

TEXTBOOK OF GEOGRAPHY

For
CLASS VI



*The Jammu & Kashmir State Board of School Educaiton
Srinagar/Jammu*

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Srinagar/Jammu

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Foreward

Social Science is an integral element of our school curriculum up to the Secondary Stage. The study of Social Science is vital as it helps our school children to understand society and the world in which they live, and view the socioeconomic developments and changes in the context of time and space and also in relation to each other. The subject provides an insight into the world's diversity and help resolve many conflicting issues. To have a firm perspective on India's past and the world from which, and in which, the country develops, sensitivity to crucial social problems is essential. The syllabus, therefore, encourages such sensitivity and understanding of human condition in terms that show the value of initiatives that take their cue from notions of democracy, equality and social justice defined in the broadest sense. The course is meant to develop among students understanding of the evolution of human societies and civilization in different parts of the world

Social Sciences consist of components of History, Civics and Geography. The objective of studying Geography at secondary level aims at map skills, understanding physical and topographical features of a particular place and importance of industrial and commercial establishments. It also helps the students to know about climate, vegetation and wildlife. This updated textbook of Geography provides a great deal of information for the teachers also. However, how successful we have been in this endeavour, only stakeholders can tell us, particularly teachers who deal with the changes in the curriculum and actually transact at the grassroots. A concise chapter on the geography of J&K has been introduced in view of the contextualization of contents so that the students do not suffer a sense of alienation.

I place on record my deep appreciation to Dr. M.S Bloeria, Secretary, BOSE for his support and cooperation, Mr. Malik Ghulam Hasan, Director Academics, for his supervision in updating this textbook, Ms. Naila Neelofar, Academic Officer (English) for her perseverance and hard work, our experts, that is, Ms. Mariam Lecturer, Geography (M.P.School), Mr. K.M. Lone, Master, GMS, Pampore for their commitment and hard work in reviewing and updating this textbook of Geography that contains valuable information, exercises that demand involvement on behalf of both , the teacher and the learner and colourful pictures to arrest the attention of the students. While dedicating this book to the children of the state,

I also express my gratitude to experts who participated in development and revision of this textbook. I would also like to thank different departments whose websites helped us in updating the textbook and, therefore, making it more interesting.

Suggestions and comments about the textbook are welcome to improvise it further as textbook development is not a one time activity but a continuous process to keep pace with the changing times.

Dr. Shiekh Bashir Ahmed
Chairman

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Malik Ghulam Hasan
Director Academics

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The Earth In Our Solar System

How wonderful it is to watch the sky! The sun shines brightly during the day. As the night falls, you may see thousands and thousands of twinkling objects. The sun and all these twinkling bodies are called stars. You may wonder, what stars are! How many of them are there in the sky? Stars are huge bodies of glowing gases. You can see many of them. But, there are many more than what you can see with your naked eyes. Those stars are far away from us. They look so small and dim. Apart from stars there are planets, dust and gases in the space. Planets, unlike stars, have no light or heat of their own. They are lit by the light of the stars. All these heavenly bodies are called Celestial Bodies, which form the vast Universe. The universe is the whole body of these stars, planets, dust or gases.

All of you must have watched clouds floating in the blue sky. They form various shapes. Similarly in the night sky the stars also form various patterns and forms. If you look at those patterns carefully, you can imagine pictures of humans, animals and several other things. A group of stars thus forming various shapes is called constellation. In India, ancient people observed these shapes. Saptarishi is one such constellation. It is a group of seven stars, i.e. seven sages. Saptarishi forms a part of the large Ursa Major or the Big Bear constellation. The science of studying stars, planets and other heavenly bodies is known as astronomy. Ancient Indians and Greeks were very good in this field.

The Sun is one of the stars.

It looks so big and bright because it is close to us.

We can see not more than 6000 stars with our naked eyes.

With powerful telescopes we can see millions of stars in the sky.



Saptarishi and the North Star

In ancient times, people used to watch stars to determine directions. The North Star or Polaris indicates the north because it is above the North Pole.

On a clear night watch the starlit sky. A huge system of stars is called galaxy. A galaxy has billions of stars very close to one another. There are billions of such galaxies in the universe. In some places stars are so close that they look like a white, glowing path. This path is the Milky Way Galaxy. In India it is known as Akash Ganga. The sun is a member of this galaxy.

A single galaxy consists of millions of stars.

A million means 10 lakh. One lakh means 100 thousand.

Scientists have identified number of galaxies.

All these galaxies put together make only a part of the universe.

True! Our universe is vast.



Milky Way

The Sun and Its Family

Just have a look at the starry night and imagine the vastness of this universe.

The sun is a star. It is the source of light and heat to us. It is at the centre of the solar system with nine planets and their satellites. This is called the solar family. The sun is the head of this solar family. Nine planets, i.e. Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus, Neptune and Pluto move around the sun. These planets have no light or heat of

Just have a look at the starry night and imagine the vastness of this universe.

their own. They get all their light and heat from the sun. The sun is very big and hot. But that tremendous heat is not so much felt by us because we are far away from it. Our earth is 150 million kilometers away from the sun. Is it not very very far?

But, where from the sun came? Scientists believe that the sun has been formed from a moving cloud of gases, which is called Nebula. The sun as well as the planets were born out of this cloud. The force of gravity has created them.

The names and symbols of most of the planets are very ancient. Even now astronomers use these symbols for these planets. Given are the various symbols.

For over millions of years, these balls of dust and gas are moving around the sun. The sun, by virtue of its mass and weight, controls the movement of the planets. This force is called the force of gravity. Have you ever watched a top spin? These planets actually are spinning around the sun. They



Symbols of the Sun and the Planets

keep wandering or moving in the sky. They have their own path of movement known as the orbit. They have also their own speed . That is the reason, each planet takes different time to complete its revolution. Observe the diagram of solar system showing the sun and the planets. You can make a chart and show the time taken by each planet to complete its round.

Another set of smaller heavenly bodies move round the planets. These are called satellites. Like planets, satellites also have no light or heat of their own. Our Earth has only one natural satellite - the Moon. Find out which planet has the largest number of satellites?



Solar System

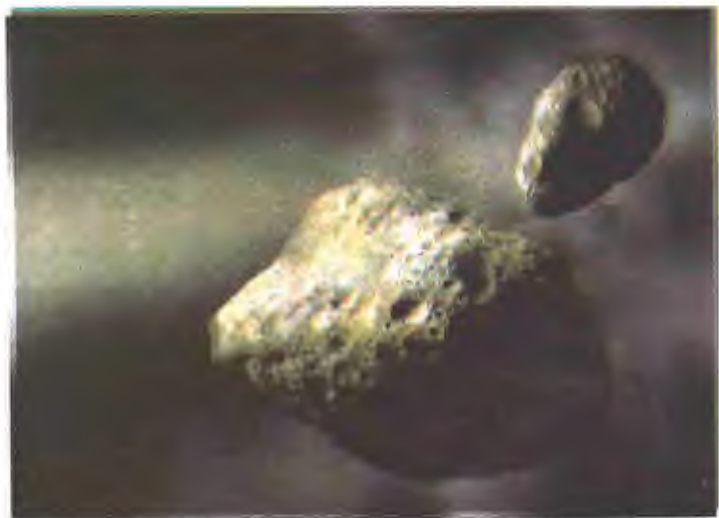
Do You Know?

Pluto is the second most massive planet known as the dwarf planet in the Solar System after Eris. Originally classified as the 9th planet of the sun, Pluto was recategorised due to recent discoveries and is now considered the largest dwarf planet within the Kupier Belt - a region of solar system beyond the planets extending from the orbit of Neptune. Kupier belt was discovered in 1992.

Solar Family is a Big Family

Now, you know about stars, planets and satellites. Apart from these, there are numerous tiny bodies, which also revolve round the sun. These bodies are called asteroids.

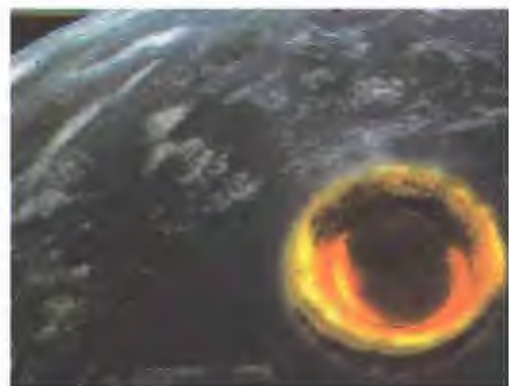
Asteroids are found between two orbits of Mars and Jupiter. The largest asteroid is Ceres. Scientists say that asteroids are parts of some exploded planet. While making their rounds, the



Asteroids

asteroids often collide and break into smaller pieces. It is said 65 million years ago, such a collision wiped out the dinosaurs. In 1937, a tiny asteroid named Hermes passed close to the earth at a distance of less than twice that of the moon.

Meteors are popularly known as shooting stars or missiles from the space. These are rocks, or small particles of dust that fall from space and burn up in the atmosphere due to friction with air. More than 100 meteors fall to earth, most of them into oceans, in a year. They crash to the ground and create craters. Meteor Crater in Arizona, USA, is a good example of that. The largest meteorite was found near Namibia in Africa in 1920.



Meteors

Comets are called long haired stars. They revolve around the Sun in elliptical orbits. When they come near the sun, they begin to glow and develop tails. Halley's Comet appears regularly after 76 years. More than 700 comets have been observed till date.

After reading this chapter, you now know that the sun has a very big and complex family. Altogether this is called the Solar System. List the names of the planets according to their distance from the sun.

Earth: Our Home is Unique in the Solar System

Earth, our home is a planet. The word planet comes from the Greek word 'Planetai' which means wanderers. Considering the distance from the sun, the earth is the third planet in the solar system. But according to size it is the fifth planet. The surface temperature of the earth is moderate and can support life, which makes it unique.

Like other planets, the earth revolves round the sun. To complete one revolution it takes about 365 days and 6 hours. Your age will tell you how many rounds you have made around the sun. Is it not fascinating?

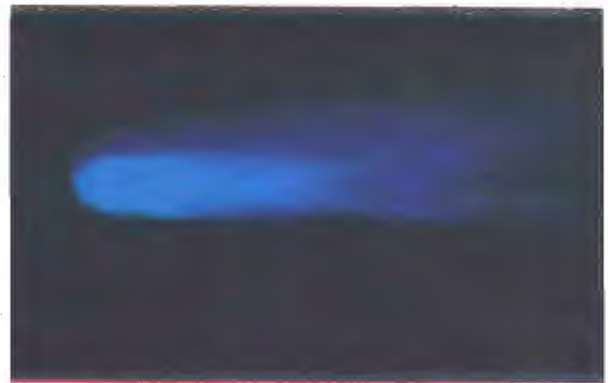
The shape of this planet is more or less like a sphere, which is slightly flattened in the north and south. But in ancient times people in various parts of the world used to think of different shapes. There were many interesting stories floating around the globe about the shape of our planet. Some used to think that the earth was like a pancake; others thought it looked like a lotus. Slightly flattened or tapered at the poles, the earth is best to be described as Geoid. Geoid means earth-like shape. So, you can see, bulged at the equator how unique our planet is.

The earth is composed of land and water. One-third of the earth is land and the rest is covered by water. In photographs taken from the space, the earth appears blue. It is, therefore, called the blue planet. No other planet has surface water. Our survival depends on the availability of water. We need water to drink, cook food, irrigate land to produce food, clean ourselves and the clothes we wear. Though almost $\frac{3}{4}$ th of the earth is covered by water- a very small part of it is usable.

We should keep water clean and also use it judiciously.

The Moon: Earth's Only Companion

The moon is the earth's only natural satellite. In the space it is our nearest neighbour. Like all heavenly bodies, it has two separate movements.



Comets

The size of the earth was calculated by a Greek Mathematician, Eratosthenes. He calculated it by observing the difference in the size of the shadow in two different places. Applying geometry he determined the size of the earth.

It spins on its own axis and it revolves round the earth. Strangely enough, the moon takes almost the same time, 27 days and 7 hours to complete both the movements. Thus it always presents the same side towards our earth, the other side cannot be seen from here.

The moon is about 384,400 kilometres away from the earth and it looks very small. Nobody is certain, how the moon was formed. Earlier, people used to believe that it was a part of the earth. But when astronauts went to the moon, they brought rock samples. Those rock samples, on examination, have proved this theory wrong. Who knows? Perhaps the moon was formed during the same time as the earth!

After so many expeditions under the Apollo Project, now we know more about the moon than any other heavenly body. Neil Armstrong and Edwin Aldrin set foot on the moon and they found uplands and valleys. If you see the photograph of the moon taken from space, it shows that the moon has no life. Valleys are filled with dry rocky materials. You can collect some more photographs of Lunar Expeditions along with related information.

Like our earth, the moon has no light of its own. It reflects the light of the sun. We see it glowing in the night sky. As the moon revolves round the earth, its position in relation to the sun changes everyday.



Neil Armstrong



Neil Armstrong on moon

Neil Armstrong was the first man to step on the surface of the moon on 29th July 1969. Find out the names of Indian astronauts who have gone into space.

Put some fresh hay and water in a glass pan. Boil the mixture on a low flame for sometime. Keep the mixture for a day or two.

Take a drop of water from it and observe it under a microscope.

Yes, you can find very tiny organisms.

Now ask yourself—where did they come from?

That is how it appears different each night. In reality, the moon neither decreases nor increases, as most people believe. The moon only appears to change its shape. When the far side of the moon faces the sun, that side is illuminated. Then we cannot see the



Moon as seen from space

moon from the earth. This situation is called the New Moon. (Hindi/Vedic name Amavas)

Gradually, from a slim crescent, the shape grows to Full Moon in 14 days. This bright surface slowly disappears again in another New Moon. This complete phase is of 29 days and 12

hours.

Scientists have discovered 134 moons in the solar system up to 2005. Mercury and Venus have none, Saturn -31, Jupiter – 60, Uranus -27, Neptune -13, Mars -2, Earth-1. The Moon is the sixth largest satellite in the space, the largest being Jupiter’s Ganymede and Callisto, Saturn’s Titan and Neptune’s Triton.

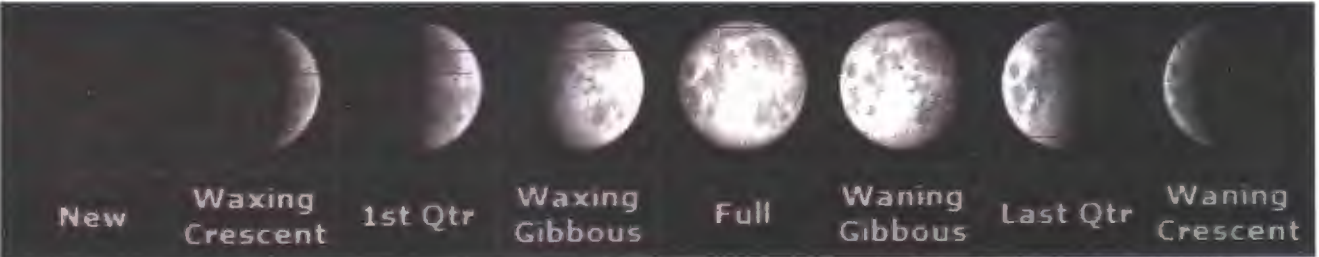
Earth’s mass is 81 times that of the moon. During day, the temperature of the moon reaches 108°C and at night -150°C. These conditions make life impossible on moon. The footprints left by astronauts cannot be wiped because there is no wind and water on the moon.

- DO YOU KNOW?
- The Moon has been known since prehistoric times. It is the second brightest object in the sky after the Sun. It was first visited by the Soviet spacecraft Luna 2 in 1959. It was called Luna by the Romans, Selene and Artemis by the Greeks, and many other names in other mythologies.
- What is it called in your native language?
- The Moon is also the only body from which samples have been returned to Earth. In the summer of 1994, the Moon was very extensively mapped by the little spacecraft Clementine and again in 1999 by Lunar Prospector.

Glossary

Star: A celestial body having its own heat and light.

- The rocks of the moon date back to 3 -4.5 billion years which are a great source to understand the solar system.
- A new mineral was discovered on the moon. It was named ARMALCOLITE, partly taken from the names of Apollo II, astronauts: ARMstrong, ALdrin and COLLins
- Find out the names of other moons in the solar system.



Phases of Moon in Northern Hemisphere



Phases of Moon in Southern Hemisphere

Artificial Satellite is a man made body. It is designed by scientists to gather information about the universe, telecommunication, defence and disaster management etc. It is carried by a rocket and placed in the orbit around the earth. Some of the Indian satellites, in space are INSAT, IRS, EDUSAT, etc.

Planet: A celestial body which revolves round the Sun and receives heat and light from it.

Satellite: A celestial body which revolves round a planet just as a planet revolves round the Sun.

Asteroid: A swarm of small bodies in between the orbits of Mars and Jupiter which revolve round the Sun.

Galaxy: A family or system of millions and millions of stars.

Universe: The vast and infinite space having millions of galaxies.



Rocket launch



Rocket falls back to the Earth



Satellite enters orbit



EDUSAT

Answer the following questions briefly:-

- (i) Describe the Universe.
- (ii) What are Celestial bodies?

- (iii) What does the word 'planet' mean?
- (iv) How does a satellite differ from a star?

2. Fill in the blanks

- (i) The Milky Way galaxy is known as _____ in India.
- (ii) The Earth's only natural satellite is _____.
- (iii) The first human to set foot on the Moon was _____.
- (iv) Meteorites are _____.
- v) Saturn has _____ Moons.
- vi) The weight of Moon is _____ times lesser than the Earth.
- vii) Dinosaurs were wiped by _____.
- viii) There can be no plants and animals on _____.
- ix) Halley's Comet appears after every _____ years.
- x) The closest star to earth is _____.

3. Make correct pairs from the two columns

- | | |
|--|--------------|
| (i) The planet nearest to the Sun | (a) Jupiter |
| (ii) The planet farthest from the Sun | (b) Mercury |
| (iii) Star at the centre of the Solar System | (c) Pluto |
| (iv) The largest planet | (d) Sun |
| (v) The largest Moon | (e) Ganymede |

Things To Do

Make a chart showing distance of the planets from the sun.

- Try to observe and identify constellation with the help of the star chart.
- Know more from your teacher about artificial satellites. Name any two artificial satellites and their functions other than mentioned in your textbook.

FUN TIME

An easy way to memorise the name of the planets in order of their distance from the sun is:

MY VERY EFFICIENT MOTHER JUST SHOWED US NINE PLANETS.

Find out the name of different heavenly bodies in your vernacular language.

Take help of your friends, teachers and neighbours.

You might have heard that people make human chains and run for world peace etc. You can also make a human solar system and run for fun.

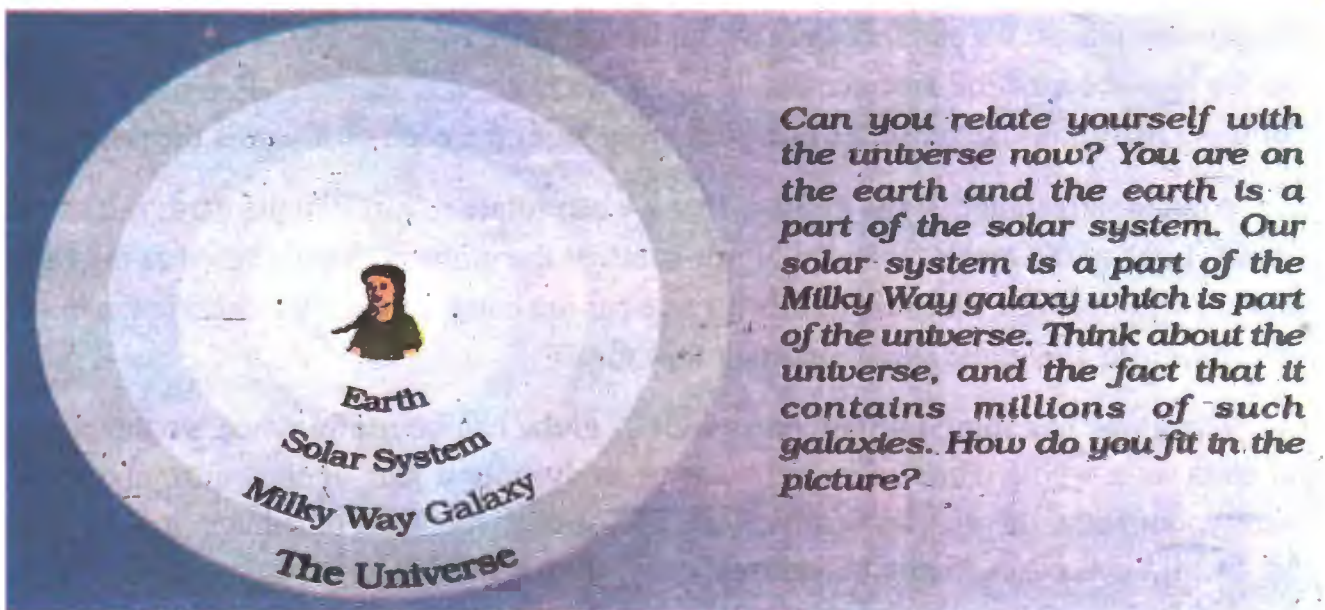
Step 1: All children of your class can play this game. Assemble in a big hall or in a playground.

Step 2: Now draw 9 circles on the ground

Use a 5-metre long rope. Mark at every half a metre with a chalk or ink. Place a small nail to mark the centre. Now hold one end of the rope at the central position. Ask your friend to hold a chalk at $\frac{1}{2}$ metre mark and move around the nail holding rope and chalk together on the ground.

You have drawn one circle just as you do on paper using a compass and a pencil. Draw other circles in the same manner.

Step 3: Prepare 11 placards. Name them as Sun, Moon, Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus, Neptune and Pluto.





2

How The Globe and Maps Help Us

You know that our earth is a Geoid. Towards the poles it is slightly flattened and bulged at equator. You may have already seen the earth in photographs. But only a model of the earth perhaps can give you a more realistic view of our planet. Unlike a photograph a globe is a three dimensional model of the earth

A globe can give us the correct idea of the shape of the earth. Both the poles, latitudes and longitudes, oceans and continents are shown on it. Thus it can give a more vivid idea of our planet. In the past, globes used to be rather difficult to carry. But now, we have folding globes, which can be inflated. Such globes can be used as we use air pillows/balloons. They have become more handy than before. Nowadays, there are globes which show various relief features like mountains, plateaus and plains. We can feel them by our hands. We can also see how the distance between the two adjoining meridians decreases as one goes away from the equator towards the poles.

A globe is a three-dimensional model of the earth. A map is a representation of the earth's surface or a part of it drawn on a flat surface.

It is drawn to a scale.

A sketch is a drawing mainly based on memory and not to the scale.

A plan is a layout of an area or a building.

Another advantage of the globe is that we can rotate it, just like the earth rotates on its axis. Look at the globe carefully. North-south of the globe is slightly tilted as the earth has a tilt with its orbit. Because of this tilt seasons are caused which we experience in our life. Therefore, the globe is an important tool for us.

The globe has some limitations as well. A globe can be useful when we talk about the earth as a whole. But, when we want to study only a part of the earth, about our country, our state, the district in which we live or only the town or village, it is of little use. In all such cases, maps of various sizes, drawn on different scales, can help us.

Maps have become very useful not only to geographers but also to the people working in various disciplines. Even the common men and women use maps. The science of map-making is known as Cartography.

Maps

It is rather difficult to give information in great details on a globe. If we draw the world, or a part of it on a piece of paper, that drawing is called a map. The details are given in the form of symbols, words, lines and colours. You cannot imagine how much information a map can contain. One map may contain as many facts as a big book.

You will be surprised to know that the earliest map which we know about, was made in 2300 B.C. It was drawn on a clay tablet. In course of time maps were made to show boundaries of land or property boundaries. Some of these maps were made as early as 2200 B.C.

Ancient people used to make maps by different techniques. For example, Eskimos used to cut coastal islands in a dark coloured animal skin. Those shapes were then sewn on a light coloured skin, symbolizing oceans.



Ptolemy

Maps have three Pillars: Distance, Direction and Symbol

Egyptians used to engrave maps on metal plates. People in the Pacific Islands used to make plans by knotting reeds. During early periods maps were based more on memory and tales than on authentic information.

But at present, map-making has become an important science. Maps are very precise. Before going to any region you can have all kinds of information you require. These are shown on maps. An Egyptian geographer and a mapmaker made map-making a science. His name was Ptolemy. In his map, he first showed direction by drawing a 'North-Line' at the top of the map. The term MAP is from the latin word 'mappo' meaning napkin or cover cloth.

A map is a representation or a drawing of the earth's surface or a part of it drawn on a flat surface according to a scale. But it is impossible to flatten a round shape completely.

We find that maps are useful to us for various purposes. One map shows a small area and a few facts. Another map may contain as many facts as a big book. When many maps are put together we get an Atlas. Atlases are of various sizes. Maps provide more information than a globe. They are of different types. Some of them are described here:

PHYSICAL or RELIEF MAPS

Maps showing natural features of the earth such as mountains, plateaus, plains, rivers, oceans etc. are called physical maps.

POLITICAL MAPS

Maps showing cities, towns and villages, and different countries and states of the world with their boundaries are called political maps.

THEMATIC MAPS

Some maps focus on specific information, theme or topic; such as road maps, rainfall maps, maps showing distribution of forests, industries etc. are called thematic maps

Suitable titles are given on the basis of information provided in these maps.

There are three Components of Maps – distance, direction and symbol.

Maps are drawings, which reduce the entire world or its parts to fit on a sheet of paper. But, this reduction is done with utmost care so that the distances between the places are kept true. In other words, distances are kept true to scale.

Distance is a very important component of any map. Therefore, a scale is chosen for this purpose.

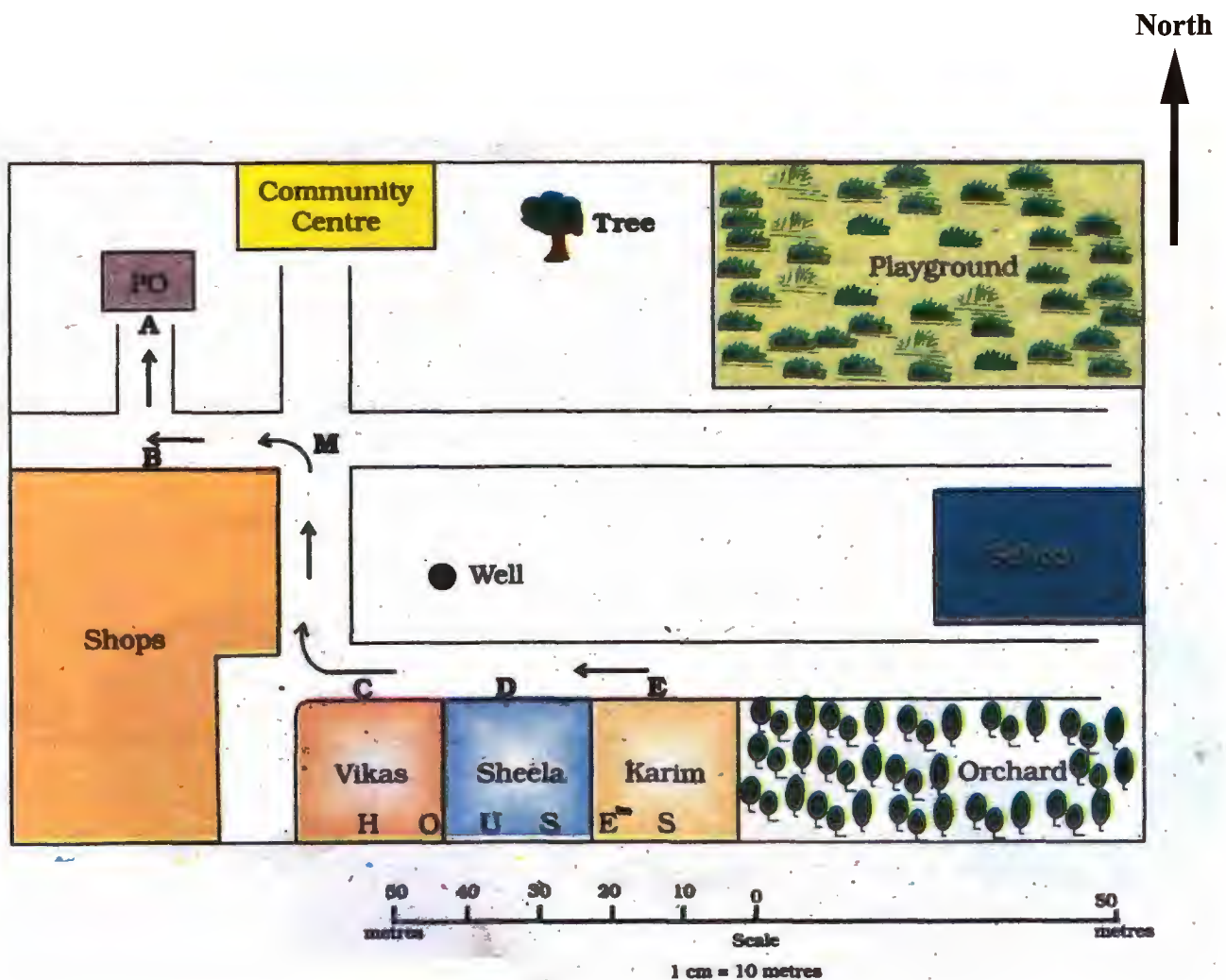
What is a scale? Scale is the proportion or ratio between the actual distance on the ground or the earth's surface and the distance on the map. For example, you want to show the distance between your school and your home, which is 10 kilometres. If you show this 10 kilometre distance by 2 centimetres on a map, it means 1 centimetre on the map will show 5 kilometres on the ground. Therefore, the scale of your drawing will be 1 centimetre is to 5 kilometres or $1\text{ cm} = 5\text{ km}$. Thus in any map, scale is a very important component. If you know the scale, you will be able to calculate distances between any two places on your map. If the scale is drawn then it is called a graphic scale or linear scale.

When a map shows larger areas on a small map, it is called a small-scale map. But if we show a part of J&K or any town or village on the sheet of the same size, it is a

large-scale map. In a small-scale map we can give very limited information. On a large-scale map, information can be given in greater details. The map of J&K, for example, is a small-scale map while as map of Srinagar, shown on a sheet of the same size, is a large-scale map.



Direction is another very important part of any map. Look at any map in the following chapters. Near the top towards the right, you can see an 'arrow with the letter 'N''. This arrow is pointing towards north. This is called the 'North Line'. When you know the north, you can find out other directions, e.g. east, west and south. Is it not very interesting?



Map of a village

For measuring the shortest distance between two places on the globe or on a map, take a piece of thread or string. Join those two points or places with the string and measure it. Note the scale given on the globe/map.

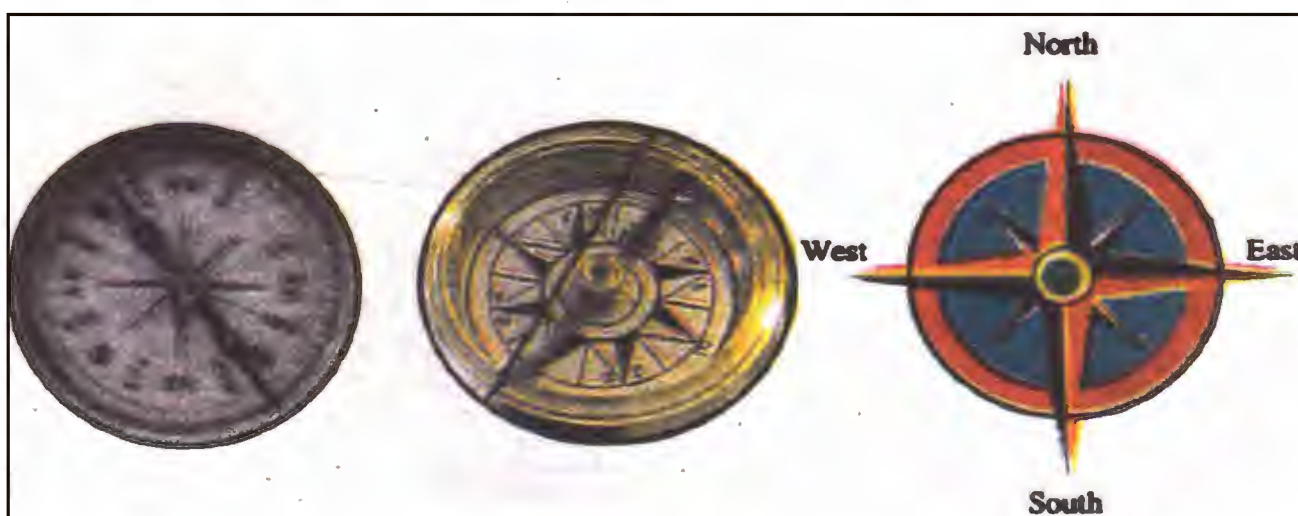
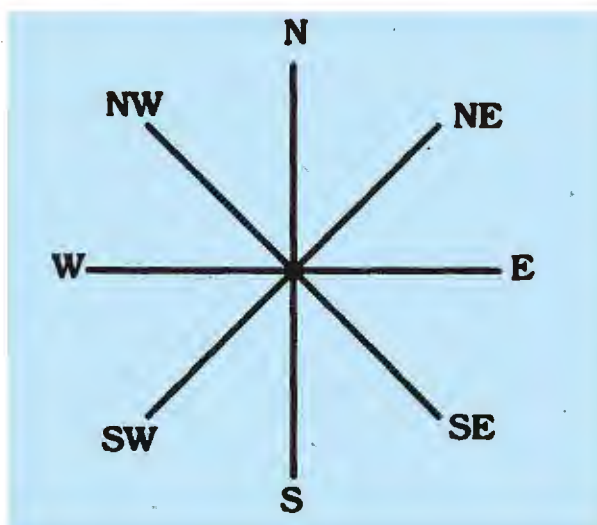
Calculate the distance as per the scale to get the actual distance.

Or, you can show it by drawing the scale as shown in the diagram on previous page.

A very simple instrument is used to find the main directions. Do you know what it is? It is a compass. The Chinese were the first who invented the compass. Now we all use it.

Four major directions, north, south, east and west are called cardinal directions. Once you know the major directions, you can also identify places situated on these major cardinal points.

Symbol is the third important component of any map. When an area is shown in a map, it is not possible to show various features, e.g. trees, buildings, roads or railway-lines in their actual shape and size. To overcome this difficulty, the features are shown by different symbols. The use of symbols saves space and a lot of information can be given in a single map. Various colours in maps are chosen for the same purpose. You will notice that only blue colour



Compass

is used to show water bodies, be they oceans, rivers or small lakes. All over the world there has been some kind of agreement regarding the use of symbols and colours. Even if you do not know the language of a certain place you intend to visit, you can have basic information about that area through map. It will help you to visit that place. Tourists from many countries visit India. Most of them do not know our languages, but they can collect information from our maps. It is rightly said that maps have a universal language - a language that can be read by all.

As mentioned above, symbols used all over the world in various maps are called conventional symbols. You can read a map using these symbols and tell the story of the map to your friends.

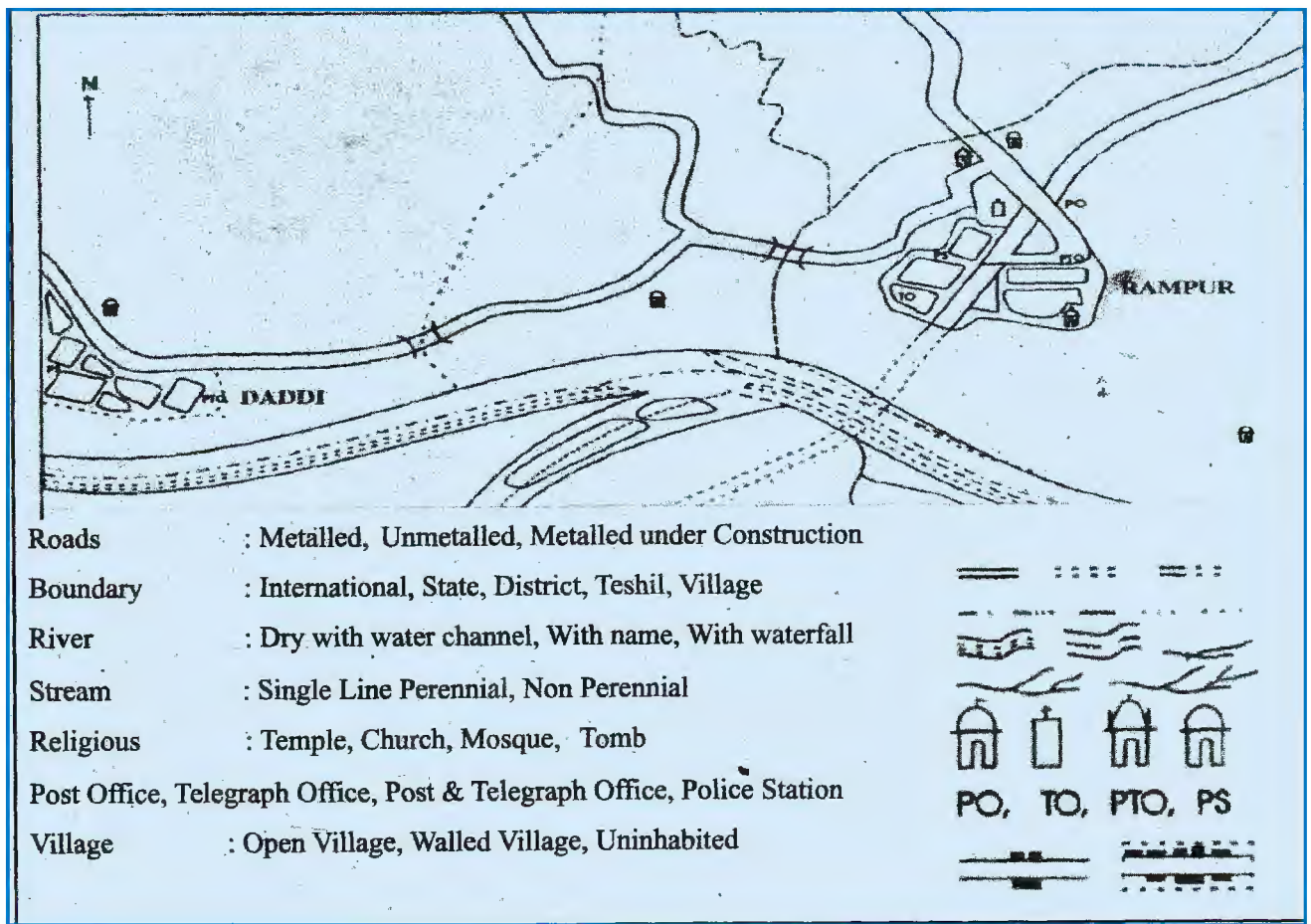
SKETCH

A sketch is a drawing mainly based on memory and spot observation and not to scale. Sometimes a rough drawing is required of an area to tell where a particular place is located with respect to other places. Suppose, you want to go to your friend's house, but you don't know the way. Your friend may make a rough drawing to show the way to his house. Such a rough drawing is drawn without scale, and is called a sketch map.

PLAN

When you draw the layout of a building/school/playground, it is called a plan. A plan is also drawn true to scale and shows true direction but you must know the difference between a map and a plan. A plan can show the detailed layout of various rooms and spaces, their length and breadth. A map shows only important features of an area. In fact this is the greatest advantage of a map. On the ground there are hundreds of natural and manmade features which might confuse us. But the maps select only some of them.

From early times, map-making techniques have undergone changes. Nowadays maps are being made on computers. Computer generated maps are not only sharp but are very accurate. You can compare an ancient map with a modern map and see how the improvement in technology has improved the quality of maps.



Conventional symbols and map

Glossary

Globe: A model of the earth.

Plan: A large scale drawing showing greater details.

Cardinal Points: The four major directions. North, South, East and West.

Map: A representation of earth's surface or part of it on a flat surface according to a scale.

1. Answer the following questions briefly:

- (i) In what way is a globe different from maps?
- (ii) List the situations in which the globe is far more useful than maps.
- (iii) How is a plan different from a map?
- (iv) What are the shortcomings of a globe?
- (v) What are the different types of maps?

2. Tick the correct answers.

- (a) Maps showing distribution of forests are

- (i) Physical map (ii) Thematic map (iii) Political map
- (b) The blue colour is used for showing
- (i) Water bodies (ii) Mountains (iii) Plains
- (c) A compass is used –
- (i) To show symbols (ii) To find the main direction (iii) To measure distance
- (d) A scale is necessary
- (i) For a map (ii) For a sketch (iii) For symbols

3. Fill in the blanks correctly

- i) The globe shows the _____ of the earth correctly, (shape/size)
- ii) The end points of the earth's axis are _____. (poles/equator and prime meridian)
- iii) A ratio between actual ground and that on the map is called _____ (scale compass)

4. Make correct pairs from the following

- | | |
|---------------|------------------------------|
| (i) A compass | (a) Three dimensional device |
| (ii) A globe | (b) Distances |
| (iii) A map | (c) Directions |
| (iv) A scale | (d) Two dimensional device |

THINGS TO DO

- Draw a map of your classroom. Show the rows of desks as north-south, lines 1 to 6. Also show lines of desks as east-west, lines A to F. Thinking the rows of desks as meridians of longitude and the lines of desks as parallels of latitude, find out the locations of the seats of your friends. How do rows (1 to 6) and lines (A to F) help you in locating seats of your friends.
- Draw a sketch of your school and show there in your classroom, your seat, and the garden.
- Draw a dial of a compass showing major directions.
- Fun Time
- Make the plan of a fun-park where you can enjoy.
- Several activities : for example swings, slides, see-saw, merry-go-round, boating, swimming, looking into funny mirrors, etc. or anything else that you can think of.



LOCATING PLACES ON THE EARTH

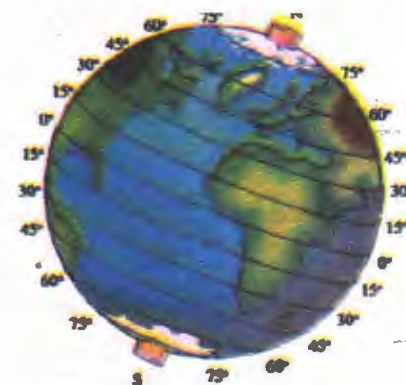
When you go to a new place, you observe certain prominent features. It could be a tree, a river or a hill. It helps to locate other nearby places. Such features are called landmarks or points of reference. Without such reference points it is very difficult to locate places on our big planet.

Two Poles and the Equator

The spherical earth has no edge or a corner from where we can begin to measure the distance of a place. But there are two reference points on the earth's surface. These two points are the North Pole and the South Pole. These are the tips or the end-points of the axis of the earth. For locating a place these two points act as basic points of reference. If you hold a globe in front of you, the top will be the North Pole and the bottom will be the South Pole. Rotate it slowly and mark a series of points near the middle of the globe, from west to east. If you join these points it will form a big circle, around the globe. This circle is the largest possible circle that can be drawn on the globe. It is called the Equator. It divides the globe in two equal parts or halves. The northern half is known as the Northern Hemisphere and the southern half is called the Southern Hemisphere. The equator is an imaginary circular line and is very important reference point to locate places on the earth. You know that a circle consists of 360° . If you travel from the equator to the pole you can cover only one-fourth i.e. 90° of a circle. That is why the North Pole is located at 90° from the equator. We mention the North Pole as simply 90° N. Similarly, the South Pole is located at 90° south of the equator.

Parallels of Latitude

Parallel to the equator one set of imaginary lines are drawn which encircle the earth and run in east-west direction. These are called latitudes. Since all these lines are parallel to the equator as well as one another, they are called parallels of latitudes.



Latitude is angular distance of a place from the equator, lying either in the north or in the south directions. The angle is formed at the centre of the earth. From the equator to the poles, parallels of latitudes become smaller. It becomes a point at the pole. As mentioned above, there are 90 latitudes at an interval of 1° in the northern and southern direction of the equator. The value of the equator is zero. In order to avoid the confusion, it is necessary to mention the latitudes using letters 'N' or 'S' with the value of the latitude. For example, Ernakulam in Kerala and Lindi in Tanzania are situated near 10° latitude. But Ernakulam is in the Northern Hemisphere while Lindi is in the Southern Hemisphere. Therefore, it is necessary to write 10°N latitude for Ernakulam and 10°S for Lindi. You can calculate the total number of latitudes drawn at 1° interval from Pole to Pole.

Important Latitudes and Heat Zones

Besides the Equator (0°), the North Pole, (90°N) and the South Pole (90°S), we have four important parallels of latitude. They are — (i) the Tropic of Cancer ($23^\circ30'\text{N}$),

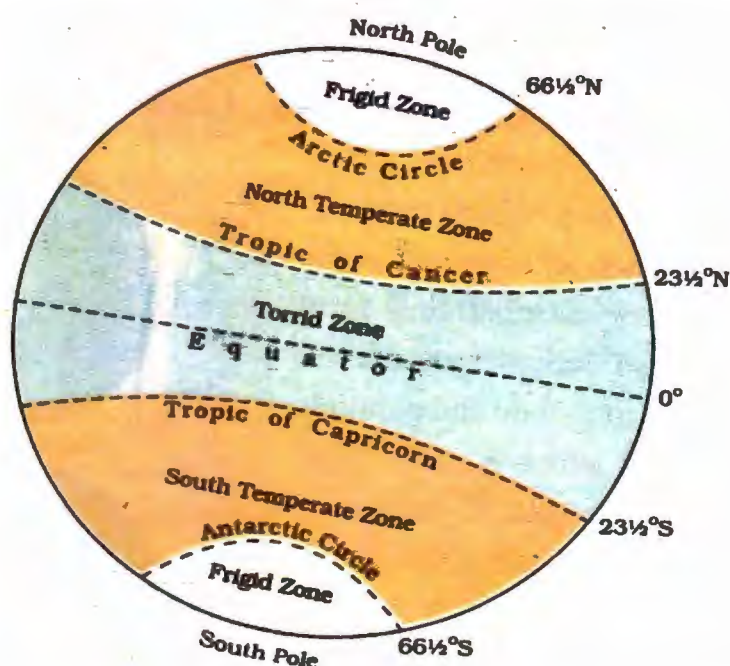


Figure 2:3 : Important Latitudes and Heat Zones

The Tropic of Cancer is, important because on 21st June the sun is directly over this
 (ii) the Tropic of Capricorn ($23^\circ30'\text{S}$), (iii) the Arctic
 Circle ($66^\circ30'\text{N}$), and (iv) the Antarctic Circle ($66^\circ30'\text{S}$).

latitude. Similar phenomenon happens on 22nd December on the Tropic of Capricorn. These two latitudes form the outer limit of the Torrid Zone. This zone spans across the equator. The Tropic of Cancer passes almost through the centre of India. It influences our climate to a great extent.

The Arctic Circle demarcates the northern Frigid Zone. This zone is very cold and lies to north of the temperate zone of the Northern Hemisphere. Similarly the Antarctic Circle separates southern Frigid Zone from the temperate Zone of the Southern Hemisphere. The Torrid Zone is the hottest part of the world. We find most of the deserts are located here, But the temperate zone is neither very hot nor very cold. The Frigid Zone is very cold.

Meridians of Longitude

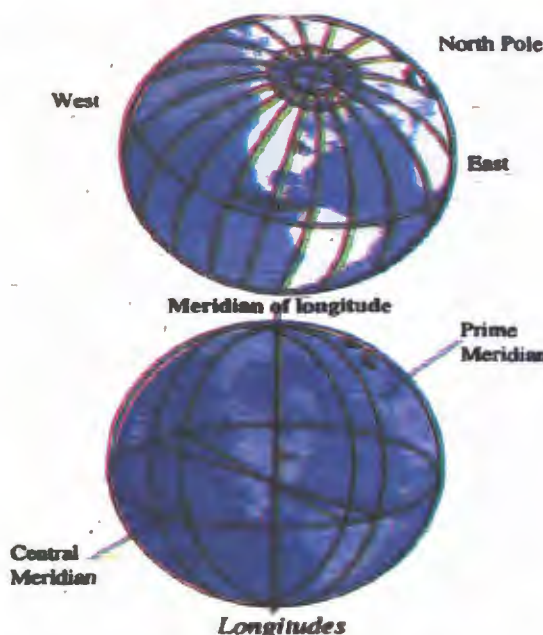
Like the equator, there are imaginary lines which divide the earth into the eastern and the western hemispheres. This imaginary line is called the Prime Meridian. A set of lines is imagined to run over the earth in north south direction which are called meridians of longitudes. These lines are not parallel to one another. They all converge at the poles. On a globe you can notice that they form semi-circles. They are also drawn at an interval of 10. These meridians of longitude and parallels of latitude form a network which is called grid. With the help of these two sets of lines, i.e., parallels of latitudes and meridians of longitude, we can determine location of places on the earth. From the diagram showing latitudes and longitudes you can prepare a comparative chart of their similarities and differences.

Unlike the parallels of latitudes, the meridians of longitudes are equal in length. But they are not parallel to one another. As one goes from the equator to the poles the distance between two meridians decreases. There was

There are 90 latitudes in each of the Hemispheres drawn at an interval of 1 degree (o).

Each degree is divided into 60 equal parts. Each part is known as minute (').

Each minute is divided into 60 equal parts. Each part is known as second ("). Ask your teacher how the total number of latitudes is 181.



an agreement world over that the longitude passing through Greenwich Observatory near the city of London will be considered as the Prime Meridian. The Chief or Prime Meridian is considered to be 0° . Areas lying to the east of this meridian is called the Eastern Hemisphere while areas lying to the west is known as the Western Hemisphere.

There are 180 meridians drawn at an interval of 1° on both the sides of the Prime Meridian. To avoid the confusion letters 'E' and 'W' are written with the values of meridians for the Eastern Hemisphere and the Western Hemisphere respectively. To which Hemisphere do we belong? You can find out in which Hemisphere Paris, Moscow, Tokyo and Sydney are located.

Locate Singapore in the world map. It is situated close to the equator. Find out the oceans lying to its west and east.

Another way to know its location is its longitude. It is 104° E.

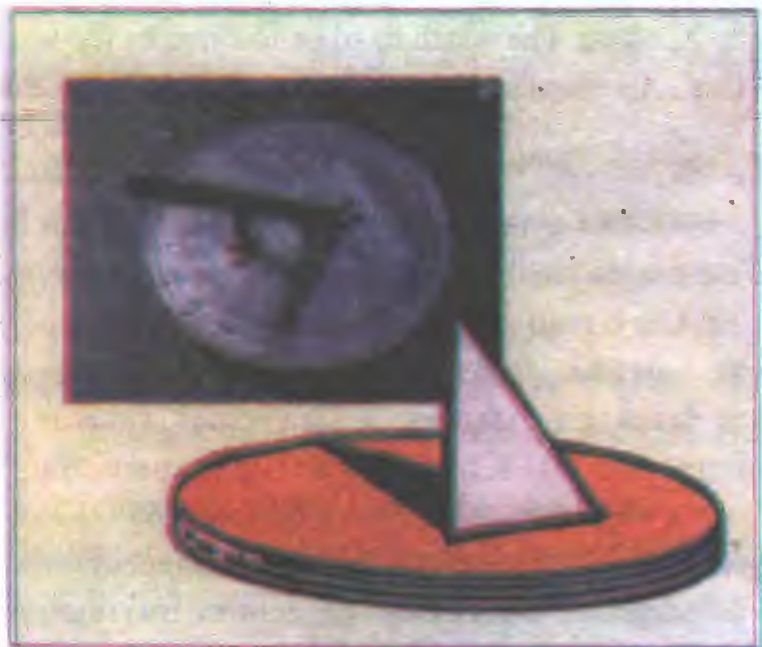
Locate Stanley Falls in Africa whose latitude is 0° and longitude is 25° E.

Locate Srinagar on the globe and note its latitude and longitudinal position.

Longitude and Time

Would you be able to tell time if you have no clock? Thousands of years ago clock, calendar or television did not exist. To early humans, the sun was the most important thing in their lives. They used to watch the sky and the progress of the sun along the sky.

The earth takes about 24 hours to complete a rotation. This means, in 24 hours the earth completes 360° . Therefore, it takes about one hour to complete each 15° or 4' (minutes) for each degree. Accordingly, the earth has been divided into 24 time



Sundial

zones of one hour each. This means each place will have different time of sunrise and sunset. For 1° (degree) of longitudinal difference, the time difference will be of 4 minutes ('). But as the earth rotates from west to east, day starts at different times in different

places. Places east of the Greenwich meridian experience day or sunrise earlier than the places lying west of the prime meridian. If Greenwich Time is taken as a base or Standard Time, then places located at 15° east of Greenwich will have sunrise one hour ahead of Greenwich Time. Similarly, places located at 15° west of Greenwich will have sunrise one hour later than Greenwich Time.

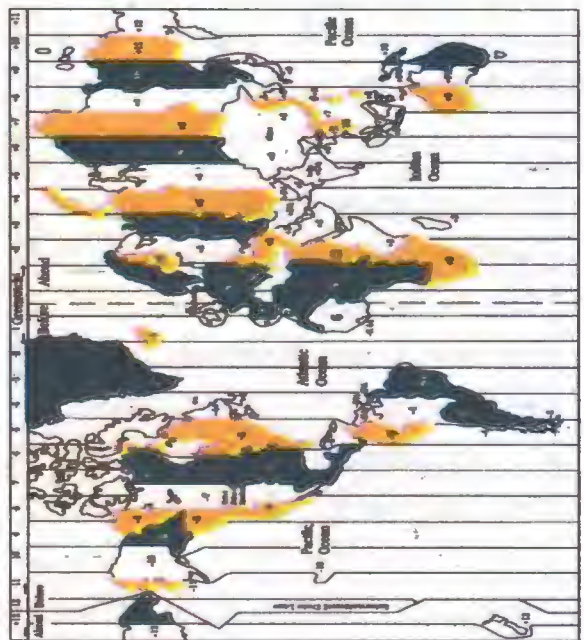


Jantar mantar at New Delhi

Day breaks with the sunrise and ends with the sunset. The shadow of an object helps us to find out time. It is the longest during the mornings and evenings and is the shortest at the noon. When you go to any place, you adjust your watch observing the midday sun. It will be 12 Noon. The watch fixed or adjusted by the sun in this manner will give you the local time. All the places situated along the same meridian will have the same local time.

Standard Time

As you know now, places situated on different meridians will have different local time. This is bound to create problems for people to function. For example, flight schedules or train time tables, which cross several longitudes will be difficult to prepare. In India the longitudinal span is from $68^\circ 7' E$ to $97^\circ 25' E$. Therefore, it was felt necessary to adopt the local time of central meridian of our country as the standard time for the country as a whole. In India $82^\circ 30' E$ has been considered for this purpose. It is called the standard meridian. The local time as per this



Time Zones

meridian is followed all over the country. This is known as Indian Standard Time (IST). The Greenwich time is 5 hours and 30 minutes behind the Indian Standard Time. In Pakistan 75°E meridian is considered as its standard meridian. Find out the standard meridians of Bangladesh and Sri Lanka.

In global context Greenwich (0°) time is followed which is called the Greenwich Mean Time (GMT). Some countries have vast east-west expanse. In such countries several standard times have been adopted. Russia is a good example where there are several time zones.

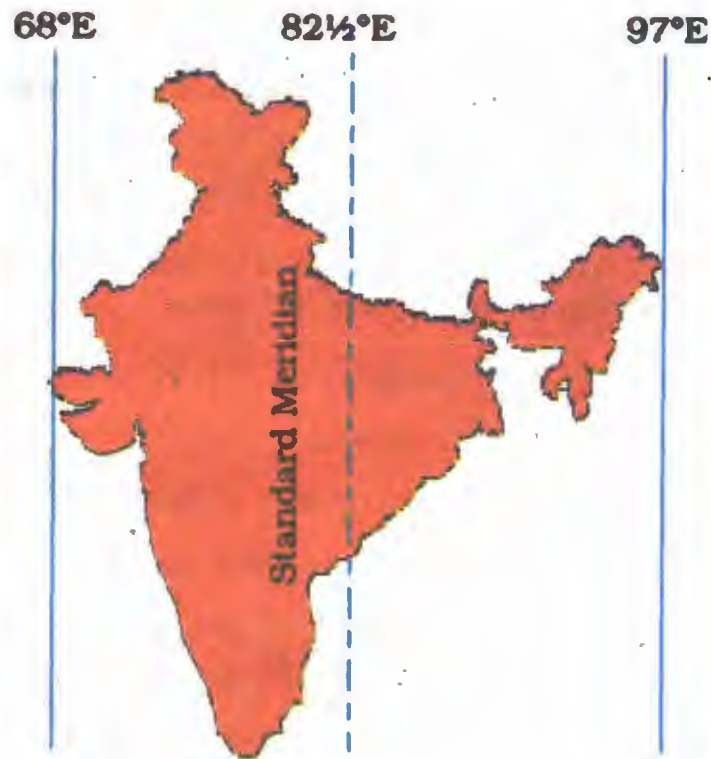


Figure 2.9 : Indian Standard Meridian

Determining time and longitudes(Relationship between the two)

When we know the longitudinal degrees of two places and time of one place, the local time of another place can be easily determined.

Steps:-

1. Find difference in the longitudinal degrees of two places.
2. Since distance between nearest two longitudes is 4 minutes, multiply the difference by 4.
3. The result will be in a minute which is to be converted into hours and minutes.
4. The places in east will have time ahead and those in west will have time before.

Q. Calcutta is situated at $88^{\circ}5' \text{E}$ and Baghdad at $44^{\circ}5' \text{E}$. What would it be at Baghdad when it is 2 p.m. in Calcutta?

Sol: -Longitude of Calcutta = 88°05' E

Longitude of Baghdad = 44°05' E

Difference in longitudes = 88°05' - 44°05' = 44°

Baghdad is to the west of Calcutta, so time will be 2 hrs. 56 min lesser than Calcutta.

I.e. Baghdad time would be = 2 p.m. or 14:00 p.m - 2:56 = 11 hrs:04 min

Q San Francisco is at 122°05' W and Canton 113°00' E. What time it would be at San Francisco when it is 9:00 a.m. at Canton

Sol: - Longitude of San Francisco = 122°05' W

Longitude of Canton = 113°00' E

Difference in longitude = 122°05' + 113°00' = 235°05'

Difference in time = 235°05' × 4 = 942 min or 15 hrs. 42 min

Since San Francisco is to the west of Canton, so here time would be 15 hrs. 42 min before Calcutta, so the time would be

9:00 – 15 hrs. 42 min = 5:18 min previous day

Q Jammu and Kashmir is situated at 80°03' E and Quetta is situated at 67°00' E. What time would it be at Quetta when it is 2:00 p.m. in J&K.?

Q What is the time of a place situated at 45°00' W of J&K when it is 10:00 a.m. at J&K, situated at 80°03' E?

Glossary

Axis: An imaginary straight line joining the two poles on which the earth rotates.

Poles: The two poles on the earth through which the imaginary axis passes.

Parallels of Latitude: Imaginary circles running parallel to the equator.

Meridian of Longitude: Imaginary semicircles running from pole to pole.

Longitude: Angular distance of a place from the Prime Meridian.

Latitude: Angular distance of a place from the equator.

Local Time: The time reckoned by the noon-sun at a given place.

Standard Time: The local time of the standard meridian of a country. Eg Allahabad in India

1. Answer the following questions briefly:

- (i) Which are the two basic points of reference on the earth's surface?
- (ii) How can we draw the greatest circle on the earth?
- (iii) Name the three heat zones along with their exact boundaries.
- (iv) Which is the standard meridian of India?
- (v) What is the difference between the local time and standard time?

2. Fill in the blanks correctly

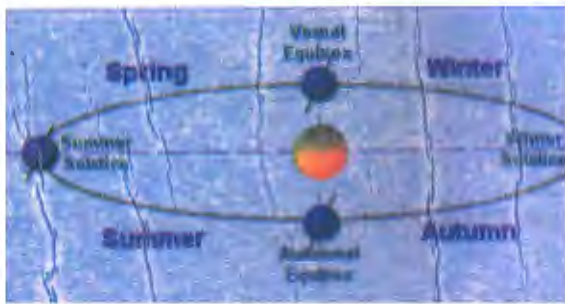
- (i) The value of the Tropic of Cancer is _____ (26°30'E/ 55°0'W/
23°30'N/ 45°15'W)
- (ii) The value of the _____ is 23°30' S. (Tropic of Cancer/Arctic
Circle/Antarctic Circle/Tropic of Capricorn)
- (iii) The 0° latitude is called the _____ (Arctic Circle/ Equator/ Prime
Meridian /Antarctic Circle)

3. Make correct pairs from the following two columns

- | | |
|--------------------|------------------------------------|
| (i) Temperate Zone | (a) Sri Lanka and Tanzania |
| (ii) Torrid Zone | (b) Antarctica and Greenland |
| (iii) Frigid Zone | (c) United Kingdom and New Zealand |

Things To Do

- The earth takes about 24 hours to complete its rotation. Calculate the hourly speed of the earth at the equator if the length of the equator is 40,000 km.
- A cricket match is being played between India and Australia in Sydney. Sydney is located at 151°E meridian. The match starts at 10 a.m. according to the local time in Sydney. At what time can we watch the telecast of the match according to Indian Standard Time?
- Capital cities of four Indian states lie very close to the Tropic of Cancer towards south. Name them correctly from west to east and show them on a map of India.
- Draw a diagram of the earth showing the earth's axis, the Great Circle, Tropics of Cancer and Capricorn, Arctic Circle and Antarctic Circle.

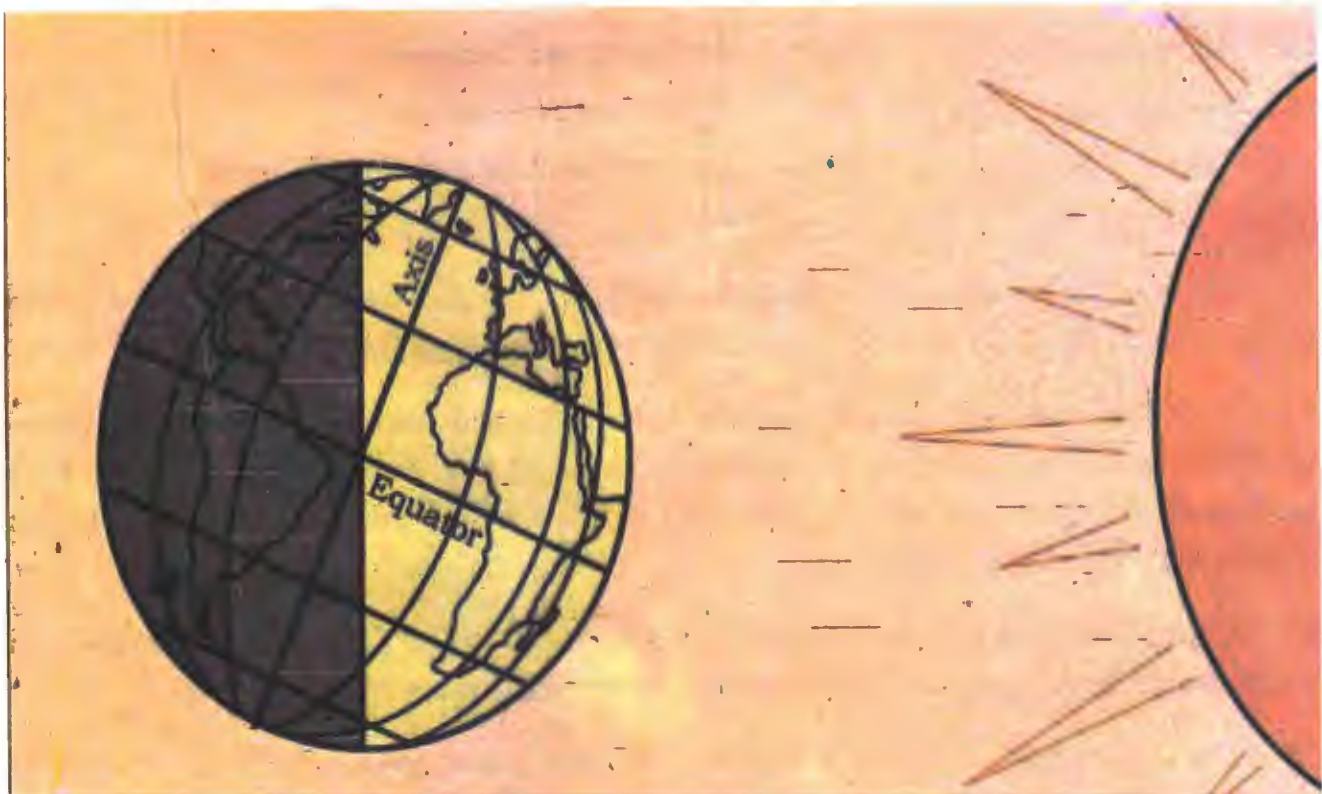


HOW DAYS AND SEASONS ARE CAUSED

The earth, like any other planet, has two motions — rotation and revolution. Let us know more about the earth's rotation and its effects.

The Earth Rotates

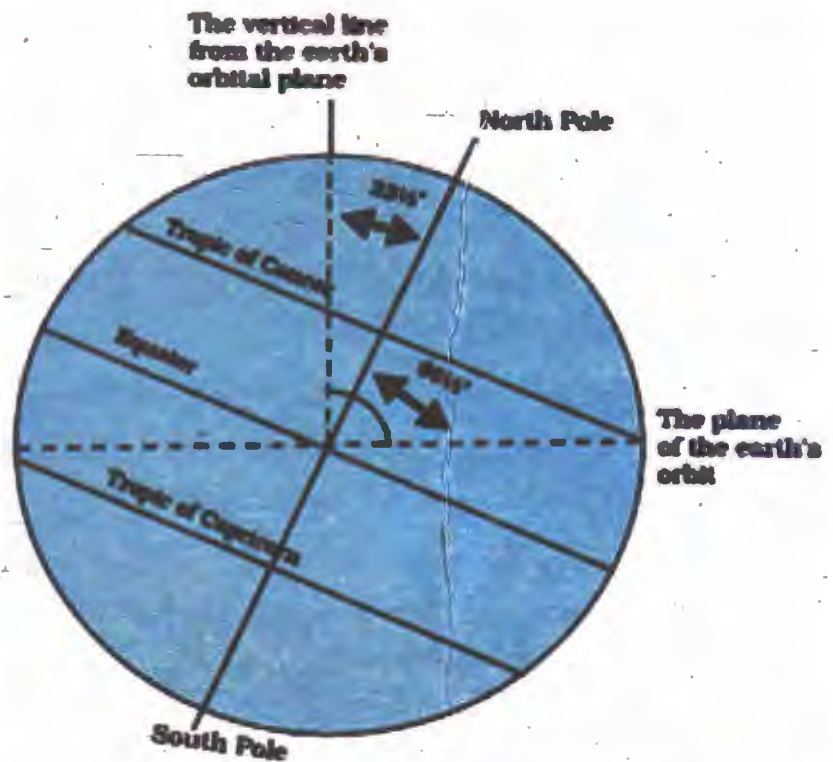
Draw an imaginary line from pole to pole which will pass through the centre of the earth. This imaginary line is called axis. Northern tip of the axis is North Pole. The southern tip of the axis is South Pole. Have you ever played with a top? Recollect how it spins. Our earth spins continuously about its axis, just like a spinning top. This movement is called rotation. The earth takes about 24 hours to complete one rotation. This period of rotation is known as the earth-day.



Day and Night on the Earth rotation

Owing to rotation every part of the earth gets sunlight, turn by turn. Sunlight, as you know, is very important for the growth and survival of living beings. Because the earth rotates from west to east we get a wrong impression that the sun rises or sets. You can compare this feature with your journey in a train when you feel the electric poles, trees and houses or fields are moving in the opposite direction. But in reality they do not move. Imagine you are in a space station; you can watch how the sun rays move across the globe and illuminate the globe, part by part. While the earth rotates, the face of the earth, receiving sunlight, experiences day, while the other face away from the sunlight remains in darkness. That part experiences night. At any time during the course of the motion, the part opposite the lighted part remains in darkness. The circle which divides the earth into its lit and unlit halves is known as the circle of illumination.

Are we not lucky to have day and night one after the other? We work hard during the day and can rest during the night.



Inclination of the Earth's axis and orbital Plane

For this experiment you will require:

- (a) Globe
- (b) One lamp.

Light the lamp.

Glow of the lamp will illuminate a part which will be daytime in those parts of the globe.

The side which is away from the lamp look dark. Night will prevail in those parts.



Experiment showing day and night

For this experiment you will require

A dark room, a globe representing the earth; a lighted lamp to represent the sun.

Mark a point X on the surface of the globe. Keep the lighted table lamp at some distance away from it.

Keep the globe in such a way that the point X is in complete darkness; It means the point X is experiencing midnight.

Now, move the globe from left to right till the point X enters the area of light.

For the point X it is morning, Continue to move the globe till the point X comes in front of the lamp. It is now noon for the point X.

Continue to move the globe till the point X enters the area of darkness. It is now evening for the point X. This is how every part of the earth's surface experiences midnight, morning, noon and evening.

How the Earth Revolves

The other motion of the earth is called revolution. While rotating on its axis the earth moves forward and revolves around the sun. In this movement the earth follows a fixed route or path. This path is known as the orbit of the earth. This path is not exactly a circle. It is somewhat elongated. This elongated circle is known as an ellipse.

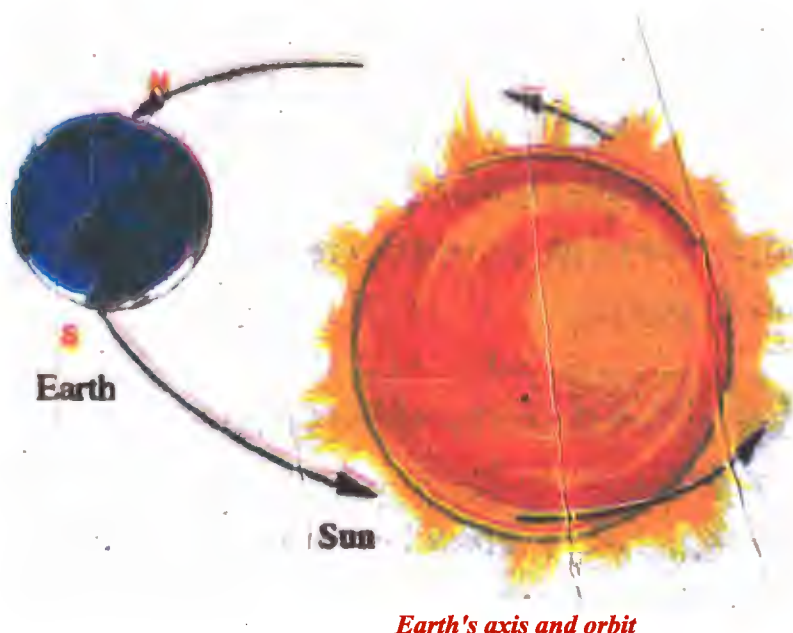
You can find out from the elders how an ellipse can be drawn on a paper using a thread, a pencil and two pins. Your drawing teacher can perhaps help you. The figure showing 'revolution of the earth' can give you an idea of an ellipse.

The total time our earth takes to complete one revolution around the sun is called a year. The earth takes 365 days and about 6 hours to complete one revolution. For the sake of convenience we consider a year is of 365 days. The additional 6 hours, after 4 years, become 24 hours or one additional day. This additional day we add to the month of February every 4 years. Thus, the month of February has 29 days instead of 28 days once in every 4 years. That particular year is called a leap-year. Leap-year is divisible by four. Try to calculate, from 1901 to 2011, how many leap-years we had. for century it should be divisible by 400.

The earth's axis is not perpendicular to the plane of the earth's orbit. It is tilted by an angle of $23\frac{1}{2}^{\circ}$ from the vertical line or perpendicular line which you can observe in the diagram. Because of this tilt the earth is making an angle of $66\frac{1}{2}^{\circ}$, with its plane.

Like rotation, direction on the earth's revolution is anti-clockwise i.e. from west to east. Now, carefully observe the diagram of earth's revolution. You will find, because of the tilt of the earth's axis, one hemisphere comes to face the sun first and then comes the other hemisphere. Therefore, variation in the weather phenomena is observed which we call seasons.

When the Northern Hemisphere faces the sun it receives direct and vertical rays from the sun. Sunlight received in those parts during the day is longer. This is summer in the Northern Hemisphere. But, the same hemisphere, when remains away from the sun's rays, direct sunlight does not reach there. Those regions experience lesser hours of sunlight. It is winter condition in those regions. While revolving around the sun, the earth comes in four critical positions. These changing positions are responsible for the cycle of season. We can study these four positions one by one.



On June 21, the Northern Hemisphere is tilted towards the sun. The sun is directly over the $23\frac{1}{2}^{\circ}$ N latitude or the Tropic of Cancer. On this date, the sunlight is available for maximum hours in this hemisphere. This situation is called the summer solstice. During this period, the sun rays fall vertical on the Tropic of Cancer and give more heat. This is the summer condition in the Northern Hemisphere.

On September 23, as the earth's revolution continues, equator faces the sun most directly. On this date day and night are equal all over the world. Or you can say, on this date we have 12 hours of day and 12 hours of night. Therefore, it is called Equinox. September 23 is an Equinox. As autumn season prevails during this time, it is called autumnal equinox in the Northern Hemisphere.

Nights on the poles extend for six months. The sun is never very high, above the horizon in the polar region.

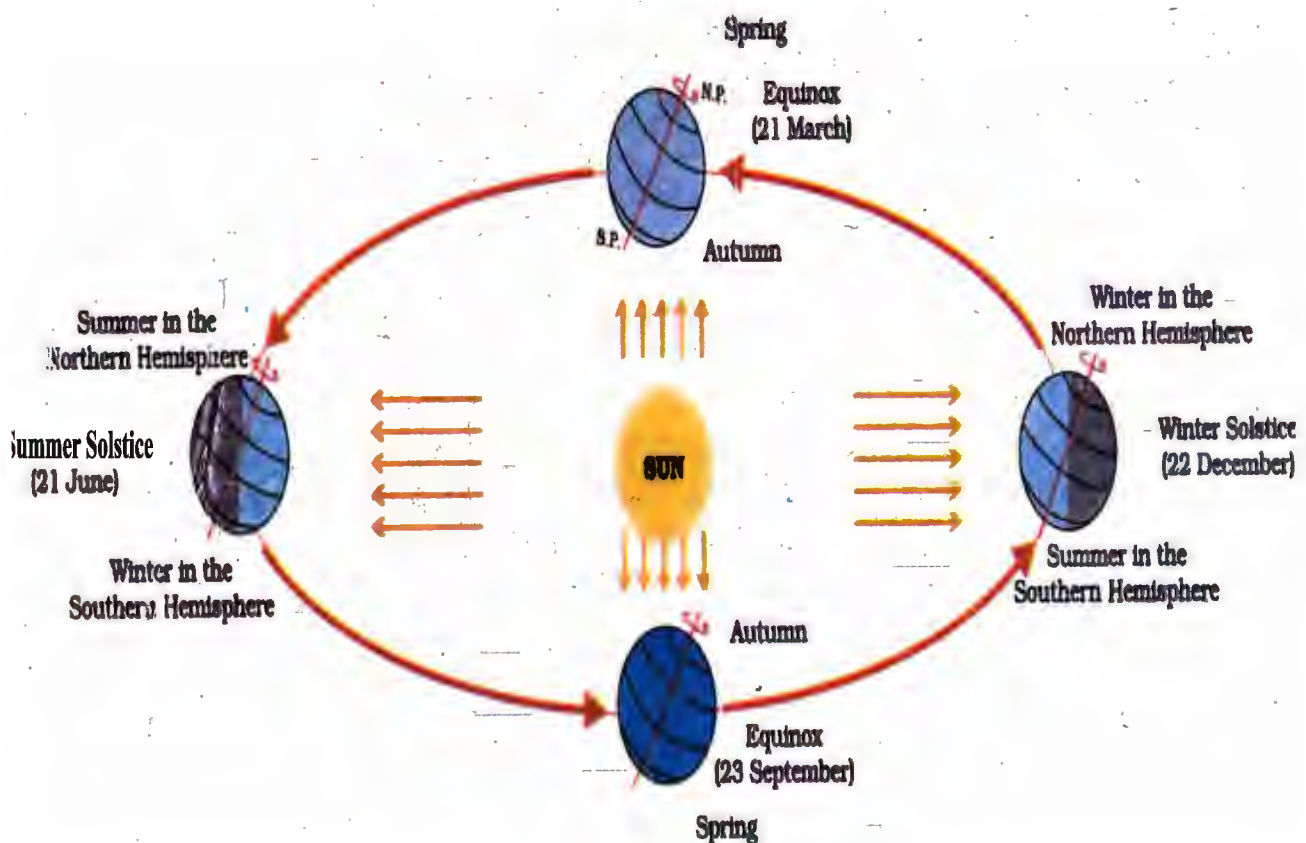
As the revolution continues, gradually the Southern Hemisphere comes closer to

Geography VI

the sun and the Northern Hemisphere moves away from it. Daylight hours increase in Southern Hemisphere. On December 22, the sun is directly over the $23\frac{1}{2}^{\circ}$ S latitude or Tropic of Capricorn. This is summer solstice for the Southern Hemisphere. On this day the Northern Hemisphere experiences shortest day and it is called winter solstice in the Northern Hemisphere.

Nights on the poles extend for six months. The sun is never very high, above the horizon in the polar region.

As the earth moves forward, on March 21, the equator again comes to face the sun, which is directly over it. Day and night become equal again on this day. This is called vernal equinox in the Northern Hemisphere.



Revolution of the earth and seasons

Now, you know what solstices and equinoxes are. You also know that in the Southern Hemisphere summer and winter solstices happen at different times than those in the Northern Hemisphere. Try to explain why this is so.

Glossary

- Rotation:** The spinning of earth on its axis completing one circle in about twenty four hours.
- Revolution:** Motion of the earth around the Sun completing one revolution in about 365 days and 6 hours.
- Earth-day:** Period of rotation of earth.
- Equinox:** On two days – March 21 and Sep 23 days and nights are of equal duration not only on equator but throughout the world.
- Solstice:** Two times in a year – June 21 and Dec 22 when the Sun is at its greatest distance from the equator. On June 21, the Sun shines vertically over the Tropic of Cancer and on 22 Dec over Tropic of Capricorn.

Exercise

1. Answer the following questions briefly:

- (i) How is the rotation of the earth responsible for causing day and night?
- (ii) When do we observe a leap year?
- (iii) Why does the Southern Hemisphere experience winter and summer solstices indifferent times than that of the Northern Hemisphere?
- (iv) Find out why your shadows are long in the morning and evening but short at noon. What are its implications in relation to the seasons we experience?

2. Tick the correct answers.

- (a) The movement of the earth around the sun is known as
- | | | |
|--------------|-----------------|-------------------|
| (i) Rotation | (ii) Revolution | (iii) Inclination |
|--------------|-----------------|-------------------|
- (b) Direct rays of the sun fall on the equator on
- | | | |
|--------------|--------------|-------------------|
| (i) 21 March | (ii) 21 June | (iii) 22 December |
|--------------|--------------|-------------------|
- (c) Christmas is celebrated in summer in
- | | | |
|-----------|------------|-----------------|
| (i) Japan | (ii) India | (iii) Australia |
|-----------|------------|-----------------|
- (d) Cycle of the seasons is caused due to

(i) Rotation

(ii) Revolution

(iii) Gravitation

3. Fill in the blanks.

- (a) A leap year has _____ days.
- (b) The daily motion of the earth is _____.
- (c) The earth travels around the sun in _____ orbit.
- (d) The sun's rays fall vertically on the Tropic of _____ on 21st June.
- (e) Days are shorter during _____ season.
- (f) The earth's axis forms an angle of _____ earth's orbit.
- (g) Days and nights are equal on _____ and _____.
- (h) The seasons are opposite in _____ and _____ hemispheres.

3. Make correct pairs from the following two columns

- | | |
|-------------------------------------|-------------|
| (i) Inclination of the earth's axis | (a) Day |
| (ii) Revolution of the earth | (b) Seasons |
| (iii) Rotation of the earth | (c) Year |

Things To Do

How does the sun illuminate our earth?

For this experiment you will need - a small ball and a torch.

- Hold the ball in one hand. Shine the torch beam directly on to the middle of the ball. A circle of bright light will fall at the centre of the ball. It is similar to the solar ray shining at the equator.
- Now, look at the light in other part of the ball. There the light is spread over much wider area and it is dim and dull. That is how polar region gets the sunshine.
- Record the timings of sunrise and sunset at your place taking help from your local newspaper on the 21st of each month and answer the following:
 - (a) In which month are the days shortest?
 - (b) In which months are the days and nights nearly equal?

FUN TIME

1. Draw different shapes of ellipses by placing two pins nearer and farther using the same loop of thread. Notice when the ellipse becomes circular.
2. On any sunny day, take a straight stick that is one metre long. Find out a clean and level place on the ground. Place this stick into the ground where it casts a distinctive (sharp) shadow.

Step (1): Mark the tip of the shadow with a stone or a twig or by any other means. The first shadow mark is always towards the west. See after 15 minutes and mark the tip of the shadow again. By then it would have moved a few centimetres away. Now join the two points and you have an approximate east-west line.

Step (2): Stand with the first mark to your left and the second mark to your right you are now facing north. This fact is true everywhere on the earth because the earth rotates in west to east direction.

An alternative method is more accurate but requires more time. Set up your shadow stick and mark the first shadow in the morning. Use a piece of string to draw a clean arc through this mark around the stick. At mid-day, the shadow will shrink or disappear. In the afternoon, it will lengthen again and at the point where it touches the arc, make a second mark. Draw a line through the two marks to get an accurate east-west line.



5

MAJOR DOMAINS OF THE EARTH

The earth is our home. It is a unique planet. Why is it so? Because life is known to exist only on the earth. Till today we do not know about any other heavenly body supporting living things. Life is found almost in all corners of the earth. It is found in water, on land and also in the air. This makes our earth unique in the entire solar system. What makes life possible on the earth? One reason is that the earth has plenty of water on its surface. Over two-thirds of its surface is covered with water in the form of oceans, seas, lakes, rivers and ice caps. All kinds of life depend on water. To be precise, every living thing is made of a considerable proportion of water.

The moon has no atmosphere. Therefore, the day is extremely hot and the night is very cold because of which life is not found on the moon.

For the development of life, equally important is the presence of air. The air envelopes the earth which is called the atmosphere. It is made up of several layers of air, containing mixture of gases. Some of these gases are essential for life. We need oxygen to breathe and survive. In hindi language oxygen is called pran vayu. Similarly, plants need carbon-dioxide for their survival. Air contains nitrogen, oxygen and carbon-dioxide along with several other gases. The most dominant gas in the atmosphere is nitrogen. Its presence is important both for plants and animals including humans. You can study the table on next page to understand the composition of the atmosphere.

The moon has no atmosphere. Therefore, the day is extremely hot and the night is very cold because of which life is not found on the moon

Thus, air, land and water form three major domains of the earth where life exists. In fact all kinds of life is confined in a narrow zone where air, water and land come in contact with one another. This narrow zone containing life is called biosphere.

Table 5.1 Proportion of various gases in the atmosphere

Gases	Approximate Proportion (%)
Nitrogen	78.1
Oxygen	20.9
Argon	0.9
Carbon-dioxide	0.03
Water vapour and others	0.2

1. The Domain of Air Atmosphere

The air which envelopes our earth on all sides is known as atmosphere. Air is a mixture of gases, water vapour, dust particles and smoke. Its composition is fairly constant in lower layers. At the earth's surface, atmosphere mostly consists of nitrogen and oxygen. It also contains small amounts of carbon dioxide, water vapour and rare gases such as argon, neon, krypton, xenon and dust particles. Oxygen is required for respiration by animals and plants; carbon dioxide is needed for photosynthesis, nitrogen is used for making proteins. It extends upto 1600 kilometres from the earth's surface. However, the density of these gases is not uniform. As we go upward air becomes thinner and less dense. In fact, the air is most dense near the surface of the earth. It comprises of five layers i.e troposphere, stratosphere, mesosphere, thermosphere and ionosphere.

Have you ever been to a hill station? If you go to a high altitude place you might feel out of breath because in higher altitudes lesser amount of oxygen in the air causes us discomfort. The atmosphere acts like a blanket. It retains heat to keep us warm and protects us from harmful effects as well as the scorching rays of the sun.

- It protects us from the harmful ultraviolet rays of the sun.
- It helps to maintain a fairly even temperature by protecting us from the cold of outer space at night and by softening the glare of the sun by day.
- Air exerts pressure. A change in air pressure causes air to move. Morning air is called fresh air wind. The change of weather from place to place and from season to season is also due to presence of atmosphere.
- It helps in the transmission of sound.

Which layer of atmosphere supports life?

In which layer is ozone found?

In which layer do aircrafts fly?

In which layer do the meteors burn up?

Plants need carbon-dioxide from the atmosphere for their survival. We exhale carbon-dioxide, which the plants take in. Plants release oxygen, which we inhale. So, it is a beautiful cycle of reversal, which is working, harmoniously on this planet.

2. The Domain of Land (Lithosphere)

The outer layer of the earth is called the crust. Crust is like the skin of the earth. The hard crust forms the outer solid surface of the earth. It is called lithosphere, where the word litho means stone or rock. About one-third of the earth's surface is occupied by land while the rest is covered with water.

Extensive masses of land rising above the sea level are called continents. There are seven continents on the earth. They are generally separated from one another by huge bodies of water called oceans. These are Asia, Africa, Europe, North America, South America, Australia and Antarctica. If you look at the world map carefully, you will find most of the land area lies in the Northern Hemisphere.

Find out the size and population of different continents with the help of your teacher.

Continents

Asia is the largest continent.

Several countries are situated in this continent. It covers about one third of the total land area of the earth. The continent lies in the North-Eastern Hemisphere. The Tropic of Cancer passes through this continent.

Name three oceans surrounding the Continent of Asia.

Which is the largest country in Asia?

Find out the most populous country of Asia.

Name two different hemispheres to which Asia belongs.

Make a chart of the countries, which are in the continent of Asia.

Europe lies to the west of Asia.

But it is not separated from Asia by any water body. Europe and Asia are continuous single landmass. These two continents are separated by the Ural Mountains and the Ural River. These two continents are referred to as Eurasia. The Arctic Circle passes through it. It is bound by water bodies on three sides. Look at the map of the world and locate it.

Africa is the second largest continent. In your atlas, see the map of Africa. The portion

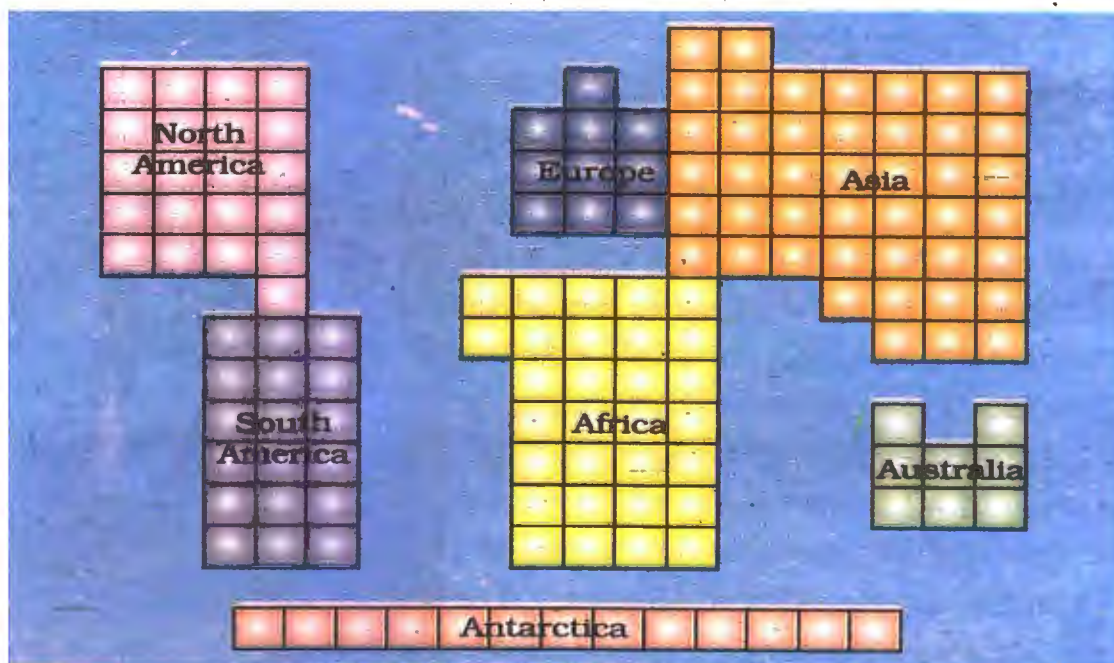
lying in the Northern Hemisphere is far bigger than the part lying in the Southern Hemisphere. The Equator or 0° latitude runs almost through the middle of the continent but does not divide the continent into two equal halves. You will find that it is the only continent through which the Tropic of Cancer, the Equator and the Tropic of Capricorn pass. The Sahara Desert, the world's largest hot desert, is located in Africa. The continent is bound on all sides by oceans and seas.

Find out the names of major mountain ranges of Europe.
 Name the highest peak of Europe.
 How many countries are there in Europe?
 Please consult an atlas for this exercise.

The continents of North America and South America are linked by a narrow stretch of land across Panama. You can use your atlas to find Panama. North America lies in the Northern Hemisphere. The major part of South America lies in the Southern Hemisphere. Because of locations in the northern and the southern hemispheres these two continents are called North America and South America respectively.

Australia is a continent situated in the Southern Hemisphere. Being the smallest continent it is often referred to as the 'Island Continent'.

Antarctica is the southernmost continent. The South Pole lies at the centre of this continent. Observe the globe in your classroom. It will be



Comparative size of continents: Name the largest and the smallest continent.

interesting to know that the North Pole is situated in an ocean, while the South Pole is situated at the heart of a continent. In size, Antarctica is bigger than Australia and Europe taken together. But, because it is situated in the Antarctic circle, it remains covered by deep snow throughout the year. Therefore, human habitation is not possible on this continent. In recent past, there have been several expeditions to Antarctica. India also has participated in such expeditions. Now we know more about this continent than we knew before.

Maitri and Dakshin Gangotri are the names of research centres set up in Antarctica by the Indian scientists.

Major Landforms

The land surface is not the same everywhere. Some parts are very high, several thousand metres above the sea level. They are rugged and difficult landforms. But there are also some parts, which are moderately high or not much higher than the sea level. Broadly these various features can be grouped as mountains, plateaus and plains. They form the major landforms on our earth.

Making of a mountain

All you require is paper on your table.

Push the paper from both sides by your hands. The sheet will fold and rise into a peak. You have made a mountain! In the same process our Himalaya or the Alps were formed!

Mountains or hills are highly elevated lands, which rise above the surrounding region. When such high hills form a long chain, they are called a mountain range. They may stretch continuously and may occur in a series of parallel ranges. The Himalayas are a very good example of a mountain with parallel ranges. There are three types of mountains- Fold Mountains, Block Mountains and the Volcanic Mountains. The Himalayan Mountains and the Alps are young fold



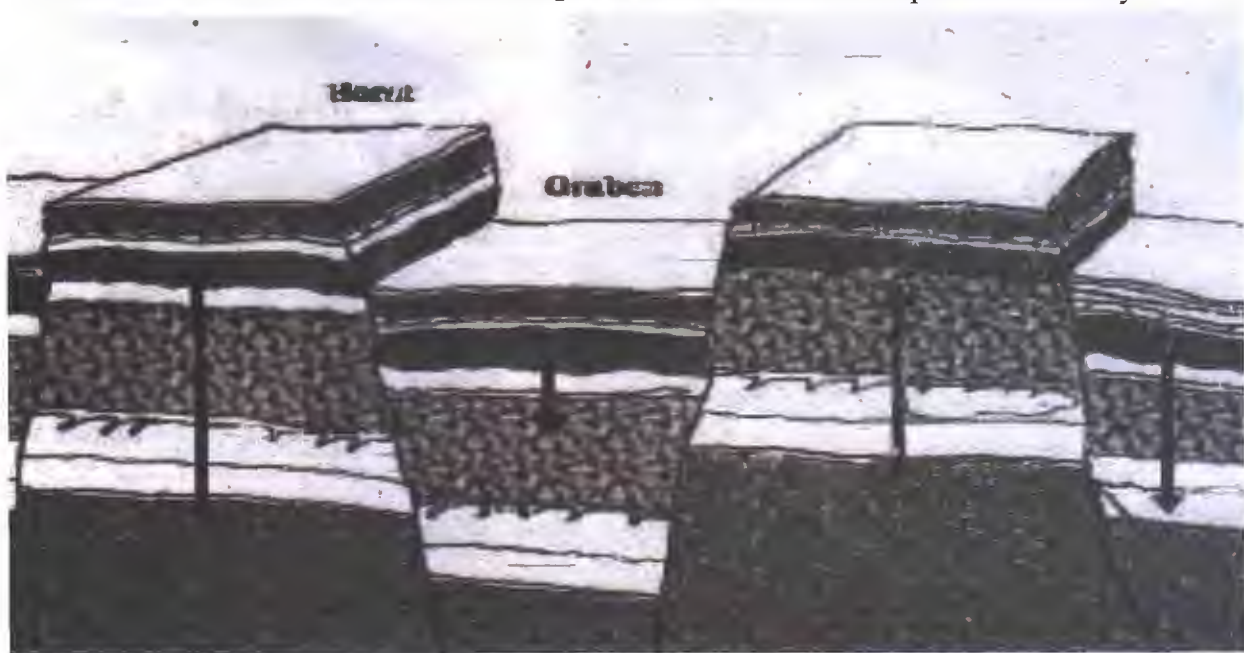
Making of a mountain

mountains with rugged relief and high conical peaks. The Aravali range in India is one of the oldest fold mountain systems in the world.



The range has considerably worn down due to the processes of erosion. The Appalachians in North America and the Ural mountains in Russia have rounded features and low elevation. They are very old fold mountains. Human habitation is not very dense in high hills because it is difficult to construct communication lines in such mountainous areas.

Block Mountains are created when large areas are broken and displaced vertically.



The uplifted blocks are termed as horsts and the lowered blocks are called graben. The Rhine valley and the Vosges mountain in Europe are examples of such mountain systems.

Volcanic mountains are formed due to volcanic activity. Mt.Kilimanjaro in Africa and Mt.Fujiyama in Japan are examples of such mountains.

On the globe or on the world map you can find out major mountain ranges in other continents.

Plateaus are moderately elevated flat topped lands. They often resemble a table and are also called table top land. Plateaus rise abruptly from the surrounding areas. They may stretch over thousands of square kilometres. Ladakh and Deccan are the plateaus. The East African Plateau in Kenya, Tanzania and Uganda and the Western plateau of Australia are other examples. The Tibet plateau is the highest plateau in the world with a height of 4,000 to 6,000 metres above the mean sea level. Therefore it is called “the roof of the world”.

Plateaus are very useful because they are rich in mineral deposits. As a result, many of the mining areas in the world are located in the plateau areas. List out the major plateaus of the world located in various continents. Plateaus are moderately populated regions. Transport is not so difficult here as it is in the mountains.



Plateau

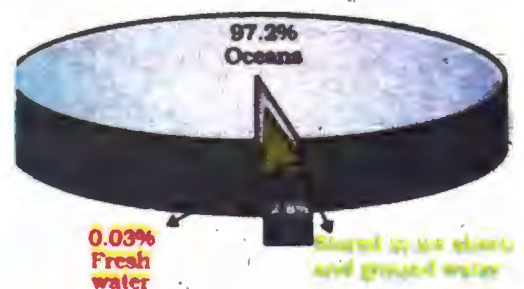
Plains are low-lying and relatively flat stretches of land. They are not very high above the sea level. Often you will find plains along the coasts or across the rivers. Rivers, emerging from the mountains carry huge amount of silt, mud and sand. Rivers carry these materials down to the sea and deposit them along the seacoast or along their banks. The largest plains are found along the river valleys in all the continents, except in Antarctica. Deposits made by rivers consist of sand, silt and clay. Thus the plains become very fertile. Agriculture all over the world flourishes on such plains. The North Indian Plain is a very good example. You can find out which rivers are responsible in the formation of this plain.

Generally plains are very fertile. Construction of transport network is easy. Thus, these plains are very thickly populated regions of the world. Some of the largest plains made by the rivers are found in Asia and North America. For example, in Asia, these plains are formed by the Ganga and the Brahmaputra in India.



3. The Domain of Water

The earth is called the blue planet. More than 71 per cent of the earth is covered with water and 29 per cent is with land. Hydrosphere consists of water in all its forms. As running water in oceans and rivers and in lakes, ice in glaciers, underground water and the water vapour in atmosphere, all comprise the hydrosphere. More than 97% of the Earth's water is found in the oceans and is too salty for human use. A



large proportion of the rest of the water is in the form of ice sheets and glaciers or under the ground and a very small percentage is available as fresh water for humans.

Oceans are vast stretches of water. Unlike the continents, oceans are all interconnected. There are four major oceans on the earth - the Pacific Ocean, the Atlantic Ocean, the Indian Ocean and the Arctic Ocean. The oceans account for about 71 per cent of the earth's surface. The hydrosphere also includes inland seas, rivers and lakes.

The Pacific Ocean is the largest as well as the deepest ocean. Earth's deepest part is the Mariana Trench (11,022 m deep) which is situated in the Pacific Ocean.

In the map try to find out which are the continents that bound this ocean. The Pacific Ocean is circular in shape. Asia, Australia, North and South Americas surround it. Mauna Kea (Hawaii) in the Pacific Ocean is an undersea mountain. It is higher than Mount Everest being 10,205 mts high.

The Atlantic Ocean looks like the letter 'S'. It is bordered by North and South Americas on the west and Europe and Africa on the east.

The Indian Ocean is bordered by the continents of Africa, Asia, Australia and Antarctica. The name of this ocean points to the importance of India in the international trade even in early years. The shape of the ocean is almost triangular.

The Arctic Ocean has North Pole at the centre of the ocean. For most part of the year the ocean remains frozen. Therefore, it is not of much use either for trade or for navigation.

The coastline may be straight or indented in nature. Indented coastlines facilitate the development of harbours or ports. Therefore, many ports or harbours develop along such coasts. Thus coastline is important from the point of view of business, i.e. export and import of products.

Importance of Oceans:

The oceans are important in a number of ways:

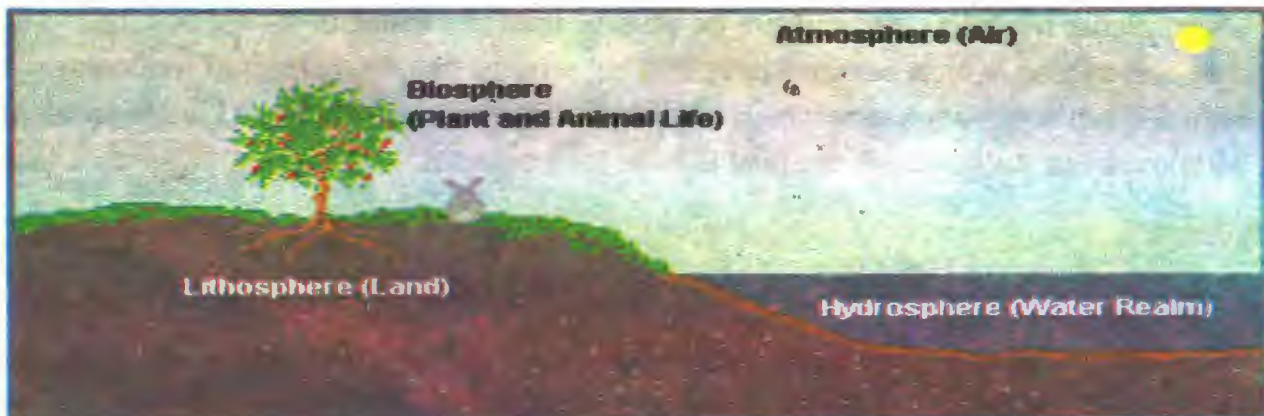
1. They are the main source from which our atmosphere derives moisture.
2. The oceans are storehouse of marine life particularly fish. A large population feeds on fish.
3. The oceans have enough salt. We get salt from oceans by evaporating water in

shallow salt pans.

4. We get pearls from oceans.
5. Energy of sea tides can be used to produce electricity.
6. The oceans provide natural highways for trade and transport.

4. The Domain of Life

We have discussed the domains of land, water and air. Now we will discuss the domain of life. It is known as biosphere. The word 'bio' means life. It is a rim-like narrow zone, where land, air and water come in close contact. The entire range of life on earth is confined to this zone. It is just a few kilometres below and above the sea level. Animals, plants and microbes are found in this sphere.



The living resources are confined to a narrow zone of interphase of air, land and water, known as biosphere.

Although the living resources of the biological world are diverse and heterogeneous in nature, all of them reveal cardinal principles of commonness, in built, in terms of the mechanism of the vital activities that sustain the life on the earth. In fact physical environment of earth in its primitive stage is unfit for present forms of life. It has been rendered hospitable by activities of microbes.

The size of organisms in biosphere varies from a minute virus to huge elephants. Scientists have classified them into two broad classes called kingdoms –

Animal kingdom and Plant kingdom

We, the humans are very important members of the animal kingdom. Therefore we should

understand the interactions between the animal kingdom and plant kingdom and should work to maintain the balance that is beneficial for the survival of the both.

At the time of its birth the earth had no life. First came the plants in the seas and then on the land to inhabit the earth. The plants manufacture food from the rays of the sun for themselves and for the animals including the humans.

In a way we depend on plants for our survival.

All the realms of the earth are interdependent. Therefore each of the realm affects the other. We, the humans, are very important members to influence and transform the various realms of the earth. Over-growing number of humans need more space. Clearing of forests may create space, but felling of trees causes other negative impacts on the nature. It will increase soil erosion. Loose soils will be deposited in riverbeds. As a result riverbed will rise. In case of excessive rainfall, river will not be able to hold the water in its shallow bed. This will cause flood, which destroys lives and property of people. Felling of trees also will reduce the quantity of oxygen we get from them. This will cause another kind of problem. Moreover, our utilization of the land is to be well planned.

Glossary

Continent: A large area of continuous land rising above sea level.

Ocean: A vast body of water on the surface of the globe, which surrounds the land.

Lithosphere: The hard crust which forms the outer solid surface of the earth.

Hydrosphere: The various types of water bodies like oceans, seas, rivers, lakes etc., form hydrosphere.

Biosphere: The narrow zone where land, water and air come in contact with each other. The entire life on the earth is confined to this zone.

1. Answer the following questions briefly:

- (i) Which are the four major domains of the earth?
- (ii) Name the two most dominant gases of the atmosphere.
- (iii) Name the major continents of the earth.
- (iv) Why is the Northern Hemisphere called 'Land Hemisphere' while Southern

Hemisphere is called 'Water Hemisphere'?

2. Fill in the blanks

- (a) The deepest point on the earth is _____ in the Pacific Ocean.
- (b) The _____ Ocean is named after a country.
- (c) The _____ is a narrow contact zone of land, water and air that supports life.
- (d) The continents of Europe and Asia together are known as _____.
- (e) The highest mountain peak on the earth is _____.
- (f) The second largest continent is _____.
- (g) _____ is the deepest ocean on the earth.
- (h) The low lying flat land is termed as _____.

Tick the correct answers.

- (a) The mountain range that separates Europe from Asia is
 - (i) The Andes (ii) the Himalayas (iii) the Urals
- (b) The continent of North America is linked to South America by
 - (i) Isthmus (ii) Strait (iii) Canal
- (c) The major constituent of atmosphere by per cent is
 - (i) Nitrogen (ii) Oxygen (iii) Carbon dioxide
- (d) The domain of the earth consisting of solid rocks is
 - (i) the Atmosphere (ii) the Hydrosphere (iii) the Lithosphere
- (e) Which is the largest continent?
 - (i) Africa (ii) Asia (iii) Australia

3. Make correct pairs from the two columns

- (i) Continent (a) Arctic
- (ii) Landform (b) Biosphere

(iii) Life (c) Antarctica

(iv) Ocean (d) Plateau

Things To Do

- Make clay models of (a) mountain range; (b) plateau; (c) a plain.
- Consult an atlas and arrange the oceans according to their size.
- Collect pictures of mountain peaks, passes and valleys.
- Imagine yourself living on a hill. Write a letter to your friend describing your food, house and dress.

6



INDIA AT A GLANCE

India is a country of vast geographical expanse. In the north, it is bound by the lofty Himalayas. The Arabian Sea in the west, the Bay of Bengal in the east and the Indian Ocean in the south, wash the shores of the Indian peninsula.

India has an area of about 3.28 million sq. km. The north-south extent from Kashmir to Kanyakumari is about 3,200 km. And the

The peninsula is a land mass that is surrounded by water on three sides.

east-west extent from Arunachal Pradesh to Kuchh is about 2,900 km. The lofty mountains, the Great Indian Desert, the Northern Plains, the uneven plateau surface and the coasts and islands present a diversity of landforms. There is a great variety

in the climate, vegetation, wildlife as well as in the language and culture. In this diversity, we find unity that

Do you Know?

Large countries which stretch extensively from east to west do not have a single Standard Time for the whole country. The USA and Canada have six time zones extending from the Pacific coast to the Atlantic coast. Do you remember how many time zones are there in Russia?

is reflected in traditions that bind us as one nation. India has a population of 1.21 billion according to the census of 2011. It is the second most populous country of the world after China.

LOCATIONAL SETTING

India is located in the Northern Hemisphere. The Tropic of Cancer ($23^{\circ}30'N$) passes almost halfway through the country. From south to north, India extends between $8^{\circ}4'N$ and $37^{\circ}6'N$ latitudes. From west to east, India extends between $68^{\circ}7'E$ and $97^{\circ}25'E$ longitudes. If we divide the world into eastern and western hemispheres, which hemisphere

would India belong to? Due to great longitudinal extent of about 29° , there could be a wide differences in local time of places located at two extreme points of India. As such, the difference between these two points would be of about two hours. As you have learnt earlier, the local time changes by four minutes for every one degree of longitude. The sun rises two hours earlier in the east (Arunachal Pradesh) than in the west (Gujarat). You have read earlier, why the local time of longitude of $82^\circ 30' E$ has been taken as the Indian Standard Time. This meridian or longitude is also termed as the Standard Meridian of India.

INDIA'S NEIGHBOURS

There are seven countries that share land boundaries with India. Find out names of these countries from the map of India shown below. How many of these countries do not have access to any ocean or sea? Across the sea to the south, lie our island neighbours—Sri Lanka and Maldives. Sri Lanka is separated from India by the Palk Strait.

POLITICAL AND ADMINISTRATIVE DIVISIONS

India is a vast country. For administrative purposes, the country is divided into 28 States and 7 Union Territories (Appendix-I). Delhi is the national capital. The states have been formed mainly on the basis of languages. Rajasthan is the largest state and Goa is the smallest state in terms of area. The states are further divided into districts.

PHYSICAL DIVISIONS

India is marked by a diversity of physical features such as mountains, plateaus, plains, coasts and islands. Standing as sentinels in the north are the lofty snowcapped Himalayas. Himalaya means 'the abode of snow'. The Himalayan mountains are divided into three main parallel ranges. The northernmost is the Great Himalaya or Himadri. The world's highest peaks are located in this range. Middle Himalaya or Himachals lies to the south of Himadri. Many famous hill stations are situated here. Find out the names of five hill stations. The Shiwalik is the southernmost range. The Northern Indian Plains lie to the south of the Himalayas. They are generally level and flat. These are formed by the alluvial deposits laid down by the rivers— the Indus, the Ganga, the Brahmaputra and their tributaries. These river plains provide fertile land for cultivation. That is the reason for high concentration of population in these plains.

In the western part of India lies the Great Indian Desert. It is a dry, hot and sandy stretch of land. It has very little vegetation. To the south of northern plains lies the Peninsular Plateau.

It is triangular in shape. The relief is highly uneven. This is a region with numerous hill ranges and valleys. Aravali range, one of the oldest ranges of the world, borders it on the north-west side. The Vindhya and the Satpuras are the important ranges. The rivers Narmada and Tapi flow through these ranges. These are west-flowing rivers that drain into the Arabian Sea. The Western Ghats or Sahyadris border the plateau in the west and the Eastern Ghats make the eastern boundary. While the Western Ghats are almost continuous, the Eastern Ghats are broken and uneven. The plateau is rich in minerals like coal and iron-ore.



India and its neighbouring countries

To the west of the Western Ghats and to the east of Eastern Ghats lie the Coastal plains. The western coastal plains are very narrow. The eastern Coastal plains are much broader. There are a number of east flowing rivers. The rivers Mahanadi, Godavari, Krishna and Kaveri drain into the Bay of Bengal. These rivers have formed fertile deltas at their mouths. The Sunderban delta is formed where the Ganga and the Brahmaputra flow into the Bay of Bengal.



Political map of India

Two groups of islands also form part of India. Lakshadweep Islands are located in the Arabian Sea. These are coral islands located off the coast of Kerala. The Andaman and the Nicobar Islands lie to the southeast of the Indian mainland in the Bay of Bengal. Do you know which group of islands were affected by the Tsunami in 2004? Find out through newspaper reports and by talking to people how in different ways people faced this challenge when Tsunami struck the Indian coast.

Glossary

Census: A decadal count i.e. (10 years) for official purposes, especially one to count the number of people living in a country and to obtain information about them.

Strait: A narrow area of sea which connects two larger areas of sea.

Range: A huge group of hills and mountains.

Tsunami: Tsunami is a huge sea wave generated due to an earthquake on the sea floor.

EXERCISE

1. Answer the following questions briefly:

- Name the major physical divisions of India.
- India shares its land boundaries with seven countries. Name them.
- Which two major rivers fall into the Arabian Sea?
- Name the delta formed by the Ganga and the Brahmaputra.
- How many States and Union Territories are there in India? Which states have a common capital?
- Why do a large number of people live in the Northern plains?
- Why is Lakshadweep known as the coral island?

2. Tick the correct answers.

- The southernmost Himalayas are known as

(i) Siwaliks	(ii) Himadri	(iii) Himachal
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- Sahyadris is also known as

(i) Aravali	(ii) Western Ghats	(iii) Himadri
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- The Palk Strait lies between the countries

- (i) Sri Lanka and Maldives
- (ii) India and Sri Lanka
- (iii) India and Maldives
- (d) The Indian islands in the Arabian Sea are known as

Alluvial deposits: These are very fine soils, brought by rivers and deposited in the river basins.

Tributary: A river or stream which contributes its water to main river by discharging it into the main river from either side.

- (i) Andaman and Nicobar Islands
- (ii) Lakshadweep Islands
- (iii) Maldives

- (e) The oldest mountain range in India is the

- (i) Aravali mountains
- (ii) Western ghats
- (iii) Himalayas

Do you know?

The Ganga and the Brahmaputra form the world's largest delta, the Sunderban delta. The delta is triangular in shape. It is an area of land formed at the mouth of the river (Where rivers enter into the sea, that point is called the mouth of the river).

2. Fill in the blanks.

- (a) India has an area of about _____.
- (b) The Greater Himalayas are also known as _____.
- (c) The largest state in India in terms of area is _____.
- (d) The river Narmada falls into the _____ sea.
- (e) The latitude that runs almost halfway through India is _____.

Let's Do

Many girls are named after rivers eg. Yamuna, Mandakini, and Kaveri. Do you know anyone in your locality who is named after a river? Ask your parents and others and make a list of such names. Could you also find other names related to water e.g. Shabnam?

Things To Do

- 1. On an outline map of India, mark the following.
 - (a) Tropic of Cancer
 - (b) Standard Meridian of India



Coral Islands

Do you know?

Corals are skeletons of tiny marine animals called Polyps. When the living polyps die, their skeletons are left. Other polyps grow on top of the hard skeleton which grows higher and higher, thus forming the coral islands. Figure here shows Coral islands.

- (c) State in which you live
- (d) Andaman Islands and Lakshadweep Islands.
- (e) Western Ghat and Eastern Ghat
- (f) Indian Ocean , Arabian Sea, Bay of Bengal
- (h) Palk strait



INDIA : CLIMATE, VEGETATION & WILDLIFE

You read in newspapers daily and watch on T.V. or hear others talking about weather. You must know that weather is about day to day changes in the atmosphere. It includes changes in temperature, rainfall and sunshine etc. For example, as such it may be hot or cold; sunny or cloudy; windy or calm. You must have noticed that when it is hot continued for several days you don't need any warm clothing. You also like to eat or drink cold things. In contrast there are days together, you feel cold without woollen clothes when it is very windy and chilly, you would like to have something hot to eat.

Broadly, the major seasons recognised in India are:

- Cold Weather Season (Winter) December to February
- Hot Weather Season (Summer) March to May.
- Southwest Monsoon Season (Rainy) June to September.
- Season of Retreating Monsoon (Autumn) October and November.

COLD WEATHER SEASON OR WINTER

During the winter season, cool, dry winds blow from north to the south. The sun rays do not fall directly in the region. As a result, the temperatures are quite low in northern India.

HOT WEATHER SEASON OR SUMMER

In the hot weather season sun rays more or less directly fall in this region. Temperature becomes very high. Hot and dry winds called loo, blow during the day.

SOUTH WEST MONSOON SEASON OR RAINY SEASON

This season is marked by the onset and advance of monsoon. The winds blow from the Arabian Sea and the Bay of Bengal towards the land. They carry moisture with them. When these winds strike the mountain barriers, rainfall occurs.

Let's have fun :

People in all parts of our country drink delicious cold drinks called Sharbat made from fruits available in their regions. They are excellent thirst-quenchers and protect our bodies from the ill-effect of the harsh 'loo'. Have you tried 'Sharbat', made from raw mango, bel, lemon, tamarind, kokum, phalsa, watermelon and buttermilk made from curds; for example chhaachh, mattha, mori, chash, etc? Many make banana and mango milkshakes too.

- After a hot summer, the first rains bring much joy. All our languages have melodious songs on 'rains'. They sound happy and bring cheer. Learn two vernacular songs on rains and sing them together. Write or collect five poems on rains. Ask your friends, neighbours and family members for names for rains and other seasons in different languages. For instance,

(Rood-Kashmiri)
 (Varsha – Hindi)
 (Pous–Marathi)
 (Barish – Urdu)
 (Barkha – Dogri)
 (Borsha – Bengali)

*Description***SEASON OF RETREATING MONSOONS OR AUTUMN**

Winds move back from the mainland to the Bay of Bengal. This is the season of the retreating monsoons. The southern parts of India, particularly Tamil Nadu and Andhra Pradesh receive rainfall in this season. However, the climate is about the average weather condition, which have been measured over many years. The climate of India has broadly been described as Monsoon type. Monsoon is taken from the Arabic word 'mausim', which means seasons. Due to India's location in the tropical

region, most of the rain is brought by monsoon winds. Agriculture in India is dependent on rains. Good monsoons mean adequate rain and a bountiful crop.

The climate of a place is affected by its location, altitude, distance from the sea, and relief. Therefore, we experience regional differences in the climate of India. Jaisalmer and Bikaner in the desert of Rajasthan are very hot, while Drass and Kargil in Jammu and Kashmir are freezing cold. Coastal places like Mumbai and Kolkata experience moderate climate. They are neither too hot nor too cold. Being on the coast, these places are very humid. Mawsynram in Meghalaya receives the world's highest rainfall, while in a particular year it might not rain at all in Jaisalmer in Rajasthan.

What would happen if monsoons were weak, or even worse, failed to occur one year?

Tick () the correct answer.

- Crop will be affected/not affected
- The level of the water in a well will come-up/go-down
- Summer will be- longer/shorter

Let's Do

On a map of India, locate the places mentioned in the paragraph.

NATURAL VEGETATION

We see a variety of plant life in our surroundings. How nice it is to play in a field with green grasses. There are also small plants called bushes and shrubs like cactus and flowering plants etc. Besides there are many tall trees some with many branches and leaves like neem, mango or some which stand with few leaves such as palm. The grasses, shrubs and trees, which grow on their own without interference or help from human beings are called natural vegetation. Do you wonder how these differ from each other? Different types of natural vegetation are dependent on different climatic conditions, among which the amount of rainfall is very important.

Due to varied climatic conditions, India has a wide range of natural vegetation. Vegetation of India can be divided into five types – Tropical evergreen forest, Tropical deciduous forest, Thorny bushes, Mountain vegetation and Mangrove forests.

TROPICAL RAIN FOREST

Tropical Rain Forests occur in the areas which receive heavy rainfall. They are so dense that sunlight doesn't reach the ground. Many species of trees are found in these forests, which shed their leaves at different times of the year. As a result,

they always appear green and are called evergreen forests. Important trees found in these forests are mahogany, ebony and rosewood. The Andaman and Nicobar Islands, parts of North-Eastern states and a narrow strip of the Western slope of the Western Ghats are home of these forests.

TROPICAL DECIDUOUS FORESTS

In a large part of our country we have these types of forests. These forests are also called monsoon forests. They are less dense. They shed their leaves at a particular time of the year. Important trees of these forests are sal, teak, peepal, neem and shisham. They are found in Madhya Pradesh, Uttar Pradesh, Bihar, Jharkhand, Chhattisgarh, Orissa, and in parts of Maharashtra.

THORNY BUSHES

This type of vegetation is found in dry areas of the country. The leaves are in the form of spines to reduce the loss of water. Cactus, khair, babool, keekar are important and are found in the states of Rajasthan, Punjab, Haryana, Eastern slopes of Western Ghats and Gujarat.



Tropical Rain Forests



Tropical Deciduous Forests



Thorny Bushes

MOUNTAIN VEGETATION

A wide range of species is found in the mountains according to the variation in height. With increase in height, the temperature falls. At a height between 1500 metres and 2500 metres most of the trees are conical in shape. These trees are called coniferous trees. Chir, Pine and Deodar are important trees of these forests. These forests are found in J&K.



Mountain Vegetation

MANGROVE FORESTS

These forests can survive in saline water. They are found mainly in Sunderbans in West Bengal and in the Andaman and Nicobar Islands. Sundari is a well-known species of trees in mangrove forests after which Sunderbans have been named.

WHY ARE FORESTS NECESSARY?

Forests are very useful for us. They perform various functions. Plants release oxygen that we breathe and absorb carbon dioxide. The roots of the plants bind the soil; thus, they control soil erosion. Forests provide us with timber for furniture, fuel wood, fodder, medicinal plants and herbs, lac, honey, gum, etc.

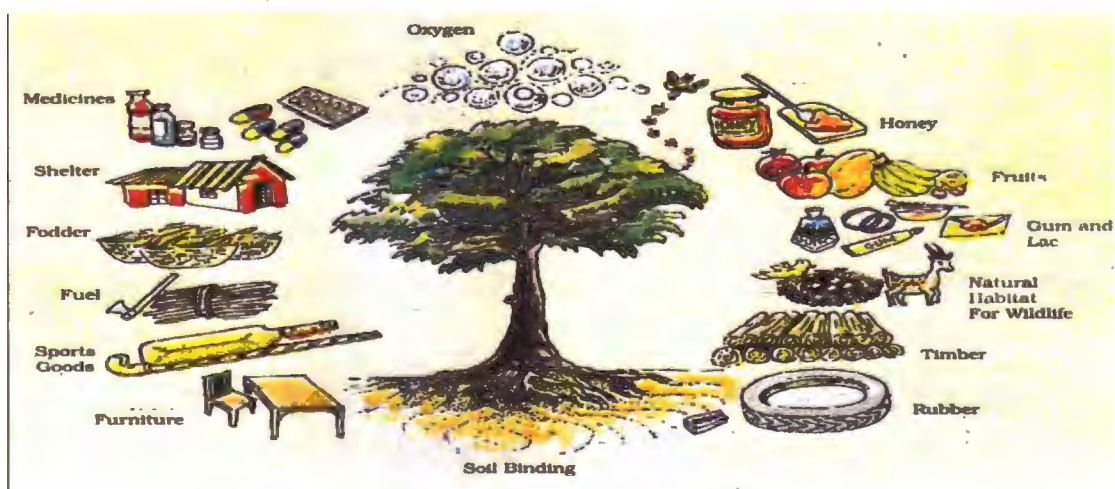
Leela's parents planted a sapling of "neem" to celebrate her birth. On each birthday, a different sapling was planted. It was watered regularly and protected from severe heat, cold and animals. Children took care not to harm it. When Leela was 20, twentyone beautiful trees, stood in and around her house. Birds built their nests on them, flowers bloomed, butterflies fluttered around them, children enjoyed their fruits, swung on their branches and played in their shade.

Forests are the natural habitat of wild life.

Natural vegetation has been destroyed to a large extent because of the reckless cutting of trees. We should plant more trees and protect the existing ones and make people aware of the importance of trees. We can have special programmes like Van Mahotsav to involve more people in making our earth green.

WILD LIFE

Forests are home to a variety of wild life. There are thousands of species of animals and a large variety of reptiles, amphibians, mammals, birds, insects and worms which dwell in the forest.



Uses of Forests



Wildlife

The tiger is our national animal. It is found in various parts of the country. Gir forest in Gujarat is the home of Asiatic lions. Elephants and one-horned rhinoceroses roam in the forests of Assam. Elephants are also found in Kerala and Karnataka. Camels and wild asses are found in the Great Indian desert and the Rann of Kuchh. Wild goats, snow leopards, bears, etc. are found in the Himalayan region. Besides these, many other animals are found in our country such as monkey, wolf, jackal, nilgai, cheetal, etc. Hangul are also found in J&K

India is equally rich in bird life. The peacock is our national bird. Other common birds are parrots, pigeons, mynah, geese, bulbul and ducks. There are several bird sanctuaries which have been created to give birds their natural habitat. These provide the birds protection from hunters. Can you name five birds that are commonly found in your area?

There are hundreds of species of snakes found in India. Cobras and kraits are important among them.

Due to cutting of forests and hunting, several species of wildlife of India are declining rapidly. Many species have already become extinct. In order to protect them many national

parks, sanctuaries and biosphere reserves have been set up. The Government has also started Project Tiger and Project Elephant to protect these animals. Can you name some wildlife sanctuaries of India and locate them on a map?

Largescale poaching alleged in Simlipal reserve

By Ansh Kumar Bhowmik



New Bhubaneswar: Yet another tiger poaching case has been reported from the Simlipal tiger reserve in Orissa's Simlipal range. The tiger was found dead in a forest near the reserve. The poacher was caught and is being held in custody. The tiger was found dead in a forest near the reserve. The poacher was caught and is being held in custody.

Will Centre, wildlife lovers finally kiss and make up?

By Chandra Shekhar

The Centre's decision to set up a tiger reserve in the state has been welcomed by wildlife lovers. The Centre's decision to set up a tiger reserve in the state has been welcomed by wildlife lovers.

More Sariskas in the making

By Chandra Shekhar

The Government has decided to set up more tiger reserves in the state. The Government has decided to set up more tiger reserves in the state.

Cramped in Gir, lions pine for grassland

By Chandra Shekhar

The lions in Gir National Park are suffering from a lack of space. The lions in Gir National Park are suffering from a lack of space.

Villages in tiger reserves must be relocated

By Chandra Shekhar

The Government has decided to relocate villages in tiger reserves. The Government has decided to relocate villages in tiger reserves.

Tiger crisis: Have we done enough to check poaching?

By Chandra Shekhar

The tiger crisis in India is a major concern. The tiger crisis in India is a major concern.

?

- Why do poachers kill tigers?
- What will happen if tigers vanish from our forests?
- Have you ever visited any tiger reserves or a zoo where tigers are kept?

You can also contribute in conserving wildlife. You can refuse to buy things made from parts of the bodies of animals such as their bones, horns, fur, skins, and feathers. Every year we observe wildlife week in the first week of October, to create awareness of conserving the habitats of the animal kingdom. Some TV channels have started the campaign SAVE THE TIGER. In J&K societies have been formed to save the endangered species such as the Markhor, Bactrian Camel, Snow Leopard etc.

Glossary

Climate: The general weather conditions usually found in a particular place for a long period of time.



Migratory Birds

Some birds migrate to India in the winter season every year such as Pelican, Siberian Crane, Stork, Flamingo, Pintail Duck, Curlew. Siberian Cranes migrate from Siberia; they arrive in December and stay till early March.

Vegetation: Plants which are found in a particular area.

Wildlife : Animals and plants that grow independently of people, usually in natural conditions.

Monsoon: The season of heavy rain during the summer in hot Asian countries.

Tropical: Hot and humid climate.

Deciduous: Trees that shed their leaves in autumn and grows new ones in the spring.

Mangrove: A tropical tree, found near water, whose twisted roots grow partly above ground.

1. Answer the following questions briefly.

- Which winds bring rainfall in India? Why is it so important?
- Name the different seasons in India.
- What is natural vegetation?
- Name the different types of vegetation found in India.
- What is the difference between evergreen forest and deciduous forest?
- Why is tropical rainforest also called evergreen forest?

2. Tick the correct answers.

- The world's highest rainfall occurs in
(i) Mumbai (ii) Asansol (iii) Mawsynram
- Mangrove forests can thrive in
(i) saline water (ii) fresh water (iii) polluted water
- Mahogany and rosewood trees are found in

- (i) mangrove forests
- (ii) tropical deciduous forests
- (iii) tropical evergreen forests
- (d) Wild goat and snow leopards are found in
 - (i) Himalayan region (ii) Peninsular region (iii) Gir forests
- (e) During the south west monsoon period, the moisture laden winds blow from
 - (i) land to sea (ii) sea to land (iii) plateau to plains

3. Fill in the blanks.

- (a) Hot and dry winds known as _____ blow during the day in the summers.
- (b) The states of Andhra Pradesh and Tamil Nadu receive a great amount of rainfall during the season of _____.
- (c) _____ forest in Gujarat is the home of _____.
- (d) _____ is a well-known species of mangrove forests.
- (e) _____ are also called monsoon forests.

THINGS TO DO

1. Make a list of trees in your surroundings and collect the pictures of plants, animals and birds and paste them in your copy.
2. Plant a sapling near your home and nurture it and write down the changes you observe for a few months.
3. Does any migratory bird come in your locality? Try to identify that. Be watchful in winter season.
4. Visit a zoo in your city or visit a nearby forest or sanctuary with your elders. Watch various types of wildlife there.

J&K AT A GLANCE

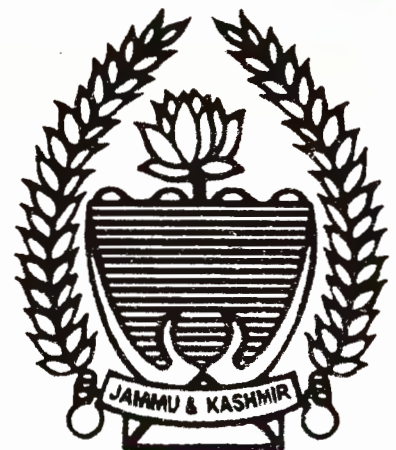
J&K is one of the states situated in the north of India. It is located between 32°17' north and 37° 6' north latitudes and 73°26' east and 80°30' east . It is bordered by China and Afghanistan in the north and Pakistan in the west. Punjab and Himachal Pradesh lie towards its South.

Area	2,22,236 Sq Kms.
Capital	(i) Summer (May-October), Srinagar (ii) Winter (November-April), Jammu
Boundaries	(i) International- China, Afghanistan, Pakistan (ii) National- Punjab , Himachal Pradesh.
Districts	22
Languages	Urdu, Kashmiri, Hindi, Dogri, Punjabi, Pahari, Ladakhi, Balti, Gojri, Sheena, Pushto
Population	1,25,48,926 (Census Operations 2011 J&K . Figures at a Glance).
Population Growth Rate	23.71% in 2011 as compared to 29.04 % in 2001.
Sex Ratio	883 in 2011 as compared to 892 in 2001(per1000)
Population Density	56 in 2011 as compared to 46 in 2001 /(km.Sq).
Literacy Rate	78.26% (males) 58.01% (females) Census Operations J&K. 2011 (Figures at a Glance).
National Parks	Kishtawar National Park, Hemis High Altitude National Park, Salim Ali National Park, Dachigam National Park.
Wildlife Sanctuaries	15
Recorded Forest Area	20230sq.km
State Animal	Hangul
State Bird	Black –necked Crane
State Tree	Chinar
State Flower	Lotus
State Sport	Polo
State Language	Urdu

Important Lakes	Wular, Dal, Aanchar, Manasbal, Gangabal, Sheshnag, Neelnag, Kousarnag.
Important Rivers	Jhelum, Ravi, Tawi, Chenab, and Indus.
Important Glaciers	Siachen, Biafo, Baltaro, Hispar, Nubra, Nunkun, Thajwas.
Important Mountains	Karakoram, PirPanjal, Shivalik. Afarwat, Nunkun, Nanga Parbat, Amarnath.
Important Passes	Banihal, Peer ki Gali, Haji Peer, Zojila, Nathula, Panzila, Synthen, Khardungla.
Important Springs	Verinag, Kokernag, Achabal, ChashmaShabi, Khirbhawani, Vasaknag.
Vegetation	Chir, Poplar, Fir, Pine , Deodar.
Endangered Species	Hangul, Markhor, Snow leopard , Bactrian Camel.
Minerals	Coal, Gypsum, Borax, Limestone, Graphite, Ochre.
Crops	Rice, Wheat, Maize, Tobacco, Oilseed , Saffron.
Industries	Handicrafts, Tourism, Silk , Cement.
Energy Resources	Hydro –power.
Irrigation Canals	Martand,Shahkul,Latkul,Nur,Sumbal,Babul,Sangul, Ranbir Canal.
Hot Water Springs	Tatta Pani, Deng & Changthang.



State Flag of J&K



Official seal of J&K

Physiographic Division

J&K is divided into three major physiographic divisions.

1. Sub- Himalayan Jammu

- a). The Outer Plains b).The outer Hills c).The Middle Mountains

2. Himalayan Kashmir

- a).The Mountain Ring b).Valley Floor c). The Jehlum Gorge d). Kishenganga Valley
e) karewas f) Side- valleys



3. Trans- Himalayan Ladakh

- a). Zaskar range
- b). Indus Furrow
- c). Karakoram
- d). Plateaus of Changthang

Climate

The climate of Jammu and Kashmir varies greatly owing to its topography. The state is divided into three climatic zones :

1. Sub-Tropical Jammu
2. Temperate Kashmir
3. Sub-Artic Ladakh

The temperature in the region varies. Leh is the coldest (-28° average) while Jammu is the hottest. Mean monthly temperature is lowest in January and highest in July, except in Jammu, where high temperature is experienced in June. Mean monthly temperature in January varies from -17° C at Drass to 14° C at Jammu; Kargil and Leh observe below

freezing degree average temperature.

Seasons of the valley

Season	Period	Native term
Spring	16th March to 15th May	Sonth
Summer	16th May to 15th July	Retkol (grishm)
Rainy	16th July to 15th September	Waharat
Autumn	16th September to 15th November	Harud
Winter	16th November to 15th January	Wandah
Ice cold	16th Jan to 15th March	Shishir

Natural Vegetation

Vegetation is influenced by climate, rainfall soil and altitude. Due to climatic and physiographic variations J&K exhibits different types of vegetation as under:

1. **Dry Savanna and Scrub:** This type of vegetation is found in Jammu plains and kandi belt. It consists of kikar (Acacia), Bēr , Shisham , pipal , banyan, mango and palm.
2. **Sub-Tropical Vegetation:** These occupy the higher slopes of Shivalik Hills. These



Pine Trees

include Chir.

3. Monsoon Temperate Forests: These are found in J&K regions and include deodar, spruce, maple, oak, walnut and poplar.
4. Alpine Vegetation: is found at an altitude of 3350m-4570m above sea level. This vegetation includes junipers, firs and rhodoclenderon.

Pastures



Gulmarg



Gulmarg

Blanks and gaps in the commercial forest zone of its fir and pine constitute the pasturelands or margs such as Gulmarg, Yusmarg and Sonamarg.

Forest Resources

In J&K, the forest area is 22,686 sq.km which is 10.21% of the total geographic area. These are largely distributed in Kashmir valley and Jammu region, Ladakh being a cold desert is devoid of forest vegetation.

Wildlife

J&K with its varied regions and diverse climates and vegetations is home to many birds and endangered animals such as Snow leopard, Hangul, Bear, Ibex, Markhor and Bactrian Camel. You will read more about the Bactrian camel and Markhor (found in Ladakh) in your English textbooks (Tulip Series of class VI and VII). Cinamon sparrows, Black Bulbul, Pheasant wagtails, herons, water pigeons, warblers, and Doves and Grossbeak are the birds that attract attention. In the hilly regions of Doda, Udhampur, Poonch and Rajouri there is a large and varied fauna including leopard, cheetah and deer, wild sheep, bear, brown musk and rat. Varieties of snakes, bats, lizards and frogs are also



Hangul



Markhor

found in the region.

Soils

The major soils found in J&K are:

1. Alluvial Soil
2. Karewa Soil
3. Sub-Mountain Soils
4. Forest hill soil
5. Glacial soil
6. Mountain meadow soil



Ibex

Mineral Resources

J&K has limited mineral and fossil – fuel resources.

These are generally found in

Jammu region. Important minerals include coal, gypsum, borax, limestone, graphite, copper and iron ore. The high quality limestone found in Kashmir province has developed the cement industry in the valley.

Glossary

Savanna: A large flat area of land covered with grass, usually with few trees, which is found in hot countries like Africa.

Tropical: Hot and humid climate .

Temperate: Neither very hot nor very cold.

Alpine: Plants that grow in high mountaineous.

1. Answer the following questions:

1. Write a short note on the climate of J&K.
2. What are the different types of vegetation found in J&K?
3. What are pastures? Name a few of them.
4. Name the varieties of wildlife species found in J&K.
5. Name the endangered species of J&K.

2. Tick the correct one

Ladakh/ Jammu is a cold desert.

High quality limestone is found in Kashmir province / Jammu province.

Bactrian camel is found in Kashmir/Ladakh.

Gulmarg is a pasture/ plain.

Waharat is a local name for rainy/winter season.

3. Match the Following

Biafo moutain

Chinar lake

Nanga parbat glacier

Wular State tree

4. Fun Time

1. Name the twenty two districts of J&K. Calculate the numbers in both the provinces. In which district do you live?

2. Write a brief introduction of your district.
3. Make a list of trees mentioned in your lesson and collect the pictures of the same.
4. Ask your teacher to show you the pictures of birds and animals mentioned in the lesson.
5. Find out the migratory birds that come in winter season to J&K.
6. Visit Mansar/ Dal/Wular or any other lake and note down at least their two specialities.
7. Draw Black-necked crane, Chinar, Lotus and Hangul in your copy.
8. What is Hangul called in English?

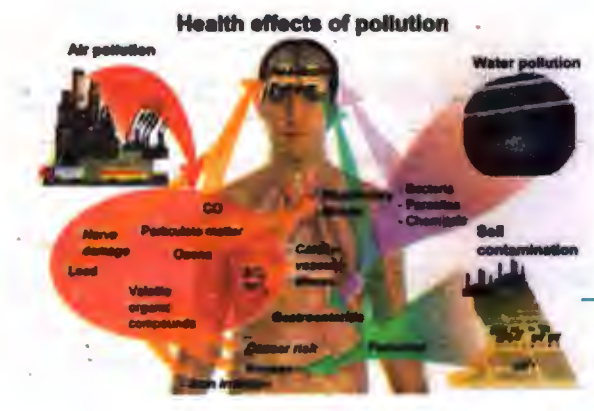


Black-necked crane



Polo

POLLUTION



Pollution is defined as the contamination of natural environment that causes instability, disorder, harm to the ecosystem i.e. physical systems or living organisms.

Air Pollution

Air is a mixture of gases, comprising mainly 78% nitrogen, 21% oxygen, little less than 1% argon, 0.03% CO₂, etc. Whenever this composition is altered or some other harmful gases/materials enter into the atmosphere, the air is said to be polluted.

Sources of air pollution

There are mainly two sources of air pollution, i.e natural and man made.



Volcanic eruption in Iceland in May 2011, a natural source of air pollution



Air pollution from World War II production, man made source of pollution

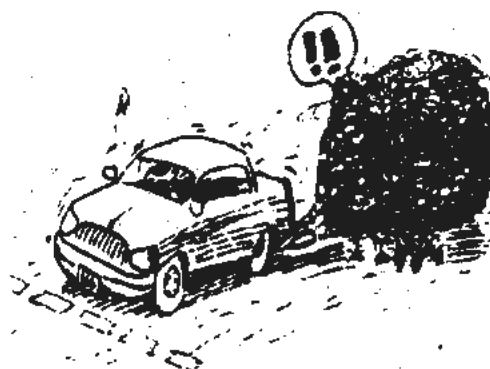
1. **Natural Sources:** In nature, volcanic eruptions occur, releasing poisonous gases like sulphur dioxide, hydrogen sulphide, carbon monoxide etc., into the atmosphere. Other contributing factors are the forest fires, decay of organic matter, and spores and pollens from flowers. The plants and animals through respiration release huge amounts of carbon dioxide.

2. **Man-made Sources:** Increase in population, deforestation, urbanization, industrialization and wars have rapidly taken place. The major threat comes from burning of fossil fuels such as coal, petroleum etc., in the industries.

Automobiles (cars, scooters, motor cycles) are the major sources of air pollutants. They produce carbon monoxide, gaseous hydrocarbons, particulate matter, lead and nitrous oxides. The agricultural activities involving the spray of biocides, pesticides/insecticides and herbicides pollute the atmosphere. Use of sophisticated nuclear weapons of atomic and nuclear reactors may lead to pollution of air by radioactive substances.

The continuous use of chloro-fluorocarbons (CFCs) as refrigerants, coolants, propellants in aerosol sprays, discharge of oxides of nitrogen from supersonic aircrafts, excessive use of nitrates as fertilizers deplete the ozone layer. This results in an increase in ultraviolet radiation from the sun reaching the earth.

Thermal power station, cement, steel, stone-crushing, industries and chemical industries release toxic fumes containing obnoxious gases, fly ash, dust particles, etc. which pollute the air. Indiscriminate cutting of plants, trees and clearing of forests has been due to the increase in population. The forest lands are being converted into agricultural lands to meet the growing demands for food. A part of the land is also being used for building houses/roads. Deforestation has led to increase in the amounts of carbon dioxide in atmosphere, and the result may lead to global warming through greenhouse effect. Steel industries located at Bhilai, Rourkela, Durgapur and Jamshedpur, the National Thermal Power Stations located at Farakka in West Bengal and Talcher in Orissa consume huge amounts of coal for production of energy and release the pollutants like fly-ash, oxides of nitrogen and hydrocarbons into the atmosphere. The cement factories located in Bargarh (Orissa) and Durgapur (West Bengal) release huge amounts of silica, aluminium and cement dust as air pollutants during the manufacture of cement. Fertilizer plants located at Sindri (Bihar), Talcher (Orissa) and Paradeep (Orissa), release enormous amounts of toxic pollutants, fly-ash into the air, thereby polluting the atmosphere.

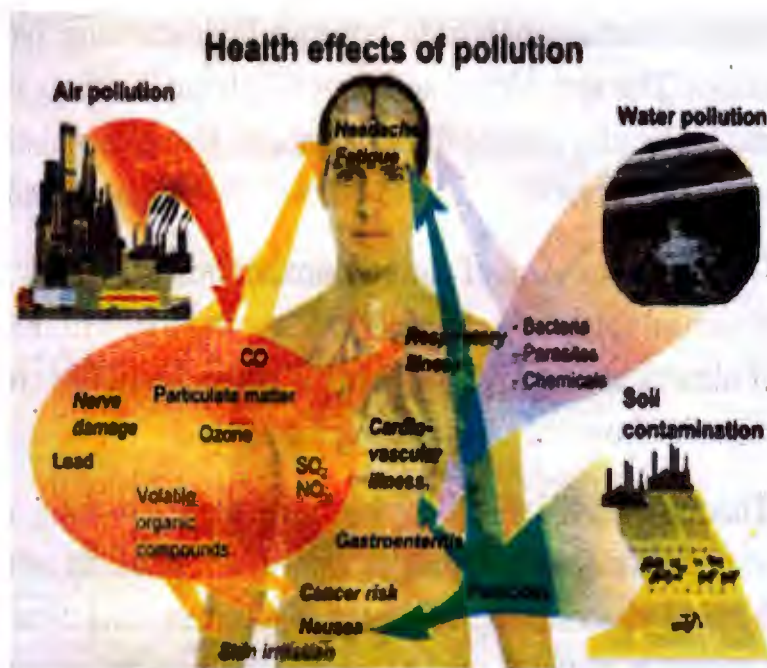


Dust rising from quarries is another source of air pollution. Inefficient methods of garbage disposal in cities represent yet another man made source of air pollution. Garbage includes paper, packing materials, polythene bags, plastic bottles, metallic wastes, decaying organic matter, hospital wastes etc.

Any sound that causes pain and annoyance is regarded as noise and can be considered as one of the sources of pollution. Noise generally originates from industries, vehicular movements, aircrafts, rocket launching and also from large gathering of people in small premises and loudspeakers. Constant exposure of high level noise may cause tension in muscles, nervous disorders, irritability and hearing impairment.

Harmful effects of air pollution

Air pollution affects human health, animals, plants and big structures in the locality (like monuments). Inhalation of polluted air causes diseases associated with respiratory system and it ranges from common cold to lung cancer; damage to respiratory system may lead to bronchitis, asthma etc.



Air polluted with carbon monoxide, when inhaled, reacts with haemoglobin of blood and reduces its oxygen-carrying capacity. Some pollutants in air also cause irritation to eyes.

Effect of air pollution on animals is also similar to that on man. Polluted air also interferes with respiration and photosynthesis in plants. Air polluted with sulphur dioxide when absorbed through stomata impair the metabolic activities of plants. The tissues get collapsed, resulting in drying of the leaves.

A Summary of air pollutants, their sources and their effects on human health is given in the following Table.

Causes and effects of air pollution: (1) greenhouse effect, (2) particulate contamination, (3) increased UV radiation, (4) acid rain, (5) increased ground level ozone concentration, (6) increased levels of nitrogen oxides.

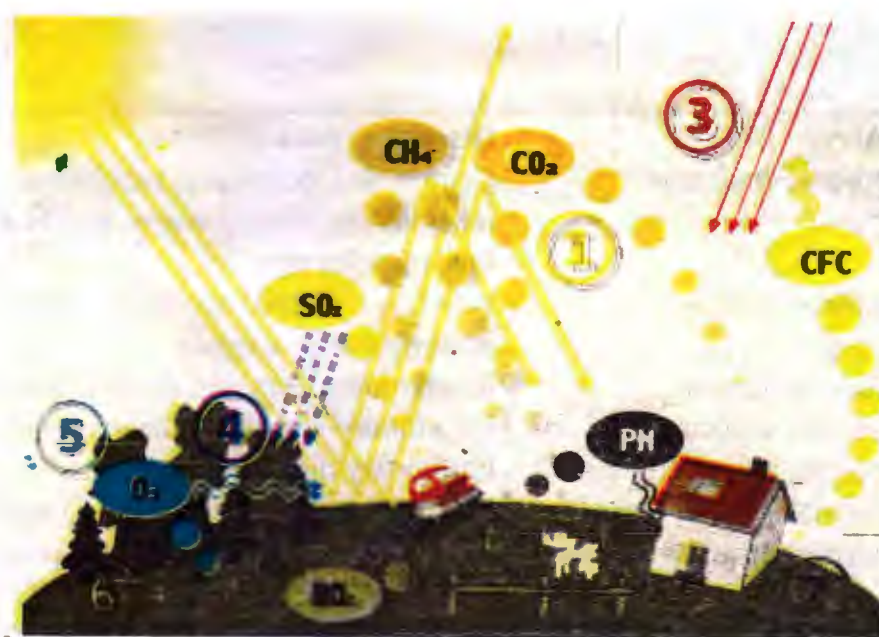
Acid Rain

Acid rain is caused mainly by the presence of oxides of sulphur and nitrogen in the upper atmosphere, where the rain precipitation occurs. This new phenomenon

Table : Air pollution and their effect on man

	Pollutant	Sources	Effects
1.	Carbon monoxide	Automobile exhausts, burning of fuels by industries	Reduction in oxygen carrying capacity in blood
2.	Sulphur dioxide, and hydrocarbons	Combustion of coal and oil, petroleum products, automobiles, chemical industries	Irritation to eyes and respiratory system, headache, and chest congestion
3.	Oxides of nitrogen	Automobile exhausts, welding	Pulmonary irritant, affects lung functioning
4.	Hydrogen sulphide	Refineries and chemical industries	Causes nausea, irritation of eyes and throat
5.	Suspended particulate matter (SPM)	Industries, automobile exhausts	Respiratory disorders
6.	Dust	Cement industry, stone quarries	Silicosis
7.	Asbestos	Roofings, brake linings, asbestos industry	Asbestosis
8.	Lead	Automobile exhausts	Affects central nervous system
9.	Pesticides	Manufacture and application	Causes depression, death if inhaled in excess

occurs mainly where industries are clustered and large number of automobiles ply. Acids are corrosive to buildings, as they react with limestone. Acid rain may also increase acidity of the soil. One peculiarity observed with acid rain is that while



causative agents are located at one place, it occurs at another place due to movement of pollutants with air currents.

Oceans are being polluted through a number of activities. This has put to danger the marine life which is very important for us. We must raise voice against pollution of the oceans.

About 85% of the pollution of oceans has its origin on land, and ocean is the ultimate dustbin where polluted rivers discharge their wastes in the form of sewage/industrial effluents, oil slicks are also sources of pollution which occur due to, accidents involving ships carrying oil. Such accidents result in the release of oil on ocean surface. Even if spills take place in deep sea, the oil sticks ultimately reach the coast. Sea water can also get polluted with radioactive materials due to nuclear testing activities under the oceans, nuclear warfare across the oceans and dumping of nuclear wastes.

Harmful effect of water pollution

The presence of acids/alkalis in water destroys the micro-organisms, there by hindering the self-purification process in rivers. It also adversely affects the fish and other aquatic life. Presence of suspended impurities in sewage and most industrial waste waters) interferes with the self-purification of streams by reducing the photosynthetic activity of aquatic plants, destroying aquatic life. The toxic metals when present as pollutants in water may enter the food chain (and cause serious health hazards in human beings and other aquatic animals. The details are given in the table.

Metal	Source	Disease in man
Mercury	Industrial discharge	Central and peripheral nervous system disorder, renal failure, blurred vision, numbness of limbs, lips, muscles etc.
Lead	Industrial wastes	Nervous disorders, renal failure, blood poisoning and anaemia
Cadmium	Industrial discharge	Renal, pulmonary and skeletal diseases
Arsenic	Industrial discharge	Respiratory and skin cancer, nervous disorders
Nickel	Aerosols, industrial dusts	Pulmonary disorder, dermatitis
Chromium	Industrial wastes, fumes	Respiratory disorders including cancer
Tin	Industrial dust	Central nervous system disorders, vision and bone disorders

Minamata disease is neurological syndrome caused by severe mercury poisoning. When petroleum spreads over a large water surface, say ocean, it remains there as it is for, a very long time. Hence petroleum is not easily bio-degradable and remains as it is for long duration. Its presence affects marine life and sea birds. It also causes dermatitis, pneumonia in lungs, damage to liver, kidneys and lungs.



Minimata Disease

Prevention and Control of water pollution

1. Provision of sewage water-treatment plants
2. Waste food materials, paper, decaying vegetables and plastic should not be thrown into open drains.
3. Sludge obtained from effluents of pulp/paper industries should be converted into boards used for packing.
4. Effluents from distilleries, solid wastes containing organic matter should be diverted to biogas plants for generation of energy.
5. Oil slicks can be skimmed off from the surface with suction device (skimmers). Spreading of saw-dust over oil-slicks also helps absorb the oil component. Spraying of microbes breaks down (degrades) the oil can also be taken up.
6. Total ban on nuclear tests and use of nuclear weapons.
7. Maintaining and setting of safety standards for the effluents discharged into the water system.
8. Creation of public awareness to maintain village ponds, lakes and wells.



Wular lake in J&K

9. Soil/Land Pollution.
10. Addition of foreign substances that change the composition of the soil, results in soil pollution. Productive soil contains approximately 5% organic matter and 95% inorganic matter.

Sources of Soil/Land pollution

11. Soil and land pollution is caused mainly by solid wastes, which include farm and animal manures, agricultural wastes, dead animals, industrial wastes like chemicals, fly-ash and cinders (which are residues of combustion of solid fuels), garbage, paper, cardboard, plastics, rubber, cloth, leather, brick, sand, metal and glass. Many of the chemicals discharged into air such as compounds of sulphur and

Green House Effect: Atmosphere consists of different types of gases namely nitrogen, oxygen, carbon dioxide and other trace gases. Out of all gases, carbon dioxide and water vapour has the tendency to retain or trap heat radiated from the earth's surface. As the concentration of carbon dioxide increases in the atmosphere, more and more heat gets trapped. Carbon dioxide and water vapour is transparent to incoming solar radiation but does not allow long wave terrestrial radiations to escape into the space. This causes the temperatures of earth to rise.

lead eventually come to soil and pollute it. The pesticides and herbicides applied in the agricultural fields also cause soil pollution. A pesticide is a substance or mixture of substances used to kill a pest. These are used to kill weeds, especially on pavements and railways. Insecticides are used to rid farms of pests which damage crops. Synthetic insecticides include like DDT, Aldrin, Dieldrin and BHC.

Glossary

- Corrosive:** Substance that causes damage by chemical action.
- Effluents:** Liquid waste that is sent out from factories or places where sewage is dealt with, usually flowing into the sea or rivers.
- Distillery:** A factory where strong alcoholic drinks are produced by the process of distilling.
- Photosynthesis:** The process by which plants make their food with the help of sunlight.
- Dermatitis:** A disease in which the skin is red and painful.
- Pneumonia:** A serious illness in which one or both lungs become red and swollen and filled with liquid.

1 Answer the following questions briefly:

1. Define pollution and its types.
2. What are pollutants?
3. Describe the harmful effects on human body.
4. How is acid rain caused?
5. Mention some harmful effects of water pollution.
6. Suggest three ways to control pollution.
7. Explain green house effect.

2 Fill in the blanks:

1. Industrial sewage produces -----.
2. Minimata is caused by _____.
3. Carbon monoxide reacts with _____ and reduces oxygen carrying capacity.
4. Acid rain is caused by _____.
5. Microorganisms are destroyed by _____ and _____.

3 Match the following:

Radio active material a large artificial hole in the ground where stone, sand, etc. is dug out of the ground for use as building material.

- | | |
|-----------|----------------|
| Quarry | sulphur |
| Acid rain | uranium |
| Sludge | soft wet earth |

Fun Time

1. Visit any lake / river in your locality. Write two ways to preserve the same.
2. Divide into groups and present your ideas about how pollution can be controlled.
3. Make a round in your school and collect polythenes. Do you think that you can launch anti pollution campaign?
4. See around and pick up all the garbage and dispose it off properly.
5. Are you satisfied with the working of civic bodies in your area as far as cleaning is concerned?

NOTES