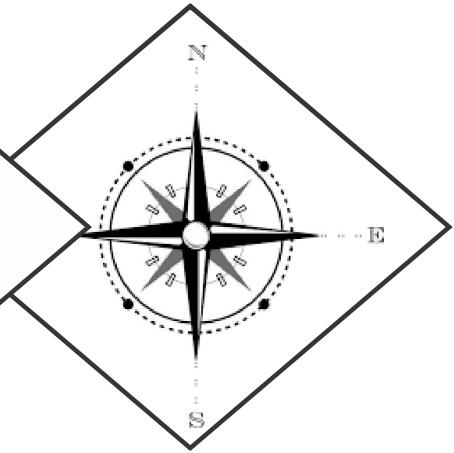
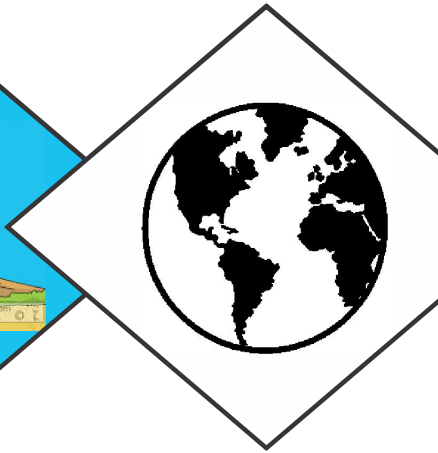
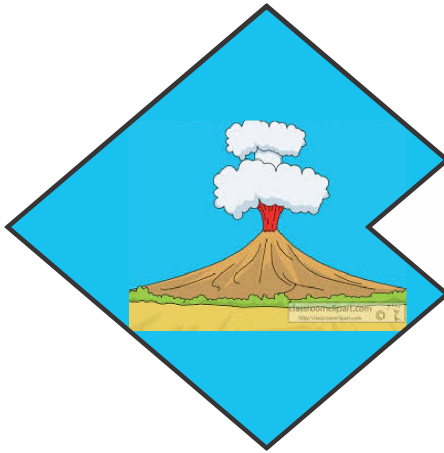


KOTHARI INSTITUTE



INDIAN GEOGRAPHY

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PREFACE

The union Public service Commission (U.P.S.C) has created the below curriculum for the selection of civil servants, which will help them to develop a advance mindset.

The curriculum can be understood into two ways :-

| 4 Pillars (External) | 2 Pillars (Internal) |
|----------------------|--|
| 1. History | 1. Reasoning Skills & Analytical Ability |
| 2. Polity | 2. Ethics & Integrity |
| 3. Geography | |
| 4. Economics | |

India is a curious country for the world. It is common belief that most of the topography & Seasonal conditions of the world can be seen in India. Because the appointment of a civil servant can be done anywhere in the country, so it is normal for them to be aware about the natural resources of the country, Natural vegetation, Rivers, their economic importance etc. They should have this information so that they can make proper use of its reasources & to suggest/ provide assistance to the govt. on their proper utilisation.

Thus, the main features/topics of the syllabus are discribed here which will help a civil servant in realizing his role & will easily achieve the goal of - "Self Building to Nation Building"!

UNIT-1 : The Earth in The Solar System

NOTES

The sun, the moon and all those objects shining in the night sky are called celestial bodies.

Some celestial bodies are very big and hot. They are made up of gases. They have their own heat and light, which they emit in large amounts. These celestial bodies are called stars. The sun is a star.

Countless twinkling stars in the night sky are similar to the sun. But we do not feel their heat or light, and they look so tiny because they are very very far from us.

While watching the night sky, you may notice various patterns formed by different groups of stars. These are called constellations. Ursa Major or Big Bear is one such constellation. One of the most easily recognisable constellation is the Saptarishi (Saptaseven, rishi-sages). It is a group of seven stars that forms a part of Ursa Major Constellation.

In ancient times, people used to determine directions during the night with the help of stars. The North star indicates the north direction. It is also called the Pole Star. It always remains in the same position in the sky. We can locate the position of the Pole Star with the help of the Saptarishi. Look at. You will notice that, if an imaginary line is drawn joining the pointer stars and extended further, it will point to the Pole Star.

Some celestial bodies do not have their own heat and light. They are lit by the light of the stars. Such bodies are called planets. The word 'planet' comes from the Greek word "Planetai" which means 'wanderers'. The earth on which we live is a planet. It gets all its heat and light from the sun, which is our nearest star. If we look at the earth from a great distance, say the moon, it will appear to be shining just as the moon.

The Solar System

The sun, eight planets, satellites and some other celestial bodies known as asteroids and meteoroids form the solar system. We often call it a solar family, with the sun as its Head.

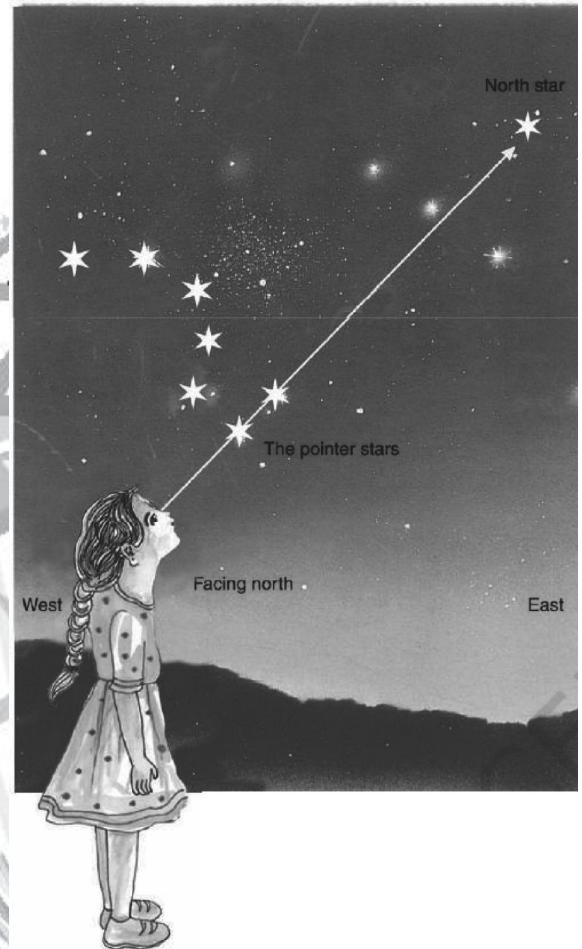


Fig. Saptarishi and the North Star

Interesting Fact

Jupiter, Saturn and Uranus have rings around them. These are belts of small debris. These rings may be seen from the earth with the help of powerful telescopes.

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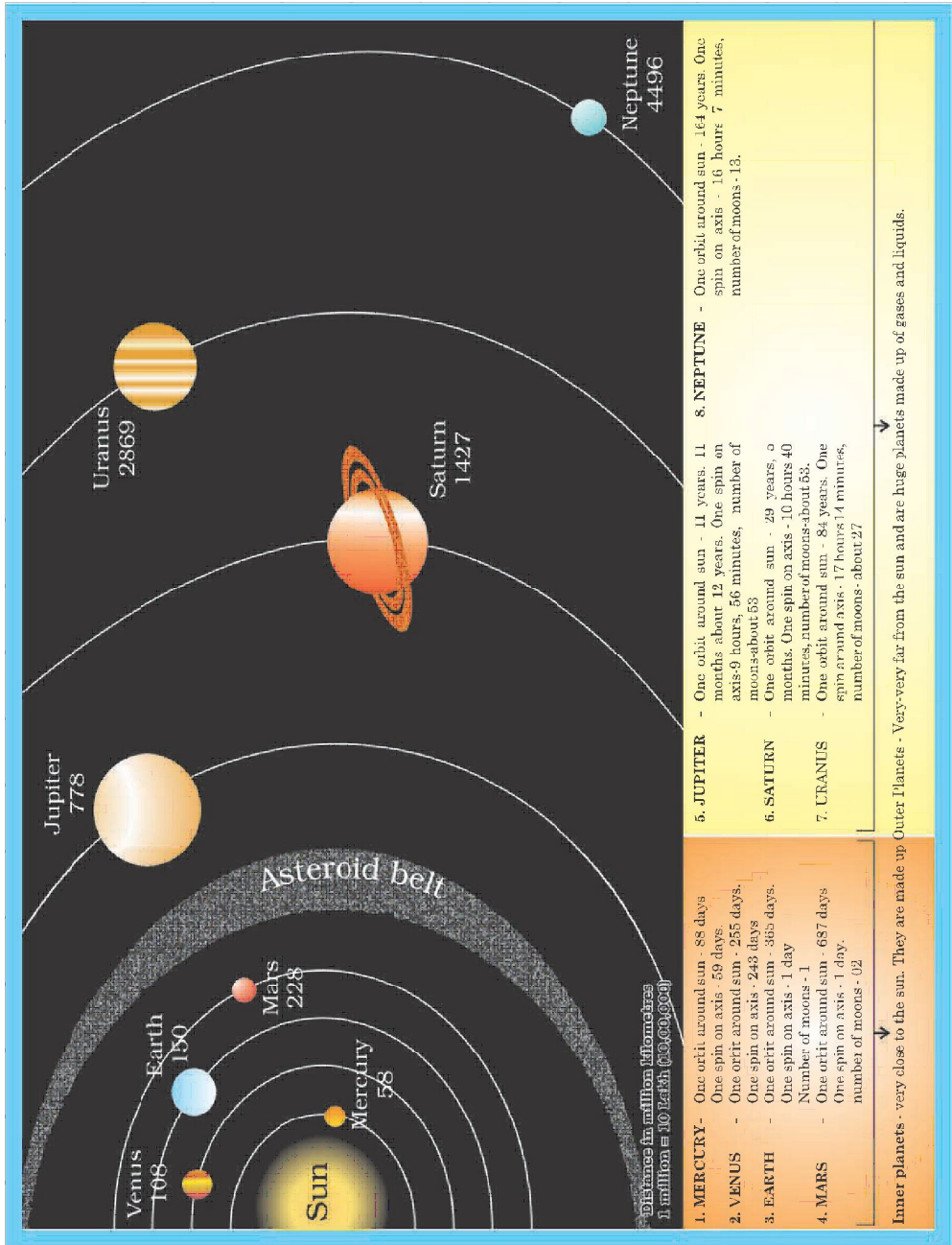


Fig : The Solar System

The Sun

The sun is in the centre of the solar system. It is huge and made up of extremely hot gases. It provides the pulling force that binds the solar system. The sun is the ultimate source of heat and light for the solar system. But that tremendous heat is not felt so much by us because despite being our nearest star, it is far away from us. The sun is about 150 million km away from the earth.

Planets

There are eight planets in our solar system. In order of their distance from the sun, they are: Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus and Neptune.

All the eight planets of the solar system move around the sun in fixed paths. These paths are elongated. They are called orbits. Mercury is nearest to the sun. It takes only about 88 days to complete one round along its orbit. Venus is considered as 'Earth's-twin' because its size and shape are very much similar to that of the earth.

NOTES

Till recently (August 2006), Pluto was also considered a planet. However, in a meeting of the International Astronomical Union, a decision was taken that Pluto like other celestial objects (Ceres, 2003 UB313) discovered in recent past may be called ‘dwarf planets.’

The Earth

The earth is the third nearest planet to the sun. In size, it is the fifth largest planet. It is slightly flattened at the poles. That is why, its shape is described as a Geoid. Geoid means an earth-like shape.

Conditions favourable to support life are probably found only on the earth. The earth is neither too hot nor too cold. It has water and air, which are very essential for our survival. The air has life-supporting gases like oxygen. Because of these reasons, the earth is a unique planet in the solar system.

From the outer space, the earth appears blue because its two-thirds surface is covered by water. It is, therefore, called a blue planet.

The Moon

Our earth has only one satellite, that is, the moon. Its diameter is only one-quarter that of the earth. It appears so big because it is nearer to our planet than other celestial bodies. It is about 3,84,400 km away from us. Now you can compare the distance of the earth from the sun and that from the moon.

The moon moves around the earth in about 27 days. It takes exactly the same time to complete one spin. As a result, only one side of the moon is visible to us on the earth.

The moon does not have conditions favourable for life. It has neither water nor air. It has mountains, plains and depressions on its surface. These cast shadows on the moon’s surface. Look at the full moon and observe these shadows.

Asteroids

Apart from the stars, planets and satellites, there are numerous tiny bodies which also move around the sun. These bodies are called asteroids. They are found between the orbits of Mars and Jupiter (Figure 1.2). Scientists are of the view that asteroids are parts of a planet which exploded many years back.

Meteoroids

The small pieces of rocks which move around the sun are called meteoroids. Sometimes these meteoroids come near the earth and tend to drop upon it. During this process due to friction with the air they get heated up and burn. It causes a flash of light. Sometimes, a meteor without being completely burnt, falls on the earth and creates a hollow.

Do you see a whitish broad band, like a white glowing path across the sky on a clear starry night? It is a cluster of millions of stars. This band is the Milky Way galaxy (Figure 1.6). Our solar system is a part of this galaxy. In ancient India, it was imagined to be a river of light flowing in the sky. Thus, it was named Akash Ganga. A galaxy is a huge system of billions of stars, and clouds of dust and gases. There are millions of such galaxies that make the Universe. It is difficult to imagine how big the universe is. Scientists are still trying to find out more and more about it. We are not certain about its size but we know that all of us – you and I belong to this universe.

Do you know?

Light travels at the speed of about 300,000 km per second. Yet, even with this speed, the light of the sun takes about eight minutes to reach the earth.

Interesting Fact

Neil Armstrong was the first man to step on the surface of the moon on 21 July 1969.

A Satellite is a celestial body that moves around the planets in the same way as the planets move around the sun.

A Human-made Satellite is an artificial body. It is designed by scientists to gather information about the universe or for communication. 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.



NOTES

UNIT-2 : Globe : Latitudes and Longitudes

Our planet earth is not a sphere. It is slightly flattened at the North and the South Poles and bulge in the middle. Can you imagine how it looks? You may look at a globe carefully in your classroom to get an idea. Globe is a true model (miniature form) of the earth

On the globe, countries, continents and oceans are shown in their correct size.

A needle is fixed through the globe in a tilted manner, which is called its axis. Two points on the globe through which the needle passes are two poles - North Pole and South Pole. The globe can be moved around this needle from west to east just as the earth moves. But, remember there is a major difference. The real earth has no such needle. It moves around its axis, which is an imaginary line.

Another imaginary line running on the globe divides it into two equal parts. This line is known as the **equator**. The northern half of the earth is known as the Northern Hemisphere and the southern half is known as the Southern Hemisphere. They are both equal halves. Therefore, the equator is an imaginary circular line and is a very important reference point to locate places on the earth. All parallel circles from the equator up to the poles are called parallels of latitudes. Latitudes are measured in degrees.

The equator represents the zero degree latitude. Since the distance from the equator to either of the poles is one-fourth of a circle round the earth, it will measure $\frac{1}{4}$ th of 360 degrees, i.e. 90°. Thus, 90 degrees north latitude marks the North Pole and 90 degrees south latitude marks the South Pole.

As such, all parallels north of the equator are called 'north latitudes.' Similarly all parallels south of the equator are called 'south latitudes.'

The value of each latitude is, therefore, followed by either the word north or south. Generally, this is indicated by the letter 'N' or 'S'. For example, both Chandrapur in Maharashtra (India) and Belo Horizonte in Brazil (South America) are located on parallels of about 20° latitude. But the former is 20° north of the equator and the latter is 20° south of it. We, therefore, say that Chandrapur is situated at 20° N latitude and Belo Horizonte is situated at 20° S latitude. as we move away from the equator, the size of the parallels of latitude decreases.

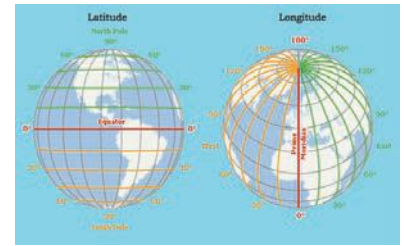


Figure : Globe

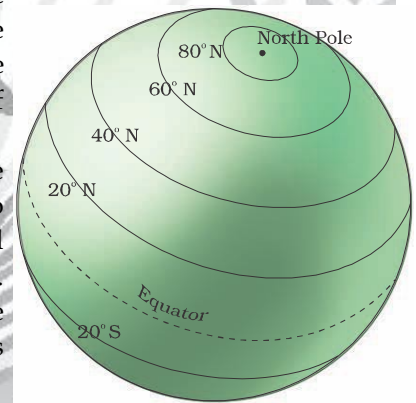


Figure : Latitude

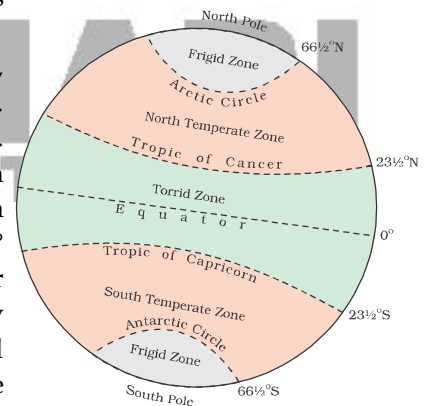


Figure : Important Latitudes and Heat Zones

NOTES

IMPORTANT PARALLELS OF LATITUDES

Besides the equator (0°), the North Pole (90°N) and the South Pole (90° S), there are four important parallels of latitudes--

(i) **Tropic of Cancer** (23½° N) in the Northern Hemisphere. (ii) **Tropic of Capricorn** (23½° S) in the Southern Hemisphere. (iii) **Arctic Circle** at 66½° north of the equator. (iv) **Antarctic Circle** at 66½° south of the equator.

HEAT ZONES OF THE EARTH

The mid-day sun is exactly overhead at least once a year on all latitudes in between the Tropic of Cancer and the Tropic of Capricorn. This area, therefore, receives the maximum heat and is called the Torrid Zone.

The mid-day sun never shines overhead on any latitude beyond the Tropic of Cancer and the Tropic of Capricorn. The angle of the sun's rays goes on decreasing towards the poles. As such, the areas bounded by the Tropic of Cancer and the Arctic Circle in the Northern Hemisphere, and the Tropic of Capricorn and the Antarctic Circle in the Southern Hemisphere, have moderate temperatures. These are, therefore, called Temperate Zones.

Areas lying between the Arctic Circle and the North Pole in the Northern Hemisphere and the Antarctic Circle and the South Pole in the Southern Hemisphere, are very cold. It is because here the sun does not rise much above the horizon. Therefore, its rays are always slanting and provide less heat. These are, therefore, called Frigid Zones (very cold).

WHAT ARE LONGITUDES?

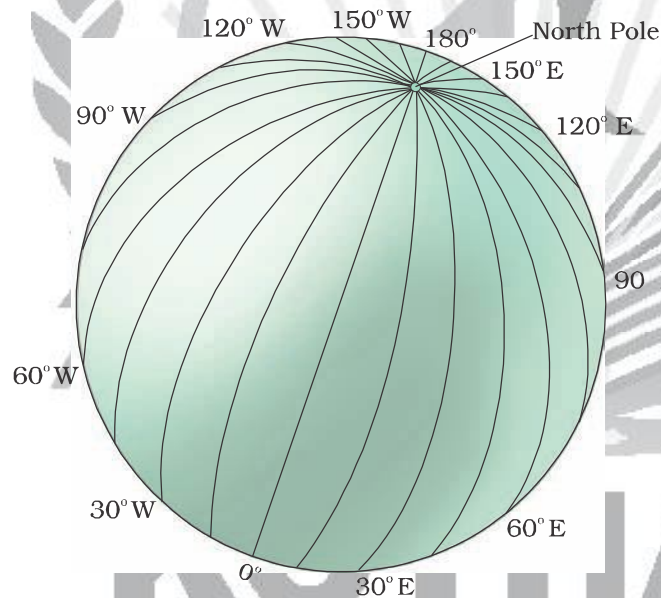


Figure : Longitudes

To fix the position of a place, it is necessary to know something more than the latitude of that place. You can see, for example, that Tonga Islands (in the Pacific Ocean) and Mauritius Islands (in the Indian Ocean) are situated on the same latitude (i.e., 20° S). Now, in order to locate them precisely, we must find out how far east or west these places are from a given line of reference running from the North Pole to the South Pole. These lines of references are called the

meridians of longitude, and the distances between them are measured in 'degrees of longitude.' Each degree is further divided into minutes, and minutes into seconds. They are semicircles and the distance between them decreases steadily polewards until it becomes zero at the poles, where all the meridians meet.

Unlike parallels of latitude, all meridians are of equal length. Thus, it was difficult to number the meridians. Hence, all countries decided that the count should begin from the meridian which passed through Greenwich, where the British Royal Observatory is located. This meridian is called the Prime Meridian. Its value is 0° longitude and from it we count 180° eastward as well as 180° westward. The Prime

NOTES

Meridian and 180° meridian divide the earth into two equal halves, the Eastern Hemisphere and the Western Hemisphere. Therefore, the longitude of a place is followed by the letter E for the east and W for the west. It is, however, interesting to note that 180° East and 180° West meridians are on the same line.

You can locate any point on the globe very easily if you know its latitude and longitude. For example, Dhubri in Assam is situated at 26° N latitude and 90° E longitude.

Find out the point where these two lines cut each other. That point will be the location of Dhubri.

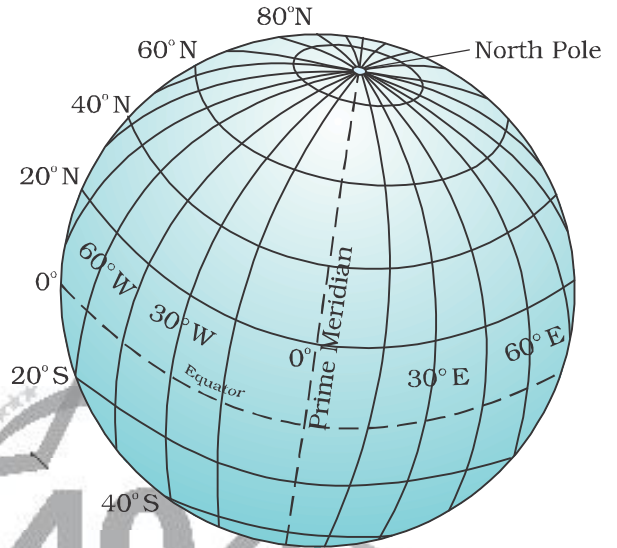


Figure : Grid

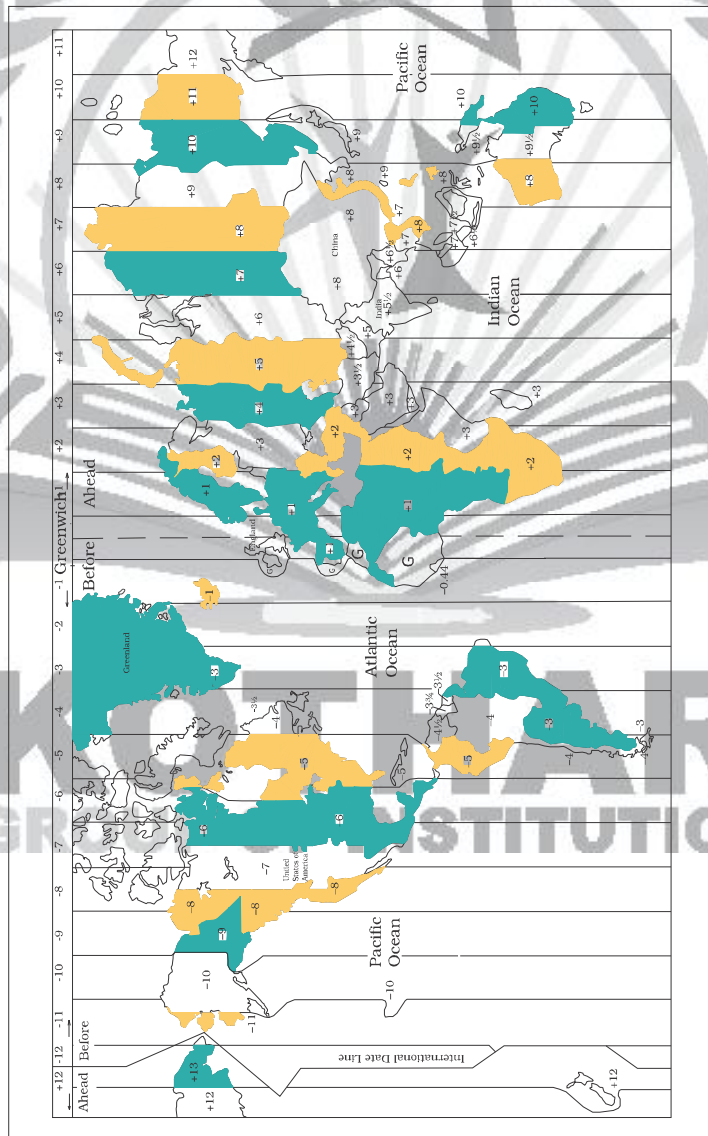


Figure : Time zones of the World

NOTES

LONGITUDE AND TIME

The best means of measuring time is by the movement of the earth, the moon and the planets. The sun regularly rises and sets every day, and naturally, it is the best time-keeper throughout the world. Local time can be reckoned by the shadow cast by the sun, which is the shortest at noon and longest at sunrise and sunset.

When the Prime Meridian of Greenwich has the sun at the highest point in the sky, all the places along this meridian will have mid-day or noon.

As the earth rotates from west to east, those places east of Greenwich will be ahead of Greenwich time and those to the west will be behind it (Figure 2.8). The rate of difference can be calculated as follows. The earth rotates 360° in about 24 hours, which means 15° an hour or 1° in four minutes. Thus, when it is 12 noon at Greenwich, the time at 15° east of Greenwich will be $15 \times 4 = 60$ minutes, i.e., 1 hour ahead of Greenwich time, which means 1 p.m. But at 15° west of Greenwich, the time will be behind Greenwich time by one hour, i.e., it will be 11.00 a.m. Similarly, at 180°, it will be midnight when it is 12 noon at Greenwich.

At any place a watch can be adjusted to read 12 o'clock when the sun is at the highest point in the sky, i.e., when it is mid-day. The time shown by such a watch will give the local time for that place.

WHY DO WE HAVE STANDARD TIME?

The local time of places which are on different meridians are bound to differ. For example, it will be difficult to prepare a time-table for trains which cross several longitudes. In India, for instance, there will be a difference of about 1 hour and 45 minutes in the local times of Dwarka in Gujarat and Dibrugarh in Assam. It is, therefore, necessary to adopt the local time of some central meridian of a country as the standard time for the country. In India, the longitude of 82½° E (82° 30'E) is treated as the standard meridian. The local time at this meridian is taken as the standard time for the whole country. It is known as the Indian Standard Time (IST).

India located east of Greenwich at 82°30'E is 5 hours and 30 minutes ahead of GMT. So it will be 7:30 p.m. in India when it is 2:00 p.m. noon in London.

Some countries have a great longitudinal extent and so they have adopted more than one standard time. For example, in Russia, there are as many as eleven standard times. The earth has been divided into twenty-four time zones of one hour each. Each zone thus covers 15° of longitude.



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UNIT-3 : Motions of The Earth

The earth has two types of motions, namely rotation and revolution. Rotation is the movement of the earth on its axis. The movement of the earth around the sun in a fixed path or orbit is called Revolution.

The axis of the earth which is an imaginary line, makes an angle of $66\frac{1}{2}^\circ$ with its orbital plane. The plane formed by the orbit is known as the orbital plane.

The earth receives light from the sun. Due to the spherical shape of the earth, only half of it gets light from the sun at a time. The portion facing the sun experiences day while the other half away from the sun experiences night. The circle that divides the day from night on the globe is called the circle of illumination. This circle does not coincide with the axis. The earth takes about 24 hours to complete one rotation around its axis. The period of rotation is known as the earthday. This is the daily motion of the earth.

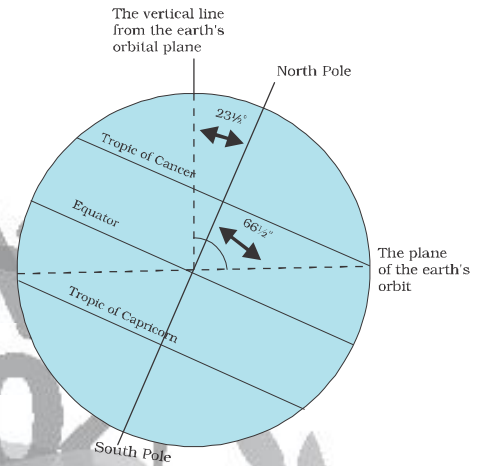


Fig. Inclination of the Earth's axis and the orbital plane

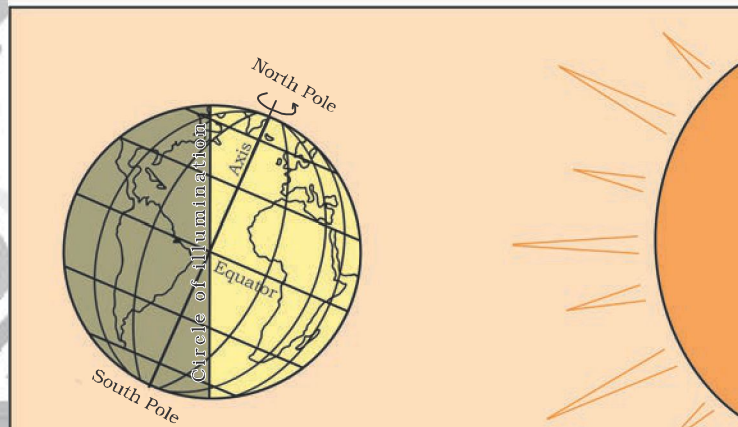


Figure : Day and Night on the Earth due to rotation

What would happen if the earth did not rotate? The portion of the earth facing the sun would always experience day, thus bringing continuous warmth to the region. The other half would remain in darkness and be freezing cold all the time. Life would not have been possible in such extreme conditions.

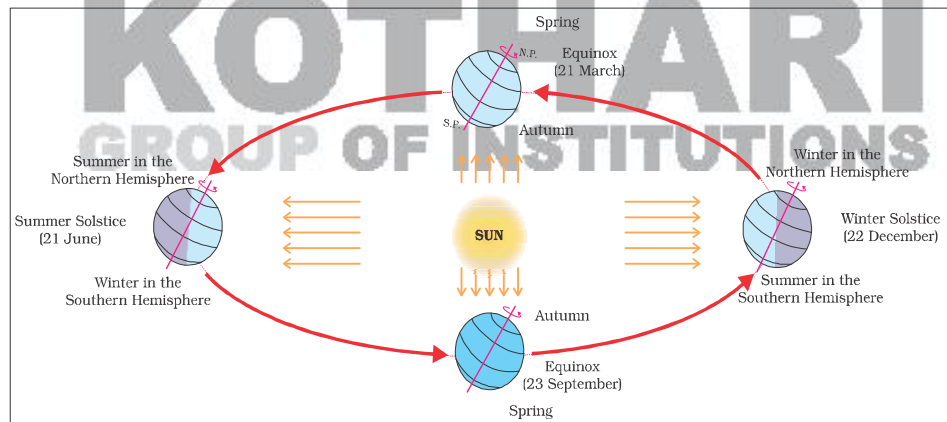


Fig. Revolution of the Earth and Seasons

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The second motion of the earth around the sun in its orbit is called revolution. It takes $365\frac{1}{4}$ days (one year) to revolve around the sun. We consider a year as consisting of 365 days only and ignore six hours for the sake of convenience.

Six hours saved every year are added to make one day (24 hours) over a span of four years. This surplus day is added to the month of February. Thus every fourth year, February is of 29 days instead of 28 days. Such a year with 366 days is called a leap year. It is clear that the earth is going around the sun in an elliptical orbit. Throughout its orbit, the earth is inclined in the same direction.

A year is usually divided into summer, winter, spring and autumn seasons. Seasons change due to the change in the position of the earth around the sun.

You will see that on 21st June, the Northern Hemisphere is tilted towards the sun. The rays of the sun fall directly on the Tropic of Cancer. As a result, these areas receive more heat. The areas near the poles receive less heat as the rays of the sun are slanting. The North Pole is inclined towards the sun and the places beyond the Arctic Circle experience continuous daylight for about six months.

Since a large portion of the Northern Hemisphere is getting light from the sun, it is summer in the regions north of the equator. The longest day and the shortest night at these places occur on 21st June. At this time in the Southern Hemisphere all these conditions are reversed. It is winter season there. The nights are longer than the days. This position of the earth is called the Summer Solstice.

On 22nd December, the Tropic of Capricorn receives direct rays of the sun as the South Pole tilts towards it. As the sun's rays fall vertically at the Tropic of Capricorn ($23\frac{1}{2}^{\circ}$ S), a larger portion of the Southern Hemisphere gets light. Therefore, it is summer in the Southern Hemisphere with longer days and shorter nights. The reverse happens in the Northern Hemisphere. This position of the earth is called the Winter Solstice.

On 21st March and September 23rd, direct rays of the sun fall on the equator. At this position, neither of the poles is tilted towards the sun; so, the whole earth experiences equal days and equal nights. This is called an equinox.

On 23rd September, it is autumn season in the Northern Hemisphere and spring season in the Southern Hemisphere. The opposite is the case on 21st March, when it is spring in the Northern Hemisphere and autumn in the Southern Hemisphere.

Thus, there are days and nights and changes in the seasons because of the rotation and revolution of the earth respectively.



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NOTES

UNIT-4 : MAPS

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, measurements drawn on different scales. Maps provide more information than a globe. They are of different types. Some of them are described below.

PHYSICAL MAPS

Maps showing natural features of the earth such as mountains, plateaus, plains, rivers, oceans etc. are called physical or relief 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, such as road maps, rainfall maps, maps showing distribution of forests, industries etc. are known as 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.

DISTANCE

Maps are drawings, which reduce the entire world or a part of it to fit on a sheet of paper. Or we can say maps are drawn to reduced scales. But this reduction is done very carefully so that the distance between the places is real. It can only be possible when a small distance on paper represents a large distance on the ground. Therefore, a scale is chosen for this purpose. Scale is the ratio between the actual distance on the ground and the distance shown on the map. For example, the distance between your school and your home is 10 km. If you show this 10 km. distance by 2 cm on a map, it means, 1 cm on the map will show 5 km. on the ground. The scale of your drawing will be 1cm = 5 km. Thus, scale is very important in any map. If you know the scale, you will be able to calculate the distance between any two places on a map.

When large areas like continents or countries are to be shown on a paper, then we use a small scale. For example 5 cm. on the map shows 500 km. of the ground. It is called a small scale map.

When a small area like your village or town is to be shown on paper, then we use a large scale that is 5 cm. on the map shows 500 metres only on the ground. It is called a large scale map.

Large scale maps give more information than small scale maps.

DIRECTION

Most maps contain an arrow marked with the letter 'N' at the upper right hand corner. This arrow shows the north direction. It is called the north line. When you know the north, you can find out other directions, for example east, west and south. There are four major directions, North, South, East and West They are called cardinal points. Other four intermediate directions are north-east (NE), southeast (SE), south-west (SW) and north-west (NW). We can locate any place more accurately with the help of these intermediate directions.

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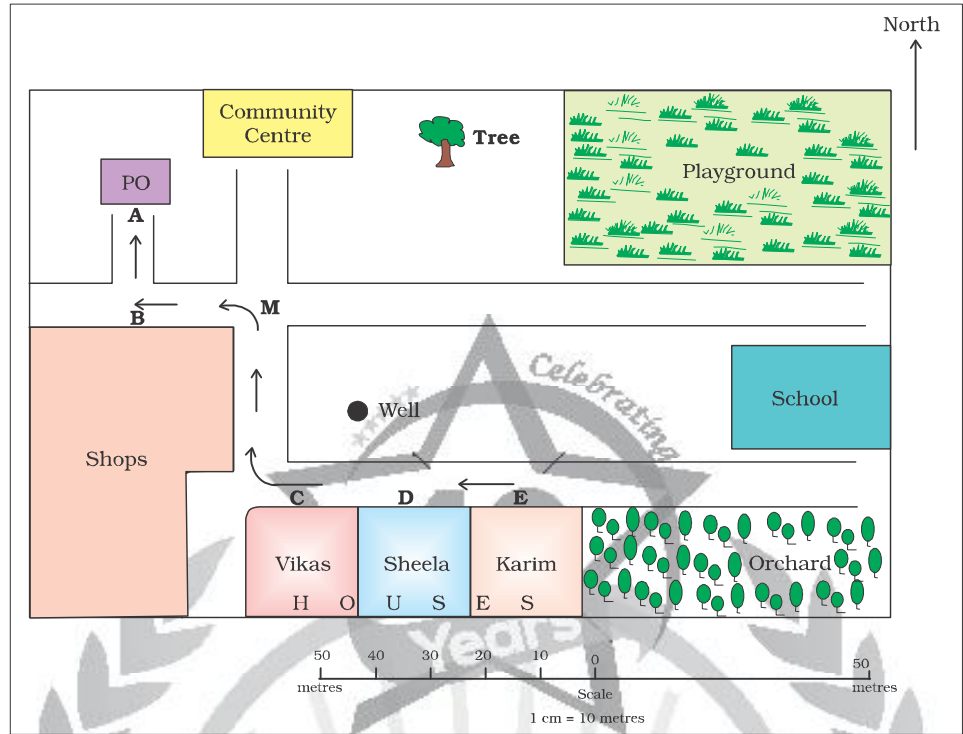


Fig. Map of a village

We can find out the direction of a place with the help of a compass. It is an instrument used to find out main directions. Its magnetic needle always points towards north-south direction.

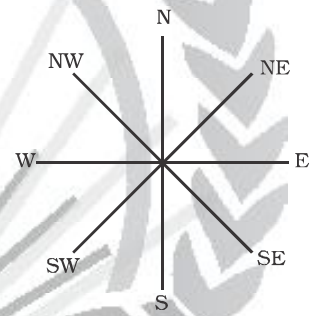


Fig. Cardinal Directions

SYMBOLS

It is the third important component of a map. It is not possible to draw on a map the actual shape and size of different features such as buildings, roads, bridges, trees, railway lines or a well. So, they are shown by using certain letters, shades, colours, pictures and lines. These symbols give a lot of information in a limited space. With the use of these symbols, maps can be drawn easily and are simple to read. Even if you don't know the language of an area and therefore cannot ask someone for directions, you can collect information from maps with the help of these symbols.

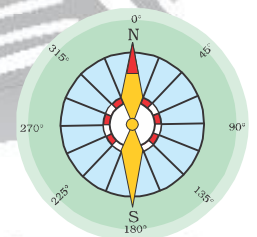


Fig. A compass

| | |
|--|----------------------|
| Railway Line : Broad gauge, Metre gauge, | |
| Railway station | |
| Roads : Metalled, Unmetalled | |
| Boundary : International, State, District, | |
| River, Well, Tank, Canal, Bridge | |
| Temple, Church, Mosque, Chhatri | |
| Post Office, Post & Telegraph Office, Police Station | PO , PTO , PS |
| Settlement, Graveyard | |
| Trees, Grass | |

Fig. : Conventional Symbols

NOTES

Maps have a universal language that can be understood by all. There is an international agreement regarding the use of these symbols. These are called conventional symbols.

Various colours are used for the same purpose. For example, generally blue is used for showing water bodies, brown for mountain, yellow for plateau and green is used for plains.

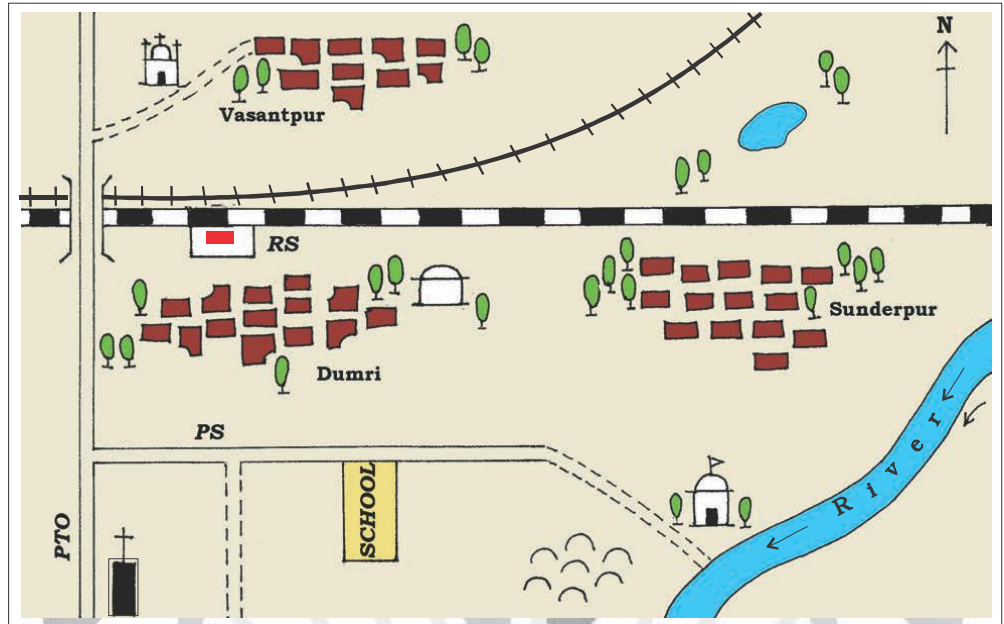


Figure : Sunderpur Village And Its Surrounding areas

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

A plan is a drawing of a small area on a large scale. A large-scale map gives lot of information, but there are certain things which we may sometimes want to know for example the length and breadth of a room, which can't be shown in a map. At that time, we can refer drawings drawn to scale called a plan.

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UNIT-5 : Major Domains of The Earth

The earth is the only planet which has life. Human beings can live here because the life sustaining elements of land, water and air are present on the earth.

The surface of the earth is a complex zone in which three main components of the environment meet, overlap and interact. The solid portion of the earth on which we live is called the Lithosphere. The gaseous layers that surround the earth, is the Atmosphere, where oxygen, nitrogen, carbon dioxide and other gases

are found. Water covers a very big area of the earth's surface and this area is called the Hydrosphere. The Hydrosphere comprises water in all its forms, that is, ice, water and water vapour.

The Biosphere is the narrow zone where we find land, water and air together, which contains all forms of life.

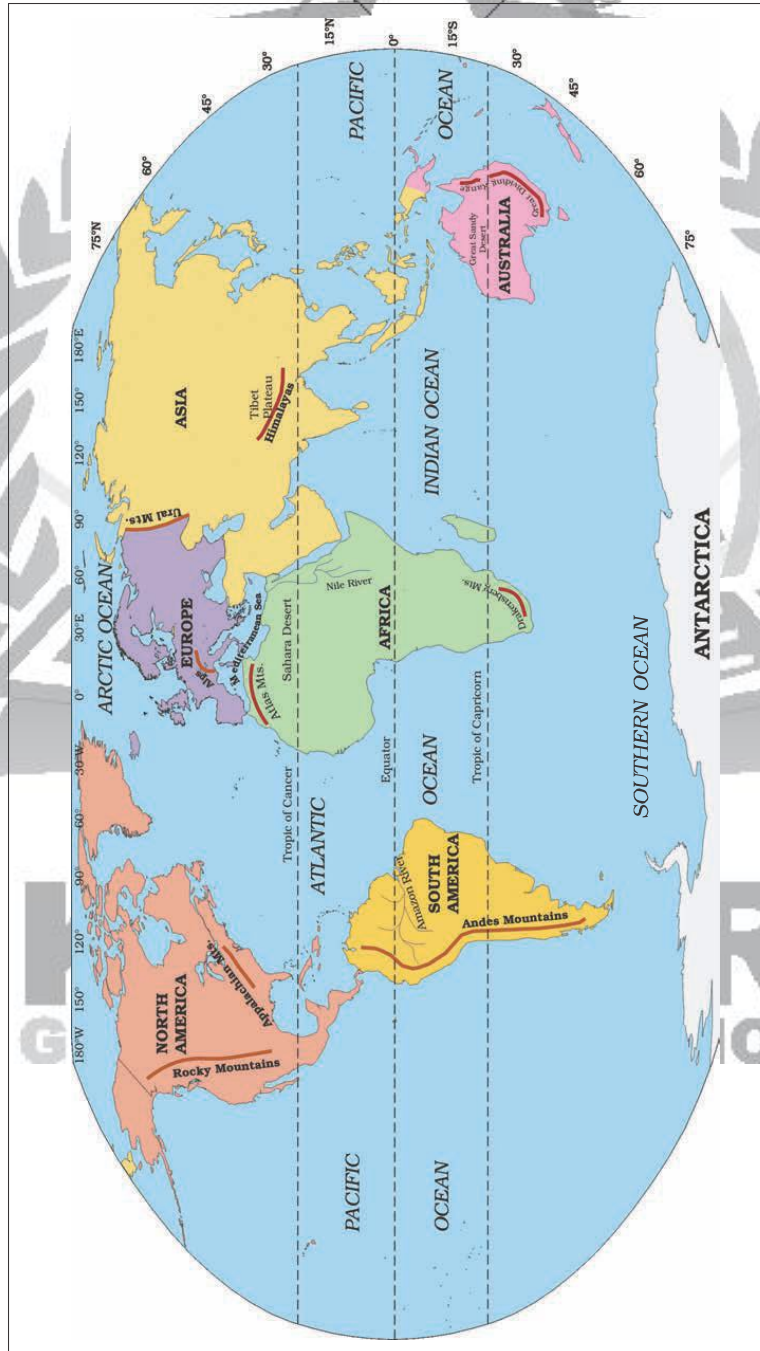


Fig. : The World : Continents and Oceans

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LITHOSPHERE

The solid portion of the earth is called the Lithosphere. It comprises the rocks of the earth's crust and the thin layers of soil that contain nutrient elements which sustain organisms.

There are two main divisions of the earth's surface. The large landmasses are known as the continents and the huge water bodies are called the ocean basins. All the oceans of the world are connected with one another.

The level of seawater remains the same everywhere. Elevation of land is measured from the level of the sea, which is taken as zero.

The highest mountain peak Mt. Everest is 8,848 metres above the sea level. The greatest depth of 11,022 metres is recorded at Mariana Trench in the Pacific Ocean.

Continents

There are seven major continents. These are separated by large water bodies. These continents are - Asia, Europe, Africa, North America, South America, Australia and Antarctica. The greater part of the land mass lies in the Northern Hemisphere.

Asia is the largest continent. It covers about one-third of the total land area of the earth. The continent lies in the Eastern Hemisphere. The Tropic of Cancer passes through this continent. Asia is separated from Europe by the Ural mountains on the west. The combined landmass of Europe and Asia is called the Eurasia (Europe + Asia).

Europe is much smaller than Asia. The continent lies to the west of Asia. The Arctic Circle passes through it. It is bound by water bodies on three sides.

Africa is the second largest continent after Asia. The Equator or 00 latitude runs almost through the middle of the continent. A large part of Africa lies in the Northern Hemisphere. 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. the world's longest river the Nile, flows through Africa.

North America is the third largest continent of the world. It is linked to South America by a very narrow strip of land called the Isthmus of Panama. The continent lies completely in the Northern and Western Hemisphere. Three oceans surround this continent.

South America lies mostly in the Southern Hemisphere. Which two oceans surround it on the east and the west? The Andes, world's longest mountain range, runs through its length from north to south. South America has the world's largest river, the Amazon.



Fig. : Isthmus and Strait

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Australia is the smallest continent that lies entirely in the Southern Hemisphere. It is surrounded on all sides by the oceans and seas. It is called an island continent.

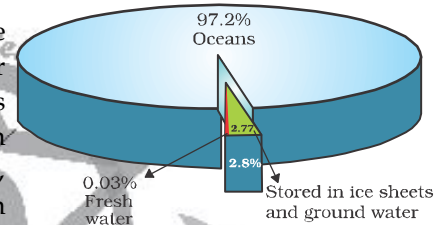
Antarctica, completely in the Southern Hemisphere, is a huge continent. The South Pole lies almost at the centre of this continent. As it is located in the South

Polar Region, it is permanently covered with thick ice sheets. There are no permanent human settlements. Many countries have research stations in Antarctica.

India also has research stations there. These are named as Maitri and Dakshin Gangotri.

Hydrosphere

The earth is called the blue planet. More than 71 percent of the earth is covered with water and 29 percent 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 icesheets and glaciers or under the ground and a very small percentage is available as fresh water for human use. Hence, despite being a 'blue planet' we face a shortage of water!!

Oceans

Oceans are the major part of hydrosphere. They are all interconnected. The ocean waters are always moving. The three chief movements of ocean waters are the waves, the tides and the ocean currents. The five major oceans are the Pacific Ocean, the Atlantic Ocean, the Indian Ocean, the Southern Ocean and the Arctic Ocean, in order of their size.

The Pacific Ocean is the largest ocean. It is spread over one-third of the earth. Mariana Trench, the deepest part of the earth, lies in the Pacific Ocean. The Pacific Ocean is almost circular in shape. Asia, Australia, North and South Americas surround it. Look at the map and find out the location of the continents around the Pacific Ocean.

The Atlantic Ocean is the second largest Ocean in the world. It is 'S' shaped. It is flanked by the North and South Americas on the western side, and Europe and Africa on the eastern side. The coastline of Atlantic Ocean is highly indented. This irregular and indented coastline provides ideal location for natural harbours and ports. From the point of view of commerce, it is the busiest Ocean.

The Indian Ocean is the only ocean named after a country, that is, India. The shape of ocean is almost triangular. In the north, it is bound by Asia, in the west by Africa and in the east by Australia.

The Southern Ocean encircles the continent of Antarctica and extends northward to 60 degrees south latitude.

The Arctic Ocean is located within the Arctic Circle and surrounds the North Pole. It is connected with the Pacific Ocean by a narrow stretch of shallow water known as Berring strait. It is bound by northern coasts of North America and Eurasia.

ATMOSPHERE

The earth is surrounded by a layer of gas called the atmosphere. This thin blanket of air is an integral and important aspect of the planet. It provides us with the air we breathe and protects us from the harmful effects of sun's rays.

The atmosphere extends up to a height of about 1,600 kilometres. The atmosphere is divided into five layers based on composition, temperature and other properties.

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These layers starting from earth's surface are called the troposphere, the stratosphere, the mesosphere, the thermosphere and the exosphere.

The atmosphere is composed mainly of nitrogen and oxygen, which make up about 99 per cent of clean, dry air. Nitrogen 78 per cent, oxygen 21 per cent and other gases like carbon dioxide, argon and others comprise 1 per cent by volume. Oxygen is the breath of life while nitrogen helps in the growth of living organisms. Carbon dioxide, though present in minute amount, is important as it absorbs heat radiated by the earth, thereby keeping the planet warm. It is also essential for the growth of plants.

The density of the atmosphere varies with height. It is maximum at the sea level and decreases rapidly as we go up. You know, the climbers experience problems in breathing due to this decrease in the density of air. They have to carry with them oxygen cylinders to be able to breathe at high altitudes. The temperature also decreases as we go upwards. The atmosphere exerts pressure on the earth. This varies from place to place. Some areas experience high pressure and some areas low pressure. Air moves from high pressure to low pressure. Moving air is known as wind.



Fig. Layers of the Atmosphere

BIOSPHERE – THE DOMAIN OF LIFE

The biosphere is the narrow zone of contact between the land, water and air. It is in this zone that life, that is unique to this planet, exists. There are several species of organisms that vary in size from microbes and bacteria to huge mammals. All the living organisms including humans are linked to each other and to the biosphere for survival.

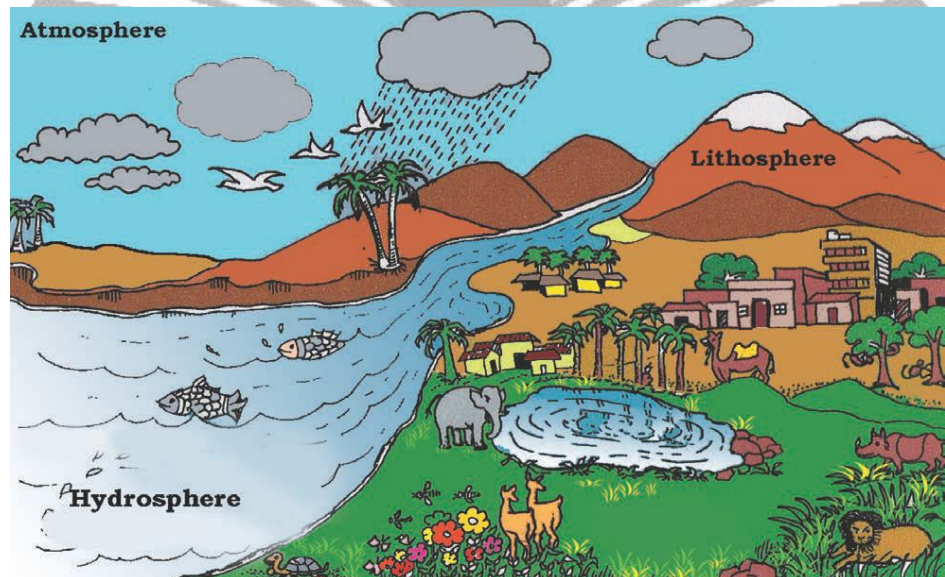


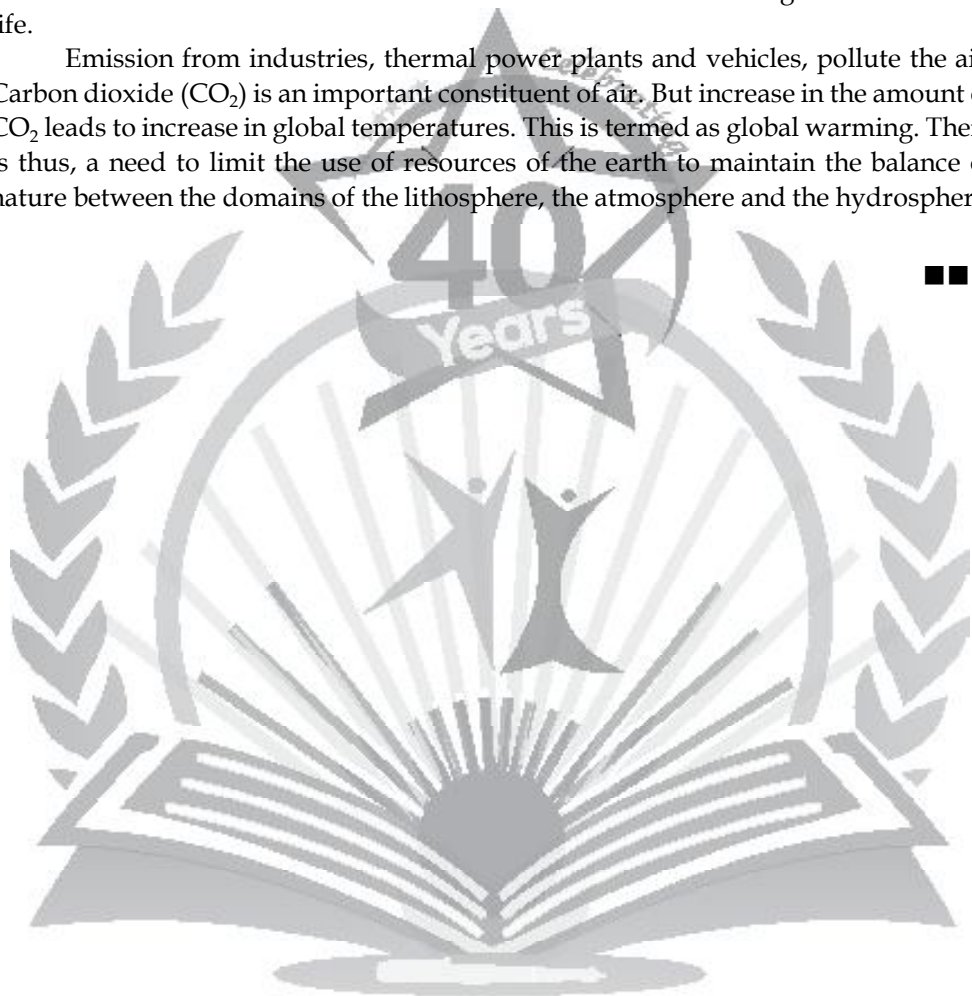
Fig. The Biosphere

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The organisms in the biosphere may broadly be divided into the plant kingdom and the animal kingdom. The three domains of the earth interact with each other and affect each other in some way or the other. For example, cutting of forests for fulfilling our needs of wood, or clearing land for agriculture may lead to fast removal of soil from slopes. Similarly earth's surface may be changed due to natural calamities like earthquakes. For example, there could be submergence

of land, as happened in the case of Tsunami recently. Parts of Andaman & Nicobar islands were submerged under water. Discharge of waste material into lakes and rivers makes the water unsuitable for human use. It also damages other forms of life.

Emission from industries, thermal power plants and vehicles, pollute the air. Carbon dioxide (CO₂) is an important constituent of air. But increase in the amount of CO₂ leads to increase in global temperatures. This is termed as global warming. There is thus, a need to limit the use of resources of the earth to maintain the balance of nature between the domains of the lithosphere, the atmosphere and the hydrosphere.



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There are three types of mountains- Fold Mountains, Block Mountains and the Volcanic Mountains. The Himalayan Mountains and the Alps are young fold 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.

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. Locate them on the world map in the atlas and find out some more examples of this type of landforms.

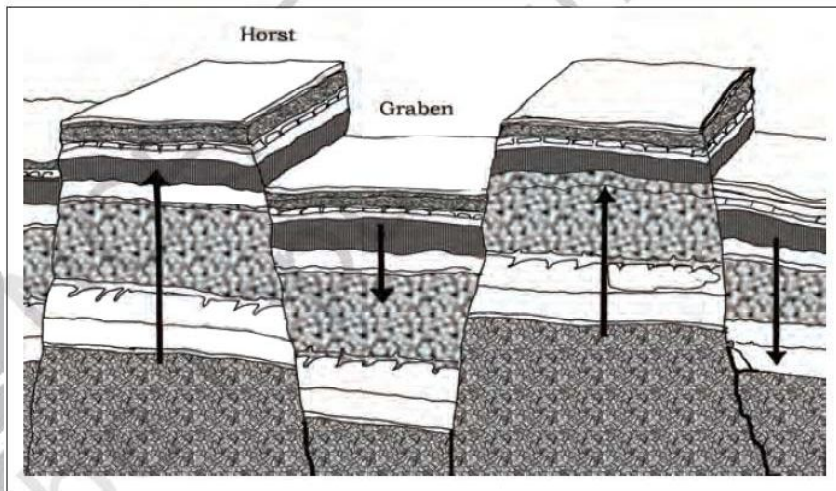


Fig. A Block Mountain

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

Mountains are very useful. The mountains are a storehouse of water. Many rivers have their source in the glaciers in the mountains. Reservoirs are made and the water is harnessed for the use of people. Water from the mountains is also used for irrigation and generation of hydro-electricity. The river valleys and terraces are ideal for cultivation of crops. Mountains have a rich variety of flora and fauna. The forests provide fuel, fodder, shelter and other products like gum, raisins, etc. Mountains provide an idyllic site for tourists. They visit the mountains for their scenic beauty. Several sports like paragliding, hang gliding, river rafting and skiing are popular in the mountains.

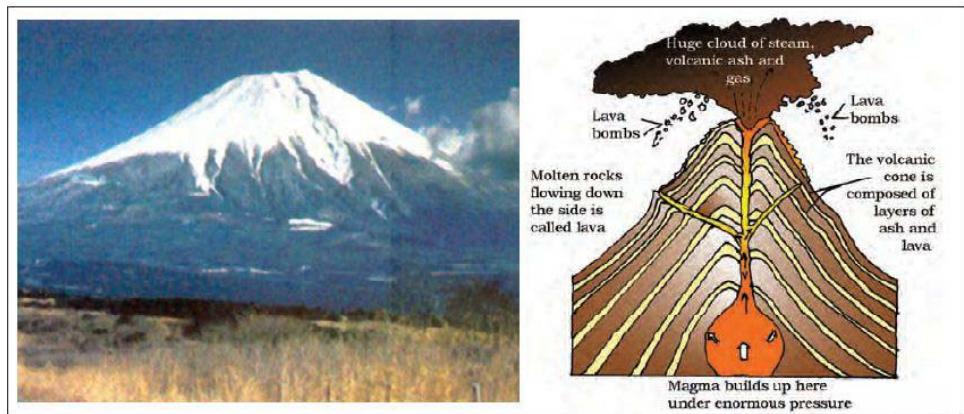


Figure : A Volcanic Mountain

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PLATEAUS

A plateau is an elevated flat land. It is a flat-topped table land standing above the surrounding area. A plateau may have one or more sides with steep slopes. The height of plateaus often varies from few hundred metres



Fig. Plateau

to several thousand metres. Plateaus, like mountains may be young or old. The Deccan plateau in India is one of the oldest 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.

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. The African plateau is famous for gold and diamond mining. In India huge reserves of iron, coal and manganese are found in the Chhotanagpur plateau.

In the plateau areas, there may be several waterfalls as the river falls from a great height. In India, the Hundru falls in the Chhotanagpur plateau on the river Subarnarekha and the Jog falls in Karnataka are examples of such waterfalls. The lava plateaus are rich in black soil that are fertile and good for cultivation. Many plateaus have scenic spots and are of great attraction to tourists.

PLAINS

Plains are large stretches of flat land. They are, generally, not more than 200 metres above mean sea level. Some plains are extremely level. Others may be slightly rolling and undulating. Most of the plains are formed by rivers and their tributaries. The rivers flow down the slopes of mountains and erode them. They carry forward the eroded material. Then they deposit their load consisting of stones, sand and silt along their courses and in their valleys. It is from these deposits that plains are formed.

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 and the Yangtze in China.

Plains are the most useful areas for human habitation. There is great concentration of people as more flat land is available for building houses, as well as for cultivation. Because of fertile soils, the land is highly productive for cultivation. In India too, the Indo-Gangetic plains are the most densely populated regions of the country.

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LANDFORMS AND THE PEOPLE

Humans have been living on different kinds of landforms in different ways. Life is difficult in mountainous areas. Plains provide much better conditions. It is easy to grow crops, build a house or a road in a plain than a mountain. Can you point out some differences in the ways people live on different kinds of landforms? Sometimes, natural calamities such as earthquakes, volcanic eruption, storms and floods cause widespread destruction. Huge loss of life and property takes place. By creative awareness about such incidences we may lower the risks. You may find out from your own surroundings in how many ways we use the land and water. Quite often we use the land in a wasteful manner, for example constructing houses on a fertile land. Similarly we throw garbage on land or in water making them dirty. We should avoid using such important gifts of nature in a careless manner. The available land is not only for our use.



Fig. Rope Bridge (Arunachal Pradesh)



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UNIT-7 : OUR COUNTRY - INDIA

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 east-west extent from Arunachal Pradesh to Kuchchh 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 is reflected in traditions that bind us as one nation. India has a population of more than one hundred twenty crores since the year 2011. It is the second most populous country of the world after China.

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

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, main land of 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 about two hours earlier in the east (Arunachal Pradesh) than in the west (Gujarat). You have already 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.

Important Facts?

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 seven and six time zones respectively. Do you remember how many time zones are there in Russia?

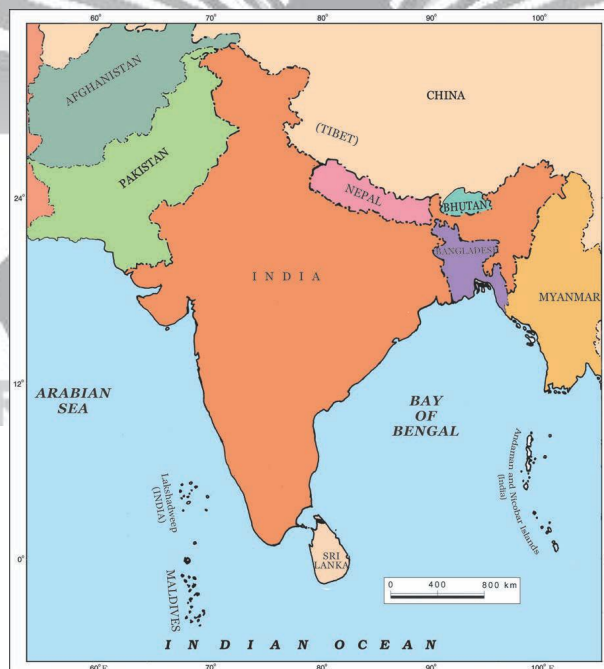


Fig. India and its neighbouring countries

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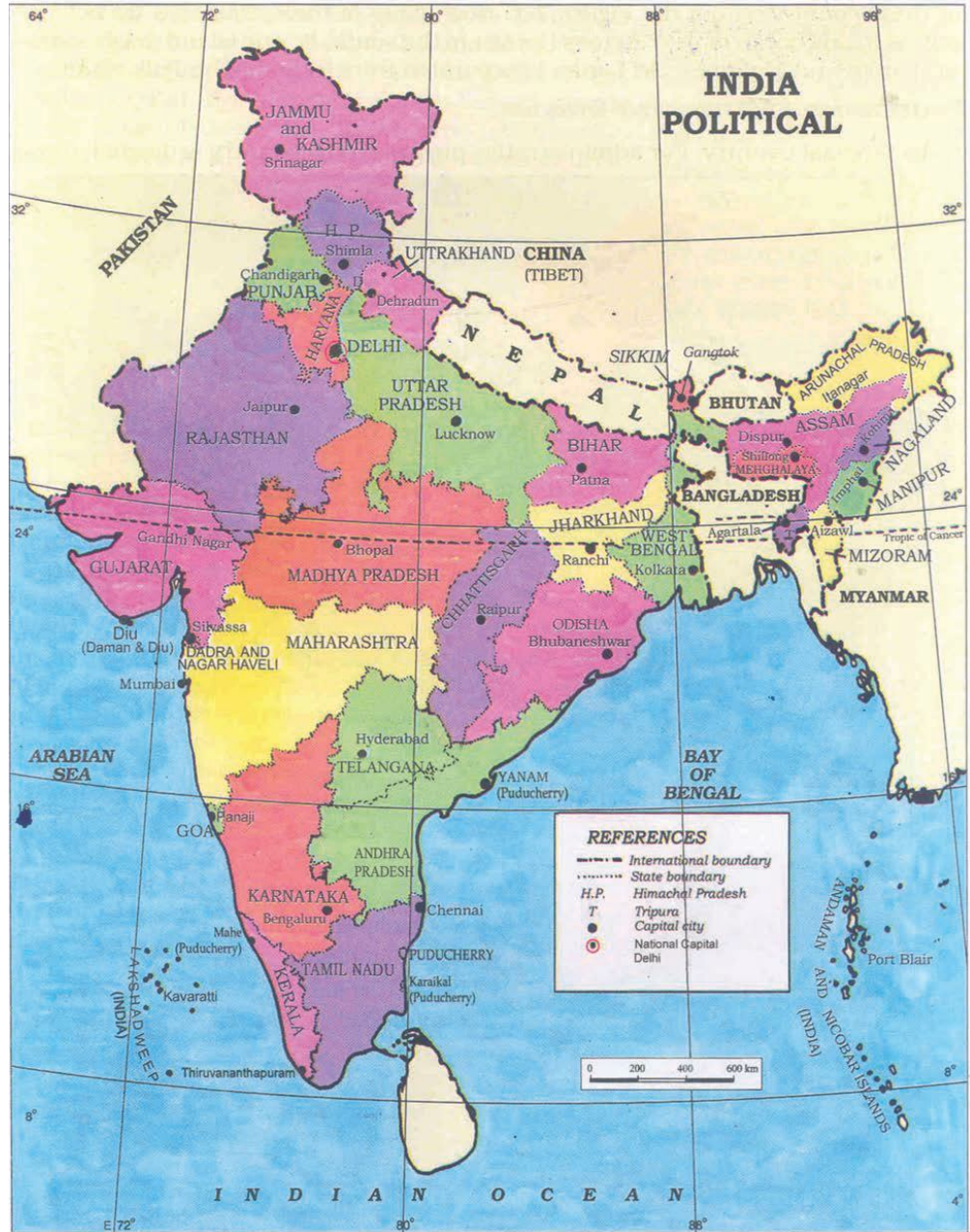


Fig. Political map of India

* Telangana became 29th state of India in June 2014

INDIA'S NEIGHBOURS

There are seven countries that share land boundaries with India. 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 29 States and 7 Union Territories (Appendix-I). Telangana became the 29th state of India on 2 June 2014. It was previously a part of Andhra Pradesh. 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.

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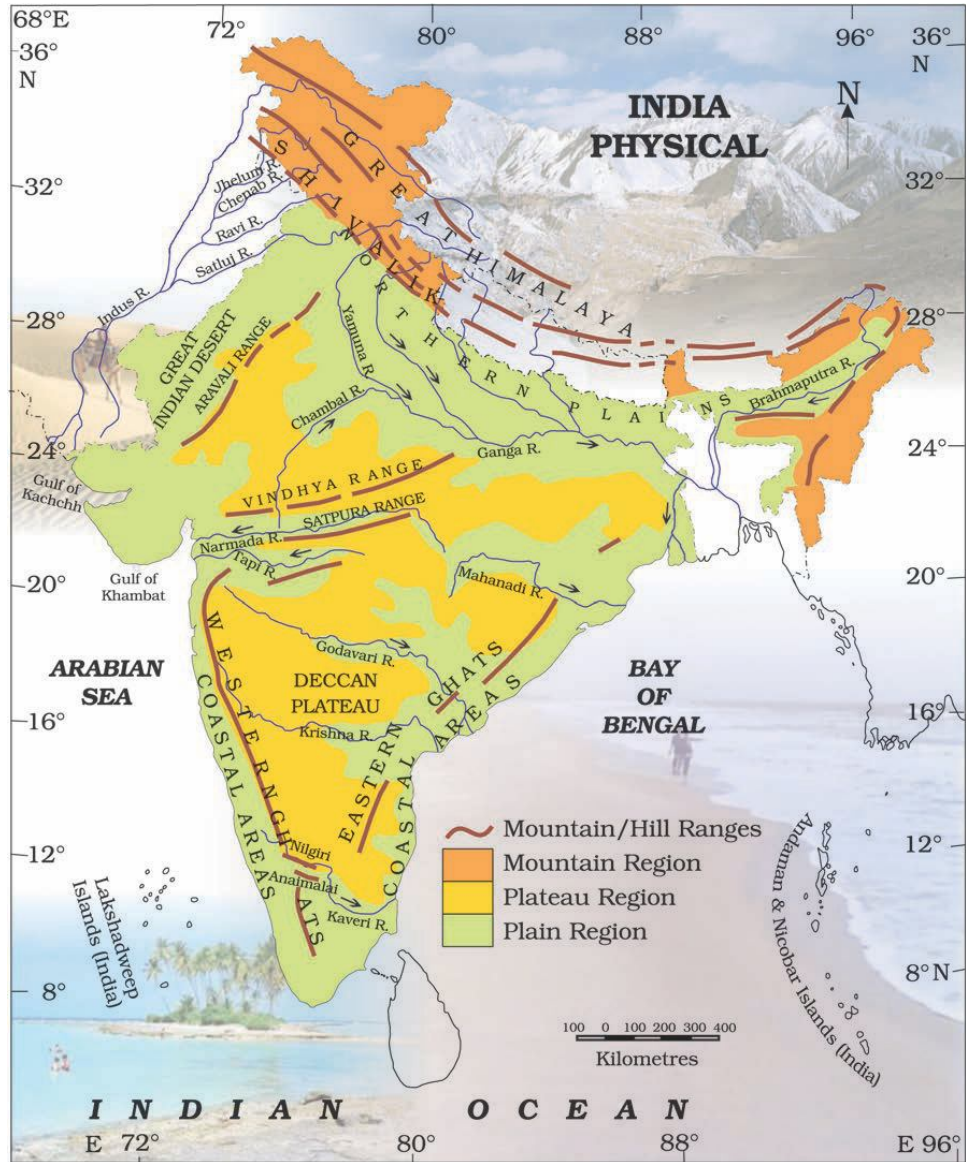


Fig. India : Physical Divisions

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 mean '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 Himachal lies to the south of Himadri. Many popular hill stations are situated here. Find out the names of five hill stations. The Shiwalik is the southernmost range.

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 a main river by discharging it into main river from either side

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.

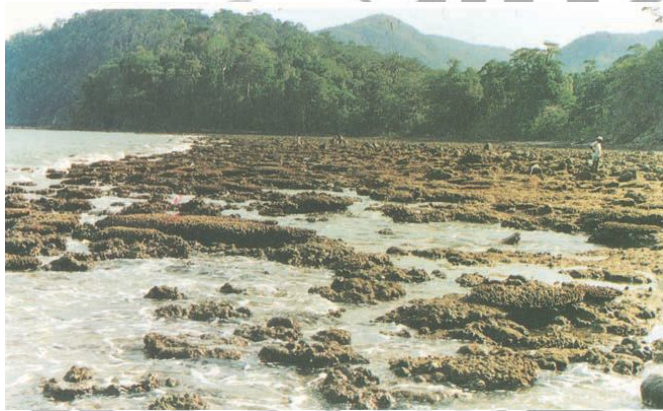
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In the western part of India lies the Great Indian desert. It is a dry, hot and sandy stretch of land. It has very little vegetation.

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 hills, one of the oldest ranges of the world, border 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 Ghat or Sahyadris border the plateau in the west and the Eastern Ghats provide 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.

Do you know?

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



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. shows Coral islands.

Figure 7.4 Coral Islands

To the West of the Western Ghats and 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 mouth. The Sunderban delta is formed where the Ganga and Brahmaputra flow into the Bay of Bengal.

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 speaking to people how in different ways people faced this challenge when Tsunami struck the Indian coast. Tsunami is a huge sea wave generated due to an earthquake on the sea floor.

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UNIT-8 : India : Climate, Vegetation and Wildlife

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 continuously 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, 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 Arabian Sea and Bay of Bengal towards the land. They carry moisture with them. When these winds strike the mountain barriers, rainfall occurs.

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.

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

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

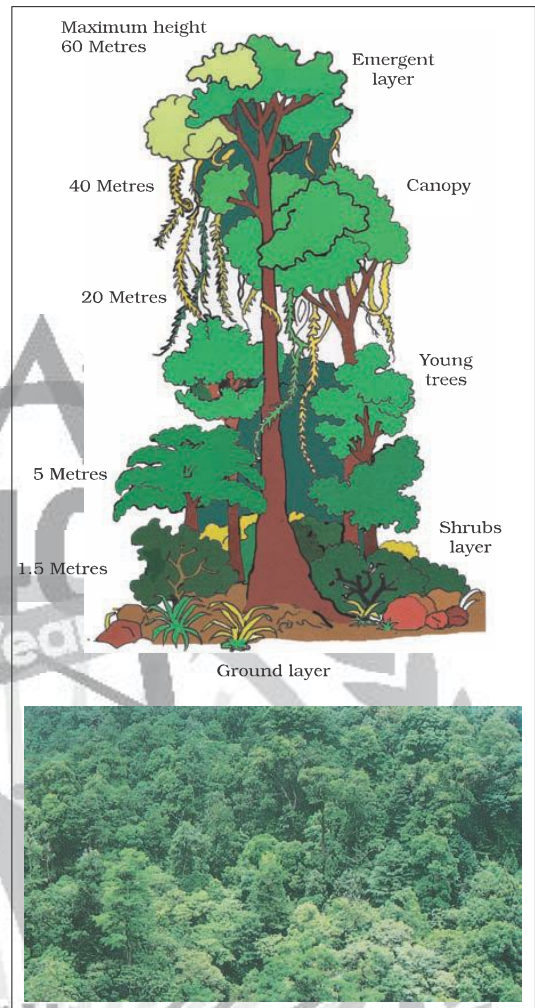


Figure : Tropical Rain Forests

Tropical Deciduous Forests

In a large part of our country we have this type of forest. 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, Odisha, and in parts of Maharashtra.

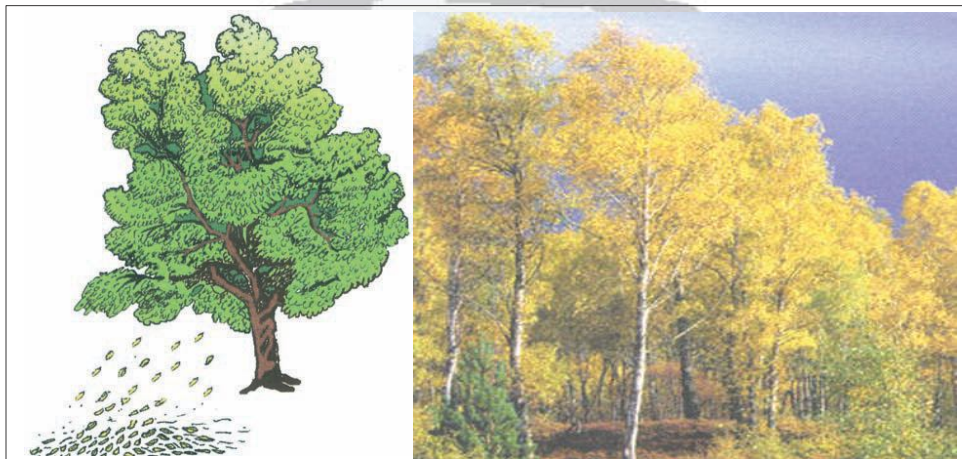


Figure : Tropical Deciduous Forests

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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.

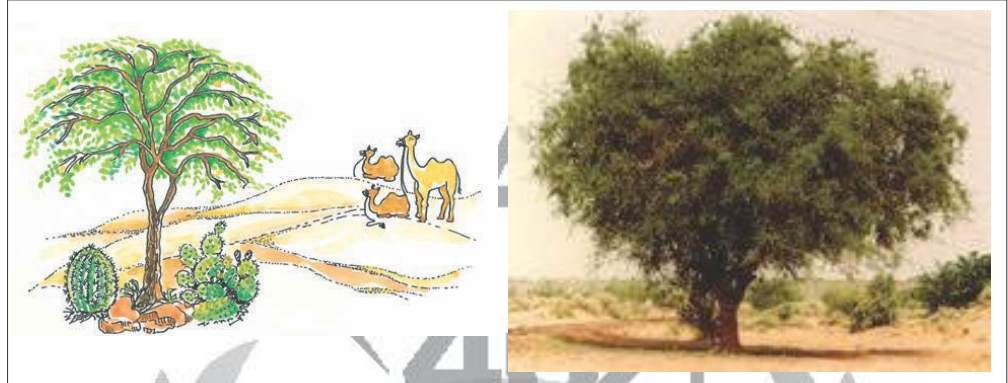


Figure : Thorny Bushes

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.



Figure : 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.

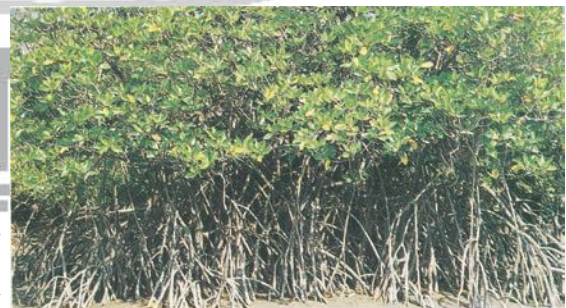


Figure : Mangrove Vegetation

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.

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Forests provide us with timber for furniture, fuel wood, fodder, medicinal plants and herbs, lac, honey, gum, etc.

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.

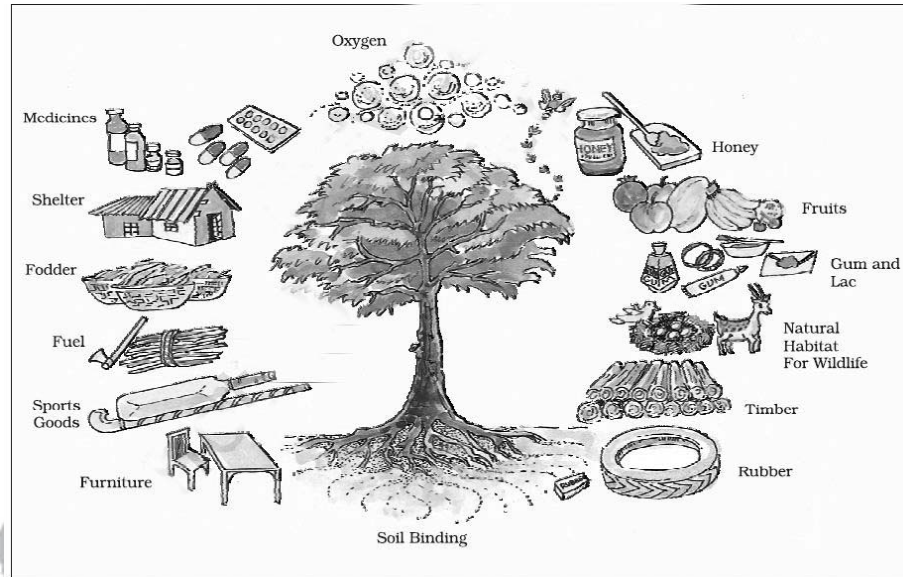


Fig. What we get from forests

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.

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 Kuchchh respectively. 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.

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.

There are several 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?

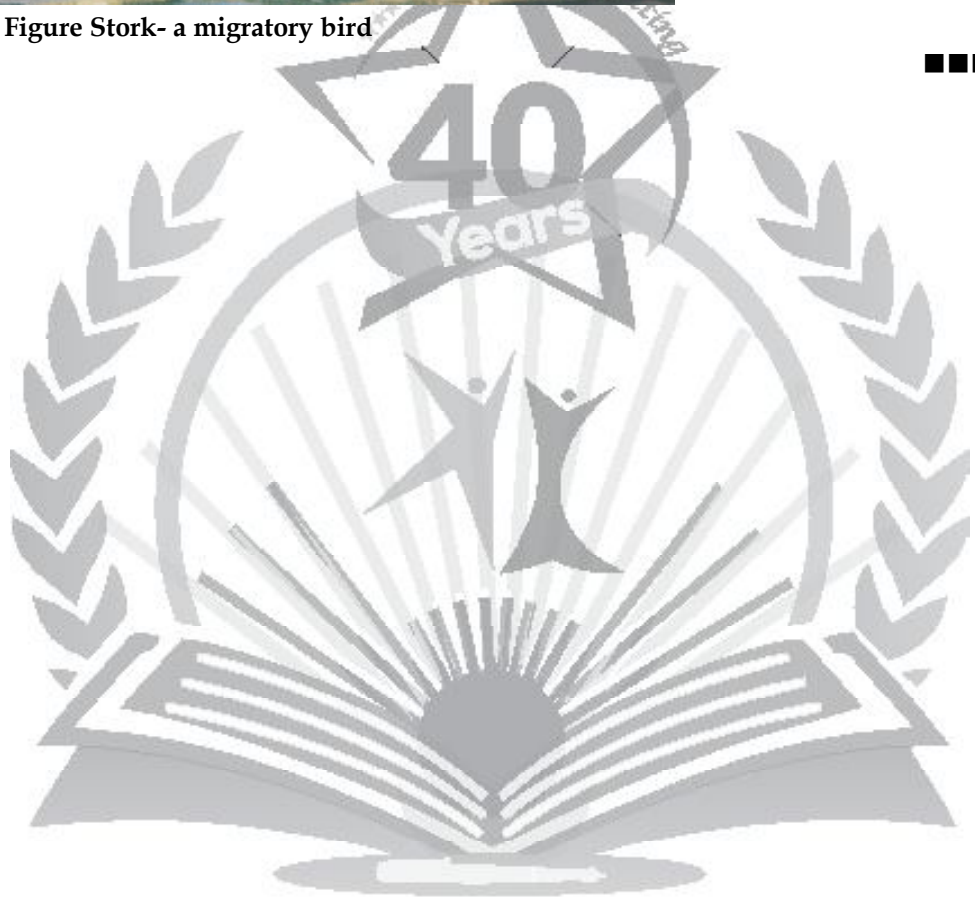
You can also contribute in conserving wildlife. You can refuse to buy things made from parts of the bodies of animals such as their bones, horns, fur, skins, and feathers. Every year we observe wildlife week in the first week of October, to create awareness of conserving the habitats of the animal kingdom.

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Migratory Birds
Some birds such as the Pelican, Siberian Crane, Stork, Flamingo, Pintail Duck and Curlew migrate to our country in the winter season every year. Siberian Cranes migrate from Siberia. They arrive in December and Stay till early March.

Figure Stork- a migratory bird



KOTHARI
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NOTES

State and Union Territories of India

| State | Capital | Union Territory | Capital |
|-------------------|--------------------|-------------------------------------|------------|
| Andhra Pradesh | Hyderabad | Andaman and Nicobar Islands | Port Blair |
| Arunachal Pradesh | Itanagar | Chandigarh | Chandigarh |
| Assam | Dispur | Dadra & Nagar Haveli | Silvassa |
| Bihar | Patna | Daman & Diu | Daman |
| Chhattisgarh | Raipur | Lakshadweep | Kavaratti |
| Goa | Panaji | Puducherry | Puducherry |
| Gujarat | Gandhi Nagar | National Capital Territory of Delhi | Delhi |
| Haryana | Chandigarh | Jammu & Kashmir | Srinagar |
| Himachal Pradesh | Shimla | | |
| Jharkhand | Ranchi | | |
| Karnataka | Bengaluru | | |
| Kerala | Thiruvananthapuram | | |
| Madhya Pradesh | Bhopal | | |
| Maharashtra | Mumbai | | |
| Manipur | Imphal | | |
| Meghalaya | Shillong | | |
| Mizoram | Aizawl | | |
| Nagaland | Kohima | | |
| Odisha | Bhubaneswar | | |
| Punjab | Chandigarh | | |
| Rajasthan | Jaipur | | |
| Sikkim | Gangtok | | |
| Tamil Nadu | Chennai | | |
| Telangana | Hyderabad | | |
| Uttarakhand | Dehradun | | |
| Uttar Pradesh | Lucknow | | |
| Tripura | Agartala | | |
| West Bengal | Kolkata | | |

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NOTES

UNIT-9 : Environment

Environment is our basic life support system. It provides the air we breath, the water we drink, the food we eat and the land where we live.

How do human beings modify this natural environment? The car fumes pollute the air, water is collected in a pot, food is served in vessels and land is used to build factories.



Human beings make cars, mills, factories and manufacture containers. This is how human beings modify natural environment.

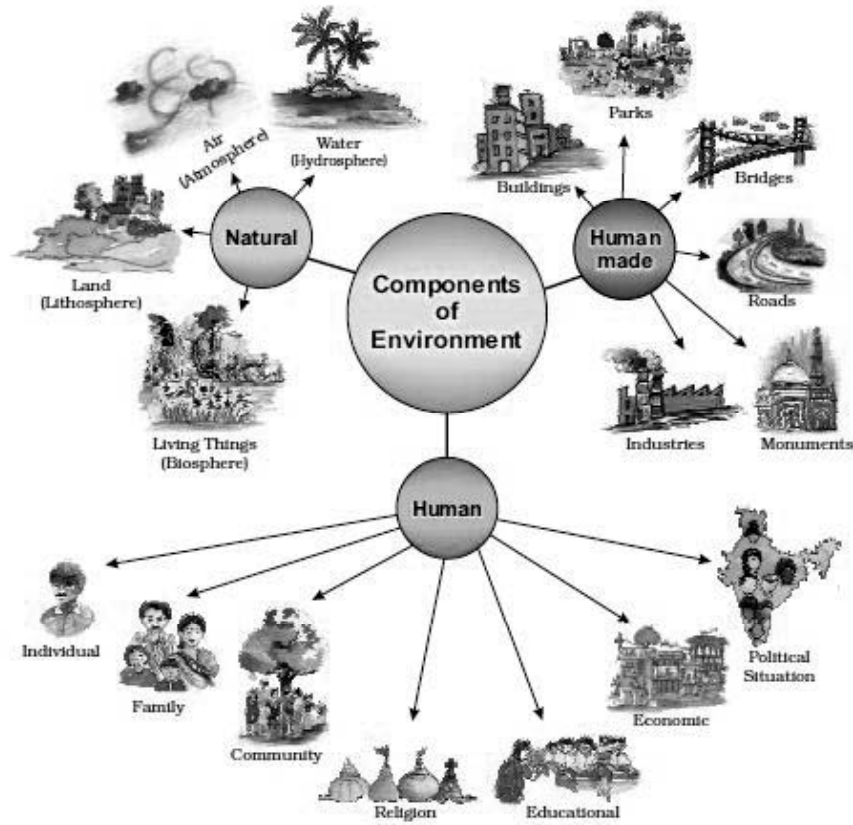


Fig. Components of Environment

The place, people, things and nature that surround any living organism is called environment. It is a combination of natural and human made phenomena. While the natural environment refers to both biotic and abiotic conditions existing on the earth, human environment reveals the activities, creations and interactions among human beings

Biotic : The world of living organisms. e.g. plants and animals
Abiotic : The world of non-living elements. e.g. land.

Natural Environment

Land, water, air, plants and animals comprise the natural environment.

Lithosphere is the solid crust or the hard top layer of the earth. It is made up of rocks and minerals and covered by a thin layer of soil. It is an irregular surface with various landforms such as mountains, plateaus, plains, valleys, etc. Landforms are found over the continents and also on the ocean floors.

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Lithosphere is the domain that provides us forests, grasslands for grazing, land for agriculture and human settlements. It is also a source of mineral wealth.

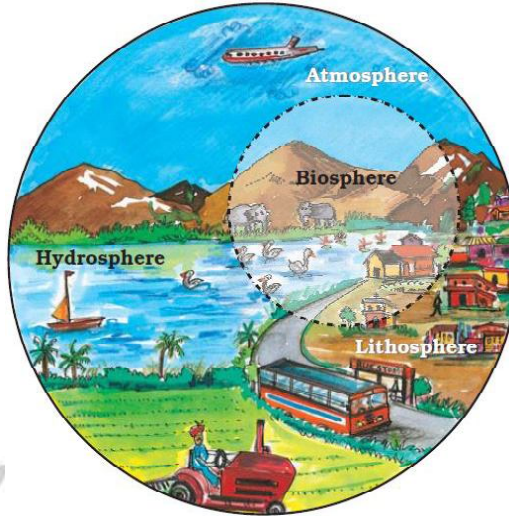


Fig. : Domains of the Environment

The domain of water is referred to as hydrosphere. It comprises various sources of water and different types of water bodies like rivers, lakes, seas, oceans, etc. It is essential for all living organisms.

The atmosphere is the thin layer of air that surrounds the earth. The gravitational force of the earth holds the atmosphere around it. It protects us from the harmful rays and scorching heat of the sun. It consists of a number of gases, dust and water vapour. The changes in the atmosphere produce changes in the weather and climate.

Plant and animal kingdom together make biosphere or the living world. It is a narrow zone of the earth where land, water and air interact with each other to support life.

All plants, animals and human beings depend on their immediate surroundings. Often they are also interdependent on each other. This relation between the living organisms, as well as the relation between the organisms and their surroundings form an ecosystem. There could be an ecosystem of large rain forest, grassland, desert, mountains, lake, river, ocean and even a small pond.

Human Environment

Human beings interact with the environment and modify it according to their need. Early humans adapted themselves to the natural surroundings. They led a simple life and fulfilled their requirements from the nature around them. With time needs grew and became more varied. Humans learn new ways to use and change environment. They learn to grow crops, domesticate animals and lead a settled life. The wheel was invented, surplus food was produced, barter system emerged, trade started and commerce developed. Industrial revolution enabled large scale production. Transportation became faster. Information revolution made communication easier and speedy across the world.

A perfect balance is necessary between the natural and human environment. Humans must learn to live and use their environment in a harmonious way.

Important Terms
Ecosystem : It is a system formed by the interaction of all living organisms with each other and with the physical and chemical factors of the environment in which they live, all linked by transfer of energy and material.



NOTES

UNIT-10 : International Structure of The Earth

Interior of The Earth

Just like an onion, the earth is made up of several concentric layers with one inside another. The uppermost layer over the earth's surface is called the crust. It is the thinnest of all the layers. It is about 35 km. on the continental masses and only 5 km. on the ocean floors.

The main mineral constituents of the continental mass are silica and alumina. It is thus called sial (si-silica and al-alumina). The oceanic crust mainly consists of silica and magnesium; it is therefore called sima (si-silica and ma-magnesium)

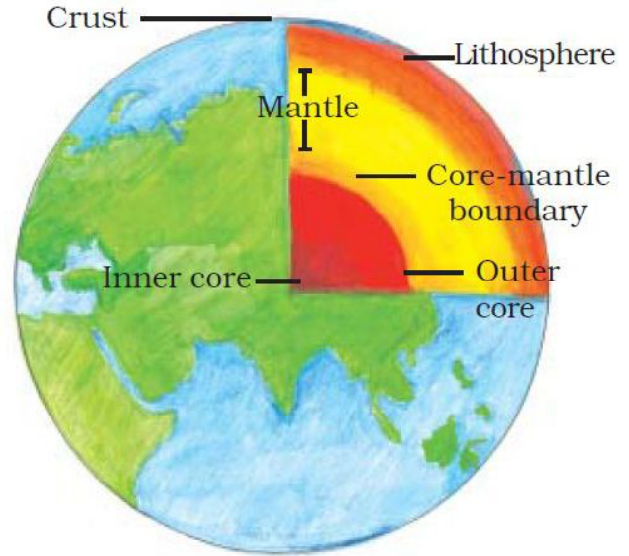


Fig.: Interior of the Earth

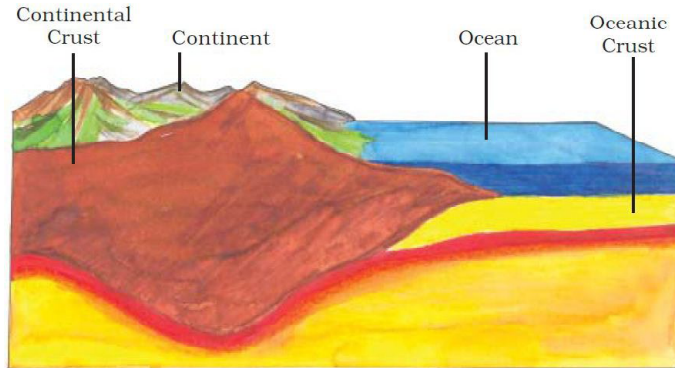


Fig. : Continental Crust and Oceanic Crust

Just beneath the crust is the mantle which extends up to a depth of 2900 km. below the crust.

The inner-most layer is the core with a radius of about 3500 km. It is mainly made up of nickel and iron and is called nife (ni - nickel and fe - ferrous i.e. iron). The central core has very high temperature and pressure.

Rocks and Minerals

The earth's crust is made up of various types of rocks. Any natural mass of mineral matter that makes up the earth's crust is called a rock. Rocks can be of different colour, size and texture.

There are three major types of rocks: igneous rocks, sedimentary rocks and metamorphic rocks.

When the molten magma cools, it becomes solid. Rocks thus formed are called igneous rocks. They are also called primary rocks. There are two types of igneous rocks: intrusive rocks and extrusive rocks.

Lava is actually fiery red molten magma coming out from the interior of the earth on its surface. When this molten lava comes on the earth's surface, it rapidly cools down and becomes

Important Terms

- The deepest mine in the world, is in South Africa. It is about 4 km. deep. In search for oil engineers have dug a hole about 6 km. deep.
- To reach to the centre of the earth (which is not possible!) you will have to dig a hole 6000 km. deep on the ocean floor.

Do You Know?

- The crust forms only 0.5 per cent of the volume of the earth, 16 per cent consists of the mantle and 83 per cent makes the core.
- The radius of the earth is 6371 km.

Important Terms

Fossils : The remains of the dead plants and animals trapped in the layers of rocks are called fossils.

NOTES

solid. Rocks formed in such a way on the crust are called extrusive igneous rocks. They have a very fine grained structure. For example, basalt. The Deccan plateau is made up of basalt rocks. Sometimes the molten magma cools down deep inside the earth's crust. Solid rocks so formed are called intrusive igneous rocks. Since they cool down slowly they form large grains. Granite is an example of such a rock. Grinding stones used to prepare paste/powder of spices and grains are made of granite.



Fig. : Sedimentary rock turned into a Metamorphic rock

Rocks roll down, crack, and hit each other and are broken down into small fragments. These smaller particles are called sediments. These sediments are transported and deposited by wind, water, etc. These loose sediments are compressed and hardened to form layers of rocks. These types of rocks are called sedimentary rocks. For example, sandstone is made from grains of sand. These rocks may also contain fossils of plants, animals and other microorganisms that once lived on them.

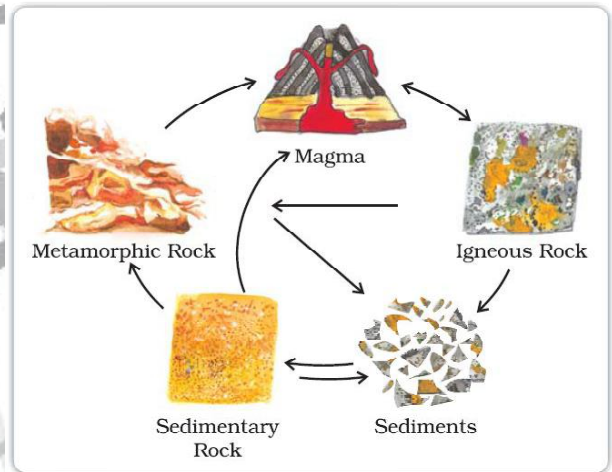


Fig. : Rock Cycle

Igneous and sedimentary rocks can change into metamorphic rocks under great heat and pressure (Fig. 2.3). For example, clay changes into slate and limestone into marble.

Rocks are very useful to us. The hard rocks are used for making roads, houses and buildings.

One type of rock changes to another type under certain conditions in a cyclic manner. This process of transformation of the rock from one to another is known as the rock cycle. You have already learnt when the molten magma cools; it solidifies to become igneous rock. These igneous rocks are broken down into small particles that are transported and deposited to form sedimentary rocks. When the igneous and sedimentary rocks are subjected to heat and pressure they change into metamorphic rocks. The metamorphic rocks which are still under great heat and pressure melt down to form molten magma. This molten magma again can cool down and solidify into igneous rocks.

Rocks are made up of different minerals. Minerals are naturally occurring substances which have certain physical properties and definite chemical composition. Minerals are very important to humankind. Some are used as fuels. For example, coal, natural gas and petroleum. They are also used in industries – iron, aluminium, gold, uranium, etc, in medicine, in fertilisers, etc.



NOTES

UNIT-11 : Our Changing Earth

The lithosphere is broken into a number of plates known as the Lithospheric plates. You will be surprised to know that these plates move around very slowly – just a few millimetres each year. This is because of the movement of the molten magma inside the earth. The molten magma inside the earth moves in a circular manner as shown in the activity.

Lithospheric plates
The earth's crust consists of several large and some small, rigid, irregularly shaped plates (slabs) which carry continents and the ocean floor.

The movement of these plates causes changes on the surface of the earth. The earth movements are divided on the basis of the forces which cause them. The forces which act in the interior of the earth are called as Endogenic forces and the forces that work on the surface of the earth are called as Exogenic forces.

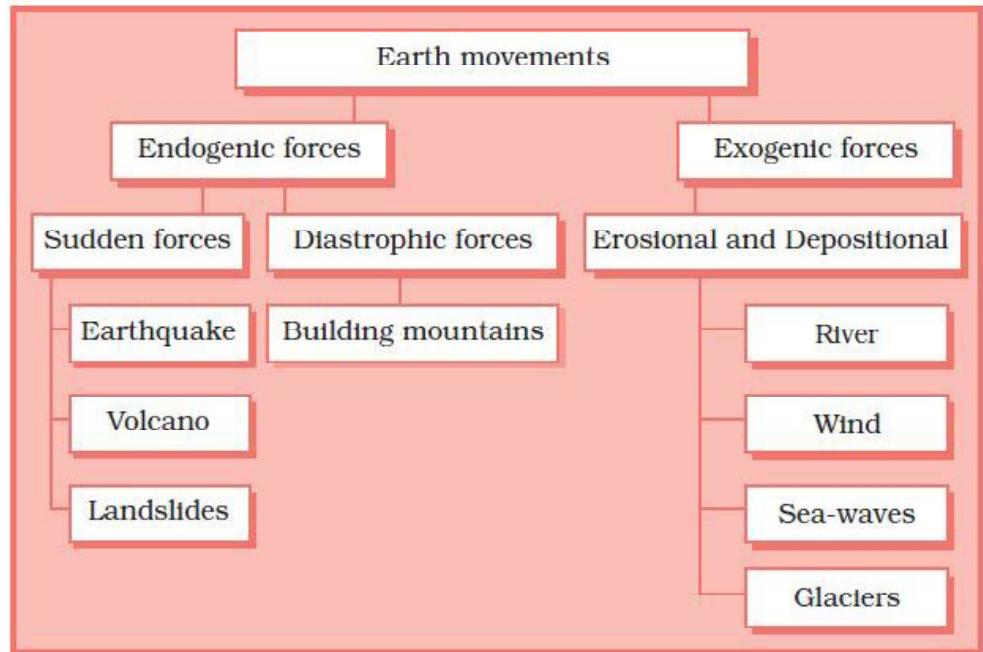


Fig. : Evolution of Landforms

Endogenic forces sometimes produce sudden movements and at the other times produce slow movements. Sudden movements like earthquakes and volcanoes cause mass destruction over the surface of the earth.

A volcano is a vent (opening) in the earth's crust through which molten material erupts suddenly.

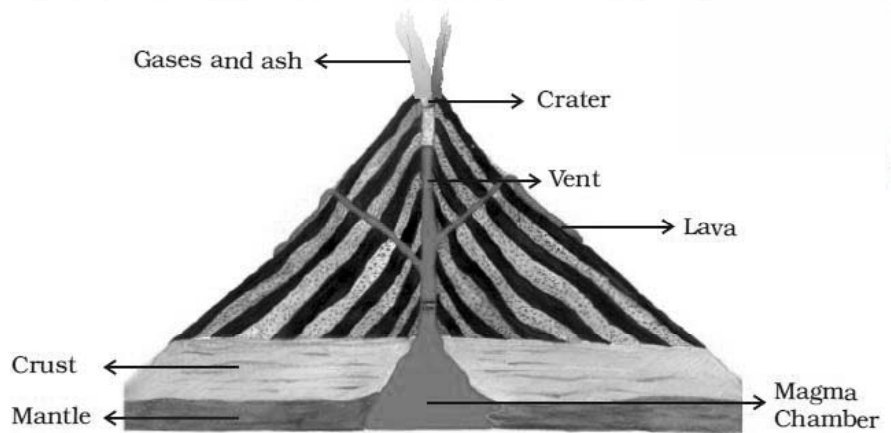


Fig. : A Volcano

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Similarly, when the Lithospheric plates move, the surface of the earth vibrates. The vibrations can travel all round the earth. These vibrations are called earthquakes. The place in the crust where the movement starts is called the focus. The place on the surface above the focus is called the epicentre. Vibrations travel outwards from the epicentre as waves. Greatest damage is usually closest to the epicentre and the strength of the earthquake decreases away from the centre.

Do you know?
 There are three types of earthquake waves.
 1. P waves or longitudinal waves
 2. S waves or transverse waves
 3. L waves or surface waves

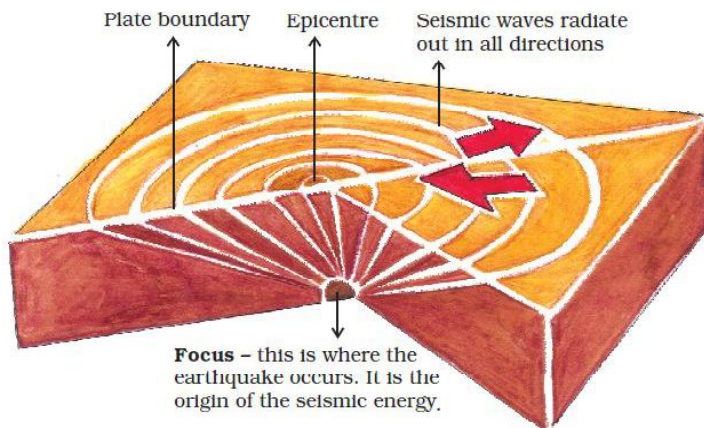


Fig. 3.3: Origin of an Earthquake

Try to find out the properties of these waves from an encyclopedia.

Although earthquakes cannot be predicted, the impact can certainly be minimised if we are prepared before-hand.

Some common earthquake prediction methods adopted locally by people include studying animal behaviour; fish in the ponds get agitated, snakes come to the surface.

Earthquake Preparedness

Where to take shelter during an earthquake-

Safe Spot : Under a kitchen counter, table or desk, against an inside corner or wall.

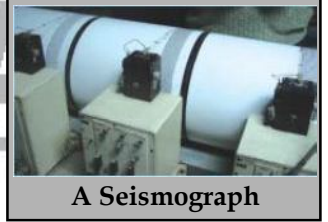
Stay Away from : Fire places, areas around chimneys, windows that shatter including mirrors and picture frames.

Be Prepared : Spread awareness amongst your friends and family members and face any disaster confidently.

MAJOR LAND FORMS

The landscape is being continuously worn away by two processes - weathering and erosion. Weathering is the breaking up of the rocks on the earth's surface. Erosion is the wearing away of the landscape by different agents like water, wind and ice. The eroded material is carried away or transported by water, wind, etc. and eventually deposited. This process of erosion and deposition create different landforms on the surface of the earth.

Do you know?
 An earthquake is measured with a machine called a seismograph. The magnitude of the earthquake is measured on the Richter scale. An earthquake of 2.0 or less can be felt only a little. An earthquake over 5.0 can cause damage from things falling. A 6.0 or higher magnitude is considered very strong and 7.0 is classified as a major earthquake.



A Seismograph

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Work of a River

The running water in the river erodes the landscape. When the river tumbles at steep angle over very hard rocks

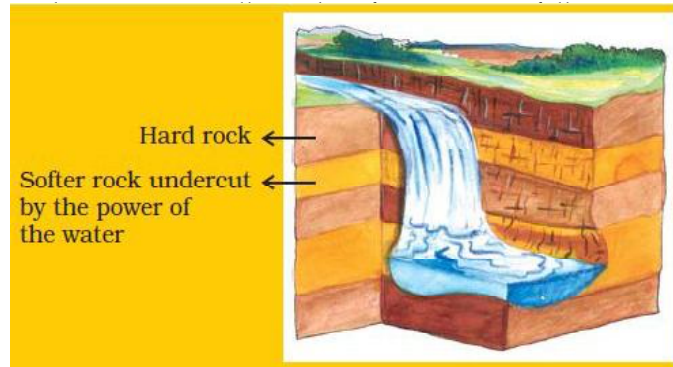


Fig. : Waterfall

As the river enters the plain it twists and turns forming large bends known as meanders. Due to continuous erosion and deposition along the sides of the meander, the ends of the meander loop come closer and closer. In due course of time the meander loop cuts off from the river and forms a cut-off lake, also called an ox-bow lake. At times the river overflows its banks. This leads to the flooding of the neighbouring areas. As it floods, it deposits layers of fine soil and other material called sediments along its banks. This leads to the formation of a flat fertile floodplain. The raised banks are called levees. As the river approaches the sea, the speed of the flowing water decreases and the river begins to break up into a number of streams called distributaries. The river becomes so slow that it begins to deposit its load. Each distributary forms its own mouth. The collection of sediments from all the mouths forms a delta.

Important Facts

There are thousands of small waterfalls in the world. The highest waterfall is Angel Falls of Venezuela in South America. The other waterfalls are Niagara falls located on the border between Canada and USA in North America and Victoria Falls on the borders of Zambia and Zimbabwe in Africa.



A Seismograph

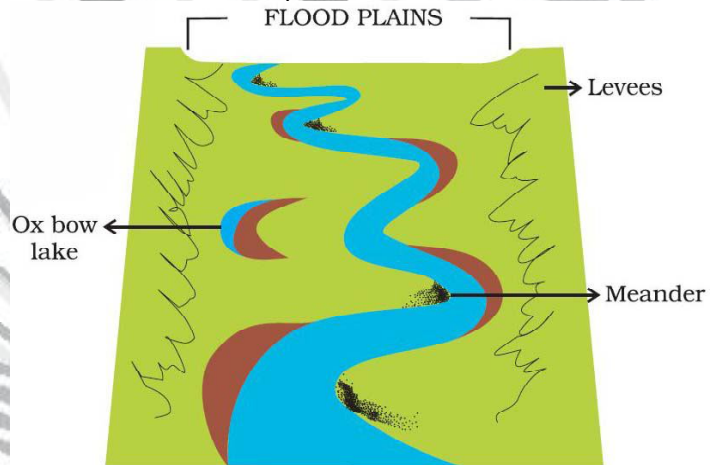


Fig. : Features made by a river in a flood plain

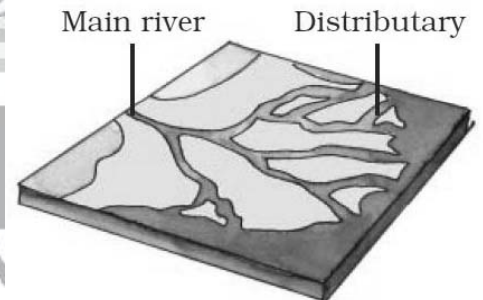


Fig. : Delta

Work of Sea Waves

The erosion and deposition of the sea waves gives rise to coastal landforms. Seawaves continuously strike at the rocks. Cracks develop. Over time they become larger and wider. Thus, hollow like caves are formed on the rocks. They are called sea caves. As these cavities become bigger and bigger only the roof of the caves remain, thus forming sea arches. Further, erosion breaks the roof and only walls are left. These

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wall like features are called stacks. The steep rocky coast rising almost vertically above sea water is called sea cliff. The sea waves deposit sediments along the shores forming beaches.

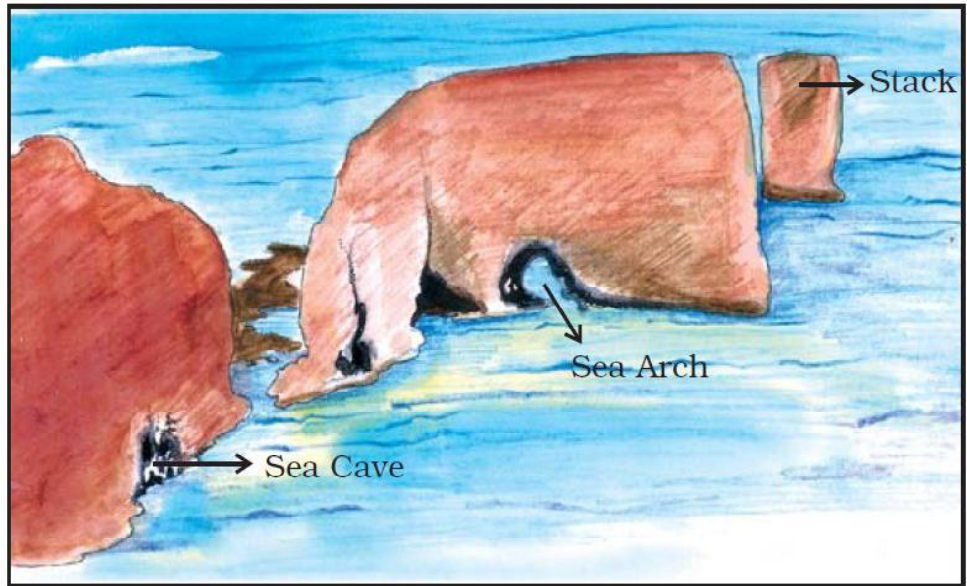


Fig. : Features made by sea waves

Work of Ice

Glaciers are “rivers” of ice which too erode the landscape by bulldozing soil and stones to expose the solid rock below. Glaciers carve out deep hollows. As the ice melts they get filled up with water and become beautiful lakes in the mountains. The material carried by the glacier such as rocks big and small, sand and silt gets deposited. These deposits form glacial moraines.



Fig. : Glacier

NOTES

Work of wind

An active agent of erosion and deposition in the deserts is wind. In deserts you can see rocks in the shape of a mushroom, commonly called mushroom rocks. Winds erode the lower section of the rock more than the upper part. Therefore, such rocks have narrower base and wider top. When the wind blows, it lifts and transports sand from one place to another. When it stops blowing the sand falls and gets deposited in low hill - like structures. These are called sand dunes (Fig. 3.9). When the grains of sand are very fine and light, the wind can carry it over very long distances. When such sand is deposited in large areas, it is called loess. Large deposits of loess is

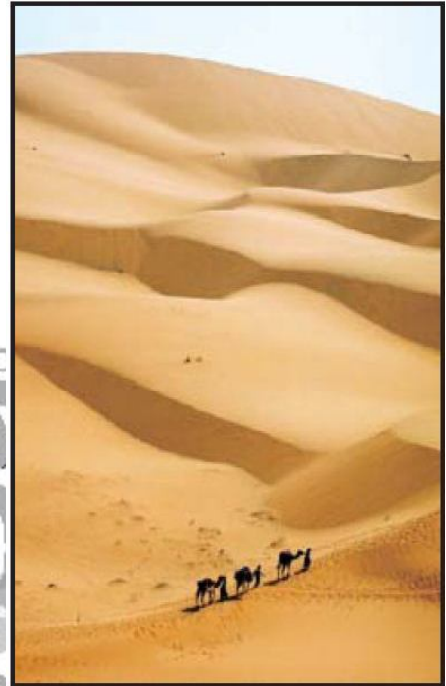





Fig. : Sand Dunes

Features Made by a River

| Photograph | Name of the Feature | Type (Erosional or Depositional or Both) |
|---|---------------------|--|
|  | Waterfall | Erosion |
|  | Meanders | Both erosion and deposition |
|  | Flood Plain | Deposition |



UNIT-12 : Air

NOTES

Our earth is surrounded by a huge blanket of air called atmosphere. All living beings on this earth depend on the atmosphere for their survival. It provides us the air we breathe and protects us from the harmful effects of the sun's rays. Without this blanket of protection, we would be baked alive by the heat of the sun during day and get frozen during night. So it is this mass of air that has made the temperature on the earth liveable.

Composition of The Atmosphere

The air we take in while breathing is actually a mixture of many gases? Nitrogen and oxygen are two gases which make up the bulk of the atmosphere. Carbon dioxide, helium, ozone, argon and hydrogen are found in lesser quantities. Apart from these gases, tiny dust particles are also present in the air. Nitrogen

is the most plentiful gas in the air. When we inhale, we take

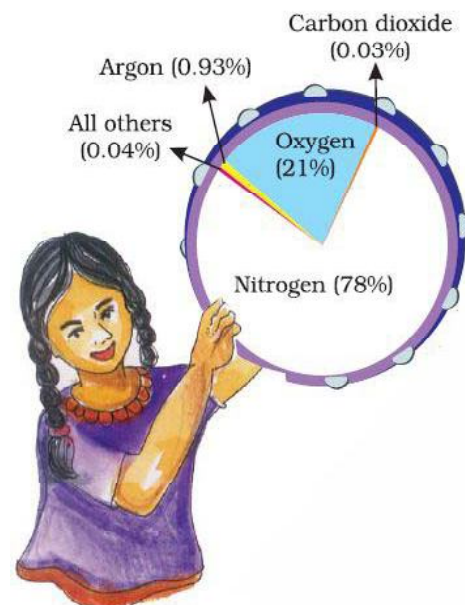


Fig. Constituents of Air

some amount of nitrogen into our lungs and exhale it. But plants need nitrogen for their survival. They can not take nitrogen directly from the air. Bacteria, that live in the soil and roots of some plants, take nitrogen from the air and change its form so that plants can use it.

Oxygen is the second most plentiful gas in the air. Humans and animals take oxygen from the air as they breathe. Green plants produce oxygen during photosynthesis. In this way oxygen content in the air remains constant. If we cut trees then this balance gets disturbed.

Carbon dioxide is another important gas. Green plants use carbon dioxide to make their food and release oxygen. Humans or animals release carbon dioxide. The amount of carbon dioxide released by humans or animals seems to be equal to the amount used by the plants which make a perfect balance. However, the balance is upset by burning of fuels, such as coal and oil. They add billions of tons of carbon dioxide into the atmosphere each year. As a result, the increased volume of carbon dioxide is affecting the earth's weather and climate.

Structure of The Atmosphere

Our atmosphere is divided into five layers starting from the earth's surface. These are Troposphere, Stratosphere, Mesosphere, Thermosphere and Exosphere.

Important Facts

Carbon dioxide released in the atmosphere creates a green house effect by trapping the heat radiated from the earth. It is therefore called a greenhouse gas and without it the earth would have been too cold to live in.

However, when its level in the atmosphere increases due to factory smoke or car fumes, the heat retained increases the temperature of the earth. This is called global warming. This rise in temperature causes the snow in coldest parts of the world to melt. As a result the sea level rises, causing floods in the coastal areas.

There may be drastic changes in the climate of a place leading to extinction of some plants and animals in the long run.

Important Facts

When air is heated, it expands, becomes lighter and goes up.

Cold air is denser and heavy. That is why it tends to sink down.

When hot air rises, cold air from surrounding area rushes there to fill in the gap. That is how air circulation takes place.

NOTES

Troposphere : This layer is the most important layer of the atmosphere. Its average height is 13 km. The air we breathe exists here. Almost all the weather phenomena like rainfall, fog and hailstorm occur in this layer.

Stratosphere : Above the troposphere lies the stratosphere. It extends up to a height of 50 km. This layer is almost free from clouds and associated weather phenomenon, making conditions most ideal for flying aeroplanes. One important feature of stratosphere is that it contains a layer of ozone gas. We have just learnt how it protects us from the harmful effect of the sun rays.

Mesosphere : This is the third layer of the atmosphere. It lies above the stratosphere. It extends up to the height of 80 km. Meteorites burn up in this layer on entering from the space.

Thermosphere : In thermosphere temperature rises very rapidly with increasing height. Ionosphere is a part of this layer. It extends between 80-400 km. This layer helps in radio transmission. In fact, radio waves transmitted from the earth are reflected back to the earth by this layer.

Exosphere : The upper most layer of the atmosphere is known as exosphere. This layer has very thin air. Light gases like helium and hydrogen float into the space from here.

Weather and Climate

“Is it going to rain today?” “Will it be bright and sunny today?” How many times have we heard this from anxious cricket fans speculating the fate of a One Day match? If we imagine our body to be a radio and the mind its speaker, weather is something that fiddles with its control knobs. Weather is this hour-to-hour, day to day condition of the atmosphere. A hot or humid weather may make one irritable. A pleasant, breezy weather may make one cheerful and even plan for an outing. Weather can change dramatically from day to day. However, the average weather condition of a place for a longer period of time represents the climate of a place.

Temperature

The temperature you feel everyday is the temperature of the atmosphere. The degree of hotness and coldness of the air is known as temperature.

The temperature of the atmosphere changes not only between day and night but also from season to season. Summers are hotter than winters.

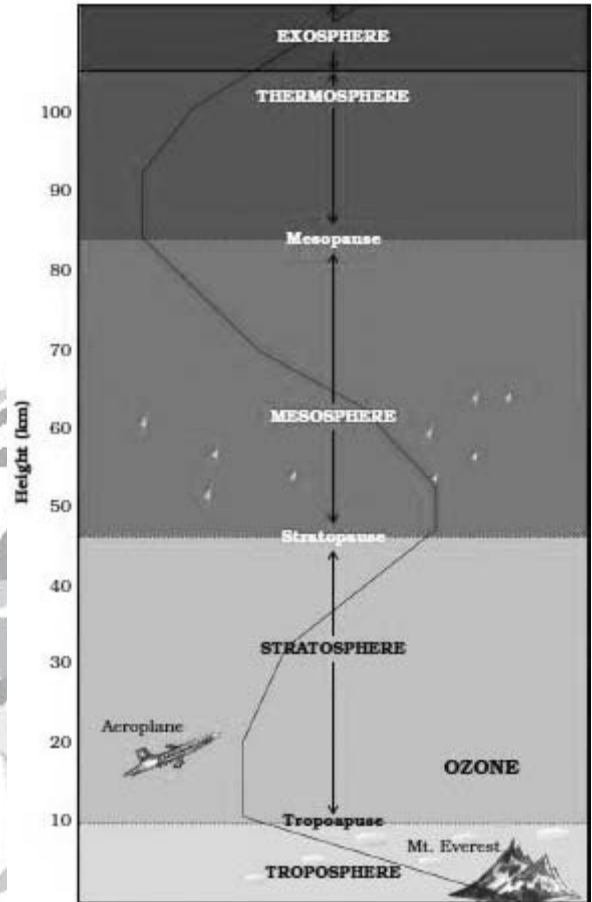


Fig. Layers of the Atmosphere

Important Facts

You will be surprised to know that the earth receives only 1 in 2,000,000,000 parts of the sun's energy.

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An important factor that influences the distribution of temperature is insolation. Insolation is the incoming solar energy intercepted by the earth.

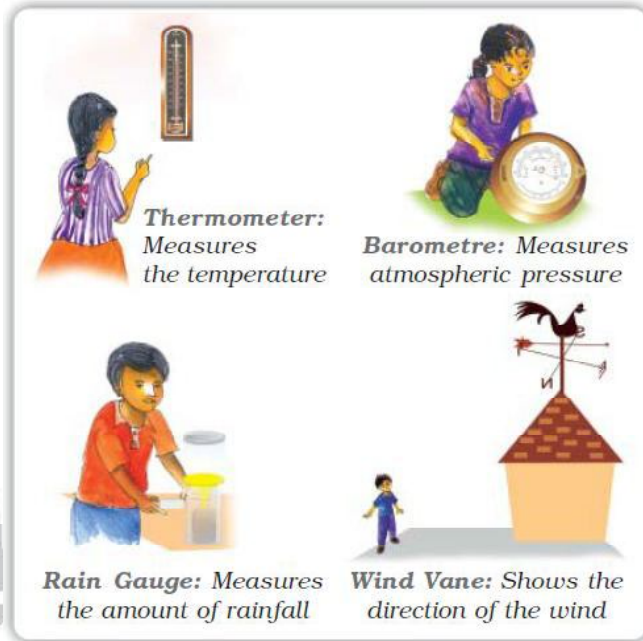


Fig. Weather Instruments

The amount of insolation decreases from the equator towards the poles. Therefore, the temperature decreases in the same manner. Now do you understand why poles are covered with snow? If the earth's temperature rises too high, it would become too warm for some crops to grow. Temperature in cities is much higher than that of villages. The concrete and metals in buildings and the asphalt of roads get heated up during the day. This heat is released during the night.

Important Facts
The standard unit of measuring temperature is degree Celsius. It was invented by Anders Celsius. On the Celsius scale the water freezes at 0°C and boils at 100°C.

Also, the crowded high rise buildings of the cities trap the warm air and thus raise the temperature of the cities.

Air Pressure

Air above us presses us with a great force on our bodies. However, we don't even feel it. This is because the air presses us from all directions and our body exerts a counter pressure.

Do you know?
On the moon there is no air and hence no air pressure. Astronauts have to wear special protective space suits filled with air when they go to the moon. If they did not wear these space suits, the counter pressure exerted by the body of the astronauts would make the blood vessels burst. The astronauts would bleed.

Air pressure is defined as the pressure exerted by the weight of air on the earth's surface. As we go up the layers of atmosphere, the pressure falls rapidly. The air pressure is highest at sea level and decreases with height. Horizontally the distribution of air pressure is influenced by temperature of air at a given place. In areas where temperature is high the air gets heated and rises. This creates a low-pressure area. Low pressure is associated with cloudy skies and wet weather.

In areas having lower temperature, the air is cold. It is therefore heavy. Heavy air sinks and creates a high pressure area. High pressure is associated with clear and sunny skies.

The air always moves from high pressure areas to low pressure areas.

NOTES

Wind

The movement of air from high pressure area to low pressure areas is called wind. You can see wind at work as it blows dry leaves down the pavement or uproots trees during a storm. Sometimes when the wind blows gently you can even see it blowing away smoke or fine dust. At times wind can be so strong that it is difficult to walk against it. You must have experienced it is not easy to hold an umbrella on a windy day. Think of some other examples when strong winds have created problems for you. Winds can be broadly divided into three types.

1. **Permanent winds :** The trade winds, westerlies and easterlies are the permanent winds. These blow constantly throughout the year in a particular direction.
2. **Seasonal winds :** These winds change their direction in different seasons. For example monsoons in India.
3. **Local winds :** These blow only during a particular period of the day or year in a small area. For example, land and sea breeze. Do you recall the hot and dry local wind of northern plains of India? It is called loo.

Things to Remember

A wind is named after the direction from which it blows, e.g. the wind blowing from the west is called westerly.

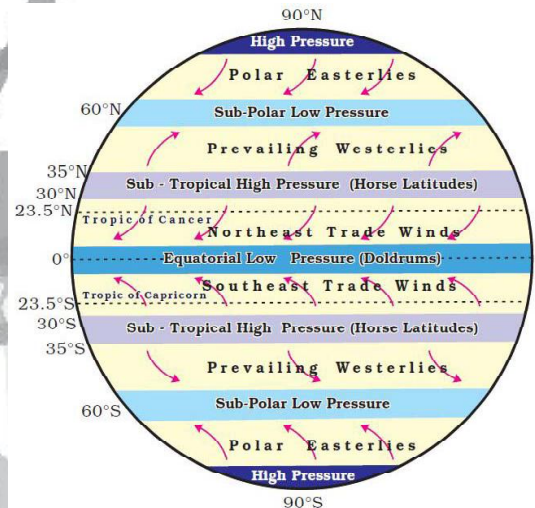


Fig. Major Pressure Belts and Wind System in a small area. For example, land and sea breeze. Do you recall the hot and dry local wind of northern plains of India? It is called loo.

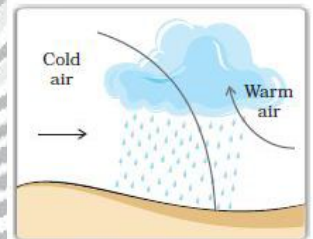
Moisture

When water evaporates from land and different water bodies, it becomes water vapour. Moisture in the air at any time, is known as humidity. When the air is full of water vapour we call it a humid day. As the air gets warmer, its capacity to hold the water vapour increases and so it becomes more and more humid. On a humid day, clothes take longer to dry and sweat from our body does not evaporate easily, making us feel very uncomfortable.

When the water vapour rises, it starts cooling. The water vapour condenses causing formation of droplets of water. Clouds are just masses of such water droplets. When these droplets of water become too heavy to float in air, then they come down as precipitation.

Jet planes flying in the sky leave a white trail behind them. The moisture from their engines condenses. We see trails of this condensed moisture for some time when there is no air movement to disturb it.

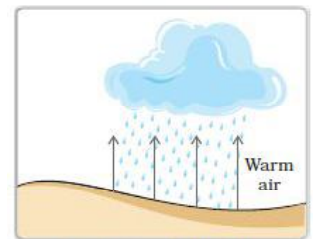
Precipitation that comes down to the earth in liquid form is called rain. Most of the ground water comes from



Cyclonic Rainfall



Relief (Orographic) Rainfall



Convective Rainfall

Fig. : Types of Rainfall

NOTES

UNIT-13 : Water

The sun's heat causes evaporation of water into vapour. When the water vapour cools down, it condenses and forms clouds. From there it may fall on the land or sea in the form of rain, snow or sleet.

The process by which water continually changes its form and circulates between oceans, atmosphere and land is known as the water cycle

Our earth is like a terrarium. The same water that existed centuries ago still exists today.

The major sources of fresh water are the rivers, ponds, springs and glaciers. The ocean bodies and the seas contain salty water. The water

of the oceans is salty or saline as it contains large amount of dissolved salts. Most of the salt is sodium chloride or the common table salt that you eat.

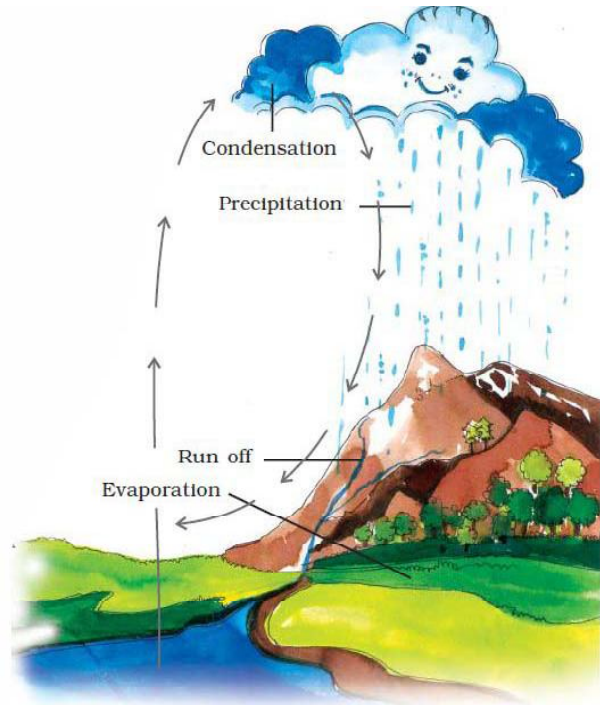


Fig. Water Cycle

Important Terms
Terrarium : It is an artificial enclosure for keeping small house plants.

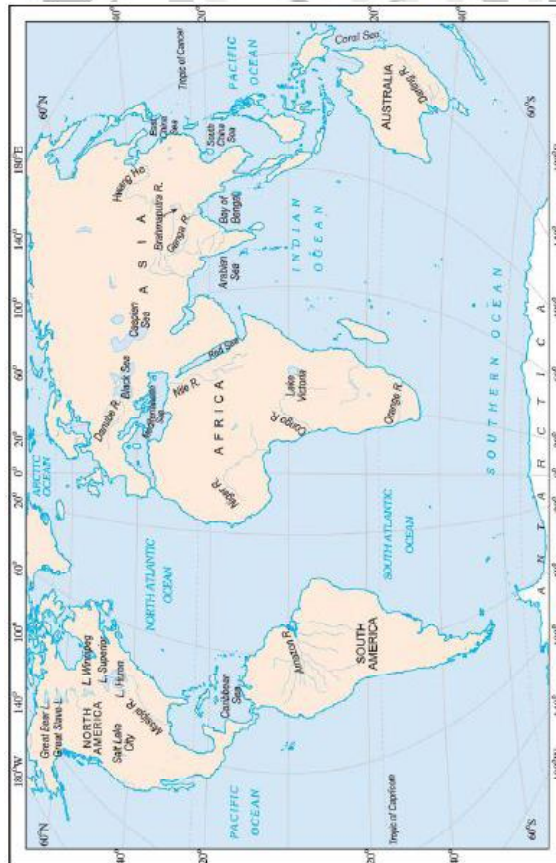


Fig. World-Major Seas, Lakes and Rivers

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NOTES

Distribution of Water Bodies

We all know that three-fourth of the earth surface is covered by water. If there is more water than land on this earth, why do so many countries face water scarcity?

Is all the water on earth available to us? The following table gives the distribution of water in percentage.

| | | | | |
|-------------------|---|---------------|--------------|---|
| Oceans | : | 97.3 | Saline Water | } |
| Ice-caps | : | 02.0 | | |
| Ground water | : | 0.68 | | } |
| Fresh Water | : | | | |
| Fresh water lakes | : | 0.009 | | |
| Inland seas & | : | | Fresh Water | |
| Salt lakes | : | 0.009 | | } |
| Atmosphere | : | 0.0019 | | |
| Rivers | : | 0.0001 | | |
| | | <u>100.00</u> | | |

Things To Remember
Salinity is the amount of salt in grams present in 1000 grams of water. The average salinity of the oceans is 35 parts per thousand.

Important Fact
Dead sea in Israel has salinity of 45 parts per thousand. Swimmers can float in it because the increased salt content make it dense.

Water distribution can be demonstrated by a simple activity (see activity box).

Ocean Circulation

There is something magical about walking bare feet on the seashore. The wet sand on the beach, the cool breeze, the seabirds, the smell of the salt in the air and music of the waves; everything is so fascinating. Unlike the calm waters of ponds and lakes, ocean water keeps moving continuously. It is never still. The movements that occur in oceans can be broadly categorised as: waves, tides and currents.

Do you know?
March 22 is celebrated as World Water Day when the need to conserve water is reinforced in different ways.

Waves

When the water on the surface of the ocean rises and falls alternately, they are called waves.



Fig. Waves

Things to remember
Waves are formed when gentle winds scrape across the ocean surface. The stronger the wind blows, the bigger the wave becomes.

During a storm, the winds blowing at very high speed form huge waves. These may cause tremendous destruction. An earthquake, a volcanic eruption or underwater landslides can shift large amounts of ocean water. As a result a huge tidal wave called tsunami, that may be as high as 15m., is formed. The largest tsunami ever measured was 150m. high. These waves travel at a speed of more than 700 km. per hour. The tsunami of 2004 caused wide spread damage in the coastal areas of India. The Indira point in the Andaman and Nicobar islands got submerged after the tsunami.

Important Fact
Tsunami is a Japanese word that means "Harbour waves" as the harbours get destroyed whenever there is tsunami.

NOTES

Tides

The rhythmic rise and fall of ocean water twice in a day is called a tide. It is high tide when water covers much of the shore by rising to its highest level. It is low tide when water falls to its lowest level and recedes from the shore.

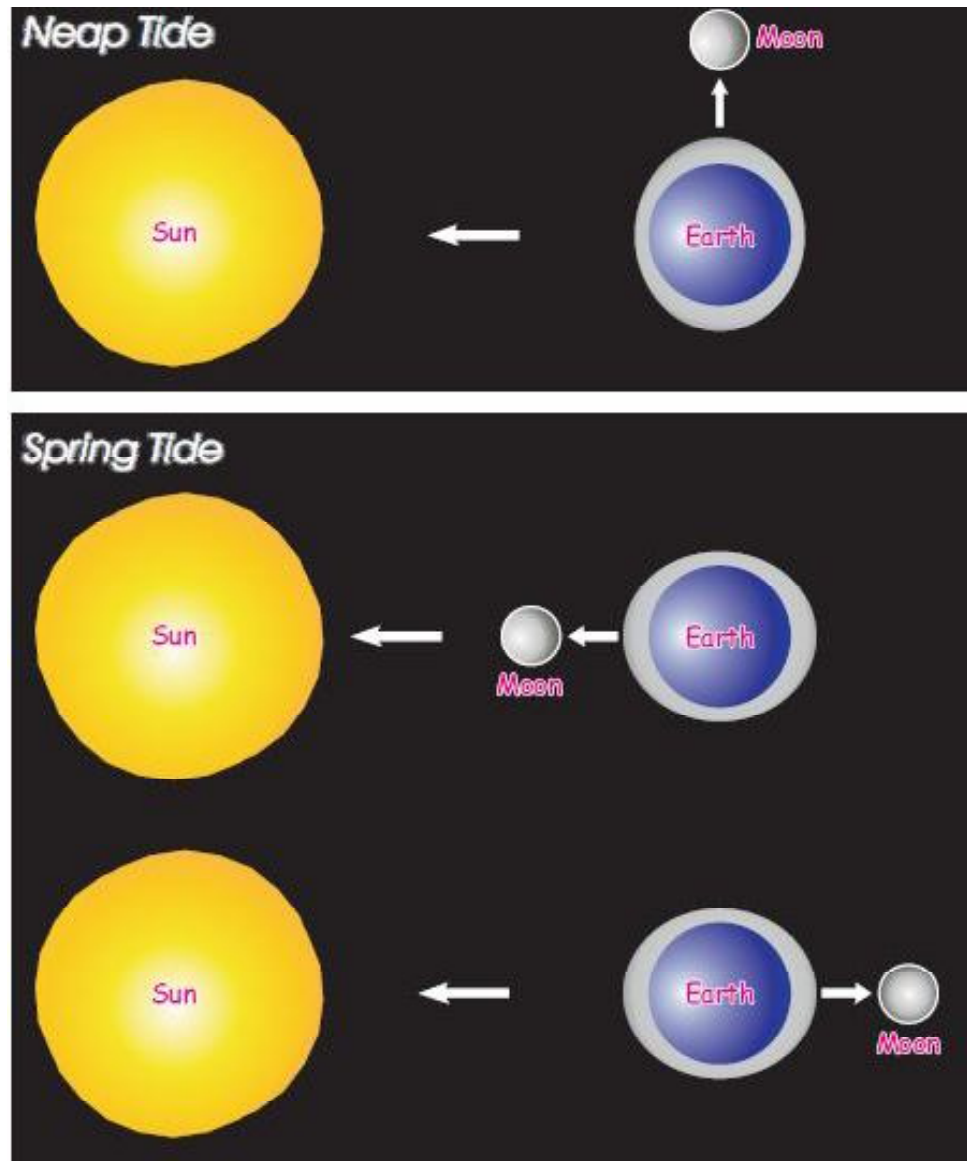


Fig. : Spring Tides and Neap Tide

The strong gravitational pull exerted by the sun and the moon on the earth's surface causes the tides. The water of the earth closer to the moon gets pulled under the influence of the moon's gravitational force and causes high tide. During the full moon and new moon days, the sun, the moon and the earth are in the same line and the tides are highest. These tides are called spring tides. But when the moon is in its first and last quarter, the ocean waters get drawn in diagonally opposite directions by the gravitational pull of sun and earth resulting in low tides. These tides are called neap tides.

High tides help in navigation. They raise the water level close to the shores. This helps the ships to arrive at the harbour more easily. The high tides also help in fishing. Many more fish come closer to the shore during the high tide. This enables fishermen to get a plentiful catch. The rise and fall of water due to tides is being used to generate electricity in some places.

NOTES

OCEAN CURRENTS

Ocean currents are streams of water flowing constantly on the ocean surface in definite directions. The ocean currents may be warm or cold (Fig. 5.6). Generally, the warm ocean currents originate near the equator and move towards the poles. The cold currents carry water from polar or higher latitudes to tropical or lower latitudes. The Labrador Ocean current is cold current while the Gulf Stream is a warm current. The ocean current influence the temperature conditions of the area. Warm currents bring about warm temperature over land surface. The areas where the warm and cold currents meet provide the best fishing grounds of the world. Seas around Japan and the eastern coast of North America are such examples. The areas where a warm and cold current meet also experience foggy weather making it difficult for navigation.

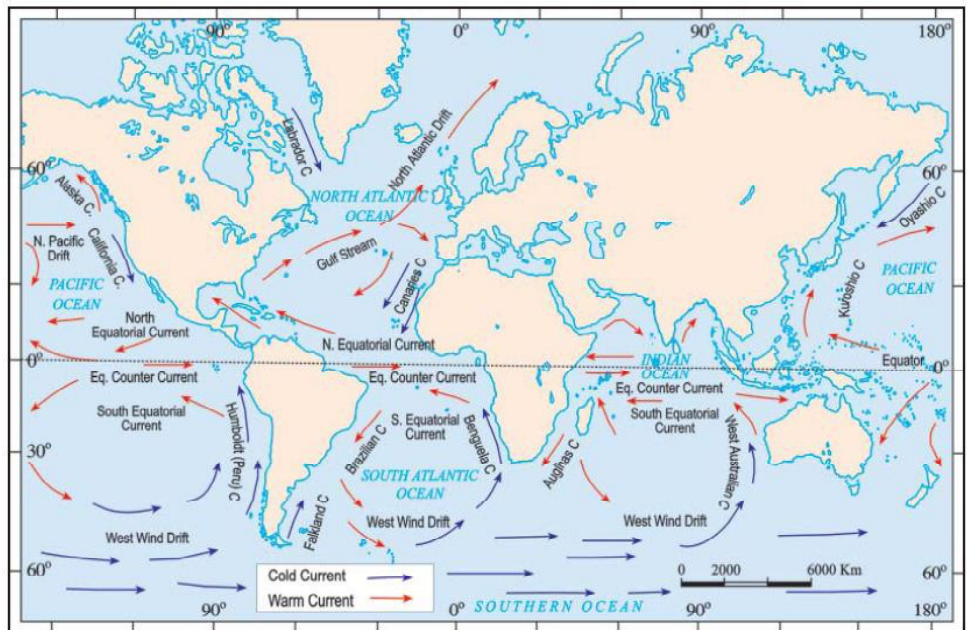


Fig. 5.6 : Ocean Currents

NOTES

UNIT-14 : Natural Vegetation and Wild Life



Fig. Thorny shrubs

There is a close relationship between height of land and the character of vegetations. With the change in height, the climate changes and that changes natural vegetation. The growth of vegetation depends on temperature and moisture. It also depends on factors like slope and thickness of soil.

The type and thickness of natural vegetation varies from place to place because of the variation in these factors.

Natural vegetation is generally classified in to three broad categories as follows:

- (a) **Forests** : Which grow where temperature and rainfall are plentiful to support a tree cover. Depending upon these factors, dense and open forests grown.
- (b) **Grasslands** : Which grow in the region of moderate rain.
- (c) **Shrubs** : Thorny shrubs and scrubs grow in the dry region.

The Himalayas have almost all variety of vegetation which one can see while moving from the equator to the polar region.

The changes in the type of natural vegetation occur mainly because of the changes of climatic condition. Let us get to know the different types of natural vegetation of the world with their characteristic features and wildlife inhabiting there.

FORESTS

Tropical Evergreen Forests :

These forests are also called tropical rainforests. These thick forests occur in the regions near the equator and close to the tropics. These regions are hot and receive heavy rainfall throughout the year. As there is no particular dry season, the trees do not shed their leaves altogether. This is the reason they are called evergreen. The thick canopies of the closely spaced trees do not allow the sunlight to penetrate inside the forest even in the day time. Hardwood trees like rosewood, ebony, mahogany are common here.

Do you know?

The tropical evergreen forest in Brazil is so enormous that it is like the lungs of the earth.

Things to Remember

Anaconda, one of the world's largest snakes is found in the tropical rainforest. It can kill and eat a large animal such as a crocodile.



Fig. : A Tropical Evergreen Forest

NOTES

Tropical Deciduous Forests

Tropical deciduous are the monsoon forests found in the large part of India, northern Australia and in central America. These regions experience seasonal changes. Trees shed their leaves in the dry season to conserve water. The hardwood trees found in these forests are sal, teak, neem and shisham. Hardwood trees are extremely useful for making furniture, transport and constructional materials. Tigers, lions, elephants, langoors and monkeys are the common animals of these regions.



Fig. A Tropical Deciduous Forest

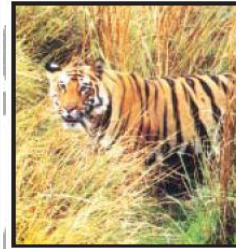


Fig. A Tiger

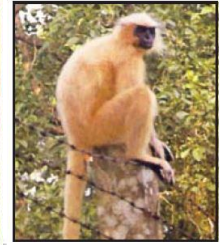


Fig. A Golden Langoor

Temperate Evergreen Forests

The temperate evergreen forests are located in the midlatitudinal coastal region. They are commonly found along the eastern margin of the continents, e.g., In south east USA, South China and in South East Brazil. They comprise both hard and soft wood trees like oak, pine, eucalyptus, etc.



Fig. A Temperate Evergreen Forest



Fig. Elephants

Temperate Deciduous Forests

As we go towards higher latitudes, there are more temperate deciduous forests. These are found in the north eastern part of USA, China, New Zealand, Chile and also found in the coastal regions of Western Europe. They shed their leaves in the dry season. The common trees are oak, ash, beech, etc. Deer, foxes, wolves are the animals commonly found. Birds like pheasants, monals are also found here.



Fig. A Pheasant



Fig. A Monal

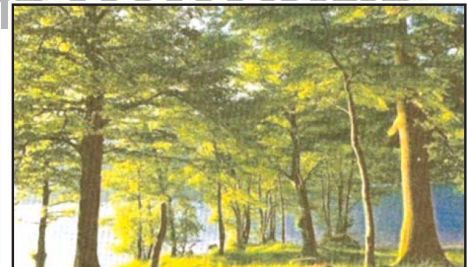


Fig. A Temperate Deciduous Forest

NOTES

Mediterranean Vegetation

Most of the east and north east margins of the continents are covered by temperate evergreen and deciduous trees. The west and south west margins of the continents are different. They have Mediterranean vegetation (Fig. 6.12). It is mostly found in the areas around the Mediterranean sea in Europe, Africa and Asia, hence the name. This kind of vegetation is also found outside the actual Mediterranean region in California in the USA, south west Africa, south western

Things to remember

- Mediterranean trees adapt themselves to dry summers with the help of their thick barks and wax coated leaves which help them reduce transpiration.
- Mediterranean regions are known as 'Orchards of the world' for their fruit cultivation.



Fig : A vineyard in the Mediterranean Region

South America and South west Australia. These regions let's do are marked for hot dry summers and mild rainy winters. Citrus fruits such as oranges, figs, olives and grapes are commonly cultivated here because people have removed the natural vegetation in order to cultivate what they want to. There isn't much wildlife here.

Coniferous Forests

In the higher latitudes (50° - 70°) of Northern hemisphere the spectacular Coniferous forests are found. These are also called as Taiga. These forests are also seen in the higher altitudes. These are the trees which Salima found in the Himalayas in abundance. They are tall, softwood evergreen trees. These woods are very useful for making pulp, which is used for manufacturing paper and newsprint. Match boxes and packing boxes are also made from softwood. Chir, pine, cedar are the important variety of trees in these forests. Silver fox, mink, polar bear are the common animals found here.

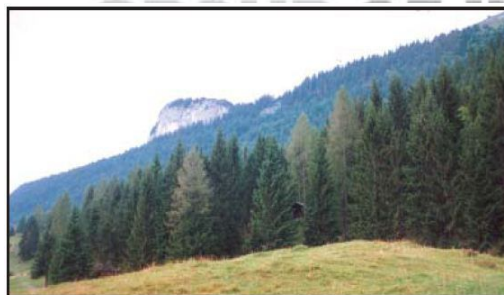


Fig. (a) : A Coniferous Forest

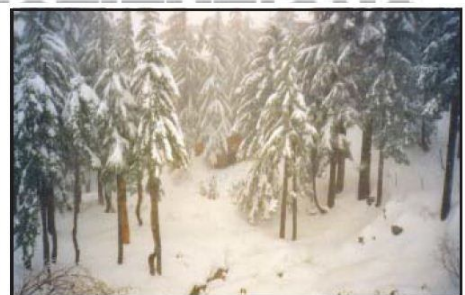


Fig. (b) : Snow Covered Coniferous Forest

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GRASSLANDS

These grow on either side of the equator and extend till the tropics. This vegetation grows in the areas of moderate to low amount of rainfall. They can grow very tall, about 3 to 4 metres in height. Savannah grasslands of Africa are of this type. Elephants, zebras, giraffes, deer, leopards are common in tropical grasslands.



Fig. : Tropical Grassland

These are found in the midlatitudinal zones and in the interior part of the continents. Usually, grass here is short and nutritious. Wild buffaloes, bison, antilopes are common in the temperate region.

These are found in the dry desert like regions. Tropical deserts are located in the western margins of the continents. The vegetation cover is scarce here because of scanty rain and scorching heat. Identify the desert regions in the world map given. Can you name the great desert of India? Name some of the common animals of the desert which you have learnt earlier.

Things to remember

Grasslands are known by different names in different regions.

Tropical Grasslands East Africa- Savanna
Brazil- Campos
Venezuela- Llanos

Temperate Grasslands
Argentina- Pampas
N. America- Prairie
S. Africa- Veld
C. Asia- Steppe
Australia- Down

If you reach the polar region you will find the place extremely cold. The growth of natural vegetation is very limited here. Only mosses, lichens and very small shrubs are found here. It grows during the very short summer. This is called Tundra type of vegetation. This vegetation is found in the polar areas of Europe, Asia and North America. The animals have thick fur and thick skin to protect themselves from the cold climatic conditions, seal, walrus, musk-oxen, Arctic owl, Polar bear and snow foxes are some of the animals found here



Walrus



Polar Bear



Seal



NOTES

UNIT-15 : Human Environment-Settlement, Transport and Communication

Early human beings depended entirely on nature for food, clothing and shelter; but with time they learnt new skills to grow food, build homes and develop better means of transport and communication. In this way they modified the environment where they lived.

Settlements are places where people build their homes. Early human beings lived on trees and in caves. When they started to grow crops it became necessary to have a permanent home. The settlements grew near the river valleys as water was available and land was fertile. With the development of trade, commerce and manufacturing, human settlements became larger. Settlement flourished and civilizations developed near river valleys. Do you recall the names of civilization that grew along the banks of rivers Indus, Tigris, Nile and Hwang-He.

Settlements can be permanent or temporary. Settlements which are occupied for a short time are called temporary settlements. The people living in deep forests, hot and cold deserts and mountains often dwell in such temporary settlements. They practice hunting, gathering, shifting cultivation and transhumance. However more and more settlements today are permanent settlements. In these settlements, people build homes to live in.

The Rural and Urban Settlements

The villages are rural settlement where people are engaged in activities like agriculture, fishing, forestry, crafts work and trading etc. Rural settlements can be compact or scattered. A compact settlement is a closely built area of dwellings, wherever flat land is available. In a scattered settlement dwellings are spaced over an extensive area. This type of settlement is mostly found in hilly tracts, thick forests, and regions of extreme climate.

Do you know?

The place where a building or a settlement develops is called its site.

The natural conditions for selection of an ideal site are-

1. Favourable climate
2. Availability of water
3. Suitable land
4. Fertile soil



Fig. Human Settlement

Do you know?

Transhumance: It is a seasonal movement of people. People who rear animals move in search of new pastures according to changes in seasons.



NOTES



Fig.: Compact Settlement

In rural areas, people build houses to suit their environment. In regions of heavy rainfall, they have slanting roofs. Places where water accumulates in the rainy season the houses are constructed on a raised platform or stilts.

Thick mud walled houses with thatched roofs are very common in areas of hot climate. Local materials like stones, mud, clay, straw etc are used to construct houses.

The towns are small and the cities are larger urban settlements. In urban areas the people are engaged in manufacturing, trading, and services.



Fig.: Scattered Settlement



Fig. Houses on Stilts

TRANSPORT

Transport is the means by which people and goods move. In the early days it took a great deal of time, to travel long distances. People had to walk and used animals to carry their goods. Invention of the wheel made transport easier. With the passage of time different means of transport developed but even today people use animals for transport.

In our country donkeys, mules, bullocks and camels are common. In the Andes Mountains of South America, llamas are used, as are yaks in Tibet. The early traders from other countries used to take several months to reach India. They took either the sea route or the land route. Airplanes have made travel faster. Now it takes only 6-8 hours to travel from India to Europe. Modern means of transport thus saves time and energy.

The four major means of transport are roadways, railways, waterways and airways.

ROADWAYS

The most commonly used means of transport especially for short distances are roads. They can be metalled (pucca) and unmetalled (kutchha). The plains have a dense network of roads. Roads have also been built in terrains like deserts, forests and even high mountains. Manali-Leh highway in the Himlayan Mountains is one of the highest roadways in the world. Roads built underground are called subways/under paths. Flyovers are built over raised structures.



Habitats made of Ice are called 'Igloo'. These are found in Arctic region, Greenland and Canada. These are built by the Eskimo.

Things to Remember

There are several National and State highways in India. The latest development in India is the construction of Express Ways. The Golden Quadrilateral connects Delhi, Mumbai, Chennai and Kolkata.

NOTES

RAILWAYS

The railways carry heavy goods and people over long distances quickly and cheaply. The invention of the steam engine and the Industrial Revolution helped in speedy development of rail transport. Diesel and electric engines have largely replaced the steam engines. In places super fast trains have been introduced to make the journey faster. The railway network is well developed over the plain areas. Advanced technological skills have enabled laying of railway lines in difficult mountain terrains also. But these are much fewer in number. Indian railway network is well developed. It is the largest in Asia.

Important Facts

The Trans-Siberian Railway is the longest railway system connecting St. Petersburg in Western Russia to Vladivostok on the Pacific coast.



WATERWAYS

In early days waterways were used for transportation. Waterways are the cheapest for carrying heavy and bulky goods over long distances. They are mainly of two types – inland waterways and sea routes.

Navigable rivers and lakes are used as inland waterways. Some of the important inland waterways are the Ganga-Brahmaputra river system, the Great Lakes in North America and the river Nile in Africa.

Sea routes and oceanic routes are mostly used for transporting merchandise and goods from one country to another. These routes are

connected with the ports. Some of the important ports of the world are Singapore and Mumbai in Asia, New York, Los Angeles in North America, Rio de Janerio in South



Fig. : Inland Waterways

NOTES

America, Durban and Cape Town in Africa, Sydney in Australia, London and Rotterdam in Europe.

AIRWAYS

This is the fastest way of transport developed in the early twentieth century. It is also the most expensive due to high cost of fuels. Air traffic is adversely affected by bad weather like fog and storms. It is the only mode of transport to reach the most remote and distant areas especially where there are no roads and railways. Helicopters are extremely useful in most inaccessible areas and in time of calamities for rescuing people and distributing food, water, clothes and medicines (Fig. 7.9). Some of the important airports are Delhi, Mumbai, New York, London, Paris, Frankfurt and Cairo

COMMUNICATION

Communication is the process of conveying messages to others. With the development of technology humans have devised new and fast modes of communication. The explains the evolution of the communication system.

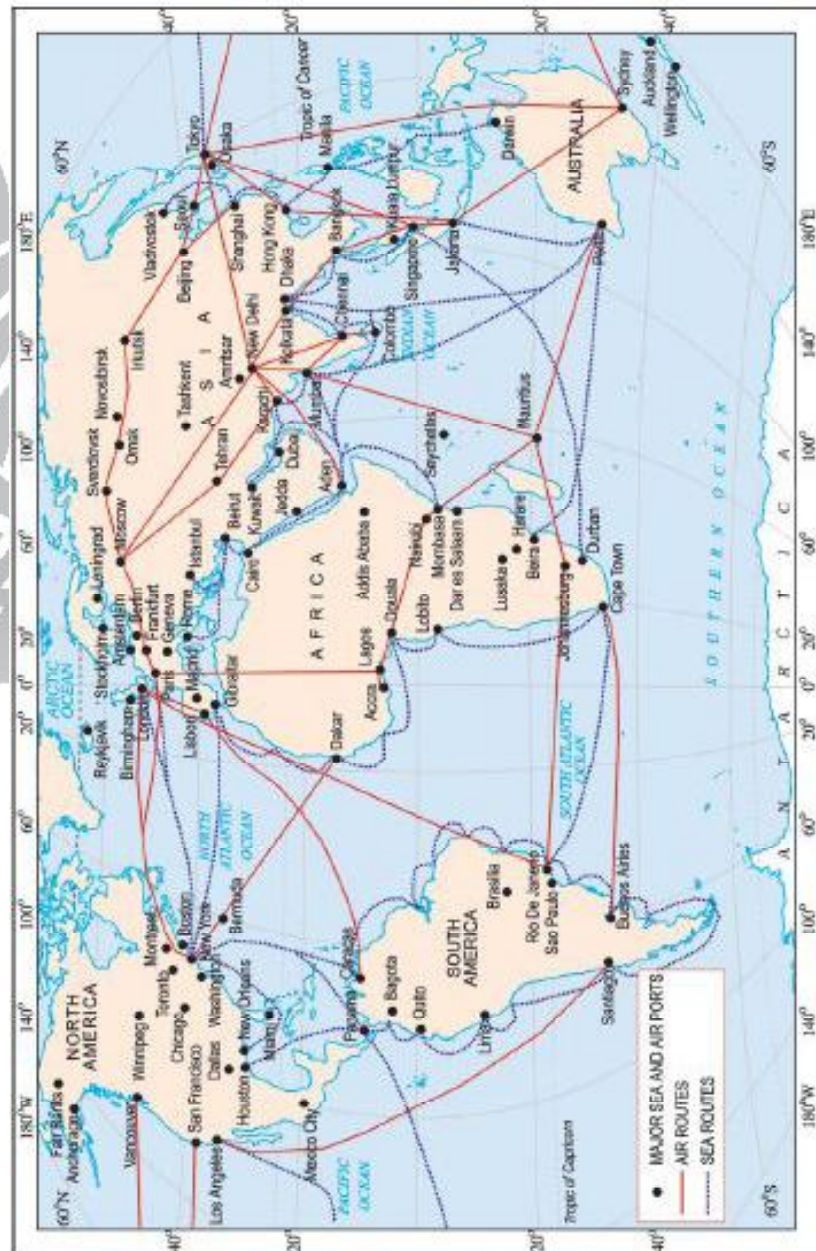
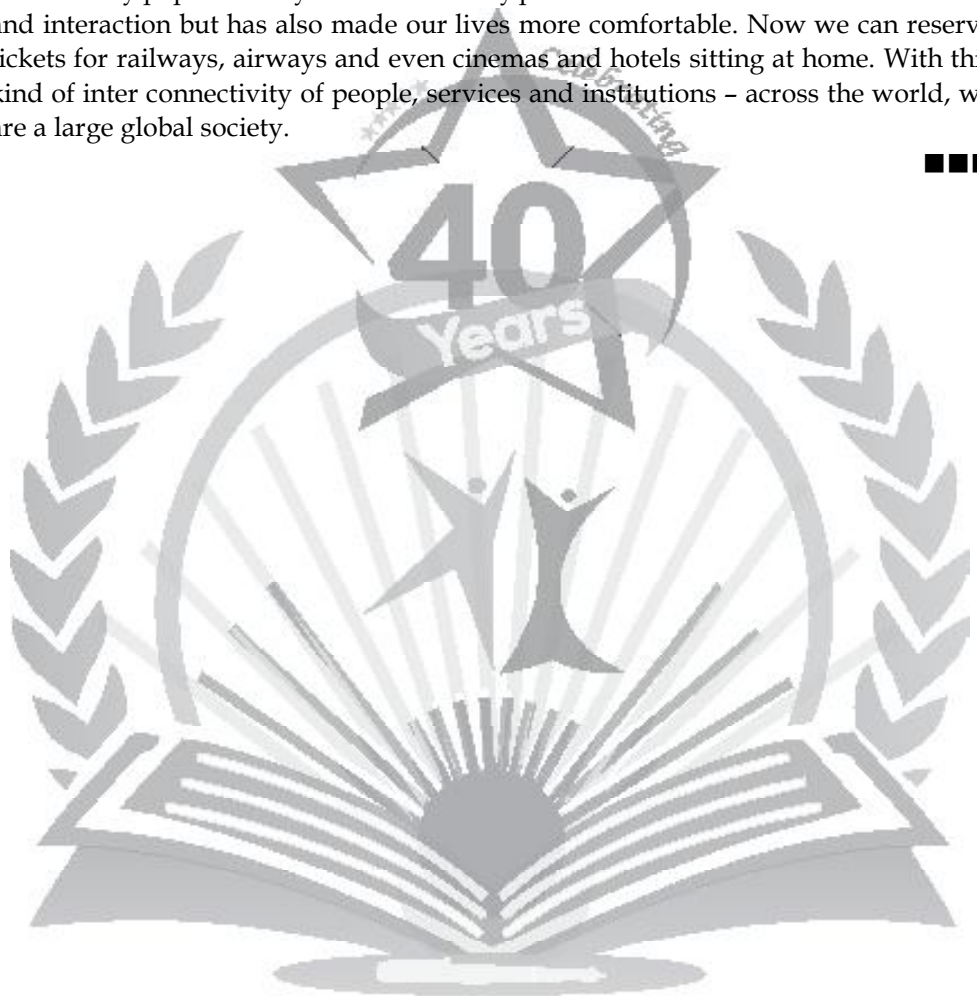


Fig. World-Major Sea Ports and Airports

NOTES

The advancement in the field of communication has brought about an information revolution in the world. Different modes of communication are used to provide information, to educate as well as to entertain. Through newspapers, radio and television we can communicate with a large number of people. They are therefore called mass media. The satellites have made communication even faster. Satellites have helped in oil exploration, survey of forest, underground water, mineral wealth, weather forecast and disaster warning. Now we can send electronic mails or e-mails through Internet. Wireless telephonic communications through cellular phones have become very popular today. Internet not only provides us with worldwide information and interaction but has also made our lives more comfortable. Now we can reserve tickets for railways, airways and even cinemas and hotels sitting at home. With this kind of inter connectivity of people, services and institutions - across the world, we are a large global society.



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UNIT-16 : Human Environment Interactions The Tropical The Subtropical Region

LIFE IN THE AMAZON BASIN

The tropical region lies very close to the equator; between 10°N and 10°S. So, it is referred to as the equatorial region. The river Amazon flows through this region. Notice how it flows from the mountains to the west and reaches the Atlantic Ocean to the east.

The place where a river flows into another body of water is called the river's mouth. Numerous tributaries join the Amazon River to form the Amazon basin. The river basin drains portions of Brazil, parts of Peru, Bolivia, Ecuador, Colombia and a small part of Venezuela.

Things to Remember
Tributaries : These are small rivers that join the main river. The main river along with all its tributaries that drain an area form a river basin or the catchment area. The Amazon Basin is the largest river basin in the world.



Fig. The Amazon Basin in South America

NOTES

CLIMATE

The Amazon Basin stretches directly on the equator and is characterized by hot and wet climate throughout the year. Both day and nights are almost equally hot and humid. The skin feels sticky. It rains almost everyday, that too without much warning. The day temperatures are high with very high humidity. At night the temperature goes down but the humidity remains high.

RAINFORESTS

As it rains heavily in this region, thick forests grow. The forests are in fact so thick that the dense "roof" created by leaves and branches does not allow the sunlight to reach the ground. The ground remains dark and damp. Only shade tolerant vegetation may grow here. Orchids, bromeliads grow as plant parasites.



Fig. The Amazon Forest

The rainforest is rich in fauna. Birds such as toucans, humming birds, bird of paradise with their brilliantly coloured plumage, oversized bills for eating make them different from birds we commonly see in India. These birds also make loud sounds in the forests. Animals like monkeys, sloth and ant-eating tapirs are found here. Various species of reptiles and snakes also thrive in these jungles. Crocodiles, snakes, pythons abound. Anaconda and boa constrictor are some of the species. Besides, the basin is home to thousands of species of insects. Several species of fishes including the flesheating Piranha fish is also found in the river. This basin is thus extraordinarily rich in the variety of life found there.



Fig. Toucans



Fig. Tapir

PEOPLE OF THE RAINFORESTS

People grow most of their food in small areas after clearing some trees in the forest. While men hunt and fish along the rivers, women take care of the crops. They mainly grow tapioca, pineapple and sweet potato. As hunting and fishing are uncertain it is the women who keep their families alive by feeding them the vegetables they grow. They practice "slash and burn agriculture". The staple food is manioc, also known as cassava that grows under the ground like the potato. They also eat queen ants and egg sacs. Cash crops like coffee, maize and cocoa are also grown.

The rainforests provide a lot of wood for the houses. Some families live in thatched houses

Things to Remember
 Slash and Burn is a way of cultivating land where farmers clear a piece of land by slashing or cutting down trees and bushes. These are then burnt, which releases the nutrients into the soil. Now crops are grown in this cleared field for a few years. After repeatedly using the patch of land, the soil loses its nutrients. So it is abandoned. Then they clear another plot of land to plant. In the mean time young trees grow in the old field. In this way soil fertility is restored. People can then return to it and start cultivating it again.

NOTES

shaped like beehives. There are other large apartment-like houses called “Maloca” with a steeply slanting roof.

Life of the people of the Amazon basin is slowly changing. In the older days the heart of the forest, could be reached only by navigating the river. In 1970 the Trans Amazon highway made all parts of the rainforest accessible. Aircrafts and helicopters are also used for reaching various places. The indigenous population was pushed out from the area and forced to settle in new areas where they continued to practice their distinctive way of farming.

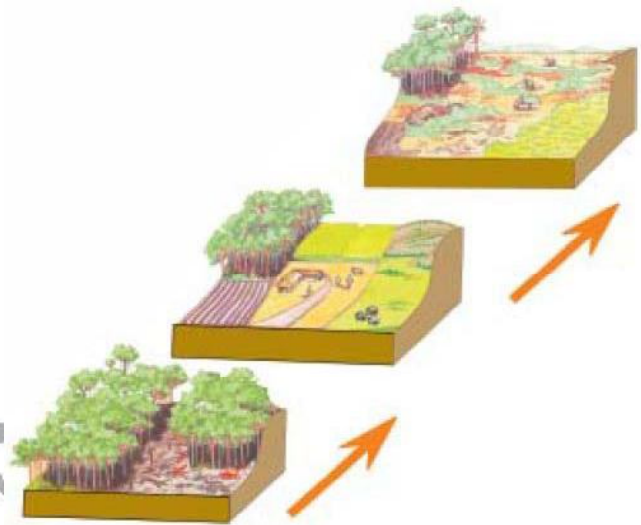


Fig. : Gradual Destruction of Forests

The developmental activities are leading to the gradual destruction of the biologically diverse rainforests. It is estimated that a large area of the rainforest has been disappearing annually in the Amazon basin. You can see that this destruction of forests has a much wider implication. The topsoil is washed away as the rains fall and the lush forest turns into a barren landscape.

LIFE IN THE GANGA-BRAHMAPUTRA BASIN

The tributaries of rivers Ganga and Brahmaputra together form the Ganga-Brahmaputra basin in the Indian subcontinent (Fig. 8.8). The basin lies in the subtropical region that is situated between 10°N to 30°N latitudes. The tributaries of the River Ganga like the Ghaghra, the Son, the Chambal, the Gandak, the Kosi and the tributaries of Brahmaputra drain it.



Fig. Ganga-Brahmaputra Basin

NOTES

The plains of the Ganga and the Brahmaputra, the mountains and the foothills of the Himalayas and the Sundarbans delta are the main features of this basin. Ox-bow lakes dot the plain area. The area is dominated by monsoon climate. The monsoon brings rains from mid-June to mid-September. The summers are hot and the winters cool.

The basin area has varied topography. The environment plays a dominant role in the distribution of the population. The mountain areas with steep slopes have inhospitable terrain. Therefore less number of people live in the mountain area of the Ganga-Brahmaputra basin. The plain area provides the most suitable land for human habitation. The soil is fertile. Agriculture is the main occupation of the people where flat land is available to grow crops. The density of population of the plains is very high. The main crop is paddy (Fig. 8.9). Since cultivation of paddy requires sufficient water, it is grown in the areas where the amount of rainfall is high.

Wheat, maize, sorghum, gram and millets are the other crops that are grown. Cash crops like sugarcane and jute are also grown. Banana plantations are seen in some areas of the plain. In West Bengal and Assam tea is grown in plantations (Fig. 8.10). Silk is produced through the cultivation of silk worms in parts of Bihar and Assam. In the mountains and hills, where the slopes are gentle, crops are grown on terraces.

The vegetation cover of the area varies according to the type of landforms. In the Ganga and Brahmaputra plain tropical deciduous trees grow, along with teak, sal and peepal. Thick bamboo groves are common in the Brahmaputra plain. The delta area is covered with the mangrove forests. In parts of Uttaranchal, Sikkim and Arunachal Pradesh, coniferous trees like pine, deodar and fir can be seen because the climate is cool and the slopes are steep.



Fig. : Paddy Cultivation



Fig. Tea Garden in Assam

There is a variety of wildlife in the basin. Elephants, tigers, deer and monkeys are common. The one-horned rhinoceros is found in the Brahmaputra plain. In the delta area, Bengal tiger, crocodiles and alligator are found. Aquatic life abounds in the fresh river waters, the lakes and the Bay of Bengal Sea. The most popular varieties of the fish are the rohu, catla and hilsa. Fish and rice is the staple diet of the people living in the area.

Things to Remember

Terraces are built on steep slopes to create flat surfaces on which crop are grown. The slope is removed so that water does not run off rapidly.



Terrace Farming

NOTES



Fig. One horned rhinoceros



Fig. Crocodiles

The Ganga-Brahmaputra plain has several big towns and cities. The cities of Allahabad, Kanpur, Varanasi, Lucknow, Patna and Kolkata all with the population of more than ten lakhs are located along the River Ganga. The wastewater from these towns and industries is discharged into the rivers. This leads to the pollution of the rivers.



Fig. Varanasi along the River Ganga

All the four ways of transport are well developed in the Ganga-Brahmaputra basin. In the plain areas the roadways and railways transport the people from one place to another. The waterways, is an effective means of transport particularly along the rivers. Kolkata is an important port on the River Hooghly. The plain area also has a large number of airports.

Tourism is another important activity of the basin. Taj Mahal on the banks of River Yamuna in Agra, Allahabad on the confluence of the Rivers Ganga and Yamuna, Buddhists stupas in Uttar Pradesh and Bihar, Lucknow with its Imambara, Assam with Kaziranga and Manas with wild life sanctuaries and Arunachal Pradesh with a distinct tribal culture are some of the places worth a visit.

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UNIT-17 : Life in the Temperature Grasslands

Just as a forest can be defined as the place where trees are the main type of vegetation, grassland can be defined as a region where grasses form the dominant type of plant life. Grasslands make up almost a quarter of the total land surface. The types of plants that grow here greatly depend on what the climate and soil are like. As climate plays an important role in the formation of grasslands, it is generally used as a basis to divide the world's grasslands into two broad categories: those that occur in the temperate region and those that occur in the tropical regions.

THE PRAIRIES

The temperate grasslands of North America are known as the Prairies. It is a region of flat, gently sloping or hilly land. For the most part, prairies are treeless but, near the low lying plains, flanking river valleys, woodlands can be found. Tall grass, upto two metres high, dominates, the landscape. It is actually a "sea of grass."



Fig. The Prairies

The prairies are bound by the Rocky Mountains in the West and the Great Lakes in the East. Look at the map of North America. You can see that the prairies cover parts of United States of America and parts of Canada. In the USA, the area is drained by the tributaries of Mississippi and the Canadian prairies are drained by the tributaries of Saskatchewan Rivers.

Do You Know

The grasslands of Prairies were the home of American Indians, more popularly known as 'Blackfoot Indians'. The Prairies were home of other tribes also like the Apache, the Crow, the Cree and the Pawnee.

Do You Know

Chinook is a hot wind that blows in winter and therefore raises the temperature in a short time. This increase in temperature results in the melting of snow, making pasture land available for grazing of animals.



Fig. The Prairies in North America

NOTES

CLIMATE

Being located in the heart of a continent, the climate is of continental type with extreme temperatures. The summers are warm with temperatures of around 20°C, while in winter -20°C has been recorded in Winnipeg, Canada. In winters a thick blanket of snow covers this region.

The annual rainfall is moderate and is ideal for the growth of grass. Due to the absence of the north-south barrier, a local wind "Chinook" blows here.

FLORA AND FAUNA

Prairies are practically tree-less. Where water is available, trees such as willows, alders and poplars grow. Places that receive rainfall of over 50 cm, are suitable for farming as the soil is fertile. Though the major crop of this area is maize, other crops including potatoes, soybean, cotton and alfa-alfa is also grown. Areas where rainfall is



Fig. A Cowboy with his horse



Fig. A Bison

very little or unreliable, grasses are short and sparse. These areas are suitable for cattle rearing. Large cattle farms called ranches are looked after by sturdy men called cowboys. Bison or the American buffalo is the most important

animal of this region. It nearly got extinct due to its indiscriminate hunting and is now a protected species. The other animals found in this region are rabbits, coyotes, gophers and Prairie dog.

PEOPLE

The people of this region are very hardworking. They have successfully harnessed technology to utilise their rich natural resources. Two of the most developed countries in the world - the USA and Canada are located in this region. Scientific methods of cultivation and use of tractors, harvesters and combines has made North America a surplus food producer. The Prairies are also known as the "Granaries of the world," due to the huge surplus of wheat production.

Dairy farming is another major industry. The dairy belt extends from the Great Lakes to the Atlantic Coast in the east. Dairy farming and extensive agriculture both promote setting up of food processing industries.

Do You Know
Combine : A machine which can sow, plough and work as thresher all by itself.

Important Facts
 Important cities in the USA are Chicago, Minneapolis, Indianapolis Kansas and Denver. In Canadian prairies the important cities are Edmonton, Saskatoon, Calgary and Winnipeg.

NOTES

Large mineral deposits particularly coal and iron and a good network of roads, railways and canals in this region have made it the most industrialised region in the world.

THE VELDS

The temperate grasslands of South Africa are called the velds. Velds are rolling plateaus with varying heights ranging from 600 m to 1100 m. It is bound by the Drakensburg Mountains on the east. To its west lies the Kalahari desert. On the northeastern part, "high velds" are located that attain a height of more than 1600 m, in some places. The tributaries of rivers Orange and Limpopo drain the region.



Fig. Veld in Africa

CLIMATE

The velds have a mild climate due to the influence of the Indian Ocean. Winters are cold and dry. Temperatures vary between 5°C and 10°C and July is the coldest month. Summers are short and warm. Johannesburg records about 20°C temperature in the summer. The velds receive rainfall mainly in the summer months from November to February. This is mainly because of the warm ocean currents that wash the shores of the velds. If the rainfall is scanty in the winter months from June till August, drought may occur.

NOTES

UNIT-18 : Life in the Deserts

It is difficult for anyone to live in places where there is no water to drink, where there is no grass for their cattle to feed on and where there is no water to help the crops to grow.

We will now learn about the places in the world where people have learned to cope with extreme harsh temperatures; in some places as hot as fire and some as cold as ice. These are the desert areas of the world. These are characterised by low rainfall, scanty vegetation and extreme temperatures. Depending on the temperatures there can be hot deserts or cold deserts. The people inhabit these lands wherever little water is available to practise agriculture.

Important Facts

Desert: It is an arid region characterised by extremely high or low temperatures and has scarce vegetation.

THE HOT DESERT – SAHARA

It is the world's largest desert. It has an area of around 8.54 million sq. km.

The Sahara desert touches eleven countries. These are Algeria, Chad, Egypt, Libya, Mali, Mauritania, Morocco, Niger, Sudan, Tunisia and Western Sahara.

When you think of a desert the picture that immediately comes to mind is that of sand. But besides the vast stretches of sands, that Sahara desert is covered with, there are also gravel plains and elevated plateaus with bare rocky surface. These rocky surfaces may be more than 2500m high at some places.



Fig. The Sahara Desert

Important Fact
Present day Sahara once used to be a lush green plain. Cave paintings in Sahara desert show that there used to be rivers with crocodiles. Elephants, lions, giraffes, ostriches, sheep, cattle and goats were common animals. But the climate has changed it to a very hot and dry region.

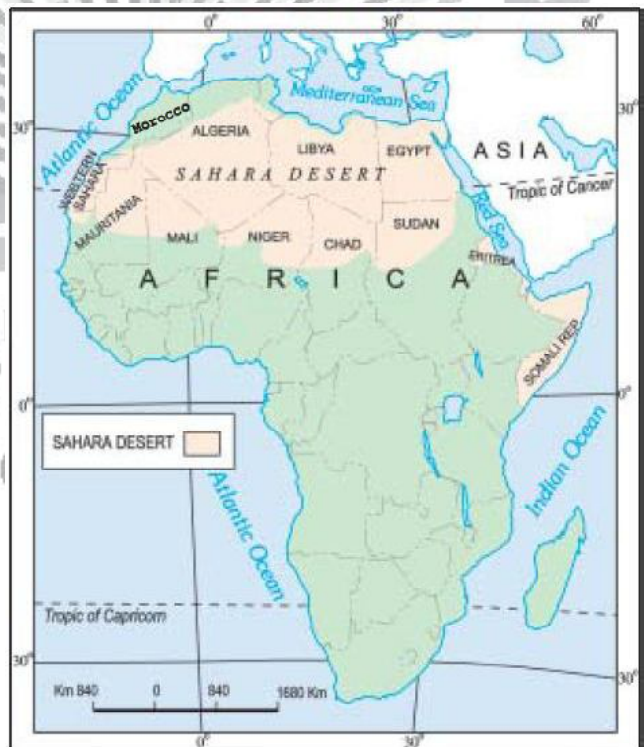


Fig. : Sahara in Africa

NOTES

Climate

The climate of the Sahara desert is scorching hot and parch dry. It has a short rainy season. The sky is cloudless and clear. Here, the moisture evaporates faster than it accumulates. Days are unbelievably hot. The temperatures during the day may soar as high as 50°C, heating up the sand and the bare rocks, which in turn radiates heat making everything around hot. The nights may be freezing cold with temperatures nearing zero degrees.

Flora and Fauna

Vegetation in the Sahara desert includes cactus, date palms and acacia. In some places there are oasis – green islands with date palms surrounding them. Camels, hyenas, jackals, foxes, scorpions, many varieties of snakes and lizards are the prominent animal species living there.



Fig. : Oasis in the Sahara Desert

People

The Sahara desert despite its harsh climate has been inhabited by various groups of people, who pursue different activities. Among them are the Bedouins and Tuaregs. These groups are nomadic tribes rearing livestock such as goats, sheep, camels and horses. These animals provide them with milk, hides from which they make leather for belts, slippers, water bottles; hair is used for mats, carpets, clothes and blankets. They wear heavy robes as protection against dust storms and hot winds.

The oasis in the Sahara and the Nile Valley in Egypt supports settled population. Since water is available, the people grow date palms. Crops such as rice, wheat, barley and beans are also grown. Egyptian cotton, famous worldwide is grown in Egypt.

The discovery of oil – a product in great demand throughout the world, in Algeria, Libya and Egypt is constantly transforming the Sahara desert. Other minerals of importance that are found in the area include iron, phosphorus, manganese and uranium.

The cultural landscape of the Sahara is undergoing change. Gleaming glass cased office buildings tower over mosques and superhighways crisscross the ancient camel paths. Trucks are replacing camels in the salt trade. Tuaregs are seen acting as guides to foreign tourists. More and more nomadic herdsmen are taking to city life finding jobs in oil and gas operations.

Important Facts

Depressions are formed when the wind blows away the sands. In the depressions where underground water reaches the surface, an oasis is formed. These areas are fertile. People may settle around these water bodies and grow date palms and other crops. Sometimes the oasis may be abnormally large. Tafilalet Oasis in Morocco is a large oasis with an area of about 13,000 sq.km.

NOTES

THE COLD DESERT - LADAKH

Do you know?
 Drass, one of the coldest inhabited places on earth is located in Ladakh.

Ladakh is a cold desert lying in the Great Himalayas, on the eastern side of Jammu and Kashmir. The Karakoram Range in the north and the Zaskar mountains in the south enclose it. Several rivers flow through Ladakh, Indus being the most important among them. The rivers form deep valleys and gorges. Several glaciers are found in Ladakh, for example the Gangri glacier.

The altitude in Ladakh varies from about 3000m in Kargil to more than 8,000m in the Karakoram. Due to its high altitude, the climate is extremely cold and dry. The air at this altitude is so thin that the heat of the sun can be felt intensely. The day temperatures in summer are just above zero degree and the night temperatures well below 30°C. It is freezing cold in the winters when the temperatures may remain below 40°C for most of the time. As it lies in the rain shadow of the Himalayas, there is little rainfall, as low as 10 cm every year. The area experiences freezing winds and burning hot sunlight. You will be surprised to know that if you sit in the sun will your feet in the shade, you may suffer from both sunstroke and frost bite at the same time.

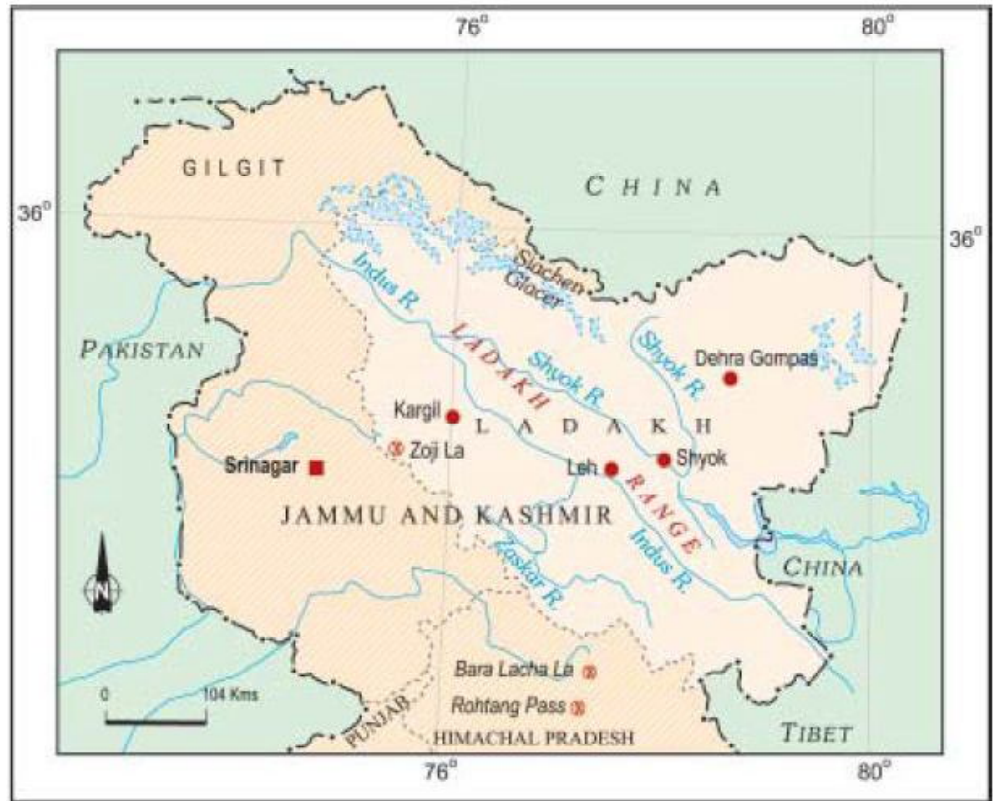


Fig. : Ladakh

Flora and Fauna

Due to high aridity, the vegetation is sparse. There are scanty patches of grasses and shrubs for animals to graze. Groves of willows and poplars are seen in the valleys. During the summers, fruit trees such as apples, apricots and walnuts bloom. Several species of birds are sighted in Ladakh. Robins, redstarts, Tibetan snowcock, raven and hoopoe are common. Some of these are migratory birds. The animals of Ladakh are wild goats, wild sheep, yak and special kinds of dogs. The animals are reared to provide for the milk, meat and hides. Yak's milk is used to make cheese and butter. The hair of the sheep and goat is used to make woollens.

NOTES

People

The people here are either Muslims or Buddhists. In fact several Buddhists monasteries dot the Ladakhi landscape with their traditional 'gompas'. Some famous monasteries are Hemis, Thiksey, Shey and Lamayuru.

Important Facts

The finest cricket bats are made from the wood of the willow trees.

Things to Remember

Manali - Leh highway crosses four passes, Rohtang la, Baralacha la Lungalacha la and Tanglang la. The highway opens only between July and September when snow is cleared from the road.



Baralacha la

In the summer season the people are busy cultivating barley, potatoes, peas, beans and turnip. The climate in winter



Fig. Ladakhi Women in Traditional Dress

months is so harsh that people keep themselves engaged in festivities and ceremonies. The women are very hard working. They work not only in the house and fields, but also manage small business and shops. Leh, the capital of Ladakh is well connected both by road and air. The National Highway 1A connects Leh to Kashmir Valley through the Zoji la Pass.

Tourism is a major activity with several tourists streaming in from within India and abroad. Visits to the gompas, treks to see the meadows and glaciers, witnessing ceremonies and festivities are important activities.

Life of people is undergoing change due to modernisation. But the people of Ladakh have over the centuries learned to live in balance and harmony with nature. Due to scarcity of resources like water and fuel, they are used with reverence and care. Nothing is discarded or wasted.

