



Geography

Standard Six



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This textbook aligns with the curriculum and syllabus developed by the State Council of Educational Research and Training, Maharashtra, Pune-30. It has also been reviewed and approved by them as per Government Resolution by GR No. Abhyas - 2116/(Pra.Kra.43/16) SD - 4 dated April 25, 2016, this textbook has been approved in the meeting of coordination committee held on May 19, 2026. It will be used from academic year 2026-27 onwards.

समग्र शक्ति

Geography

Standard Six



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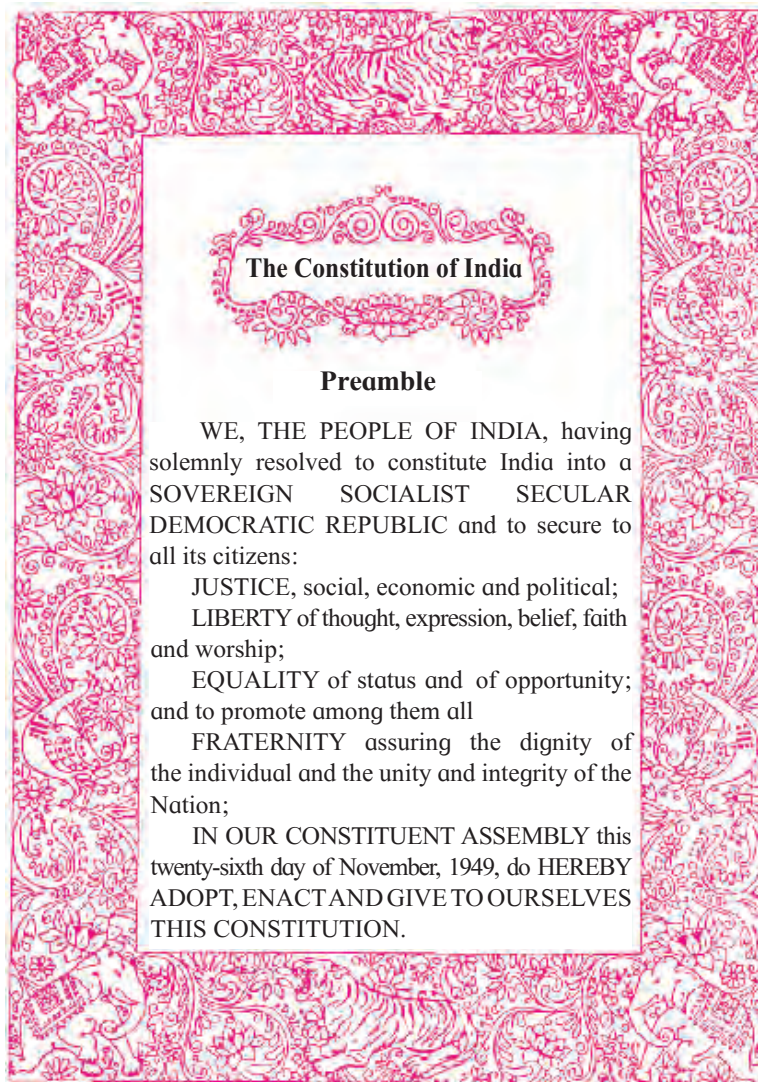
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The Constitution of India

Chapter IV A

Fundamental Duties

ARTICLE 51A

Fundamental Duties – It shall be the duty of every citizen of India –

- (a) to abide by the Constitution and respect its ideals and institutions, the National Flag and the National Anthem;
- (b) to cherish and follow the noble ideals which inspired our national struggle for freedom;
- (c) to uphold and protect the sovereignty, unity and integrity of India;
- (d) to defend the country and render national service when called upon to do so;
- (e) to promote harmony and the spirit of common brotherhood amongst all the people of India transcending religious, linguistic and regional or sectional diversities, to renounce practices derogatory to the dignity of women;
- (f) to value and preserve the rich heritage of our composite culture;
- (g) to protect and improve the natural environment including forests, lakes, rivers and wild life and to have compassion for living creatures;
- (h) to develop the scientific temper, humanism and the spirit of inquiry and reform;
- (i) to safeguard public property and to abjure violence;
- (j) to strive towards excellence in all spheres of individual and collective activity so that the nation constantly rises to higher levels of endeavour and achievement;
- (k) who is a parent or guardian to provide opportunities for education to his child or, as the case may be, ward between the age of six and fourteen years

NATIONAL ANTHEM

Jana-gana-mana-adhināyaka jaya hē
Bhārata-bhāgya-vidhātā,

Panjāba-Sindhu-Gujarāta-Marāthā
Drāvīda-Utkala-Banga

Vindhya-Himāchala-Yamunā-Gangā
uchchala-jaladhi-taranga

Tava subha nāmē jāgē, tava subha āsisa māgē,
gāhē tava jaya-gāthā,

Jana-gana-mangala-dāyaka jaya hē
Bhārata-bhāgya-vidhātā,

Jaya hē, Jaya hē, Jaya hē,
Jaya jaya jaya, jaya hē.

PLEDGE

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

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

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

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

राज्यगीत

जय जय महाराष्ट्र माझा, गर्जा महाराष्ट्र माझा
जय जय महाराष्ट्र माझा, गर्जा महाराष्ट्र माझा ॥धृ॥

भिती न आम्हा तुझी मुळी ही गडगडणाऱ्या नभा
अस्मानाच्या सुलतानीला जबाब देती जिभा
सह्याद्रीचा सिंह गर्जतो शिव शंभू राजा
दरी दरीतून नाद गुंजला महाराष्ट्र माझा
जय जय महाराष्ट्र माझा, गर्जा महाराष्ट्र माझा ॥१॥

काळ्या छातीवरी कोरली, अभिमानाची लेणी
पोलादी मनगटे खेळती, खेळ जीवघेणी
दारिद्र्याच्या उन्हात शिजला
निढळाच्या घामाने भिजला
देश गौरवासाठी झिजला
दिल्लीचे ही तख्त राखितो, महाराष्ट्र माझा
जय जय महाराष्ट्र माझा, गर्जा महाराष्ट्र माझा
जय जय महाराष्ट्र माझा ॥२॥

Preface

Dear students,

In view of the implementation of the National Education policy 2020, School education curriculum has been prepared. Government approved curriculum has been gradually started from academic year 2026-27. In school curriculum for Geography subject has been added in 'The World Around Us part -1' textbook for std third to fifth. Geography as a separate subject has been included from sixth standard. Accordingly this Geography textbook has been prepared. We are happy to present this textbook to you.

The student centric teaching-learning process, experimentation and self-learning are emphasized in this textbook; also the book is prepared with perspective of joyful learning. Through this subject you will get knowledge of concepts about the earth that are associated with our day to day life.

It is planned to introduce different geographical concepts and skills, to understand how fundamental concepts are applied through the activities, charts, graphs, maps, pictures and information communication.

To make the textbook more informative, high quality and flawless, it is reviewed by the teachers, educationists, subject experts from Maharashtra. Textbook Bureau, subject committee members, cartographer and illustrator have attempted to make the book best of its kind. We expect that this textbook will be useful to you and will be welcomed by you.

You can complete all the activities, projects on your own or with peer learners, parents, teachers and with the help of internet.

The traditional structure of exercises avoided and they include open ended and thought provoking questions. Let us happily start the journey of learning with excitement and joy.

Best wishes to you all.



(Anuradha Oak)

Director

Pune

Date : 1st May 2026

Indian Solar Date : Viashakh 11, Shaka 1948
Maharashtra Din

Maharashtra State Bureau of Textbook
Production & Curriculum Research,
Pune

■ Geography ■

Learning Objective: CG-1 : To understand various aspects of human life and apply incomplete statements meaningfully.

Sr. No	Curriculum Competency	Learning Outcomes	Page Number
1	C-1.1 Collects information from various sources of information (primary and secondary) to understand the historical, cultural, geographical, and socio-political aspects of human life and applies it meaningfully.	• Explains the evolution of word 'geography'.	2
		• Explains the sources used in the study of geography.	2, 3
		• Explains the concept of primary sources used in the study of geography.	3
		• Explains the concept of secondary sources used in the study of geography.	3
		• Classify primary and secondary sources used in the study of geography	4
2	C-1.2 In the form of contents, charts, diagrams and maps, presents and analyzes information related to various dimensions of human life.	• Explains the concept of angular distance.	17
		• Explains the concept of latitude.	18
		• Explains the characteristics of latitudes.	18
		• Names the important latitudes.	19
		• Explains the concept of longitudes.	19
		• Explains the characteristics of longitudes.	20
		• Explains the importance of prime meridian.	22
		• Differentiates between latitude and longitude.	22, 23
		• Explains the concept reference grid.	21
		• Neatly draw the figure representing globe with spatial reference.	25
		• Explains the concept of maps.	28
		• Explains the elements of maps.	32
		• Explains the types of maps.	29

Learning Objective: CG-3 : To study various social and historical events or phenomena, identify their causes and effects, and relate them to human life.

3	C-3.1 Analyzes the impact of changes in the family in the human society from early nomadic stages to settled life, civilization / culture, human settlement, the nature of work, socio-cultural beliefs of people, changing concepts over time that have had a significant impact on human society.	• Explains the concept of human settlement.	90
		• Explains factors responsible for the formation of human settlements with examples.	91, 92, 93, 94
		• Explains the changing nature of human settlements.	94

Learning Objective: CG-6 : To understand the spatial distribution (local and global), relationships, natural phenomena, and environmental changes along with their effects.

4	C-6.1 Explains natural phenomena such as air and climate, oceanic cycle, soil formation, and river flow, and describes their distribution.	• Explains the spheres of the Earth.	38
		• Explains the concept of lithosphere.	39
		• Identifies the divisions of Earth's interior.	40, 41, 42

		• Explains the characteristics of the Earth's crust.	40
		• Explains the characteristics of the mantle.	40, 41
		• Explains the characteristics of the core.	41
		• Draws diagrams/model of the internal structure of the Earth.	41
		• Explains the concept of landforms.	43
		• Explains the characteristics of landforms.	43, 44
		• Identifies landforms and draw it.	44
		• Locate the continents in world map.	45
		• Locates major mountains, plateaus, and plains on a map.	46
		• Explains the concept of atmosphere.	50
		• Identifies the elements of atmosphere.	51
		• Explains the importance of gases in the atmosphere.	51, 52
		• Explains the importance of moisture in the atmosphere.	51, 52
		• Explains the importance of aerosols in the atmosphere.	52
		• Names the layers of the atmosphere.	53
		• Draw sketch representing the structure of atmospheric layers.	55
		• Explains the characteristics of atmospheric layers.	53
		• Prepares a comparative table of atmospheric layers.	53
		• Explains the significance of ozone layer in sustenance of life on the earth.	51, 54
		• Underlines the impacts of atmospheric phenomena on human life.	54
		• Explains the concept of hydrosphere.	57
		• Explains the forms of hydrosphere	58
		• Arranges major oceans in order of area.	58
		• Locates major oceans, seas, and gulfs on a world map.	22, 45, 46
		• Explains the concept of structure of ocean floor.	59
		• Prepare a diagram / model of structure of the ocean floor	69
		• Explains the concept of tides	60
		• Explains the factors affecting tides	60
		• Explains the difference between neap tides and spring tides.	62
		Explains the impacts of tides.	62
		• Explains the interrelations between oceans and environment.	63
		• Finds the environmental impact of ocean pollution.	65
		• Explains the concept of biosphere.	66
		• Explains the importance of biosphere.	68
5	C-6.2 Identifies the distribution of resources such as water, agriculture, raw materials and services across the geographical area.	• Explains the concept of resources.	71
		• Classifies natural and man-made resources.	72
		• Narrate the sources of resources in the surroundings (water and agriculture related).	73
		• Explains the distribution of water on Earth.	57, 73
		• Identifies sources of potable / usable water.	73

		• Explains the concept of agriculture.	74
		• Names the major types of agriculture.	75
		• Explains the concept of subsistence farming.	75
		• Explains the types of subsistence farming.	75, 76
		• Locates and shows the distribution of subsistence farming on a map.	76
		• Explains the concept of commercial farming.	77
		• Explains the types of commercial farming.	77
		• Locates and shows the distribution of commercial farming on a map.	78
		• Explains the difference between traditional and modern farming and identifies examples.	79
		• Explains the importance of water and agriculture in human life.	74, 79
C-6.3 Analyzes the sustainable elements of society and the efforts being made to preserve them from an Indian perspective, highlights their importance and explains what more needs to be done in the context of global climate change.	• Explains sustainable factors.	98	
	• Explains significance of sustainable elements in Indian society (water, land, air, sun)	100	
	• Discuss the role of Indian festivals in the conservation of sustainable elements.	102	
Learning Objective: CG-9 : Understanding economic processes and activities (production, consumption, trade, and commerce).			
7	C- 9.1 Explains the impact of main components of trade and commerce, goods, production, consumptions and capital on individual, life and society	• Explains the concept of human economic activities (primary, secondary, tertiary).	83, 84
		• Describes various economic activities in the local area and surroundings.	84
		• Establishes a relationship between changes in economic activities over time.	86
		• Classifies human economic activities.	84
Learning Objective: CG-10 : Understanding India’s contribution in various fields of social sciences from past to present.			
8	C-10.1 In the course understands, clarifies and studies India’s significant contributions to all aspects studied (concepts, explanations, methods), including specific aspects in an integrated manner. For example, understands the strength of India’s democratic traditions through history.	• Explains ancient Indian geographical concepts.	9
		• Relates ancient Indian concepts with the present time.	12
Learning Objective: CG-11 : (Practical work in Geography)			
9	Competence for course objectives. Already 1,3,6,7b,9 and 10 were incorporated under this. There are (1.1, 1.2, 3.2, 6.1, 6.2, 6.3, 7b 2, 9.1, 10.1)	• Classifies the tools used for studying Geography.	31
		• Reads and interprets maps, graphs, diagrams, and tables.	11, 16, 22, 23, 25, 28, 31, 32, 34, 45, 46, 76, 78
		• Explains the concepts of area, measurement, and fieldwork.	35

Understanding the Textbook...

Teachers and Parents –

- First, understand the textbook yourself.
- Considering the sequence of concepts, teach the chapters according to the content, that will be appropriate for the knowledge building of the subject.
- This textbook is designed for a constructive and activity-based teaching method.
- Create a careful and independent conducive environment for the activities given in each chapter. Plan the teaching of every chapter in advance.
- Your active guidance is essential for 'interaction,' 'process,' and 'active participation of all students' in the teaching-learning process.
- It is necessary to use geographical tools in the school according to the requirements of the topics for a proper understanding of the subject. For example: maps, globes, map outlines etc.
- Most concepts in Geography are based on scientific foundations and abstract matters. Encourage learning activities such as self-study, peer learning and learning with the help of parents; this will make it easier for the students to understand geographical concepts.
- Organize the classroom in such a way that students get maximum opportunities for learning. Also, plan innovative initiatives, activities and projects.
- Ensure, that the character ‘**Globi**’, who provides instructions regarding various boxes in the chapters, becomes a companion to the students to make the teaching-learning process more enjoyable.
- The section of ‘Do you know?’ should not be considered for formal evaluation/ exams.
- For evaluation, use activity-oriented, open-ended, multiple-choice and thought-provoking questions. Samples of these are given in the exercises at the end of the chapters.
- Conduct regular practice of geographical skills like map reading, observation, filling in maps and analytical reasoning.
- Explain local to global geographical information through examples.
- Websites, Reference and appendices are provided at the end of the textbook.
- Considering the Holistic Progress Card (HPC), involve parents, teachers, students and peers in the learning, teaching, and evaluation process.
- Conduct the teaching learning process for students with special needs, sign language  as well as other supplementary pedagogical methods should be used. Students with special need should be given an opportunity to express themselves in whatever way is possible for them.

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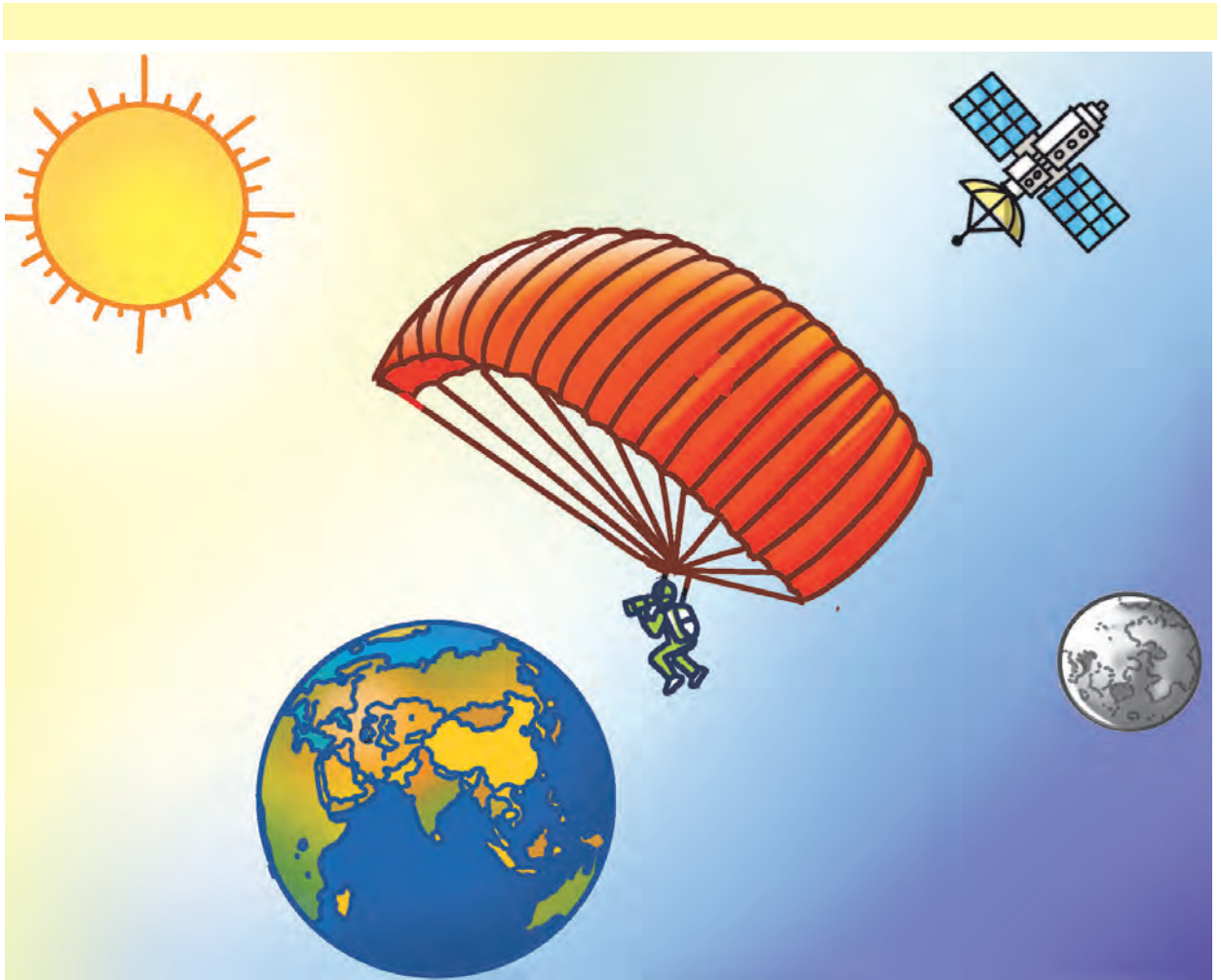
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Note : Maps in textbooks have been prepared only for educational purposes. They should not be considered as a standard for any geographical or political use. While preparing the maps maximum level of accuracy is maintained. However, any error that may remain could be due to technical limitations.



1 Friendship with Geography

‘Geography is a comprehensive subject,
It is filled with the contents of the Universe!’



**Thought-
provoking
questions** ?

- If you get an opportunity to go to space, what would you study through observations?
- Express your opinion on the scope and thought of geographic study.

|| Concept of Geography

‘Geography’ is the word taken from the Greek word ‘Geographia’. ‘Geo’ means the Earth and ‘graphia’ means description. So Geography means ‘the science that describes the Earth.’

Geography includes the study of physical and anthropogenic (man-made) components on the surface of the Earth and their interdependence. ‘Physical Geography’ and ‘Human Geography’ are the two main branches of geographic study. According to the scope of study, various sub-branches of Geography have been formed.



Always remember this.



Try to find.

With the help of the internet and reference books, find out the concepts of Geography expressed by geographers.

Sources of geographic study-

In Geography, physical and human components and their interrelationships are studied. To conduct such studies scientifically, sources of data play an important role. There are two types of sources of data collection – ‘Primary’ and ‘Secondary’.



Just think.

1. Is geography the study of the Earth only?
2. How is the subject of Geography incorporated in day-to-day life?

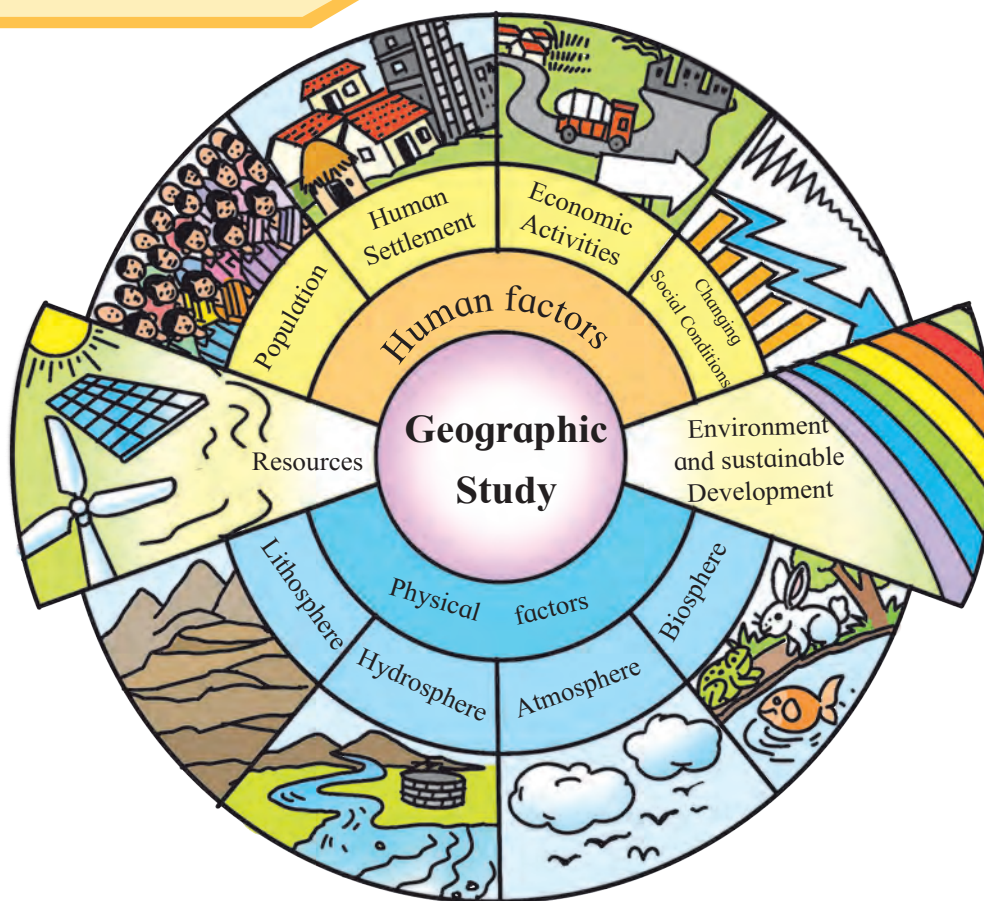


Figure no. 1.1 Geographic Study

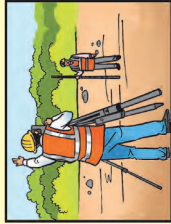
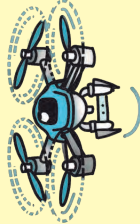
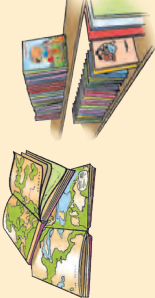
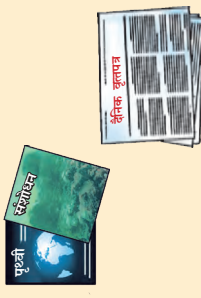
Primary Sources		Secondary Sources	
Definition: Primary data in geographic studies means the data that is collected through actual observations, measurements and records.		Definition: Secondary data in geographic studies means data that is already collected, analysed or presented. This data is received through some other individual, organisation or publication, e.g. reports, maps, articles, etc.	
Characteristics of primary sources	Examples of Primary Sources	Characteristics of secondary sources	Examples of Secondary Sources
- Direct and original information is received. - It has more credibility. - It is the source of new information. - Location-specific – Gives exact data about a specific location. - Requires more effort and is more expensive.	Field visit  Interview  Survey  Drone Survey Image  Weather Data 	- Data is indirectly collected. - The credibility of the data can differ from source to source. - The data is already processed and then presented. - Data can be easily available through books, reports, the internet, etc. - Less expensive, save efforts and time	Globe, Map  Atlas, Text and Ref.books  Research Journal, Magazines and Newspapers  Artificial Satellite Image  Climatic Data 

Table No. 1.1 Primary and Secondary Sources of Data



Tell me.

Which sources of information will you use to collect data about the population in your village or town/city?



Try if you can.

- Complete the table given below with your classmates.

Point	Primary Source	Secondary Source
Concept/Definition	Original data, collected through actual observations, surveys and measurements	Already collected, analysed and presented data.
Methods of collection	By actually going to the location, collected through observations, interviews and measurements.	
Credibility		Relatively low credibility – dependent on the author/organisation.
Nature of data		Already processed, in an analysed form.
Scope	Location-specific, for a limited area	
Cost and time	Required more	
Possibility of error	Errors by the observer or in the instrument	Outdated data, bias perspective
Examples		

Table No. 1.2 Primary and Secondary Sources of Information

Do you know this?

Chhatrapati Shivaji Maharaj established our 'Swaraj' by using his geographic knowledge very effectively. He made warfare techniques, governance, fort-building and administration more capable. By making the apt use of mountains hills and valleys, using guerrilla tactics,

the enemy was brought to its knees. The coast was used to establish the navy. Forts, castles and citadels were constructed by applying geographic knowledge.



Just think.

- Which primary and secondary sources of data will you use to study the agricultural practices in your taluka?
- How should the primary and secondary sources be used for learning the subject of Geography?



Try if you can.

Geography subject is not just to memorize names of the countries or to draw maps. It is a science that teaches the relation between man and the environment. So establishing a friendship with geography means understanding the world from the right perspective. For this, discuss and write a note on 'Need for friendship with Geography' in your notebook based on the points given below.

- To strengthen the bond with nature.
- For the use in day-to-day life.
- For understanding human settlements and society.
- For protecting the environment.
- For enhancing a scientific perspective.
- For future opportunities in business.
- To develop a global perspective.

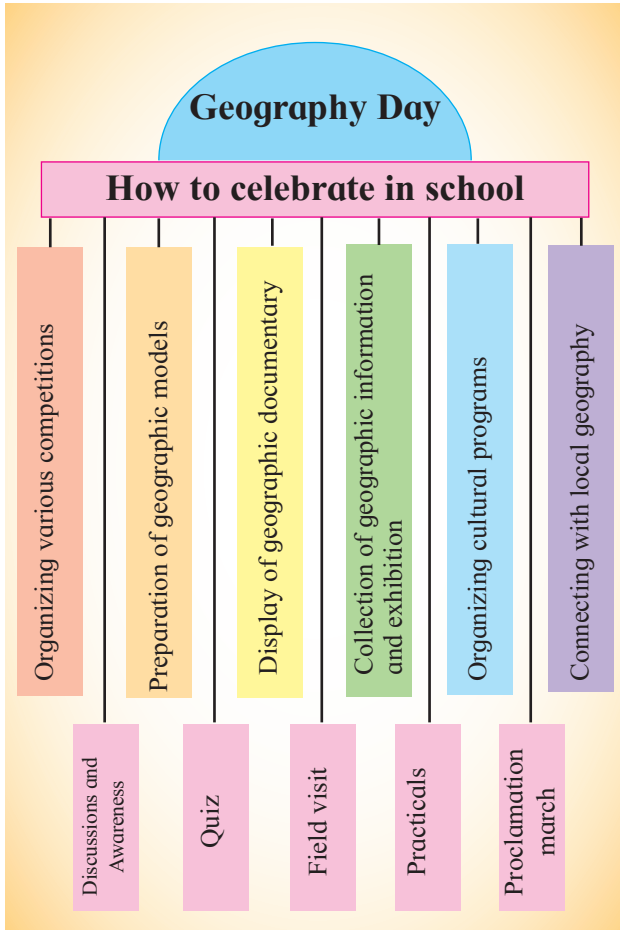


Figure No. 1.2: Geography Day



Let us discuss.

A geographic study is not limited to the school-going children, but is useful for every element of the society. How is Geography useful for students, teachers, parents, researchers, farmers, businessmen, administration and defense forces?



Tell me.

Based on observations of figure no. 1.1, explain how interrelationships between physical factors and man-made factors are studied in Geography?

|| We understood this....

- Understood the concept of Geography
- Understood the sources of geographic study.
- Can classify sources of geographic study as primary and secondary.



Exercise

A) Encircle (O) the correct option.

- 1) What are the meanings of the words 'Geo' and 'graphia'?
 - a) Earth and to describe
 - b) Sky and to describe
 - c) Climate and describe
 - d) Mountain and describe
- 2) Which are the elements studied in Geography?
 - a) Only human elements.
 - b) Only Physical elements,
 - c) Biological and human elements on the earth.
 - d) Only atmospheric elements..
- 3) Which of the following is the primary source of geographic data?
 - a) Textbook
 - b) Map
 - c) Field visit
 - d) Gazette
- 4) Collecting data about climate in a village from villagers is which source?
 - a) Secondary source
 - b) Primary source
 - c) Documented source
 - d) Historical source
- 5) Which skill does a student develop while collecting data through maps, field visits and satellite images?
 - a) Memorising
 - b) Drawing
 - c) Writing
 - d) Observation and analysis

- 6) Which one of the following is not a primary source?
 - a) An interview conducted by oneself
 - b) A survey conducted by oneself
 - c) Self-experienced field visit
 - d) A travelogue read by oneself
- 7) Which one of the following statements is not true about the secondary sources?
 - a) The credibility of the data collected through this is more
 - b) The data in this are collected on the basis of researches.
 - c) These data sources are not easily available
 - d) The data in these can be outdated.

B) Check the following statements, correct the incorrect statements and rewrite them.

- 1) The meaning of Geography is 'the science that describes the earth'.
- 2) In Geography, only the physical structure of the Earth is studied.
- 3) Photographs and videos are the primary sources.
- 4) Research and research papers are the secondary sources.

C) Write short answers.

- 1) Explain the concept 'Geography'.
- 2) Explain the differences between the primary and secondary sources of geographic study.

D) Do as directed.

1) Write a geographic description of any one place that you have visited during the field visit in your own words.

2) By observing Figure 1.1, write in your own words about which elements are studied in Geography.

E) Complete the following activity.

Classify the following means into primary and secondary sources of information in geographic study and mark (✓) in the space near a source.

Primary Source	Means of geographic study	Secondary Source	Primary Source	Means of geographic study	Secondary Source
	• Soil samples collected by oneself			• Travelogues	
	• Map of soil distribution			• Observations of various types of flowers and fruits by oneself.	
	• Pictures of various flowers and fruits			• Rock samples collected by oneself	
	• Report of field visit written by you			• Newspaper cuttings of geographic information	
	• Video recording of natural beauty of Chikhaldara			• The samples of cereals and pulses collected by you	

Activity :

(Seek help from parents and teachers)

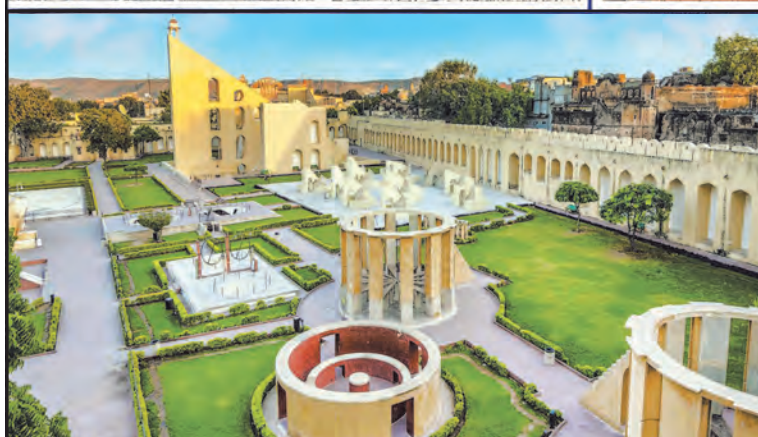
- Prepare a wall chart showing various branches of geography and the subject matter studied in each branch.
- Collect talukawise information about the population or major crops grown in our district from the internet.



2 History of Indian Geography

‘Geography is timeless,

The history of Indian Geography is inspiring’!



**Thought-
provoking
questions**



- Think of the various means of acquiring information about the history of Indian geography.
- How far back in time do you think it is possible to acquire ancient geographical knowledge?
- Explain with examples the interrelation between the ancient geographic knowledge and history of Indian Geography.

|| Ancient Indian Geographic Concepts:

Up to the fifth standard, we have introduced the Geography through Environmental studies. In this lesson, we will acquire information about concepts of the ancient Indian geography.

Indian geographic knowledge has a ancient long and glorious history. Many geographic concepts have developed from the ancient Indian culture.

The geographic concepts are mentioned in the ancient scriptures, philosophy, Puranas, Vedas and Upanishadas in India, besides religious scriptures in Jainism and Buddhism and the records by the foreign travelers who visited India.

Do you know this?

The term '*Bhugol*' is mentioned in the Indian scripture '*Suryasiddhant*'.

Many Indian thinkers such as Varahmihir, Kautilya, Kalidas, Aaryabhata, Vijaynandi, Brahmagupt, Utpal, Bhaskaracharya have contributed to the development of various branches of knowledge like Astrology, Mathematics, Geography and Cartography.

Ancient thinkers put forth many geographic concepts. Some of these important concepts are given below

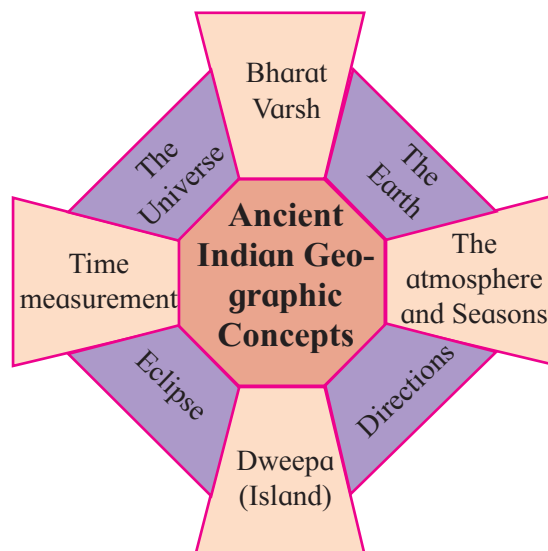


Figure no. 2.1 Ancient Indian Geographic Concepts

Universe :

The concept '*Vasudhaiv Kutumbakam*' is put forth by Indian thinkers. The comprehensive thought about the universe and its creation is expressed in Indian literature.

There is an in-depth explanation of the creation of the Universe in the Vedas. Gases, Space, the Sun, the Moon and the other planets are formed in the process of the creation of the Universe. In the Vedas, the Earth is mentioned as '*Pruthvi*' or '*Dharani*'.

In modern science, according to the 'Big Bang' theory, the Earth is created from an explosion of small body of infinite density and then is spread at a very high speed.

In the Puranas, the Universe is called '*Bhahyantara*', and there is information on '*Saptamahadweep*' and '*Saptasagar*'.

In the Upanishads, it is mentioned that, the earth evolved from water.

Also, there is mention of the Earth as 'Pruthvi' or 'Bhu'. At the same time, there is a mention of two gases, 'Pran' and 'Apan', which represent gases in the atmosphere.



Try to find.

Find the information about the evolution of the Universe on the internet.

The Earth :

The ancient Indian thinkers were aware of the circular shape of the Earth. In the 6th century BC, it was mentioned that the diameter of the Earth could be 13,000 km. In ancient Indian scriptures, the Earth is described as 'Saptadweep', in which seven *dweeps* (islands) are included. There is a mention of 'Meru Parvat (Mountain)' in ancient Indian scriptures, which is supposed to be located in the middle of the Earth. Also, there is a mention of four oceans, namely – *Kshir Sagar* (the Indian Ocean), *Dadhi Sagar* (the Atlantic Ocean), *Sura Samudra* (the Pacific Ocean), and *Kshar Samudra* (the Arctic Ocean).

Do you know?

Ancient Indian astronomers considered *Ujjayani* (Ujjain) as the central point of the Earth and proposed the concept of base longitude for the first time. On the basis of this, they did the time calculations, positions of the planets and prepared maps.

Dweep (Island) :

Ancient Indians proposed the concept of *Dweep*, meaning the land naturally encircled by water.

Jambudweep - on this Island (*Dweep*), there were abundance of Jamun trees. This part is surrounded by water and is situated in the middle of all

the other islands (*dweepas*). This covers most of the Asian continent. It includes the '*Bharatvarsh*' and many other countries.

Do you know?

उत्तरं यत् समुद्रस्य हिमाद्रेश्चैव दक्षिणम्

वर्षं तद् भारतं नाम - *Vishnu Purana*

The land to the north of the Ocean and to the south of the Himalayas is known as '*Bharat*'.

Plaksh Dweep – This *dweep* was occupied by *Plaksh* trees. It was extended around the Mediterranean Sea.

Shalmali Dweep – The part occupied by Silk Cotton Trees (*Savar*), which have cotton-like tissue, was *Shalmali Dweep*. Madagascar Island, Somalia, and the East African coastal areas are included in this.

Kushdweep – This was called *Kusha* as it was occupied by *Kush* grass. In this *Dweep*, Iran, Iraq and the adjoining desert area and the north-eastern part of today's Africa are included.

Kraunchdweep – This *Dweep* was named after the big aquatic bird and the *Kraunch Parvat* (Mountain). This included today's Northern and Central Europe.

Shakdweep – This includes the long stretch of land in the southeast of the *Jambudweep*. This includes the South east Asian countries.

Pushkardweep – This was called '*Pushkar*' as it was occupied by lakes full of lotus plants (*Pushkar* meaning Lotus). This is situated in the Asian continent, in which today's eastern Russia, North and South Korea and Japan are included.

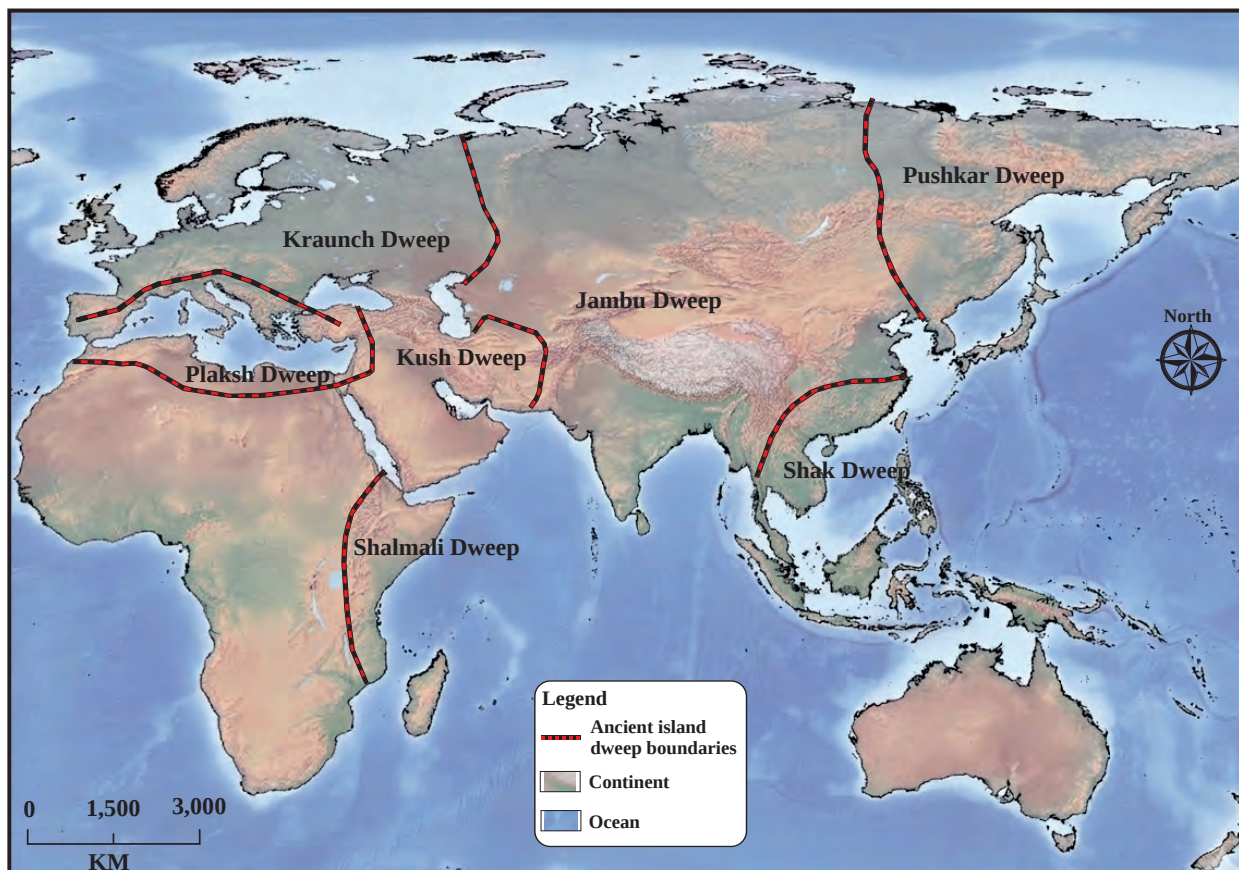


Figure no. 2.2 – Ancient Islands (Dweep)

Eclipse :

At the time of a lunar eclipse, the shadow of the Earth is cast on the Moon, which is circular in shape. Considering this, the ancient Indians knew that the Earth is circular in shape. In this period, the terms such as *Grahansparsh* (start of eclipse), *Khagras* (total eclipse), *Khandgras* (partial eclipse) and *Moksh* (end of eclipse) were established.



Just do it.

Collect the information about the planets, stars, constellations, eclipses, *nakshatras*, etc., with the help of parents by the means of observing the sky or by visiting a planetarium in the vicinity.

Direction and Time :

The ancient Indians had excellent

knowledge of directions and time. Local time, which used to be expressed on the basis of the position of the Sun, was used for daily practice. The units such as '*Ghatika*', '*Pale*' were used for measuring time.

Activity :

- Prepare a Wheel of Directions

Do you know?

Ancient Indian time measurement represents a traditional system of time measurement. It was based on observations of the Sun, the Moon, constellations and the changing positions of stars and planets. Units in the ancient Indian Time Measuring System – *Kshan*, *Nimish*, *Pal*, *Ghatika*, *Muhurt*, *Prahar*, *Diwas* (Day) and *Ratra* (Night), *Paksha*, *Mas* (Month) and *Varsh* (Year).

The Indians had developed the technique of accurately calculating the local time on the basis of the positions of the Sun and the Moon in the sky. They could accurately predict the timings of eclipses. In ancient times, solar clocks were installed at various places – e.g. Konark Sun Temple, Jantarmantra at Jaipur. Even today, time can be calculated using these solar clocks.

The atmosphere and the seasons -

The ancient Indians had knowledge of the atmosphere. In the *Rigveda*, it is mentioned that the earth is surrounded by space. Bhaskaracharya has described that the atmosphere is 12 yojanas (96 km) thick and all the phenomena, such

as clouds, lightning, winds, rain and fog, occur in this. The descriptions of seasons are found in the *Rigveda*. In that, one year is divided into six seasons (Ritus) and twelve months.



Try if you can.

- Using the calendar, write the months in the Christian Gregorian year.
- Write the twelve months in the Hindu samvatsar (year).
- In which months does it rain in your district?
- In which months is the maximum hot and the minimum cold air in your district?

Complete the table below using a calendar.

Sr. no.	Festival	Month	Geographic significance
1.	<i>Makar Sankranti</i>	January <i>Paush</i>	1. Crops are ready after winter 2. Temperature slowly rises 3.
2.	<i>Gudhi Padva</i>		1. A new harvest (crop) is brought home. 2. 3.
3.	<i>Diwali</i>	 <i>Ashwin</i>	1. The joy after selling the <i>Kharif</i> crops. 2. 3.
4.	<i>Christmas</i>	December	1. The winter is severe. 2. 3.
5.	<i>Ramazan Eid</i>	 Ninth month in the Hijari Calender	1. The bigning of Ramzan month varies with latitude and seasons. 2. 3.

Table no. 2.1 Indian Festivals and Significance

|| We understood this

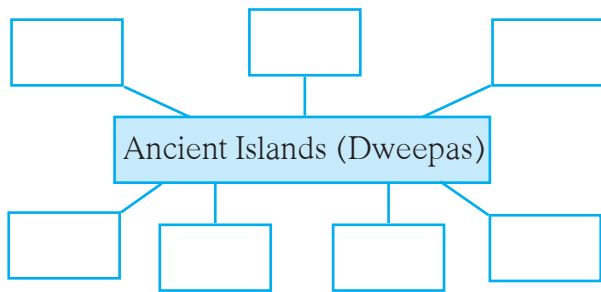
- Understood the concept of the evolution of the Universe as per ancient Indian concepts.
- Understood the concept of the shape of the Earth.
- Understood the information about the continents and the oceans in the ancient period.
- Understood the glorious history of the ancient Indian Geographic Knowledge system.



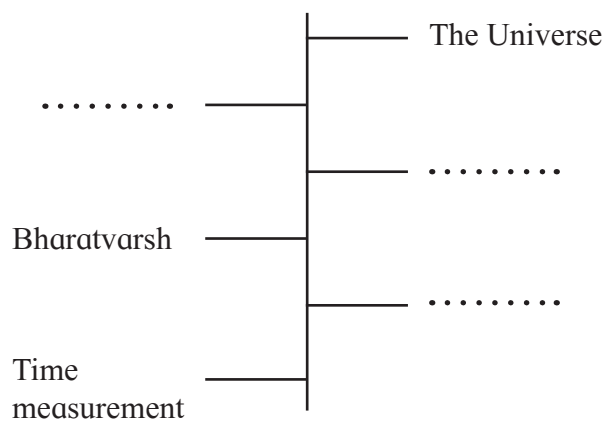
Exercise

A) Complete the concept drawing given below:

1) Ancient Dweepas



2) Ancient geographic concepts



B) Complete the sentences given below by using the correct words given in the bracket.

(*Pushkar*, Asia, the Earth)

- 1) Most of the part of Jambudweep is in ----- continent.
- 2) The area occupied by lakes with lotuses was a part of ---- Dweepa.
- 3) In a lunar eclipse, the shadow of ----- is cast on the Moon.

C) Identify the odd element in the group.

- 1) (a) Lakshdweep (b) Jambudweep
(c) Kushadweep (d) Pushkardweep
- 2) (a) The Moon (b) Stars
(c) Constellations (d) Chandrayan

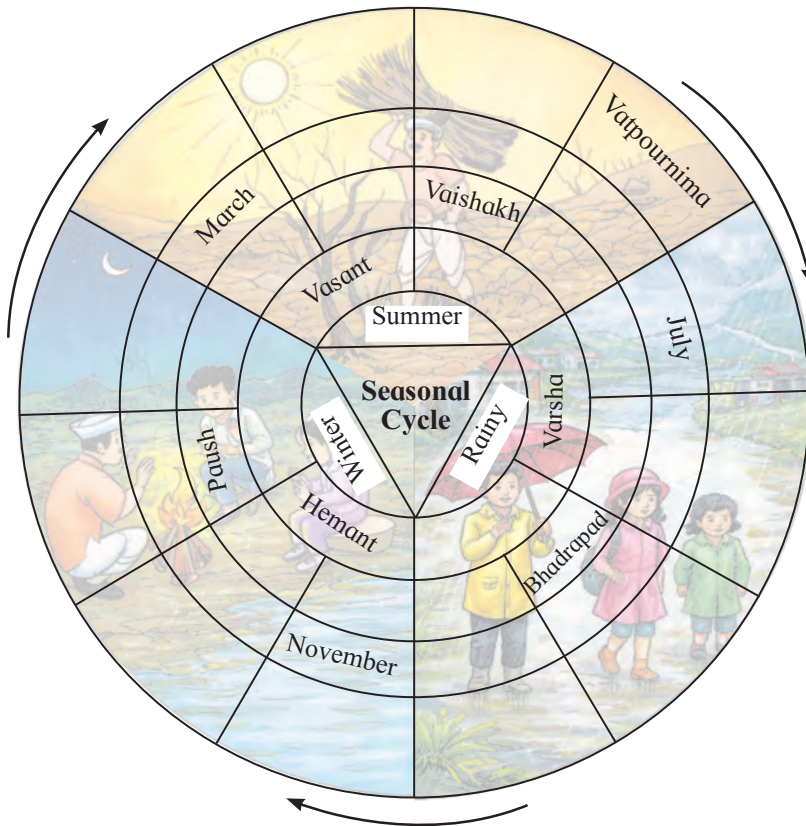
D) Identify who I' am?

- (a) The land has plenty of Jamun trees –
- (b) A big acquious bird or the area of *Kraunch* Mountain –
- (c) The land of *Kush* grass –
- (d) The land surrounded by water –

E) Write short notes.

- 1) The Universe
- 2) The Earth
- 3) *Dweep*
- 4) Eclipse

F) Complete the following activity by using a calendar.



Note: Write the names of the seasons, months in the inner empty spaces and the festivals in the outer empty spaces in the figure.

G) Write the answers of the following questions on the basis of the observations of the Ancient Dweepas figure no. 2.2 – .

- 1) Which Dweepas are included in the African continent?
- 2) To which ancient Dweepa, the land of India is related to?
- 3) In which of the Dweepas, the eastern landmasses are included in?

H) Identify the correct option :

- 1) Which of the following was understood by the ancient Indians through the observations of eclipses?
 - a) change of seasons
 - b) amount of rainfall
 - c) velocity of wind
 - d) positions of the earth and the other planetary objects.

- 2) Which observations are useful for identifying the directions?
 - a) Rain b) Sunrise c) Wind d) River
- 3) What is Jambudweep?
 - a) a small island
 - b) a large land mass
 - c) mountain
 - d) river

Project:

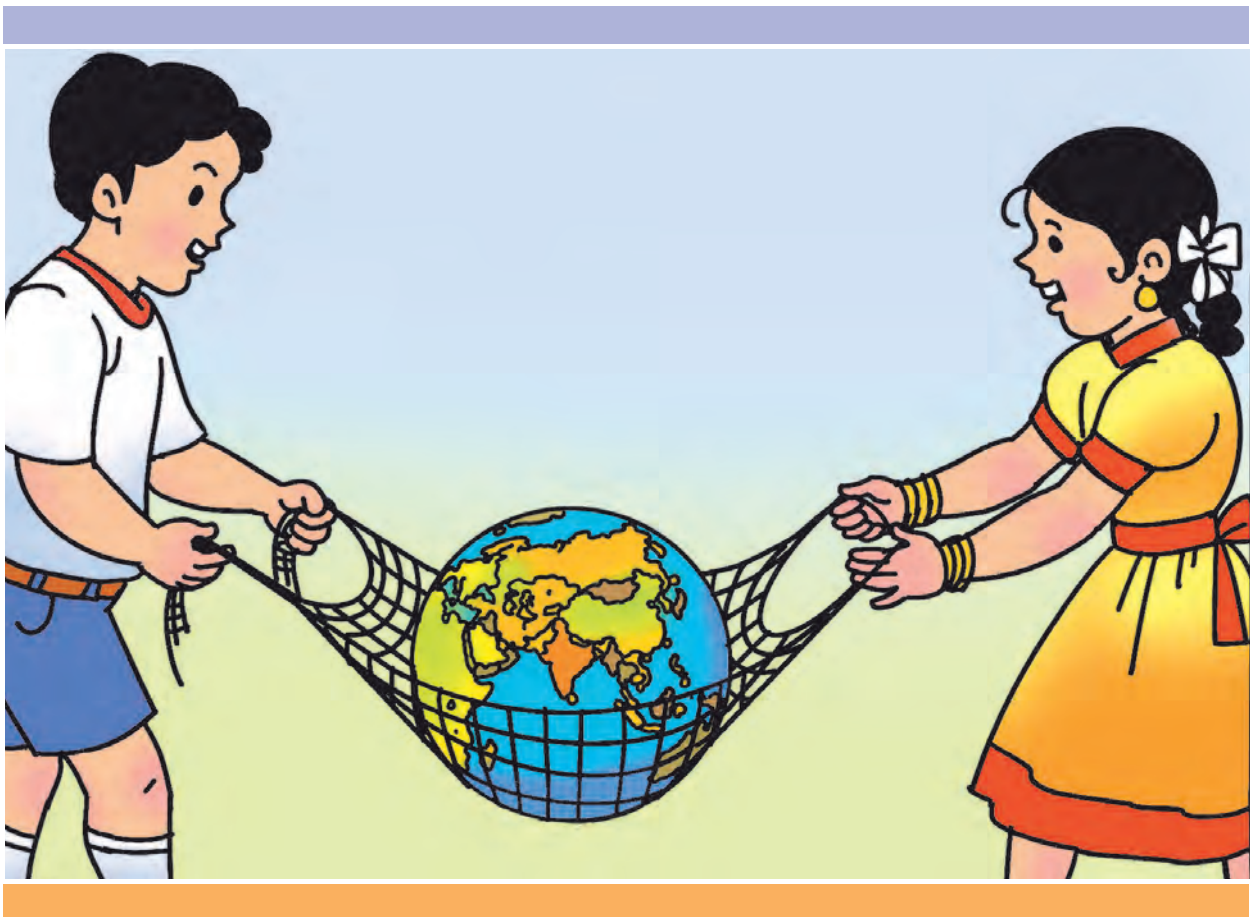
- Present the information about the ancient Indian thinkers in the presentation arranged on the occasion of the Geography Day.

Activity:

- With the help of the internet, collect the information on the travelers who visited India in the ancient period.



‘If there is a fixed goal in life,
any line can show the path’.



**Thought-
provoking
questions** ?

- Why do you think that humans felt the need to construct the imaginary graticule of latitudes and longitudes on the Earth?
- Which scientific method is followed for drawing this graticule on the globe of the Earth?

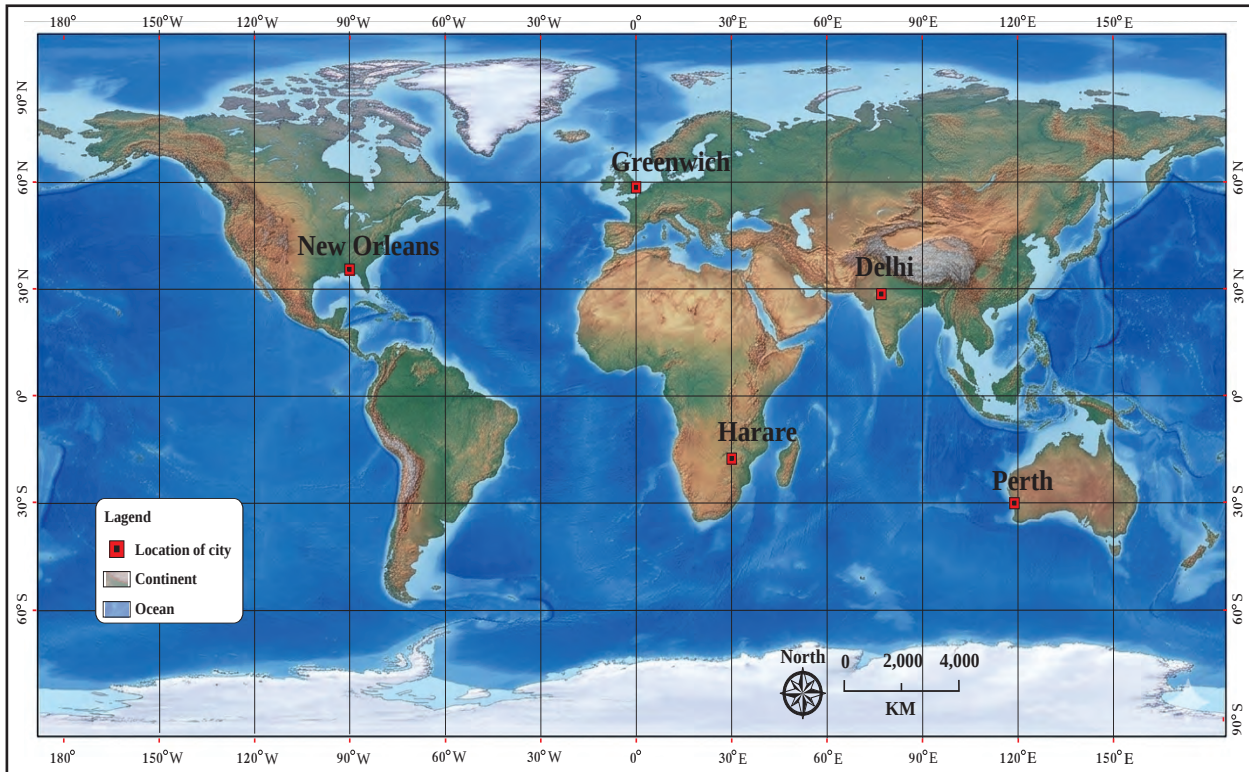


Figure no. 3.1 World Map

Latitudes and Longitudes on the globe of the Earth

- The globe is three-dimensional (3D) model of the Earth.
- Maps are two-dimensional (2D).



Just think.

- Observe the map and the globe and conduct group discussion on their shapes, coordinates and uses.
- Can the vertical and horizontal lines as seen on the map and the globe be drawn actually on the Earth?
- How do we find the locations of the cities seen on the map?
- Are some points or lines necessary to find any location?
- How to find the location of a place on the globe?
- Give examples of two-dimensional and three-dimensional objects.



**Figure no. 3.2
The Globe**

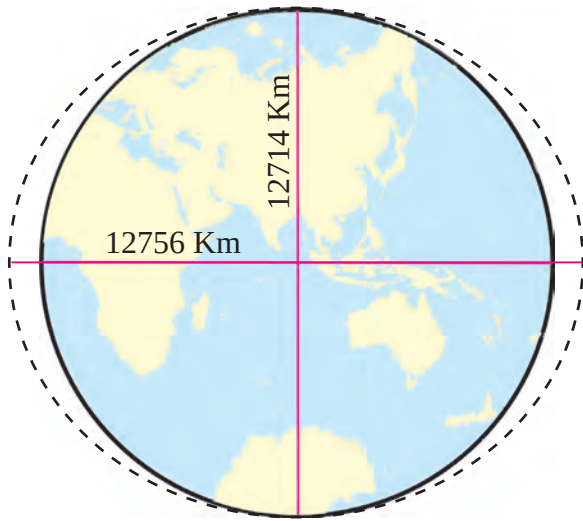


Figure no. 3.3 The size of the Earth

In Figure 3.3, the lengths of the east-west and north-south diameters are shown. Due to Earth's large size, it is not possible to actually draw horizontal and vertical lines on the Earth. To overcome this difficulty, man created a model of the Earth in the form of a globe. A globe is useful for determining the location of places on the Earth. The horizontal-vertical lines on the globe are imaginary. The dashed line in Figure 3.3 shows the actual shape of the Earth. This shape is due to the **centrifugal force**. The Earth is bulged at the equator and flattened at the poles due to the **centrifugal force** created by its rotation.

Angular distance :

To determine the location of any place, one must first see where it is located on the Earth with reference to the center of the Earth. For this, the line joining the location of that place and the center of the Earth is considered. This line makes

an angle with the plane of the **equator** at the centre of the Earth. This angular distance is used for determining the location of a place on the globe.

For example, in Figure No. 3.4, the angular distance ($\angle ABC$) of the place 'A' from the **equatorial plane** is 50° . Measure and note down the angular distance of the place 'M'.

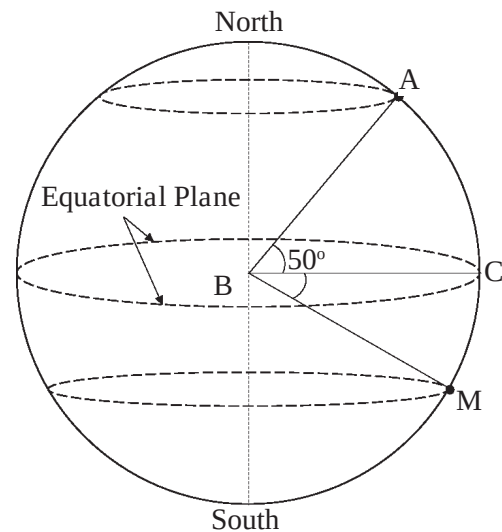


Figure no. 3.4 Angular distance: **Latitude**



Do remember.

In the northern hemisphere or the southern hemisphere, the line joining all the places having 30° angular distance means 30° North or 30° South latitude. Since the angular distance of all these places is the same, all are at 30° latitude. The same concept is applied to all the **latitudes**.

Latitudes :



Just do it.

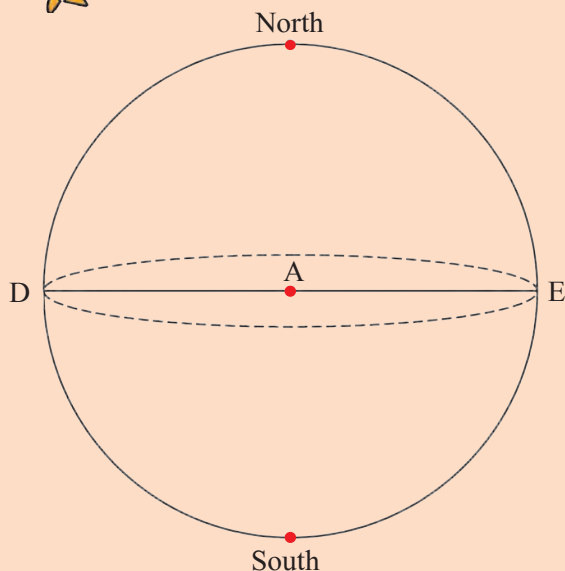


Figure no. 3.5 Practical: Latitudes

Do as directed by using the figure no. 3.5.

- Draw angles of 50° from the point 'A' in the northern part of the circle. Name them as 'B' and 'C'.
- Draw an ellipse ($\bigcirc$) joining the points 'B' and 'C', which will be like the equatorial plane.
- Now, draw angles of 30° from the point 'A' in the southern part of the circle. Name them as 'M' and 'L'.
- Draw an ellipse ($\bigcirc$) joining the points 'M' and 'L', which will be like the equatorial plane.



Tell me.

- Are the distances of the ellipses in both parts of the circle same?
- Compare the ellipses drawn by you and check if they are of equal size or not. Also, tell the reason why these are so.

Geographic explanation –

You must have noticed that, according to the drawing in Figure No. 3.5, the distances between 'B' and 'M' from 'A' are not same. Also, the ellipse with reference to 50° is smaller than that drawn with reference to 30° . Though in the figure, these lines are elliptical, on the globe, they are circular. These circles are called **latitudes**. Since the **latitudes** are drawn by measuring angles, their values are expressed in degrees. These angles are called degrees of latitude. All **latitudes** are parallel to each other.



Just do it.

With reference to Figure no. 3.5, try to understand the concepts of angular distances and **latitudes** through actual activity on the ground with the help of your teachers.

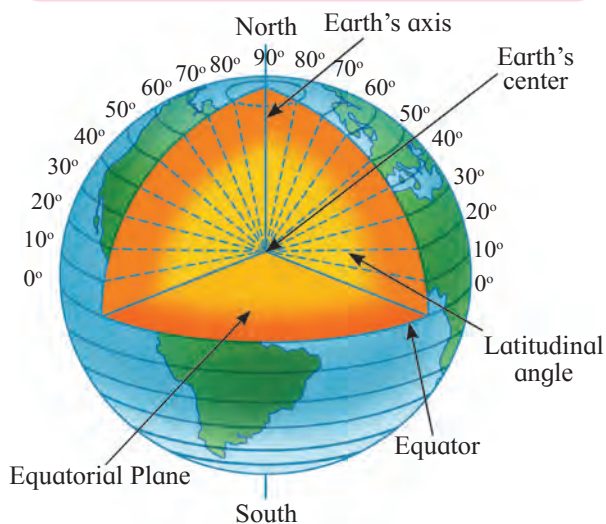


Figure no. 3.6 Latitudes

The angles of **latitudes** are measured from the equatorial plane, as shown in Figure 3.6. So, the **equator** is considered the latitude of 0° . It is also called the 'base latitude' or the 'Great Circle'. The value of **latitudes** increased from the **equator** to the North Pole or the South Pole, but their perimeter decreases.



Figure no. 3.7

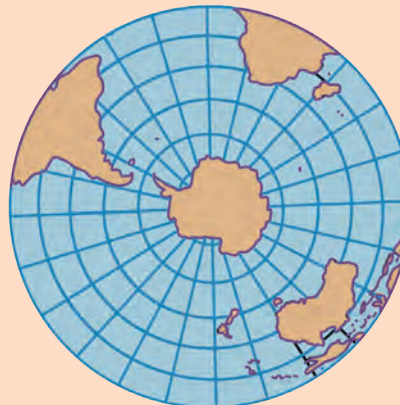


Figure no. 3.8

- Observe the figures given above, identify the hemispheres and name them.



Just do it.

Using the information given in the table below, draw the figure of the globe and write the names of the latitudes and their values.

0°	The equator
23° 30' N	The tropic of Cancer
66° 30' N	The Arctic Circle
90° N	The North Pole
23° 30' S	The tropic of Capricorn
66° 30' S	The Antarctic Circle
90° S	The South Pole

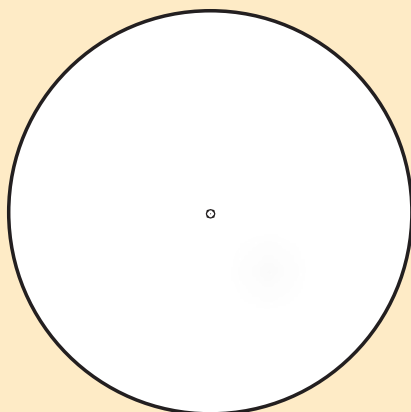


Figure no. 3.9 Practical:
The Main latitudes



Do remember.

A total of 181 latitudes can be drawn on the Earth with an interval of 1°.

- 0° Equator is one latitude.
- 90 latitudes in the northern hemisphere from 1° to 90°.
- 90 latitudes in the southern hemisphere from 1° to 90°.
- The actual distance between two consecutive latitudes on the Earth is 111 km everywhere.

Longitudes :

Answer the following questions by referring to the globe in your school.

- Why are vertical lines drawn on the globe?
- Name the points from where the vertical lines start and end.
- Tell where the distance between two consecutive vertical lines is more or less.

Let us understand how these semi-circular imaginary vertical lines have been drawn on the globe.



Just do it.

Do as directed by referring to the figure no. 3.10

- In the figure, the line AB shows the angle of 0° . Now join the points A and C. Measure the angle subtended by the lines AC and AB and write the angle measurement near 'C'. Now draw a semicircle passing through 'C' joining the North and the South poles. Darken the semicircle drawn with dots in the figure.
- Now consider the point 'D' towards the east and join points 'A' and 'D'. Measure the angle subtended by the line 'AD' with the line 'AB' and write the angle measurement near point 'D'. Draw a semicircle passing through 'D' joining the North and the South poles.
- Draw a line passing through 0° and join the North and the South poles.

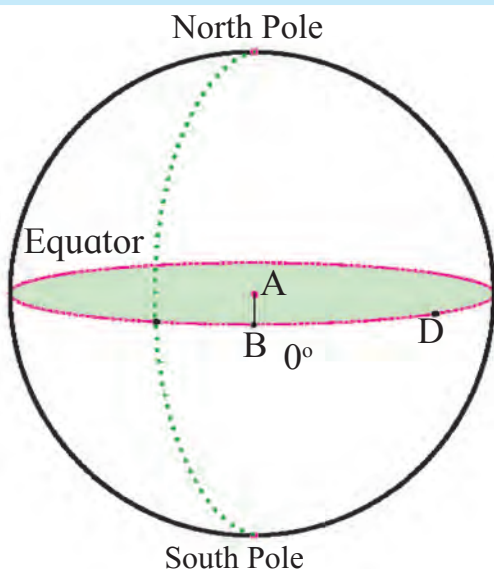


Figure no. 3.10 Angular distance: Longitudes

Geographic explanation –

Based on the activity in Figure No. 3.10, it is understood that 'B', 'C', and 'D' are the angles subtended by the equatorial plane at point 'A'. In this way, semicircular lines joining both the poles are drawn to the east and west of the 0° longitude on the equatorial plane at an interval of 1° . These semicircular lines are called longitudes. The 0° longitude is called the base longitude. The angular distances of the other longitudes from the 0° longitude are expressed in degrees. These are called longitudes. If such longitudes are drawn at the interval of 1° , then the 180° longitude will come exactly on the opposite side of the 0° longitude. In this way, circles are formed on the globe as the longitudes come opposite each other. 0° and 180° longitudes face each other, forming a circle that divides the Earth into the Eastern and the Western hemispheres. If longitudes are in the Eastern hemisphere, then the value of longitudes are expressed as 10° East longitude, 120° East longitude and as 10° West longitude, 120° West longitude if in the Western hemisphere.



Remember this.

The distance between two consecutive longitudes on the Earth.

- On the equator – 111 km.
- On the tropic of Cancer/ Capricorn – 102 km.
- On the Arctic and the Antarctic latitudes – 44 km.
- On the North and the South poles – 0 km.

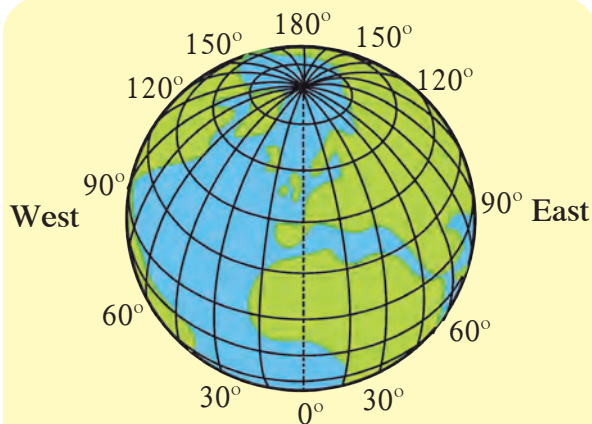


Figure no. 3.11 Longitudes

I am the Globe speaking.

- In my Eastern hemisphere, how many **longitudes** are there?
- In my Western hemisphere, how many **longitudes** are there?
- If all the **longitudes** are counted, how many **longitudes** are drawn on me?



Remember this.

The distance between two consecutive **longitudes** on the Equator is 111 km. For expressing the locations of the places in between (the consecutive **longitudes**), the degrees are further divided into smaller units. The degrees are divided into minutes, and the minutes are divided into seconds. This is a kind of angle measurement. So, the minutes and seconds here are not the units of time, but are the units of angle measurement.

The distance between two consecutive **longitudes** is 1° , which is divided into 60 parts, and each of these is of 1 minute. Further, one minute is divided into 60 parts, and each part is 1 second. These values are shown with the symbols as follows: degree ($^\circ$), minute ($'$), second ($''$).

1 degree = 60' (minutes)

1 minute = 60'' (seconds)

Graticule :

Latitudes and **longitudes** are considered for expressing the location of a place. **Latitudes** and **longitudes** on a globe form a **graticule**. This **graticule** is used for fixing locations on the Earth. In today's modern world, **graticule** is also effectively used.

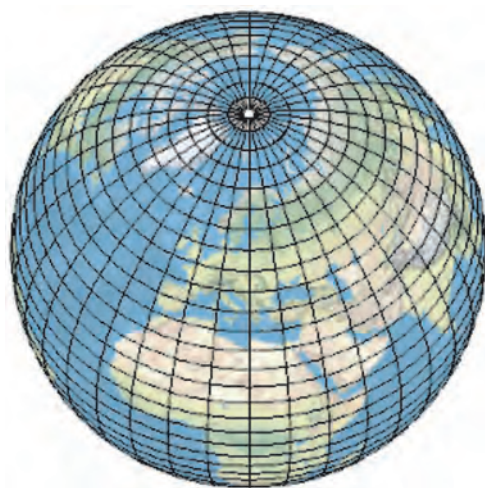


Figure no. 3.12 Graticule



Just think.

Observe the above given **graticule** and discuss in a group.

1. **Graticule** is formed due to which circles?
2. What are the differences between **latitudes** and **longitudes**?
3. For what purpose is a **graticule** used?
4. Tell the names of the objects at home or in the environment that are like a **graticule** and discuss.
5. What can be called a **graticule**? Express in your own words.

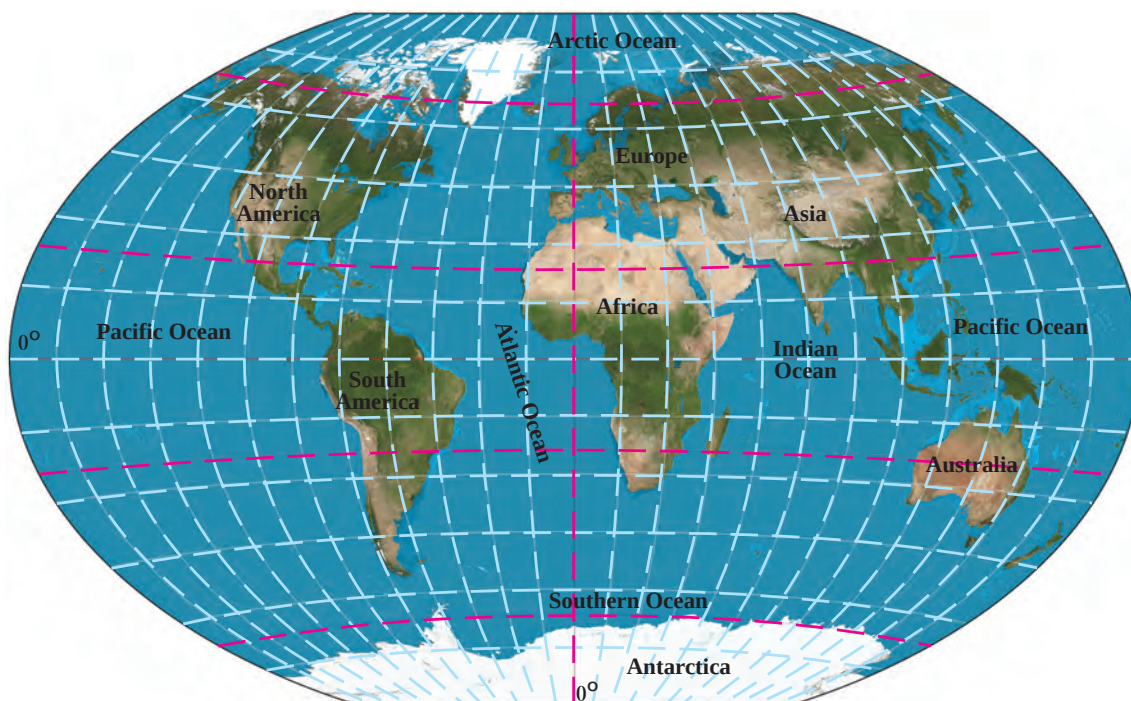


Figure no. 3.13 World: Latitudes and Longitudes

- **Observe figure no. 3.13.**
The interval between the latitudes and longitudes in the map is 15° . Accordingly, answer the following questions.
1. From which continents does the 0° longitude pass?
 2. From which oceans does the 75° East longitude pass?
 3. From which continents and oceans does the 90° West longitude pass?



Just do it.

- Form some groups of students in the class.
- Give globes to some of the groups and world maps to the other groups.
- Find the locations of specific places using the latitudes and the longitudes and conduct groupwise presentations.

Global Standard Time (GMT) -

0° longitude is called the Prime Meridian. The main objective of this longitude is to fix the global standard

time and coordinate the standard times of various countries. This longitude passes through Greenwich, a town near London. This is considered the standard time of that place. (GMT = Greenwich Mean Time). Besides Global Standard Time, UTC (Co-ordinated Universal Time) is also used.

Do you know this?

India has achieved self-sufficiency in the Geographic Positioning System technology. For this, India uses the system of seven satellites and provides accurate location, time and navigation services in the nearby area of 1500 km. This system is called IRNSS – The Indian Regional Navigation Satellite System.

Dramatization: Introduction to the latitudes and longitudes

Latitudes and longitudes sing together on the backdrop of Geography.

“We are the lines of parallels and meridians, but are different.

- ☉ I am the latitude
- ☉ I am the longitude
- ☉ We are spread from North to South.
- ☉ We are spread from East to West.
- ☉ My circumference decreases from the equator to the poles
- ☉ But I don't change, my size remains the same
- ☉ We maintain an equal distance from everyone.
- ☉ We converge at poles.
- ☉ Together in both hemispheres, we are 181.
- ☉ 360 are we as we go through each degree.

☉ We are Circular and 179 in number; however, two are in point form.

☉ We cross the polar points and do not change our appearance.

Both (sing): We intersect each other at right angles every time
That is the reason why a **graticule** is formed!



Remember this.

The Indian Standard Time (IST) officially came into effect from January 1, 1906. The **Indian Standard Time** is based on the 82°30' East longitude that passes through Mirzapur in Uttar Pradesh. This standard time is ahead of the global standard time by 5 hours and 30 minutes.

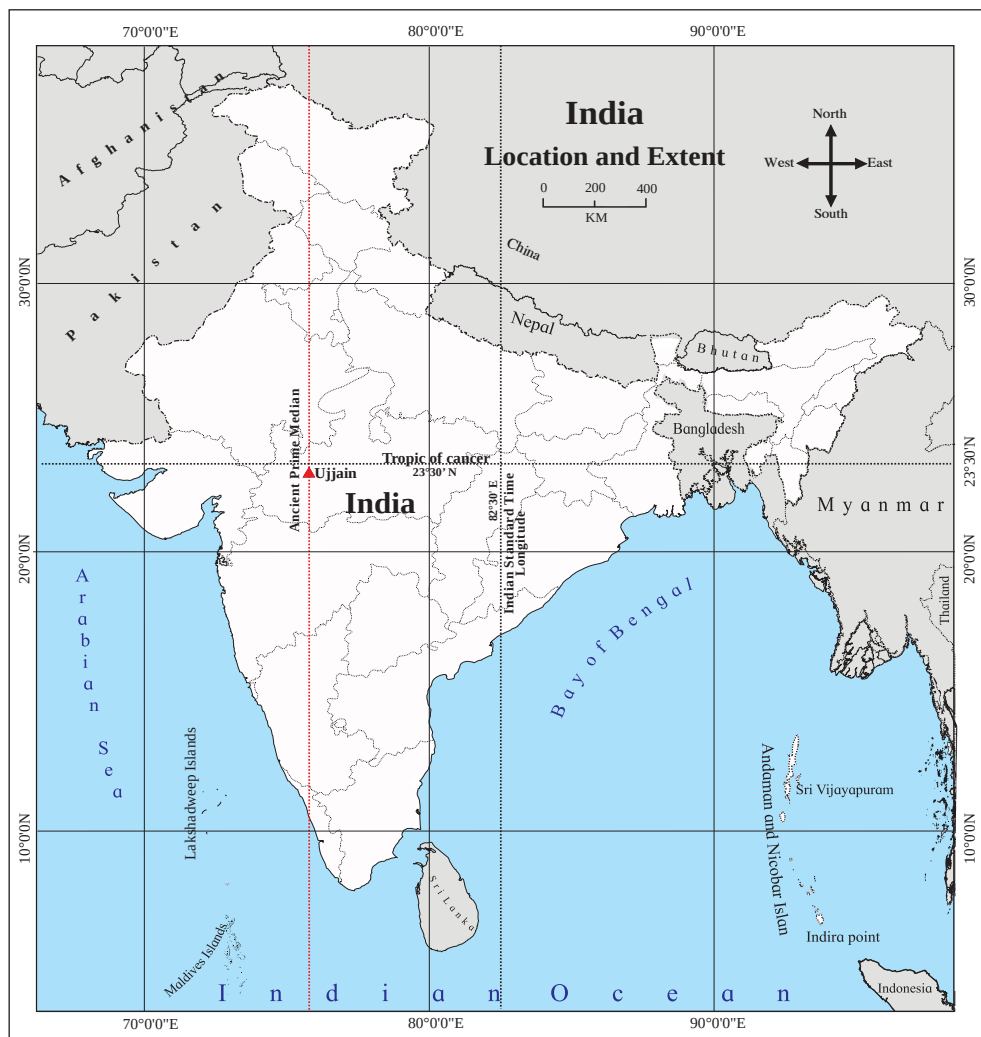


Figure no. 3.14 The Ancient Longitude and the Indian Standard Time

Do you know?

India had its own Prime Meridian before the 0° Greenwich longitude was considered as the Prime Meridian (figure no. 3.14). This was called the central meridian, and it was considered to pass through the city of *Ujjayini* (Ujjain), which was the centre for astronomic studies for many centuries. About 1500 years ago, the famous astronomer 'Varahmihir' used to reside here and study.

The Indian astronomers were aware of the concepts of latitudes and

longitudes, and they also realised the need for a zero or the Prime Meridian. Ujjaini Prime Meridian had become the reference for all the Indian astronomical computations in Indian astronomical books,

We understood this.

- Understood the concepts of angular distances, latitudes and longitudes
- Understood how to fix the location of a place on the earth.
- Understood the concept of Global Standard Time.



Exercise

A) Solve the following questions as directed.

1) Choose the correct option by matching the right pairs from the 'A' and the 'B' groups.

'A'

'B'

- | | |
|-------------------------|-------------------------|
| 1. Tropic of Cancer | A. $23^\circ 30'$ South |
| 2. Tropic of Capricorn | B. $23^\circ 30'$ North |
| 3. The Antarctic circle | C. $66^\circ 30'$ North |
| 4. The Arctic Circle | D. $66^\circ 30'$ South |
- a) 1 – A, 2 – B, 3 – C, 4 – D
b) 1 – B, 2 – A, 3 – D, 4 – C
c) 1 – C, 2 – D, 3 – A, 4 – B
d) 1 – D, 2 – C, 3 – B, 4 – A

2) Identify which are the true statements about latitudes and longitudes and choose the correct option.

1. The 0° latitude divides the Earth into two equal hemispheres.
2. The 0° and the 180° longitudes together divide the earth into the eastern and the western hemispheres.
3. The length of all the longitudes is equal.

4. All latitudes are of the equal length.
Options:

- | | |
|---------------|------------|
| A) 1, 3, 4 | B) 1, 2, 3 |
| C) 1, 2, 3, 4 | D) 1, 2, 4 |

3) Examine the following statements, correct the incorrect statements and rewrite.

1. All longitudes converge at the north and the south poles.
2. The consecutive longitudes are parallel to each other.
3. The 180° longitude is the base longitude.
4. The base longitude divides the Earth into the northern and the southern hemispheres.
5. The equator is also called the Great Circle.

B) Identify the features with the help of a Globe.

1. The tropic of Cancer, the tropic of Capricorn, the Equator, the base longitude
2. The 90° East, 90° West, the 5° East, 90° North

3. Brazil, India, Japan, China
4. Moscow, Delhi, Sydney, Tokyo

C) The figure below represents one hemisphere. Answer the following questions by observing the figure.

1. The figure 3.15 represents which hemisphere?

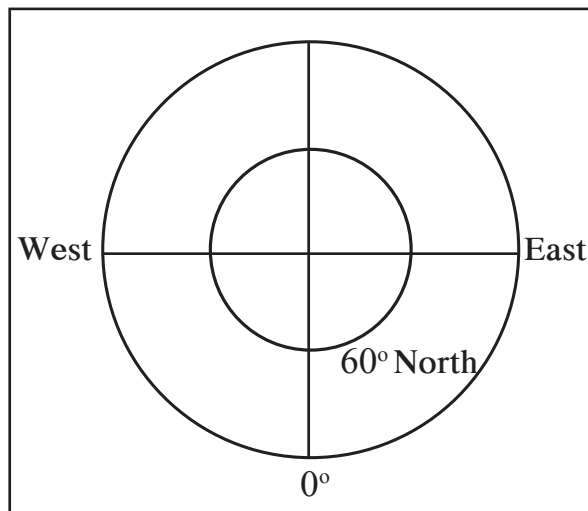


Figure no. 3.15

2. How many circles are shown in the figure?
3. How many **latitudes** are shown in the figure?
4. How many **longitudes** are shown in the figure?
5. Names of how many circles can be expressed for sure?

D) Explain the difference between the latitudes and the longitudes with the help of a figure.

E) Choose the correct option from the bracket and write in the boxes of figure no. 3.16 by observing the figure.

(Equator, the **Arctic Circle**, the **Tropic of Cancer**, the base longitude, the **Tropic of Capricorn**, the **Antarctic Circle**)

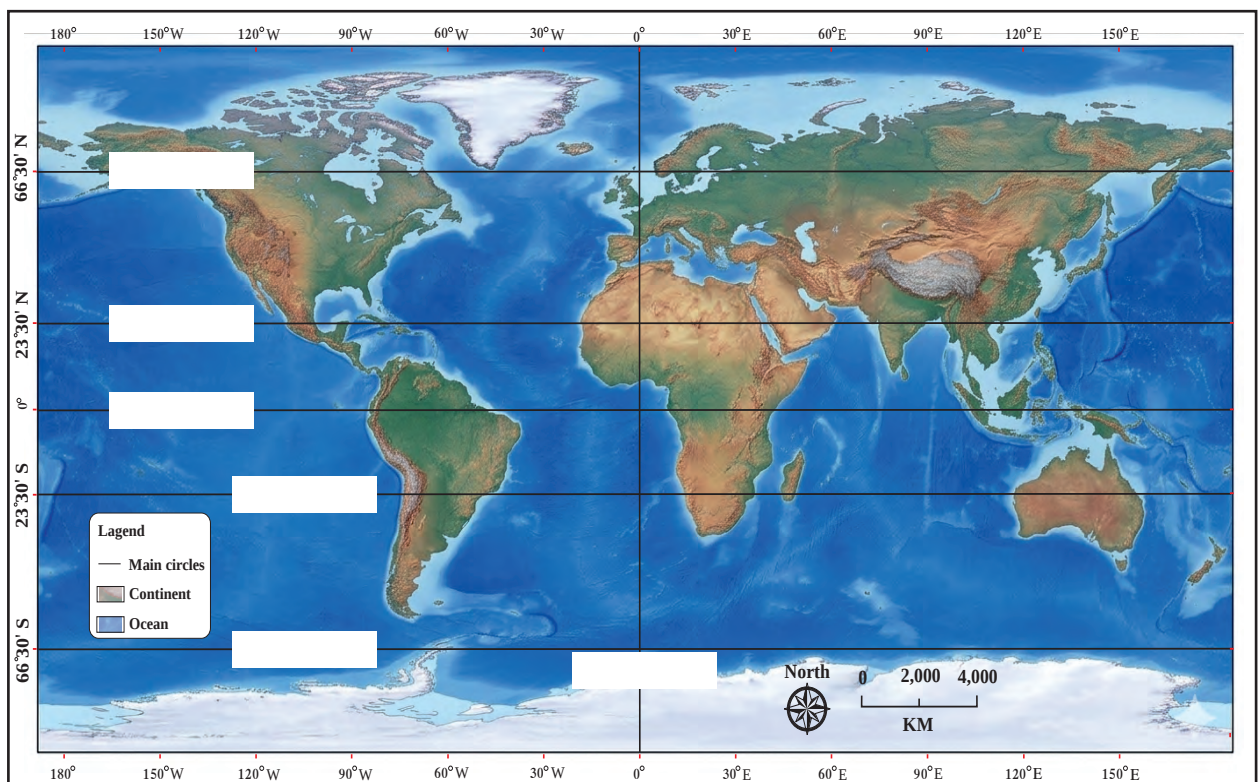


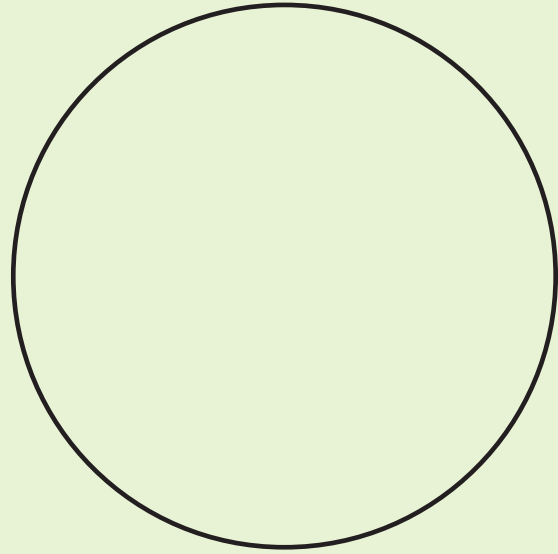
Figure no. 3.16 Activity: The Main Circles

F) Answer the following questions based on the observation of figure no 3.13.

1. From which oceans and continents do all the **longitudes** pass?
2. From which oceans and continents does the **Equator** pass?
3. From which continents and oceans does the **prime meridian** pass?
4. From which continents do both the 0° circles pass?
5. How many **latitudes** on the globe are circular in shape?

Activity:

- Draw the **graticule** of **latitudes** and **longitudes** by using the figure given below:



- 'Eartha' is the largest rotating Globe in the world. Gather the additional information about 'Eartha' with the help from teachers and internet.



‘The knowledge is achieved from experiences,
And the observation leads to experiences!’



Thought-provoking questions ?

- The instruments required for practicals in geographic studies are shown in the picture above. Can you identify these instruments?
- Enlist the instruments required for practicals that you know other than these.
- Which practicals in Geography can you conduct with the help of the instruments given above?
- What changes do you think might happen in the methods of cartography (map making) in the future?



Friendship with map

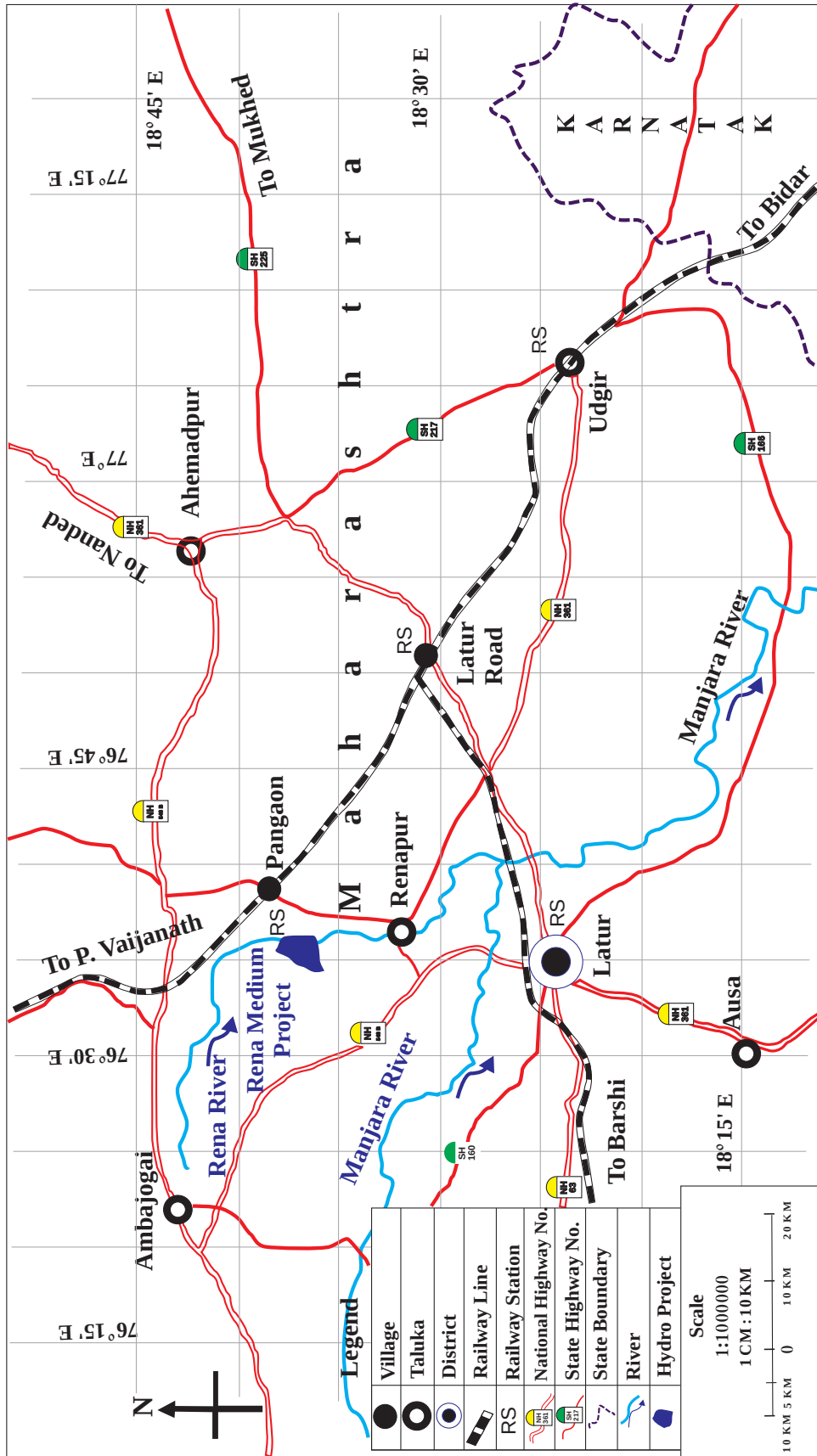


Figure No. 4.1: Map Reading



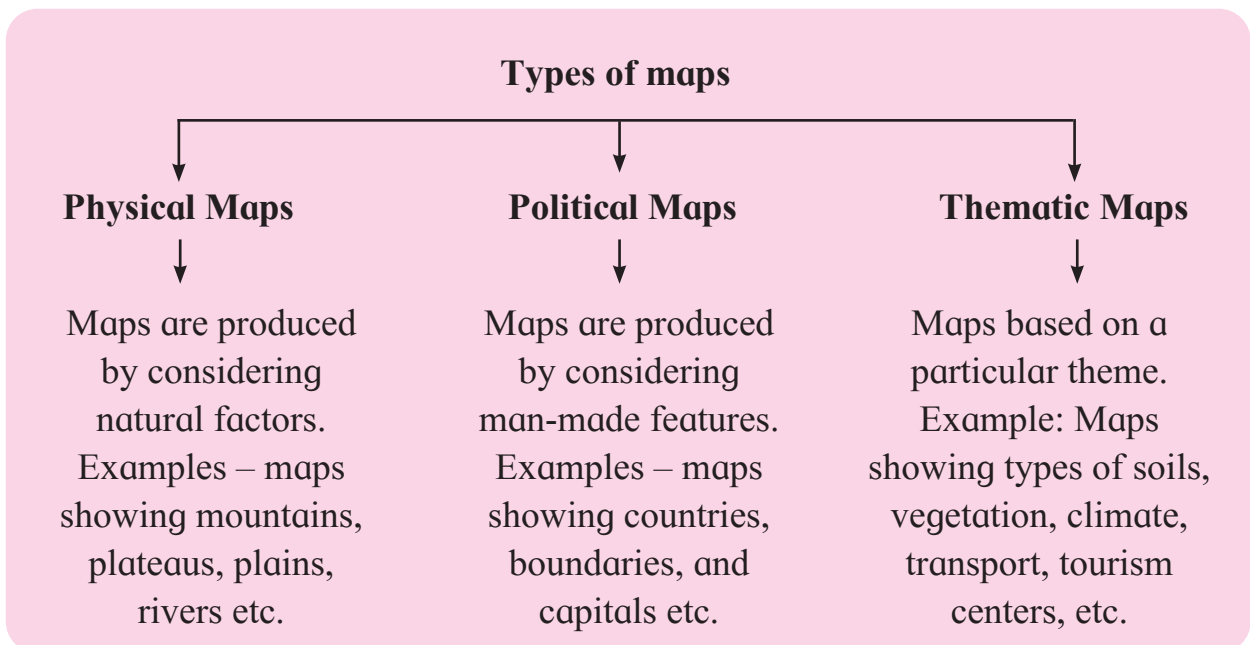
Tell me.

- Read the given map in figure no 4.1 and answer the following questions.
- 1. State the latitudinal and longitudinal extent of the map.
- 2. State the scale of the map.
- 3. Towards which direction does the land slopes in the map?
- 4. Where is the source of the Rena River?
- 5. Which type of modes of transportation are shown in the map?
- 6. State the names of the railway stations on the map.
- 7. Which hydro-projects are there on the map?
- 8. State the direction of the railway route that is going towards Bidar.

Various types of instruments are used for learning the subject of Geography. Geography is a discipline that is best understood through practical exercises and experiential learning.

Geographic Explanation -

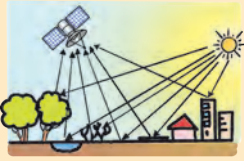
Maps are a very effective learning tools for Geography students. After fixing the location of a place on a globe, we have to prepare a map by considering its direction and using conventional signs and symbols. The figure drawn on a flat surface by using conventional signs and symbols, directions, legend and scale, is called a map.



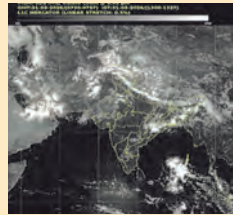


Let us know this.

Tools of Information and Communication Technology for Geographic studies



Remote Sensing



Satellite Image



Geographic Information System (GIS)



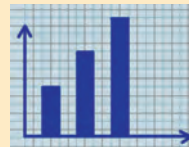
Global Positioning System (GPS)



Digital Maps and online mapping



Drone



Statistical Records



Educational Websites and App

Figure no. 4.2 Tools of Information and Communication Technology



Let us discuss.

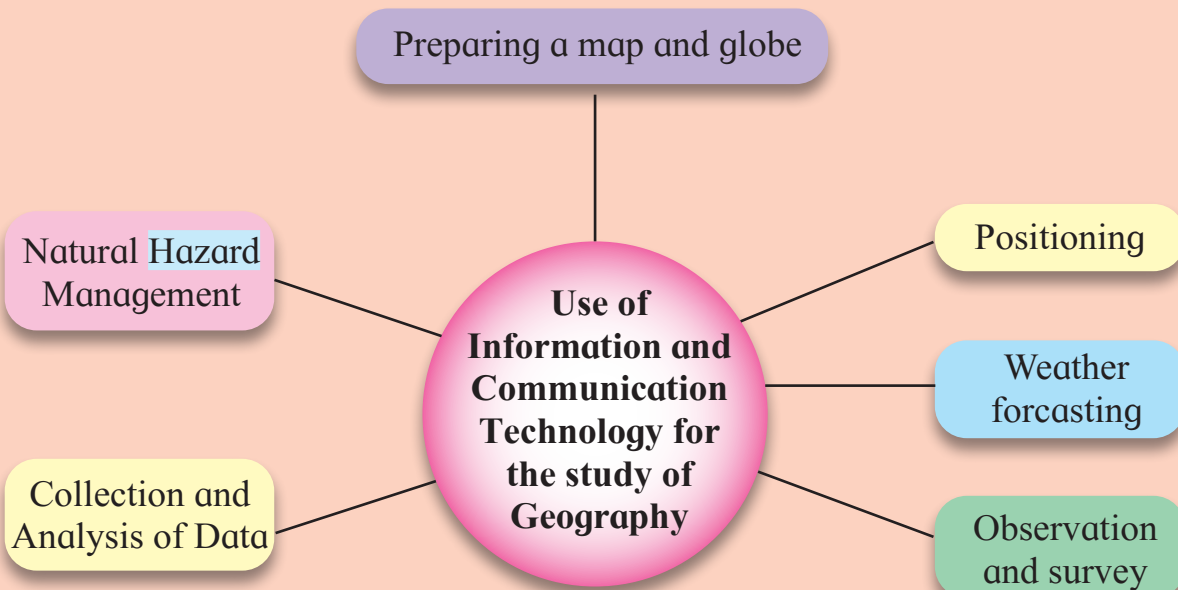


Figure no 4.3 Use of Information and Communication Technology



Elements of a Map

The elements of a map are crucial for making a complete map. For accurate data, directions, analysis, and reading, the elements of the map are useful.

• Title, Subtitle, Scale, North Arrow, Legend: Conventional symbols and signs, Latitudes, Longitudes

• Identify the elements in the map given below and write in the respective box.

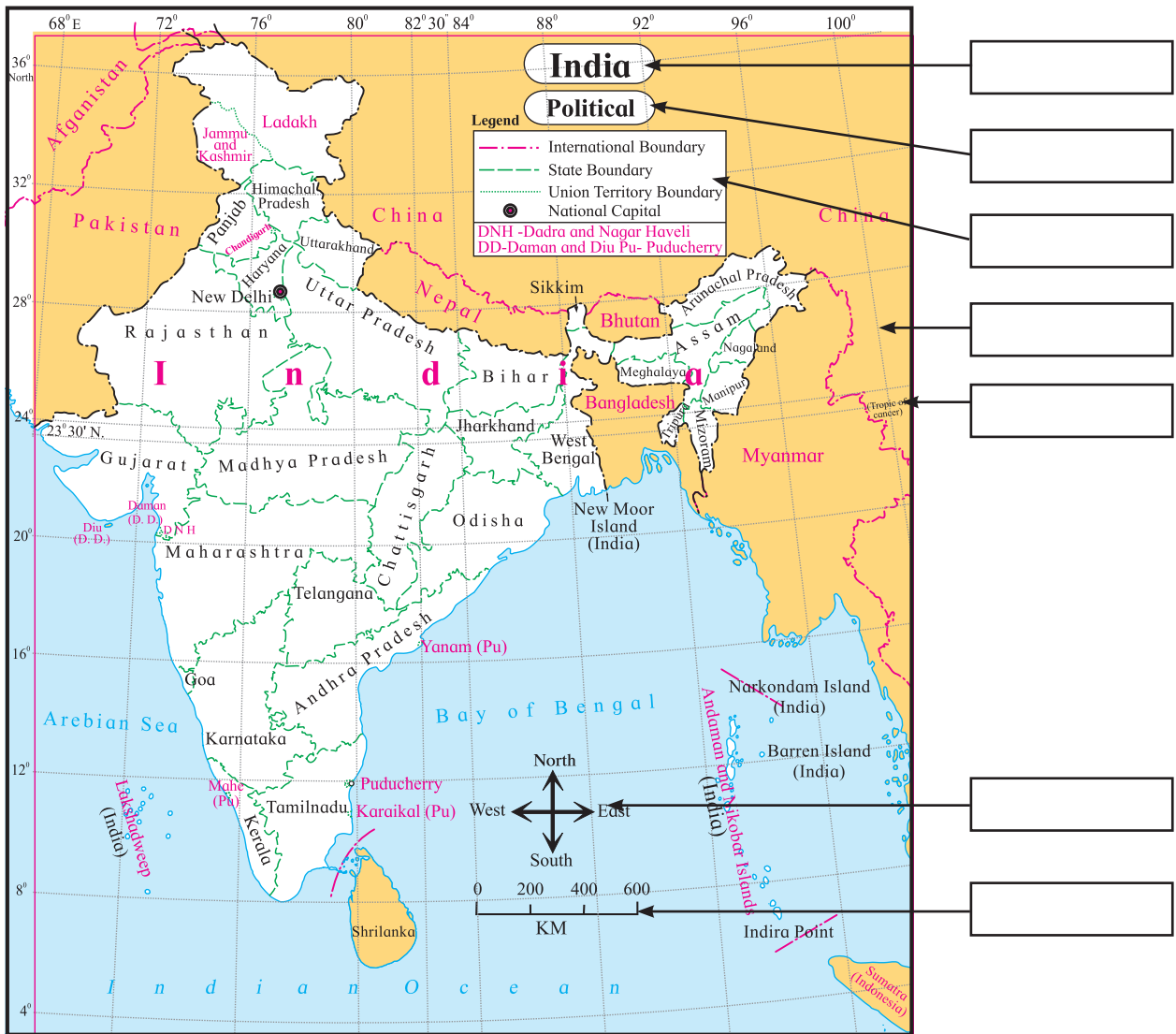


Figure no. 4.5 Elements of Map

Map Scale :

The distance between two places on the map and the distance between the same two places on the ground is not the same. So to express the interrelation between these two, map scale is used. There are three main types of map scale.

1) Verbal scale – 1 cm = 1 km

2) Numerical scale – 1:100000

3) Graphical scale (Scale bar) - 0 1 2 km



Try if you can.

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- Measure the length of your school building and convert it into all three types of map scales given.

Conventional Signs and Symbols

National Highway		Port		Pass	
State Road		Fort		Police Station	PS
Village / Settlement		Lake		Railway Station	RS
City/Town		River		Contours	
Capital		Coal Mine		Light House	
Railway		International Border		Post Office	PO
Airport		Peak		Reserved forest	RF

Table no. 4.6 Conventional Signs and Symbols

Latitudinal and longitudinal reading:

a) Latitudinal extent: $8^{\circ} 47' 32''$ S. (Eight degrees, forty-seven minutes, thirty-two seconds South) to $18^{\circ} 30' 20''$ N. (Eighteen degrees, thirty minutes, twenty seconds North)

b) Longitudinal extent: $34^{\circ} 47' 30''$ W. (Thirty-four degrees, forty-seven minutes, thirty seconds West) to $73^{\circ} 59' 32''$ W. (Seventy-three degrees, fifty-nine minutes, thirty-two seconds West).

- **Find the latitudinal and longitudinal extent of India and write.**

Latitudinal extent: ---- $^{\circ}$ 4' N to ---- $^{\circ}$ 6' N.

Longitudinal extent: ---- $^{\circ}$ 7' E to ---- $^{\circ}$ 25' E.

- **Observe and make notes.**

Groups of students should record the minimum and maximum temperatures on the school campus with the help of a thermometer. Also, record the daily rainfall using rain gauge. Note these records in the table given below and prepare appropriate graph (multiple line graph and simple bar graph).

Sr. No.	Day	Date	Temperature ($^{\circ}$ C)		Rainfall (mm)
			Minimum	Maximum	

- Observe the graphs given below and answer the questions.

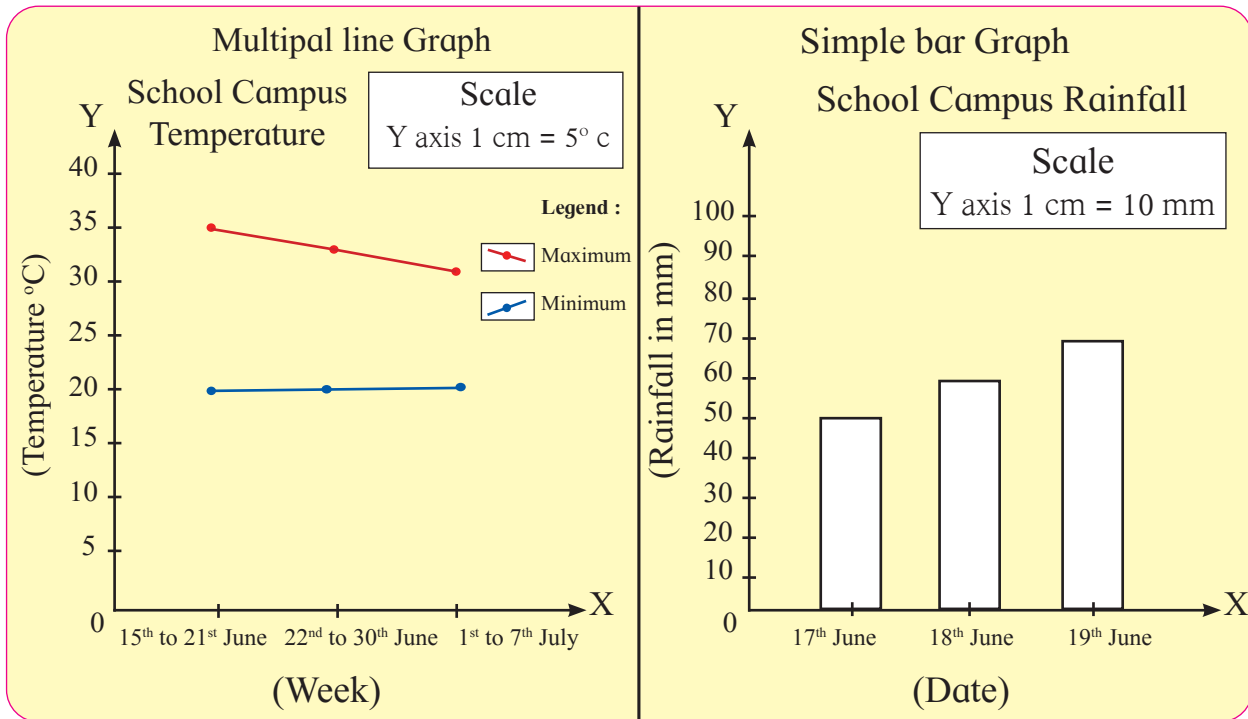


Figure no. 4.6 (A)

Figure no. 4.6 (B)

Questions :

- Identify the type of graph in figure no. 4.6 (a).
- In which week is the temperature maximum?
- In which week the range of temperature is maximum?
- Write the scale of the graph shown in figure no. 4.6 (b)
- How much is the rainfall on June 18th?
- State the difference in the amount of rainfall between 17th June and 19th June.

Major Types of Graph

- Simple line graph – To compare only one variable
- Line graph – To indicate temporal changes
- Multiple line graph – for comparison of more than one variables on the single graph.

Besides these, joint bar graph, divided bar graph, pie charts etc. are important types of graph.



Remember this.

Graticule location

Latitudes and longitudes intersect each other at specific points on the Earth. These points are called graticule locations. These locations are shown with 'location pin' 'location marker'. These are useful for fixing the location of any place on the Earth.



Tell me.

- Where have you been for a field visit?
- In which direction is that place from your school?
- Which means of transport did you use to reach that place?
- Which objective of yours is achieved by visiting that place?
- Where else would you like to go for a field visit?

Field visit: Studying the geographic and cultural elements of a selected geographic place through a field visit

Places for Field Visit

Education
science centers, libraries, universities, research centers, observatory,

Scenic
coastal areas, rivers, waterfalls, sanctuaries, lakes, reservoirs, hill stations,

Historical
forts, castles, palaces, caves, monuments, museums,

Religious
temples, places of worship, holy places, pilgrimage sites,

Cultural
theatres, cinema halls, festival sites, cultural centers,

Social
orphanages, old-age homes, local offices, markets,

Industrial
factories, business, processing units, electricity centers, IT companies,

Recreational
gardens, stadiums, swimming tanks, art centers,

Objectives of field visit:
1)-----
2)-----
3)-----
4)-----

Importance of field visit: Field visit serves as one of the most important primary data sources for geographic studies. 'Knowledge through actual experience' is the main characteristic of this source. When we actually visit a place to collect data about that place, it is considered a field visit. A specific geographic place can be selected, and the geographic and cultural elements of that place can be studied through a field visit. So, a field visit is important in geographic studies.

Planning and Preparation for Field Visit:

- The objectives of the field visit, the selection of a place, prior permission, transport arrangements, schedule, and collection of materials for the field visit.
- Report writing:** A write-up/ note based on the data collected during the field visit

Q1. How will you prepare for a field visit?

Q2. What precautions will you take concerning the environment during the field visit?

Tools required for field visits

- Use the objects given below to complete the given activity.

(map, compass, notebook and pen, pencil, first-aid box, binoculars, Google map, mobile phone, camera, means of transport, questionnaire, water bottle, cap, money, bag and tiffin, identity card)

- | | |
|---|--|
| <ul style="list-style-type: none"> • For journey <input style="width: 50px; height: 20px;" type="text"/> • For expenditure <input style="width: 50px; height: 20px;" type="text"/> • For finding the sites and places <input style="width: 50px; height: 20px;" type="text"/> • For accurate places and routes <input style="width: 50px; height: 20px;" type="text"/> • For deciding directions <input style="width: 50px; height: 20px;" type="text"/> • For photography <input style="width: 50px; height: 20px;" type="text"/> • To see the objects at far distances. <input style="width: 50px; height: 20px;" type="text"/> • For sketching <input style="width: 50px; height: 20px;" type="text"/> | <ul style="list-style-type: none"> • For noting data and observations <input style="width: 50px; height: 20px;" type="text"/> • For asking questions during interview <input style="width: 50px; height: 20px;" type="text"/> • For collecting samples <input style="width: 50px; height: 20px;" type="text"/> • For protection from sun <input style="width: 50px; height: 20px;" type="text"/> • For quenching thirst <input style="width: 50px; height: 20px;" type="text"/> • For first-aid <input style="width: 50px; height: 20px;" type="text"/> • To prove the self-identity <input style="width: 50px; height: 20px;" type="text"/> • For communication <input style="width: 50px; height: 20px;" type="text"/> |
|---|--|

We understood this....

- Understood the concepts of area observation and field visit.
- Understood the elements of a map.
- Can draw/ construct a graph based on the data given.
- Can read a map and a graph



Exercise

A) Depict the following elements in the world map with a legend.

- 1) The Equator and the Prime Meridian
- 2) The Australian continent
- 3) The Atlantic Ocean
- 4) India

B) Construct a simple bar graph based on the data given below.

Taluka	Ambajogai	Dharangaon	Pandharpur	Kamti
Rainfall in mm (Year 2024)	622	559	732	845

C) Construct a line graph based on the data given below.

Taluka	Ambajogai	Dharangaon	Pandharpur	Kamti
Temperature Degree C° (March 2024)	34	35	37	30

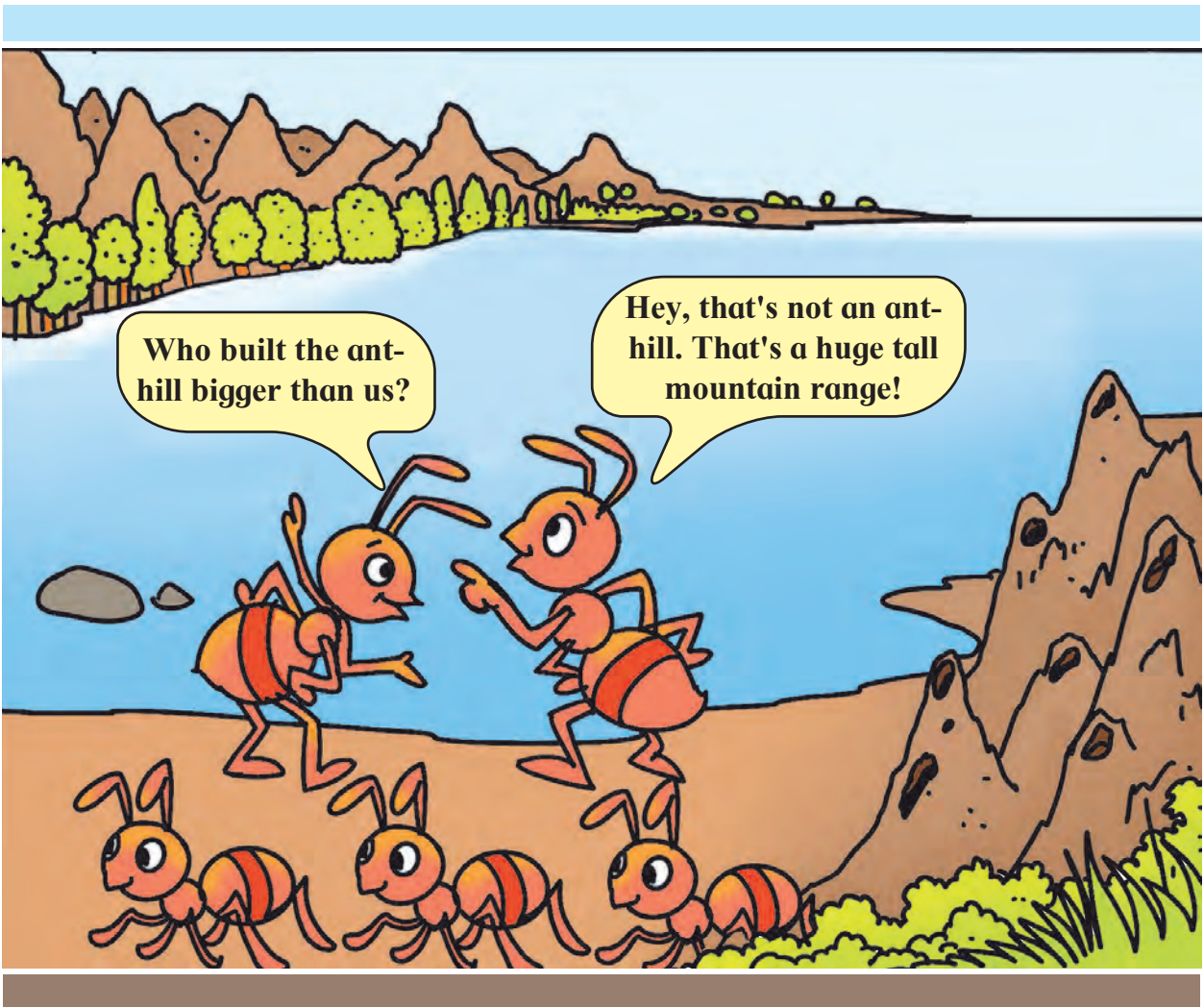
Activity:

- Prepare a questionnaire for a field visit to a place in your surrounding area.
- Enlist the modern techniques useful for reaching an unknown place properly.



‘The lithosphere is adorned by landforms,

The Earth is shaped by temperature and pressure through time!’



**Thought-
provoking
questions** ?

- Let it be naturally built mountains or an anthill, both are forms found in the Lithosphere. Find other such forms of Lithosphere.
- Enlist the landforms around you.

Introduction to the layers of the Earth

Observe.



Figure no. 5.1 Spheres of the Earth

Complete the table given below by observing Figure No. 5.1

Nature of the sphere	Name of the sphere
Solid	
Liquid	
Gaseous	
Habitat of living organisms	

Table no. 5.1 Types of spheres

Observe Table No. 5.1 and answer the following questions

- Classify the components shown in the figure into 'natural components' and 'man-made components'.
- Which means of transport are shown in the figure?
- In which sphere do birds and aeroplanes fly?

- In which of the Earth's spheres do ships travel?
- Which of the Earth's spheres is used for constructing roads and railways?
- Which of the spheres of the Earth in the figure are the trees, birds, humans and fish?



Try to find.

Conduct a comparative study of the environment of your region and that of the other regions. On the basis of this, understand the effect of various spheres on the environment.

There are various layers of the Earth on which we live. These mainly include the lithosphere, hydrosphere, atmosphere and biosphere.

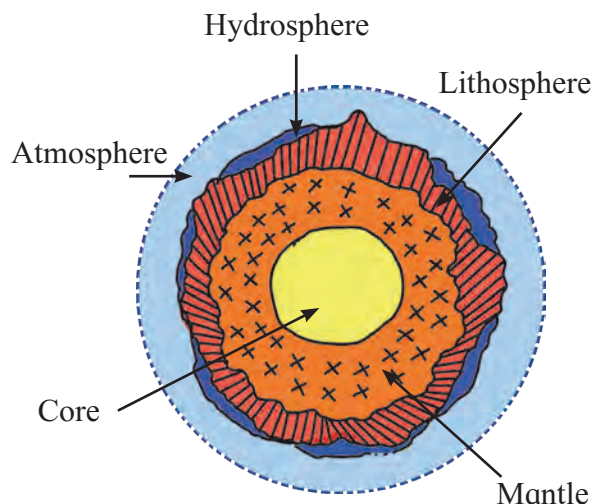


Figure no. 5.2 – Cross section of the Earth and the spheres

Geographic explanation –

About 71% of the Earth's surface is covered with water, while the remaining 29% is land. This land portion is called 'Lithosphere', which we also refer to as 'landmass'. The 71% of the portion covered with water is also part of the lithosphere, which we call the 'ocean floor'. The landmass is the 'upper layer' of the lithosphere, while the ocean floor is the 'lower layer'. (See figure 5.3). Some part of the lithosphere is also occupied by the 'biosphere'.

The thickness of the Earth's lithosphere ranges from 100 to 150 km, but this thickness is not uniform everywhere around the Earth. (See figure 5.2).

In its initial stage of formation, the Earth was a highly heated, gaseous sphere. Over time, this gaseous sphere transformed into a solid sphere, giving rise to the present Earth. However, the Earth's interior is not entirely solid. We will study this in the interior structure of the Earth. The outer portion of the Earth cooled layer by layer, forming the solid part which we call the 'Lithosphere.' Direct and indirect observations of the

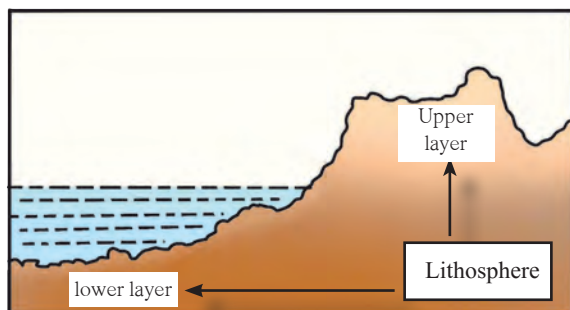


Figure no. 5.3 – Lithosphere : Upper layer and lower layer.

lithospheric materials reveal that, the lithosphere is not a homogeneous entity, but it is composed of diverse types of rocks and minerals.

After studying the interior of the Earth, it is found that, the lithosphere is comparatively harder, called 'Crust'. Geologists have identified two parts of the lithosphere. The one that is in the form of continental lithosphere is also called 'Continental crust'. The other one is the oceanic lithosphere, which is also called as 'Oceanic crust'.



Try to understand me.



**Figure no. 5.4:
The nature of the Earth**

Which questions regarding the interior of the Earth come to your mind when you look at the figure given above? Enlist those questions.

-
-
-
-

|| Interior of the Earth

The radius of the Earth is approximately 6400 km. Because of this, so far, it has not been possible to directly reach the center of the Earth using any tools. However, geologists have acquired information about the interior of the Earth by studying earthquake waves. Further, geologists are still in the process of acquiring information about the increasing temperature from the surface to the center, inferences about the density of elements there and the components that are given out through the volcanic eruptions.

On the basis of the information about the propagation of earthquake waves, the model of the interior of the Earth is generated. With the additional knowledge of the Earth's magnetism and gravity, the Earth's interior is divided into various layers. From the surface of the Earth to its centre, there are three layers: The crust, the mantle and the core.



Find me.

The layers in the interior of the Earth are not continuous. The names of the scientists who discovered that there are discontinuities between the layers due to layer-wise changes in densities are given to the respective discontinuities. With the help of your teachers, find out information about these discontinuities using the internet.

Layers in the interior of the Earth –

The layers in the interior of the Earth are composed of various chemical compounds. At the time of its origin, the Earth was in the form of a mixture of extremely hot dust and gases. Eventually, it was converted into a high-temperature

liquid form. When it was in liquid form, the light and heavy elements were separated according to their depths in various parts of the Earth. In this process, the lighter elements such as Silica and Aluminum settled in the upper parts, whereas the heavier elements such as Nickel and Ferrous settled in the deep middle parts.

A) The Crust -

The Crust is the uppermost part of the lithosphere of the Earth. This is solid in nature and is composed of various types of layers. In general, the Crust is divided into two parts. The upper one is 'continental crust', and the one that is below the oceans is called 'oceanic crust'.

1) Continental crust: This is mainly composed of lighter elements such as Silica and Aluminum. So it is called 'SiAl' (Si+Al).

2) Oceanic crust: The oceanic crust is comparatively thin, and the upper layer of this is composed mainly of stratified sedimentary rocks, below which is the layer of igneous rocks. This layer is composed mainly of elements such as Silica and Magnesium. So, it is called 'Sima' (Si+Mg).

B) The Mantle –

There is a layer of greater thickness and hard rocks below the Crust. This layer is in between the Crust and the Core, it is called 'Mantle'. The mantle is divided into the 'outer Mantle' and the 'inner Mantle'.

1) Outer Mantle – It is inferred from the study of earthquake waves that, this layer could be liquid (flowing). The temperature of this layer is similar to the melting point of the rocks composed. As a result, the rocks here are in semi-molten conditions. Therefore, this layer is in a semi-fluid state. This semi-fluid characteristic of this

layer is responsible for the movement of lithospheric plates. These movements are responsible for earthquakes. The friction between the plates is also responsible for earthquakes.

2) Inner Mantle – This layer is more solid than the Outer Mantle. The structure and the density of rocks here suddenly change.

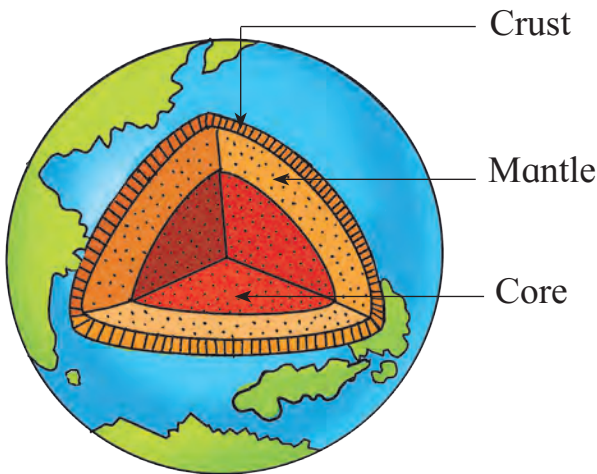


Figure no. 5.5 (A): The layers in the interior of the Earth

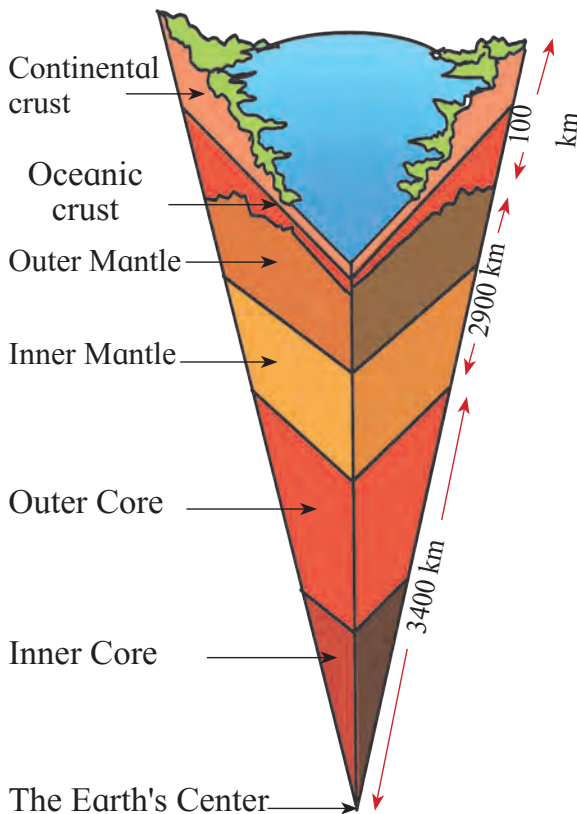


Figure no. 5.5 (B): The cross-section of the Earth's interior

C) The Core -

Below the Mantle starts the Core of the Earth. There is tremendous pressure on the Core. The samples of the elements from the Core are not available for analysis. However, the scientists have inferred that, there must be heavy elements such as Nickel and Ferrous. The Core is also called as 'NiFe' (Ni + Fe). The Core has two different states.

1) Outer Core – This part of the Core, which is between the Mantle and the Inner Core, is in a liquid state. Due to the movements of the metals in the liquid form in this part, the magnetic field of the Earth is created, which saves the biosphere from solar winds.

2) Inner Core – This is the innermost layer in the interior of the Earth, which is in a solid state. The experts think that, in spite of having extreme temperatures at the centre, this part is in a solid state because of the extreme pressure there.

Do you know?

The temperature increases with increasing depth from the surface of the Earth. Approximately, there is an increase of 1°C with each 32-meter depth. Example – the increasing temperature in a coal mine.



Do you know this?

Comparative Information of the layers of the Interior of the Earth									
Sr. No.	The Main Division	Location	Sub-layer	State	Thick-ness of layer	Temperature	Density	Main elements	Main rocks
1.	The Crust	The outer-most part of the Earth	Continental Crust (SiAl)	Solid	Average 30 to 70 km	The average tem-perature of the surface is 15° C. It increases by 1° C with every 32 meters of depth.	Appro. 2.7 gm/cm	Silica (Si), Aluminum (Al)	Gran-ite
			Oceanic Crust (SiMa)		Average 3 to 5 km		Appro. 3.0 gm/cm	Silica (Si), Magnesium (Mg)	Besalt and Gabro
2.	The Mantle	The layer situated between the Crust and the Core	Outer Mantle	Semi-fluid	Appro. 2900 km	Appro. 1400° C to 3000° C	Appro. 3.3 gm/cm	Silica (Si), Magnesium (Mg), Fer-rous (Fe)	-
			Inner Mantle				Appro. 5.5 gm/cm		
3.	The Core (NiFe)	Centre of the Earth, below the Mantle	Outer Core	Liquid	Appro. 3400 km	Appro. 3000° C	Appro. 10 gm/cm	Nickel (Ni)	-
			Inner Core	Solid			Appro. 13 gm/cm	Ferrous (Fe)	

Table no. 5.2 Table of the layers in the Earth's interior



Just do it.

Prepare a model/diagram of the interior of the Earth by referring to Figure no. 5.5 and Table No. 5.2. Present it in the class.

Major landforms: -

The landforms on the Earth are formed naturally. Various landforms are created by the slow or sudden movements in the Earth's interior, the stress and strain due to energy waves, and natural factors. 'Landforms' means various structural shapes of the Earth's crust. The combined structure of these landforms is called the physical structure. Various landforms having different shapes, structures and characteristics are found.

• Mountain:

The landform that is higher than the surrounding area and the other landforms is a 'Mountain'. Towards its peak, a mountain becomes narrower. The continuously high and steeply sloping mountains are called a 'mountain range'. This series of mountains, spread in any directions, is called a 'mountain chain'. Mountains are more than 1000 meters in height. The Sahyadri, the Satpuda, the Himalaya, the Andes, and the Rocky are examples of mountain ranges.

• Plateau:

A plateau is lower in height than a mountain, but higher than surrounding terrain with a flat top. Mostly, the edges of a plateau have steep slopes. Generally, the heights of plateaus

range from 100 to 1000 meters. Some plateaus are even higher than this. The Deccan Plateau, Chota Nagpur and Malwa plateau etc. Similarly the Saswad Plateau (Pune), the Kas Plateau (Satara), the Malegaon Plateau (Nasik), the Toranmal Plateau (Nandurbar) are some examples of plateaus in Maharashtra.

• Hill:

In height, a hill is higher than a hillock and lower than a mountain. Hills are larger in size than hillocks, and the slope is gentler than that of mountains. The height of the hill is more 600m than surrounding Jarandeshwar (Satara), Jyotiba dongar (Kolhapur), Akrani dongar (Nandurbar), Bhamragad dongar (Gadchiroli) etc. are examples of hills.

• Hillock:

The hills of low height are called hillocks. The hillocks are generally circular and dome-shaped and have gentle slopes. The height of these ranges from 300 to 600 meters or more. The Parvati hillock, the Vetal hillock (Pune), Sanjeevani hillock (Latur), Garo, Khasi and Jantia hillocks in the Northeast, etc., are examples of hillocks.

• Valley:

The low-lying and elongated landform between mountains, hills and hillocks is called a 'Valley'. The shape of valleys can be like 'V' or 'U' letters in English. Streams flow through most of the valleys. Valleys are broad. A narrow and deep valley is called a 'Gorge'. Kundalika valley (Raigad), Narmada river valley, Spiti valley, Great Rift valley (Africa) etc. are examples of valleys.

• **Plain:**

A plain is a low-lying, generally flat, and extensive landform that is at a lower elevation from sea level. The elevation of the plains is less than 300 meters. These have gentle slopes. Most of the plains are made up of river basins and deltaic areas. Some plains are composed of fertile soil. Some plains are occupied by dense forests. Arid, dry plains are considered deserts. The plain region at the coast, the North

Indian Plains, the Mississippi plains, the Siberian Plains, etc., are examples of plains.



Find me around.

Enlist the landforms found in your area, write and discuss their characteristics with your classmates.



Try if you can.

- Identify the landforms in the figure given below and write the names at the correct places.

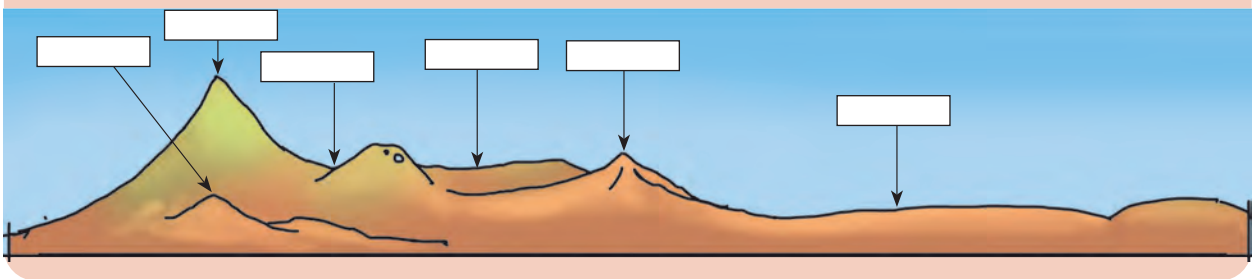


Figure no. 5.6: Various landforms



I would like to tell.

The elevation of landforms is measured from sea level. The elevation of the sea level is considered to be 0 meter. Elevation from sea level means the height of places on the land above the average level of sea water. The vertical distance of a point on the ground from sea level determines the elevation of that point, whereas the distance of a point below water in the downward direction decides the depth of the sea floor.

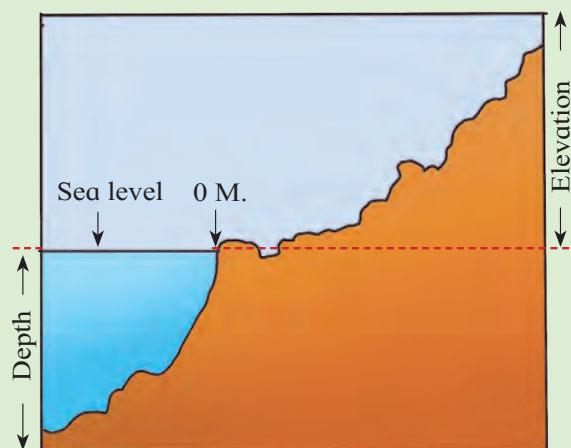


Figure no. 5.7: Elevation and depth from sea level.



Let's identify.

e.g. Some people dare to be brave and go mountaineering to climb my peak. Highest in all the landforms is my identity. Let's find my identity. Tell me, who am I?

Mountain

1. I am created through fissure eruption. I am like a block though have slopes. Though I am tall, flat is my top. This is my identity.

Tell me, who am I?

2. I am at a low level from the sea level. Have not become plain by rubbing. Low-lying, extensive is my identity.

Identify me, who am I?

3. I don't have a sharp peak, nor do I have a plain top. However, I look tall and straight on the ground. Circular and dome-shaped is my identity.

Identify me, who am I?

4. Where the slopes of two mountains meet, There are the imprints of my existence. 'A river flows through me' is my identity.

Identify me, who am I?



|| Friendship with Map

The landmasses of the lithosphere that is seen between the oceans in the world map are the main 'seven continents' known by specific names. Colour the continents in the given map and write their names.

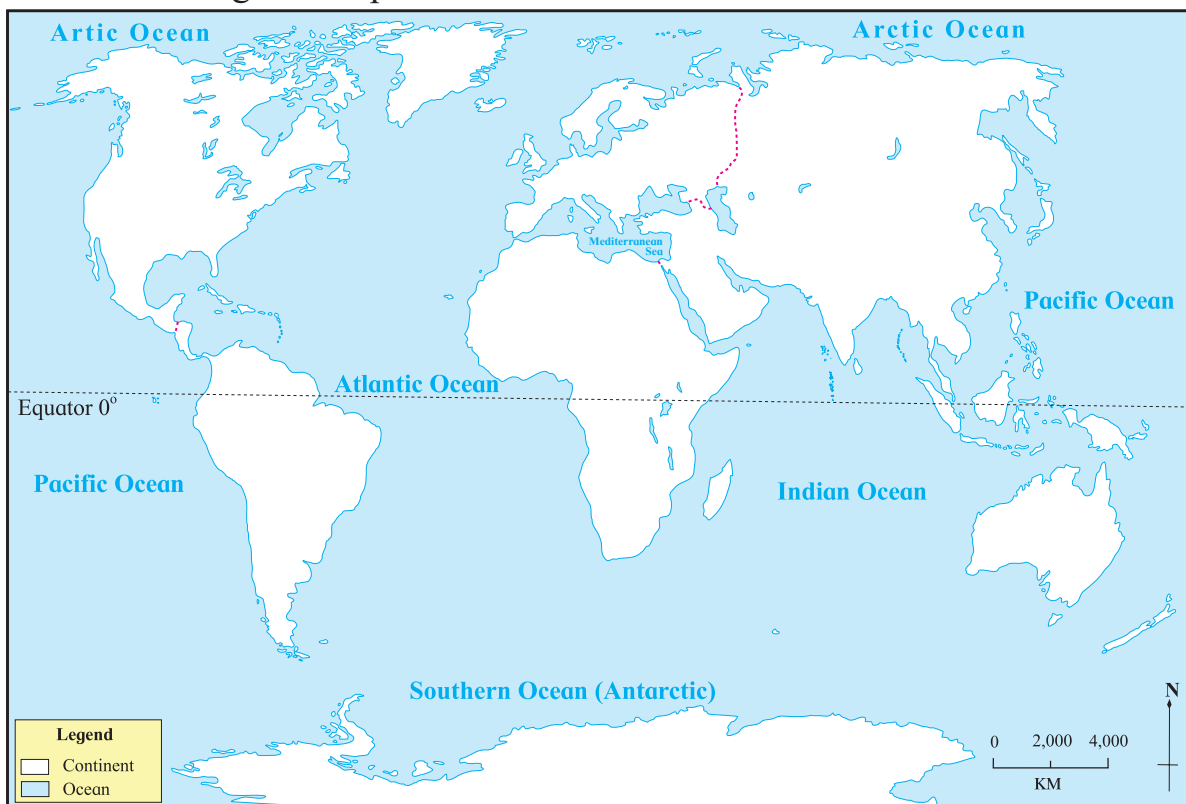


Figure No. 5.8 : World Map (Continents)

Identify the landforms found all over the world in the physical map of the world given. Find out the names of the landforms with the help of the internet and teachers.



Figure No. 5.9 World Physical Structure

Mountains	Plateau	Plains

|| We understood this.

- Understood the spheres of the Earth.
- Understood the concept of lithosphere.
- The interior of the Earth can be explained with a figure.
- Continents and landforms can be shown on a world map.
- Know the characteristics of the Crust, the Mantle and the Core.
- Can identify landforms.



Exercise

A) Do as directed.

1) Complete the sentences by choosing the correct option.

- 1) The height of the landforms on the Earth's surface and the depth of the ocean floor start from -----.
(1000, 100, 10, 0)
- 2) The diameter of the Earth is approximately ----- km
(6400, 12800, 3200, 9600)

2) Choose the incorrect statement.

- a) The edges of a plateau are generally steeply sloping.
- b) The peaks of mountains become narrow.
- c) A wide and shallow valley is called gorge.
- d) Not all plains are fertile.

3) Choose the correct option of the pair. 'Mountain' 'Continent'

- | | |
|------------------|------------------|
| 1. The Rockies | a) South America |
| 2. The Ethiopian | b) Australia |
| 3. The Alps | c) Asia |
| 4. The Andes | d) North America |
| 5. The Altai | e) Europe |
| | f) Africa |

A) 1-a, 2-c, 3-e, 4-b, 5-f

B) 1-d, 2-f, 3-e, 4-a, 5-c

C) 1-f, 2-d, 3-b, 4-c, 5-a

D) 1-b, 2-d, 3-a, 4-f, 5-c

B) Write the result.

- 1) Movement of liquid metals in the outer mantle.
- 2) Tremendous pressure on the Earth's centre.
- 3) Friction between plates.

C) Explain the differences with the help of diagrams.

- 1) Mountain range and mountain chain
- 2) George and Valley
- 3) Upper and lower parts of the Crust (Continental crust and oceanic crust)

D) Give reasons.

- 1) Continental crust is called SiAl.
- 2) The Core is called 'NiFe'.

E) Think and write an answer.

- 1) Why are the maximum quantities of Ferrous and Nickel are found in the Core?
- 2) What are the reasons for the movements of plates other than the semi-fluid state of the outer mantle?

F) Answer in brief.

- 1) Write a note about the temperature in the Earth's interior.
- 2) Explain the difference between the inner core and the outer core.
- 3) Answer why the outer mantle is semi-fluid.
- 4) How could the Earth's interior have been studied?
- 5) Explain the impact of landforms on human life.

Activity :

- Create a model of the structure of the Earth's interior.
- Enlist the landforms found in your area and write their characteristics.
- Enlist the landforms that are not found in your area, but are found in other parts of the world, with the help of your parents and present in class.

G) Perform group discussion.

- 1) Have you ever been on a trip?
Discuss in a group the differences between the landforms found in your area and the area you visited.

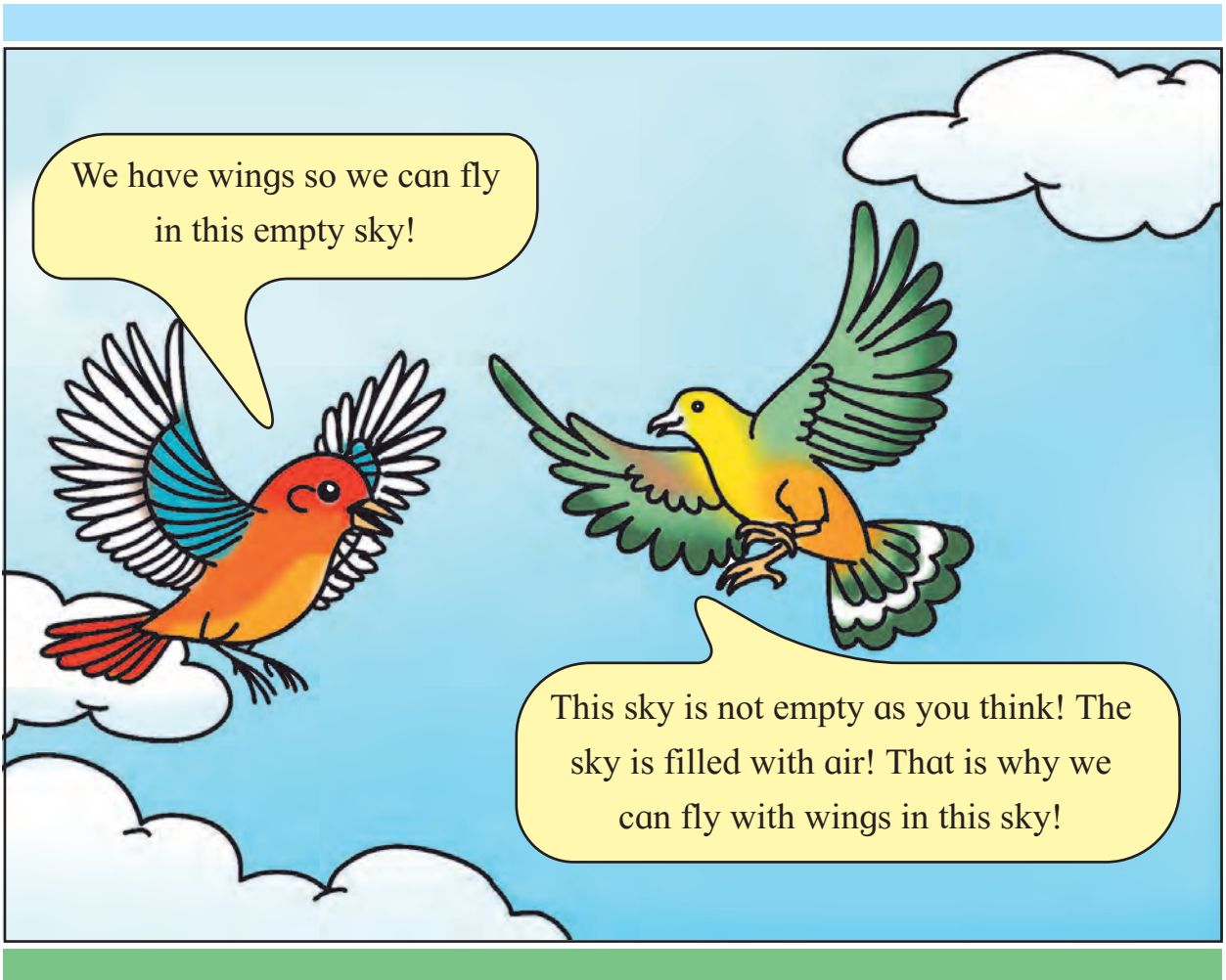


- Observe the above picture and identify landforms.



‘The atmosphere surrounds us, but is invisible.

The study unfolds the mystery behind it!’



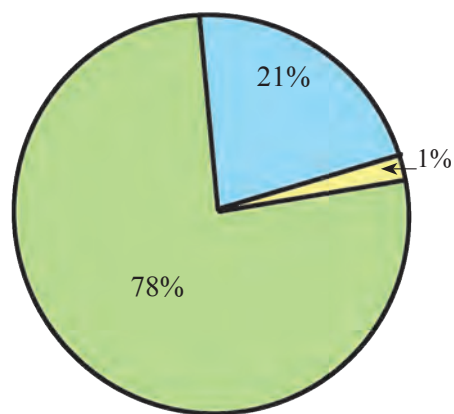
Thought-provoking questions ?

- Which fact is revealed from the conversation – ‘the sky is filled with air’, between the birds in the picture above?
- Is it possible that some other planet also has an atmosphere like the Earth?
- What if there had not been an atmosphere around the Earth?



- (During the recess, Manpreet, Rehan, Srushti, Akshata, Swaraj were chitchatting in the shadow of a big banyan tree in the school.)
- Manpreet: How large are the leaves of this tree, aren't they?
- Akshata: Yes... and the roots of this must have gone too deep in the soil, don't you think?
- Srushti: What an enormous tree it is!
- Swaraj: ... and what a cooling shadow!
- (At that moment, the leaves of the banyan tree rustled and the banyan tree started speaking -)
- The Banyan Tree: Are you children talking about me?
- (The children were initially frightened due to this sudden incident, but then they realised that the voice was of the banyan tree itself.)
- Rehan: (surprisingly) Banyan tree, can you speak?
- The Banyan Tree: Yes, I can speak also, hear also and see also! I have been standing here for many years. Today's atmosphere has changed from that of the past.

- Rehan: What is atmosphere?
- Srushti: Which changes have occurred as compared with the past?
- The Banyan Tree: Atmosphere means the envelope of the air around the Earth. In the past, there was pure air in the atmosphere. Now, the air has become impure because the number of trees has decreased and the smoke from vehicles has increased.
- All the children: Today's atmosphere is not as pure as it was in the past?
- The Banyan Tree: No, but children, all of you together can improve this atmosphere. For that, plant many trees, save water and dispose waste properly. Then see how our environment will become pure again!
- (As per the above discussion, discuss the atmospheric problem in your village.)
- The gaseous envelope around the Earth is called the 'atmosphere'. Because of which we are saved from the Sun's heat. The atmosphere provides us with a constant supply of air which is essential for our lives.



- Nitrogen (N_2) : Approx. 78%
- Oxygen (O_2) : Approx. 21%
- Other gases : Approx. 1%

Figure no. 6.1 Various gases in the Atmosphere

|| The components of the atmosphere:

1) Various gases:

- **Nitrogen (N_2):**

Nitrogen is one of the main components of the atmosphere, and it constitutes around 78%. This gas helps to control the combustion caused by oxygen and is essential to form the compounds for living organisms. Chemically, it is a neutral gas.

- **Oxygen (O_2):**

Oxygen constitutes 21%. It is essential for respiration and combustion. It combines with the food of organisms and they get the heat and energy. Vegetation releases oxygen into the air. The oxygen is useful for life.

Other gases:

The nitrogen and oxygen together constitute 99% by volume, argon (0.93%), carbon dioxide (0.04%), neon, helium, krypton, xenon, hydrogen, methane (0.03%), etc., together have the proportion of 1% in the atmosphere.

Carbon dioxide (CO_2):

The proportion of carbon dioxide in the atmosphere varies as it is produced through the respiration of organisms, combustion, volcanic eruption and the disintegration of vegetation, etc. Vegetation separates carbon dioxide in the presence of sunlight with the help of chlorophyll and releases oxygen, so carbon dioxide is important for vegetation.

Ozone (O_3):

The proportion of ozone is not the same everywhere. The proportion of ozone is less near the Earth's surface. The concentration of ozone is maximum at the elevation of 25 to 40 km from the sea level, so this is called 'Ozone layer'. To create awareness about the conservation of the ozone layer, September 16th is celebrated as World Ozone Day.

2) **Water vapour:**

Vapour is the gaseous form of the water. Because of the **evaporation** of water from the oceans, rivers, lakes and land on the Earth, vapour is added to the atmosphere. Water vapour constitutes about 4% of the atmosphere.



Let us discuss.

On the basis of the points given in the figure, discuss the importance of vapour in environment.

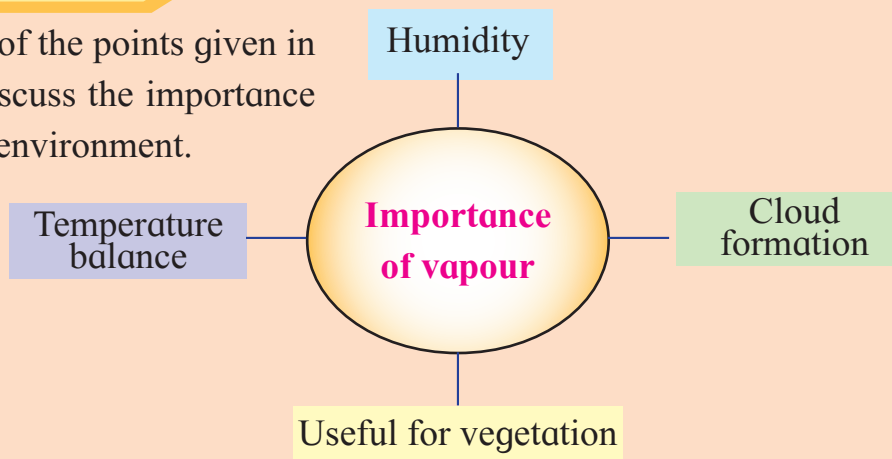


Figure No. 6.2 Importance of Water Vapour

In arid desert regions, it is very low. The water vapour is found up to the height of 8 to 12 km above sea level. With the increasing height above the sea level, the proportion of water vapour decreases. There has to be sufficient temperature for water vapour to be in the atmosphere. At greater heights, due to low temperatures, vapour is converted into water droplets or ice particles. The role of vapour in the water cycle is very important. The clouds, rainfall, snowfall, hailstorms and fog are experienced because of water vapour.

3) Dust particles:

Dust particles are the microscopic, solid particles of dust that are suspended in the air. These include the soil particles, pollens, seeds of fungi, dry particles of vegetation, particles of industrial pollution, and volcanic ash, etc. The dust particles are so small in size that, around one lakh particles can be accommodated within the length of one centimetre. In general, some of the components of dust particles are harmful to the health

of organisms. But the existence of dust particles is important for the environmental balance.



Just do it.

- Pour soil into a glass jar. Shake the jar. After some time, the soil (particles) will settle at the bottom, but some of the fine particles will be seen suspended in the jar. These are the dust particles in the air.

|| The layers of the atmosphere:

There is an infinite vacuum around our Earth. In this vacuum, the atmosphere is spread up to around 1000 km above the Earth's surface. The atmosphere is dense near the Earth's surface, and it becomes sparse with increasing elevation and merges with space. There is no definite boundary of this atmosphere in the vacuum. On the basis of the figure no. 6.4, study the comparative characteristics of atmospheric layers.



Remember this.

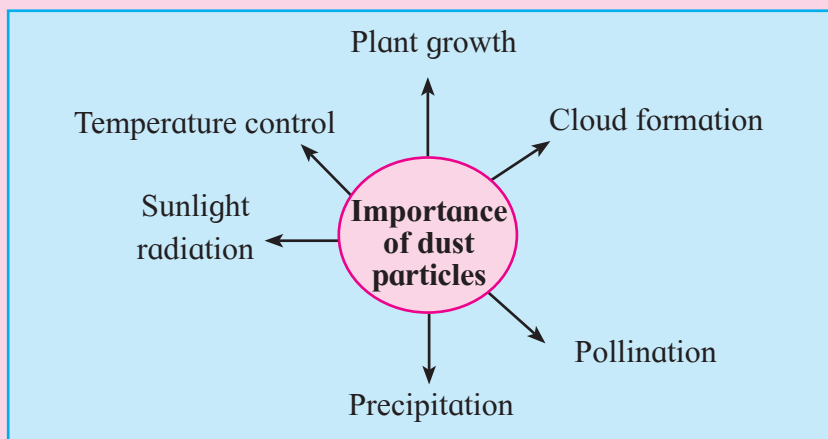


Figure no. 6.3 Importance of dust particles

Layers of the atmosphere and information about them

Height (Approx.)	Name of the layers	Changes according to height		Characteristics	Importance for Man
		Temperature	Density		
0 to 10 km	Troposphere	Temperature decreases with increasing height	The highest air density is found here.	Water vapour and clouds are formed in this layer.	Humidity in the atmosphere prevails here. Rainfall, snow-fall and hails occur. Fog is formed.
10 to 60 km	Stratosphere	The temperature is more than that in the troposphere	Air density is low in this layer.	The Sun's ultraviolet rays are absorbed by the ozone layer.	Due to Ozone gas in this layer, the biosphere is protected from the Sun's ultraviolet rays. This layer is useful for air routes.
60 to 100 km	Mesosphere	Temperature decreases and falls up to -100°C.	The density of air decreases with the increase in height	The meteorites coming in the direction of the Earth burnt and are destroyed in this layer.	Protects the Earth from the attacks of meteorites.
100 to 300 km	Ionosphere	Temperature rapidly increases with height. It is approximately more than 1000° C.	The density of air is very low.	Due to the ions in this layers, radio waves get reflected to the Earth.	Helpful for the broadcast of radio (<i>Akashvani</i>), television (<i>Doordarshan</i>) and satellite communications.
above 400 km	Exosphere	Extreme temperature	The density of air is extremely low.	This is the outermost layer of the atmosphere. This layer contains higher proportions of Hydrogen and Helium.	This layer is useful for space shuttles and artificial satellite systems.

Figure no. 6.4 Layers in the Atmosphere

Observe the picture carefully given in Figure no. 6.5 and describe the picture in five sentences.

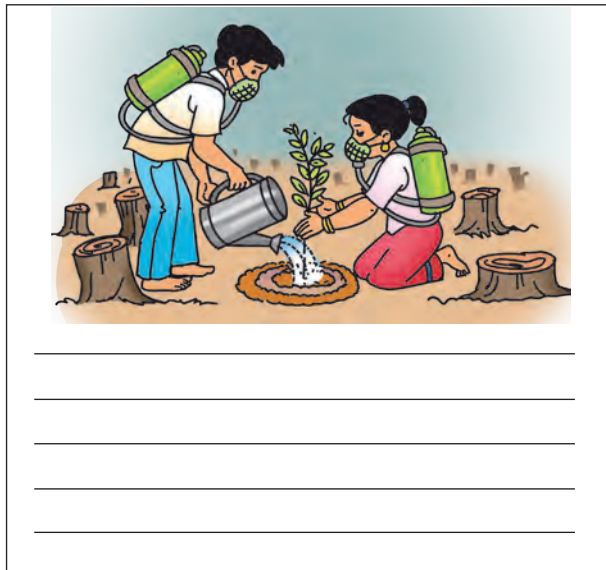


Figure No. 6.5 Tree plantation for Oxygen.

The impact of atmospheric phenomena on human life:

Many phenomena occur in the atmosphere. Some of these phenomena are beneficial to human life, while others are harmful. Atmospheric phenomena have serious impacts on human life. Human life gets disrupted when natural phenomena such as extremely heavy rainfall, snowfall, storms, lightning, fog, heat waves and hailstorms occur in the atmosphere. e.g. due to dense fog, the possibility of accidents increases, visibility decreases and flights are cancelled, and water transport is disrupted. The respiratory system of man is affected.



Try if you can.

Around the Earth

If there were no ozone gas

- * The ultraviolet rays would have directly reached the Earth.
- * _____
- * Temperature control would have been impaired.
- * _____
- * The diseases, such as skin cancer, irritation, and eye diseases, would have arisen.
- * _____
- * Animals would have been badly affected.
- * _____

Because ozone gas is there

- * _____
- * The effect of ultraviolet rays is reduced.
- * _____
- * Temperature is maintained at the right level for life.
- * _____
- * The destruction of vegetation is avoided.
- * _____
- * The environmental balance is achieved.



Just do it.

FOR FREE DISTRIBUTION

Make a collection of newspaper cuttings about atmospheric phenomena of the news published in newspapers. Discuss the effects of atmospheric phenomena on human life in the class.

|| We understood this.

- Understood the concept of atmosphere.
- Understood the atmospheric elements.
- Understood the importance of gases in the atmosphere.
- Understood the importance of water vapour in the atmosphere.
- Understood the characteristics of atmospheric dust particles, layers and their characteristics.
- Understood the importance of the ozone layer.
- Understood the impacts of atmospheric phenomena on human life.



Exercise

A) Complete the statements by choosing the right options given in the bracket.

(exosphere, stratosphere, ionosphere, troposphere, mesosphere)

- 1) ----- is the coolest layer in the atmosphere.
- 2) The satellites in space move in the ----- layer.
- 3) The existence of ozone gas is found in ----- layer.
- 4) The maximum proportion of air and water vapour is found in ----- layer of the atmosphere.

B) Find whether the statements given below are true or false, correct the false statements and write the correct ones.

- 1) In atmosphere, dust particles stick to water vapor.
- 2) The meteorites that come towards the Earth are burnt in the exosphere.
- 3) The visibility increases in fog.
- 4) The proportion of hydrogen is maximum in the atmosphere.

C) Identify the wrong pair in the following.

- A) Troposphere – changes in the atmosphere
- B) Mesosphere – Burning and vanishing of meteorites

- C) Ionosphere – Communication
- D) Stratosphere – Dominance of Hydrogen and Helium

D) Select the correct option.

- 1) If the ultraviolet rays of the Sun had directly reached the Earth, then the biosphere would have been in danger. To avoid this, which layer acts as a 'protective shield'?
A) Troposphere B) Mesosphere
C) Ionosphere D) Stratosphere

E) Answer the questions.

- 1) Explain the temperature differences in the various layers of the atmosphere.
- 2) Explain the importance of dust particles in the atmosphere.
- 3) Explain with examples the effects of atmospheric phenomenon on human life.

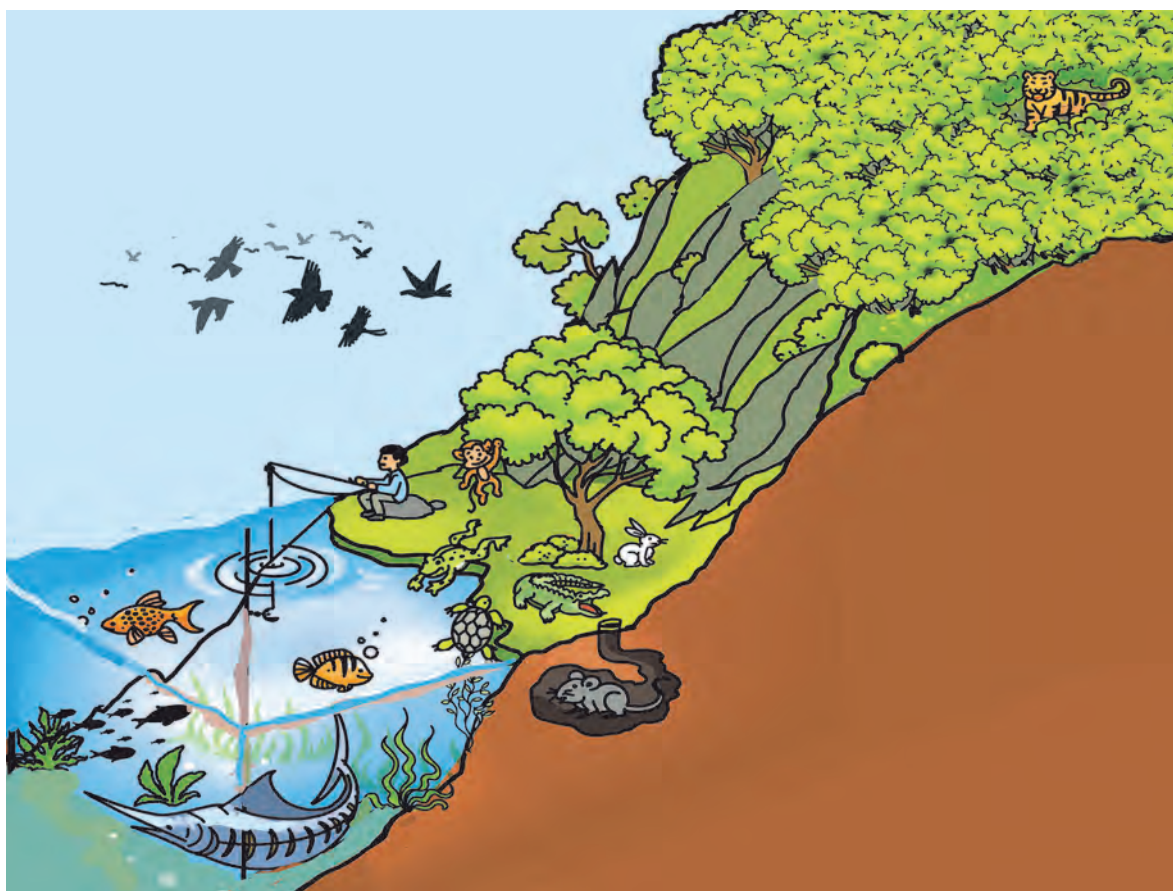
Activity:

- Collect the information about the ionosphere and write about its importance.
- Prepare a diagram showing the structure of the atmospheric layers and display it in class.
- Prepare a poster based on 'save ozone, save life' and present it in the class



7 Hydrosphere And Biosphere

‘May our wisdom and approach grow as wide as ocean,
explaining its greatness like fish in deep ocean!’



**Thought-
provoking
questions**



If I would be sea fish ...?

- What can I see in the sea water?
- What thoughts would arise in my mind about world outside the water?
- What will you say about biosphere inside the water and biosphere outside the water?



Try to tell.



Clouds



Rainfall



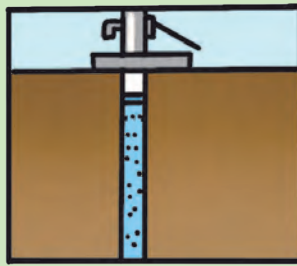
River



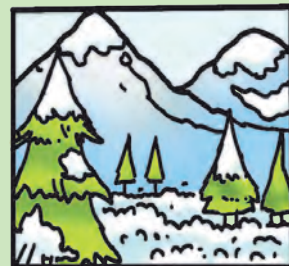
Sea



Lake



Groundwater



Snow



Ice

Observe the pictures and answer the following questions.

1. Which is the common factor in these pictures?
2. What is the most suitable word to represent all these pictures?
3. What would have happened if there was no water on the earth?

Hydrosphere: Concept and forms:

Hydrosphere refers to all reserves of water on the earth surface, subsurface and in the atmosphere.

71% of the total surface of the Earth is covered by water therefore, the planet earth is named as 'Blue Planet' or 'Water Planet'.

Hydrosphere includes all forms of water on the Earth such as oceans, rivers, lakes, reservoirs, groundwater and atmospheric water vapour. The importance of hydrosphere has

increased due to oceans occupied more area than the continents.

Proportion of water:

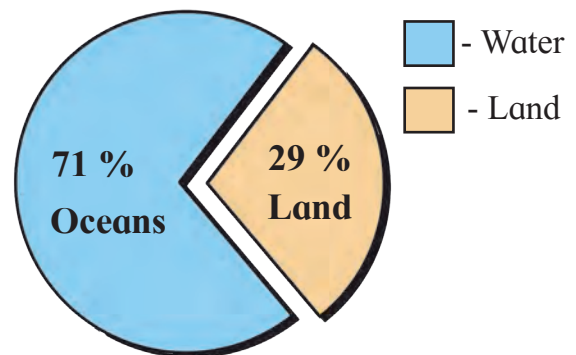


Figure no. 7.1 Distribution of water and land on the Earth Surface

From Figure no. 7.1 it is easy to understand the distribution of land and water on the Earth's surface. The amount of water available in different forms on the earth is given in Figure no. 7.2.

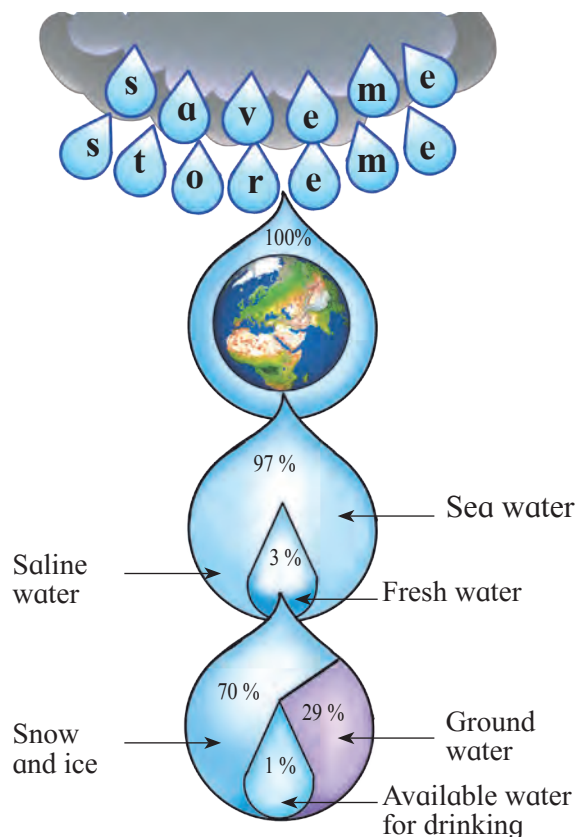


Figure 7.2 Forms of hydrosphere and proportion of water.

Geographical explanation:

Taking into consideration, the division of total hydrosphere, ocean water occupy highest proportion (97%) of water on the earth surface. Only 3% of the water on the earth is fresh water. Freshwater can be utilized for different purposes. However, out of total usable freshwater on the earth surface, 70% of it is in the form of icebergs and glaciers, groundwater occupies 29% and merely 1% fresh water is available in other forms as depicted in figure no. 7.2.



Just think.

The actual sources of usable water are extremely limited, how to increase them?

Oceans:

97% of the total hydrosphere on the earth is occupied by the oceans. The saline water on the Earth is distributed in five major oceans. This distribution is based on geographic limits and same characteristics of the oceans. Although all oceans on the earth surface are connected to each other, each of them greatly vary in terms of their surrounding climate, ocean currents and characteristics of ecosystems.



Let us do this activity.

- Show oceans with different colours in the outline map of the world.

A vast expanse of saline water lying between two or more continents is known as an ocean.

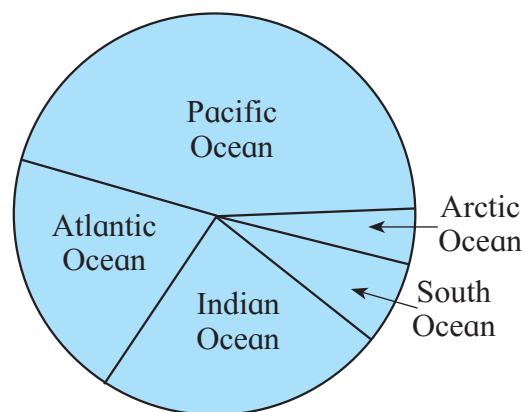


Figure no. 7.3 Distribution of Oceans and their area

Ocean	Area (Sq. Km.)
Pacific	16,62,40,977
Atlantic	8,65,57,402
Indian Ocean	7,34,26,163
South (Antarctic)	2,03,27,000
Arctic	1,32,24,479

Table no. 7.1 Area of Oceans



Find out.

- What are the uses of ocean water?
- What are the sources of groundwater?

A) Ocean floor topography:

As we know, the maximum portion of the earth surface is covered by oceans. We can find diverse Ocean bottom topography similar to the diversity of landforms observed on the continents such as oceanic mountains, plateaus, plains, guyot, trenches, continental slope and continental shelf etc. The average depth of the oceans is 3730 m.

Continental Shelf:

A continental shelf is the submerged margins of the continents characterized by gentle slope with shallow water in the coastal areas. Generally, continental shelf extends up to 200 m depth from coastline. The extent of continental shelf is not same everywhere. Continental shelf is significant for human life as worlds' important fishing grounds are found on the continental shelves. Besides, continental shelf is also significant for the production of crude oil, natural gas and various minerals.

Do you know?

On the continental shelf of Arabian Sea crude oil and natural gas are found at 'Mumbai High'.

Continental Slope:

The ocean floor beyond continental shelf is characterised by narrow and steep sloping ocean bed. It is called as "continental slope". The depth of the ocean in this zone ranges from 200m to 3000m. from mean sea level.

Abyssal Plain:

After the end of the continental slope, at the base the gently sloping ocean bottom that is called abyssal plain.

The depth of this ranges from 3000 to 5000 metres.

On the abyssal plain, submerged highlands, submerged mountains, plateaus etc. are found.

Oceanic Mountains:

Mountain ranges on the ocean floor are known as submerged mountain at few places the peaks of submerged Mountain emerge above the ocean surface, these are called oceanic Islands. e.g. Andaman and Nicobar Islands.

Oceanic Plateau:

The elevated ocean floor with flat and extensive top is called oceanic plateau. e.g. Chagos plateau in Indian ocean.

Abyss and oceanic trenches:

Ocean floor is characterised by deeps with steep sides. They are called as abyss and trenches.

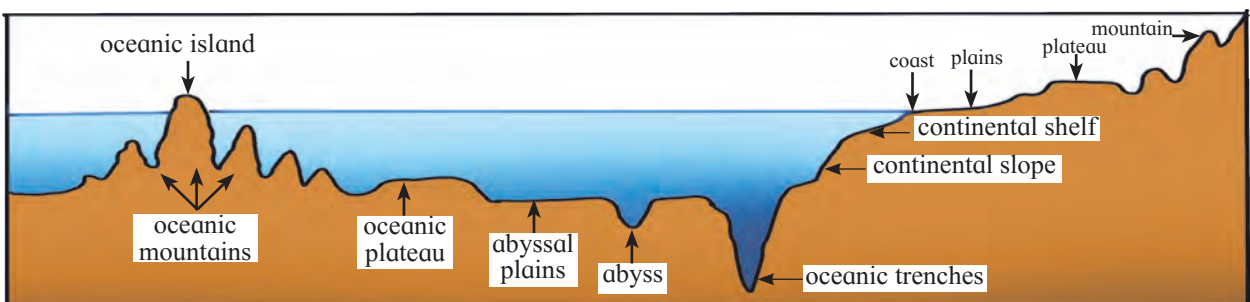


Figure no. 7.4 Structure of the Ocean floor

Generally shallow depressions are called abyss whereas deep and narrow depressions are called oceanic trenches. Mariana trench in Pacific Ocean is the deepest oceanic trench with the depth of 11,034 meters. Besides these major landforms of the ocean floor, guyot, oceanic canyons are important landforms of the ocean floor.



Let us discuss.

State, how the following factors affect the movement of ocean water.

- 1) wind 2) sea waves
- 3) earthquakes 4) volcanic eruption

|| High tide and low tide:

The definite and periodic rise and fall of ocean water level is called 'tide'. Moon is closer to the earth as compared to the Sun. Therefore, gravitational pull of the moon is greater and to certain extent Sun's gravitational force exerted on the earth causes tides.

Tide is a continuous movement of sea water. In one day (24 hours) tides occur once or twice at places. The cycle of tides occur continuously.

Causes of tide formation :

1. Moon's gravitation:

Moon is closer to the Earth hence, its gravitational force pulls ocean water and increases the level.

2. Sun's gravitation:

The sun is far away from the earth. Therefore, the impact of gravitational force of the sun is lesser than that of moon. Even then, the force affects the tides.

3. Earth's centrifugal and gravitational force:

The water bulges due to centrifugal force caused by earth's rotation which is opposite to gravitational force. The water cannot be thrown in space

because earth's gravitational force is greater than the centrifugal force.

This force is created in the rotating and revolving objects. This force is directed away from the centre of the object that pushes the objects in outward direction. E.g. swinging a slingshot. Centrifugal force is an imaginary force that means it is not experienced unless the object is in circular motion. This force is experienced from centre to outward only in case of moving objects. Because of the revolution of the earth and moon the centrifugal force is generated from the common centre of the masses.

Centrifugal force:

This type of force is generated when objects move in rotational and revolution motion. Centrifugal force operate in the direction opposite to the centre of the object. Therefore, surface objects are thrown apart. For example, in a slingshot game or similar actions, this kind of force is experienced. Centrifugal force is an imaginary force which actually do not exist. However, if we think from the perspective of rotating objects, then such force is experienced. Centrifugal force is exerted in the direction away from the centre on the rotating objects. Centrifugal force is generated due to rotational movement of the earth. Additionally due to combined revolution of the moon and the earth, the centrifugal force is generated away from the common centre of mass of the earth and the moon.

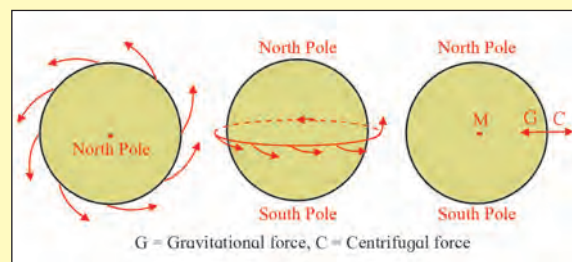


Figure no. 7.5 Centrifugal force and Gravitational force



Try to understand me.

Why do the timings of tides change every day?

It is generally perceived that high tide occurs after 12 hours in a day. However, the time difference in two successive high tides is practically 12 hours and 25 minutes. The reason behind it is the speed of rotation and revolution of the earth and the moon. When moon is overhead at any place (means when the place on the earth appears exactly in front of the moon), then it causes highest high tide. However, moon takes 50 minutes more to complete its one revolution of 24 hours. Hence, after every 12 hours, the timing of high tide is extended by 25 minutes which continues during a lunar month. The same is observed in the timings of low tides. The change in timings of high tides:

e.g. The high tide occurs today at 06.00 am, 06.25pm, tomorrow 06.50 am and 07.15 pm. Note down the change in timings of high tides of subsequent days.



Just Think:

- What happens when the Earth experience either the gravitational or centrifugal force?

Types of High Tides and Low Tides:



Try to understand.

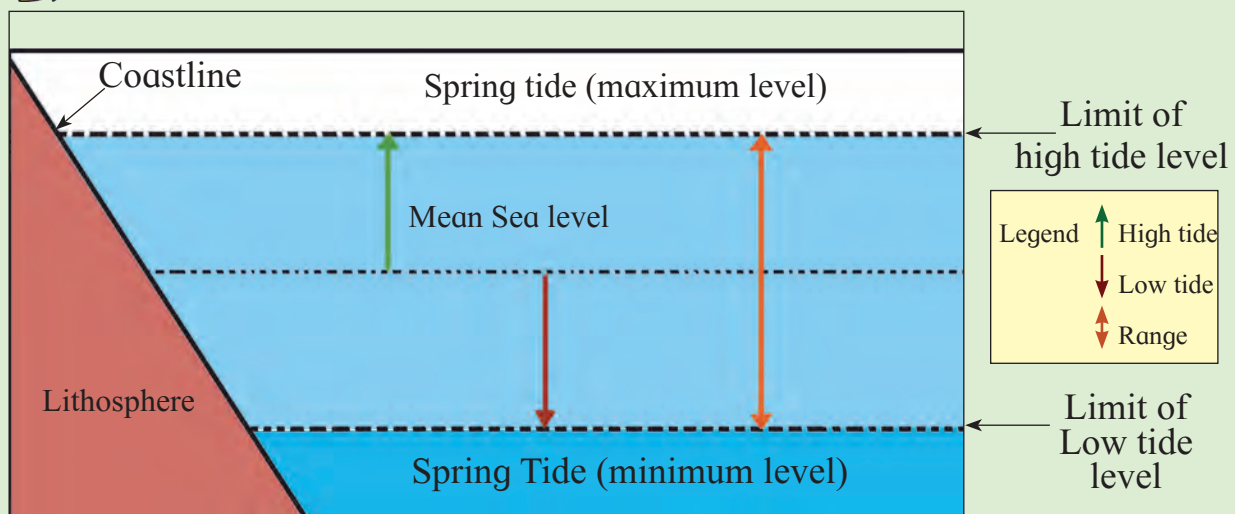


Figure no. 7.6 Range of High and Low tide

Observe the Figure no. 7.6 and answer the following questions.

- The movement of sea water from minimum level to maximum level is called.....
- The movement of sea water from maximum level to minimum level is called.....
- The highest point achieved by sea water level is called.....
- The lowest point achieved by sea water level is called.....
- The difference between maximum and minimum level of high tide and low tide is called.....

Following two pictures belong to the same place but of different conditions. Please remember it through observation.



Figure no. 7.7 (a) High tide



Figure no. 7.7 (b) Low tide

- Study both the pictures given above and compare these pictures based on your observations and understanding.



I would like to tell you.

At any point on the earth's surface where high tide occur, at the place located at 180 degrees meridian on the opposite side of the earth (antipodes) also experience high tides. The same happens during the low tide as well. e.g. When there is high tide at 120 degrees west **longitudes**, then at the same time 60 degrees east **longitudes** in Indian ocean also experiences high tide.

- **Spring Tide:**

Generally, on new moon day and full moon day, the highest high tide and lowest low tide occur. On these two days, Sun, Moon and earth align. Hence, the gravitation force of moon and sun is added to generate maximum tidal force. As a result of this, ocean surface water level rises significantly higher than usual during high tide and the ocean water level falls greatly than usual during low tide.

- **Neap Tides:**

On the eighth day after new moon (half moon) and eighth day after full moon, the tides are the least. On these days due to the position of the Sun, Moon and the Earth are at right angles (quadrature) to each other. The gravitational force of the sun and the moon is divided in different directions. This causes low rise than average high tide and fall than average low tide.

Impacts of tides:

- Movement of tidal waters cause erosion of coastal areas and sediments are transported. This changes structure of the coastal landscape.
- Large number of fish enters creeks with high tide water. This helps for fishing activity in creek areas.
- Ocean water level rises during high tide which helps ships navigate to the ports easily.

A - Combined impact of gravitational force of moon and the sun.

A1 – Impact of gravitational force of moon.

A2 – Impact of gravitational force of the sun.

B – Greater impact of moon's gravitational force

C – Less impact of sun's gravitational force

D – Impact of centrifugal force of the earth

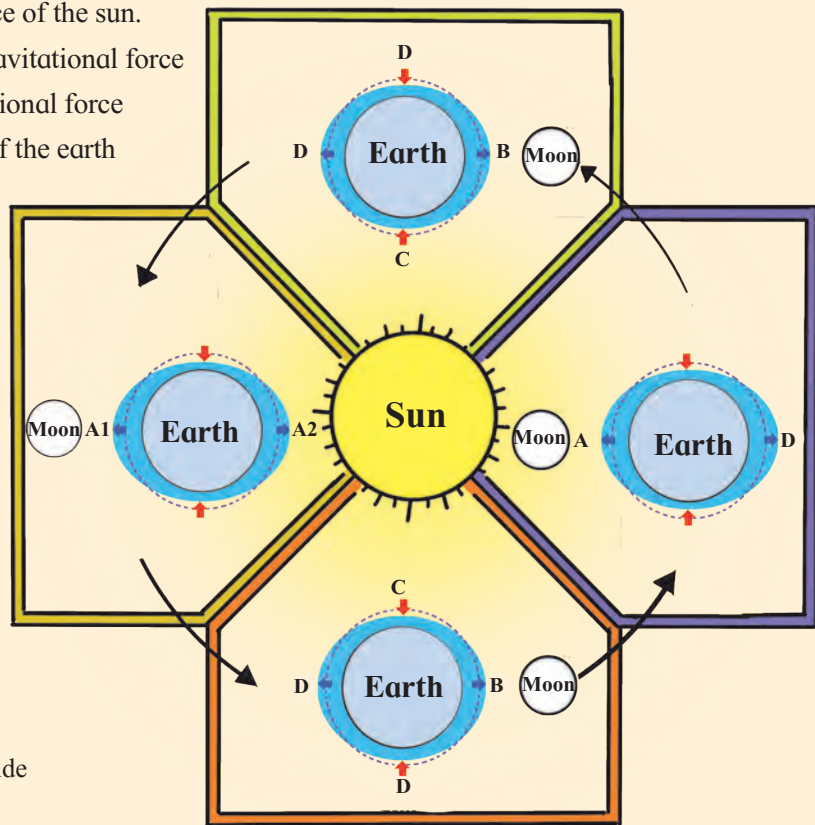
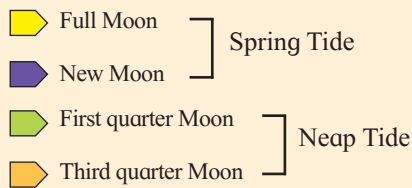
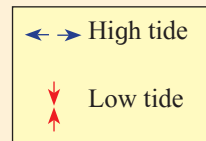


Figure no. 7.8 Types of Tides

- During high tide, sea water is stored in salt pans and used for salt production.
- The tidal energy can be generated through the process of high tide and low tide.
- Due to misjudgement of high tide and low tide, people lose their lives while swimming in sea water.
- Tides help in protecting and developing mangroves, coastal ecosystems and biodiversity.



Just think.

Although sun's gravitational force is greater than gravitational force of moon, during neap tide the places facing moon experience high tide and places facing sun experience low tide. Why is it so?

Ocean and Environment interrelationship:

Oceans are not only reserves of resources but also a place of power in maintaining environmental balance. If we do not respect, the oceans then future on the earth may be in danger.
Dr. A. P. J. Abdul Kalam

- Based on the points given, distinguish between spring tide and neap tide and complete the following table.

Spring Tide	Point of comparison	Neap Tides
	Which day it occur?	
	Position of Sun, Moon and the Earth	
	High tide water level	
	Low tide water level	



Try to understand.

You may think that on full moon day, the sun and moon are in one line and earth is in the middle. So, the gravitational force of sun and moon will cause high tide but on new moon day both sun and moon are on one side of the earth. The gravitational forces of these work in same direction, why the high tide occurs on the opposite side of the earth? If you would like to know the answer, study the following figure and think, so you can understand which force is responsible for high in the opposite side.

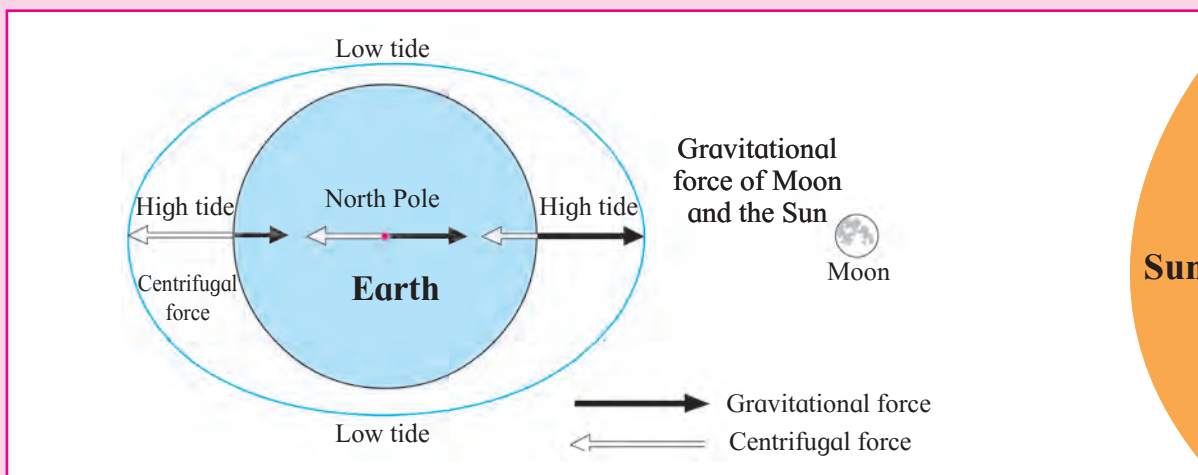


Figure no. 7.9: The process of tide formation

Geographical Description:

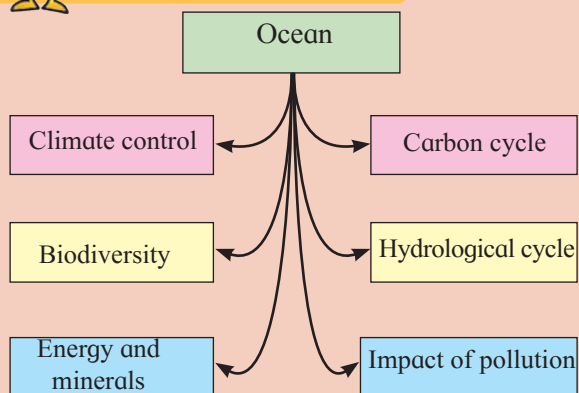
The oceans and our environment are closely interdependent. Ocean is the largest ecosystem on the earth. In environment, land ecosystem and water ecosystem are the two groups. Oceans are important components of the water ecosystem. Ocean ecosystem comprises of various smaller ecosystems

extending from coastline to the deep oceans. It is important to understand the interdependence between oceans and other elements of the environment. Ocean plays an important component of the environment. So, it is our duty to take care of that.

‘Stop the sources of pollution, save life in the ocean.’



Just think.



Observe the above diagram and perform group discussion and try to explain interdependence of oceans and environment.

Figure no. 7.10



Remember this.

- Oceans absorb a large amount of the Sun's heat and help to maintain the balance in temperature, climate and precipitation.
- Oceans absorb large amounts of carbon dioxide from the atmosphere.
- Marine micro-organisms produce oxygen through the process of photosynthesis and help the environment.
- The hydrological cycle on Earth depends on oceans, ensuring continuous renewal of freshwater.
- Oceans have a vast bio-resources and are an important source of human food chain.
- Oceans provide resources like petroleum, natural gas, salt and minerals for environmental systems.
- Today, due to human activities, oceans are getting polluted, affecting marine life and humans. Examples: plastic, oil spills, chemicals.
- More than half of the world's oxygen is produced by oceanic plants. Therefore, oceans are called the 'lungs of the Earth.'



Try if you can.

Perform group discussion on the factors responsible for oceanic pollution and fill the blank boxes given in the following diagram.

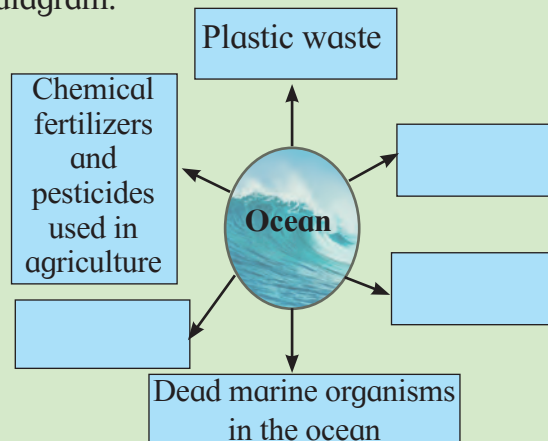


Figure no. 7.11 Oceanic pollution



Remember this.

- Chemicals, metals, and toxic substances from industries are released into the sea.
- Sewage and untreated wastewater reach the sea directly due to insufficient treatment plants.
- Plastic bags, bottles, and fishing nets cause pollution.
- Oil spills occur due to ships and tanker accidents.
- Chemical fertilizers and pesticides used in agriculture reach the ocean through river and ground water.
- Soil, dust and metallic substances enter the sea due to mining and coastal constructions.
- Smoke from factories and air pollutants mix with seawater through rainwater.
- Due to the global warming, the sea levels are rising and affecting environment and human settlements.



Just think.

- Study the impact of pollution on marine life and write the solution in the given blank boxes.



Solution

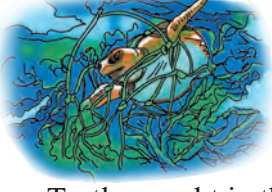
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A fish swallowed a piece of plastic



Solution

.....

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.....

Turtle caught in the fishing net

Solution

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.....



Bleached Corals

Solution

.....

.....

.....

.....



Dead marine organisms

Figure no. 7.12 Impact of pollution on marine life

Biosphere:

Based on the location and distribution of the **resources**, we have gained the information about lithosphere, hydrosphere and atmosphere of the earth.

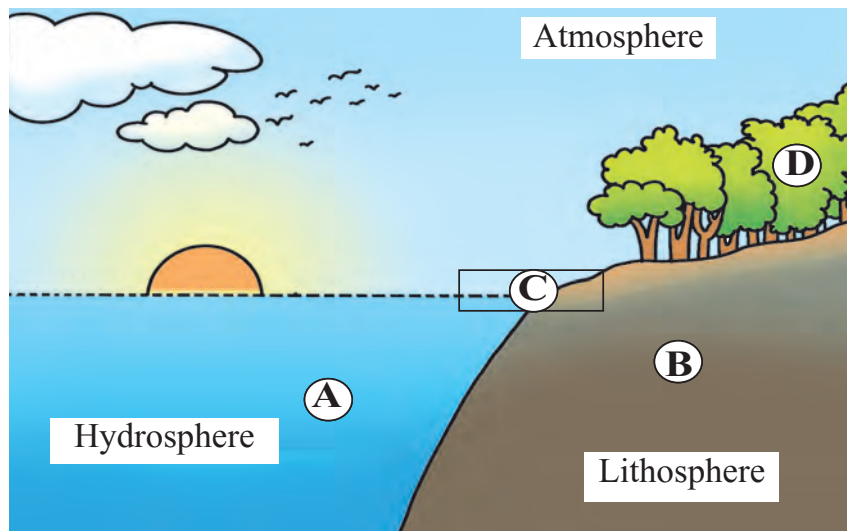


Figure no. 7.13 Different spheres of the earth and living organisms

Carefully observe Figure no. 7.13 and answer the following questions.

- Match the elements given in the picture.
- Which living organisms are observed in the atmosphere?
- Which organisms live on the lithosphere?
- Which living organisms are found in the hydrosphere?
- Which organisms are found both on the land (lithosphere) and in the water (hydrosphere)?

- A ●
- B ●
- C ●
- D ●
- Natural vegetation
- Aquatic fauna
- Terrestrial fauna
- Amphibious creature

Observe the figure no. 7.13 and tick (✓) in the boxes where the organisms live.

		Areas where living organisms live			Total		
Sr. No.	Name of the living organism	Land	Water	Air	Live in how many areas		
1	Humans				1	2	3
2	Vegetation				1	2	3
3	Birds				1	2	3
4	Fish				1	2	3
5	Snake				1	2	3
6	Frog				1	2	3
7	Monkey				1	2	3
8	Rabbit				1	2	3
9	Earthworm				1	2	3
10	Butterfly				1	2	3

From the above discussion, we understand that living organisms are interrelated with the Earth's lithosphere, hydrosphere and atmosphere. Therefore, Biosphere includes the lithosphere, hydrosphere and atmosphere.

Several types of microorganisms, plants and animals live in the biosphere. Different living organism get nurturing environment in different environments from the ice covered polar regions to equatorial regions.

The biosphere zone that is most favorable for life, extends from 8 to 10 km above the Earth's surface, upto 2 km in the lithosphere and about 10,000 m depth in the hydrosphere.

Biosphere:

Generally, living organisms are classified based on the site and situation where they exist in the biosphere.

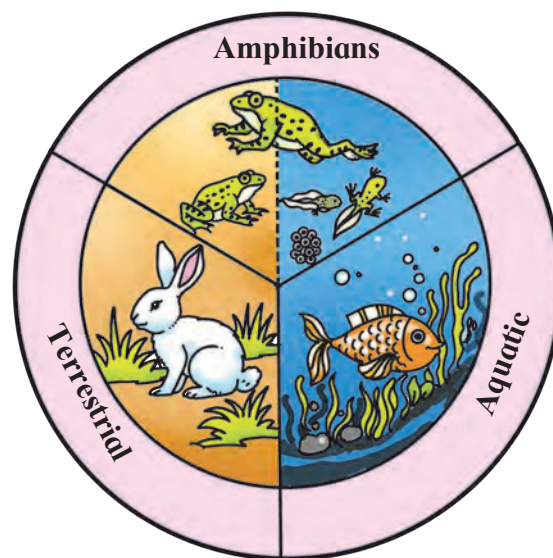


Figure no. 7.14 Classification of Biosphere

Terrestrial : These animals exist and live on the land surface. e.g. elephant, dog, cow, humans etc.

Aquatic : Aquatic animals live only in water such as whale fish, jelly fish, octopus etc. These aquatic animals are extremely important for environment and ecosystems.

Amphibians:

As per the classification of animals, vertebrates having four limbs form a group of animals. The lifecycle of these animals is of two stages. During the first (larval) stage, these live in water and in second (mature) stage, these live on the land. Therefore, these are called amphibians. Example, frog, salamander etc.

Plants:

Plant, is the most important component of biosphere the living world which play important role in food chain. Trees, climbers, grass, shrubs grow on the land. On the other hand, few plants grow only in water and submerged such as Algae and Elodea. Some plants float on the water surfaces such as lotus, duckweed etc. These plants try to acclimatise with the surrounding in order to living and sustain in the floating situation.



Figure no. 7.15 Habitat of plants.

Significance of Biosphere:

Biosphere is extremely important for sustenance of life on the earth. Biosphere provides **resources** like the food, water and air required for sustenance of living organisms. All living organisms in the biosphere are interdependent and at the same time they depend upon surrounding **abiotic** elements. For example, the existence of life on the earth is protected due to temperature and it also helps in maintaining the balance in the environment.

Group Discussion :

With the help of following points, perform group discussion on ‘the significance of plants, animals and microorganisms of biosphere in the living environment’.

Plants	Animal and insects	Micro-organisms
* Production of oxygen * Source of food * Temperature control * Purification of air	* Pollination and spread of seeds * Formation of food chain and energy flow	* Decomposition of organic matter and improve fertility of soil. * Disintegration of dead remains of organisms and cleaning the environment
Functions of ecosystem and role of ecosystem in maintaining environmental balance		

|| We understood this:

- Can explain different forms of hydrosphere.
- Can map major oceans in the outline map of the world.
- Can explain ocean floor topography.
- Can elaborate factors affecting the formation of tides.
- Can explain significance of biosphere.



Exercise

A) Fill in the blanks.

- 1) -----% of the total earth surface is covered by water.
- 2) ----- % of the total water in the world is stored in the oceans.
- 3) Large amount of fresh water reserves are available predominantly in ----- and groundwater.
- 4) In the process of tide formation, the gravitational force of sun, moon and ----- is responsible.
- 5) The highest high tide named as --- ----- tide occurs on full moon and new moon day when moon is closest to the earth.

B) Choose the correct option.

1. Based on the location of the habitat in the biosphere, where the amphibians live?
 - a) Terrestrial
 - b) Land and water
 - c) Hydrosphere
 - d) Plants
- 2) What does the landform named in which part of ocean landform is emerged above the sea level?
 - a) oceanic mountain
 - b) oceanic plateau
 - c) abyssal plains
 - d) oceanic islands

C) Answer in one sentence.

- 1) What is meant by hydrosphere?
- 2) What are the four main forms of the hydrosphere?

- 3) Which is the largest ocean in the world by its area?
- 4) Which major landforms are included in the ocean floor?
- 5) On which lunar day neap high and low tides occur?

D) Write geographical reasons:

- 1) The body structures of aquatic and terrestrial animals are different.
- 2) The rate of evaporation is higher in equatorial regions.
- 3) Maintaining balance of environment and biosphere is important for humans.

E) Distinguish between:

- 1) Neap and spring tides.
- 2) Saline water and fresh water

F) Answer in brief:

- 1) Structure of the ocean floor.
- 2) Concept of biosphere.

G) 'Protection of oceans is our collective responsibility.' Write your opinion on this and discuss with friends.

H) Which occupations have developed on the continental shelf?

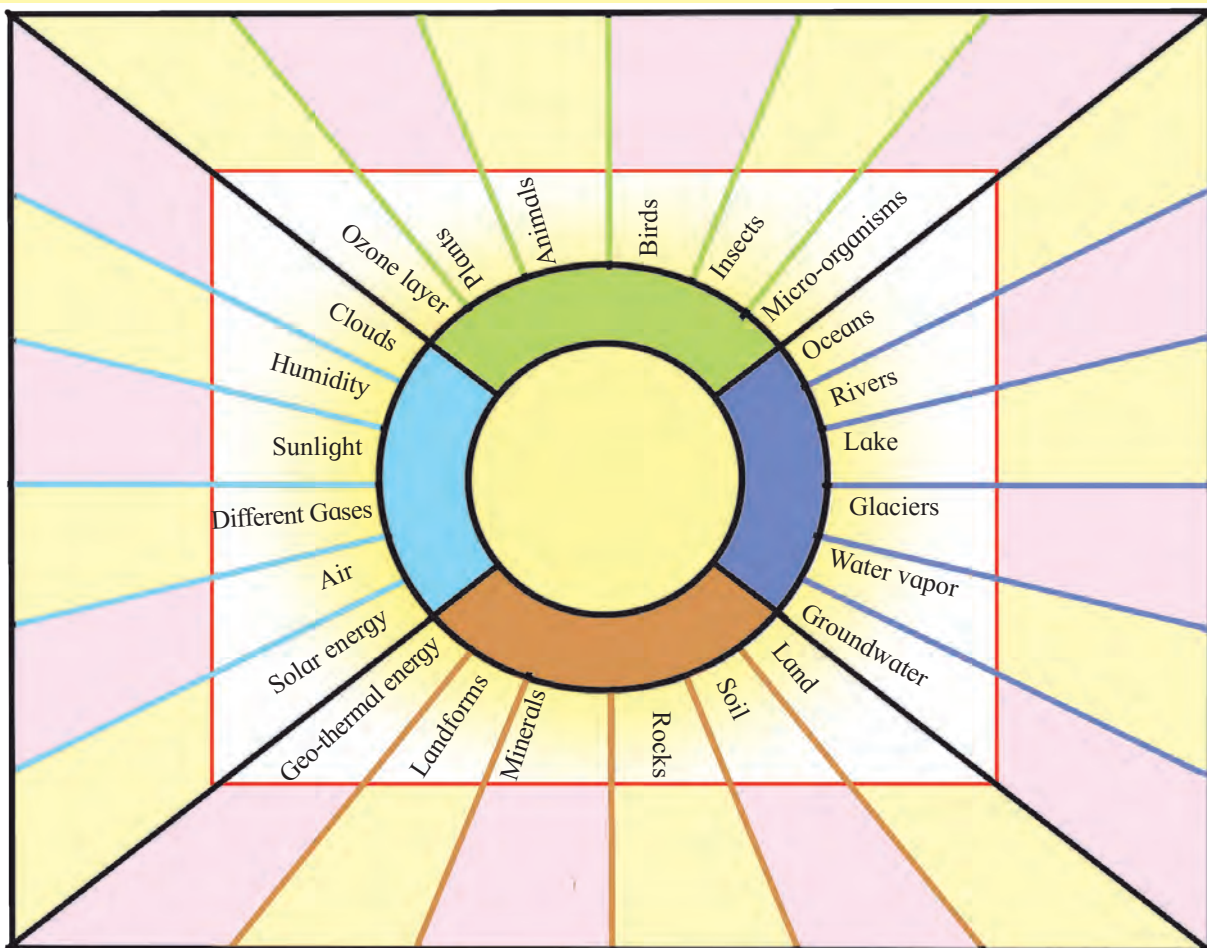
Activity:

- Prepare a diagram/model of the ocean floor and display it in class.



8 Resources

‘Resources are nature's gift. Their wise utilization means securing future of generation to come!’



Thought-provoking questions



- Read the above diagram and list names of remaining resources in the blank boxes according to different spheres of the earth.
- Discuss how the above mentioned resources are useful for human being with suitable examples.



Figure no. 8.1 Dialog on Resources

(Snehal and Bhushan are helping their father to clean the house. The conversation taken place at that time.)

Bhushan: So many things in our house! Clothes, utensils, grains, books, notebooks, combs... why do we need all these things?

Snehal: Yes! Because each of these is useful to us in some way!

Father: They are useful, hence they are important and that is why they are **resources** for us!

Bhushan: Father, what does “resource” mean?

Father: Anything that is used to fulfill our needs is called a resource.

Snehal: Then father, things outside the house are also useful to us. Should they also be called **resources**?

Father: Yes, absolutely right! If you look around you, you will find many **resources**.

Geographical Explanation

Some **resources** have economic value, while others have limited or

no economic value. Metals may have economic value whereas beautiful scenery is free. But both are important and can satisfy human needs. Therefore, both metals and beautiful scenery are **resources**.



Try if you can.

Encircle the **resources** from the list below that are available free of cost with the help of your parents:

Cotton cloth	Agricultural land
Intelligence	Clean environment
Medicinal plants	Old Folk songs
Medical knowledge	Good climate
Coal reserves	Singer’s voice
Beautiful scenery	Grandmother’s medicine bag

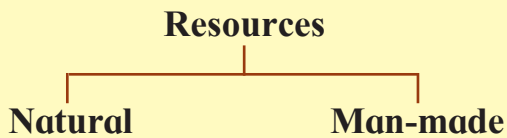
Some **resources** may gain economic value over time. The home remedies given by your grandmother are free of cost. But if a company patents them and sells them, they can gain economic value.

Time and technology are two important factors that can convert materials into **resources**. Both materials and **resources** are related to human needs. Humans themselves are the most important resource. Their ideas, knowledge, research, and inventions inspire the creation of **resources**. Every discovery or invention leads to many other processes. The invention of fire led to cooking and the invention of the wheel led to the development of new modes of transport. Hydroelectric technology has converted the energy of **flowing** water into an important resource.



Figure no. 8.2 Humans: A resource

|| Types of Resources:



1) Natural Resources:

Resources that are obtained from nature and used without any processing are called natural **resources**.

The air we breathe, water from rivers and lakes, soil and minerals are all natural **resources**. These are gifts of nature.

2) Man-made Resources:

After humans modify the natural form of **resources**, they become man made **resources**.

Until iron is extracted from iron ore, it remains a natural resource. But when iron is used to make buildings, bridges, roads, machinery and vehicles, it becomes a man-made resource.

Do You Know?

Humans as a Resource: Humans possess knowledge, skills, and abilities. They make the best use of nature to create more **resources**. For this, humans need technology. Education and good health in making humans a valuable resource.

By improving the quality of human skills, more **resources** can be created. This process is called **human resource development**.

'Crops destroyed due to drought'



Can I find solution to this?

Figure no. 8.3 Drought and Flood induced famine



Let us discuss.

Compare natural **resources** and man-made **resources** through group discussion.

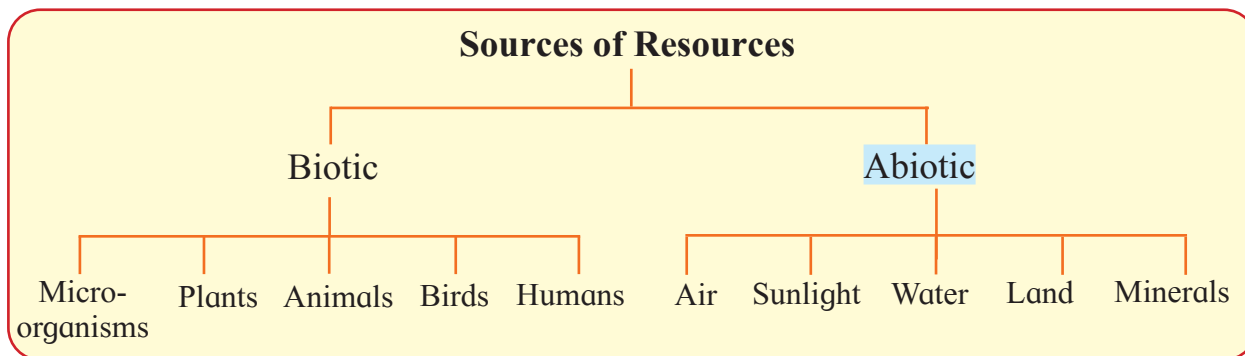


Figure no. 8.4: Sources of resource

|| Water as a Resource

All living beings need water to survive. Water is the basis of human life. The amount of potable (usable) water on Earth is limited. Therefore, water must be used carefully. Water management is our collective responsibility. Water is extremely essential for agriculture, industry, production of hydroelectric power and domestic use.

Distribution of Water

About 71% of the Earth's surface is covered with water. If there is so much water on Earth, then why do many places face water scarcity?

Is all the water on Earth available for use? The ocean cannot be used directly for drinking or agriculture.



Try to find out.

Distribution of Fresh Water on the Earth

Component	Proportion (%)
Snow and Ice	—
Groundwater	—
Potable Water	—

Sources of Usable Water

- **Rivers and Lakes:** Rivers, streams, and lakes are important natural sources of surface water.
- **Groundwater:** Water stored underground is used through wells, tube wells and springs.
- **Rainwater:** Rainwater is stored and used for drinking, agriculture, and other purposes.
- **Recycled Water:** Wastewater can be treated and reused for agriculture and industrial purposes. This helps in saving fresh water.



Tell me.

- Why is water important for us?
- Suggest some ways to save water:
 - a) At your home
 - b) At your school
- When is the World Water Day celebrated?



Try to find.

Who is named as “India’s Water Girl”? Gather additional information about her work. Find and gather the information about other persons actively working on water resource conservation.



Study, assimilate and express your views : Study the maps of the major rivers, lakes, oceans, icesheets and ground-water in the world. In the class, collect the information about the global distribution of water with the help of teachers, parents and internet.

Elaborate to the class with the solutions on how can we save the water by the way of actual measurement of water usage.

Compare the amount of water used by you and your friend's family and have group discussion.

|| Agriculture:

In ancient times, primitive humans lived in forests in search of food. He used to earn his living from the products obtained from forests. Later he discovered the idea of cultivating crops. Man started agricultural products and stored food grains for the year. Leaving the previous nomadic life, he started living in one place and took up permanent farming occupation. Agriculture fulfils the needs of man for food, clothing and to some extent shelter. So, agriculture is an important resource.

Types of Farming

Farming methods have evolved due to geographical diversity and cultural differences. Type of farming is determined by objective of farming, crops cultivated, methods of farming, techniques used, land use etc. If farming is carried out in traditional way, then generally farming can be classified into following types.

Subsistence Farming : Farming practised mainly to meet the livelihood needs of the farmer and his family is called subsistence farming.



Try if you can.

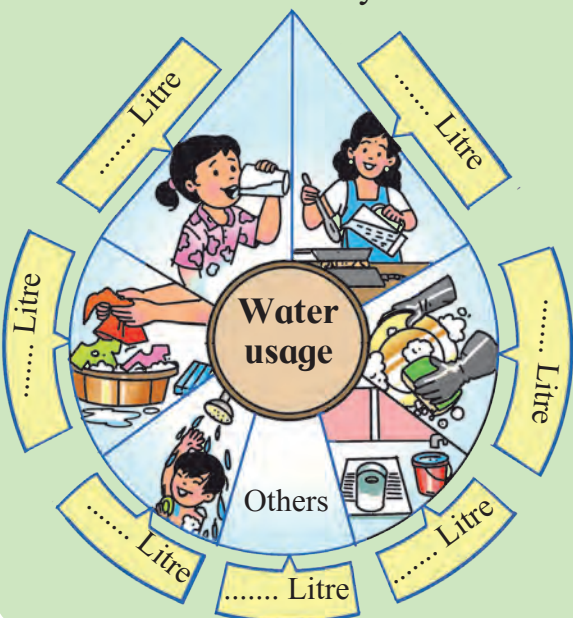
- Find information about potable water sources in your surroundings area.



Just do it.

Water consumption survey

- Conduct a survey on how much water is used by your family in a household in one day.



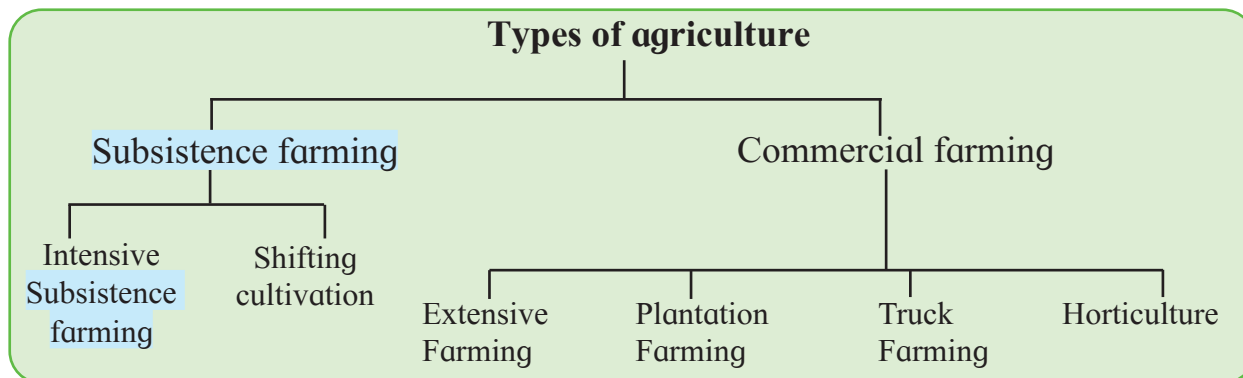


Figure no. 8.5 Types of agriculture

Subsistence farming is classified into intensive Subsistence farming and shifting cultivation.

Intensive subsistence Farming

Intensive subsistence farming is the type of farming that maximize production in limited land.

- Farming is carried out on the same land for many years.
- Due to high population the availability of cultivable land per person is limited, therefore intensive subsistence farming is practiced.
- This type of farming is mainly found in developing countries.



Figure no. 8.6. Intensive subsistence farming

The produce obtained from this farming is just enough to meet the food require-

ments of the farmer's family.

- The farmer and his family are completely dependent on farming. Due to low production, their economic condition remains weak.
- There is more use of human and animal labour in farming.
- Besides food crops, vegetables are also cultivated.

Shifting Cultivation

Shifting cultivation is an early form of agriculture. It is practised in regions with dense forests in tropical regions and hilly areas. For farming, the farmer first selects a patch of forest land. The trees, bushes, and grass are cut down to clear the land. After drying, the cut vegetation is burnt. The remaining ash is mixed with the soil and acts as manure.

Before the rainy season, seeds are sown and crops are cultivated.

We get our daily meal from food grains produced by hardworking farmers.

Therefore, we need to be grateful to them and we should think before we waste food.



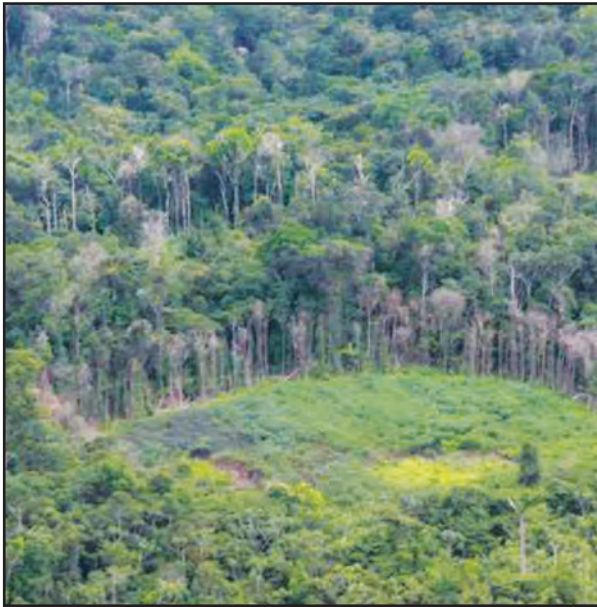


Figure no. 8.6. Shifting Cultivation

(See Figure no. 8.6) The agricultural output from shifting cultivation is not sufficient to satisfy need of food. Therefore, it is supplemented with hunting, fishing, food gathering to meet the requirement of food for family. In this type of farming the period of cultivation is short and period of fallow is more. After 2 to 3 years, when productivity of cultivated land declines, different patch is chosen in other parts of the forest.



Let us discuss.

Discuss which type of agriculture / farming is practiced in your surroundings.

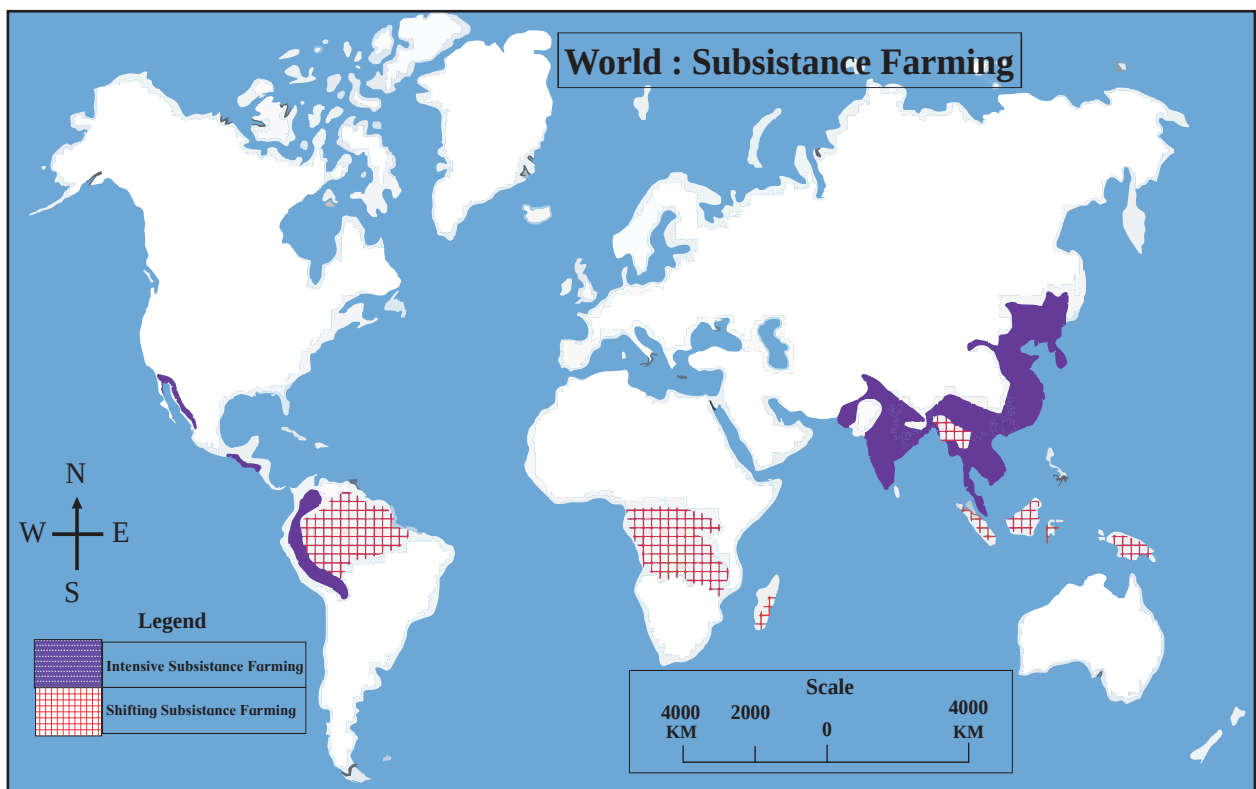


Figure no. 8.7 Global Distribution of Subsistence Farming

Observe the map given above and answer the following questions.

- Which continent has highest land under subsistence farming?
- In which part of India do the subsistence farming is practised?
- How does the latitude affect the distribution of subsistence farming?

Commercial Farming:

Commercial farming is practised on a large scale with the primary objective of earning profit. It involves the use of advanced technology and significant capital investment to produce crops for sale in the market. Commercial farming involves production of commercial crops to meet the standards of international market. Therefore, the focus is always on large scale production, quality agriculture product and efficiency.

Types of commercial farming and their characteristics:

Type of commercial farming	Characteristics of commercial farming		
	Size of the agricultural land holding	Cropping method	Region
Extensive farming	Due to large agricultural areas of 200 hectares or more and sparse population, this type of farming is performed with the help of machinery. e.g. Tractor and Harvester etc.	One crop system e.g. wheat, corn, barley, oats, soybeans, cotton etc.	Temperate grassland-Steppes, Prairies, Downs, Pampas, Veld.
Plantation farming	Farming of 40 hectares or more is the large area of commercial farming of a single cash crop using modern and capital-intensive methods. In this farming, local manpower is of great importance.	Monoculture is the production of only cash crops, such as tea, rubber, coffee, coconut, cocoa, spices etc.	In the tropical region-India, South Asian countries, South Africa, South and Central America
Truck farming	Small land holding. In this, modern form of agriculture is practised. Farmers grow vegetables and other crops in areas due to demand of urban population.	Mixed cropping system, crop rotation system, e.g. vegetables and other crops.	It is cultivated near urban areas in India and near most major cities In the world.
Horticulture and Floriculture	Small size land holding. Fruits and flowers are the main products of this type of farming. This farming is practised in both traditional and modern ways.	Planned scheduled cropping system, intercropping, Lily, Gerbera, Tulip, Chrysanthemum, marigold etc. Horticulture produces indigenous and exotic fruits like mango, custard apple, grapes, banana, pomegranate, dragon fruit, cherry etc.	India, South Asia, China, East Asia, California, Mediterranean region – France, Italy, Japan, Europe – Netherlands India – Karnataka, Tamil Nadu, Maharashtra

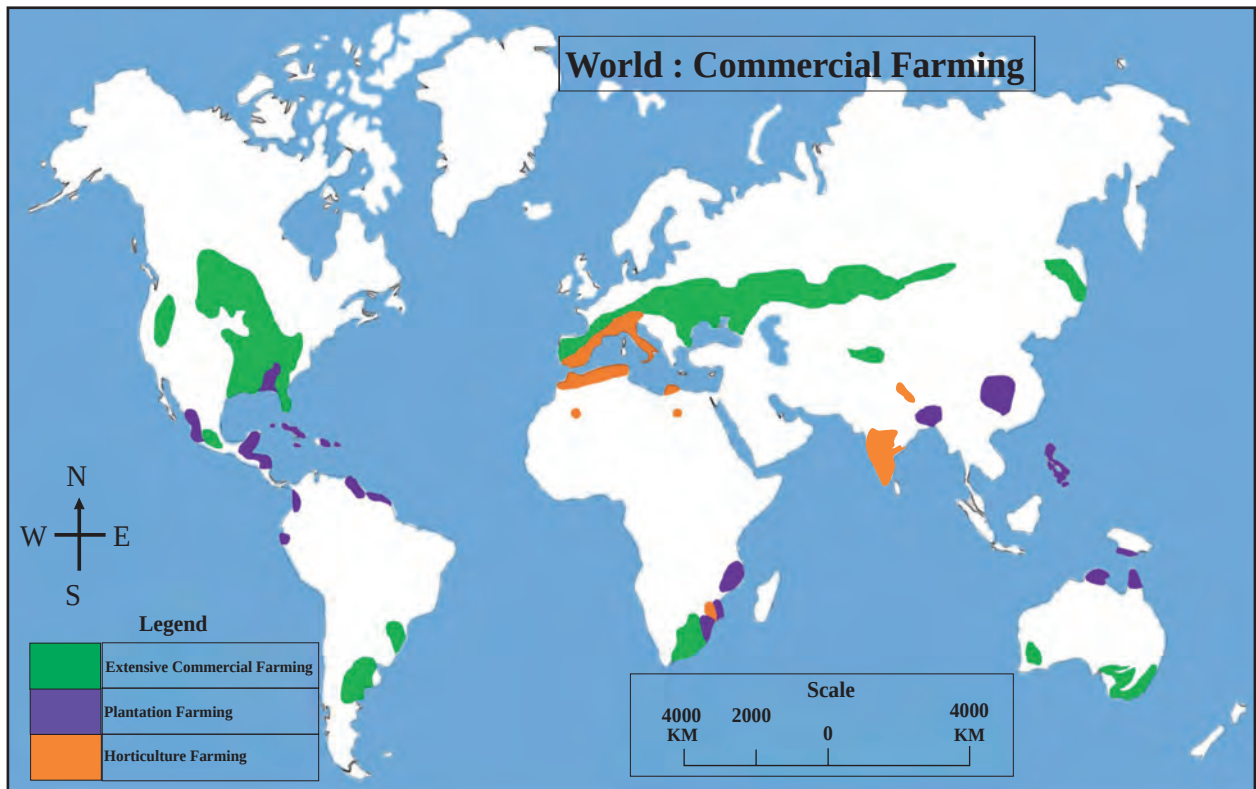


Figure no. 8.9 Global Distribution of Commercial Farming

Observe the above map and answer the following questions.

- Which continent has the highest area under commercial farming?
- State whether the countries dominated by commercial farming are developed or developing economies.
- Name three countries having commercial farming.



Let us do it.

If you have a little space around your house or on the terrace of the building, which of the above types of modern agriculture can be used to grow vegetables? Write the information about this in five lines.



Let us find out.

Maha-agro : Under A.I. policy of 2025 -2029, Government of Maharashtra is establishing Special AI and Agritech and innovation centers to use Artificial Intelligence for agriculture. e.g. Gather the information about Baramati (AIC-ADT Foundation) and similar centers.

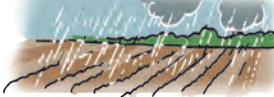
Green revolution in Maharashtra –

During the period from 1963 to 1975 the use of advanced technology, seeds and irrigation facilities has increased in Maharashtra under the leadership of then Chief Minister of Maharashtra Late Shri. Vasantao Naik who contributed to the agricultural reforms in Maharashtra. Therefore, he is known as the father of Green Revolution in Maharashtra.



Traditional farming and Modern farming - Traditional farming largely depends upon nature and is practised using manpower. Modern agriculture on the other hand is technology based, productive and market – oriented. Both types of agriculture have their own significance. However, today the use of both types of farming needs to be made in balanced manner for achieving sustainable development.

Complete the following table of differences between
Traditional farming and Modern farming

Element	Traditional farming	Modern farming
Meaning	Farming is practised traditionally, based on experience. 	Science, technology and research-based agriculture 
Tools	Simple tools like plow, sickle and oxen 	
Seeds		Use of hybrid and genetically modified seeds 
Use of fertilizers	Manure, compost, plant-based manure 	
Pest control		Pesticides, herbicides and modern medicines 
Production capacity		Production is large and stable 
Water management	Largely depend on rain 	
Need for agricultural labour	More manpower is needed 	
Time		More production is obtained in less time. 

|| Modern Technology in Agriculture :

- Use of modern technology such as irrigation tools, drones, sensors, robotics, solar energy, artificial intelligence (AI), digital apps, etc.
- Optimum use of resources in limited space, optimum use of water and fertilizers; selection and planning of crops based on climate.
- Helps increase productivity and farmers' income.
- Types of farming such as hydroponics, vertical farming, organic farming, green soil farming,

contract farming etc. are being developed using modern technology.

Project :

Collect detailed information (with the help of the internet) about modern agricultural technologies and methods, and present it in the class.

Importance of resources –

Resources are Natural or man-made things which are used to satisfy human needs and improve their standard of living.

|| We have understood...

- The concept of “resources” is understood.
- Natural and man-made resources can be classified.
- Importance of water as a resource is understood.
- Types of farming and their characteristics are understood.
- Importance of agriculture in human life is understood.



Exercises

A) Choose the correct option:

- 1) Which one of the land resources is most important for agriculture?
a) Rocks b) Hills
c) Soil d) Sand
- 2) Progress of a country depends on which of the characteristics of available resources?
a) Quality of resources and human skills
b) Stop use of resources
c) Export resources
d) The number of resources only
- 3) Out of total water on the Earth, approximately how much of fresh water is available for drinking?
a) 29% b) 97%
c) 71% d) 3%
- 4) Which modern irrigation method is used to prevent wastage of water in farming?
a) Drip irrigation
b) Canal irrigation
c) Well irrigation
d) Flow irrigation
- 5) What is the major cause of depletion of resources?
a) Natural disasters
b) Afforestation
c) Overuse of resources and increasing population
d) Research

- 6) Which of the following type of farming aims to sustain family?
- Commercial farming
 - Subsistence farming
 - Mixed farming
 - Plantation farming

B) Answer in brief :

- 1) Prepare a comparative table showing the differences between 'subsistence farming' and 'commercial farming.'
- 2) Write the changes that have taken place over time in traditional farming and modern farming.
- 3) Explain the importance of irrigation in agriculture.
- 4) What crops are cultivated in your nearby area? What are the geographical reasons for it?

C) Write geographical reasons :

- 1) Commercial and extensive farming requires more capital.
- 2) Plantation farming requires skilled and experienced labourers.

Activity:

- Study the changes brought by water conservation in villages like Ralegan Siddhi and Hiware Bazar, and collect information about similar villages in your region using the internet. Present it in class.
- Find information about father of global and Indian Green Revolution and present it in class.



- If you were to name this picture 'The World of Resources,' what would be the reason for it?



9 Economic Activities

|| ‘Respect for labour is a moral responsibility’.



**Thought-
provoking
questions**



- Find the occupations around you in the above pictures and enlist the additional occupations you know besides these.
- Classify the above mentioned occupations according to economic activities.
- Which one of the occupations would you like to choose in future? Give reasons for your choice of occupation.

A conversation between teacher and student in the class-

Teacher: Traditionally, agriculture has been the main occupation in India. But today, the nature of this occupation is changing.

Priya: My grandfather had a large farmland. He used to stay in the fields all day.

Merry: Why did you say ‘had’? doesn’t he practise it now?

Priya: He does, but now our agricultural land has reduced. A factory has been started there.

Veena: Which factory?

Priya: A sugar factory.

Arbaz: My uncle works in that sugar factory.

Siddharth: My father transports the sugar produced in the factory to the agricultural market committee (market yard) by truck.

Tanaya: Listen! Vinaya’s father is the manager of that factory.

Karan: My aunt checks sugar quality.

Kapil: My uncle supervises the slurry-based process unit of this factory.

Teacher: Oh, that’s great! See how much efforts your family members taking for you. Never look down on any work. All these activities help in fulfilling the economic needs of our families.

Geographical Explanation:

From the above conversation, we can understand that humans perform various activities to satisfy their

different needs. These include different occupations such as business, industries, and trade. These activities are called economic activities.

Some of these activities are directly dependent on nature. The products obtained from such activities come directly from nature, such as crops like sugarcane and cotton etc. grown in the agricultural area.

Alongwith the agriculture, economic activities such as animal husbandry, fishing, mining and forest product gathering etc. also depend on nature. Economic activities that depend on nature are included as primary economic activities.



Just think.

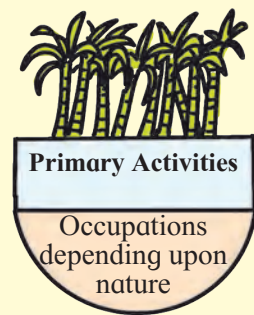
If a glass of sugarcane juice costs ₹15, but sugar of the same weight costs ₹25, why is there such a difference in their prices?

Some products obtained from primary activities are used directly, while others undergo processing to become more durable, high-quality, and useful. Due to this, their value increases.

For example, refer to Figure No. 9.1. The raw materials required for processing industries come from primary activities. This means processing industries depend on primary activities. Therefore, such activities are included in secondary economic activities.

With the growth of these activities, the Industrial Revolution began in the 18th century. As a result, production of various goods increased, employment opportunities grew, and significant changes occurred in human lifestyle.

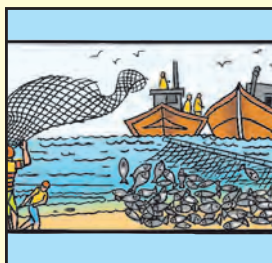
Economic Activities



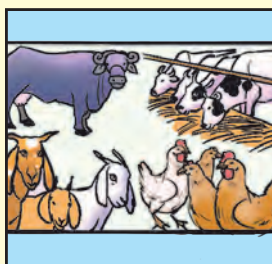
Agriculture



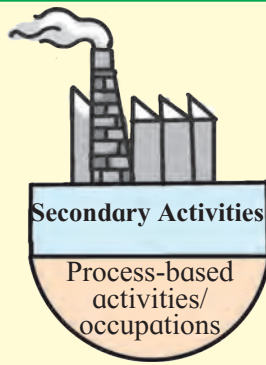
Mining



Fishing



Animal Husbandry



Food processing



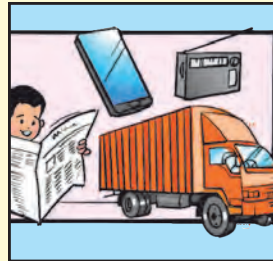
Construction



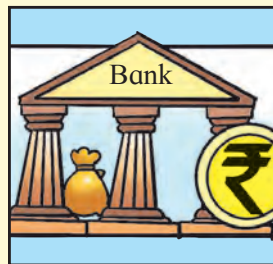
Food packaging



Dairy Industry



Transport and Communication



Banking



Health



Education

Figure no. 9.1 Classification of Economic Activities

Some services are required for transporting sugarcane from the producing region to the industry and sugar from industry to market and customers. These include services such as transportation, communication, trade, etc. The activities that provide such services are included under tertiary economic activities. In these activities, no goods are directly produced; instead, services are provided. Therefore, tertiary activities are also known as the service sector. These activities connect and support primary and secondary activities.



Try if you can.

- Which economic activities are found in your area?
- Which economic activities are found on large scale in your area?
- How do natural and human factors affect economic activities?

Percentage distribution of workforce in different economic activities (%)

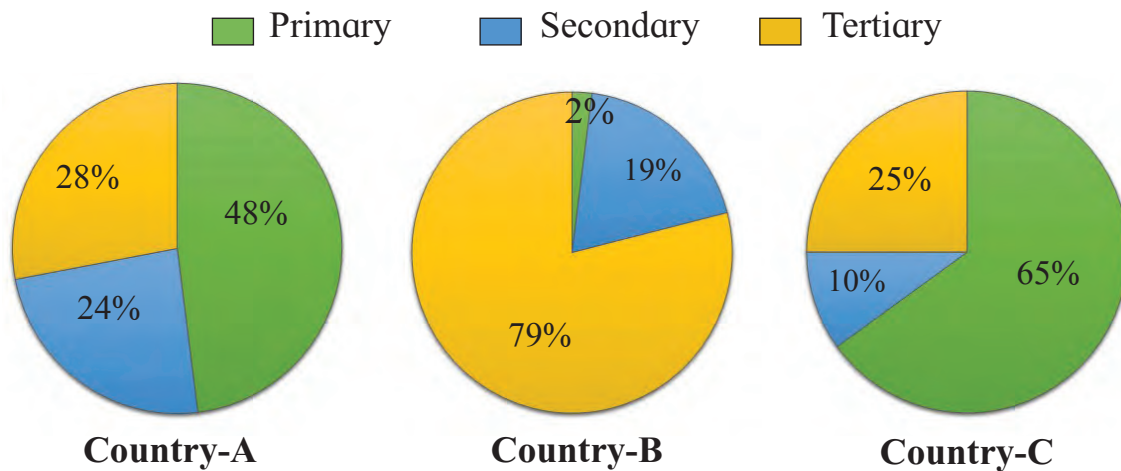


Figure no. 9.2: Percentage distribution of workforce

In all countries of the world, these economic activities exist in varying proportions. The workforce engaged in economic activities determines a country's **Gross National Product (GNP)**, National income, international trade, and whether its economy is classified as into developed, developing or underdeveloped.

By observing Figure No. 9.2, we understand that countries with a higher proportion of workforce in tertiary activities are considered developed. Countries where primary and secondary activities dominate are considered developing, while countries with a higher proportion of primary activities are considered economically underdeveloped.



Try if you can.

- Complete the following activity.

Raw material	Secondary activity	Products
Sugarcane	→	Suger, Jaggery
Cotton	→	
	→	Curd, Ghee, Icecream
Mineral	→	
	→	Pickles, sweet raw mango preserve, medicines, jam
Wood	→	

Fig 9.3 Secondary activities and products

Changing nature of economic activities:

Teacher: Students, the nature of economic activities keep on changing with time. The occupation in which your grandfather was engaged might be different from the economic activities performed by your father or uncle. Even if they are running traditional business, these economic operations must have become modern with the help of education, infrastructural facilities, and technological advancement.



Just do it.

Field visit

Visit the family members / persons engaged in economic activities around you or manufacturing industry near you and gather the information about changing nature of these occupations and present a report of field visit.

Arbaz: Yes, I don't have father but my mother is helping us do our schooling through her tailoring work. Now, she has completed her curriculum in tailoring and she has become a fashion designer. The nature of her previous work has changed and her income has also increased.

Merry: Very true, due to increased work pressure, my mother does not go to bank as she is doing all her financial transactions online. Not only this, but she is also doing her shopping online.

Teacher: This is exactly I wanted to tell you that in modern times, a person can become successful professional only if he/she is acquainted with knowledge, technology, skills and passion for the business.



Ajanale Village

Ajalane village is located in Sangola Taluka of Solapur District in the State of Maharashtra. About 90% of the population here is directly or indirectly dependent on pomegranate production. Abundant sunlight and rocky land are characteristics of this area. During the drought of 1972, the village was included in the scheme 'Krushi Pandhari Scheme'. Pomegranate gardens are flourished through water revolution in the form of dams, embankments, percolation tanks and farm ponds. Find the information about the economic activities in Anjanale village with the help of the internet and prepare a project report.

Ajanale Village

15 – 20 years before present



Figure no. 9.4 (A)

In the year 2025



Figure no. 9.4 (B)



Try if you can.

‘My Business Idea’

Write your business idea of your choice with the help of following points.

- Name of the business and its nature
- Target customer
- Production / service
- Use of technology

Geographical Explanation:

Through such communication, the changing nature of economic activities is realised. From this, many economic activities taking place in the surroundings are understood. The nature of transactions, communication and economic activities are different depending on whether a place is a village or a city. In every region, how people earn money through economic activities, how they spend it, and how society progresses through it



Exercises

A) Identify the odd one out:

- 1) Farming, Mining, Factory, Fishing
- 2) Health, Dairy products, Textile industry, Paper production
- 3) Animal husbandry, Banking, Transport, Education

B) Choose the correct option and write the sentence:

- 1) Which of the following is related to secondary economic activity?
 - a) Making sugar from sugarcane
 - b) Collecting fruits
 - c) Serving in a bank
 - d) Animal husbandry
- 2) Which economic activities are also called 'service sector'?
 - a) Primary economic activities
 - b) Secondary economic activities
 - c) Tertiary economic activities
 - d) All of the above

C) Distinguish between :

- 1) Primary economic activity and secondary economic activity
- 2) Textile industry and transport service

D) Write geographical reasons:

- 1) Primary economic activities are found in large numbers in rural areas.

is observed. It is hence understood that economic activities have become an integral part of our lives.

|| We Have Understood:

- The concept of human economic activities.
- Various economic activities in the family and surroundings.
- Classification of human economic activities.
- Changing nature of economic activities in families and surroundings.

- 2) Tertiary economic activities are supplementary to primary and secondary economic activities.

- 3) India is a developing country.

F) Complete the table:

Primary Economic Activity	Secondary Economic Activity	Tertiary Economic Activity
Fishing	1) Fish processing	1) Export
	2) _____	2) _____
Floriculture	1) _____	1) _____
	2) _____	2) _____
Iron ore	1) _____	1) _____
	2) _____	2) _____

G) Answer in brief:

- 1) Find out in which country or which state in India the items in your house are produced. Take help from your parents and write.
- 2) Write about the changes in the nature of economic activities over time in your surroundings.

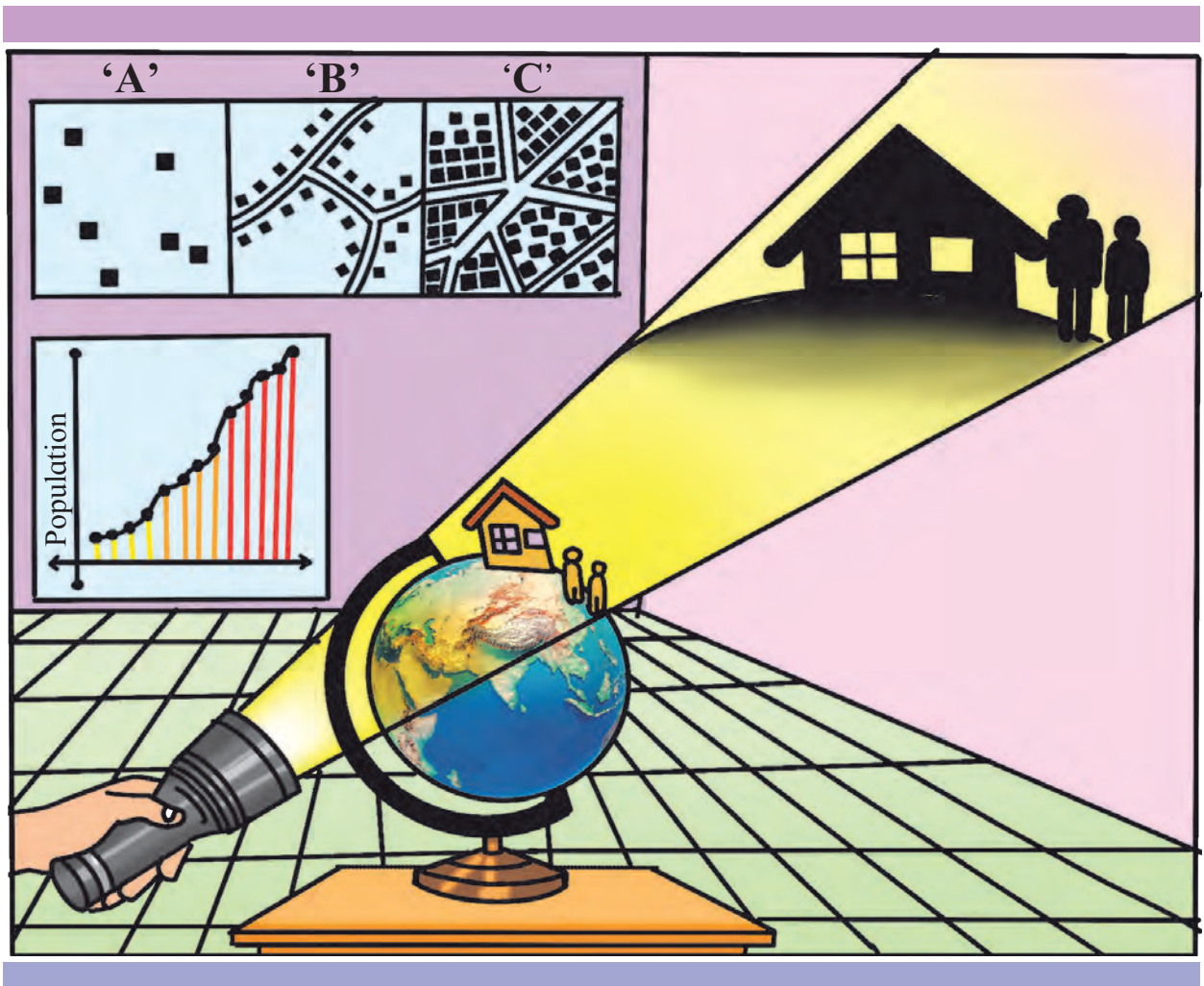
Activity:

- Collect information about villages which are famous for economic activities like village Ajnale.



10 Human Settlements

‘Grew the settlements, grew in the urbanization,
Increasing population is the only reason’.

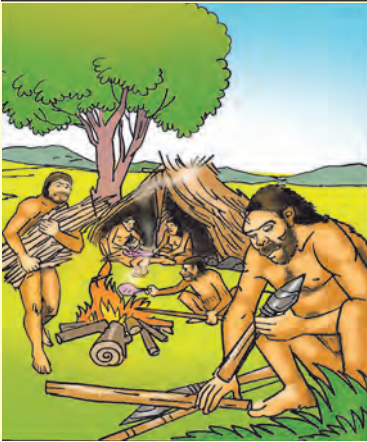


**Thought-
provoking
questions**



- Observe the structure of the settlements ‘A’, ‘B’ and ‘C’ shown in the picture and explain main difference among them.
- Explain the relationship between graph of population growth and growth in the settlements.
- The picture shows a family house and a family on the Globe. By referring to this picture how the concept of ‘Local to Global’ be explained?
- What could be the possible symbolic meanings of torch throwing light on the picture of the earth?

Nomadic Human Settlement



Picture no. 10.1 (A)

Primitive Human Settlements



Picture no. 10.1 (B)

Urban Human Settlements



Picture no. 10.1 (C)

Changes taken place in the human settlements



Tell me.

Study the picture above and answer the questions given below.

- 1) Where did primitive humans live?
- 2) Why do we live in villages or cities today?

Geographical explanation:

In ancient times, humans used to live in a nomadic way. Humans migrated from one place to the other in search of food, cloth and shelter. Hunting, food gathering (fruits and root fruits) were the only source of their livelihood. However, in due course of time humans started practicing agriculture. For practising agriculture they had to live near sources of water and live sedentary life. Therefore, humans started living in permanent settlements by building permanent houses. This has led to the development of permanent human settlements.

After settling humans started cultivating the land and grow various crops. This has led to increased production of food grains, fruits and vegetables. Excessive agricultural output has been used for selling in the market. Trade led to the exchange of goods and thus the market began to fill up in villages. Various economic activities started due to stable and permanent settlements. This brought about the development of knowledge, art and culture. Thus, settled human life has helped in expansions of agriculture, trade and education.

Living in permanent settlements provided many benefits to humans. For example, an increased a sense of security. It became easier to protect onself from wild animals and enemies in the forest or natural disasters. The settlements provided facilities like roads, water, electricity, healthcare, markets, schools and people started gathering together to complete huge tasks with ease. For

example harvesting crops, celebrating festivals, constructing wells etc. has resulted in the development of social unity and cooperation.

Small settlements together form villages. Villages have less number of houses and less people and agriculture is the main occupation. As settlements

grow larger, they develop into towns and cities with increasing population. In cities, industries, trade, schools, colleges, hospitals and various services are developed more than farming. Although villages and cities have their own unique advantages, changes in the size, shape and nature of human settlements occur according to people's needs.



Try if you can.

- Complete the following table with characteristics of human settlements.

Factors / characteristics	Rural Settlement (Village)	Urban Settlement (City)
Houses	Spacing between the individual houses is more	Spacing between the individual houses is less
Population	Low	
Infrastructure		Infrastructure is abundant
Economic activities	Primary : agriculture, animal husbandry, fishing	
Surrounding atmosphere		Crowded, noisy and polluted
Examples		

Table no. 10.1 Characteristics of human settlements

Geographical explanation:

Most people in rural areas are engaged in occupations based on local natural resources. For example, fishermen community live near the coast, farmers live on the banks of rivers, and tribal communities live in forest areas.

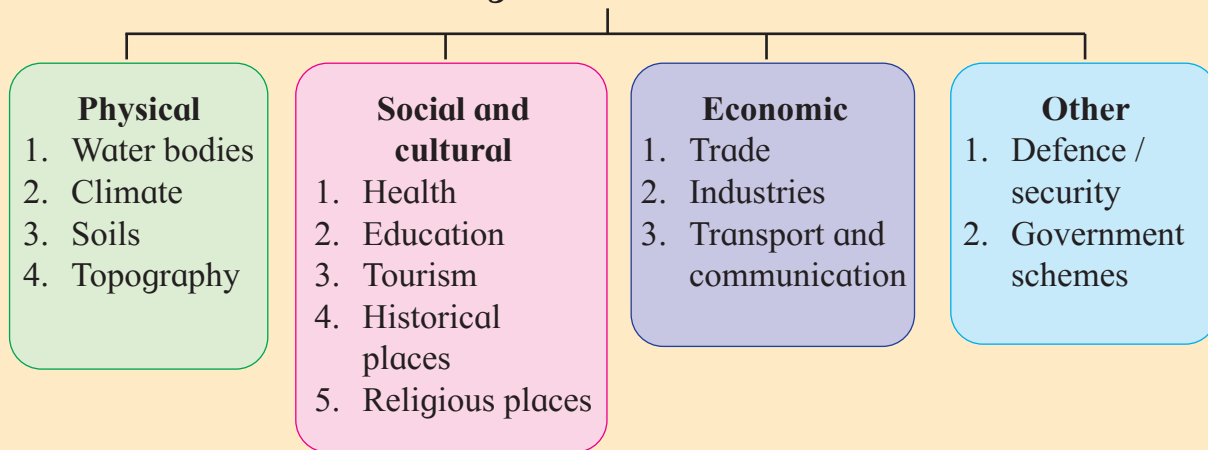
In rural settlements, other related occupations also grow along with the main occupation. With development and industrialization, employment opportunities increase. As employment increases, people from nearby areas migrate continuously, leading to

population growth in rural areas. To accommodate the growing population and provide facilities, roads, hospitals, administrative offices, banks, markets, shops, communication, transport, restaurants etc. services are developed. Therefore, the importance of primary occupations decreases, and rural settlements transform into urban settlements. Religious, historical, commercial, educational and tourism factors cause transformation of rural settlements into urban settlements.



Just do it.

Factors affecting location of human settlement



Try doing it.

Field visit :

- 1) Visit the settlement near your school and observe.
- 2) Observe following things during field visit.
 - a) How are the houses?
 - b) What is the important occupation of people in the settlement?
 - c) Does this settlement have roads, schools, water supply, market and such other facilities?
- d) Note down activities of the people and shape of the settlement in your notebook.
- 3) Narrate your observations in the classroom.
- 4) Perform group discussion on this
- 5) Each group should prepare a sketch of the settlements based on their own observations.

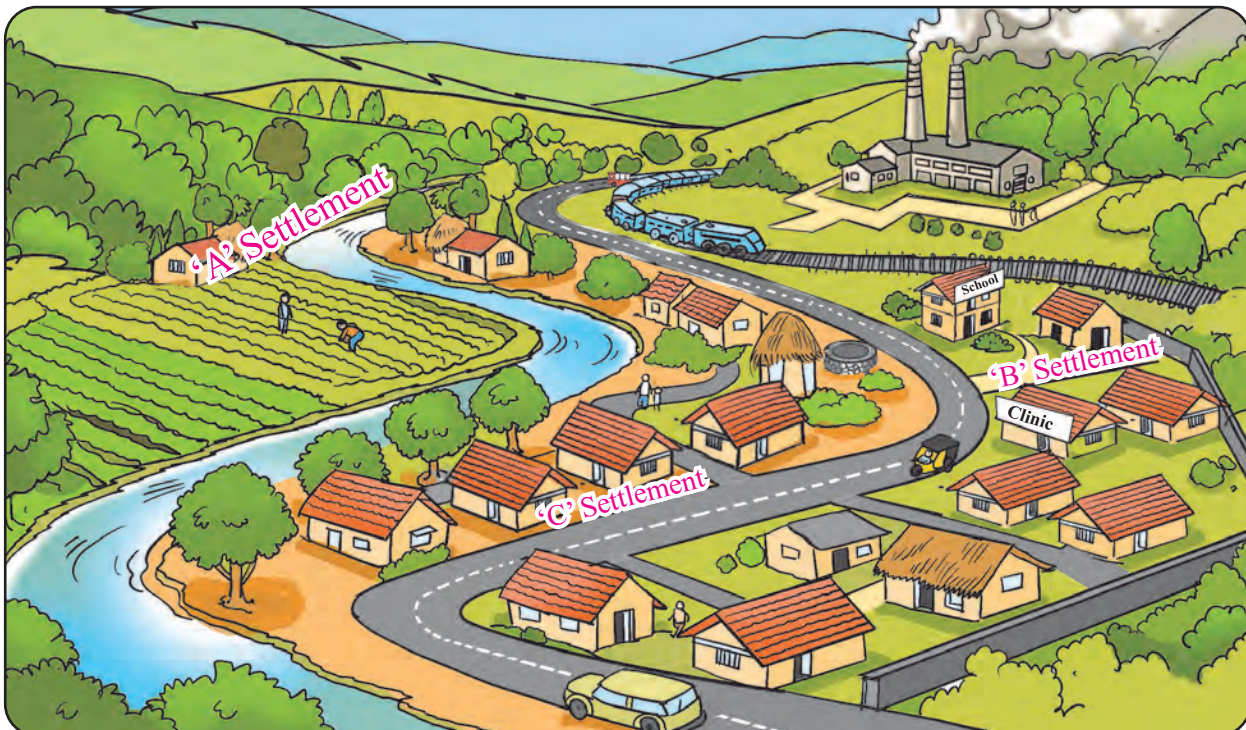


Figure no. 10.2 Factors affecting location of the Human settlements



Tell me.

Observe Figure No. 10.2 and answer the following questions:

1. Which type of settlement is found in places where irrigation and water supply facilities are available?
2. Which settlement has developed due to transport facilities?
3. Which settlement has developed due to service facilities?
4. Classify the factors affecting the location of human settlements in the figure into natural, social and cultural, economic and other factors.

Geographical explanation:

There are many factors that determine where human settlements develop. These include physical, social, cultural, economic and other types of factors. All these factors together influence the location and growth of settlements.

A) Physical Factors

1. Water bodies : Settlements grow in places where drinking and irrigation water is abundantly available. Example : On the banks of Krishna River – Maharashtra, On the banks of Ganga River – Varanasi

2. Climate : Human settlements are more in places with favorable climate.

Example : In Maharashtra, Pune has a higher population, whereas in extremely hot Thar desert or very cold regions, settlements are sparse. e.g. Ladakh

3. Soil : Fertile soil is suitable for agriculture. Therefore, population grows rapidly in such areas. The alluvial soil in the plains of the Ganga region is suitable for farming, so population density is high.

In contrast, in Rajasthan, sandy soil and hilly regions of the Satpura range have sparse settlements.

4. Topography : The shape and nature of the land influence the development of settlements. It is easier to practise farming and construct transport routes and houses on flat land. In mountainous regions, it is difficult to build transport routes and houses. Example : Many large settlements have developed in plains, while settlements in mountainous regions are dispersed.

B) Social and Cultural Factors

1. Health : Places with good healthcare services attract and sustain population growth. Example: Mumbai, Akaluj, Miraj have seen population growth due to large hospitals.

2. Education : Cities with educational facilities attract students, teachers, and researchers. Example: Pune, Latur, Kota, etc.

3. Tourism : Places with natural beauty, historical forts, or seashores attract tourism, leading to settlement growth.

Example: Matheran, Chikhaldara, Salher, Malvan, etc.

4. Historical Places : Places of historical importance have developed into large cities over time. Example: Sitabardi, Ayodhya, Delhi, etc.

5. Religious Places: To fulfill the needs of pilgrims the settlements of pilgrim and religious centers flourish. Religious centres grow in order to meet the demands for pilgrims. e.g. Pandharpur, Prayagraj etc.

C) Economic Factors

1. Trade : Places having large marketplaces have higher population and settlements. Example : Solapur – cloth markets; Surat – diamond and textile, etc.

2. Industries : Settlements grow in places where factories and industries provide employment opportunities. Example : Bhiwandi – textile industry; Jalna – steel industry, etc.

3. Transport and Communication : Places where transport and communication facilities are well developed witness large-scale settlement growth. Example : Kolkata, Bengaluru, etc.

D) Other Factors

1. Security/Protection : Settlements develop at safe and secured places. Example – area of Gwalher fort, Daulatabad – Mahakot.

2. Government Policies : New settlements are developed due to government schemes and policies. Example : Supa industrial

settlement in Ahilyanagar district.

Conclusion : In short, human settlements do not depend on a single factor. They develop due to the combined effect of various natural, social, economic, and other factors. Settlements grow faster in places where proper facilities and opportunities are available.

Changing Nature of Human Settlements :

The houses, buildings, or societies in which we live today are suitable for habitation, but think:

- Where did early humans live?
- How were villages during the times of our grandparents?
- What will settlements look like after 50 years?

Human settlements have evolved from caves to modern buildings. This change is due to agriculture, industry, trade, population growth, security, and technological advancement. As human life continuously changes, so does the nature of settlements.

The changing nature of human settlements can be understood through satellite images. For this purpose, Google Earth Pro can be used.

We are safe because our soldiers protect us along the borders of the countries. We should always be grateful to the soldiers who protect us within the country and at the borders.



Figure No. 10.3 (a): Supa MIDC (Ahilyanagar) satellite image – 2010



Figure No. 10.3 (b): Supa MIDC (Ahilyanagar) satellite image – 2025

- Observe the above satellite images and conduct group discussion on the changes taken place in the settlement.



Just do it.

- How to use Google Earth Pro is explained in the following steps:

1. Download the Google Earth Pro app.
2. Go to the search option and enter the name of your village or city.
3. Then click on the “**Show Historical Imagery**” icon.
4. After that, move the slider backward and forward.

This will help you see the changes that have occurred over the past 10–20 years.

5. Then click on the File icon.
6. Click on **Save**, and then select **Save Image**.
7. Then click on the **Map Options**.
Choose the elements you want in

the image.

Example: Title and description, legend, scale, compass, HTML area. Then click on the **Save** button.

8. After that, select the image resolution as required.

Example:

- Current: 1024×786 , 1280×720 (720 HD)
 - 1920×1080 (1080 HD), 3840×2160 (4K HD)
 - 8192×4320 (8K HD) – maximum
9. The final step is to save the image:
 - i) File name – write the name of your village/city and the year.
 - ii) Save the image in JPG or PNG format.
 - iii) Click on the save button to save the image.

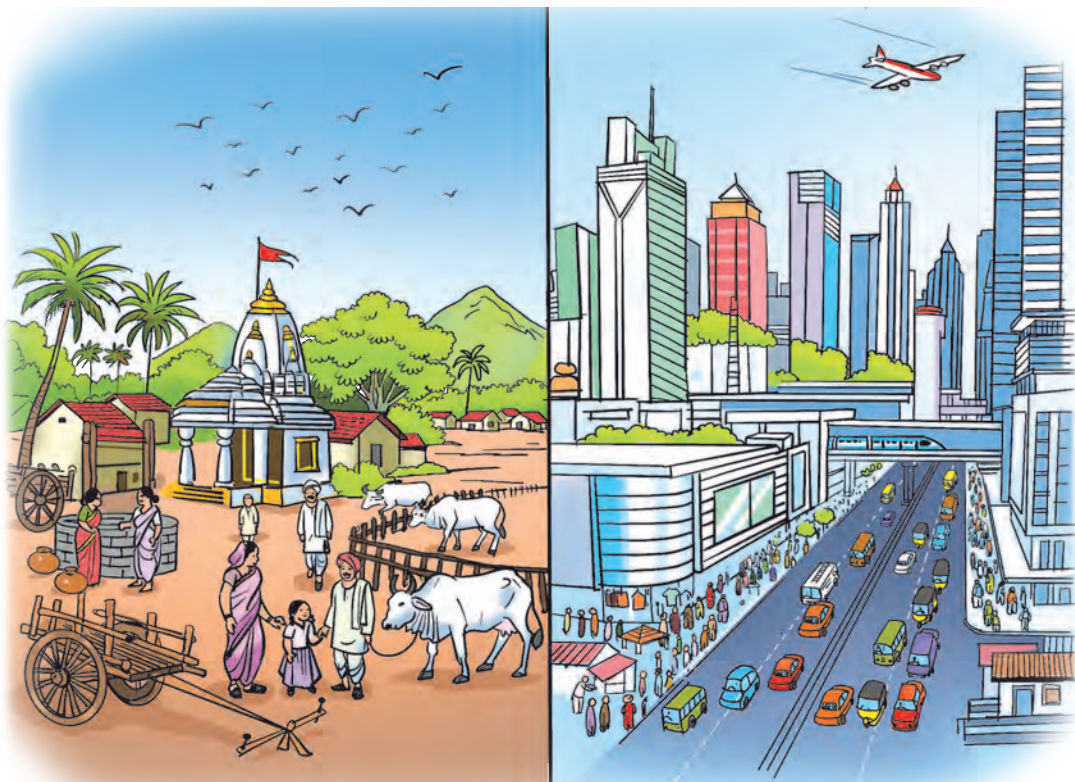


Figure no. 10.4: Rural and Urban Settlements



Just do it!

Activity : With the help of parents, use Google Earth/Maps to compare images of your area from a few years ago and the present. Identify what changes have occurred in these images (e.g., new roads, buildings, industries, etc.). Prepare a list and discuss it with your parents.

|| We understood...

- The concept of human settlements.
- The factors responsible for the formation of human settlements.
- The changing nature of human settlements.



Exercises

A) Choose the correct option:

1) In a village, agriculture is the main occupation. Houses are scattered and population is low.

What type of settlement is this?

- a) Urban settlement
- b) Rural settlement
- c) Commercial settlement
- d) Industrial settlement

B) Identify whether true or false

and give reasons:

- 1) In urban settlements, people are completely dependent on agriculture.
- 2) Landform, climate, and availability of water are natural factors that affect the location of human settlements.
- 3) Rural settlements are compact in nature, while urban settlements are scattered.
- 4) Availability of transport facilities promotes the development of urban settlements.
- 5) The only difference between rural and urban settlements is the population.

Interview:

- Talk to the elderly people (grandparents/senior persons) at your home or in surroundings.

Ask them the following questions.

Observe the picture:

1. How was their village/city during their childhood?
2. What changes have taken place in the settlement?

Students should write all the information in their notebook and present it in class.



C) Answer the following questions:

1) If you want to modernize a rural settlement, which three measures would you suggest?

2) Write how rural and urban settlements are interdependent.

3) Compare rural and urban settlements.

D) Write geographical reasons:

1) Rural settlements are mainly found in agricultural regions.

2) Urban settlements develop in industrial regions.

3) Scattered settlements are found in hilly regions.

Activity:

- Write a short play on the topic “Village to City”, showing the contrast between old villages and modern suburbs.
- With the help of parents, teachers, classmates and internet, gather the information about changing nature of human settlements with climate change.



'Conservation of forests, water,
and land is true human welfare!'



**Thought-
provoking
questions** ?

- How can **resources** be used in order to ensure comfortable life of ours and our future generations?
- Think about the '**resources** of the future'.

|| Our Sustainable Components

We use elements of nature extensively in order to satisfy our daily needs and make our life comfortable. We enjoy the nature by visiting places such as forest, mountains, rivers, sea etc.

Have we ever thought? Will these **resources** be available in sufficient quantities to meet the needs of our future generations? And will human of future generations be able to survive and enjoy the nature like us?

- **Complete the table by thinking about the following components:**

Components of Nature		Use in Daily Life
1	Sunlight	
2	Coal	
3	Mineral oil (Petroleum)	
4	Natural gas	
5	Air	
6	Water	
7	Vegetation	
8	Animals and birds	
9	Land	



Tell me.



Figure no. 11.1 – Questions about the Future

If we think about the use of the above **resources**, we understand that we are using all natural **resources** extensively. But in this modern scientific age, are humans thinking about the availability of these **resources**?

Observe Figure no. 11.1 and answer the following questions:

1. Which **resources** shown in the picture are getting exhausted due to human use and which are renewable?
2. What do you understand from the given picture?

Exhaustible Resources:

Humans are excessively using fuels such as petrol, diesel, and natural gas to meet their needs. These fuels take millions of years to form, so they are exhaustible and may get depleted soon in the near future due to their uncontrolled use.

Inexhaustible Resources:

Some natural elements never get exhausted or are naturally reproduced. Air, water, soil, trees, sunlight, etc., are inexhaustible resources and play an important part in human life.

Prepare a list of exhaustible and inexhaustible resources found in your surroundings.

Comparative Study:

Exhaustible Resources	Inexhaustible Resources
These resources fall under non-renewable resources. They get depleted when used and are not regenerated, or regenerate very slowly. Examples: Minerals – iron, copper, bauxite, etc. Fuels – petroleum, coal, natural gas, etc.	These resources are available in unlimited quantities in nature. They are reproduced quickly and comparatively in short period. Examples: Sunlight, air, water, plants, animals, microorganisms, etc.



Remember This.

The word “Shaswat” is derived from Sanskrit and means “lasting forever” or “permanent (sustainable)”.

Group Discussion

Does environmental imbalance occur due to human activities or due to the activities of other living organisms? Express your opinion.

Do You Know?

Some major government initiatives for sustainable development:

1. Swachh Bharat Abhiyan

2. Ek Ped Maa Ke Naam



A step towards cleanliness!



Figure no. 11.2 – Government schemes for sustainable development

Importance of Sustainable Components in Indian Society

Component Points	Sun 	Air 	Water 	Land 
1) Living Standard	Provides heat and light; sustains life	Essential for respiration	Essential for drinking and cleaning	Provides shelter and food
2) For Occupational use	Solar energy helps in crop growth and ripening	Wind energy, pollution-free industries	Agriculture, fishing, occupation, hydroelectricity	Farming, mining, construction, etc.
3) Economic Development	Use of renewable energy leads to economic progress	Green energy improves health	Irrigation and increase in production due to industries	Industries, transport, and infrastructure
4) Vegetation	Necessary for photosynthesis	Maintains carbon-oxygen cycle	Required for growth and food production	Nutrients in soil
5) Animals	Provides warmth and supports biological activities	Required for respiration	Habitat and drinking	Necessary for habitat and food chain
6) Environmental Balance	Controls climate and seasons	Maintains atmospheric balance	Maintains water cycle balance	Maintains stability of ecosystems
7) Conservation	Increase use of solar energy	Afforestation and pollution control	Water conservation, rainwater harvesting, replenishing water reserves	Soil conservation, weathering, prevention of encroachment.

Conclusion: From this, it is understood that the Sun, air, water, and land are the essential elements for human life. If these resources are used sustainably and conserved properly, human life will improve, the economy will become stronger and environmental balance will be maintained.

Table no. 11.1

Role Play



: I am the Sun.
I am a star, the true foundation of life!
I give light, I give warmth,
Within me lies immense energy!



I am the Earth.
: I am everyone's support,
on which stand homes and shelters!
I always become the path beneath your feet,
Behind me lies the wave of the ocean!



: I am the Water, I am the life.
The heaven is flourished in deserts due to me.
Within me shines this beautiful green nature,
I can even create a heavenly paradise!



I am Air, clean and cool
: I become everyone's breath,
Though I am invisible, I still exist,
Improve my quality, know my importance

- With the help of teachers prepare a dialogue like the one given above.



:
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- Keeping in mind, the significance of above conversation, discuss how should we behave in future? Try to understand how this conversation can be continued, which points can be placed in the same and perform this conversation in the form of play along with acting.

Sun, land, air and water are four pillars of nature. The true formula for sustainable development is conservation and protection of these resources. It is in our hands whether to spoil natural cycle or to create a beautiful future while achieving sustainable development.

Contribution of Indian festivals in conservation of elements for sustainable development.

Indian festivals are not only based on religious traditions, but they are also connected to nature, science, health, Ayurveda, and agricultural life. These festivals are linked to the time, seasons, climate, farming, geographical events, and natural elements.

Each festival has a specific scientific perspective. These festivals inspire the preservation and balance

of natural elements such as trees, animals, soil, water, air, the sun, and the moon. Therefore, Indian festivals play an important role in the context of sustainable elements. Vatpournima - Banyan tree, Pola - Bullock (animals), Ghatasthapana - Soil and air, Makar sankrant - the Sun, Narali pournima - the Sea, Ramjan Eid and Buddha pournima - the Moon, Baisakhi - crop harvesting.

Festivals vary according to social, cultural, and geographical regions, as well as natural conditions. Along with this, festivals include various forms of folk literature such as folk songs, powada, ovi (traditional verses), bharud (devotional songs), dances, etc.

Thus, in the context of sustainable elements, festivals make a valuable contribution.



Let's discuss.





Just think.

What are the most common things that frequently cause harm to the environment due to human behaviour?



Tell me.

Enlist the do's and don'ts for conservation of environment.

Project:

- Prepare a presentation about Indian festivals related to sustainable elements in your geographical and social context based on the following points:

- | | |
|--|---|
| 1. Name of the festival | 2. Date, day, and tithi (lunar day) |
| 3. Introduction | 4. Purpose of celebration. |
| 5. Connection with geographical elements | 6. Information about folk art, dance, and literature |
| 7. Importance from the environmental point of view | 8. Effects on the environment and preventive measures |
| 9. Conclusion | 10. Pictures, charts, maps, slogans, posters, etc. |
| 11. References | |



Try if you can.

- Observe the following pictures and write the names of the types of sustainable energy they represent.





Exercise

A) Choose the correct option.

- 1) What is sustainable development?
 - a) Only economic development
 - b) Meeting present needs while considering future needs
 - c) Increasing industrial development
 - d) Increasing agricultural production.
- 2) Which of the following statements is most appropriate to describe exhaustible elements?
 - a) They are available in unlimited quantities
 - b) They are reproduced fast
 - c) Once used, they are exhausted
 - d) They are always produced naturally

B) Match the following:

Group A

- 1) Water conservation
- 2) Air conservation
- 3) Soil conservation

Group B

- a. Plant trees
- b. Making compost fertilizer
- c. Keeping taps closed

C) Explain the differences:

Exhaustible elements and
Inexhaustible elements.

D) Write short answers to the following questions:

- 1) What are inexhaustible resources? Explain with examples.
- 2) What is the sustainability of natural resources?
- 3) Explain the importance of water in Indian society.
- 4) Write about the Indian festivals associated with 'the Sun'.

E) Write detailed answers:

- 1) Explain how air affects human health and the environment.
- 2) How do Indian festivals conserve sustainable elements? Explain with examples.

F) Is there wastage of sustainable elements in your home or school? If yes, write two examples.

G) What measures are taken in your home and school for water conservation?

Activity:

- Prepare a poster on sustainable development.



- “Prepare a slogan based on this picture. • “Write 7–8 lines about this picture.”

Appendix

1. **Antarctic Circle:**

The latitude of $66^{\circ}30'$ in the Southern Hemisphere. This latitude determines the limits of sunlight duration. The maximum duration of the sunlight in the north of $66^{\circ}30'$ is up to 24 hours, whereas in the south, the duration of sunlight exceeds 24 hours which is up to 6 months at poles.

2. **Latitudes:**

The angular distance from the equator and any place. This angular distance is measured near the center of the Earth. Latitudes are measured to north and south of the equator.

Longitudes:

Imaginary lines of parallel on the surface of the earth. This distance is measured on the plane through that meridian.

3. **Parallels of Latitude:**

Imaginary circular lines drawn on the Earth according to latitude are called parallels of latitude. They are parallel to each other.

4. **Abiotic:**

Non-living components of the environment, such as air, water, minerals, etc.

5. **Less Developed Countries:**

Compared to economically developed countries, the per capita income of people in these countries is low; industrialization is less, and they constantly face

economic, social, and structural challenges

6. **Arctic Circle:**

The latitude of $66^{\circ}30'$ in the Northern Hemisphere. This latitude determines the limits of sunlight duration. South of $66^{\circ}30'$ latitude, duration of sunlight can last upto 24 hours, while north of it, sunlight duration is more than 24 hours. At the Poles, it lasts up to six months.

7. **International Trade:**

International trade means the exchange of goods and services between two or more countries. Import and export are the main types, which help in the overall economic growth and development of a country.

8. **Indian Regional Navigation Satellite System (IRNSS):**

The Indian Regional Navigation Satellite System, now known as NAVIC, is India's indigenous, autonomous satellite-based positioning and navigation system developed by the Indian Space Research Organisation (ISRO).

9. **Hazard:**

Any sudden and serious event that negatively affects human life, property, society, and the environment. This includes natural disasters like earthquakes, floods and man-made disasters like industrial accidents and wars.

10. Semi-fluid:

‘Semi-fluid’ or ‘semi-liquid’ (half-liquid) means a state between solid and liquid, such as thick liquid or certain types of gel. It means ‘not completely liquid, but not completely solid either.’

11. Centrifugal Force:

The force of moving away from the center is related to a rotating object revolving around itself. The tendency to move away from the center creates this force, and the force that pushes the object away from the center is called ‘centrifugal force’.

12. The Tropic of Cancer:

Latitude $23^{\circ}30'$ in the Northern Hemisphere. Sunlight fall perpendicular from equator up to this latitude. The sun’s rays fall east and west of the Tropic of Cancer. The rays fall towards the Earth. The Tropic of Cancer passes through India.

13. GPS:

This is a location determination technology. It is called the Global Positioning System.

14. Coordinated Universal Time (UTC):

Coordinated Universal Time (UTC) is the standardized time used worldwide to regulate clocks and time. Global standard time is determined using local time at prime meridian.

15. Precision Agriculture:

Using technology (GPS, sensors, data analytics), farming is done in an accurate, rational way with the right amount of water, fertilizer, and pesticides due to which production increases, expenditure decreases and also natural environment is protected. This is called ‘right things, at right time and at right place’.

16. Temperature Range:

The difference between maximum (highest) and minimum (lowest) temperature is called the ‘temperature range.’

17. Per Capita Income:

The total income of a country or region divided by the population of that country or region is called per capita income. It indicates the economic condition of the country.

18. Per Capita agricultural Land:

Availability of per capita agricultural land in a country is called per capita land. When total land in the country is equally distributed to its population, then the amount of land that each person gets is ‘per capital land’ means ‘land holding’. According to “Land Ceiling Act”, one person can hold certain amount of land with ceiling limit. The per capita land availability is decreasing. So according to Land Holding Act, a farmer cannot hold the land beyond defined limit. This limit is different for irrigated farming and

dry land (rain-fed) farming (e.g. In Maharashtra, it is 18 Acre for irrigated farming and 54 acre for dry land farming (rain-fed farming)).

19. Melting Point:

The stable temperature at which any solid substance melts and transforms into liquid form is called the melting point of that substance.

Such as the melting point of ice is 0°C (273°K), meaning it melts and becomes water.

20. Express way:

This is a specific type of roadway (express way) available for high speed of travel with controlled access.

21. Subsistence Farming:

A farming that is practised for the production needed by the farmer and his family, where most of the produce is used for their own needs. In such farming, only food crops are grown.

22. Flowing:

Means flowing, streaming, having a current, continuous flow (like flowing liquid or continuous stream), and being part of a flow or flux.

23. Ecosystem:

In a specific ecosystem, all living (plants, animals, microorganisms) and non-living (air, water, soil, sunlight) components interact with each

other, where they depend on each other and exchange energy and nutrients.

24. Evaporation:

The process by which water turns into vapor due to heat is called “evaporation.”

Vaporization of a substance means the transition of liquid into vapor. Vaporization is of two types: evaporation and boiling. Evaporation occurs on the surface, while boiling occurs throughout the substances.

25. Indian Standard Time (IST):

Indian Standard Time (IST) is based on $82^{\circ}30'$ East longitude, which is with off set of UTC+05:30. India observes daylight saving time. IST is 5 hours 30 minutes ahead of Co-ordinated Universal Time (UTC).

26. Tectonic Plate:

‘Tectonic plate’ means large pieces of the Earth that form part of the Earth’s crust and move due to geological activity. This concept is called ‘Plate Tectonics’ and is used in geography and geology.

27. Geology:

The scientific study of the Earth, its structure, materials (rocks, minerals), processes (earthquakes, volcanoes), and its history and future. Geology is important for understanding Earth’s natural resources, environment, and associated hazards.

28. Tropic of Capricorn:

Latitude $23^{\circ}30'$ in the Southern

Hemisphere. The apparent southward movement of the sun is upto this latitude. After that, northward apparent movement of sun starts. From the equator to the Tropic of Capricorn, all places observe perpendicular sun rays twice in a year. The maximum apparent southward movement of the Sun seen from the Earth is up to this circle (Tropic of Capricorn).

29. Human Resource Development:

Human resource means developing the skills of individuals in an organization for its work, achieving objectives, or growth, or training those individuals.

30. Prime Meridian:

Among the longitudes of the Earth, the meridian passing near Greenwich city. This meridian is considered as zero degree longitude.

31. Meridian:

Imaginary lines connecting North Pole to the South Pole of the Earth. All these lines are semicircular.

32. Displacement:

A slight or major change in the position of surfaces on the Earth's crust is called displacement.

33. Discontinuity:

A boundary found between different layers of the Earth where the velocity of seismic waves suddenly changes, such as the Mohorovicic discontinuity between the crust and the mantle,

or the Gutenberg discontinuity between the mantle and core. It indicates changes in the structure or composition of the layers.

34. Developed Country:

A country whose economic condition is strong, where advanced technology is available, and per capita income is high.

35. Developing Country:

Developing countries are those where development of economic activities is in progress by which development of infrastructure for taking benefit from schemes for agriculture, primary sector and trade etc. are applicable.

36. Scattering:

A light ray is made up of many colours. When a light ray hits the microscopic particles of a solid, liquid or gas, the colours (wave lengths) are separated. This is called scattering.

37. Equator:

This is called the main latitude. Its value is zero degrees. Since the Earth is spherical, the equator divides the Earth into two equal halves. Equator is the largest latitude (great circle).

38. Graticule:

The imaginary network of latitudes and longitudes on the Earth's surface.

39. Graticule Location:

A place on Earth shown using

latitude and longitude with the help of meridians.

40. Sustainable Development:

The development that meets the needs of present generation, but it does not compromise the ability of future generations to satisfy their needs. In this, it is expected that we should wisely use natural resources to ensure balance in economic growth, social equality and protection of environment so that a good and sustainable future can be generated for all.

41. Intensive Farming:

Farming done using human labor, capital, fertilizers, pesticides, and modern technology to obtain maximum production from limited land.

42. Remote Sensing:

The process of obtaining information about an object from a distance without direct contact. Through remote sensing, aerial photography and satellite data are obtained and used to study the Earth's surface. Such information is applied in various fields.

43. Resources:

Any component or tool used to produce goods, e.g., natural (land, water, air) or man-made (machines, buildings, roads). Resources help fulfill human needs. Any material or

form of energy used to improve human living standards is called a 'resource.' However, it must be technically available and economically affordable to be considered a resource.

44. Service Industry:

A business where services, labor, or assistance are provided to customers instead of selling goods. These businesses help people and charge fees in return, making them economically important.

45. Shifting Agriculture:

This is an ancient farming method where forest trees and shrubs are cut, crops are grown until soil fertility is decreased and then the land is left fallow while farming shifts to another location. This process continues repeatedly.

46. Gross National Product (GNP):

The total market value of all final goods and services produced by the citizens of a country (both within the country and abroad) during a specific period (e.g., one year).

47. Greenhouse Gases (GHGs):

Gases in the atmosphere that increase Earth's temperature. These Greenhouse gases include carbon dioxide, chlorofluorocarbons (CFCs), Argon, water vapor, etc. The increase in the concentration of these gases in the atmosphere is causing Earth's temperature to rise.

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