aquatic life. The aquatic plants in such water bodies absorb their nutrients from polluted water and hence become a storehouse of them. Fish and



Sewage in water

other aquatic animals that consume these ingest the pollutants also. Human beings who consume such organisms, thus take in the chemicals, which can be harmful.



When water from such contaminated water bodies is used to irrigate our agricultural fields, the harmful chemicals can affect crops too. Thus pollution of an abiotic component, say water can directly affect not only the aquatic organisms, but humans too.

These pollutants reach us through the food chain, and can affect a large population.

Kavin: Food chain? What is it?

Srinath: You see grasshoppers in the garden. From where do they get food?

Kavin: From plants.

So its Plants \longrightarrow Grasshopper, the food chain begins here.

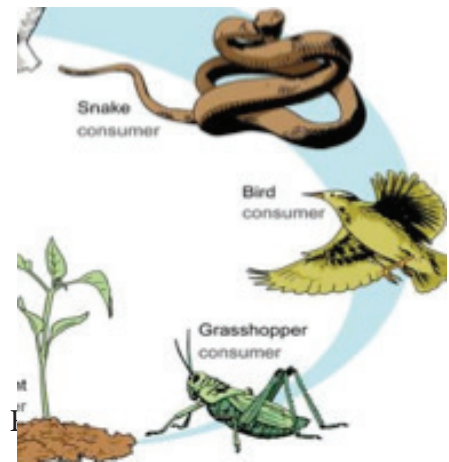
Srinath: In turn have you noticed the grasshopper becoming a food for any other being?

Kavin: Yes. I have seen the birds eat grasshoppers.

Srinath: Good observation. So, the grasshopper becomes the food for birds.

Hence now its Plants \longrightarrow Grasshopper \longrightarrow Birds. Do you know that birds can become food for another bird or animal?

Kavin: Yes, we have learnt that snakes prey on birds. Bigger birds like eagles and vultures are also predators of smaller birds and animals.



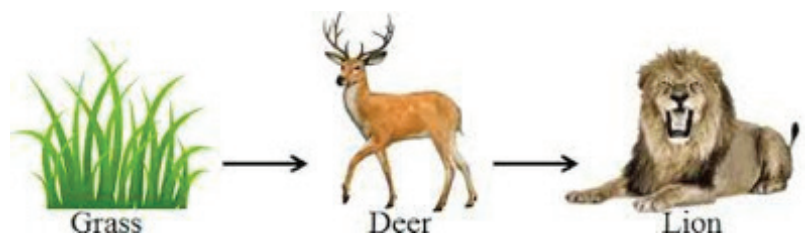
Food chain in a garden

Srinath: Very good Kavin. Now the food chain extends further like

Plants \longrightarrow Grasshopper \longrightarrow Birds \longrightarrow Snakes \longrightarrow Decomposers

Kavin: Decomposers!?! What are they? How do they become a part of the food chain?

Srinath: Let me explain. The last link in any food chain are the decomposers. They are the bacteria and fungi that work on the remains of dead organisms to break them down into simpler substances. These substances that are released in the process nourishes the soil, by adding nutrients to it. Thus the soil is again ready to grow plants.



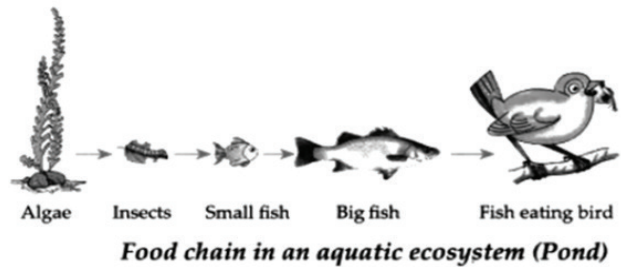
Food chain in a forest

What we saw now is a food chain that you see in the garden. Let us take a forest where deer and lions live. What would be the food chain there?

Kavin: Plants \longrightarrow Deer \longrightarrow Lions \longrightarrow Decomposers



Srinath: Excellent Kavin. Similarly, in a water body, we have the algae an aquatic plant, which become the food for insects in water, the small fishes eat away these insects and are in turn consumed by the bigger fishes. Thus, this becomes a food chain in an aquatic ecosystem.



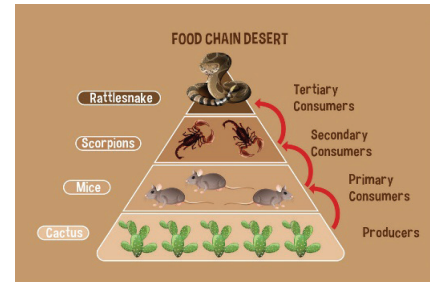
Food chain in an aquatic ecosystem

The food chain can be depicted as

Algae → Insects → Small fishes → Big fishes → Decomposers

Kavin: Do we have a food chain in the desert too?

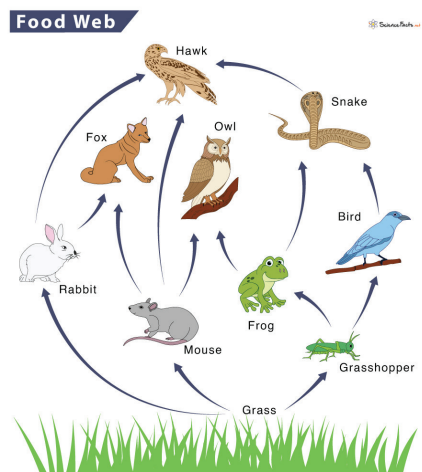
Srinath: Yes of course Kavin. As you know only plants like cactus grow in the desert. They are eaten by rats which are in turn eaten by the scorpions. The rattle snakes that are common in the deserts feed on the scorpions. Thus a food chain in the desert could be



Cactus (Green Plants) → Rats → Scorpions → Rattlesnakes → Decomposers.

An important aspect of a food chain that we need to remember is that the arrows in the food chain denote the **flow of energy** from one level to another. You can also see that decomposers are common to all food chains as it is them who facilitate the continuation of the chain.

The food chains that we have discussed here are only examples. We may have a number of food chains in an ecosystem. When a number of food chains are interlinked with each other, it results in a food web. What are the two organisms that are common in all food chains?



Kavin: All food chains begin with a plant and end with a decomposer.

Srinath: Amazing observation skills! All green plants including alga (an aquatic plant) are producers of food. Can you guess, why they are called producers?

Sumitha: Because they produce food.

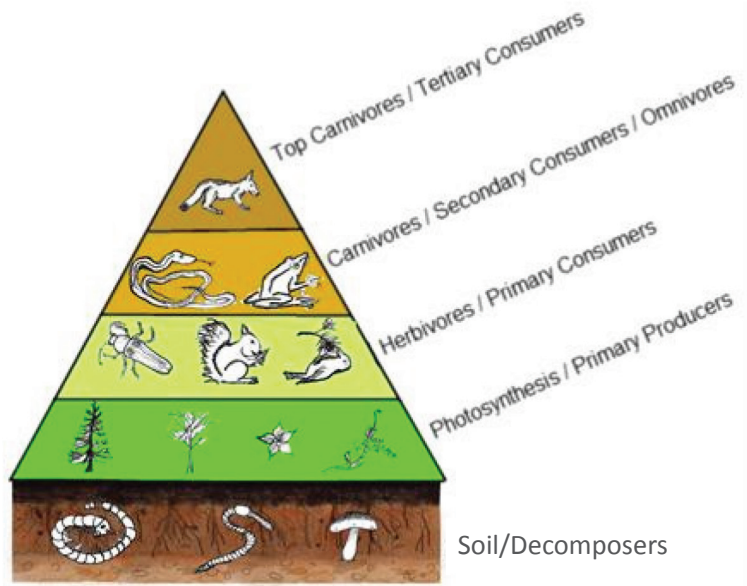
Srinath (smiling): Green plants are the producers of food because all other living organisms depend on them either directly or indirectly for food.

Kavin: That is amazing. What are the other organisms in the food chain called?



Srinath: All other organisms are consumers. The herbivores are the primary consumers, while those that eat the primary consumer become the secondary consumers. The tertiary consumer is the predator of the secondary consumer. The tertiary consumer can become a prey to an apex consumer.

When an organism dies, the bacteria and fungi that live in the soil feed on their carcass breaking them down into simpler substances that can nourish the soil. These microorganisms are the decomposers. The decomposers help the plants to grow and thus maintain the food chain.



Kavin: That is very informative.

Sumitha: Now I understand why green plants are very important to us.

Srinath: Green plants are the only organisms that can make their food from sunlight, or in other words, they absorb energy from the sun and convert it into food that give all other organisms energy. Thus, Sun is the ultimate source of energy and green plants are the producers.

Kavin: Now I understand why our ancient scholars considered Sun a Devata.

Srinath: Now we know that all food chains also have decomposers as the last biotic component. Imagine what would happen if the dead organisms do not decay.

Sumitha: Oh! That sounds terrifying! In the absence of decomposers there would be piles of carcasses probably with no place for living beings, as it is the decomposers that break down the deceased organisms.

Kavin: So it is important to take care of not only the producers, but the decomposers too. To sum up, it looks like food chains play a big role in the ecosystem.

Mugil: Certainly they do. Imagine, a forest not having any carnivores like lions. What do you think would happen?

Sumitha: All the deer and other herbivores would be happy. They need not fear for life.

Mugil: But what would happen to the deer population in the forest?

Kavin: It would increase vastly.



Mugil: True. The deer population would be so high, that they would not have enough grass to graze. So, there would be shortage of food for them and they would start entering our fields to get food.

Kavin: Ok... what would happen if the deer population was very less or there were no deer in the forests?

Mugil: If that is the case, the carnivores would not be able to find food for themselves. Then, they would enter the nearby villages and carry away cattle or sometimes even people as food.

Kavin: Now I understand the role of all organisms in the food chain in maintaining a balance in the ecosystem. Too much or too less of any can harm the balance. But, how can people like us help?



Srinath: Each one of us have a role to play in keeping our environment fit for living. We can ensure that we do not generate too much waste, as dumping of wastes is one of the leading causes of pollution especially in urban areas, which in turn can affect the food chain.



Sumita: But, wastes need to be disposed off. How can it be done without adding to pollution?

Srinath: Yes. We can follow the policy of the three "R"s. Reduce, Reuse and Recycle.

Sumita: Sounds interesting. What is it?

Srinath: The first one is to **reduce** the use of unnecessary things, especially the ones that can harm the soil and the environment. We can reduce the use of plastics and other non-biodegradable substances.

Sumita: What are non-biodegradable substances?

Srinath: Look at the used plastic pen that is lying in the corner of your garden. From the amount of soil and dirt on it, it looks like it has been there for at least a few weeks.



Composting

Sumita: True Srinath. My teacher has asked me to leave it aside and report to her when it is eaten away by ants or any other insects, or it disintegrates into the soil. She has also asked me to look at what happens to the vegetable peels and dried leaves in the garden during the same duration.



Srinath: That is a good exercise. Did you do that?

Sumita: Yes, I did. The fruit peel that I dropped along with the pen has already mixed with the soil. I am not able to differentiate it from the soil much.

Kavin: It sounds similar to the compost pit that my nana (**maternal grandfather in Gujarati**) has created. My nana ensures that the vegetable and fruit peels go into the compost pit. Do you see a pit in the corner? It is about 3 feet deep and wide. We deposit the kitchen waste in it, add a little bit of water and leave it for about 3 weeks. If we open the pit after 3 weeks, we can find all that we put into it have mixed with one another and are no longer in their original form. This compost is mixed with some garden soil and put at the roots of the plants. My nana says that it is a good manure.

ACTIVITY

Name a few non-biodegradable wastes that you generate every day.

Srinath: Great work by your nana. Substances like the dried leaves, kitchen waste, garden waste and dung of animals are biodegradable. They break down into simple substances in the soil and become nutrients to the plants. This change is brought about by the microorganisms, the decomposers that live in the soil.

You have also observed that materials like plastic do not get decomposed this way. They are called non-biodegradable substances. Non-biodegradable substances pollute the environment.

Bio-degradable substances also needs to be used and processed properly, to make it useful to us.

Going back to our three “R”s, we need to reduce the use of non-biodegradable substances. The next R is **reuse**. We need to make use of the resources that are available to their maximum extent possible. For example, we can reuse the containers in which we buy materials like paint to grow plants, reuse newspapers and magazines as wrapping paper. You can give the unused papers in your notebooks to children in need. The used papers can also be given for **recycling**, the (third “R”), to vendors.

Kavin: What is recycling?

Srinath: Recycling is conversion of waste material into useful material. Conversion of kitchen waste into compost is an example of recycling. You are upcycling it to make it more useful. Old dress can be recycled to be used as rag cloth. Old sarees can be converted into quilts and bags. Thus we do not add to the garbage load of the Earth.

Sumitha: That is a great way to use things efficiently. We save the cost of buying such items and also protect our environment from harm too. I promise that I will follow all these practices.



Srinath: Good Sumitha. It is also important for us to protect nature, to help the sustenance of food chain. Let us remember that when we use chemicals as fertilizers and pesticides, the microorganisms in the soil cannot survive.

If they do not survive, the organic matter in the soil will not be converted into nutrients. This, in turn, can retard the growth of plants and yield of crops. Thus, we need to reduce use of chemicals to maintain soil fertility.

Natural farming is one of the best ways by which we can achieve this. In this method of farming only materials obtained from farms are used, thus the organisms in the soil flourish and soil fertility is maintained or improved.

Kavin: We can reduce soil pollution by not dumping wastes in landfills. The chemicals from the dump harm the soil. When they leech into the underground, ground water is also polluted.

Srinath: Great Kavin. Thus soil pollution can also lead to water pollution.

Sumitha: That is a good piece of learning for me. Similarly, can air pollution also lead to other problems?

Srinath: When air contains unwanted substances mixed with it, we say that it is polluted. If the air that we breathe in is polluted, it can cause respiratory disorders in us. Air pollution can also affect human beings in other ways such as bringing about acid rain.

Sumita: What is acid rain?

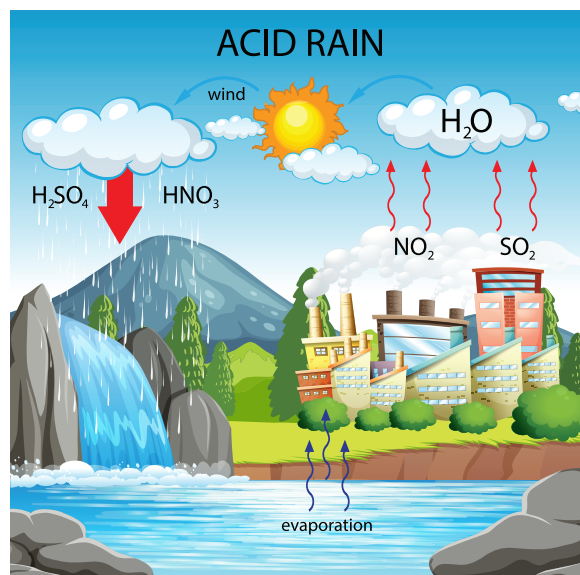
Mugil: When the rain water becomes acidic in nature due to the dissolution of some gases in the air, we call it acid rain.

When such rain water reaches the earth, water bodies become acidic. Water from such places are unfit for irrigation. Acid rain can affect crop growth and also make us sick. It can also affect aquatic life, which in turn can affect the food chain. The harmful substances can reach us too through the food chain.

Sumita: So air pollution can also lead to water pollution?

Srinath: Yes. I hope our interaction today has added to your awareness on environment.

Sumitha: Definitely it has Srinath. Thank you for initiating an interesting interaction.



SUMMARY

- Environment is everything that is around us.
- Grouping of things based on a common characteristic is called classification.
- Biotic factors are living things in the environment, such as plants, animals, and bacteria; abiotic factors are non-living components, such as water, soil and atmosphere.
- Ecosystems are made up of a combination of biotic and abiotic components, which interact with each other.
- A natural ecosystem occurs naturally in nature and requires no human activity for its functioning. Examples of natural ecosystems include ocean, ponds, rivers, forests, etc.
- Artificial ecosystems are human-made structures. Examples of artificial ecosystems include aquariums, zoos, garden etc.
- Water pollution can be defined as the contamination of water bodies. Water pollution is caused when water bodies such as rivers, lakes, oceans, and groundwater get contaminated with sewage and industrial effluents.
- A food chain shows how each living thing gets its food. The food chain is a linear sequence of organisms where nutrients and energy is transferred from one organism to the other. It begins with the producer organism, follows the chain and ends with the decomposer organism.
- All green plants are producers and all other living organisms which depend on plants for food are called Consumers.
- Decomposers are microorganisms that break down dead or decaying organisms such as bacteria and fungi.
- All organisms in the food chain play a role in maintaining a balance in the food chain
- Natural Farming is a chemical-free farming and it is one of the best way to maintain soil fertility.
- Acid rain is due to the dissolution of some gases in air. Acid rain affects the food chain.
- Bio-degradable substance like kitchen & garden waste can be broken down to simple substances in the soil by micro organisms. Non-biodegradable substances like plastics cannot be decomposed and pollute the environment.
- 3Rs are i) to reduce use of non-biodegradable substances.
ii) to reuse all resources to the maximum.
iii) to recycle waste material into useful material.





I. Fill in the blanks

1. Grouping of things based on a common characteristic is called _____.
2. The living component of the environment is called _____
3. Interaction between the components of the environment forms the _____
4. The arrows in the food chain denote the _____ from one level to another.
5. When air gets polluted due to the presence of certain gases, it leads to _____

II. Name the following

1. The process of converting waste materials into useful materials.
2. The non- living component of the environment.
3. The ultimate source of energy.
4. The three R s in waste management.
5. The final organism in any food chain.
6. Substances that harm the quality of air, water and soil.

III. Classify the following as

a) Biodegradable and Non-Biodegradable:

vegetable peels, dry leaves, iron nails, tea powder, paper, battery, plastic

b) Different types of ecosystem.

ocean, aquarium, fish tank, sanctuary, zoo

c) Transparent, translucent and opaque objects.

air, water, wood, glass, book, oil, ball, butter, paper

IV. Observe and complete

1. Artificial ecosystem: zoo:: Natural ecosystem: _____
2. Plants: biotic :: _____ : abiotic
3. Algae: producers :: _____ : decomposers
4. Biodegradable: Vegetable peels :: _____ : Non biodegradable
5. Tissue paper: _____ :: Book : opaque



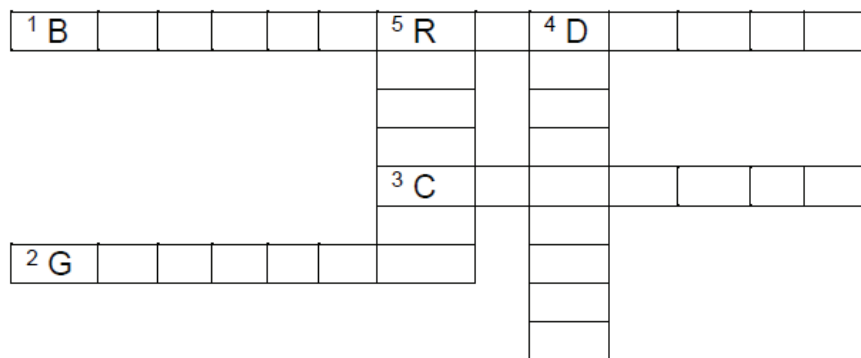
V. Use the clues to solve the crossword puzzle

Across

1. Fruit peels are _____ waste
2. _____ is a solid waste
3. _____ is a manure made from biodegradable waste

Down

4. Biodegradable substances _____ and mix with the soil.
5. To _____ means to make something useful from waste.



VI. Answer the following

1. What is an ecosystem? Explain its types with an example
2. How does water get polluted?
3. What is waste management?
4. How is acid rain caused? Why is it not desirable?
5. Explain food chain with a diagram.
6. How can we maintain a balance in the ecosystem?
7. Mention any two ways by which you wish to positively contribute to the environment in which you live.



VII. Activity

1. Classify the actions that are eco-friendly and non-eco-friendly



Cutting a tree



Throwing
garbage in river



Say "NO" to
plastic bags



Planting a sapling



Garbage in
dustbin

2. List ways by which you can recycle used paper.



9

PLANTS – The Providers



Expected Learning Outcomes

Students...

know the causes of pollution, the uses of quinine, the first man-made natural dye, plant-based dyes, the outcome of the indigo movement in Bengal, the sugar bowl, the spice capital, the cotton capital, and the perfume capital of India, the **role of** media and arts in creating awareness about the plight of farmers, the varieties of spices, their uses and where they are grown.

know the meaning of pollination, effluents, cash crops, spices, rhizome.

understand the advantages of dyes in fabric, the use of natural materials as dyes, **why** flowers are colourful, **the reason** behind the Indigo riots, **the role of** insects in pollination, **the importance of** treating effluents to reduce pollution, Indigo movement in the independence struggle, growing cash crops (e.g., sugarcane, cotton, jute), the Champaran movement.

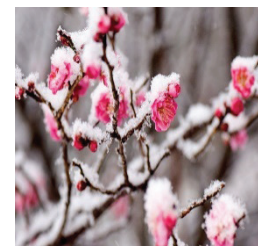
analyze the difference between natural and synthetic dyes, perfuming and flavouring agents.

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



THANKS TO FLOWERS

Not only the cultivated ones in parks and gardens, unfolding immaculate petals on a terrace or trellis, and not just the wild ones, kissed by elegant birds in jungle foliage, or brightening roadsides and meadows, blossoming anyplace that anything can blossom, but thanks also to flowers blooming in paintings, on carpets, pottery, fabrics of dresses and draperies or wherever the real or invented colours and shapes of flowers lift the mood of a scene, as they are snipped from bushes, gathered in cordless bunches, tied in ribbons or arranged in rare bouquets for precious vases. Perfect by nature for gift and centerpiece, they perfume ballrooms, backyards and prairies, and, indoors or out the window, they gladden celebrations and refresh every country and season, for, even in iciest winter. The word flower thrives in every language, adorning what everyone says and imagines with the beautiful thought of flowers which teach by timeless example that life goes by anyway;
you might as well flower.



- Kate Farrell



Anand and Arti are back to school after their vacation. Their visit to the fields and interactions in the village have made them observant of the plants around them. They are interested to know more about plants so they can take care of them.

Arti: Look around Anand. See how colourful the school garden is with all flowers in bloom. It is a wonderful sight indeed!

Anand: Yes Arti. Just look at this plant. Though I have seen this plant many times, only now I notice that the leaves of this plant are not fully green. They have other colours too on them. I want to ask my teacher why it is so.

They reach their class wanting to share with their friends the experiences during their visit to the farm in their village. As they are in an animated discussion, the teacher enters.

Children: Namaste acharya.

Acharya: Namaste children. Please sit down. I am very happy to see your bright, cheerful faces again. Hope all of you had a pleasant vacation. You can share your experiences one by one, after I mark the attendance.

Children happily wait for their turn to interact with the acharya.



Enrichment

Chlorophyll is the green pigment found in plants that helps in photosynthesis.

TASK

Talk to your school gardener. List out the flowering plants in your school.



Rice field harvest season

Acharya: Let us start sharing our experience.

Anand: Acharya, sorry to interrupt but I need to ask you a doubt.

Acharya: Go ahead Anand.

Anand: I observed that a few plants in our

school garden, have leaves that have colours other than green. I am intrigued about it.

Acharya: You have become observant Anand. There are some plants whose



Variegated Leaves



leaves contain other pigments apart from chlorophyll. Hence, leaves of such plants have colours other than green too. Such leaves are called variegated leaves.

Anand: Acharya, do the other pigments that are present in leaves help in preparation of food?

Acharya: A good question to raise. No, they don't. Only chlorophyll the green pigment present in the leaves helps the plant to prepare food. Shall we move on to sharing our experience now?

Arti: May I madam?

Acharya: Proceed Arti.



Botanical garden, Kolkata

Arti: We visited our **nana and nani (maternal grandparents in Hindi)** and **mama (mother's elder brother in Hindi)** in our village. My mama is a farmer. It was time for harvest in their fields. We had an opportunity to observe, how food grains were harvested, stored and transported. This has increased my interest to know more about plants.



Enrichment

Botany is the branch of science that deals with study of plants and trees.

A **botanical garden** is a place where a large variety of trees and plants are nurtured. Plant species that are endangered, need specific environmental conditions may also be found here. It helps botanists to study in detail about plants.

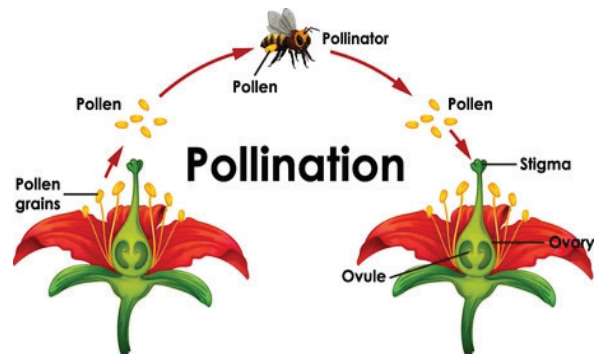
Vijay: I visited a botanical garden in Kolkata. They explained that the flowers that are colourful, bloom during the day to attract bees and other insects for pollination. Flowers that bloom at night are generally white and have a fragrance to attract insects for pollination.

Ramya: What is pollination?

Acharya: Pollination is the first step that helps the flowers to mature into a fruit. The yellow powder seen in the flowers is known as the **pollen grains**. They need to be transferred from one flower to another for them to grow into fruits. Bees and other insects help in pollination.

Suja: So, without bees and insects will we not get fruits acharya?

Acharya: Bees and other insects act as agents of pollination, enabling plants and trees to produce fruits. Thus, they sustain mankind. If these insects were to disappear, we would not be able to get most of the food as pollination may not happen.



Rajesh: Acharya, I had the opportunity to visit the Indian Museum in Kolkata. The textile museum fascinated me the most.

I saw clothes of all kinds in the museum. I understood that our country has a long tradition of dyeing fabrics. The dyes then were all made from naturally available materials.



Bee covered with pollen

I also understood that the dyes that were made from natural materials not only made the dress a beautiful garment to wear, but also protected the cloth from fungi and other organisms that can eat away the fabric.

Suja: That's interesting. I see advertisements in newspapers and television where the advertisers claim that dyes made from natural materials like turmeric and hibiscus are used for dyeing their clothes. I thought that they were new findings.

Acharya: In olden days they used only substances obtained from plants for dyeing. We primarily had clothes dyed in orange, yellow, red and purple, the dyes that were available in nature without processing. Henna is a natural dye, which we use during festive occasions on our hands and legs.

Rupa: My nani uses henna on her hair. I also like the colour that it leaves on our skin. It ranges from a light orange to a dark maroon depending on the variety of leaves and the duration for which it is in contact with the skin.

Acharya: Natural henna has medicinal properties. It keeps infection of nails at bay.

Somesh: I happened to visit Tirupur in Tamil Nadu. The Noyyal river that flows through that place looked highly polluted. My pitaji told me that it is because of proliferation of dyeing industries in Tirupur. Can dyes pollute water bodies?



Enrichment

The liquid waste from industries that are let into water bodies are called effluents.

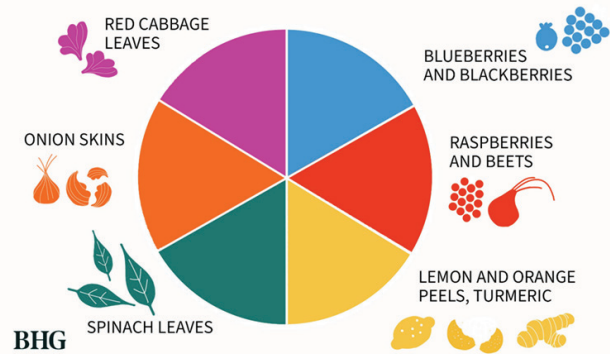
Acharya: That is a good question, Somesh. Natural substances do not cause pollution.



Ponder

List a few insects that act as agents of pollination.

NATURAL FABRIC DYE GUIDE



Industrial revolution brought in synthetic dyes. The ever-growing population and the race to bring in cost effective and more attractive colours led to usage of more synthetic dyes. The synthetic dyes and the dyeing process pollute water bodies around the dyeing unit as the effluents that are generated during the process are let into them. The chemicals used as synthetic dyes are harmful to the environment. A large quantity of such water is released by the dyeing units into the nearby water bodies. In the case of Tirupur, it is the River Noyyal, that flows through it.



Effluents being let out in a river

But now the regulations laid down, have made the dyeing units responsible for reducing pollution. They need to treat the effluents to make them less harmful before they are let into water bodies.

Arun: What does “treating them” mean acharya?

Acharya: The process by which the wastes are made less harmful to the environment is called its treatment. The effluents are filtered and are also allowed to react with some chemicals to reduce their harmful effects. However, we can only reduce the harm, but cannot fully do away with the damage they cause.



Roots of madder plant

Roja: My favourite colour is red. How was it obtained in olden days, acharya.

Acharya: The red dye was obtained from the roots of the madder plant. The same dye was first produced synthetically in 1869. It became

the first natural dye that became man made.

Did you know that a plant-based dye had an important role to play in our freedom struggle?

Rajiv: I know acharya. It is indigo. It was called the Indigo movement.

Acharya: Can you share more about it Rajiv?

Rajiv: The Indigo riot of 1858-60 was also known as Neel Bidroho. Textile industry was growing in England and availability of raw materials for dyeing was a challenge. Indigo a shade of blue was the most sought after colour. The Britishers decided to exploit the Indian peasants and make huge profits by making the farmers grow only the plants from which the dye could be obtained. Many retired British officials engaged



themselves in indigo plantations in Bengal. They compelled the local peasants to cultivate indigo either by entering into a contract with them or by engaging them as labourers at a very low cost.

When the farmers refused to cultivate indigo in their farms the British used coercive methods like burning their fields and houses, beating them and forcing them into indigo cultivation for no return on investment.

Dinabandhu Mitra's play "Nil-darpan" in Bengali brought the attention of the government towards the misery of the indigo-cultivators. Newspapers like Hindoo Patriot and Amrita Bazar Patrika published articles on cruelties meted out to the ryots by the Britishers.

Not able to bear the misery the cultivators took a vow not to cultivate indigo anymore. This resulted in the elimination of indigo plantations in Bengal, by 1860.



Indigo fields

Acharya: The indigo cultivation was done by the British planters in Champaran, Bihar as well. The present Bihar, Jharkhand and Bengal were a part of the Bengal Province during the British rule. Here the peasants were forced to cultivate indigo in a particular portion of their land much against their wish. They were not allowed to raise crops like rice for their livelihood either. They were also not compensated for the same. In 1917-18, the peasants decided to protest against this oppression. It can be said that Mahatma Gandhi practiced his Satyagraha for the first time here to provide some relief to the peasants. Thus, indigo movement played a vital role in our freedom struggle.

The school bell rings to indicate that the ongoing period was over.

Vidya: Acharya, many of us, have not shared our experiences and its already time for a break.

Acharya: You are right. We shall meet again after the break in the EVS period and continue our discussions.

Children are happy discussing their holiday experiences during the break too. After the break they are ready to share their experiences again. Let us listen in.

Vidya: Acharya, I had the good fortune to visit Kashmir during the holidays. I happened to visit the saffron fields. The agriculturist there told me that the best quality saffron in the world is grown in Kashmir.

Acharya: That's true. Did you observe how saffron strands are obtained from the flower?



Vidya: No ma'am.

Acharya: The saffron strands that we use is the stigma of the flower. Large quantity of the flower is required to get a small quantity of the strands. Saffron can be grown only in climatic conditions that exist in places like Kashmir. This makes saffron an expensive spice.



Saffron flower

Since the western nations were not able to raise spices, they started conquering nations looking for them. The first foreign invasion on India was by the Portuguese through the Malabar coast in search of pepper.

Vijay: What is a spice acharya?

Acharya: Have you observed that we do not like to eat if we are not able to smell the food?

Vijay: Yes, that is why we don't feel like eating when we have a common cold.

Acharya: True. Spices add flavour to the food. They do not add any nutrients to the food. But, of late, there are findings that say they can also keep us healthy. For example, turmeric a spice that gives a flavour and colour



Black pepper

to the food is found to have anti-inflammatory properties. It is also believed that it can prevent some diseases that occur in the elderly.

Vijay: The turmeric my mother uses to make powder does not look like a fruit or a flower. Which part of the plant is it acharya?

Acharya: Turmeric is an underground stem, called the **rhizome**. India is one of the major exporters



Enrichment

Anti-inflammatory substances reduce inflammation providing relief from pain and high fever.

Varun: I came to know that India had to suffer a number of foreign invasions because of the variety of spices that could be cultivated on her soil.

Acharya: We can say with pride that we are the "Spice capital" of the world. The climatic conditions and the terrain of our country favour cultivation of spices.



Cardamom



of turmeric. Erode, in Tamil Nadu is the **turmeric capital** of the world.

Rajan: Oh, really?

Ram: What are the other spice varieties acharya?

Acharya: We have ginger, garlic, cardamom, cinnamon, aniseeds, bay leaves.



Cinnamon tree



Bark of cinchona trees



Mosquito

They are very commonly used by us in our day-to-day cooking. Did you know that cinnamon is the bark of a tree?

Ram: Is it so acharya? My pitaji who is a doctor said that we get medicine for malaria from the

bark of a tree. We tried to visit the plantations when we visited Darjeeling. I forgot the name of the tree acharya. Could it be cinnamon?

Acharya: No Ram. It is the cinchona tree. We get quinine from the bark of cinchona trees. Quinine is used for treating malaria, a disease that spreads by the bite of Plasmodium mosquito. Nowadays, it is also used for treating other diseases. During the beginning of the Covid pandemic it was used to treat that too.

Ram: We also saw a lot of cardamom plantations in Darjeeling.

Acharya: The cardamom pods contain black seeds which are used as whole or in powdered form to flavour dishes. When chewed it freshens our breath. Ayurveda uses cardamom to treat urinary infections and diabetes.



Clove

Raghu : My pitaji also told me that clove is another plant product which is a spice and also a medicine. It is used for relieving toothache. Where is it grown acharya?

Acharya: It is largely grown in Tamil Nadu, Kerala and Karnataka.

Vinayak : I was surprised to know that it is the flower bud of the plant, with good aroma.

Vignesh: Acharya, I went to Uttar Pradesh, the **sugar bowl** of India.

Ram: Sugar bowl? What do you mean by it?



Vignesh: It means that it produces the maximum sugar in the country. I saw a lot of sugar cane fields in Uttar Pradesh.

Acharya: Sugarcane, cotton and jute are the important cash crops of our country. Ahmedabad with a number of textile mills is the “**cotton capital**” of our country.

At least 85% of the world’s produce of jute is from the Ganges delta. West Bengal produces the maximum, followed by Assam. A large quantity of jute is exported from these states, as there is a huge demand due to its high quality, which has become possible due to the soil and climatic conditions there.



Sugarcane



Cotton



Jute

Mani: Why are they called cash crops acharya?

Vignesh: I know. They are called so because they are grown for sale in the market and give the farmers good profit, if conditions are favorable.

Acharya: The cotton grown in our country is one of the best varieties of the world. During the British rule we were forced to send these to England and in turn receive the finished goods. This made clothes very costly for us, Indians. Had we made those in India, which the Britishers did not allow us to, we would have not languished in poverty.

Varun: Now I understood, why we want to become a manufacturing hub. The ‘Make in India’ policy says it all.

Acharya: I see your hand up, Harinder. You may share.

Harinder: I visited Kannauj in Uttar Pradesh to attend my uncle’s wedding. During one of the morning walks with my didi (elder sister in Hindi), I saw a person carrying a sack of rose flowers. When I asked didi, she told me that they make a perfume known as attar from those roses.

Varun: My mataji once bought ‘attar’ from the Khadi Gramodyog Bhavan. She told me that it was very expensive.

Harinder: Yes, it is. I can tell you why it is expensive. It is because a large volume of flowers is required to distill a small quantity of the perfume. The process is also a laborious one.



Perfume Distillation



Acharya: Good Harinder. Roses with a good scent grow well in the Gangetic plains. Hence, these yield good quality perfume, which is exported to many parts of the world. Kannauj is thus known as the “perfume capital” of India.

Varun: Do they use only roses to make perfumes acharya?

Acharya: Jasmine and kewra are also used to make perfumes. Another perfume that has both cosmetic and medicinal properties is the one made from sandalwood.



Sandal wood trees



Sandal wood oil



Enrichment

What is Khadi Gramodyog?

Khadi Gramodyog promotes and develops traditional village industries. Khadi refers to hand-spun and hand-woven fabric, often made from cotton, silk or wool. Khadi had an important role to play in freedom struggle.

Vivek: India produces 85% of the sandalwood in the world. The three southern states Karnataka, Kerala and Tamil Nadu are the dominant producers of sandal wood in the country. India also exports a large volume of sandal wood. The oil extracted, is used as a raw material for the manufacture of soap and is also used as a perfume.

Vijay: Acharya, you say that spices add flavour. Each of them also have a unique smell. Can we say that perfumes and flavours are the same?

Acharya: Perfumes are used externally, while flavours are ones that add taste and smell to what we eat/drink. Thus, spices are flavouring agents.

Varun: Acharya, yesterday my father bought vanilla essence from a shop to add flavour to the ice cream that we made at home. My mother said that it was synthetic, and not natural.



Scan this code to listen to song “Enna valam illai...”



Enrichment

1. All spices are flavouring agents whereas all flavouring agents are not spices.
2. Spices are natural while flavouring agents can be synthetic.
3. Spices have medicinal value but flavouring agents do not have medicinal value.

Acharya: Perfuming and flavouring agents are nowadays manufactured. But they do not have the medicinal properties that natural substances possess. In fact, continuous use of synthetic flavouring agents can harm us.



Vidya: Acharya, I am reminded of a Tamil song that I heard recently “Enna valam illai intha thirunaatil, en kaiyai endha vendum veli naatil” meaning “What is the need to go to other lands when our own country has an abundance of all resources!”

Acharya: Yes, our country has it all, let us stand tall and make it strong.

The school bell rings and the class breaks for lunch.

SUMMARY

- Variegated leaves contain other pigments apart from chlorophyll. Hence leaves of such plants have colours other than green.
- Flowers bloom during the day are colourful to attract bees and insects for pollination whereas flowers bloom in night have a fragrance to attract insects for pollination.
- Pollination is the first step that helps the flowers to mature into a fruit. Bees and other insects help in pollination.
- Dyes made from natural materials not only make the dress beautiful, but also protects the cloth from fungi and other organism that can eat away the fabric.
- Noyyal river flows through Tiruppur in Tamilnadu
- Natural dyeing substances do not cause pollution.
- Industrial revolution brought in synthetic dyes which pollute water bodies.
- The process by which the wastes are made less harmful to the environment is called its treatment. The effluents are filtered and are also allowed to react with some chemicals to reduce the harmful effects.
- The red dye was obtained from the roots of the madder plant.
- The Indigo riot of 1858-60 was also known as Neel Bidroho. The British compelled the local peasants to cultivate Indigo in their farms by entering into a contract with them at a very low cost.
- The peasants decided to protest against the oppression. Mahatma Gandhi practiced Satyagraha in Champaran for the first time in order to provide some relief to the peasants. The Indigo movement played a vital role in our freedom struggle.
- The saffron strands that we use are the stigma of the flower. Saffron can be grown in a place that has climatic conditions like Kashmir.
- India is called as the ‘**Spice Capital**’ of the world. The first foreign invasion on India by the Portugese through the Malabar coast was in search of pepper.
- Spices add flavor to the food, they do not add any nutrients but findings say that they can keep us healthy.
- Turmeric has anti-inflammatory properties. Turmeric is an underground stem called the rhizome. Erode in Tamilnadu is the ‘**turmeric capital of the world**’.
- Spice varieties include ginger,garlic, cardamom, cinnamon, aniseeds, bay leaves etc.



- Quinine is a medicine obtained from the bark of Cinchona tree used for treating malaria, a disease that spreads by the bite of Plasmodium mosquito.
- Ayurveda uses cardamom to treat urinary infections and diabetes.
- Clove is used for relieving toothache, largely grown in TN, Kerala and Karnataka.
- Clove is the flower bud of the plant with good aroma.
- Uttar Pradesh is the '**sugar bowl of India**'. Sugarcane, cotton and Jute are the important cash crops in our country. Ahmedabad with a number of textile mills is the '**cotton capital**' of our country.
- 85% of the world's jute produce is from the Ganges delta.
- Jute, cotton and sugarcane are called cashcrops because they are grown for sale in the market and give the farmers a good profit, if conditions are favourable.
- Kannauj in Uttar Pradesh is known as the '**Perfume Capital**' of India as it produces roses for making perfume.
- Jasmine, Kewra and Sandalwood are used for making perfume. India produces 85% of the sandalwood in the world. Karnataka, Kerala and Tamilnadu are the major producers of sandwalwood in our country
- Sythetic perfumes and flavouring agents are available, but their continuous use can cause harm.



I. Fill in the blanks

1. The yellow powder seen in the flowers is known as _____
2. The liquid waste from industries that are let into water bodies are called _____
3. The Red dye is obtained from the root of the ___ plant.
4. The Portuguese invaded India in search of _____.
5. Quinine is used for treating _____ .
6. Clove is used for relieving _____.

II. Give one example for each of the following

1. Natural dye.
2. Expensive spice from Jammu and Kashmir.
3. Flower used for making perfume.



- An insect that causes malaria.
- State that is a dominant producer of sandalwood in our country.

III. Match the following

| Spice | Part of the plant |
|----------|-------------------|
| Clove | Bark |
| Cinnamon | Flower |
| Fennel | Bud |
| Saffron | Seed |

IV. Complete the table

| A | B |
|---------|-------------------------|
| Kannauj | |
| | Cotton capital of India |
| Kerala | |
| | Sugar bowl of India |
| Erode | |

V. Answer the following

- What is pollination?
- What are the benefits of natural dyes used in olden days?
- How do industries pollute water bodies?
- What is a cash crop? Give examples.
- Why are spices an important component of our food?
- Draw pollination and label it.

VI. Proposed Activity

- Collect pictures of spices and make a collage.
- Group activity: Children can bring samples of harvest from plants and identify them as cash crops or food crops.
- (a) Stick pictures of different types of fabrics used in India in your scrapbook.
(b) Classify them based on whether they are obtained from plants or animals.
(c) Do we need to obtain products from animals for our clothing? Discuss.
- List a few natural perfumes. Identify the source from which they are made.



VII. Mapwork

Mark the following states and their capitals on the political map of India.

1. West Bengal
2. Tamil Nadu
3. Gujarat
4. Bihar
5. Jammu and Kashmir
6. Jharkhand
7. Kerala
8. Karnataka
9. Uttar Pradesh



10

BHARAT – The Subcontinent



Expected Learning Outcomes

Students...

know Bachendri Pal's feat, the civilian awards of India, the name of Mt. Everest in Sanskrit and its meaning, the highest peak of the Himalayas in the Indian region, to identify the Deccan Plateau on the map of India, the riches of the Deccan Plateau, that the intensity of earthquake is measured using a Richter scale, **who** a seismologist is

know what delta, glacier, peninsula, plateau, sand dune, landform are

know about Bachendri Pal, the physical features of India (the Himalayan region, Northern Plains, Eastern Ghats and Eastern coastal plains, Western Ghats and Western coastal plains)

understand how the Himalayan range protects India, how earthquakes are caused, the **difference between** perennial, rain fed rivers

understand why a delta is fertile, India is a sub-continent, the western coast has bountiful rainfall while the eastern coast does not, there is a difference in fertility between the Eastern and Western coastal plain

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



A lake in a cave

Krem Chympe is one of India's longest caves, near Khaddum village (Meghalaya state) in the East Jaintia Hills. Inside the cave there is an enormous, deep lake with waterfalls tumbling over stunning limestone formations.



Car moving with the engine off

This Gravity hill is located on Srinagar-Leh highway. The most unique occurrence here is that even when the engine of the car is turned off the car moves uphill in this stretch of the road.



Light amidst the marsh

Alaya ghost lights in Sundarbans is a mysterious phenomenon where some lights appear in the middle of the marshes, which the scientists believe to be due to methane that is present in marshlands.

Meteor made lake

Lonar lake is found in Maharashtra. A meteor crashed in this region creating a crater millions of years ago. This slowly evolved into a beautiful lake over the years.



An arch due to erosion

This is a Natural Arch, found in Tirumala hills. This is a 2.5 million years old arch formed due to natural erosive forces over the years.



Jagan is very excited after knowing about Smt. Bachendri Pal in one of his language classes. As soon as he entered the house, he went straight to his **nana mama (mother's younger brother in Gujarati)**, who is a Colonel in the Indian Army to share his learning.

Jagan: Nana mama, today we were supposed to talk about any one Indian achiever during our language class. When I listened to my friends, I realized that we have so many..., I was awestruck and I want to be one of them.

But, nana mama of all those I heard about today, Bachendri Pal was the most interesting.

Nana mama: Oh...What makes you feel so?

Jagan: Nana mama, she was the first Indian woman to summit the Mt. Everest. She accomplished this at 1.07 p.m. on 23rd May, 1984. My friend also narrated the challenges that she had to face to achieve this feat. She stood her ground to realise her dream, despite the many challenges that she faced. She was awarded the Padma Shri in 1985, in recognition of her resilience and perseverance to reach her goal.



Bachendri Pal



Himalayan region



Enrichment

Padma Shri is the fourth-highest civilian award of the Republic of India, after the Bharat Ratna, the Padma Vibhushan and the Padma Bhushan.

Listening about Smt. Bachendri Pal's achievement, has made me curious about our mountain ranges. You have served in the Himalayan region as an army officer for long. Please tell me more about it.

Nana mama: I am happy to hear that you want to know more about your motherland.

Freshen up and join me, we shall discuss.

Jagan places his bag in the place allocated for it, washes his lunch boxes, changes from uniform to casual wear, has his evening snack and is all geared up to listen to his nana mama. Let us also listen to their conversation to know more.

Jagan: Nana mama, I am all ears now.



Nana mama: Good Jagan. You were very quick. Do you freshen up at the same pace daily?

Jagan: No, I don't. Today, I am interested in learning about the mountains. So, I don't feel tired or bored.

Nana mama: You got interested because, you became aware of, the feat of a mountaineer.

Do you know that Mt. Everest is known as Sagarmatha that means "The Peak of Heaven" in Sanskrit and Nepali. It lies at the border of Nepal and Tibet.



Kanchenjunga

Jagan (intervening): Is it not in India? I thought the Himalayas were in India.

Nana mama: The Himalayan mountains form the Northern boundary of our country. Kanchenjunga is the highest peak in the Indian region.

The mountains have always fascinated us human beings. To know about the Himalayan range consisting of high peaks, deep valleys and fast flowing rivers is very interesting.

Jagan: Is it a range of mountains? So, are they spread over a large area?

Nana mama: The Himalayan range runs from the Indus in the west to the Brahmaputra in the east, thus it is the northern boundary of our country.

Jagan: From what you say, it looks like a mighty mountain range.

Nana mama: True. It forms a mighty boundary too. It deters the foreign invaders from entering our land. It prevents the very cold Siberian wind from blowing into our country and protects the northern plains from extreme cold conditions. It stands as a barrier to the rain bearing south west winds and helps the northern plains get bountiful rainfall.



Enrichment

Himalayas is 2500 km in length. It passes through Pakistan, India, China, Nepal and Bhutan.



Enrichment

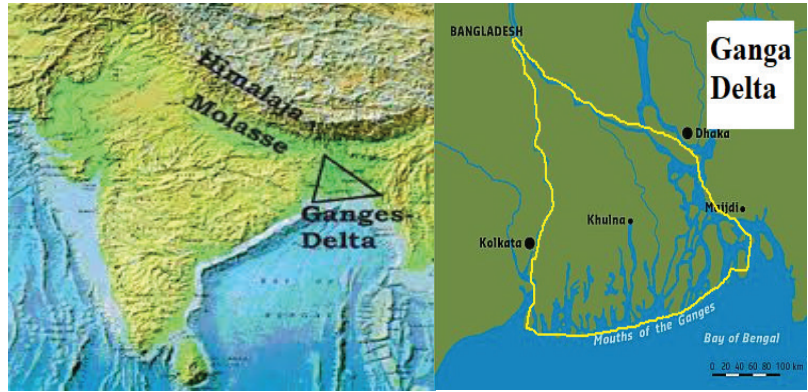
Snowfall accumulated and flattened over a period of time in a location forms a huge mass of ice called a glacier. Glaciers are also moving blocks of ice.

Jagan: That is so interesting nana mama. But you said something called the northern plains. What are they?

Nana mama: As I told you, Himalayas is the origin for a number of rivers that irrigate our plains. Plains are large areas of flat land. Rivers like Indus and Ganges run down the Himalayas



due to the melting of glaciers. These rivers flow down to the plains. Since the plains are in the northern region of our country, we call them the northern plains. They are also known as the Indo-Gangetic plain, as they are irrigated by the River Indus and Ganga.



It is also called the Gangetic plain. The rivers when they flow down the mountains, carry with them a lot of dissolved minerals and nutrients. The rivers slow down when they meet the sea and deposit the soil that they have washed down. This is called the **silt**. The landform here is called the delta.

ACTIVITY

Name the major rivers of India and classify them as perennial and seasonal rivers.

A delta is an extremely fertile region as it has silt that is laden with nutrients. The mixture of sand, clay and silt that is deposited makes the alluvium, which is extremely fertile.

Jagan: Now, I understand why the Gangetic plain is fertile and we are able to cultivate crops like wheat, rice and sugarcane in those plains.

Nana mama: Apart from the fertile soil, the Gangetic plain is also irrigated by the perennial rivers. So, they are good cultivable lands, that can feed a huge population.

Jagan: What is a perennial river nana mama?

Nana mama: Perennial rivers are those rivers that flow throughout the year. In summer, the river is fed by the melting of snow and during the monsoon by the rains. So, the areas where these rivers flow have enough water for irrigation throughout the year.

Jagan: So, are there rivers that are not perennial nana mama?

Nana mama: Yes Jagan. Most of the rivers that flow in the southern part of our country are seasonal or rain-fed rivers. They have copious water during the monsoon, but not enough water during summer. Some years, when the monsoon fails, there is not enough water during monsoon too.

Jagan: So, are there no plains, where we can cultivate food crops in the southern region?

Nana mama: In the southern region we have the eastern coastal plains that are fertile due to rivers like Mahanadi, Godavari and Krishna. These rivers too form deltas



and deposit alluvium. But the western coastal plain is not very fertile except for the Malabar Coast.

Jagan: So, why are these called coastal plains, while the northern plains are not called so?

Nana mama: That is a good question to ask Jagan. Take a look at the map of India. Look at the large coast line formed by the Bay of Bengal on the east and the Arabian Sea on the west. We also have a range of mountains on the east and the west.

Jagan: Oh ... yes nana mama. Are these also Himalayas?

Nana mama: No Jagan. They are the Western Ghats on the west and the Eastern Ghats on the east. On the west you have a narrow strip of land between the Western Ghats and the Arabian sea. This is known as the western coastal plain.

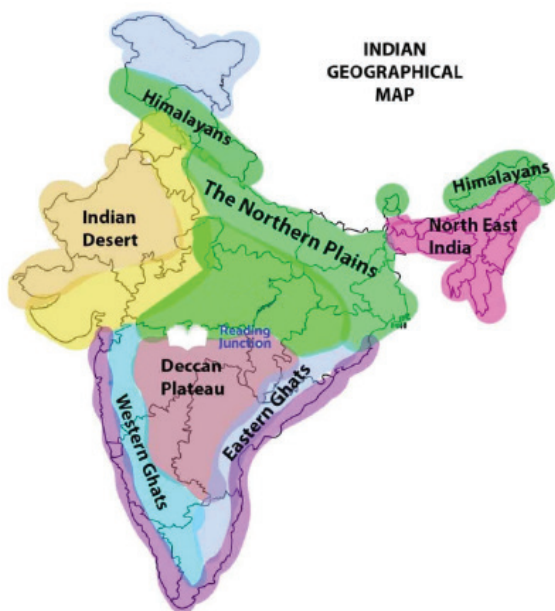
Jagan: So, the eastern coastal plain is one that lies between the Eastern Ghats and the Bay of Bengal?

Nana mama: Yes Jagan. That is a good way to learn. Here again, the Western Ghats stop the rain bearing clouds and bring abundant rainfall to the western coast. The winds before it reaches the eastern coast loses all its moisture. That is why the eastern coastal plains do not receive enough rain from the south-west monsoon. It receives rain only during the north-east monsoon.

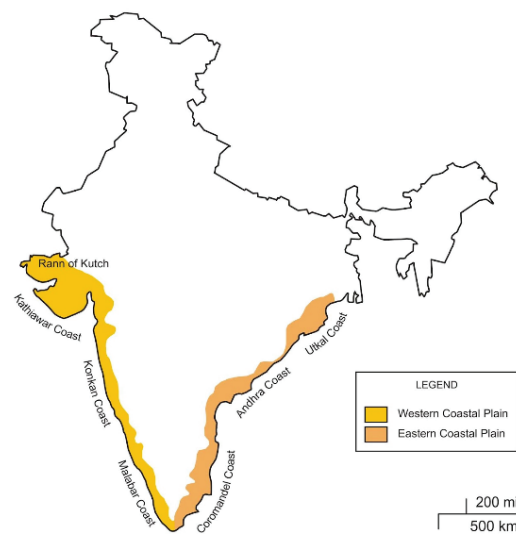


Enrichment

Malabar Coast is a stretch of coastline along the southwestern part of India. It runs through the states of Karnataka, Kerala, and Tamil Nadu, until the southern tip of the country.



Coastal Plain of India



Jagan: How fascinating nature is!! How vital a role these play in our lives!! From the map I see we have the Indian Ocean on our south. So, we have water on three sides?

Nana mama: Yes Jagan. We are a land surrounded by water on three sides. So, we are a peninsula.

Jagan: We have the Himalayas in the north, the Indo-Gangetic plain, the western and the eastern coastal plains... Do we have some other land forms too nana mama?

Nana mama: Yes Jagan. Again, take a closer look at the map. Just below the Indo-Gangetic plain, in between the Eastern and the Western Ghats, you see a raised land.

Jagan: Yes, nana mama. It is written as the Deccan plateau. What does it mean?

Nana mama: Plateau means a raised land. Deccan is derived from the Sanskrit word "Dakshin" which means south. The southern raised land, is called the Deccan plateau. It extends from the Vindhyas in the north to Nilgiris in Tamil Nadu.



Enrichment

Ore refers to a naturally occurring mineral or rock that contains a large quantity of a particular element. e.g., magnetite (an ore of iron).

Jagan: Is the plateau suitable for growing crops?

Nana mama: It is suitable for growing crops like cotton, pulses, millets, sugarcane and rice. Deccan plateau is rich in minerals. We have plenty of iron, mica, coal and uranium deposits or ores here.



The rivers Narmada and Tapti pass through the Deccan plateau and flow into the Arabian Sea.

Jagan: I remember the names of those rivers. I have also learnt in my third standard that we have the Great Indian Desert on the west. I also know that the deserts receive very less rainfall, have sandy soil and have extreme temperatures.

Nana mama: Do you know that the deserts also have sand dunes?

Jagan: What are they nana mama?

Nana mama: You know that a desert is a vast expanse of sand. When wind blows, sand grains are carried and a mound is formed.

The mounds so formed are called **sand dunes**. The location of sand dunes in a desert keep shifting based on the direction and speed of the wind.



Sand dunes





Enrichment

In the Thar desert, the shifting sand are locally known as Dhrian.

Jagan: Have you seen a sand dune nana mama?

Nana mama: Of course, I have. Being a part of the armed forces, I have been posted in the north western part of our country, where these deserts are. I have been amidst the shifting sand dunes. It is definitely an experience.

Jagan: That is interesting nana mama. You know about almost all the parts of our country. I would also like to be a part of the armed forces. Have you also been to Lakshadweep nana mama? I have learnt about it in III standard.

Nana mama: Yes Jagan. As you know, they are a group of islands in the Arabian Sea. I am sure you know the Andaman and Nicobar Islands too.



Andaman and Nicobar Islands

Jagan: Yes nana mama. I have learnt about Kala Pani and the islands of Andaman in the Bay of Bengal.

Nana mama: That's great. Every citizen of this land should know about the struggle that our forefathers endured to help us gain the independence that we enjoy now. The Britishers executed the idea of building a gruesome jail in these islands, making use of our freedom fighters who were deported there, as man power.

Patriots like Veer Savarkar were confined in cellular jail in extremely inhuman conditions. It is our duty to remember those great souls and work for the betterment of our country with sincerity and commitment.

Jagan: I shall definitely do it.

Nana mama: So, we have the Himalayas, Indo-Gangetic plain, Deccan plateau, the eastern and the western coastal plains and the islands in our country. We have almost all the landforms, climate zones and cultures that a continent has. That is why India is called a **subcontinent**.

Jagan: What is a land form, nana mama?



Map showing the location of Andaman and Nicobar Islands





Enrichment

A seismologist is a scientist who studies the seismic activity of the Earth and hence the earthquakes too.

Nana mama: A landform is the natural feature on the surface of the earth. The mountains, hills, plateaus, plains, valleys etc. are all land forms.

Jagan: That's interesting. How are these formed?

Nana mama: Just below the earth crust lies plate like structures called the tectonic plates, which are constantly moving. The movement of these

tectonic plates leads to the formation of land forms. When the tectonic plates that are close to the earth crust shift, it leads to an earthquake.

You sometimes hear in the news about an earthquake happening. In fact, our Himalayan region is an earthquake prone region.

Jagan: I remember, that they also report some number along with earthquake, when it occurs.

Nana mama: You are right Jagan. The intensity of earthquake is measured on a Richter Scale. More the number on the scale, greater the intensity. The movement of tectonic plates can create landforms like hills or mountains. Erosion by water or wind can also create landforms like valleys. These processes happen over millions of years. In fact, the Himalayas that was formed around fifty million years ago is the youngest mountain range.

Jagan: Nana mama, all these are very interesting. I don't know what I should become when I grow up, be a seismologist or join the army or become an agricultural scientist.

Nana mama: I am happy that you think so much. You will have more interests coming your way as you grow up. You can choose the one that suits you best at that point in time. I think we have been talking for a long time. You missed your evening games too today to learn more about our country.

Jagan: Thank you nana mama.



Enrichment

Richter scale is used to measure the magnitude of earthquakes.



SUMMARY

- Bachendri Pal was the first Indian woman to climb Mt. Everest and was awarded the Padma Shri in recognition of her resilience and perseverance to reach her goal.
- Mt. Everest is also known as Sagarmatha that means “The peak of Heaven” in Sanskrit and Nepali language, is situated at the border of Nepal and Tibet.
- Mt. Kanchenjunga is the highest peak in India.
- Himalayan range runs from the Indus in the west to the Brahmaputra in the east
- Himalayas is the northern boundary of our country, which deters the foreign invaders from entering our land, prevents the cold Siberian winds, barrier to the South west monsoon winds and helps the Northern plains to get bountiful rainfall.
- Plains are large areas of flat land.
- Northern plains also known as Indo-Gangetic plains and they are irrigated by the River Indus and the Ganga.
- The river slows down when they meet the sea and deposit the dissolved minerals and nutrients (called as silt) and creating deltas.
- Perennial rivers are those rivers that flow throughout the year, fed by melting of snow during summer and by the rains during monsoon season.
- Non-perennial rivers are also known as seasonal rivers or rain-fed rivers which gets copious water only during the monsoon season. When the monsoon fails, there is not enough water in these rivers.
- The narrow strip of land between the Western ghats and the Arabian sea is known as the Western coastal plains and the narrow strip of land between the Eastern ghats and the Bay of Bengal is known as the Eastern coastal plains.
- A piece of land surrounded by water on all three sides is known as Peninsula.
- The Southern raised land is called the Deccan plateau which extends from the Vindhyas in the north to Nilgiris in the south.
- Deserts receive very less rainfall, have sandy soil and have extreme temperatures.
- A landform is the natural feature on the surface of the earth. The mountains, hills, plateaus, plains, valleys etc are all landforms. Movement of tectonic plates leads to the formation of landforms.
- Erosion by water or wind can also create landforms like valleys.
- Shift of tectonic plates close to the earth crust leads to earthquakes. Intensity of earthquakes are measured in Richter scale.





I Fill in the blanks

1. Sagarmatha means _____.
2. River Narmada and Tapi pass through Deccan plateau flow into the _____.
3. Sand dunes in a desert keep shifting based on the direction and speed of the _____.

II Match the following

- | | |
|------------------------|-----------------------|
| 1. Mt. Everest | Deccan Plateau |
| 2. Mt. Kanchenjunga | Northern Plains |
| 3. River Yamuna | Arabian Sea |
| 4. River Krishna | Bay of Bengal |
| 5. Andaman Islands | Sagarmatha |
| 6. Lakshadweep Islands | Highest peak in India |

III Name the following

1. First Indian woman to climb Mount Everest.
2. The other name for Mount Everest.
3. Large moving ice on Earth.
4. The fourth highest civilian award of the Republic of India.
5. The great Indian desert.
6. Natural disaster caused due to movement of tectonic plates.
7. The youngest mountain range in the world.

IV Identify the landform

1. A piece of land surrounded by water on all sides.
2. A flat area of land that is higher than the land around.
3. A body of land surrounded by water on three sides.
4. A broad area of relatively flat land.

V Answer the following

1. How is the Himalayan range important to India?
2. What makes the northern plain fertile?
3. Differentiate between perennial and non-perennial rivers.



4. Write a short note on Deccan plateau.
5. Why is India called as a subcontinent?
6. What causes an earthquake? Name any two earthquake prone regions in India.

VI Map work

1. On the outline map of India, mark the various physical features mentioned in the lesson and colour them appropriately.

VII Pen down

Burning of fossil fuels results in global warming which leads to rapid melting of snow in the Himalayas.

- a) What would happen if the Himalayan ranges loses its snow cover?
- b) How can you as a student reduce the use of fossil fuels to bring down global warming?



11

TRAVEL – Explore India



Expected Learning Outcomes

Students...

know the capital of Punjab, how Punjab got its name, the 5 rivers flowing through Punjab, and Thiruvaiyaru (a town in Tamil Nadu), the states through which NH44 passes.

know about Himadri, Himachal and Shiwalik, National Highway (NH), Langar, a few places of interest in Manali, Vashisht Kund, Manikaran and Solang Nullah, **how** the Himalayas were formed

understand the **significance of** places such as the Jallianwala Bagh, Golden temple, Wagah border, the **significance of** building tunnels, the **function of** Border Roads Organisation (BRO), **why** the hot springs are so, **why** the mountainous regions need to be protected

locate state/s, capital/s, rivers, tributaries and other geographical divisions from the lesson on a political map of India



The Majestic Himalayas of India

The white crown shining,
On India's forehead,
Snowcapped peak glittering,
Like diamond gems,
The high steep ranges unexplored,
High walls of mountain protect,
From enemies and cold,
The majestic,
The pride of India

Magnificent Himalayas,
House of snow and rivers,
Religious shrines bestow blessings,
The sacred rivers flowing,
Like silver thread deep below
The enchanting exotic view of
Himalayas,
Enthralled every visitor with
surprise,
Words are difficult to describe
The real beauty of Himalayas

– Renu Vig Sharma



Vini, a student of class V, comes home one evening determined to persuade her parents to take her to Alps for the ensuing vacation. Bhavishya is a new joinee of Vini's school. She was in France earlier and was on a vacation to Alps the previous year. Vini is waiting for the family time after dinner to bring up the topic of vacation.

Vini: Pitaji (father in Hindi) where shall we go for vacation this year?

Pitaji: I have not decided yet. Do you have any place on your mind?

Vini: Yes pitaji. Shall we visit the Alps? Bhavishya who has returned to India, boasts that she visited the Alps last year and that it was so exciting and beautiful. I would also like to talk about such a visit.

Mataji (mother in Hindi): Vini, Bhavishya was in France, which is closer to Alps. Probably, she visited Alps because of it. We shall first explore and know the places that are in our country and then move outside of it.

Pitaji: True. Our country Bharat is, as you know a sub-continent, which has various land forms. I suggest that we visit the Himalayan region this time, which has mountains that are much taller than the mountains in the Alps. We can also visit



Himalayan Range



Enrichment

हिम - snow; आलय - abode;
हिमालय- abode of snow

some places of historical interest to understand our country better.

Vini: Since, both of you say so I agree. But, tell me a little more about the Himalayas.

Mataji: Three parallel mountain ranges make the Himalayas. The northern most range is called the Himadri. They are snow clad mountains. It has the loftiest Himalayan peaks. Their altitude is about 6000 metres.

Just below it is the Himachal. These are snow-capped mountains. This range has the famous valleys of Kashmir, Kangra and Kullu. The altitude is about 4000 metres.

Below that we have the Shiwaliks. The mountains have an altitude of about 1000 metres.



Himadri



Himachal



Shiwalik



Between the Himachal and Shivalik lie the Duns. Dehra Dun, a popular hill station is one of the duns.



Dun



Enrichment

Duns are valleys created between the Himachal and Shivalik ranges of the Himalayan range.

Vini: Sounds exciting. But tell me where we are planning to go.

Mataji: We are working on the itinerary Vini. You will find the vacation plan interesting and informative too. You will have enough and more to talk to your friends about. Now let us retire for the day.

Vini gets busy with her school work during the coming days. She gets to know from her parents that they were going on a trip during the Diwali break and not waiting for the summer vacation and is very excited.

Vini: Pitaji, why are we travelling during the Diwali break and not during summer?

Pitaji: That is a good question. We arrived in Ludhiana last April from Coimbatore after my transfer. Do you remember the weather that we experienced here in May?

Vini: Yes, I do pitaji. Coimbatore had a cool climate, whereas it was extremely hot here in Ludhiana.

Pitaji: We did not want to travel during the harsh summer season. Moreover, you have around 15 days of vacation during Diwali in this part of the country.

Vini: Yes pitaji. In Coimbatore it used to be a week during Dussehra and another week in December. But, here we get about 2 weeks during Diwali.

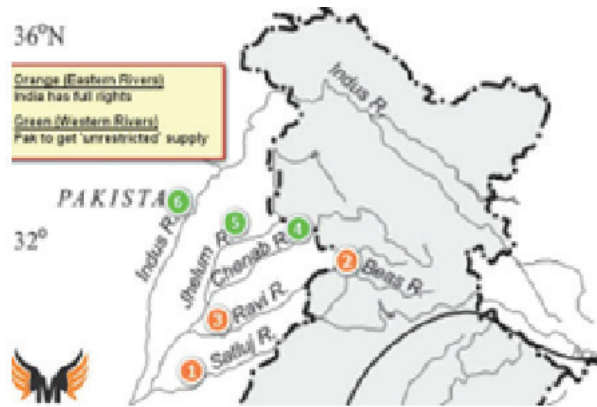
Pitaji: Since the weather is pleasant and you too have a good number of holidays, mataji and I planned a trip now. It's going to be a long travel, but I am sure you would enjoy it.

Vini: Where are we going first pitaji?

Pitaji: We are leaving for Amritsar tomorrow morning. Do you know that Chandigarh is the capital of Punjab?

Vini: The capital of Punjab is Chandigarh and I also know why Punjab got its name. Shall I tell you?





Pitaji: Please continue.

Vini : Punjab is the land of five rivers. Punjab means five and ab means water. The five tributary rivers of the River Indus are Jhelum, Chenab, Ravi, Sutlej and Beas flow through this state.

Mataji: Great Vini. There is a town in Tamil Nadu which has five rivers flowing. It is known as Thiruvaiyaru.

Vini: I know. My music teacher in Coimbatore told me that. It is the place where Saint Thyagaraja, the great composer of Carnatic Music lived. But, what are the rivers there mataji?

Mataji: They are Vadavar, Cauvery, Vettar, Vennar and Kudamurutti.



River Cauvery in Thiruvaiyaru



The Annual musical tribute to Saint Thyagaraja "Thyagaraja Aradhana" at Thiruvaiyaru



Saint Thyagaraja

Vini: Our country is truly great mataji. At what time are we leaving tomorrow?

Mataji: We are leaving at 5:00 am in the morning. We are travelling by car to Amritsar.

Vini: Why are we taking a cab, can't we take a train?

Mataji: We wanted some flexibility of time, so that we can see a few places in Amritsar.

Vini: Why do we need the flexibility of time mataji?

Mataji: The Jallianwala Bagh, the Golden Temple are the places that we want you to spend time in. We do not want to rush through to take the next bus or train. So, we have taken a private transport. If we have to take the public transport, when we have to visit multiple places within a short time, we need a lot of planning. Private car, though costly, helps us be flexible with regard to time.

Now, we shall retire for the day. We need to be up by 4:00 am, so that we are able to utilize the day effectively.

The following day, they wake up by 4:00 am and proceed on the trip as planned



Vini: Pitaji, how long would it take for us to reach Amritsar?

Pitaji: Amritsar is about 150 kilometres from Ludhiana. It would take about three hours to reach Amritsar from Ludhiana. It also depends on the traffic that we need to negotiate during that particular hour.

Vini: The board there says NH44. What is NH pitaji?

Mataji: NH stands for National Highway. National Highway connects different states of India. NH connects major cities of India (ports, capital of states) thereby becoming the backbone of Indian road network.

NH is maintained by the Government of India. NH44 is the longest highway. You can proudly say that you travelled through the longest National Highway of our country. It extends from the Union Territory of Jammu and Kashmir in the north to Kanyakumari, the southern most tip of our country in Tamil Nadu. It runs through Punjab, Haryana, Delhi, Uttar Pradesh, Madhya Pradesh, Maharashtra, Telangana, Andhra Pradesh, Karnataka and Tamil Nadu. It is 4100 km long.

Vini: Is there something called the state highway too?

Pitaji: Yes. The state highways connect different parts of a state. It is maintained by the state government.

Vini: Pitaji, it looks like we have reached the Jallianwala Bagh.

Mataji: Yes. We have.

As they move in, they see bullet marks on the walls.

Vini: What happened here mataji?

Mataji: In 1919, the British, who were then ruling India, passed the Rowlatt act giving themselves powers to arrest anyone, whom they believed to be acting against their rule. On April 13th 1919, the Baishaki day, there was a peaceful gathering of people here opposing the Rowlatt Act (1919).


O'Dwyer, the Lt. Gen. of Punjab decided to suppress this peaceful protest and ordered Col.Reginald Dyer, to fire against the innocent thousands who had gathered at Jallianwala Bagh on that day. He



NH44



Jallianwala Bagh

 **Enrichment**
Rowlatt Act (1919)
An act introduced by the British to curb the fundamental rights of people.



ordered the closure of all exits from the ground, and to fire indiscriminately at the most crowded part of the ground. There was a well here into which several men and women fell into in the commotion and lost their lives too. It is predicted that at least 1000 Indians would have lost their lives here on that fateful day.

Vini: This is heartbreaking!

Mataji: The sacrifice of so many people have sown the seeds of freedom that we enjoy today. It is our duty to see that the hard won independence, makes our nation great too. All of us citizens need to contribute our might to the cause of our nation.

Pitaji: We shall now move on to the Golden Temple.

Vini: Is the temple made of gold pitaji? To which deity is this temple dedicated?

Pitaji: The Golden temple also known as Harmandir Sahib, is one of the most sacred temples of the Sikh community. It is a Gurudwara located in the city of Amritsar, here in Punjab. Maharaja Ranjit Singh, rebuilt it in marble and copper and overlaid the sanctum with gold leaf. The manmade pool here was constructed by the fourth Sikh Guru, Guru Ram Das.



Golden temple

The Sikhs worship their sacred book, the Guru Granth Sahib. It is kept in the temple during the day. The sacred book is taken to the Akal Takht in the night. The Akal Takht also has the ancient weapons used by the Sikh warriors.

Look at the tree there. This old Jujube tree is believed to possess special powers.

It was planted by the first priest, Baba Buddha. It is considered to be more than 400 years old.

We shall visit all these, pay our respects and have lunch at the langar before we leave.

Vini: What is a langar?

Pitaji: The Sikh temples, the Gurudwaras have a langar, a community run kitchen, which provides vegetarian food to the pilgrims free of cost throughout the day. The services in almost all the gurudwaras are voluntary. Please remove your footwear like how we do at all the places of worship. One is also expected to cover his/her head when they enter a Gurudwara.



Jujube tree in Amritsar



After paying respects at the Gurudwara, they have lunch at the langar and head towards their next destination, the Wagah border

Mataji: Do you know that Wagah is between Amritsar and Lahore (in Pakistan)?

Vini: It is so close to Pakistan, when would we reach Wagah?

Pitaji: We would need another hour to reach the Wagah border. The ceremony begins at about 4:15 pm in Wagah. However, since the entry is on first come first serve basis, we need to reach the place a little early to get a comfortable place to watch the happenings.

Vini dozes off during the car ride. Her mother wakes her up as soon as they reach the border

They reach the place around 3:45 pm and find a comfortable place to watch the proceedings.

The program begins at around 4:15 pm.

They watch the beating the retreat and change of guard that happen at Attari-Wagah border and are awestruck by the magnificent performance of the soldiers. Soldiers from both the countries march in perfect drill, going through the ceremonious lowering of their respective national flags.



Attari–Wagah border



Soldiers performing at the ceremony at the Wagah border

Prior to that there is a joyous singing of patriotic songs and dancing to the tunes of patriotic fervor. As the Sun goes down, the nationalistic temperament rises. The lights are switched on marking the end of the ceremony. There is a thunderous applause, befitting the occasion to cheer the guards who perform with all earnestness to kindle the spirit of patriotism amongst the visitors.



Vini: Mataji, it was breathtaking. A visit to the border after an understanding of the gruesome massacre of our patriots at Jallianwala Bagh truly makes me feel that I need to do the best for my Bharat. I shall be a true Bharatian upholding the values that my country stands for. Jai Hind.

Mataji: That's the true spirit Vini. We are going to Jalandhar, from there we take a train to Manali in Himachal Pradesh.

Vini: How long would it take us to reach Jalandhar mataji?

Mataji: We will reach in about 2 hours. We shall have our dinner and board the train to Manali. We will reach Manali, tomorrow morning.

Vini: This plan seems good to me mataji. I can sleep in the train and be fresh the next morning for another round of visiting places.

Mataji: True, Vinni. I thought you were going to tell me that you would miss watching the scenery from the train.

Vini: Definitely, I would. But I am tired now after a long day. I think the train journey would give me sufficient time to reenergize myself for the following day.

They reach Jalandhar, have their dinner and board the train to Manali.

Vini: Mataji, its quite cold here. I feel like putting on my sweater now.

Mataji: Please put it on. We are at Manali, a hill station. You will for sure feel cold.

Vini: Where are we going now mataji?

Pitaji: We will go freshen up and start going round the place soon. We shall see as many places of interest as possible.

They freshen up, have their breakfast and head towards their destination. They reach Vashisht Kund.

Pitaji: This is one of the ancient villages in Manali. It is believed that sage Vashisht, the Guru of Rama and Lakshmana lived here. The hot spring here is believed to cure several ailments that modern medicine is unable to.



Vashisht kund hot springs

Vini: Pitaji, it is amazing to see a spring that is extremely hot, amidst the cool River Beas that flows. Are there more hot springs here?

Mataji: We will visit Manikaran, which is known for its hot spring. Manikaran also has a Gurudwara built across River Beas. Just adjacent to the Gurudwara you will see a hot spring. We shall head there soon.



Vini: We seem to be having a lot of Gurudwaras here. Is there any reason mataji?

Mataji: Whenever people of a particular faith settle down in a place, they build their places of worship too. The Sikh Gurus were also from this part of the country. Hence, we have a number of ancient Gurudwaras built here.



Manikaran

They reach Manikaran. They offer their prayers at the Gurudwara. They see the hot spring along the mighty Beas. It is so hot that when a bunch of channa or rice is tied in a muslin cloth and dipped in the spring, it gets cooked. Vini is very excited about the hot spring that lies very close to a very cool, wide, large and roaring river. They also see a place where they find enclosures for men and women to bathe with water from these hot springs.

Vinni: How does the water here become so hot pitaji?

Pitaji: The water becomes hot due to the geothermal energy that is generated under the earth. We shall read about geothermal energy when we have access to our encyclopedia.



Enrichment

A hot spring occurs when ground water gets heated up by hot rocks deep within the earth's crust and rises to the surface. Thus, we say that the water is geo-thermally (geo-earth thermal-heat) heated. This generally happens due to underground volcanic activity.

Since we are at a hill station, it is generally not advisable to travel during late evenings. Tomorrow we shall visit the Rohtang Pass and Solang Nullah and we would head back to Ludhiana.

Vini: Mataji, is this also the River Beas that we discussed about earlier?

Mataji: Yes Vinni. India has a number of perennial rivers (rivers that have water throughout the year) that are majestic and flows long distances. These have a lot of fresh water, we need to manage it well to help us reap the maximum benefit.



River Beas at Manikaran

The next day morning they are at the Rohtang Pass.





Enrichment

Pass is a route through which one can travel between the mountain ranges.

They see a board that says that we need to respect the mountain

Vini: Why should we respect the mountains mataji?

Mataji: We must always respect nature be it the mountains, forests or the rivers. Instead when we litter and over crowd the place, it leads to natural disasters like unprecedented floods, landslides etc. Excessive emission of carbon dioxide due to vehicles can lead to more of green house gases and this can destroy the climatic conditions of the place. Remember, mountains are the home to 60-80% of our freshwater sources.

Vini: Could this be the reason for the many mishaps happening in the Himalayan region?

Mataji: Yes Vini. Relentless urbanization for the sake of tourism is leading to a lot of problems in areas such as these. We need to be very careful about following the rules laid down for the protection of these fragile locations.



Solang Valley

From there they drive down to Solang Valley, through the snow-covered mountain peaks. The tall trees, wild flowers and the serene atmosphere make it a place that one would love to be in.

Vini finds this place a marvel. She is very happy that her parents brought her to a place of such pristine beauty.

Vini: I see a board saying that we are at a height of about 4000 feet from the sea level. How do our men lay roads on such terrains pitaji?

Pitaji: I am happy that you think about people who take pains to make our life easy and trouble free. At the borders of our country, especially in high mountainous terrains,



we have our Border Roads Organization (BRO) (a part of Indian armed force) putting their heart and soul to lay roads.

Mataji: These roads laid by them help the people here connect to the main land. It also brings tourists from the plains to the hills. The living conditions of the people here improve because of movement of goods and also because of the revenue that tourists bring in. However, one needs to be very cautious to not exploit nature.



Pitaji: In places where laying roads on the hills might not be possible or when the stretches might be too long to connect places, our men have also constructed tunnels.

Vini: What are tunnels, pitaji?

Pitaji: A tunnel is an underground passageway, dug through the mountainous terrains to provide passage for vehicles without breaking down the mountains fully. Tunnel, generally has only an entry and an exit. The longest road tunnel in India is the Dr. Syama Prasad Mukherjee tunnel, in Jammu and Kashmir on NH44. It has reduced the distance between Jammu and Srinagar by 30 km. The tunnel has a ventilation system with inlets and exhaust outlets.

The Rohtang tunnel or the Atal tunnel on the Leh-Manali Highway would provide us a unique experience when we pass through it. We shall plan to experience it in our next vacation.



Dr. Syama Prasad Mukherjee Tunnel

Vini: I am really glad that you took me here rather to another country. I have understood that our country is "Saare Jahaan se achha". My teacher in Coimbatore used to always say that our country is "Paarukkulle nalla naadu, yengal Bharatha naadu".

TASK

Name the first or the oldest tunnel built in India.



Scan to listen to "Saare Jahan se achha"



SUMMARY

- The three parallel mountain ranges in the Himalayas are the Himadri, the Himachal and the Shivalik.
- Duns are valleys created between the Himachal and the Shivalik ranges of the Himalayas.
- Punjab is the land of five rivers namely Jhelum, Chenab, Ravi, Beas and Sutlej.
- Thiruvaiyaru is a town in Tamilnadu which has five rivers flowing. They are Vadavar, Cauvery, Vettar, Vennar and Kudamurutti.
- NH stands for National Highway. It connects major cities of India thereby becoming the backbone of Indian road network. It is maintained by the Government of India.
- SH stands for State highway. It connects different parts of the state and maintained by State government.
- Rowlatt Act (1919) was introduced by the British to curb the fundamental rights of the people.
- The people protested against the Rowlatt act at Jallianwala Bagh. They were attacked by the British and atleast thousand Indian people were killed.
- Golden temple in Amritsar also known as Harmandir Sahib is one of the most sacred temples of the sikh community.
- The Sikhs worship their sacred book, the Guru Granth Sahib.
- Gurudwaras have a langar, a community run kitchen, which provides vegetarian food to the pilgrims free of cost throughout the day.
- Vashist kund is one of the ancient villages in Manali.
- Hot springs are found in Vashisht kund and Manikaran. The water here becomes hot due to the geothermal energy that is generated under the earth.
- Pass is a route through which one can travel between the mountain ranges.
- Border Roads Organisation (BRO) – a part of Indian armed forces lay roads in high mountainous terrains, inorder to help the people to connect to the mainland.
- When laying roads are not possible in hills due to long stretches, tunnels are constructed.
- Tunnels are underground passageways dug through the mountainous terrains to provide passage for vehicles without breaking down the mountains fully.
- The longest road tunnel in India is the Dr.Syama Prasad Mukherjee tunnel in Jammu and Kashmir on NH44.





I. Fill in the blanks

1. Duns are valleys created between the _____ and _____ ranges of the Himalayas.
2. The Golden temple was rebuilt by _____
3. The ancient weapons used by the sikh warriors are kept in _____
4. BRO stands for _____
5. Hot spring occurs when the ground water is _____ heated.
6. The Rohtang tunnel or the Atal tunnel is on the _____ highway.

II. Name the following

1. The capital of Punjab.
2. The other name for Golden temple.
3. The Vashist Kund is located here.
4. The longest tunnel in India.
5. Two places where hot springs are found in India.

III. Match the following

- | | | |
|--------------|---|---------------------|
| a) Himachal | - | Abode of snow |
| b) Shivalik | - | Northern most range |
| c) Himadri | - | Hot spring |
| d) Himalayas | - | Middle range |
| e) Manikaran | - | Lowest range |

IV. Answer the Following

- 1) Compare National Highways with State Highways.
- 2) What is a) Langar b) Dun?
- 3) How are hot springs formed?
- 4) Describe a tunnel.
- 5) How does the BRO help the people in high mountain regions?
- 6) List the major rivers of Punjab and Thiruvaiyaru.



7) Identify the picture and answer the following questions:

- a. Name this holy place of the Sikhs.
- b. The city in which it is located
- c. The Holy book of Sikhs
- d. Where is the holy book kept during the day and in the night?



V. Activity Time

1. Write a letter to your friend describing a memorable bus/train/ship or air journey that you experienced recently.
2. Make an album of pictures on the place that you visited recently.
Give information on the a) climate b) famous tourist spots c) food
d) language e) transportation f) clothing of that place.
3. Do people always travel for pleasure? What are the other reasons for which people travel? Talk to someone who has travelled due to (a) transfer of job, (b) to seek medical help. Try to understand their experience.

VI. Life Skills and Values

1. List down few things that you should be careful about while travelling.
2. There are many beautiful tourist places in India. Many of these have historical monuments. Some mischievous people deface these. Since we learn our history from these monuments, it is our duty to protect them.
Being a responsible citizen, how would you contribute towards the care and upkeep of such places?
3. Mention any three fundamental rights as per the Indian constitution.

VII. Map Work

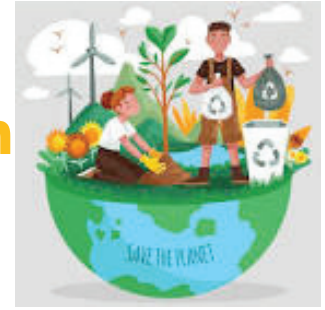
Mark the following places on the political map of India and their capital

1. Himachal Pradesh
2. the land of five rivers
3. State in southern India that has a town with 5 rivers.



12

Farming Practices & Forest Conservation



Expected Learning Outcomes



Students...

know India's rank in forest cover, the different layers of soil, the layer of soil on which plants grow, the four kinds of soil – places where they are found in India, and their nutritive value, three kinds of soil based on the size of particles and ability to hold water

know what is meant by deforestation, afforestation, plantation, crop rotation, soil erosion, soil conservation, irrigation, drip irrigation

understand the **importance of** forest cover, protecting the top layer of soil, drip irrigation, the **reason for** human-animal conflict, **what** the forest man of India did to improve forest cover, the **need for** crop rotation to improve soil fertility, **how** soil fertility can be protected, **why** plants grow only in top soil, the **different ways** of promoting soil conservation, the **role of** dams in bringing large area of land under cultivation

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



What do we plant?

What do we plant when we plant the tree?
We plant the ship, which will cross the sea.
We plant the mast to carry the sails;
We plant the planks to withstand the gales
The keel, the keelson, and the beam and knee;
We plant the ship when we plant the tree



What do we plant when we plant the tree?
 We plant the houses for you and me
 We plant the rafters, the shingles, the floors
 We plant the studding, the lath, the doors
 The beams, and siding, all parts that be;
 We plant the house when we plant the tree



What do we plant when we plant the tree?
 A thousand things that we daily see
 We plant the spire that out-towers the crag
 We plant the staff for our country's flag
 We plant the shade, from the hot sun free;
 We plant all these when we plant the tree



- Henry Abbey

Rahul was reading the news in one of the leading dailies which said that India ranks 10th in the world in forest cover, our forest area being 24.4% of land area. He skimmed through the news and understood that the nations that stood ahead of us in forest cover, were thinly populated than us. But he was wondering why forest cover was so important to make the headlines. Just then his **mami (mother's brother's wife in Assamese)** enters.

Rahul: Mami, I just now read in the newspaper that we stand 10th in the world in terms of forest cover. I understand from my reading of it that forests are very important to a nation. Please tell me why.

Mami: It's good that you want to know more on what you read casually. Shall we look at a few things that we get from the forests?

Rahul: We get honey, wood for furniture, ...not able to think of more.

Mami: Look around. You will see more, the paper that you are holding, rubber that we use for various purposes ...



Forest products





Which state has the largest forest cover in India?

Rahul: Oh... I did not know that.

Mami: Paper is made from wood pulp; the dyes of your clothes are also obtained from various trees and plants. Forests provide bamboo, gum, a few oils that are used in chocolates. It is the home to a variety of flora and fauna.

Rahul: But, we have always been using these products. Why are we suddenly worried about the forests?

Mami: Forests also help us to maintain the climatic conditions of a place. Trees release water vapour into the air by transpiration thus keeping the place cool. They hold the rain bearing clouds like how mountains do and help us get enough rainfall. They also help us maintain the fertility of the soil by preventing soil erosion. We are now trying to reduce global warming, to slow the pace of climate change. We also want to maintain soil



Tribes who live in forests

fertility so that the future generations continue to enjoy the bounty of nature. These thoughts have made the world look at forests in a different perspective, though we as a culture have always protected trees and lived in harmony with nature, before we faced invasions.

Rahul: Do people live in forests mami?

Mami: Yes. There are people for whom, forest is not only their home but is also a source of livelihood. They also depend on the forest environment for their celebrations, food and dress habits. Thus, we lose a culture when we destroy forests.

Rahul: Did we start destroying forests only recently mami?

Mami: No, as population increased, we needed more and more agricultural land to produce food. The British who ruled us for a long time encouraged the production of jute, cotton, sugar and indigo for their needs. Thus, the land available for food production decreased. They considered forest lands unproductive and cut down a lot of trees for various purposes indiscriminately, reducing the forest cover. Thus we lost forest and also the land for food production.

Rahul: That is sad.





Deforestation

Mami: The large scale cutting of trees to clear a forest area is called **deforestation**. When deforestation happens, it also affects the food chain in that place. When the forest cover is reduced, herbivores do not find enough food. So, large herbivores like elephants enter the nearby agricultural fields and destroy the crops. The farmers thus affected, tend to attack the animals.

When animals like deer and buffalo disappear from the forest, carnivores like tigers do not find food. Hence, they enter into the villages nearby and carry away cattle and children for food. Again, there is a conflict between man and animals because of an imbalance in the eco system.

Rahul: How are we going to resolve this?

Mami: Now we follow the practice of afforestation as a solution to this disturbance in the ecosystem.

Rahul: What is afforestation?

Mami: Afforestation is planting of different varieties of trees to reduce the effect of deforestation.



Elephants trampling agricultural land

Rahul: But, what can we do as individuals, to increase the forest cover?

Mami: The forest man of India Jadav Payeng single handedly raised a forest in the barren sand bar in Majuli Islands, that is in Assam. He has created a forest in which wildlife have become inhabitants.

Rahul: That's amazing mami. How big is the forest?

Mami: It is about 550 acres. He toils in it even today tending to the forest. Sometimes he loses his cattle to the carnivores living in the forest. However, he believes that the wildlife in the forest have a greater right over the forest area and feels that human beings should stop destroying the forest.

Rahul: What motivated him to grow a forest, mami?

Mami: On a hot summer day, he saw that numerous snakes that had crawled on the barren sand bar had lost their life due to the heat of the land. He was able to judge that the land had got heated up because it was barren, without any vegetation. This





led him to plant a few bamboo shoots. As these started growing, he decided to grow more and more trees to help the barren land rejuvenate into a forest.

Rahul: Did he grow only bamboo?

Mami: We need to remember Rahul that the forests have a wide variety of plants and animals. He grew a variety of trees, and plants and wildlife started thriving there.

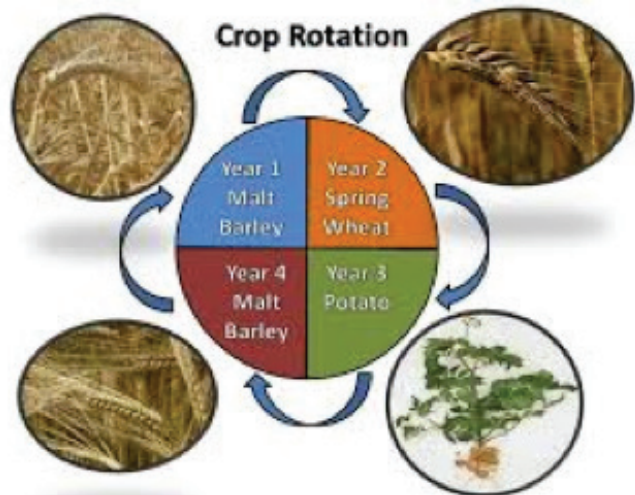
Many a times when we adopt the process of reforestation, we plant only one variety of plant. Such growing of one kind of plant is called a **plantation**. Plantation does not lead to the thriving of wide variety of plants and animals. We also tend to bring them down periodically, to get the yield that we desire. The soil also loses fertility when we grow the same crop again and again. This culture of plantations was also brought into by the British and has slowly changed our environment.

Rahul: Does it hold good for the crops that we grow in the agricultural field also?

Mami: Yes, it does. That is why farmers follow the system of crop rotation.

Rahul: What is crop rotation mami?

Mami: The practice of growing different crops in different seasons is called **crop rotation**. When we grow the same crop every other season, the same nutrient is utilised by the plants from the soil. As a result, the soil would lose fertility and become unfit for cultivation over a period of time. But growing different crops in succession results in improved soil health and optimizing nutrients in the soil.



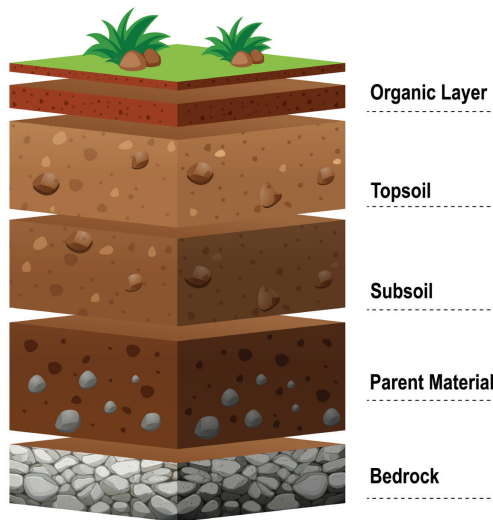
Rahul: Are there other ways by which we can protect soil fertility mami?

Mami: Yes Rahul. Sometimes farmers leave the land fallow.

Rahul: What do you mean when you say leaving it fallow?

Mami: Farmers do not cultivate any crop for a season in between so that the land is replenished of its nutrients. But leaving the land fallow for a long time can lead to soil erosion.





Rahul: What is soil erosion mami?

Mami: Before we understand soil erosion, let us look at the layers of soil. Soil has three layers, top soil, sub soil and the bed rock.

Plants have their roots fixed in the top soil. It is also the fertile layer of the soil. It is loose and allows plants to fix their roots. Top soil is a mixture of sand, silt, clay and humus. Humus is made up of dead plants and animals. It is dark brown or black in colour. The presence of humus in soil, makes it fertile.

Just below the top soil is the sub soil, which is made of small pieces of rocks. Plants do not grow on subsoil.

The bottom most layer of the soil is the bedrock, which consists of huge rocks. Plants do not grow on bedrock.

Rahul: So, plants grow only on top soil. The particles of top soil are light and loose and allow the roots of the plant to fix themselves.

Mami: True. So, when the land is left fallow or barren for a long time, wind and water can blow away or wash away the top soil as it is loose. This process is known as **soil erosion**.

Rahul: So, to prevent soil erosion, we must not let soil be barren or fallow for long.

Mami: Very correct. The process by which we prevent soil erosion is called **soil conservation**. To prevent soil erosion on the mountainous regions we follow **terrace farming**. The slopes of the hills are cut into steps, so that the speed of water is reduced while it flows down the slopes. Hence, top soil is not washed away, thus helping in soil conservation.



Terrace farming

Over grazing by cattle can also lead to soil erosion as plants do not grow on such land. So, it has to be prevented to avoid soil erosion.



Rahul: That is very interesting mami. I have a small kitchen garden, but I need to dig the soil on and off so as to make it loose. Otherwise, the soil becomes hard and when I water the plants, water stays on the surface and does not percolate into the soil.

Mami: That is a good observation, Rahul. There are different kinds of soil based on their particle size. Are you aware of what they are?

Rahul: I know there are different types in soil. But I don't know their names.

Mami: Let me tell you. Sandy soil is made of large particles. It does not hold water. Have you tried making the water stay on the soil that you get from the beach?

Rahul: Yes mami. The water does not stay. The particles of the soil are also larger than the other kinds of soil.

ACTIVITY

Name the two oldest trees in India.

Mami: True. Such soil does not have much of nutrients and is not fit for growing crops. Some vegetables can be grown in it but we need to add manure to the soil, at regular intervals to maintain the nutrients and help the plant grow well. The other kind of soil is the clayey soil.

Rahul: Is it the soil that potters use?

Mami: Correct. The particles of this soil are very small.

Rahul: It feels very smooth. Water stays in the soil for a very long time. I have seen this in my village. Do crops grow well in clayey soil, mami?

Mami: Rice and wheat need plenty of water and hence can grow well in clayey soil. But it can be very wet during the rainy season and can crack during summer.

The silt that is deposited by the rivers at their mouth is loose, rich in nutrients and an ideal soil to grow crops. Our country has a rich deposit of silt due to the rivers flowing in it. This soil being light and loosely packed can get eroded easily.

The loamy soil, which is a combination of sand, silt and clay is the best soil for cultivation. It holds water, is loose enough to allow the plants to fix their roots, allows circulation of air and also contains humus.

Humus is the decaying plant and animal wastes that add nutrient value to the soils.

Rahul: Thank you mami. But **dada (elder brother in Assamese)** was reading aloud about different kinds of soil. They did not have names like these. I remember only black and red soil.

Mami: What we discussed now are the different kinds of soil based on the size of their particles and their ability to hold water. But what you heard your brother studying about is kind of soil based on the places where they're found in India and the nutrient content of the soil. Soil found in our country can be classified broadly in four kinds, as



the alluvial soil, black soil, red soil and desert soil. Now look at the table to know their characteristics, places in India where such soil is found and crops grown on them.

| Soil type | Characteristics | Found in | Crops that grow well |
|---------------|--|--|--|
| Alluvial soil | Highly fertile, light, porous | Indo-Gangetic Plain- Uttar Pradesh, Punjab, Haryana, Bihar, West Bengal, Assam, some parts of Gujarat. | Rice, wheat, sugar cane, jute, oil seeds |
| Black soil | Rich in nutrients | Maharashtra, Gujarat, Karnataka, Madhya Pradesh | Cotton, wheat, groundnut |
| Red soil | Not as fertile as alluvial or black soil | Tamil Nadu, Karnataka, Orissa, Chattisgarh, Bihar | Ground nut, pulses, millet |
| Desert soil | Very low in nutrients | Rajasthan, Kutch in Gujarat, parts of Tamil Nadu | Bajra, jowar (if irrigation facilities are provided) |

Rahul: Mami, irrigation is providing water to the crops systematically. Am I correct?

Mami: Yes Rahul. Indian farmers practice a variety of irrigation techniques depending on the location of the field and the rainfall that is available in the place.

We have built dams across rivers so that the excess water that flows in these rivers in certain seasons can be stored and used for generation of electricity and irrigation.

The Hirakud dam across Mahanadi river, the Bhakra Nangal across Sutlej river, Nagarjuna Sagar Dam across Krishna river are a few dams that have helped us to bring large areas of land under cultivation.



Enrichment

What is a dam?

A dam is built across a river to hold flowing water. Dams prevent floods and also helps in irrigation, generation of hydroelectric power, and drinking water supply.



Hirakud dam



Bhakra Nangal dam

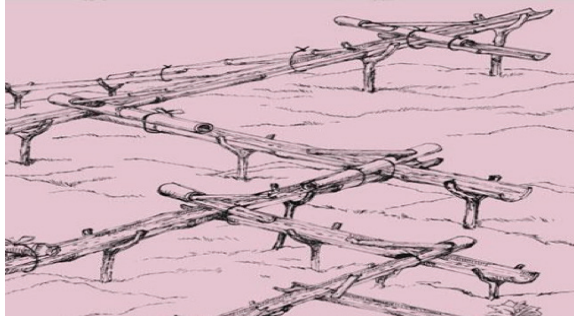


Nagarjuna Sagar dam



Drip irrigation is a process by which very small quantity of water is supplied to the plant, mainly to the roots, so that it can be absorbed and transported to other parts of the plant. This is especially useful in places where there is scarcity of water and also for plants that do not need a lot of water. This is a smart system which can reduce wastage of water.

There is evidence to say that this method of irrigation was followed in the North Eastern India for a long time. They used naturally available material like bamboo for creating such drips. Israel is following this method of irrigation on a large scale.



Drip Irrigation

Rahul: Mami, it was an eyeopener learning about the types of soil, their preservation, the crops grown in them and other interesting facts of farming.

Mami: You have also been an enthusiastic learner, Rahul. It was great sharing information with you.

Green Revolution in India

When India gained Independence from the British, we had to struggle a lot to reach food self-sufficiency. However, we stood together, put our head, heart and soul to work for the betterment of the country. We need to thank our fellow countrymen whose tireless and selfless efforts made it possible for us to hold our head high today. One such person is Dr.M.S Swaminathan who brought about the Green Revolution.



Dr.M.S.Swaminathan

Dr.M.S.Swaminathan contributed immensely to the Green Revolution in the 1960s. The primary goal of the program was to increase the production of crops. The key objectives were producing high yielding variety seeds, using chemical fertilizers and pesticides and improve irrigation facilities.

He worked on developing high yielding varieties of wheat and new varieties of rice that would yield a good harvest in response to usage of technology, fertilizers and pesticides.

However, he also warned that the Green Revolution could become Greed Revolution if not practised with caution. His warning has sadly come true as excessive usage of chemical fertilizers and pesticides has resulted in ruined health of farmers and consumers alike.

Dr. Swaminathan points out the need to move on to Evergreen Revolution from Green Revolution which, while feeding the increasing population will also stress upon maintaining the fertility of the soil, maximising crop yield and safeguard the health of the farmers and consumers through sustainable practices.



SUMMARY

- Forests are very important to a nation as we get honey, paper, rubber, dyes for clothes, oils, wood for furniture and many more products. It is the home to a variety of flora and fauna.
- Forests also help us to maintain the climatic conditions of a place. Trees release water vapour into the air by transpiration, hold rainbearing clouds to get rainfall and prevent soil erosion.
- There are people for whom, forest is not only their home but is also a source of livelihood.
- The large scale cutting of trees to clear a forest area is called deforestation and it affects the food chain causing imbalance in the ecosystem.
- Afforestation is planting of different varieties of trees to reduce the effect of deforestation.
- The forest man of India Jadav Payeng single handedly raised a 550 acre forest in the barren sand bar in Majuli Islands, in Assam.
- Growing of one kind of plant is called a plantation. The practice of growing different crops in different seasons is called crop rotation.
- Soil has three layers, top soil, sub soil and the bed rock. Top soil is a mixture of sand, silt, clay and humus and is fertile for plant growth. Subsoil is made of small rocks and bed rock contains huge rocks. Humus is made up of dead plants and animals.
- The process by which we prevent soil erosion is called soil conservation. Terrace farming prevents soil erosion in mountainous regions.
- There are different kinds of soil based on the particle size of the soil. Sandy soil is made of large particles and does not hold water. Clayey soil is made of very small particles and holds water for a long time. Loamy soil, is a combination of sand, silt and clay and is best for cultivation.
- Soil found in our country are of four kinds based on where they are found and the nutrients they contain. They are alluvial soil, black soil, red soil and desert soil.
- Dams are built across rivers so that the excess water that flows in them in certain seasons can be stored and used for generation of electricity and irrigation.
- The Hirakud dam across Mahanadi river, the Bhakra Nangal across Sutlej river, Nagarjuna Sagar Dam across Krishna river are a few dams that have helped us to bring large areas of land under cultivation.
- Drip irrigation is a process by which very small quantity of water is supplied to the plant, mainly to the roots and is useful in places with water scarcity.





I. Fill in the blanks.

1. Trees release water vapour into the air by the process of _____.
2. Paper is made from _____
3. Deforestation can affects the _____ of a place.
4. Conflict between man and animals is because of _____ in the eco system.
5. Growing of one kind of plant is called a _____
6. The decaying plant and animal wastes that add nutrient value to the soil are called _____.
7. Over grazing by cattle can also lead to _____
8. Plants have their roots fixed in the _____ soil.
9. A smart system which can reduce wastage of water is _____ irrigation.
10. Dams are constructed across rivers so that the excess water that flows in these rivers can be used for generation of _____

II. Name the following

1. The forest man of India.
2. The bottom most layer of the soil.
3. The process by which the fertile layer of soil is lost.
4. The popular method of irrigation followed in the North Eastern India.
5. The kind of soil used by potters.
6. Soil that is very low in nutrients
7. The practice of growing different crops in different seasons

III. Match the following

- | | |
|--------------------|-------------|
| 1. Majuli | Kaveri |
| 2. Hirakud | Sutlej |
| 3. Bhakra Nangal | Krishna |
| 4. Nagarjuna Sagar | Mahanadi |
| 5. Kallanai | Brahmaputra |



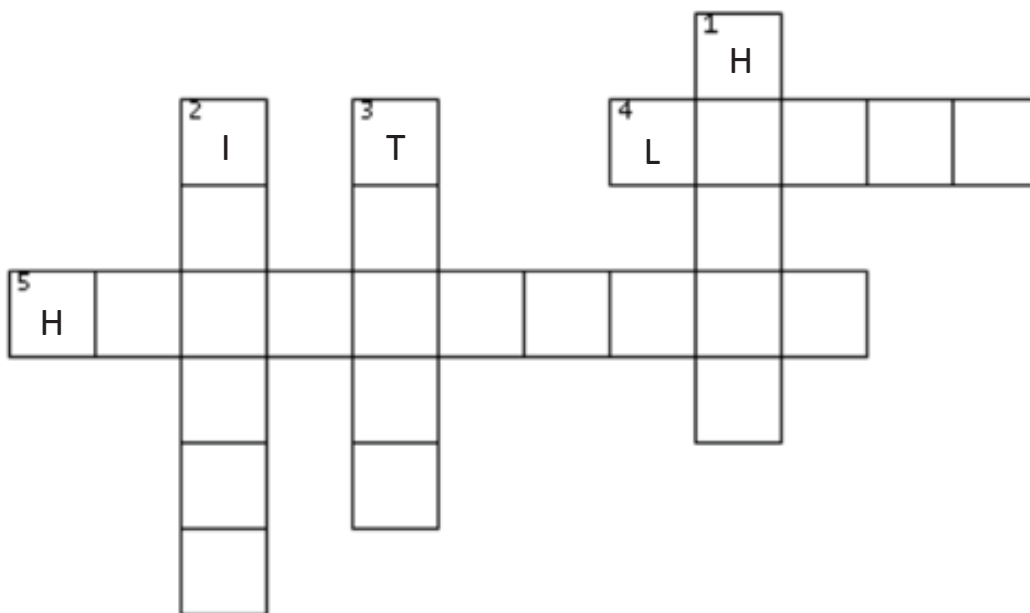
IV. Complete the table:

| Soil type | Characteristics | Crops that grow well |
|---------------|--|--|
| Alluvial soil | | Rice, wheat, sugar cane, jute, oil seeds |
| | Rich in nutrients | Cotton, wheat, groundnut |
| Red soil | Not as fertile as alluvial or black soil | |
| Desert soil | | |

V. Answer the following:

1. Name the three layers of soil.
2. How can we prevent soil erosion?
3. Forests are important to us. Give reasons.
4. Distinguish between afforestation and deforestation.
5. What are the impacts of deforestation on the environment?
6. What is crop rotation? Why is it important?
7. List the different kinds of soil found in India. Also name the states where each one is found.

VI. Puzzle:



ACROSS

4. The soil that has both sand and silt.
5. Animals that eat only plants.

DOWN

1. A forest product.
2. The country which follows the method of drip irrigation on a large scale.
3. A group of people who live together in a forest sharing the same culture and language.

VII. Mapwork:

- A. Mark on the political map of India, two states where the following are found. Name them.
 1. Alluvial soil
 2. Black soil
 3. Red soil
 4. Desert soil
- B. Mark the following on the map of India - Rivers.
 1. River Sutlej
 2. River Mahanadi
 3. River Krishna

VIII. Proposed activity:

1. Collect pictures of a few forest products (finished or unfinished) and paste it in your scrapbook.
2. Prepare a model of
 - (a) Layers of soil
 - (b) Terrace farming.
3. Gather a few samples of different types of soil in and around your area. Assess their ability to hold water by formulating a suitable experiment:

Hint: Take containers of almost the same dimension. Take different kinds of soil in each of the containers, to the same level. Add an equal quantity of water to each of these containers.

Observe the level of water in the containers. The container which has no stagnated water on top of the soil within the shortest time has the soil that absorbs water the most.





Ponder

निर्वनो वध्यते व्याघ्रो निर्व्याघ्रं छिद्यते वनम् ।

तस्माद्वाघ्रो वनं रक्षेद्वनं व्याघ्रं च पालयेत् ॥ (Mahabharata 5.29.48)

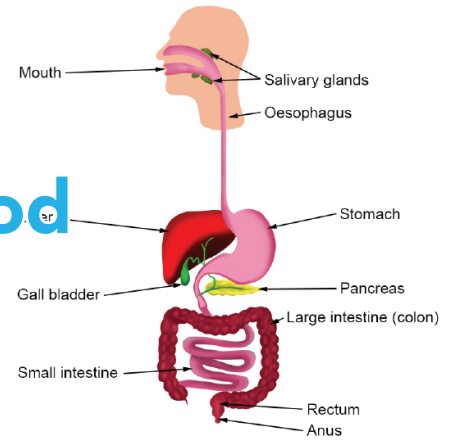
nirvanō vadhyatē vyāghrō nirvyāghram chidyatē vanam
tasmādvyaāghrō vanam rakṣēdvanam vyāghram ca pālayēt.

The tiger dies without the forest, and similarly the forest is cut down without the tiger. Hence the tiger and the forest protect each other



13

DIGESTION – The Journey of Food



Expected Learning Outcomes

Students...

know humans have four types of teeth, birds have beaks instead of teeth, the organs of the digestive system and the excretory system

know about milk teeth and permanent teeth, cud chewing

know how to maintain oral hygiene, a woodpecker uses its beak to make its home, a swallow gathers its food

understand the **functions of** incisors, canines, premolars and molars, the excretory system, **the need for** oral hygiene, **the harm caused** by soft drinks to our teeth, the relation between the size and shape of bird's beak and the structure of teeth in animals to the food they eat, **how** herbivores and carnivores digest their food, the process of digestion in human beings and the organs involved in each of it



Who am I?

- I'm colourful
I can fly.
But I'm not a kite.
I can talk,
I like fruits
But I'm not a human being
- I can jump,
I can swim,
I swing from tree to tree
And I make a house much
Bigger than myself.
- I'm a bird, but I cannot fly
I eat fish but I can live on land.
I'm black and white
My home is white.
- I live on land and in sea,
Yet I can neither walk nor swim.
I travel by foot, but I have no toes.
I'm never away from my home.
- I hang upside down,
And I eat fruits.
I see with my ears
And don't use my eyes.



Sunita, Sweta and Preeti are in class I, IV and VIII, respectively. Sunita has a loose tooth and is waiting for it to fall. She is also worried that there might be a big gap between her front teeth, that would show up when she smiles, till her new tooth erupts. Her sisters Preeti and Sweta are amused at her worries and try to reassure her. Let us also listen to them to know more about our teeth.

Sunita: Didi (sister in Hindi). This tooth that is shaky is very painful too. I am so unhappy that I would also look different if it falls off.

Preeti: It indicates that you are growing up Sunita. The first set of teeth that we have, generally falls off one by one and is replaced by another set of teeth. The new set of teeth that we get are called the **permanent teeth**.

Sunita: Permanent teeth! Do we have them with us always?

Preeti: Yes, the set of teeth that replaces our milk teeth would be with us, for our life time, if we take care of them properly. If for some reason, we lose them we do not get a third set of teeth.

Sweta: Oh... then what is the first set that we have called didi?

Preeti: They are our milk teeth. Do you know that we have 20 milk teeth?

Sweta: So all the 20 are replaced by a new set of teeth?

Preeti: Yes. The permanent teeth are 32 in number, we also get teeth that are larger than the milk teeth. As we grow our jaw size increases to accommodate more and larger teeth.

Sweta: It is interesting to know that the teeth that we get would be larger than our milk teeth. May be that is why the space in the mouth looks larger than the teeth, that has fallen.

Preeti: True Sweta. Have you seen that the front teeth in either the top line or the bottom line fall off first?

Sweta: Yes didi. I have seen that happen for my friends also.

Preeti: The set of teeth in the front are called the incisors. They help us to bite our food. We bite into an apple or a mango using our incisors.

Sweta: How many incisors do we have didi?

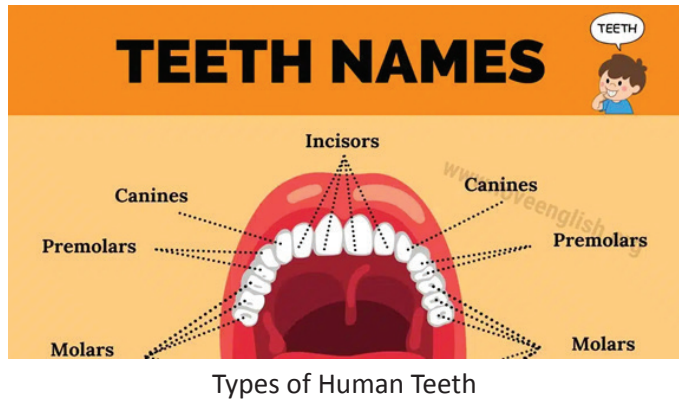
Preeti: Our upper and lower jaws have 4 incisors each.



Sweta: What are the other kinds of teeth that we have?

Preeti: We have two canines, one on either side of the incisors. They are the two sharp teeth that you see adjacent to your incisors.

Sweta: (Looks at herself in the mirror) Yes didi. It looks like the teeth that I see in dogs and cats also.



Preeti: True Sweta. They are sharp and help us to tear the food. When we have to eat something like sugarcane we use our canines.

Sweta: Then after canines?

Preeti: Next to the canines, we have the premolars followed by molars. We have 4 premolars and 6 molars. They are broad and help us to chew our food well.

Sweta: That is quite interesting didi.

Preeti: Last week a dentist visited our school and told us about the importance of oral hygiene. I will share a few points with you.

We need to brush our teeth twice a day, once in the morning and at night before going to bed. We have to gargle our mouth after every meal to ensure that food particles do not remain between our teeth.

Sweta: What would happen if food particles remain between our teeth didi?

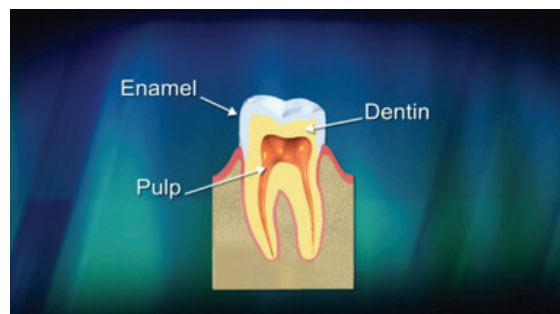
Preeti: Microorganisms, especially bacteria grow well if we have food particles between our teeth. They form the plaque. Bacteria in the plaque produces certain acidic substances that can lead to cavities. This is what we call tooth decay. This is not only painful, but it can also lead to loss of teeth.

Sunita: We need not worry if our milk teeth have cavities, except that it is going to be painful.

Preeti: No Sunita. Cavities in the milk tooth can also harm the permanent tooth that erupts in that part. So it is important to maintain dental hygiene always.

Sweta: That is something I need to learn then. What are the other ways to care for our teeth didi?

Preeti: We need to avoid foods that contain lots of sugar. Bottled drinks contain a large quantity of sugar. Our teeth have an outer layer called



Structure of human tooth



the **teeth enamel**. This is the hardest part of our body. The components of soft drinks can dissolve the teeth enamel and expose the inner part of our teeth the same way the colonies of bacteria affect them. This condition can be very painful. It can lead to other problems too, if neglected.

We need to brush our teeth, but at the same time, if we brush it too hard our enamel might be lost. We have to brush our teeth gently giving a circular motion using a soft brush and tooth paste that is made of natural substances.

Ponder
Do cats and dogs lose baby teeth like the way humans do?

Eating of raw food like carrots, apples, guava also helps us to keep our teeth clean and also healthy.

Sweta: Do birds have teeth didi?

Preeti: No birds do not have teeth. They have beaks. The shape and size of the beak are in accordance with the food that they eat.

Birds like sparrows, pigeons and peacocks have short, hard and pointed beaks for crushing grains and seeds.



Sparrow



Peacock

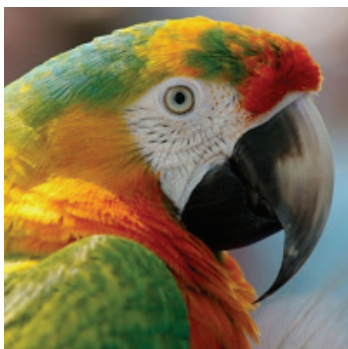


Pigeon

Sweta: I have seen that parrots have curved beaks.

Preeti: Birds like parrots and macaws have hard curved beaks to help them crack open the nuts and fruits.

The beaks of eagles are sharp, strong and hooked. This helps them to tear the flesh of their prey, as other birds and small animals are their food. The strong beak also helps them to carry their prey to a different location or to their nest.



Macaw



Parrot



Eagle



Sweta: Yesterday, I saw a wood pecker in our school. It was trying to chisel the bark of the tree.

Preeti: Wood peckers have beaks whose tip is like that of a chisel. This helps the bird to drill holes into the bark of trees, to make a hole to live and also to catch insects which are their food.



Woodpecker

Sweta: I have seen other birds too carry the material they need to make a nest using their beak. They also use their beak to preen themselves and to feed their young ones.

Preeti: I saw in one of the edutainment programmes yesterday that swallows go round and round in the air with their mouth open to get their food.

Sweta: That is funny. Why do they do that?

Preeti: Their mouth is sticky on the inside. When they move around with their mouth open, insects stick to their mouth and they get their food.

Sweta: Animals also eat different kinds of food. Do they also have different kinds of teeth didi?



Enrichment

Preening is cleaning, maintaining, and arranging of feathers by birds.

Preeti: Yes Sweta. Do you remember, when we went to the Goshala, we saw cows chewing their food at leisure?

Sweta: Yes didi. Pitaji (father in Hindi) also said that they were chewing something. I don't remember what.

Preeti: It is cud chewing Sweta. The herbivores, those that eat only plants, have broad flat and sharp front teeth. They bite their food with them and swallow it. They then bring the swallowed food to their mouth and chew the food slowly after finding a safe place so that the food becomes fit for digestion. This is called **cud chewing**.

Sweta: Why is it so didi?

Preeti: May be because, they are always under the threat of being attacked by predators like lions and tigers in the forests, or by human beings when they enter our fields. They just gobble up their food and when they find a safe place, they ruminate or cud chew, by bringing back the food to their mouth.

Sweta: Then do lions and tigers have different kind of teeth didi?

Preeti: Carnivores like lions and tigers have sharp, pointed and long teeth to catch hold of their prey and tear the flesh. They also have strong sharp claws which helps them in tearing their prey and to hold them.



The teeth of omnivores are wide and somewhat chisel shaped to help them bite into chunks of meat. They have broad molars to help them grind food obtained from plants, too.



Sweta: That was interesting didi. I want to go out to play. After I come back, I would like to know whether they have different kinds of stomach too.

Preeti: Can we all play together? Let us discuss what you want to know during our bed time.

After dinner, Sweta and Preeti decide to read a book to find out more about what happens to the food that enters the body of an animal and a human. Let us also look into what they are reading.

Herbivores

Herbivores need a longer time to digest the plant based food. Hence their stomach is larger to store the food for that length of time.

Carnivores

Carnivorous animals on the other hand have smaller stomachs as they do not retain their food in the stomach for long. They have a simpler digestive system compared to herbivores.

Omnivores

Omnivores have a stomach with one or two chambers. Their digestive tract is designed to digest the varieties of food that they eat.

Digestion in Human Beings.

Food undergoes the following processes in the body.

1. Ingestion: The process of taking in food by swallowing.
2. Digestion: The process by which the food taken in is broken down into simpler substances that can be absorbed by the body.



3. Absorption: The process by which the digested food is made available as nutrients to the body.
4. Assimilation: The process by which the nutrients are utilized by the body.
5. Egestion: The process by which undigested food is excreted from our body.

The group of organs that bring about the above process form the digestive system. Now let us look at how the above processes take place in our body.

Mouth

Food enters our body through our mouth. It is also called the buccal cavity. Our teeth help us to grind our food well. The tongue helps us to taste the food and also to move the food to different parts of the mouth to help us chew the food well.

Digestion of food begins in the mouth, when food mixes with saliva. Carbohydrates present in our food starts breaking down in the mouth.

When we swallow our food, the food travels to the next part of our digestive system.

Oesophagus or food pipe

Food that is swallowed enters the oesophagus. Our brain signals the muscles of the oesophagus about the presence of something that can be sent into our body. Then the muscles of the oesophagus contract and relax and help the food reach the stomach. The movement of food from here is automatic, i.e., it happens without our active participation in the process. Our brain also senses what passes through the oesophagus and tries to stop if it finds the substance to be harmful.

Stomach

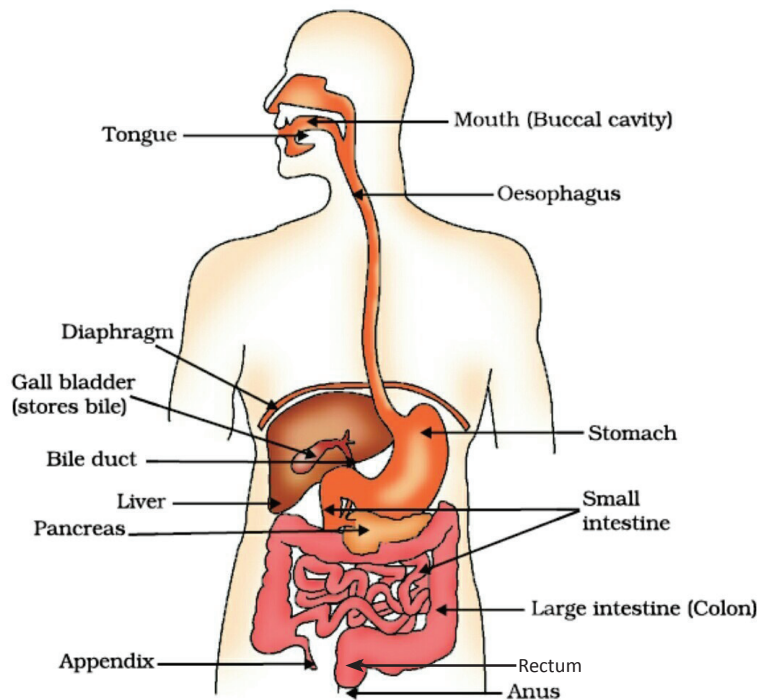
Food enters the food bag called the stomach from the oesophagus. It is interesting to note that stomach is an extremely acidic region. The acidic environment can be tolerated only in the stomach. It can cause harm, even if the acid reaches the oesophagus. The acid here helps in digestion of food and also for killing the microorganisms that might otherwise harm us.

The food gets mixed with the digestive juices and the digestion of protein begins. The partly digested food enters the small intestine from here. This movement is involuntary i.e., it is not under our control.

Small intestine

The small intestine is a narrow and long organ that is folded many times and it is here digestion of food is completed. It is the longest section of the gastrointestinal tract. It also helps in absorption of nutrients by our body. Digestive juices made by the pancreas, liver, and intestines help to break the food into simpler substances so that they can be absorbed by the body. The small intestine has small finger like organs called villi that help in absorption of nutrients.





Human digestive system

Large intestine

The undigested food is pushed from the small intestine to the large intestine. The large intestine is wider and shorter than the small intestine. Most of the remaining water is absorbed here. No digestion takes place in the large intestine.

Pancreas and Liver

The pancreas and liver provide the stomach and the small intestine with digestive juices and enzymes that help in digestion and absorption of nutrients. The gall bladder stores the bile secreted by the liver and releases it when it is required for the digestion of fats.

Rectum

The end of the large intestine is called the rectum. The undigested food is stored here and pushed out through the anus as faeces.

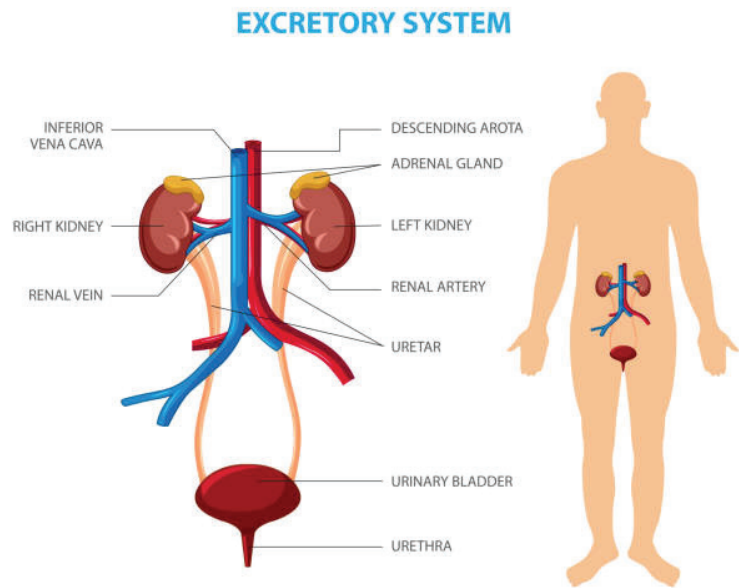
Sweta and Preeti are happy after reading the book, as they are now aware of what was happening to the food that they were eating. As they flip through the pages, they also see another picture and get curious to read that also.

Preeti: This looks like the excretory system that our teacher taught us yesterday. Shall we read that Sweta?

Sweta: Yes, we can.



Our body releases energy from the food we eat. Wastes are also released during the process. For example, skin releases sweat. Sweat contains water and salts dissolved in it. When we breathe, we also release carbon dioxide which is a waste released by our respiratory system. You just now read that the undigested food is released in the form of faeces from our body. Our body also releases, the excess water, other salts that are produced during various processes in the body in the form of urine.



The organs involved in this system called the **excretory system** are, kidneys, ureters, urinary bladder and urethra.

Kidneys are a pair of bean shaped organs that are placed just below the rib cage. They are placed one on each side of the spine. The kidneys have a number of units called the nephrons, which act like filters in our body. They filter the wastes from our body and produce urine.

The urine that is produced passes through the ureter into the urinary bladder.

The urinary bladder is a bag like organ in which urine is stored. Once the bladder is full, the nerve endings there send messages to the brain. We receive a sensation to empty the bladder or in other words to pass urine. We are able to control this urge due to the strong muscles in the pelvic region.

When we visit the rest room, the urine collected in the urinary bladder, passes out of our body through the urethra.

If we allow the urine to stay in the urinary bladder for long, we may suffer a urinary infection.

It is always good to visit the rest room to empty out the bladder or the rectum, when we have the urge to do it, without delaying much.

Sweta: Didi, the way you read out the book was very comfortable for me to understand without disturbing the flow.

Preeti: I'm glad you too enjoyed our reading together just as I did. I think now it is time for us to go to bed.



SUMMARY

- Milk teeth are the initial set of teeth that develop throughout childhood and fall out and are replaced by permanent teeth.
- Human teeth include incisors, canines, premolars, and molars. Children will usually get all of their 20 primary teeth by around the age of 3. By around the age of 20, most people will get 32 permanent teeth.
- Plaque is formed from leftover food particles in between our teeth and saliva that mix in our mouth. Plaque contains bacteria, which can lead to cavities.
- Teeth enamel is the hardest part of our body. However, excess intake of soft drinks and sugary food can dissolve the teeth enamel.
- Different birds have different types of beaks. The shapes and size of the beak are in accordance with the food they eat. They can be short, pointed, curved, sharp, hooked or chiseled.
- Animals have different types of teeth. Herbivores have broad flat and sharp front teeth, whereas carnivores have sharp pointed long teeth and omnivores have wide and chisel shaped teeth.
- The digestive system of herbivores, carnivores and omnivores are different to suit their food habits.
- In human beings, food undergoes processes such as Ingestion, Digestion, Absorption, Assimilation and Egestion.
- The group of organs that bring about the digestion process form the Digestive system. It includes the mouth, oesophagus, stomach, small intestine, large intestine, pancreas, liver and rectum.
- Our body processes whatever food and water we take in and releases waste in the form of faeces, urine and sweat.
- The organs involved in excretion are the kidneys, ureters, urinary bladder and urethra.



I. Fill in the Blanks

1. The first set of teeth that we have are called _____
2. The permanent teeth are _____ in number.
3. The set of teeth in the front are called the _____
4. Our teeth have an outer layer called the _____
5. Wood peckers have beaks whose tip is like that of a _____



6. Cows chewing their food at leisure is called _____
7. _____ have a stomach with one or two chambers.
8. Digestion of food begins in the mouth, when food mixes with _____

II. Name the following

1. The new set of teeth that we get.
2. Sharp teeth that are adjacent to incisors.
3. The hardest part of our body.
4. Food bag in our digestive system.
5. The longest section of the gastrointestinal tract.
6. The organ that stores bile.
7. Pair of bean shaped organ that aids in the filtration of waste from our body.
8. Sweat is released through this part of our body.

III. Who am I ?

1. I am a bird with a sharp beak that can drill holes into the bark of a tree.
2. I open my mouth and fly so that insects stick to my mouth.
3. I have larger stomach to store the food for a longer time.
4. I am also called as buccal cavity.
5. No digestion takes place in me, but I am also an intestine.

IV. Match the following

| | |
|--------------|---|
| Ingestion | The process by which the food taken in is broken down into simpler substances that can be absorbed by the body. |
| Assimilation | The process by which undigested food is excreted from our body. |
| Absorption | The process by which the digested food is made available as nutrients to the body |
| Egestion | The process by which the nutrients are utilized by the body. |
| Digestion | The process of taking in food by swallowing. |



V. Answer the following

1. How many types of teeth do adult human beings have? Write their functions.
2. What kind of food should we eat to keep our teeth healthy?
3. Birds have beaks of different shapes and sizes. Why?
4. Cows and goats have broad, flat and sharp front teeth. Why?
5. List the organs that aid in digestion along with their functions.
6. How do kidneys help us?
7. What is the function of urinary bladder?
8. Write a short note on the wastes produced by our body.

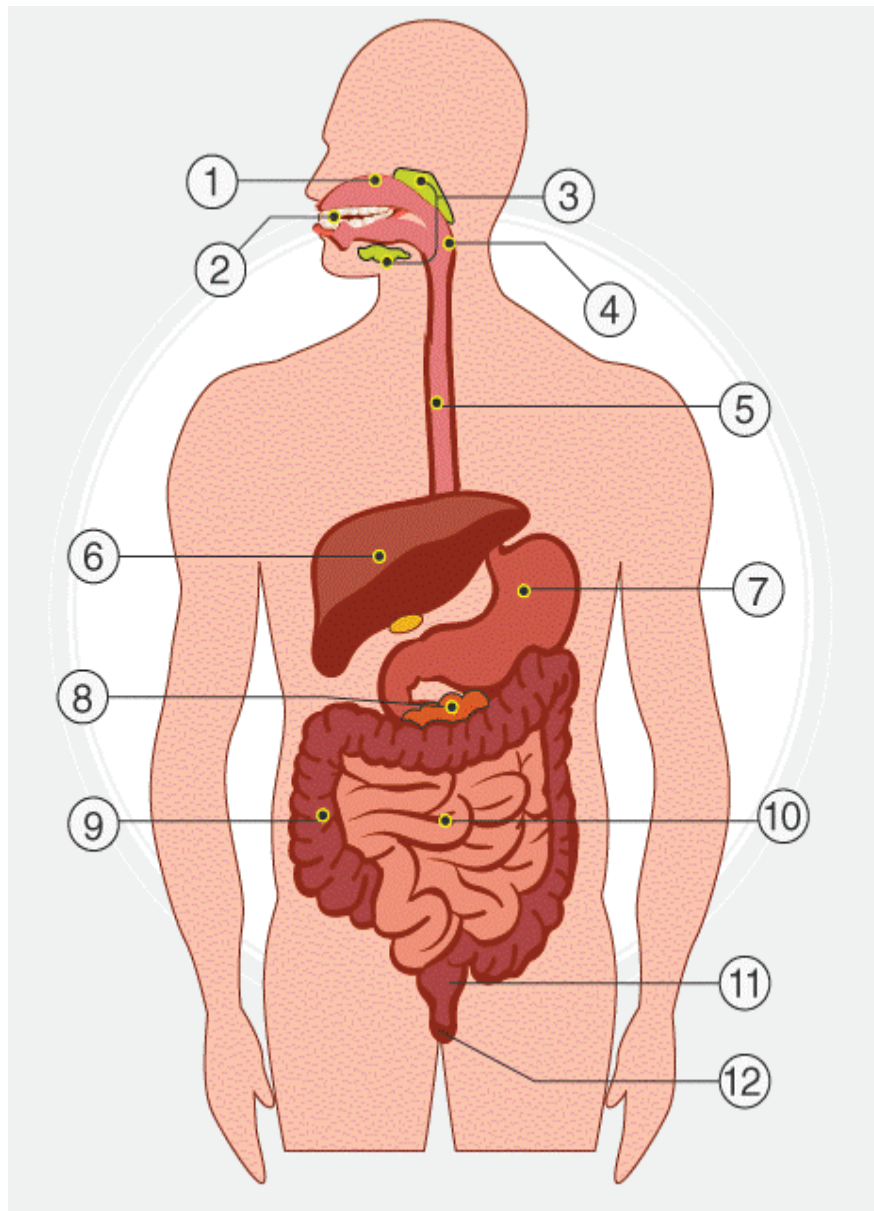
VI. Activity A.

- (i) Observe what you consume on any one day from when you wake up till you go to bed.
- (ii) Classify what you consume as that which you (a) drink (b) eat.
- (iii) Amongst what you eat identify the ones in which you use
 - (a) Only the premolars and molars
 - (b) The canines and the molars
 - (c) The incisors and molars
- (iv) Were you able to eat anything without using your premolars/molars? List them.
- (v) Why is maintenance of oral hygiene important?

Activity B: Make a clay model of the different types of teeth.



Activity C: Label the parts marked in the digestive system



14

FESTIVALS – A Celebration of Diversity



Expected Learning Outcomes

Students...

know the festivals of various religions in India, when the period of lent is observed, that various religions follow various calendars, the teachings of Mahavira and Gautama Buddha, the beliefs behind celebrating diwali in North and South India

know how Dusshera is celebrated differently in different parts of India

know about the importance of adopting vegetarianism

understand the structure of the Islamic calendar, **why** natural materials are used to make idols of Gods and Goddesses during festival celebrations

understand the significance of few religious festivals and the customs and practices followed during such festivals, fasting during Ramzan and Muharram, the sacred thread worn by Hindus .

appreciate how festival celebrations pave way to inculcate human values, instill devotion towards Almighty, promote brotherhood and culture and pay respects to those who have suffered for the cause of humanity



Krishna Jayanthi



Karthigai Deepam





Dree festival-the harvest festival of Arunachal Pradesh



Horn bill festival-Nagaland

Bharat-Festivals

Jubilation was in the air as the school's annual day was fast approaching. It is generally celebrated in the last week of January.

Students were in their class but their ears and mind was on the preparations that were going on in the campus for the spectacular cultural event that will be part of the school annual day. It would generally be a thematic display of carefully chosen concepts which would enhance the students' awareness on social issues and moral values.

Acharya enters the class.

Acharya: Namaste students. I am well aware that you are all excited about our school annual day. So to make today's class interesting, I have decided to have you exhibit your knowledge on the various festivals that are celebrated in our country.

So diverse is our culture it's indeed very interesting to talk about our festivals. As we are in the beginning of the calendar year we can start with the festivals that are celebrated henceforth, month wise. We will go clockwise beginning with Kishore.

Kishore: Namaste acharya. Thank you. Shall I start with Mahavir Jayanti?

Acharya: Kindly go ahead.

Kishore: Mahavir Jayanti falls on the 13th day of the month of Chaitra. It was on this day that Mahavir, the founder of Jain religion was born in 599 BC. But there are other years also mentioned by some historians.

Acharya: When does it fall in the Gregorian calendar Kishore?



Mahavir Jayanti



Kishore: The month of Chaitra begins the day following the full moon day in the month of March-April. It is roughly between 14th March and 15th April. We visit the temple, participate in prayer, have a procession of the idol of Swami Mahavir and have satvik food.

Acharya: You have begun from April, that's fine. Can you elaborate on the teachings of Mahavira?

Kishore: He led by example. He encouraged all to follow the principle of ahimsa, satya, asteya (non-stealing), self-control and aparigraha (non-attachment).

Acharya: Children, I hope all of you have made a note of what Kishore said. Mahavir Jayanti is generally in March-April. Make a note of that too. We shall move on to the next student. Shanti, can you share your thoughts now.

Shanti: Namaste all. Thank you, acharya. Shall I also start with something in March-April?

Acharya: Go ahead.

Shanti: Easter is one of the most important festivals celebrated by Christians in the month of either March or April.

Acharya sees a hand go up among the audience.

Acharya: I appreciate you waiting for your turn to raise a point. You may speak now.

Student: Akka says that it is a Christian festival. I know of Christmas and it falls every year on 25th December. Why does the date of Easter vary?

Acharya: Shanti, can you clarify?

Shanti: I am not very sure acharya. I have to look up.

Peter puts up his hand

Acharya: Go ahead Peter.

Peter: March 21st is spring equinox. The first Sunday after the full moon, after the spring equinox is celebrated as Easter. The Friday preceding Easter is observed as Good Friday.

Shanti: Thank you Peter. Acharya, may I request Peter to continue with the way it is celebrated.

Acharya: Peter, you can continue if you are comfortable.

Peter: It is always a pleasure to talk about celebrations. Easter has two parts. We fast for about 40 days prior to Good Friday. This is called the period of lent. During this period, we do not have celebrations, we eat satvik food. We also repent for the sins that we have committed.





Special prayers in Church

On Good Friday, many of us observe a day of fasting as it was on that day that Jesus Christ was crucified. There are special prayers in Churches in which we participate. We believe that the Lord resurrected on Sunday, that follows the Good Friday. It is celebrated as Easter. There are special prayers and we have a feast on Easter.

Shanti: Thank you Peter.

Acharya: Thank you. Is there anything else that you would like to add Peter?

Peter: Acharya, our feast generally includes non-vegetarian food too. But, after a lot of deliberation on issues like more resources being used up to produce such food and such food not bringing us great health benefits and also looking at it as lack of compassion towards living beings our family has started moving towards vegetarianism. In fact, as an individual, that gives me a lot of mental peace. When I see animals being happy and emotionally attached to their young ones, I don't feel guilty that I am destroying their peace.

Acharya: I appreciate you sharing that with us Peter. Who would like to speak next?

Vani: (raises her hand to speak) Can I acharya?

Acharya: Yes Vani.

Vani: In March-April, we celebrate Ugadi, Baisakhi, Bihu, Vishu and also the Tamil new year. We welcome the new year with festivities and hope that the new year would bring in all prosperity.

Preeta: May I acharya?

Acharya: Continue Preeta.

Preeta: Thank you acharya. Vaisaki Purnima, that is the full moon that falls in the month of April-May, is celebrated as Buddha Purnima. Gautama Buddha born as Prince Siddhartha, on that day, attained enlightenment and showed the path of Dharma. He also encouraged people to follow the path of dharma, that includes practicing compassion, tolerance and ahimsa.



Buddha Purnima



Gautama Buddha attained enlightenment under a bodhi tree at Gaya in the present-day Bihar. Hence Buddha Purnima is celebrated in a grand manner in Gaya. People from other countries like Japan, Sri Lanka and Indonesia, where there are a lot of Buddhists, gather here to offer special prayers.

Acharya: I see a hand up among the audience. You may raise your point.

Student: Acharya, apart from the luni-solar calendar and the Gregorian calendar, is there any other calendar that is followed in our country, Bharat?

Acharya: We have a significant population in our country following Islam. They follow the Hijri calendar. We can look at their festivals too.

Shamim: May I acharya?

Acharya: Carry on Shamim.

Shamim: We the muslims follow the Hijri calendar that has 11 days less than the Gregorian calendar. We have our calendar based on the sighting of the crescent moon, the third night, after the new moon. All Islamic festivals are according to Hijri calendar. The calendar is such that we celebrate all the festivals in almost all the seasons in a span of 30 years. So, the festivals fall on different months of the Gregorian calendar in different years.

The most important festival is the Ramadan. Celebrations begin in the month of Ramadan, with the sighting of the crescent moon and ends with the sighting of the next crescent moon after the new moon day.

Fasting from sunrise to sunset is the hall mark of this festival. But we are permitted to eat before sunrise and after sunset. This is also a period of intense prayer and charity. The period of fasting for a month culminates into a celebration with family, friends, special prayers and a special feast.

Though there is no restriction on the food we eat even during the days of fasting some of us, like our family, have decided to be vegetarians, to avoid cruelty to animals.

Acharya: That is a good gesture. Can you tell us more about the other important festivals that Muslims celebrate?

Shamim: Bakrid and Muharram are also important. Bakrid, is to remember Ibrahim's



Ramadan



Bakrid



sacrifice with complete devotion. It marks the end of the annual Haj pilgrimage to Mecca in Saudi Arabia.



Muharram

Muharram is the first month of the Hijri calendar. The 10th day of Muharram is observed by the Shia Muslims to mourn Hussein's death. Hussein was the grandson of Prophet Mohammed. On this day, a section of Muslims inflict self-harm. The period from 1st to 10th of Muharram is also a period of fasting, which is as important as the fasting during Ramadan, which is observed by almost all Muslims.

Acharya: Thank you Shamim. That was a good insight to all of us. May I know who the next speaker is going to be?

Vishal: Acharya, May I speak about Upakarma?

Acharya: Go ahead Vishal.

Vishal: Hindus celebrate a number of festivals like Vinayaka Chaturthi, Janmashtami, Varalakshmi Viratam, Yajur Upakarma in the month of July-August.

Amongst all of these, I would like to speak on Yajur Upakarma.

It is on this day, we change our sacred thread, and reiterate our commitment towards our parents and ancestors, our teachers and the Almighty.



Yajur Upakarma

In the earlier days, it was an important ceremony for both genders and all sections of the society. However, social, political and historic challenges that we faced changed this and so it is now observed only by men and also only by a small segment of the population.

The day following Yajur Upakarma is a day for chanting the powerful Gayatri

Mantra, especially in the southern part of Bharat.

In the northern part of the country, this day is also celebrated as Raksha Bandhan. Sisters express their affection by tying rakhi on their brother's wrist who in turn pledge



Enrichment

The three strands of the sacred thread denote Devarunam, Acharyarunam, and Pitrunam that is fulfilling one's obligation towards God, teachers and parents.



to protect them. This ritual however, came into vogue as recently as a thousand to two thousand years ago, when we were invaded and the foreign rulers did not allow the women of our country to live in peace.

Acharya: That was great, Vishal. Who would like to be the next speaker?

Roopa: I would like to speak about Dussehra Acharya.

Acharya: Go ahead Roopa.

Roopa: Dussehra is a ten-day long festival celebrated with much devotion and splendour all over our country. In the state of Karnataka, it is celebrated as the victory of Goddess Chamundeeswari over Mahishasura, the buffalo headed demon. The Mysuru palace, is decorated in all gaiety and splendor. There is a grand procession of the idol of the Goddess, in which multitude of



Dussehra in Mysuru



Navarathiri Golu

men and women participate. In fact, people from all over the world throng Mysuru to witness the grand occasion.

Malini: In Tamil Nadu, it is celebrated for 10 days. The first three days people worship Goddess Durga, the symbol of valour, the next three days are dedicated to worship Goddess Lakshmi, the symbol of wealth, the last three days are for the

worship of Goddess Saraswati, the symbol of wisdom. The tenth day culminates as Vijayadashami, which is celebration of victory of the good over evil. It is a symbolic festival to celebrate womanhood and appreciate the innate strength of women. Women take special interest during this festival to show case their culinary expertise, artistic talents and hospitality.



QR code for Sundal recipe

There is a grand display of dolls (golu) in some homes during the festive period. The home is decorated with grandeur. Nutritious sundal (a dish made from whole gram) is made and distributed to all who visit the golu. Women also exchange gifts on this occasion.



The ninth day of the festival is celebrated as “Ayudha Pooja”. It is considered the best time to express our gratitude to the tools and machines that help us make a living. The tools and machines are cleaned well, and so are the work place or the office. People offer their prayers to the tools, that they use irrespective of what it is. I have seen my mother who is a teacher, place her books and pens for pooja. She believes that this practice would bring good luck to her and her students. My cousin who is an artist, places his palette, brush and other tools.

‘Vijaya’ means victory. It is believed that anything that is begun on the day of Vijayadashami, the culminating festival of Dussehra will result in success. Children are admitted to schools, to begin their years of schooling, new businesses start functioning and children are also initiated to learn fine arts. We spend sometime reading, singing, painting or anything that we do regularly to hone our skills at it, on that day.

Riya: Acharya, may I speak about how it is celebrated in the north, especially in Delhi?

Acharya: Waiting to listen Riya.

Riya: In Delhi also, it is a ten-day festival.

The city is decorated, lighted up and people enjoy the festivities. Dandia dance is performed in many places with fervor and spirit.

The best comes on the last day of the festival the Ravan dahan or the burning of the effigy of Ravana, a demon in the epic “Ramayana”. Effigies of Ravana’s brother Kumbhakarna, his son Meghnath are also burnt. This burning happens at many places in Delhi symbolizing the victory of good over evil. This motivates common men to burn their evil thoughts and move towards goodness.



Burning of the effigy of Ravana



Enrichment

According to the great epic Mahabharatha the Pandavas had to go into exile for 12 years and remain incognito for a year after they lost a game of dice against the Kauravas. During the period of their remaining incognito, they hid their weapons in the hole of a tree. It is believed that on Vijayadashami day they took out their weapons to fight a war that was unavoidable and won it.

Chayya: Garbha is a folk dance popular in Gujarat. Men and women dressed in traditional costumes, dance to the tune of music and use colourful sticks that they strike against each other. The sticks thus produce a pleasant rhythmic sound and the colours coming together is a sight to watch. Many of us from Gujarat look forward to this colourful ten-day festival, which is again a celebration of



womanhood, by celebrating the victory of Maa Durga over the demon.

Sharmila: In West Bengal, Dusshera is celebrated as Durga Pooja. The entire state wears a festive look, with celebrations happening day and night.

Huge pandals are set up with idols of Goddess Durga placed in them. The pandals (temporary pavilions) are set up using different materials and themes. Sometimes the pandal is made of jute, terracotta too.



Garbha



Goddess Durga

Maa Durga is worshipped during the entire ten-day period in pandals, with offering of flowers, food and ornaments. On Vijayadasami day, the idol is taken in procession and immersed in River Ganga.

In the earlier days idols were made of material that would not pollute the water body. But in between we started using other materials too. With more and more awareness

being created, we are again moving towards natural materials that would not pollute the water bodies.

Nirmala: I am awe-struck at how one festival with the underlying theme of empowering women and victory of goodness, is celebrated in different ways in our country. Now I understand, why our teachers say that it is the culture that binds us all.

Acharya: Good summing up Nirmala. I see Rakesh's hands going up. You may speak Rakesh.



Rakesh: The festival that I cherish the most is Diwali. I shall share with you all its significance and celebration in the northern part of our country. It is celebrated in the luni-solar month of Kartika, which is October-November in the Gregorian calendar. It is celebrated as Ram Lila, the day Ram reached Ayodhya after spending 14 years in exile.



It is celebrated for 5 days. The first day is spent in getting the house ready for the celebration. Lamps are lit in a row, as the name of the festival Deepavali means. Worship of Goddess Lakshmi begins on day one and continues into the second and third day. However, the third day marks a grand celebration. Goddess Lakshmi is worshipped in all pomp and splendour to usher in prosperity. Crackers are lit to keep away the evil. It is on this day, that Diwali is celebrated in a grand manner in South India. It is celebrated to mark the victory of Lord Vishnu over the Demon Narakasura. So again marks the victory of good over evil. The fourth day is earmarked for visiting friends and relatives. Sisters invite their brothers for a grand feast on the 5th day and spend time together exchanging pleasantries and reaffirming their affection for each other. I love this festival, as it involves a grand celebration, good feasts with lots of sweets, meeting of relatives and friends and the hope that it gives us.



Diwali

Acharya: Well-articulated Rakesh. Sumathi, do you want to share on how it is celebrated in the South?

Sumathi: Thank you ma'am. In the south we celebrate Diwali on the same day of the grand celebration in the north, the third day of their celebration. It is celebrated to mark the victory of Lord Vishnu over the demon Narakasura, who troubled women. So, it again marks the victory of good over evil.

The celebrations begin early in the morning, with us having a ceremonial bath with oil smeared on our head and body. The senior most in the family applies oil on our head, and blesses us. We wear new clothes, burst crackers and have a good meal. The day is spent in visiting and receiving friends and relatives. Exchange of sweets and savouries with each other is the hallmark of this festival. My mother told me once, we earlier included non-vegetarian food in the celebration. But now due to the awareness on environment, animal rights and welfare we have resolved to have a vegetarian diet.

In the evening there is a solemn pooja conducted in most of the households to usher in prosperity and peace.

Acharya: Jains also celebrate Diwali. They pay tribute to the penance and sacrifice of Lord Mahavira. Entrepreneurs begin their accounting year from the day following Diwali.

Who wants to be the next to speak?

Prema: Acharya, immediately after Diwali, is Christmas. It is celebrated on 25th December, to mark the birth of Jesus Christ. We recreate the scene of the stable in





Birth of Lord Jesus Christ

which Christ was born in our homes using small dolls. An illuminated star is hung outside the house. Hymns are sung as Carols and we visit friends and relatives. On the night of Dec 24th, the eve of Christmas there are special Mass in Churches. We have a grand meal on the day of Christmas, i.e. the 25th December.

Acharya: I think we have covered almost all the festivals in a year excepting the harvest festival which is celebrated across all parts of India with different

names. It is Pongal in Tamil Nadu, Makar Sankranti in Gujarat, Bihu in Assam and Lohri in Punjab. As we celebrate a bountiful harvest, we also express our gratitude to the Devatas like the Sun, Rain, who helped us achieve it. People living in cities also express their gratitude to the farmers. As the Tamil poet Tiruvalluvar says

உழுதுண்டு வாழ்வாரே வாழ்வார்மற் றெல்லாம்
தொழுதுண்டு பின்செல் பவர்.

Uzhudhundu Vazhvar Vazhvar Mattrellam

Thozhudhundu pinsel bavar.

Which means that the farmers alone are free men on the soil as they produce food. People practising other professions are dependent on farmers for their survival.

I am sure all of you enjoyed today's class as much as I did. I am glad to see that you all have a deep knowledge on our festivals. Sharing it with your friends today must have been a satisfying experience. You can now disperse in an orderly manner. Thank you.



Pongal

SUMMARY

- Lord Mahavir was the founder of Jain religion (Jainism).
- Mahavir encouraged all to follow the principle of ahimsa, satya, asteya (non-stealing), self-control and aparigraha (non-attachment).
- March 21st is spring equinox. The first Sunday after the full moon, following the spring equinox is celebrated as Easter. The Friday preceding Easter is observed as Good Friday.
- Vaisaki Purnima, that is the full moon that falls in the month of April-May, is celebrated as Buddha Purnima.



- Gautam Buddha encouraged people to follow the path of dharma, that includes practicing compassion, tolerance and ahimsa.
- All Islamic festivals are according to Hijri calendar.
- Ramdan, Bakrid and Muharram are the important festivals celebrated by muslims.
- Muharram is the first month of the Hijri calendar.
- On the day of Yajur Upakarma, we change our sacred thread, and reiterate our commitment towards our parents and ancestors, our teachers and the Almighty.
- The day following Yajur Upakarma is a day for chanting the powerful Gayatri Mantra, especially in the southern part of Bharat. This day is also celebrated as Raksha Bandhan in the northern part of our country.
- Dussehra is a ten-day long festival celebrated with much devotion and splendour all over our country. In Tamilnadu, the ninth day of the festival is celebrated as “Ayudha Pooja” and the tenth day is Vijayadashami. In West Bengal, Dusshera is celebrated as Durga Pooja.
- Diwali is celebrated to mark the victory of Lord Vishnu over the demon Narakasura. It again marks the victory of the good over evil .
- Christmas is celebrated on 25th December, to mark the birth of Jesus Christ.
- Harvest festival is celebrated across all parts of India with different names like Pongal in Tamil Nadu, Makar Sankranti in Gujarat, Bihu in Assam and Lohri in Punjab.



I Fill in the Blanks

1. The fast observed for about 40 days prior to Easter _____
2. The Bodhi tree under which Gautama Buddha attained enlightenment is in _____
3. The Muslims undertake Haj pilgrimage to _____ in Saudi Arabia.
4. All Islamic festivals are according to _____ Calendar
5. In Tamil Nadu, there is a grand display of dolls called _____ during Dusshera.
6. The day after Yajur Upakarma is dedicated to the chanting of _____ Mantra in South India.



II Match the following

1. Gujarat - Pongal
2. Assam - Lohri
3. Punjab - Makar Sankranti
4. Tamilnadu - Bihu

III. Name the following

1. The first month of Hijri calendar.
2. Festival during which we pay our respects to our tools.
3. The Hindu calendar month during which Buddha Purnima is celebrated.
4. The harvest festival in the north eastern part of India.
5. A grand procession marks Dussehra celebrations here.
6. Folk dance popular in Gujarat

IV. Answer the following

1. Elaborate the teachings of Lord Mahavir and Gautam Buddha.
2. When is Easter celebrated?
3. How is Dusshera celebrated in Mysuru?
4. Describe the Diwali celebrations in North India
5. Name any two festivals celebrated by a) Muslims b) Christians c) Hindus d) Jains.

V. Activity

1. List down the plans that you made for Diwali Celebrations at your home.
 - a. How many of the above were you able to implement?
 - b. Why were you not able to implement others? Discuss with your parents.
3. Make a time line depicting the various festivals celebrated in your family.
4. Write a recipe of a festive meal using millets.

VI. Ponder

How would our lives be if there were no festivals?



VII. Find the festivals in the grid

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| C | A | C | A | N | B | K | A | O | C | T | M |
| H | X | R | B | D | U | G | A | O | I | T | A |
| R | C | B | Y | R | D | R | K | H | K | H | H |
| I | D | N | Z | Z | D | I | W | A | L | I | A |
| S | A | O | C | C | H | E | A | C | P | R | V |
| T | B | P | I | R | A | Y | Y | Z | Q | B | I |
| M | Y | R | B | S | P | O | N | G | A | L | R |
| A | Z | H | T | M | U | J | A | R | Q | L | J |
| S | C | E | C | A | R | N | H | I | T | B | A |
| L | R | G | H | L | N | A | M | G | H | K | Y |
| B | F | H | O | L | I | Z | M | L | O | L | A |
| K | H | K | I | P | M | B | Y | A | E | W | N |
| L | L | A | J | K | A | R | S | Y | D | V | T |
| W | S | N | U | P | A | K | A | R | M | A | I |
| U | M | A | R | H | E | S | S | U | D | U | N |

- Christmas
- Mahavir Jayanthi
- Buddha Purnima
- Pongal
- Holi
- Ramadan
- Easter
- Upakarma

VIII. Mark on the political map of India any two states

- where diwali celebrated for five days
- Dussehra is celebrated in a grand manner
- The state where the day after Yajur upakarma is earmarked for chanting Gayatri mantra



TERM 2 – SAMPLE PAPER

Max Marks : 80

Time : 2 hours

I Fill in the blanks: (5 x 1 = 5)

1. The liquid waste from industries that are let into water bodies are called _____.
2. Erosion by water or wind can create landforms like _____.
3. Dumping of wastes in landfills leads to _____ pollution.
4. Cows chewing their food at leisure is called _____.
5. The Bodhi tree under which Gautama Buddha attained enlightenment is in _____.

II Match the following: (6 x ½ = 3)

| | | | |
|----|------------------|--|-----------------|
| 6 | Turmeric capital | | Lohri |
| 7 | Sugar bowl | | Pongal |
| 8 | Mt. Everest | | Uttar Pradesh |
| 9 | River Yamuna | | Bihu |
| 10 | Tamil Nadu | | Erode |
| 11 | Punjab | | Northern Plains |
| | | | Sagarmatha |

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

12. The bottom most layer of the soil.
a) Top soil b) Bed rock c) Loamy soil d) Sub soil
13. Expensive spice from Jammu and Kashmir is _____
a) Sugarcane b) Sandalwood c) Pepper d) Saffron
14. The non-living components of the environment
a) Anaerobes b) Abiotic c) Biotic d) Ecosystem
15. People gathered at the Jallianwala Bagh to oppose _____
a) Charter Act b) Rowlatt Act c) Pitts India Act d) Regulating Act
16. Sweat is released through our _____
a) Anus b) Skin c) Kidney d) Liver



IV Give two examples for the following: (2 x 1 = 2)

17. Cash crops

18. Minerals found in Deccan Plateau

V Observe the following pattern and write the answer: (3 x 1 = 3)

19. Algae: Producers :: _____ : decomposers

20. Cinnamon: _____ :: Fennel : seed.

21. Desert soil : less in nutrients :: _____ : Highly fertile

VI Correct the underlined words and rewrite the sentences: (5 x 1 = 5)

22. The lowest range of Himalayas is Manali

23. Reusing is the conversion of waste material into useful material.

24. Leaves that contain other pigments apart from chlorophyll are called parallel leaves.

25. A Plateau is a fertile region rich in minerals deposited by rivers.

26. In the Northern part of the country Yajur Upakarma is celebrated as Diwali

VII Name the following: (5 x 1 = 5)

27. The process by which we breathe out.

28. The cotton capital of our country.

29. A group of islands in Arabian sea.

30. The longest tunnel in India

31. Food bag in our digestive system

VIII Answer in short : (7 x 2 = 14)

32. List any two ways to prevent soil erosion.

33. Kidneys are a pair of bean shaped organs that are placed below the rib cage. How do they help us?

34.



- Identify the insect shown in the picture
- What is the disease that it can cause?
- Name the medicine used to cure the disease caused
- From which tree is the medicine obtained.



35. Dam is a structure built across rivers for various uses. List any two uses of dams.
36. Soil pollution can lead to water pollution. Justify
37. What is a National Highway? Name the longest National highway in India.
38. Elaborate the teachings of Lord Mahavir.

IX Answer in brief:

(6 x 3 = 18)

39. a) How are hot springs formed?
b) Name two places where hot springs are found in India.

40.



- a) Name the product shown in the picture _____.
- b) Give one of its uses.
- c) In which states of India do these grow well?
41. How is acid rain caused? Why is it not desirable?
42. Distinguish between Western and Eastern coastal plains.
43. What is crop rotation? Why is it important?
44. How many types of teeth do adult human beings have? Write their functions.

X Answer in detail:

(4 x 4 = 16)

45. Describe the Diwali celebrations in south India
46. How are objects classified based on their ability to allow light to pass through? Explain with an example.
47. a) What causes an earthquake? Name any two earthquake prone regions in India.
b) India is a subcontinent. Justify
48. Elaborate the significance of Wagah – Attari border

XI Mark the following on the political map of India:

(4 x 1 = 4)

49. Jharkhand
50. The land of five rivers
51. The state where river Krishna originates
52. Himachal Pradesh



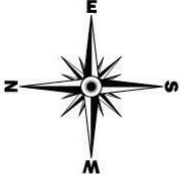
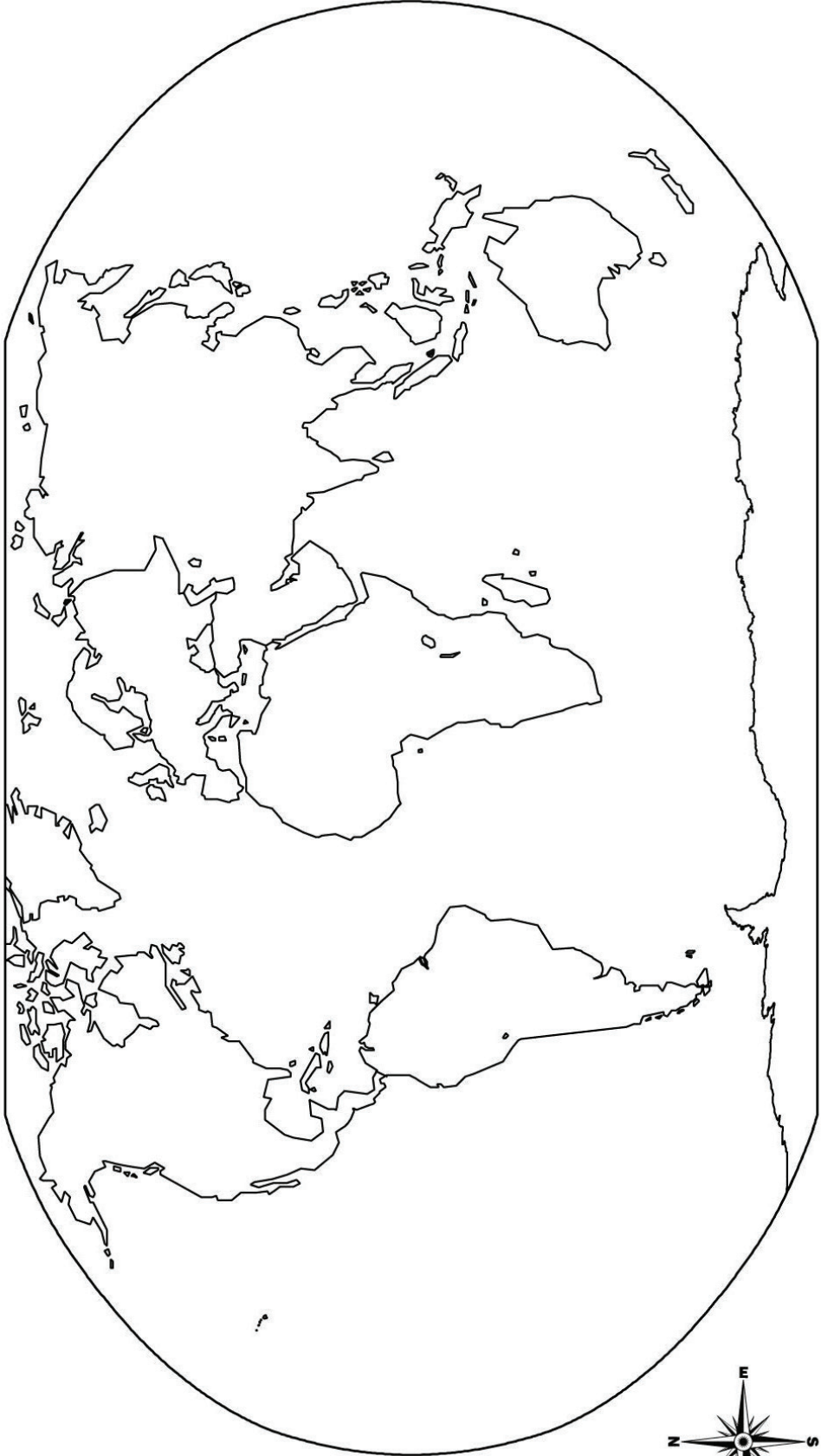
Political map of India



Rivers of India map



World Outline map





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.

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