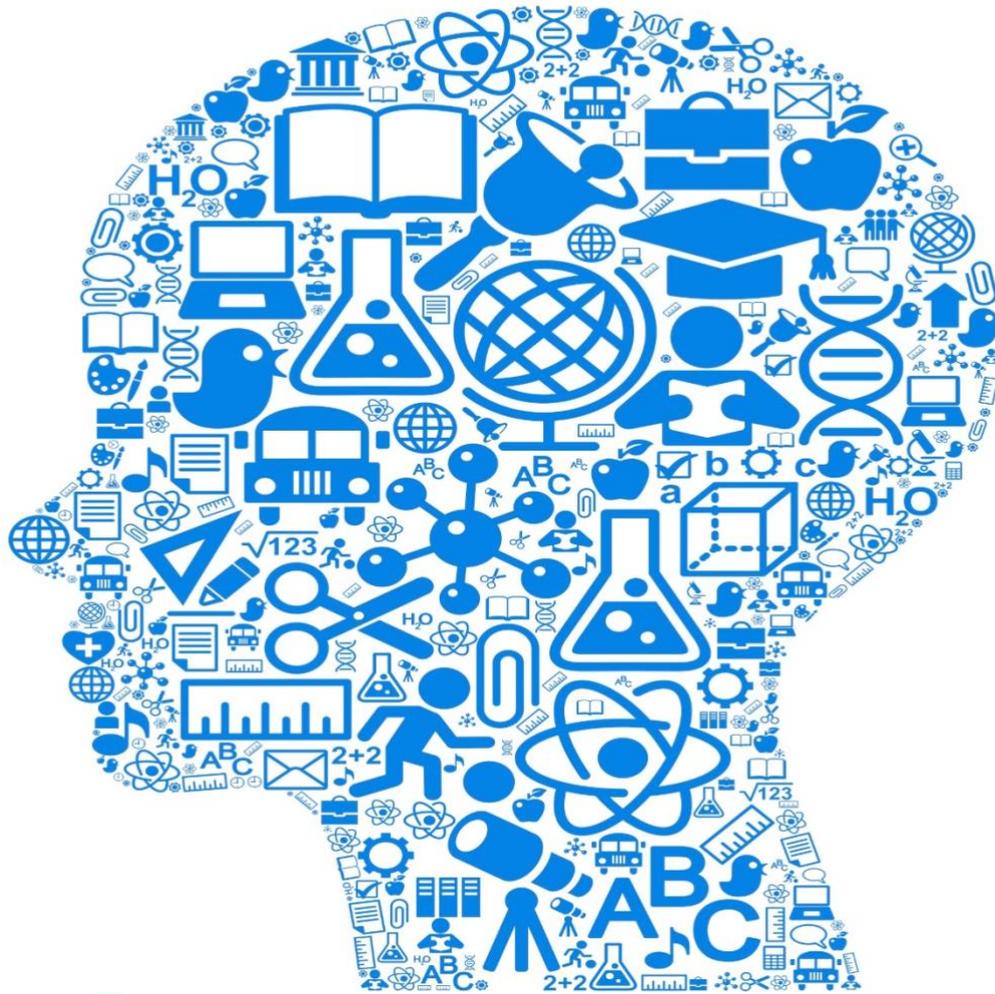


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THE EARTH AND THE SOLAR SYSTEM

Fact sheet: - Why can't we see the moon and all kinds of bright objects during day Time?

- ❖ It is because Very bright light of the sun does not allow us to see all these bright objects of the night sky.

➤ **About the Stars:** -

- Some celestial bodies are big and hot, some are made of gases, some have their own heat and light- such are called stars (Sun). These small twinkling objects in a sky are the stars far away from the solar system.
- **Definition:** - A star is type of astronomical object consisting of a luminous spheroid of plasma held together by its own gravity.
- Various patterns formed by different group of stars are called Constellations. Saptrishi is a group of 7 stars that forms the part of Ursamajor (Big Bear) constellation.
- For at least a portion of its life, a star shines due to thermonuclear fusion of hydrogen into helium in its core, releasing energy that traverses the star's interior and then radiates into outer space.
- **Using the stars to determine your direction at night:** - In ancient times, people used to determine- during the night with the help of stars. The North Star indicates the north directions. It is also called the Pole star. It always remains in the same condition in the sky.

➤ **About the Planets:** -

- Some celestial bodies do not have their own heat and light. Such bodies are called Planets. These Planets receive their heat and light from their nearer star (Earth receives it from the sun).
- A planet is an astronomical body orbiting a star or stellar remnant that is massive enough to be rounded by its own gravity, is not massive enough to cause thermonuclear fusion.

➤ **The solar System:** -

The Solar System is the gravitationally bound system of the Sun and the objects that orbit it, either directly or indirectly. Of the objects that orbit the Sun directly, the largest are the eight planets, with the remainder being smaller objects, such as the five dwarf planets and small Solar System bodies.

The vast majority of the system's mass is in the Sun, with the majority of the remaining mass contained in Jupiter.

- The four smaller inner planets, Mercury, Venus, Earth and Mars, are **terrestrial planets**, being primarily **composed of rock and metal**.
- The four outer planets are giant planets, being substantially more massive than the terrestrials.
- The two largest, Jupiter and Saturn, are gas giants, being composed mainly of hydrogen and helium; the two outermost planets, Uranus and Neptune, are ice giants, being composed mostly of substances with relatively high melting points compared with hydrogen and helium, called volatiles, such as water, ammonia and methane.
- All eight planets have **almost circular orbits** that lie within a nearly flat disc called the ecliptic.
- The Solar System also contains smaller objects. The asteroid belt, which lies between the orbits of Mars and Jupiter, mostly contains objects composed, like the terrestrial planets, of rock and metal. Beyond Neptune's orbit lie the Kuiper belt and scattered disc, which are populations of trans-Neptunian objects composed mostly of ices

❖ The Sun: -

The Sun is 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. The sun is about 150 million km away from the earth. It comprises 99.86% of all the mass in the Solar System, produces temperatures and densities in its core high enough to sustain nuclear fusion of hydrogen into helium, making it a main-sequence star. This releases an enormous amount of energy, mostly radiated into space as electromagnetic radiation peaking in visible light.

Along with light, the Sun radiates a continuous stream of charged particles (a plasma) known as the solar wind. This stream of particles spreads outwards at roughly 1.5 million kilometres per hour. **Earth's magnetic field stops its atmosphere from being stripped away by the solar wind.** Venus and Mars do not have magnetic fields, and as a result the solar wind is causing their atmospheres to gradually bleed away into space. The interaction of this magnetic field and material with Earth's magnetic field funnels charged particles into Earth's upper atmosphere, where its interactions create **aurorae seen near the magnetic poles.**

❖ Planets: -

All the 8 planets of the solar system move around the sun in fixed paths. These paths are elongated and are called orbits.

The inner Solar System is the region comprising the **terrestrial planets and the asteroid belt.**

Characteristics of Inner planets: -

- The four terrestrial or inner planets have dense, rocky compositions, few or no moons, and no ring systems.
- They are composed largely of refractory minerals, such as the silicates—which form their crusts and mantles—and metals, such as iron and nickel, which form their cores.
- Three of the four inner planets (Venus, Earth and Mars) have atmospheres substantial enough to generate weather; all have impact craters and tectonic surface features, such as rift valleys and volcanoes.
- The term inner planet should not be confused with inferior planet, which designates those planets that are closer to the Sun than Earth is (i.e. Mercury and Venus).

❖ Asteroid belt: -

Asteroids except for the largest, Ceres, are classified as small Solar System bodies and are composed mainly of refractory rocky and metallic minerals, with some ice. They range from a few metres to hundreds of kilometres in size. Asteroids smaller than one meter are usually called meteoroids and micrometeoroids (grain-sized), depending on different, somewhat arbitrary definitions. The asteroid belt occupies the orbit between Mars and Jupiter.

❖ Outer Solar system and Outer planets: -

The outer region of the Solar System is home to the giant planets and their large moons.

Characteristics of Outer planets: -

- The four outer planets, or giant planets (sometimes called Jovian planets), collectively make up 99% of the mass known to orbit the Sun.
- Jupiter and Saturn are together more than 400 times the mass of Earth and consist overwhelmingly of hydrogen and helium.

- Uranus and Neptune are far less massive than 20 Earth masses and are composed primarily of ices. For these reasons, some astronomers suggest they belong in their own category, ice giants.
- All four giant planets have rings, although only Saturn's ring system is easily observed from Earth.

❖ **Kuiper belt: -**

The Kuiper belt is a great ring of debris similar to the asteroid belt, but consisting mainly of objects composed primarily of ice.

❖ **Where does Solar System ends?**

The point at which the Solar System ends and interstellar space begins is not precisely defined because its outer boundaries are shaped by two separate forces: the solar wind and the Sun's gravity. The limit of the solar wind's influence is roughly four times Pluto's distance from the Sun; this heliopause, the outer boundary of the heliosphere, is considered the beginning of the interstellar medium.

The heliosphere is a stellar-wind bubble, a region of space dominated by the Sun, which radiates at roughly 400 km/s its solar wind, a stream of charged particles, until it collides with the wind of the interstellar medium. The outer boundary of the heliosphere, the heliopause, is the point at which the solar wind finally terminates and is the beginning of interstellar space.

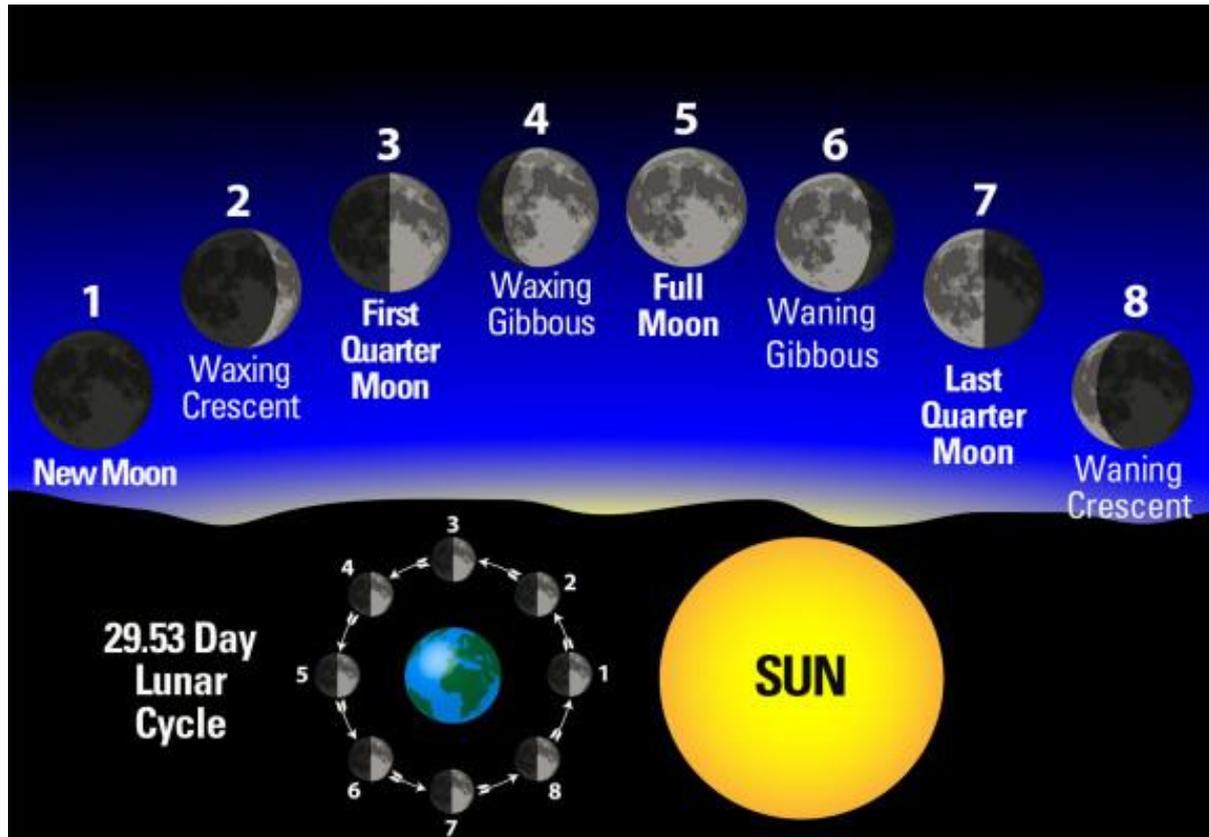
❖ **The Earth: -**

The Earth is the 3rd nearest planet to the sun. In size it is the 5th largest Planet. It is slightly flattened at the poles which is by its shape called Geoid. From the outer space, the Earth appears blue because Its 2/3rd surface is covered by H₂O therefore, it is called Blue Planet. The life of the sun takes about 8 mins to reach the earth. The life form (Earth) can only exist in a specific area of any solar system or similar body. This **zone is known as Goldilocks.**

❖ **The Moon: -**

Earth has only 1 satellite that is the moon. Its diameter is only one quarter that of the earth. It is about 3,84,400 km away from the earth. 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. It has neither Water nor air. It has mountains, plains and depressions on its surface. These scars shadows on the moon's surface. Full moon occurs only once in a

month and every fourth night (15 days) there is a new moon.



❖ Meteoroids: -

The small pieces of rocks which move around the sun are called **meteoroids**. When these objects enter earth's atmosphere they tend to be heated up and burn due to friction, which causes a flash of light. At this stage they are called **meteors**. Sometimes these meteors don't burn up completely and fall on the surface of the earth. At this stage, they are called **meteorite**.

➤ International Astronomical Union (IAU)

International Astronomical Union is an international association of professional astronomers, at the PhD level and beyond, active in professional research and education in astronomy. Among other activities, it acts as the internationally recognized authority for assigning designations and names to celestial bodies (stars, planets, asteroids, etc.) and any surface features on them.

The IAU is a member of the International Council for Science (ICSU). Its main objective is to promote and safeguard the science of astronomy in all its aspects through international cooperation.

MOTION OF THE EARTH AND ITS DIMENSION

The earth is not a sphere and is slightly flattened at the north and the south poles. The earth is tilted from its axis at the angle of $23\frac{1}{2}$. The axis passes through the north and the South Pole. The earth rotates from West to East. Hence, the sun rises from east.

➤ About Latitudes and Equator: -

The equator is an imaginary line which divides the northern hemisphere from the southern half into equal half. Equator is an imaginary circular line and is very important reference point to locate places on the earth.

All parallel lines from the equator upto the poles are called "Parallels of Latitude". Latitudes are measured in degrees. The equator represents the zero latitude. Since the distance from the equator to either of the poles is one-fourth of a circle around the earth, it will measure one-fourth of 360 degree that is 90 degree.

All parallel north of the equator are called North latitude to the south are called south latitudes. As we move away from the equator, the size of the parallels of latitude decreases.

Important Parallel of Latitudes: - There are 4 important parallels of latitudes

Tropic of Cancer- $23\frac{1}{2}^{\circ}$ N

Tropic of Capricorn- $23\frac{1}{2}^{\circ}$ S

Arctic Circle- $66\frac{1}{2}^{\circ}$ N

Antarctic Circle- $66\frac{1}{2}^{\circ}$ S

❖ Heat Zone of the Earth: -

Work to do: -

1. List out countries through which following latitudes pass (West to East)
 - a. Tropic of Cancer
 - b. Equator
 - c. Tropic of Capricorn
2. List of Indian States through which Tropic of Cancer passes. (West to East)

Space for Work

- The midday sun is exactly overhead at least once a year on all latitudes in between the tropic of cancer and the tropic of Capricorn. This zone is called **Torrid Zone**.
- The midday sun never shines overhead on any latitude beyond the tropic of cancer and Capricorn. These areas have moderate temperature and are called **Temperate zones**.
- Areas lying between Arctic Circle and the North Pole are very cold as sun does not rise much about the Horizon- this zone is called **Frigid Zone**.

- On the equator the midday sun (when the sun is over head) will occurred **twice** a year.

➤ **About Longitude, Prime Meridian and International Date Line: -**

Longitude is the measurement east or west of the prime meridian. Longitude is measured by imaginary lines that run around the Earth vertically (up and down) and meet at the North and South Poles. These lines are known as meridians. Each meridian measure one arc degree of longitude. The distance around the Earth measures 360 degrees.

The meridian that runs through Greenwich, England, is internationally accepted as the line of 0 degrees longitude, or prime meridian. The anti-meridian is halfway around the world, at 180 degrees. It is the basis for the International Date Line.

The distance between the longitudes is measure in degrees, each degree is further divided into mins each mins into secs. They are semi-circles and the distance between them decrease steadily pole wards until it becomes zero at the poles, where all the meridians meet.

Half of the world, the Eastern Hemisphere, is measured in degrees east of the prime meridian. The other half, the Western Hemisphere, in degrees west of the prime meridian.

❖ **Longitude and the World Time Zones: -**

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 calculated by the shadows casted by the sun, which is the shortest at noon and longest at sunrise and sunset. Degrees of longitude are divided into 60 minutes. Each minute of longitude can be further divided into 60 seconds. For example, the longitude of Paris, France, is 2° 29' E (2 degrees, 29 minutes east). The longitude for Brasilia, Brazil, is 47° 55' W (47 degrees, 55 minutes west).

As the earth rotates from west to east, those places east of Greenwich will be ahead of Greenwich time and those of the west will be behind it. The Earth rotates 360 degree in about 24 hrs, which means 15 degree an hour or one degree in 4 mins. In India, there is a time difference of 1 hr and 45 mints in the local times of Dwarka in Gujarat and Dibrugarh in Assam. In India, the longitude of 82° 30' E is treated as the Indian standard time. India is located 5 hrs and 30 mints ahead of Greenwich (GMP).

Some countries have a great longitude so they adopted more than one standard time. The earth has been divided into 24 times zone of one hr each. Each zone thus covers 15 degree of longitude.

➤ **Rotation and Revolution of the Earth**

Imagine a line passing through the center of Earth that goes through both the North Pole and the South Pole. This imaginary line is called an axis. Earth spins around its axis, just as a top spins

around its spindle. This spinning movement is called **Earth's rotation**. At the same time that the Earth spins on its axis, it also orbits, or revolves around the Sun. This movement is called **revolution**. In short, **Rotation** is the movement of the earth on its axis and **Revolution** is the movement of the earth around the sun in a fixed path or orbit.

The axis of the earth which is an imaginary line, makes an angle of $66\frac{1}{2}$ degree with its orbital plane. Due to the spherical shape of the earth, only half of its get light from the sun at a time. The circle that divides day from night on the globe is called the **circle of Illumination**.

Earth Day is referred to the period of rotation that is 24 hrs and is called earth day.

The Earth revolves around the Sun because gravity keeps it in a roughly circular orbit around the Sun. The Earth's orbital path is not a perfect circle, but rather an ellipse, which means that it is like a slight oval in shape (Figure 24.10). This creates areas where the Earth is sometimes farther away from the Sun than at other times. We are closer to the Sun at perihelion (147 million kilometers) on about January 3rd and a little further from the Sun (152 million kilometers) at aphelion on July 4th.

❖ **Seasons occurring on the Earth**

The earth is going around the sun in an elliptical orbit. Seasons change due to change in position of the earth around the sun. When northern hemisphere experiences winter it is called **Winter Solstice (22nd December)**. When the northern hemisphere experiences summer it is called **Summer Solstice (21st June)**. Autumn and spring occur around 21st march and 23rd Sept in southern and northern hemisphere represent. On 21st June the rays of the sun fall directly on the Tropic of Cancer. 21st June is also the longest day and the shortest night in the northern hemisphere.

Students sometimes think our elliptical orbit causes Earth's seasons, but this is not the case. If it were, then the Northern Hemisphere would experience summer in January! The reason the Earth (or any planet) has seasons is that Earth is tilted $23\frac{1}{2}$ degrees on its axis. This means that during the northern hemisphere "summer" the North pole points toward the Sun, receiving direct solar rays, and in the northern hemisphere "winter" the North Pole is tilted away from the Sun and the rays of the Sun are angled rather than direct. Thus, the season we experience depends not on where the Earth is in its revolutionary orbit around the Sun, but rather the inclination of the axis of the Earth.

❖ **What would happen if earth did not rotate?**

- One half of the earth will experience day while the other will experience night for a period of 6 months.
- The part receiving the day night would be too warm to sustain life and the part experiencing the night would be too cold for sustainability.

MAJOR DOMAINS OF THE EARTH

There are 4 main components of the environment

1. **Lithosphere**:- The solid portion of the earth on which we live.
2. **Atmosphere**: - The gaseous layer that surrounds the Earth.
3. **Hydrosphere**: - Water covers a big area of the earth surface and this area is called hydrosphere. Hydrosphere comprises of all forms of water:- Water and Water Vapours.
4. **Biosphere**: - Biosphere is the narrow zone where we find land, water and air together, which contains all forms of life.

➤ **Lithosphere**

A lithosphere is the rigid, outermost shell of a terrestrial-type planet, or natural satellite, that is defined by its rigid mechanical properties. On Earth, it is composed of the crust and the portion of the upper mantle that behaves elastically on time scales of thousands of years or greater. The outermost shell of a rocky planet, the crust, is defined on the basis of its chemistry and mineralogy. It comprises the rocks of the earth's crust and the thin layers of soil that contain nutrients which sustain organisms.

There are 2 main divisions of the earth's surface. The large land masses are known as the continents and the huge water bodies are called the ocean basins. The level of sea water remains the same everywhere.

Elevation of land is measured from the level of the sea which is taken as zero. The highest mountain peak, Mount Everest is about 8.8 km above the sea level. The greatest depth of about 11 kms is recorded at Mariana trench in the Pacific Ocean.

Major landforms of the Earth: - The Earth has an infinite variety of landforms. The ground we are standing on is in continuous movement. The internal process leads to the upliftment and sinking of the earth's surface at several places. The external process is the continuous wearing down and rebuilding of land surface. The wearing away of earth's surface is called erosion and rebuilt by the process of deposition. These two processes are carried out by running water, ice and wind.

❖ **Mountains**

A mountain is any natural elevation of the earth surface. The mountains may have a small summit or (Peak) and a broad base. In some mountains, there are permanently frozen rivers of ice. They are called glaciers. There are some mountains one cannot see, they are under the sea/Ocean. Mountains may be arranged in a line known as Range. Many mountain systems consist of a series of parallel ranges for e.g.: - The Himalayas, the Alps and the Andes.

There are three types of mountains: -

1. **The Fold mountains**: - Fold mountains are the most common type of mountain. The world's largest mountain ranges are fold mountains. These ranges were formed over millions of years. Fold mountains are formed when two plates collide head on, and their edges crumpled, much the same way as a piece of paper folds when pushed together. The upward folds are known as anticlines, and the downward folds are synclines.
2. **The Block mountain**: - These mountains form when faults or cracks in the earth's crust force some materials or blocks of rock up and others down. Instead of the earth folding over, the earth's crust fractures (pulls apart). It breaks up into blocks or chunks.

Sometimes these blocks of rock move up and down, as they move apart and blocks of rock end up being stacked on one another. Often fault-block mountains have a steep front side and a sloping back side.

3. **The Volcanic mountains:** - Volcanic Mountains are formed when molten rock (magma) deep within the earth, erupts, and piles upon the surface. Magma is called lava when it breaks through the earth's crust. When the ash and lava cools, it builds a cone of rock. Rock and lava pile up, layer on top of layer.

- The **Himalayan Mountains and the alps** are young fold mountains with ridged relief and high conical peaks.
- The **Ravines in India** are form of old fold mountain systems. The range has considerably worn down due to the process of erosion.
- The **Block Mountains** are created when large areas are broken and displaced vertically. The uplifted blocks are called Horsts and the load block is called Graven.
- The **Rhine valley and Vosges Mountains** in Europe are examples of such mountains system.
- The **volcanic mountains** are formed due to volcanic activity. **Mount Kilimanjaro** in Africa and Mount Fuji in Japan are its examples.
- The mountains are a store house of H₂O, many rivers have their source in the glaciers in the mountains.
- The river valley and traces are ideal for cultivation of crops. Mountains have a rich variety of flora and fauna.

❖ Plateaus

Plateau mountains are not formed by internal activity. Instead, these mountains are formed by erosion. Plateaus are large flat areas that have been pushed above sea level by forces within the Earth, or have been formed by layers of lava. The dictionary describes these as large areas of 'high levels' of flat land, over 600 meters above sea level. Plateau mountains are often found near folded mountains. As years pass, streams and rivers erode valleys through the plateau, leaving mountains standing between the valleys.

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 which step slopes. The high of the plateau often varies from few hundred meters to several thousand metres.

The Deccan plateau in India is one of the oldest plateaus. The east- African plateau in Kenya, Tanzania and Uganda and Western Plateau of Australia are other examples. The Tibetan plateau is the highest plateau in the world.

Plateaus are very useful because they are rich in mineral deposits. African plateau is famous for gold and diamond mining. In India huge reserves of Iron, Coal and magnesia are found in the chotanagpur plateau. In India, the hundred falls in the chotanagpur plateau on the river Subarnarekha and the jog Falk in Karnataka flows from the plateaus. The lava plateaus are rich in black soil that is fertile and good for cultivation.

❖ Plains

Plain is a flat, sweeping landmass that generally does not change much in elevation. Plains occur as lowlands along the bottoms of valleys or on the doorsteps of mountains, as coastal plains, and as plateaus or uplands. Plains are one of the major landforms on earth, where they are present on all continents, and would cover more than one-third of the world's land area. Plains may have been formed from flowing lava, deposited by water, ice, wind, or formed by erosion by these agents from hills and mountains. Plains would generally be under the grassland (temperate or subtropical), steppe (semi-arid), savannah (tropical) or tundra (polar) biomes. In a few instances, deserts and rainforests can also be plains.

- ❖ **Continents:** - There are 7 major continents and the greater part of them lies in the northern hemisphere: -
 - **Asia:** - It is the largest continent and covers about $1/3^{\text{rd}}$ of total land area of the earth. The continent lies in the eastern hemisphere. The Arctic Circle, Tropic of Cancer and Equator passes through this continent. Asia is separated from Europe by the Ural Mountains on the west.
 - **Europe:** - It is much smaller than Asia. The continent lies to the west of the Asia. The Arctic Circle passes through it. It is bounded by water bodies on three sides. The combined land mass of Europe and Asia is called Eurasia.
 - **Africa:** - It is the second largest continent after Asia. The equator or zero-degree latitude runs almost through the middle of the continent. A large part of Africa lies in the northern hemisphere. This is the only continent through which the tropic of cancer, the equator and the tropic of Capricorn passes.

Work to do

Enlist all the African countries from west to east from which: -

1. Tropic of cancer passes
2. Equator passes
3. Tropic of Capricorn passes

Space for Work

- **North America:** -
It 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.
- **South America:** -
It lies mostly in the southern hemisphere. 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.
- **Australia:** -

It 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:** -

It lies completely in the southern hemisphere. The South Pole lies almost at the centre of this continent. It is permanently covered with thick ice sheets. There are no permanent human settlements but many countries have research stations in Antarctica. India's research stations are: - Maitri and Dakshingangotri.

- ❖ **Interiors of the Earth**

- **Crust:** - The upper most layer over the earth's surface. It is the thinnest of all the layers. It is about 35km on the continents and only 5kms in the oceans. The main mineral constituents of the continental mass are Silica and Alumina (Si Al). The oceanic crust mainly consists of silica and magnesium (Si-Ma). The Crust forms only 1% of the volume of the earth, 84% consist of the mantle and 15% makes the core.
- **Mantle:** - Trust beneath the crust is the mantle which extends upto a depth of 2900km below the crust.
- **Core:** - It has a radius of about 3500km. It is mainly made up of Nickel and Iron (Nife). The central core has very high temp and pressure.

- ❖ **Rocks and Minerals**

Any natural mass of mineral matter that makes up the earth's crust is called a rock. There are three major types of rocks that is **igneous rocks, sedimentary rocks and metamorphic rocks.**

- 1. Igneous Rocks:** - When the molten magma cools, it becomes solid. Rocks thus formed are called igneous rocks. Also called Primary Rocks. There are 2 types of igneous rocks:
 - I. Intrusive Rocks:** - Sometimes the molten magma cools down deep inside the earth's crust. These types of rocks are called intrusive igneous rocks. They cool down slowly and hence form large grains. For Example, Granite.
 - II. Extrusive Rocks:** - Lava is actually very 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 solid. Rocks form in such a way on the crust is called extrusive igneous rocks. They have a very fined grained structure. For example, Basalt. The Deccan plateau of India is made up of Basalt rocks.
- 2. Sedimentary Rocks:** - 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 harden to form layers of rocks and such type of rocks is called sedimentary rocks. Ex- Sandstone: - Red fort is made up of Red sandstone. These rocks may also contain fossils of plants, animals and other microorganisms that once lived on them. **Fossils:** - The remains of the dead plants and animals trapped in the layer of the rocks are called fossils.
- 3. Metamorphic Rocks:** - Igneous and sedimentary rocks can change into metamorphic rocks under (Great heat pressure) for ex- clay into slate and limestone into marble. The metamorphic rocks which are still under heat and pressure melt down to form molten magma.

- ❖ **Rock Cycle:** - This process of transformation of the rock from one to another is known as the rock cycle. Rocks are made up of different minerals. Minerals are naturally occurring substance which has certain physical property and definite composition.
- ❖ **The Lithospheric Plates:** - The earth's crust consists of several large and small rigid, irregularly shaped plates which carry continents and the ocean floors. These plates move around very slowly: - Just a few millimetres each year. The molten magma inside the earth moves in a circular manner. The movement of these plates cause change on the surface of the earth. The earth's movements can be divided on the basis of the forces which cause them.

1. Endogenic Forces: - The forces which act in the interior of the earth are called endogenic forces. The endogenic forces sometimes produce sudden movement like earthquake 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. When the lithospheric plates move the surface of the earth vibrates the vibration can travel all around the earth. These vibrations are called earthquake. The place in the crust where the movement starts is called the focus and the place on the surface above the focus is called epicentre.

There are 3 types of earthquake wave: -

P- Waves: - They travel longitudinally

S- Waves: - These are called transverse waves.

L- Waves: - They travel on the surface of the earth.

The Shadow Zone: - Seismic shadow zone is an area of the Earth's surface where seismographs can only barely detect an earthquake after its seismic waves have passed through the Earth. When an earthquake occurs, seismic waves radiate out spherically from the earthquake's focus. The **Primary seismic waves** are refracted by the liquid outer core of the Earth and are not detected between 104° and 140° from the epicentre. The **Secondary seismic waves** cannot pass through the liquid outer core and are not detected more than 104° (approximately 11,570 km or 7,190 mi) from the epicentre.

2. Exogenic forces: - The forces that work on the surface of the earth are called exogenic forces.

❖ **How landforms are formed?**

The landscape goes through continuous change by two processes i.e. Weathering and Erosion

- **Definition of Weathering:** -It is the breaking up of the rocks on the earth's surface.
- **Definition of Erosion:** - It is the wearing away of the landscape by difference agents like water, wind and glaciers. The eroded material is carried away or transported by water, wind etc and eventually deposited.
- **Work of a River:** -
 - **Course of a River:** -
 - **Young River – The Upper Course:** - The beginning of a river, when it flows quickly with lots of energy, is called a young river. The river here is smaller and usually has a rapid, tumbling flow that cuts a narrow channel through rocky hills or mountains. The fast flowing river can create waterfalls where it carves out layers of soft rock and leaves a cliff of hard rock standing.

- **Middle Aged River – The middle Course:** - The middle of a river's journey, when it gets wider and slows down, is called the middle age. Rivers often meander (follow a winding path) along their middle course. The current of the river no longer has the force to carry stones or gravel. This material drops to the riverbed, where it forms bars of sand or gravel or builds islands. As the floods it deposit layers of fine soil & other material called sediments along its banks. The lead to the formation of as flat flood plain. The raise bank are called **Levees**.
- **Old River – The lower Course:** - At the mouth, there is often a river delta, a large, silty area where the river splits into many different slow-flowing channels that have muddy banks. As the river approaches the sea the speed of the river begins to break up into a number of streams called **Distributaries**. Each distributor forms its own mouth the collection of sediments from all the mouth forms a data.
- **Work of Sea Waves:** -
 - The erosion and deposition of the sea waves gives rise to coastal land forms. Sea waves continuously strike at the rock. Developing cracks in the rocks.
 - Hollow like caves are formed on the rocks. They are called sea caves. As these cavities become bigger and bigger only the roof the caves remain forming **sea arcs**. Further, erosion breaks the roof and only walls are left. These walls like features are called **stacks**.
 - The steepy rock coast rising almost vertically above sea water are called **Sea Cliff**.
 - The sea waves deposit sediments along the shores forming beaches.
- **Work of the Glaciers**
 - Glaciers are rivers of ice which too erode the landscape by building soil and stones to expose the solid rock below.
 - Glaciers carve out deep hollows which later becomes lakes in the mountains.
 - The material carried by the glaciers such as rocks, sand & silt get deposited. These deposits form **Glacial Moraines**.
- **Work of Wind**
 - An active agent of erosion & deposition in the desert is wind. In deserts – rocks in the shape of mushroom are formed which are called **mushroom rocks**. Winds erode the lower section of rocks more than the upper part.
 - When the wind blows, it lifts & transport sands from one place to another. When it stops blowing the sand falls & gets deposited in low hill like structures. These are called sand deans. When the grains of sand are very fine & light, the wind can carry it over long distances. When such sand is deposited in large areas it is called **Loess**.

➤ Hydrosphere

Earth is called the Blue Planet. More than 71% of the earth is covered with H₂O and 29% is with land. 97% of earth's H₂O is found in the oceans and it is too salty for Human use. A large proportion of the rest of the water is in the form of ice sheets and glacier son under the ground.

Oceans: - Oceans are the major part of hydrosphere and they are all interconnected. **Ocean waters are always moving. The three chief movements of ocean water are: -**

1. **Waves:** - Waves are created by energy passing through water, causing it to move in a circular motion. However, water does not actually travel in waves. Waves transmit energy, not water, across the ocean and if not obstructed by anything, they have the potential to travel across an entire ocean basin.

Waves are most commonly caused by wind. Wind-driven waves, or surface waves, are created by the friction between wind and surface water. As wind blows across the surface of the ocean or a lake, the continual disturbance creates a wave crest. These types of waves are found globally across the open ocean and along the coast.

2. **Tides:** - Tides are the rise and fall of sea levels caused by the combined effects of the gravitational forces exerted by the Moon and the Sun, and the rotation of the Earth. The predictions are influenced by many factors including the alignment of the Sun and Moon. Tide changes proceed via the following stages:
 - a. Sea level rises over several hours, covering the intertidal zone; **flood tide**.
 - b. The water rises to its highest level, reaching **high tide**.
 - c. Sea level falls over several hours, revealing the intertidal zone; **ebb tide**.
 - d. The water stops falling, reaching **low tide**.
3. **Ocean currents:** - An ocean current is a continuous movement of ocean water from one place to another. Ocean currents are created by wind, water temperature, salt content, and the gravity of the moon. The current's direction and speed depend on the shoreline and the ocean floor. They can flow for thousands of miles and are found in all the major oceans of the world. One major example of an ocean current is the Gulf Stream in the Atlantic Ocean. Ocean currents can be found on the water surface and deeper down

Currents on the surface often depend on wind. They travel clockwise in the northern hemisphere. They travel counter clockwise in the southern hemisphere. They are found up to 400 metres (1,300 ft) below the surface of the ocean. Deeper currents depend on water pressure, temperature, and salt content.

- ❖ **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.
- ❖ **The Atlantic Ocean** is the second largest ocean and is in the shape of S. The coast line of Atlantic Ocean is highly indented. This irregular and indented natural harbours and ports. The Atlantic Ocean forms the British Ocean.
- ❖ **The Indian Ocean** is the only ocean named after a country and is in the shape of a triangle.
- ❖ **The Southern Ocean** encircles the continent of Antarctica and extends north world to 60-degree South latitude.
- ❖ **The Arctic Ocean** is located within the Arctic Circle and surrounds of the North Pole. It is connected with the Pacific Ocean by a narrow strait of shallow H₂O known as (Bering Strait).

Water Cycle: - Sun is the source of ultimate solar energy which causes various climatic phenomena on the surface of the earth. It regulates the amount of isolation coming on the surface of the earth. Sun's heat causes evaporation of water vapours which results in cloud formation & causing rainfall

Water (L) → Water Vapour (Gas) → Rainfall (WL)

The process of which water continuously change its form & circulates between oceans atmosphere & land is known as Water cycle.

Facts: -

- **Isthmus:** - A narrow strip of land joining the two land masses.
- **Strait:** - A strait is a narrow passage of water connecting two large bodies like seas and oceans.

❖ **Salinity:** Amount of salt in grams present in 1000grms of water. The average salinity of the ocean is 35 parts per thousand. Dead Se in Israel has salinity of 340 and is one of the highest saline water.

➤ **Atmosphere**

The earth is surrounded by a large of gas called atmosphere. This thin layer of gases provides us with the air we breathe and protects us from the harmful effects of Sun's rays. The atmosphere extends upto a height about of 1600kms. The atmosphere is composed mainly of nitrogen and oxygen, which makes up about 99% of clean and dry air. The composition is Nitrogen- 78%, Oxygen- 21% and CO₂, Argon and other gases makes up 1%.

Oxygen is the breath of life. While nitrogen helps in the growth of living organism. CO₂, though present in minute amount is important as it absorbs heat. Radiated by the earth, thereby keeping the planet warm. The density of the atmosphere varies with height. It is maximum at sea level and rapidly as we go up. Air moves from high pressure to low pressure, moving air is known wind.

The atmosphere is divided into 5 layers based on composition, temp and other properties. The layers, starting from the earth's surface are the troposphere, the stratosphere, the mesosphere, the thermosphere and the exosphere. When the air is heated, it expands become lighter and goes up. Cold air is dense & heavy.

❖ **Structure of Atmosphere**

The atmosphere can be divided into five layers.

1. **Troposphere:** - This layer is the most important layer of the atmosphere. Its average height is 13Km. Almost all the weather phenomena's like rainfall, fog & hill storms occur in this layer. The height of troposphere is maximum at equator and minimum over the poles in winters.
2. **Stratosphere:** It is above the troposphere & extends up to a height of 50Km. This layer is almost free from clouds & associated weather phenomena making conditions most ideal for flying aeroplane. One Important feature of stratosphere is that it contains layer of Ozone Gas.
3. **Mesosphere:** This the third layer of the atmosphere. It lies above the stratosphere. It extends upto the height of 180Km. Meteorites burn up in this layer on entering the earth's atmosphere.

4. **Thermosphere:** In thermosphere temperature rises very rapidly with height. **Ionosphere** is a part of this layer. It extends between 80 to 400 Km. This layer help in radio transmission. Infact radio waves transmitted from the earth are reflected back to the earth by this layer.
5. **Exosphere:** The Upper most layer of atmosphere is known as exosphere. This layer has very thin air. Light gases like Helium & Hydrogen float into the space from here.

❖ Weather and Climate

The average weather conditions of a place for a long period of time represents the climate of place

1. **Temperature:** The degree of hotness and coldness of the air is known as temperature. The temperature of the atmosphere changes not only between day & night but also from season to season. An important factor that influences the distribution of temperature is insolation. Insolation is the incoming solar energy intercepted by earth. The amount of insulations decreases from equator towards the poles.
Heat Island: Temperature in cities is much higher than that of villages. The concrete of roads get heated during the day. This makes cities warmer than its surrounding area, hence forming heat island.
2. **Air Pressure:** Air Pressure is defined as the pressure exerted by the weight of air on the earth's surface. The air presses us from all directions and our body exerts a counter pressure. If there is no air pressure the counter pressure exerted by our body would make the blood vessels burst. The air pressure is highest at sea level & as with height. Air pressure depends on temperature horizontally in area where temperature is high the air gets heated and rises. This created a low-pressure area. The low area is associated with cloudy skies & wet weather. In areas having low temperature, the air is cold & heavy, hence the air sink & created a high-pressure area. The high-pressure area is associated with clear & shiny skies. The air always moves from high pressure area to low pressure area *(Reason for monsoon coming)
3. **Wind:** The most of air from high pressure to low pressure is called wind. A wind is named after the direction of which it blows. Winds can be broadly divided into three types:
 - a. **Permanent Winds:** The trade wind westerlies and easterlies are permanent winds. These blow constantly throughout the year in particular direction.
 - b. **Seasonal Winds:** These winds changes their direction in different seasons. For Example: Monsoonal winds in India
 - c. **Local Winds:** this blow on particular period of the day for a year in small area.
4. **Moisture:** When water evaporates from land & different water bodies it becomes water vapours, is known as humidity. When the air is full of water vapours, we call it humid days. When the water vapour rises it starts cooling, the water vapour condenses forming the causing of water droplets Clouds are just masses of such water droplets. Jet planes flying in the sky leave a white trail. The moisture from their engines condense and hence we see the trail of this condensed moisture. Precipitation that comes down to the earth is liquid form is called rain. Most of the ground water comes from rain water.

➤ Biosphere

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. In the Biosphere living beings are inter related and inter dependent on each other for survival. The life supporting system is known as ecosystem.

Vultures in the Indian sub-continent were dying of kidney failure. After scavenging like stock treated with Diclofenac. (a Pain Killer). Vulture due to its ability to feed on dead life stock is scavenger and is considered as vital cleaner of the environment. Growth of vegetation depends primary on temperature and humidity. The forests are associated with area having abundant water supply. As the amount of moisture decreases the size of trees and their density reduces.

Thorny shrubs grows in dry areas of low rainfall in such areas plants have deep roots and leaves with thorny and waxy surface reduce the loss of moisture through transpiration (evaporation of water through Leaves).

About CITES (Convention on International Trade In Endangered Species of Wild Flora & Fauna) International agreement: - A national park is a natural area designated to protect the ecological integrated of one or more ecosystems for the present & future generations.

WORLD GEOGRAPHY FEATURES

➤ Tropical and Subtropical Regions

The tropical region lies vary close to the equator, between 10°N to 10°S. So, it is referred as the equatorial region. The River Amazon flows through the mountains to the west & reaches the Atlantic Ocean to the east. When Spanish explorers discovered the Amazon River, local tribes waring head gears and grass skirts reminded them of spheried tribes of women warriors known as Amazon's.

➤ Rainforest

Thick forests which do not allow sunlight to reach the ground. The ground remains dark and dem. Orchids, bromeliads grow as parasites. Bromamides are the plant species that store water in their leaves. They are rich in fauna, birds such as Toucans, humming birds and bird of paradise, crocodiles, snakes & Pathogens, flesh eating Piranha fish are also found here.

Slash & Burn: Farmers clear as piece of land by cutting down trees & bushes and these are burnt to release nutrients into the soil. Over the time after repeated activity, the soil losses nutrients.

➤ The Prairies

They are located in North America. These are temperate grasslands on flat gentle sloped hill land. For most part prairies have tree less topography but near low plains, woodlands can be found. Tall grass also known as sea of Grass is found here. They are bound by Rocky Mountains in west and great lakes in easter. In USA the area is drained by the tributaries of Mississippi and in Canada by Saskatchewan River. The tribes found in this region are Apache, Crow, Cree and Pawnee. Climate is of continental type with extreme temperature. It receives moderate Annual rainfall. The area receives local hot wind called Chinook.

Prairies are practically treeless but where water is available trees such as willows, alders, poplars grow. The area is good for crops like Maize, Potato. Soyabean, cotton and alpha- alpha. And where rainfall is very less where grasses are short & spare this region is suitable for cattle raring cattle farms called Ranches.

➤ The Velds

They are bound by Drakensburg mountains in the east and the Kalahari Desert in the west. The terrain is drained by river orange and Limpopo. They have a mild climate due to the influence of

Indian Ocean. Winters are cold and dry. July is the coldest month. Soils are not fertile due to Presence of discontinuous grassed. Major crops like Maize wheat, Barely, Oats and Potato are grown here. Cash Crops like Tobacco, Sugarcane and Cotton are also grown here.

Velds have rich reserves of minerals, iron, steel, gold and diamonds. Jonesburg is known as Gold Capital of World. Kimberley is famous for Diamond Mining.

➤ **Sahara Desert**

It is an arid region with low rainfall & extremely high or extremely low temperature having cactus vegetation. It is world's largest desert and can be found in North Africa. It touches 11 countries: Algeria, Chad, Egypt, Libya, Mali, Mauritania, morocco, Niger, Sudan, Tunisia with gravel plains & elevated plateaus. The present Sahara once used to be lush green plain. Due to climatic conditions it changed into a barren land.

Sahara Desert is extremely hot and dry. It has a short rainy season & the sky is cloudless and clear. The discovery of oil in Algeria, Libya and Egypt constantly transforming the desert. Iron, Phosphorus, manganese & uranium.

INDIA AND ITS FEATURES

In the north, it is bound by the Lofty Himalayas. The Arabian Sea is in the West, the Bay of Bengal in East and Indian Ocean in the South. India has an area of about 3.28 million sq mt.

The North-South extend of India is about 3,200 kms and the east- west extend is about 2900 kms. It is the second most popular country of the world. The tropic of cancer ($23\frac{1}{2}$ N) passes almost half way through the country. From South to North, mainland 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. The local time changes by 4 mins for every one degree of longitude.

Sri Lanka is separated from India by Palk Strait. The Adam's Bridge is situated between Tamil Nadu and Sri Lanka. Pamban Island is a part of the Adam's Bridge. Rameshwaram is situated on this island.

➤ **The Himalayan mountains**

The Himalayas geologically young & structurally fold mountains stretch over the northern borders of India. The northern most is the great Himalayan or Himadri. The world's highest peaks are located in Himadri range. Himadri is the most continuous range consisting of logistic range with an average height of 600m. Its cont. all the prominent Himalayan peaks. The folds of great Himalayas are grown as asymmetrical in nature. The core of this part of Himalayas is composed of granite. It is perennially snow bound. A large number of glaciers descend from these ranges.

Middle Himalayas or Himachal lies to the south of Himadri. The Shivalik is the southernmost range. These mountain ranges run in a west – east direction from the Indus to Brahmaputra. The ranges are mainly composed of highly compressed and altered rocks. The altitude varies about 3700m and the average width of 50km. While the Pir Panjal range forms the longest and the most important range, the Dholadhar and the Mahabharata ranges are also prominent ones. This range consist of the most valley of the Kashmir the Kangra and Kullu valley in H.P.

The outer most range of the Himalayas is called the Shivalik. They extend over a width of 10 -15 Km and have an altitude varying between 900 and 1100m. These ranges are composed of unconsolidated sediments brought down by rivers from the main Himalayan ranges located farther north. These valleys are covered with thick gravel and alluvium. The longitudinal valleys lying between lesser Himalayas and Shivalik are known as Duns. For example: Dehradun, Kotlidun and Patlidun.

The Himalayas represent the loftiest and one of the most rugged mountain barriers of the world. They form an arc which covers a distance about 2400km. Their width varies from 400km in Kashmir to 150 km in Arunachal Pradesh. The altitude variations are greater in the eastern half than those in the western half. The Himalayas consists of three parallel ranges in its longitudinal extents. A number of valleys lie between these ranges.

Besides the longitudinal divisions the Himalayas have been divided on the basis of regions from west to east. These divisions have demarcated by river valleys.

River System	Name of the Area
Indus and Satluj	Punjab Himalayas (Himachal Himalayas or Kashmir Himalayas)
Satluj and Kali	Kumaon Himalayas
Kali and Tista	Nepal Himalayas
Tista and Dihang	Assam Himalayas

The Brahmaputra marks the eastern most boundaries of the Himalayas. Beyond the Dihang gorge, the Himalayas bend sharply to the south and spread along the eastern boundary of India. They are known as Purvanchal or the eastern hills and mountains. Purvanchal hills running through N- eastern states of India are mostly composed of strong sand stones which are sedimentary rocks. The Purvanchal comprises of Pataki hills, Naga Hills and the Mezo hills.

➤ The Northern Plains

The Northern Indian plains lie to the south of the Himalayas. They are generally level and flat, and formed by the alluvial deposits laid down by the rivers. In the Western part of India lies the great Indian Desert. It is a dry, hot and sandy stretch of land with very little vegetation.

The northern plains have been formed by interplay of three major rivers system: - Indus, Ganga and Brahmaputra. The plains have an extend of 2400 km and width of 242 to 320Km. In the lower coarse and due to gentle slope, the velocity of river decreases which result in the formation of river an island. Majuli in the Brahmaputra river is the largest in habited Riverian Island in the world. Majuli is now the largest river island district in the world and is located in Assam. The rivers in the lower coarse splits into numerous channels due to the deposition of silt. These channels are known as Distributaries.

The western part of the Northern plains is referred to as the Punjab Plains. Formed by the Indus and its tributaries the large part of this plain lies in Pakistan. The Indus and its tributaries the Jhelum the

Chenab, Ravi and Beas and the salty originates in the Himalayas. This section of plains is dominated by Doabs.

The Ganga plain extends between Ghaggar and Tista river. It is spread over the states of North India- Haryana, Delhi, U.P and Bihar and parts of Jharkhand and West- Bengal. In Assam region lies the Brahmaputra plains.

The Northern plains have little variation in relief. According to the variations the Northern plains can be divided into four regions.

Region	Explanation
Bhabar	The rivers, after descending from mountains, deposit pebbles in a narrow belt of about 8 to 16 km in width lying parallel to the slopes of Shivalik. All the streams disappear in this region.
Terai	South of the Bhabar, the streams and river remerge and create marshy region known as Terai. This region was once thickly forested and full of wildlife. The forests has been cleared create agriculture land.
Bhangar	The largest part of the Northern plain is formed of older aluminium. They lie above the flood plains of rivers and present a terrace like feature. This part is known as Bhangar. The soil in these region cont. Calcareous deposits locally known as Kankar.
Khadar	The newer, younger deposits of the flood plain are called khaddar. They year and so are fertile, thus ideal for intensive agriculture.

➤ The Peninsular Plateau

To the South of Northern plains lies the peninsular plateau. It is triangular in shape. The peninsular plateau is highly uneven with numerous hill ranges valley. Peninsular Plateau is a table land composed of the old crystalline, igneous and metamorphic rocks. The plateau is rich in minerals like coal and iron ore. The plateau has broad and shallow valleys and rounded hills. The plateau can be broadly divided into central highlands and the deccan plateau. The part of the peninsular plateau lying to the north of Narmada river covering a major area of Malwa plateau is known as the central highland. The Central highlands are wider in the west but narrower in the east. The eastward extension of this plateau is locally known as Bundelkhand and Bagelkhand. The chotanagpur plateau marks the eastward extension drain by the Damodar River. Further westward extension gradually merges with the sandy and rocky desert of Rajasthan. The flow of the rivers draining this region namely the Chambal, the Sind, the Betwa and Ken from southwest to North-east. Thus, indicating the slope.

Aravalli hills, one of the oldest hangs of the world, border it on the North west side. The Vindaya and Satpura are the important ranges. The river Narmada and Tapi flow through these ranges. The Narmada and Tapi rivers are west flowing rivers that drain into the Arabian Sea. The Satpura range flanks its border in the North while the Mahadeo, Kaimur hills and the Malayagiri range from its eastern extension. The rivers Mahanadi, Godavari, Krishna and Kaveri drain into the Bay of Bengal. These rivers have formed fertile deltas at their mouth. The deccan pt. Is higher in the west and slopes gently eastwards. An extension of the plateau is also visible in the north east- Locally known as the

Meghalaya's Karbi - Anglong plateau and north Cachar hills. It is separated by a fault of Chotanagpur plateau. The three prominent hill ranges from west to East are the Garo, Khasi and the Jaintia hills.

The Western Ghats or Sahyadri border the plateau in the west and the Eastern Ghats provide the eastern boundary. Western Ghats are almost continuous; the Eastern Ghats are broken and uneven. The western Ghats and eastern Ghats marks the eastern and western edges of deccan plateau respectively. The Western Ghats lie parallel to the western coast. They are continuous and can be crossed through passes only. The Western Ghats are higher than the Eastern Ghats. Their average deviation is 900m to 1600 mt. as against 600 meters of the Eastern Ghats. The Eastern Ghats stretch from the Mahanadi valleys to Nilgiri in the south. The Eastern Ghats are discontinuous irregular and dissected by rivers draining into Bay of Bengal. The Western Ghats cause orographic rain by facing the rain bearing moist to rise along the western slopes of the Ghats. The height of the Western Ghats progressively increases from North to South. The highest peaks of Western Ghats are the Anamudi (2695m) and Doda Betta (2637m). Mahendragiri (1501m) is the highest peak in the Eastern Ghats. Shevaroy hills are located to the south east of the Eastern Ghats. One of the distinct features of the peninsular plateau is the black soil are known as Deccan trap. This is of volcanic origin; hence the rocks are igneous.

➤ Coastal Plains

To the west of the Western Ghats and to the east of the Eastern Ghats, lie the coastal plains. The western coastal plains are very narrow while the eastern coastal plains are much broader.

Western Coastal plains can be divided into two sections: -

Section	Area
Konkan	Mumbai to Goa
Kannad Plains	Karnataka area.
Malabar Coast	Southern most (Kerala)

The Eastern Coastal plains along the Bay of Bengal are wide and levelled and can be divided into two sections: -

Section	Area
Northern Circars	Upper Eastern India (Odissa area + Andhra)
Coromandel Coast	Puducherry and Tamil Nadu.

➤ Islands of India

Lakshadweep islands and Andaman and Nicobar Islands are also part of India. Lakshadweep islands are Coral islands located off the coast of Kerala. 8° Channel (8° N latitude) is between Minicoy and Maldives and 9° Channel (9° N latitude) separates Minicoy from the main island of Lakshadweep.

Andaman and Nicobar island group consist of North Andaman, Middle Andaman, South Andaman, Little Andaman, Car Nicobar, Little Nicobar and Great Nicobar. Port Blair is the capital of Andaman and Nicobar islands located in South Andaman. The Indira Point, the southern most point of India is the southern most point of Great Nicobar island. The Barren Island is the only active volcano situated in the east of middle Andaman. Narcondam island is also a volcanic island, located in the North -

eastern part of North Andaman. 10° Channel (10° N latitude) separates Andaman and Nicobar. Duncan pass is between South Andaman and Little Andaman. Coco Strait is between Coco Islands (Myanmar) and North Andaman).

➤ Seasons of India

The different seasons in India are: -

- Cold Weather Season (Winter)- Dec to Feb
- Hot Weather season (Summer)- March to May.
- South-West Monsoon Season (Rainy)- June to Sept.
- Season of Retiring Monsoon (Autumn)- Oct to Nov

Hot and Dry winds are called **Loo**, which blow during the day during summers. The winds blow from Arabian Sea and Bay of Bengal towards the land during the South west monsoon. These are moisture carrying winds which when strike the mountain barriers cause rain.

In the retreating monsoon (North-East) monsoon being winds back from the mainland to the Bay of Bengal and cause rains in Tamil Nadu, Andhra Pradesh and Andaman and Nicobar.

The climate of India has broadly been described as monsoon type. Due to India's location in the tropical region, most of the rain is brought by monsoon winds. Agricultural in India is high depend on rains. The climate of a place is affected by its location, altitude, distance from the sea and relief.

❖ **Precipitation:** - While precipitation is mostly in the form of snowfall, in the upper parts of Himalayas, it rains over the rest of the country. The annual precipitation varies from over 400cm in Meghalaya and to less than 10cm in Ladakh and western Rajasthan. Most of the country receives rainfall Tamil Nadu gets a large portion of rain during October and November. In general coastal areas experience less contrast in temp conditions. Seasonal are more in the interior generally from east-west in Northern plains.

❖ **There are 6 major controls of the climate.**

- I. **Latitude:** - Intensity of solar Radiation.
- II. **Altitude:** - Temperature with height
- III. **Pressure and wind system:** - It influences Rainfall
- IV. **Distance from sea:** - It has a moderating effects
- V. **Ocean currents:** - It affects the climate of coastal area
- VI. **Relief Features:** - High mountains act as a Barrier to monsoon winds and cold Siberian winds

❖ **Jet Streams:** - It lies between in a narrow Belt in the troposphere. Speed of Jet streams in summers is 180km/hr and about 400 km/hr in winters. These jet streams are located approximately over 27-30° N latitude. Over India they blow over the south of Himalayas although the year except in summers. They bring cyclonic disturbances in the North and North-West India. In summers the sub-tropical westerly jet streams moves north of the Himalayas due to apparent movement of the sun. In this case an easterly jet stream blows over peninsular India approximate. Over 14° N latitude.

❖ **Western Cyclonic Disturbance:** - The climate of India is strongly influenced by monsoon winds. The Arabs named the word 'monsoon' describing it as "Seasonal Reversal of wind system". The

monsoons are experienced in the tropical areas roughly between 20° N and 20° S. Following facts are important related to monsoons: -

1. Differential heating and cooling of land and water
2. Shift of position of Intertropical Convergence Zone (ITCZ)
3. Presence of high-pressure area in east of Madagascar in the Indian Ocean.
4. Intense heating of Tibetan Plateau.
5. Movement of westerly jet streams to the North of the Himalayas.
6. Changes in the pressure conditions over the southern oceans also affect the monsoon.

Normally when the tropical Eastern South Pacific Ocean experiences High Pressure the Tropical Indian Ocean experiences Low Pressure. But in certain years there is a reversal in these pressure conditions. This periodic change is known as Southern Oscillation. Feature connected with Southern Oscillation is El Nino phenomena. In this a warm ocean current that flows at a prevail coast in place of cold prevail current. The changes in the pressure conditions are connected with the concept of El Nino.

➤ **Flora and Fauna of India**

Flora of India

The grasses, shrubs and trees, which grow on their own without interference or help from human being are called natural vegetation.

❖ **Tropical Evergreen Rainforests**

- Tropical rainforest occur in the areas which receive heavy rainfall.
- They are so dense that sunlight does not reach the ground.
- Many species of trees are found in these forests like Mahogany, Ebony and Rose road.
- Andaman and Nicobar Islands, parts of North- eastern states and a narrow strip of the western slopes of the Western Ghats are home to these forests.

❖ **Tropical Deciduous Forests**

- This is the most common type of forests in India, and is called monsoon forests.
- They are less dense and shed their leaves at a particular time of the year.
- Important trees of these forests are Sal, teak, Peepla, Neem and Shisham.
- They are found in Madhya Pradesh, U.P, Bihar, Jharkhand, Chhattisgarh, Orissa and in parts of Maharashtra.

❖ **Thorny Bushes**

- This type of vegetation is found in dry are of the country. The leaves are in the form of spines to reduce the loss of water.
- Growth of vegetation is limited here. Only mosses and lichens are found here.
- The plants found here are cactus, Khair, Babool, Keekar etc.
- This type of vegetation is found in the states of Rajasthan, Punjab, Haryana, eastern slopes of western Ghats Gujarat

❖ **Mountain Vegetation**

- A wide range of species is found in the mountains according to the variation in height.
- At the height between 1500 meters and 2500 meters most of the trees are conical in shape. These trees are called coniferous trees.
- The important trees of these forests are: - Chir, Pine and Deodar.

❖ **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.

❖ Grass Land

- I. **Tropical Grasslands:** They occur on both sides of equator & extend till tropics. Moderate to low amount of rainfall. The grass can grow very tall (3 to 4 M in Height). Savannah grasslands of Africa are of this type. Elephants, Zebras, Giraffes, Deer and Leopard
- II. **Temperate Grasslands:** Found in mid latitude zones. Grass is short & nutritious. Wild Buffaloes, Bison and Antelopes.

Medical Plants and their Values

Sno.	Plants/Species	Properties
1	Sarpagandha	Used to treat Blood Pressure. It is found only in India.
2	Jamun	The juice from the ripe fruit is used to prepare vinegar and have digestive properties.
3	Arjun	The fresh juice of leaves is a cure for headaches and also used to regulate blood pressure.
4	Babool	Leaves are used as a cure for eye sore. Its gum is used in medicine, paints and dyes.
5	Neem	It has high anti-biotic and anti-bacterial properties.
6	Tulsi	It is used to cure Asthma and Ulcers.
7	Kanchnar	It is used to cure Asthma and Ulcer. Its buds and roots are used for digestive problems.

Wildlife of India

- Gir forest in Gujarat is the home of Asiatic lion.
- Elephants and one Horn rhinos can be found in Assam. Elephants are also found in Kerala and Karnataka.
- Camels and Wild asses are found in Great Indian Desert and Runn of Kutch receptively.
- Wild goats, snow leopards, Beers are found in the Himalayan region.
- There are several 100 of species of snakes found in India, Cobras and Kraits are important among them.

➤ Life in the Ganga, Brahmaputra Plain

It lies in the sub-tropical region between 10°N to 30°N latitude

Main Features:

1. It contains Mountains, Foothills, Sundarbans Delta, Oxbow Lake. The area witnesses monsoon rains from mid june to mid September. Summers are hot & winters are cold in the region of Ganga & Brahmaputra (Tributaries) & States. The mountain area with steep slopes have rough terrains. The plain area provides suitable conditions for life. The soil is fertile, agriculture is the main occupation, high density of population is paddy.

2. Silk is produced through the cultivation of silkworms in parts of Bihar & Assam.
3. Tropical deciduous trees along with teak, Sal & people. Thick Bamboo grooves are found in Brahmaputra plains. Delta areas is covered with mangroves forests. In Uttrakhand, Sikkim & Arunachal Pradesh coniferous trees like Pine, deodar and fern are found.
4. One Horned Rhinoceros is found in Brahmaputra plain in (Kaziranga National Part in Assam) One- Horned Rhino is vulnerable. Black Buck is the state animal of Andhra Pradesh, Punjab and Haryana.
5. A variety of fish like Rohu, Hilsa and Catla are found here. River Brahmaputra a variety of Dolphins called Susu (Blind Dolphin). Its presence is an indication of Health of river.
6. Major Cities: Allahabad, Kanpur, Varanasi, Patna, Lucknow & Kolkata. Kolkata: Imp. Port River Hoogli river passed from it.
7. Taj Mahal in Agar is located on the banks of river Yamuna.

➤ **India's Rock Formation**

Stratigraphically, India can be divided into

- I. **Archean System:** Archean rocks are the oldest rocks of the earth's crust. They belong to Precambrian period. This period covers about 86% of the total geological historic time of earth. The major characteristics are that they are devoid of any form of remnants of life in them. Archean or Purana rocks in India are found in the Aravalli mountains, 2/3rd of Deccan Peninsula & some parts of North - east. These rocks have abundant metallic & non- Metallic minerals such as iron, Cu, Manganese, lead, zinc, gold, silver, mica, graphite, etc.
- II. **Dharwar System:** This system is later than the Archean system but older than the other system. Dharwar rock system is special because it is the first metamorphic – sedimentary rock system in India. These can be found in Karnataka, Aravalli, Tamil Nadu, Chotanagpur plateau. Meghalaya, Delhi and the Himalaya region. The Dharwar rocks are rich in iron ore, manganese, lead, zinc, gold, silver, etc. The Champions series containing gold mines lie within this system. This Champion system is named after the Champion reef in the Kolar Gold Fields.
Cudappah System: - This is a sub type of Dharwar system but still significant enough to be considered separately. Cudappah system rocks are rich in metamorphic rocks such as sandstone shale, limestone, quartzite and slate. They contain iron & other inferior quality of ores and minerals. Mainly found in Cudappah district of Andhra Pradesh, Chhattisgarh, Rajasthan, Delhi and the lesser Himalayas.
- III. **Vindhyan System:** - This system is named after the Vindhyan and are spread across the region extending from Rajasthan to Bihar. The Vindhyan System is separated from Aravalli by the Great Boundary Fault. They are famous sources of Red stone & other building material. The well-known Panna and Golconda diamonds are found in this formation.
- IV. **Gondwana System:** - They are major coal deposits of India. This system contains famous Damuda and Panchet series which are famous for coal deposits. The important coal bearing areas of this series are Raniganj, Jharia, Karanpur and Bokaro in Odisha, Panch valley in Chattisgarh & areas of M.P.
- V. **Deccan Traps:** - These traps cover almost all of Maharashtra some parts of, Gujarat, MP, Karnataka and Andhra Pradesh. Deccan trap is thought to have formed due to result of sub aerial volcanic activity associated with continental deviation during the Mesozoic. The Deccan traps are generally igneous.
- VI. **Tertiary System:** - It belongs to Cainozoic era. The final breakup of Gondwana land occurred in this area & the delays sea got lifted in the Himalayas. Most important rocks of this system are

in the northern plains of India, in Kashmir & Basins of Himalayan Rivers. The rock of this system are also found in the coastal areas of Kutch, Katiawar, Konkan, Malabar, Nilgiri and Eastern Ghats.

DRAINAGE SYSTEM OF INDIA

The area drained by a single river system is called a drainage basin. Any elevated area such as mountains, which separates two drainage basins is called a Water Divide. The World's largest Drainage Basin is of the Amazon River. Accordingly, the Indian Rivers are divided into following major groups: -

- I. **The Himalayan Rivers:** - Most of the Himalayan Rivers are perennial. It means that they have water throughout the year. These rivers receive water from rain as well as from melted snow from the Lefty Mountains. They have cut through the mountains making gorges. The Himalayan Rivers have long course from their source to the sea. They perform intensive erosional activity in their upper course and carry huge loads of silt and sand. In the middle and the lower course, these rivers form meanders, oxbow lakes and many other depositional features.
 - a. **The Indus River system:** - The River Indus rises in Tibet, near lake Mansarovar, flowing West it enters India in the Ladakh district of Jammu and Kashmir. Several tributaries like Zaskar, the Nubra, the Shyok and Hunza, join it in the Kashmir region. The Indus flows through Baltistan and Gilgit and emerges from the mountains, at attock. The Satluj, Beas, Ravi, Chenab and Jhelum join together to enter the Indus near Mithankot (Pakistan). Beyond this, the Indus flows southward eventually reaching the Arabian Sea, east of Karachi. The Indus plain has a very gentle slope with the total length of 2900 km, the Indus is one of the longest river of the world. A little over a third Indus basin is located in India in the state and Jammu and Kashmir, Himachal Pradesh and the Punjab and the rest is in Pakistan. According to the Indus water treaty of 1960 brokered by the world Bank. India has complete control over the Eastern Rivers of the Indus (Ravi, Beas and Satluj) and Pakistan has control over the Western rivers (Indus, Jhelum, Chenab). India can utilise the water of the western rivers without disrupting its flow.
 - b. **The Ganga River System:** - The Head waters of the Ganga, called the Bhagirathi is feeded by the Gangotri glacier and joint by the Alaknanda at Devaprayag. At Haridwar, the Ganga emerges from the mountains on to the plains. The Ganga is joint by many tributaries from the Himalayas such as the Yamuna, Ghaggar, Gandak and Kosi. Kosi river is known as the "sorrow of Bihar". The river Yamuna rises from the Yamunotri glacier in the Himalayas. It flows parallel to the ganga and as the right bank tributary meets the Ganga at Allahabad. The Ghaggar, Gandak and Kosi rise in the Nepal Himalayas. They are the rivers, which flood parts of the northern plains. The main tributaries, which comes from the peninsular uplands are the Chambal, Betwa and the Son. The rivers that come from the peninsular uplands have shorter coarse and do not carry much water in them. The main stream flows southward into Bangladesh and is joined by the Brahmaputra. Further down the stream it is known as Meghna. This mighty river forms the Sundarbans Delta. The length of the Ganga is over 2500km and Ambala forms the water divide between the Indus and the Ganga river system. The

plains from Ambala to Sundarbans stretch over nearly 1800km, but the fall in its slope is hardly 300km. It means that there is a drop of 1 meter for every six kilometres.

- c. **The Brahmaputra River system:** - It rises in Tibet, east of Mansarovar lake, very close to the sources of Indus and the salty. It is slightly longer than the Indus, and most of its course lies outside India. It flows eastwards to the Himalayas and on reaching Namchabarwa (7757m) located above Sea level. It takes a U-turn and enters India into Arunachal Pradesh through a gorge. On entering Arunachal Pradesh, It is known as Dihang and is joined by Debang, Lohit and many other tributaries to form the Brahmaputra in Assam. In Tibet the river carries a smaller volume of water and less silt as it is a cold and a dry area. In India, it passes through a region of high rainfall here the river carries a large volume of water and considerable amount of silt. The Brahmaputra has an abraded channel in its entire length in Assam and forms many riverain islands. Every year during the rainy season, the river overflows, its banks, causing widespread devastation due to floods in Assam and Bangladesh. Unlike other North Indian rivers, the Brahmaputra is marked by huge deposits of silt on its bed causing the river bed to rise. The River also shifts its channel frequently.

❖ **About River Ganga**

Left Bank	Right Bank
Ramganga	Yamuna
Gomti	Tamsa
Kosi	Son
Gandak	Punpun
Mahananda	

CITIES ALONG GANGA: - Rishikesh, Haridwar, Kannauj, Bithoor, Kanpur, Prayagraj, Varanasi, Buxar, Patna, Bhagalpur, Farakka, Murshidabad, Plassey, Kolkata

❖ **About River Indus**

Left Bank	Right Bank
Zaskar	Shyok
Suru	Hunza
Soan	Gilgit
Jhelum	Swat
Chenab	Kabul
Ravi	Kurram
Beas	Gomal
Sutlej	Zhob
Ghaggar - Hakra	
Luni	

CITIES ALONG INDUS: - Leh, Skardu, Dasu, Besham, Swabi, Sukkur, Hyderabad

❖ **About River Brahmaputra**

Left Bank	Right Bank
Dibang	Kameng
Lohit	Manas
Dhansiri	Beki
Kolong	Raidak
	Teesta
	Subansiri

CITIES ALONG BRAHAPUTRA: - Guwahati, Dibrugarh, Tezpur

II. The Peninsular River: - The main water divide in peninsular India is formed by the western Ghats which run from north to South close to the Western Ghats.

- a. The Narmada Basin:** - The Narmada rises in the Amarkantak hills in the M.P. It flows towards the west in a rift valley formed due to faulting. The marble rocks near Jabalpur where the Narmada flows through a deep gorge. All the tributaries of Narmada are very short and most of these join the main stream at right angle. The Narmada Basin covers the part of M.P and Gujarat.

Left Bank	Right Bank
Burhner	Hiran
Banjar	Tendoni
Sher	Choral
Shakkar	Kolar
Dudhi	Man
Tawa	Uri
Kaveri	Hatni
Kundi	Orsang
Goi	
Karjan	

- b. The Tapi Basin:** - The Tapi rises in the Multai and drains in Gulf of Khambhat. It also flows in a rift valley parallel to the Narmada but it is much shorter in length. Its basin covers parts of Madhya Pradesh, Gujarat, and Maharashtra. The coastal plains between Western Ghats and the Arabian sea are very narrow. Hence the coastal rivers are shorter.
- c. The Godavari Basin:** - It is also called "Ganga of South" or Dakshin Ganga. The Godavari is the largest Peninsular River. It rises from the slopes of the Western Ghats in the Nasik district of Maharashtra. Its length is about 1500km and it drains into the Bay of Bengal. Its drainage basin is also the largest among the peninsular rivers. The Basin covers Maharashtra, Telangana, Chattisgarh, Andhra Pradesh and Puducherry.

Left Bank	Right Bank
Banganga	Nasardi
Kadva	Darna
Shivana	Pravara
Purna	Sindphana
Pranahita	Manjira
Indravati	Manair
Talliperu	Kinnerasani
Sabari	

- d. The Mahanadi River:** - The Mahanadi rises from Sihawa in Chattisgarh and flows through Orissa to reaches the Bay of Bengal and has its mouth on the False Point. The length of the river is about 860km. Its drainage basin is shared by Maharashtra, Chattisgarh, Jharkhand and Orissa.

Left Bank	Right Bank
Seonath	Ong
Mand	Parry

Ib	Jonk
Hasdeo	Telen

CITIES ALONG MAHANADI: - Rajim, Sambalpur, Cuttack, Sonapur, Banki

e. The Krishna River: - It rises from a spring near Mahabaleshwar in Maharashtra. The Krishna flows for about 1400km and reaches the Bay of Bengal. Its drainage Basin is shared by Maharashtra, Karnataka, Andhra Pradesh and Telangana.

Left Bank	Right Bank
Bhima	Venna
Dindi	Koyna
Peddavagu	Panchganga
Musi	Dudhganga
Paleru	Ghataprabha
Munneru	Malprabha
	Tungabhadra

f. The Kaveri Basin: - The Kaveri rises in the Brahmagiri range of Western Ghats at Talakaveri in Karnataka and it reaches the Bay of Bengal with its mouth at Poompuhar in Tamil Nadu. Its total length of river is about 760km. Its basin drains part of Karnataka, Kerala Tamil Nadu.

Left Bank	Right Bank
Harangi	Lakshmana Tirtha
Hemavati	Kabini
Shimsha	Bhavani
Arkavathy	Noyyal
	Amaravati
	Moyar

❖ Lake of India

A meandering river across a floodplain forms cut off that later develop into oxbow lake. Spits and bars from lagoons in the coast areas. For ex- Chilka lake, Pulikat Lake and Pularu lake. Lakes are sometimes seasonal like the sambar lake of Rajasthan, which is a salt water lake. Its water is used for producing salts. Most of the fresh water lakes are in the Himalayan region. They are of glacier origin.

The Wular lake in Jammu and Kashmir is the result of Tectonic activity. It is the largest fresh water lake in India.

HUMAN ENVIRONMENT

Settlements are places where people built their home. Over the time settlements saw a transition from caves to river valleys and to cities with the development of trade, commerce & settling became larger. Settlements can be temporary or permanent. **Transhumance:** Seasonal migration or seasonal move of people. There can be two types of settlements: 1)Rural 2)Urban.

❖ **Transport:** Transport is the means by which people and goods move. In our country donkeys, camels, bullocks are common means of transport.

Four Major means of transport:

- Roadways:** Most commonly used for short distances. They can be metalled and Unmetalled. Roads built underground are called subways & under path. The Golden Quadrilateral joins Delhi, Mumbai, Chennai & Kolkata.
- Airways:** An airway or air route is a defined corridor that connects one specified location to another at a specified altitude, along which an aircraft that meets the requirements of the airway may be flown. Airways are defined with segments within a specific altitude block, corridor width, and between fixed geographic coordinates for satellite navigation systems, or between ground-based radio transmitter navigational aids or the intersection of specific radials of two nav aids.
- Waterways:** A waterway is any body of water that can be used for transportation by people in boats. These include rivers, lakes, oceans, and canals. They must be wide and deep enough for the boats, and either have no waterfalls and rapids, or have ways for boats to get around them, such as locks.

Major Ports in India	Location
1. Chennai Port or Madras Port	Chennai. Madras
2. Haldia (Kolkata Dock system and Haldia Dock Complex)	Kolkata
3. Jawahar Lal Nehru Port, also known as Navashya	Maharashtra, South Mumbai
4. Kamarajar Port or Ennore Port	Ennore, Chennai
5. Kochi Port or Cochin Port	Kochi Kerala
6. Panaji	Panaji Goa
7. Vishakhapatnam Port	Vishakhapatnam, Andhra Pradesh

Minor Ports in India	Number of Minor Ports
1. Gujarat	40
2. Maharashtra	53
3. Goa	5
4. Karnataka	10
5. Kerala	13
6. Diu & Daman	2
7. Lakshdeep Island	10
8. Pondicherry	1
9. Tamil Naidu	15
10. Andhra Pradesh	12

- Railways:** India railway network is well developed & largest in Asia. The train from Xining has runs at an altitude of 4000meters above sea level and highest point is 5072M. The trans-Siberian railway is the longest railways system starting from saint Petersburg to Vladivostok.

❖ Communication:

- Mass Media: Radio Television, Newspaper.
- Satellites can make navigation faster.
- Satellites have helped in Oil Exploration & survey of forest.
- Mineral exploration wealth, forecasting and disaster forecasting.

RESOURCES

Utility or usability is what makes an object or substance a resource. Things become a resource only when they have value. Its use or utility gives it as value. All resources have some value.

➤ Patent

It means the exclusive right over any idea or invention. **Ever greening of Patents:** Ever greening is any of various legal business & technological strategies by which patent extends this patents product that are about to expire, in order to retain royalties from them by either taking out new patents or buying a frustrating competitor for longer normally be permissible under the law.

Time and technology are two important factory that can change substances into resources. Both are related to the needs of the people. Human capital that is people themselves are the most important resources. It is there ideas, knowledge invention and discoveries that lead to the creations by more resources.

➤ Natural Resources

Resources that are drawn from nature and used without much modification are called Natural resources. On the basis of their development & use resources can be classified into two groups:

❖ Actual and Potential Resources

1. **Actual resources** are those resources whose quantity is known. These resources are being use in the presence. For example: Coal in Rhine in Germany.
2. **Potential resources** are those whose entire quantity may not be known. And these are not being used at present. The level of technology have at present may not be advanced enough to easily utilize these resources. For example: Uranium found in Ladakh.

❖ Renewable and non- Renewable Resources

1. **Renewable Resources:** - Renewable resources are those resources which get renewed or replenished quickly some of these are unlimited and are not affected by human activities such as solar and wind energy. Water seems to be an unlimited renewable resources. But shortage of natural water sources is a major problem in many parts of the world today.
2. **Non-Renewable Resources:** - These are those which have a limited stock. Once the stocks are exhausted it may take 1000 of years to renew and replenished. For example: Coal, Petroleum and natural gas.

❖ Distribution of Natural Resources

The distribution of natural resources depends upon number of physical factors like Terrain, Climate and altitude. The distribution of resources is unequal because these factors are differ so much over the earth.

❖ Human Made Resources

Sometimes, natural substances become resources only when their original form has been changed. Iron ore was not a resource until people learnt to extract iron from it. People use natural resources to make building, bridges, roads machinery and vehicles which are known as made resources. Technology is also a human Made technology

❖ Human Resources

Human resources refers to the number (Quantity) and ability (Mental & Physical) of the people. Education and health help in making people a valuable resources. Improving the quality of people's skills can make them able to create more resources. Using resources carefully and giving them to get renewed is called resource conservation. Balancing the need to use resources & also conserve them for the future is called the sustainable development.

❖ Land as a Resources

Land is among the most important natural resources. It covers only about 30% of total area of the earths, surface all parts of this small percentage are not habitable. The uneven distribution of population in different part of world is mainly due to varied characteristics of land & population occupies only 30% of the land. The rugged topography, steep slopes of the mountains, low lying area are susceptible to water logging, desert areas, thick forested area are normally sparsely populated or in habited.

Plains & rivers valleys offers suitable land for agriculture. Hence, these are the densely populated areas of the world. The use of land is determined by physical factors such as topography, soil, climate, minerals and availability of water. The cropland forms the major percentage of the land use in India about 57%. People & their demands are ever-growing, but the availability of land is limited. The quality of land also differs from place to place.

Growing population & their ever-growing demand has led to a large scale destruction of forest cover and arable land and has created a fear of losing this natural resource. Afforestation, land reclamation, regulated use of chemical pesticide and fertilizers and checks on overgrazing are some of the common methods used to conserve land resources.

Landslides: - Landslides are simply defined as the mass mount of rocks, debris or earth down a slope. They often take place in conjugation with earthquakes, floods & volcanoes. A prolonged spell of rainfall can cause heavy landslide that can block the flow of river for quite some time. The formation of river blocks can cause Havoc to settlements downstream on its bursting.

Some board mitigation techniques of landslides are as follows:

1. Hazard Mapping: To locate areas prone to landslides.
2. Construction of Retention Walls: To stop land from slipping.
3. Vegetation cover to arrest land slide.
4. The surface drainage control: This works to control the movement of landslides along with rainwater and spring flow.

SOIL

The thin layer of greenery substance covering the surface of earth is called soil. Soil is made up of organic matter minerals and weathered rocks found on the earth. This happens through the process of weathering.

Weathering: The breaking up and decay of exposed rocks, by temperature changes, frozen actions plants, animals and human activity.

S.No.	Factors	Features
1	Parent Rock	Determine colour texture chemical properties of minerals, content & permeability
2	Relief	Altitude and slope determines accumulation of soil.
3	Flora, Fauna	Affect the rate of humus formation

4	Climate	Temp, rainfall influence , rate of weathering & humus
5	Time	Determine thickness of soil profile.

Conservation of Soil

1. **Mulching:** The bare ground between plants is covered with a layer of organic matter like straw. It helps to retain soil moisture.
2. **Contour Barrier:** Stones, grass, soil are used to build barriers along contour trenches are made in front of barriers to collect water.
3. **Rock Dam:** Rocks are piled up to slow down the flow of water. This prevents gullies and further soil loss.
4. **Terrace Farming:** Broad flat steps or terraces are made on the steep slopes so that flat surfaces reduce surface runoff and soil erosion.
5. **Inter Cropping:** Different crops are grown in alternate rows and are sown at different times to protect the soil from rainwash.
6. **Contour Ploughing:** Ploughing parallel to the contours of high slope to form a natural barrier for water to flow down the slope.
7. **Shelter Belts:** In the coastal & dry regions rows of plants are planted to check the wind move to protect the soil cover.

❖ Water

Water is a renewable natural resource. 3/4th of earth's surface is covered with water. The ocean water is saline and is not fit for human use. Fresh water forms 2.7% of total water found on the earth. 70% of this occurs as ice sheets and glaciers in the regions of Antarctica, Greenland and other mountain regions. Due to their location they are not available for use. Only about 1% fresh water is available for humans & fit for use. 1% ground water, surface water in rivers & lakes, water vapour. The total volume of water remains constant. This is ensured through the water cycle.

Water Market: Amreli city in Gujarat is dependent on purchasing water from nearby regions. Countries located in climatic zones most suitable to drought face a great problem of water scarcity.

Thus, water shortage may be a consequence of variation in seasonal or annual precipitation or the scarcity caused by over-exploitation & contamination of water resources. Discharge of untreated sewage, agricultural chemical & industrial effluents are major contaminants. They pollute water with nitrates, metals and pesticides. Forests and vegetation cover slow the surface run and replenish runoff.

MINERALS & POWER RESOURCES

A mineral is a naturally occurring substance that has a definite chemical composition. Minerals are not evenly distributed across the earth. They are created by natural processes without any human interference. They can be identified on the basis of their physical properties such as colour, hardness etc and chemical properties such as solubility. Methods of extraction are: -

1. **Mining:** Taking of minerals from rocks buried under the earth's surface.
2. **Drilling:** Deep wells are bored.

3. **Quarrying:** A quarry is a type of open-pit mine in which dimension stone, rock, construction aggregate, riprap, sand, gravel, or slate is excavated from the ground.

❖ **Rock:** A rock is aggregate of one or more minerals but without definite composition of constituent materials. Rocks from which minerals are extracted are known as Ores.

❖ **Distribution of Minerals**

Generally metallic minerals are found in igneous and metamorphic rock formations that form large plateaus. Iron are in North Sweden, Cu-and Nickel deposits in Ontario.

Iron-Nickel, chromite and platinum in South Africa are some ores of minerals found in igneous & metamorphic rocks.

Sedimentary rock found in plains and young fold mountains contain mineral rocks like limestone.

Distribution Continents Wise:

ASIA

- China & India: - Iron Ore Deposits
- Asia Produces more than 50% of world's tin (Major countries: China, Malaysia & Indonesia).
- China is a leader in production of Lead, Antimony, Tungsten and Manganese (Rare Minerals)

EUROPE

- The area is a leading producer of Iron ore in world
- Iron Ore is mainly found in Russia, Ukraine, Sweden & France.
- Copper, lead, Zinc, Nickel are found in Eastern Europe & eastern Russia.
- Switzerland has no minerals deposits of its own.

SOUTH AMERICA

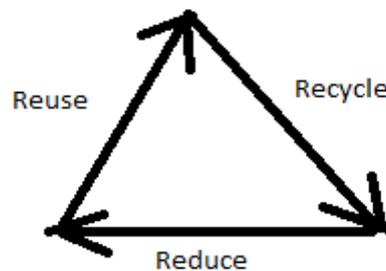
- Brazil is the largest producer of High grade Iron Ore.
- Chile and Peru tops Production of Copper.
- Brazil and Bolivia are production house of Tin.
- Minerals Oil – Venezuela, Argentina, Chile, Peru and Columbia.
- Others material found here are Asbestos, Platinum, Diamond, Bauxite

AFRICA

- It is top produces of Bauxite.
- Gold, Iron Ore, Diamond, etc. are also found here.

DISTRIBUTION IN INDIA

- I. **Iron:** India high grade iron ore. Jharkhand, Orissa, Chattisgarh, Madhya Pradesh, Maharashtra, Karnataka & Goa.
- II. **Bauxite:** Jharkhand, Orissa, Chattisgarh, Madhya Pradesh, Gujarat, Maharashtra & Tamil Nadu
- III. **Mica:** Jharkhand, Bihar, Andhra Pradesh & Rajasthan
- IV. **Copper:** Rajasthan, Madhya Pradesh, Jharkhand, Karnataka and Andhra Pradesh
- V. **Manganese:** Maharashtra, Madhya Pradesh, Chhattisgarh, Orissa, Karnataka and Andhra Pradesh.
- VI. **Limestone:** Bihar, Jharkhand, Orissa, Madhya Pradesh, Chhattisgarh, Rajasthan, Gujarat & Tamil Nadu.
- VII. **Gold:** Karnataka (Kolar Mines).
- VIII. **Salt:** India is one of the World's leading producer and exporter of Salt.

❖ **3-R Strategy**

❖ **Fossil Fuels:** Such as Coals, Petroleum & Natural gas are the main resources of conventional energy.

I. **Coal:** Most abundant fossil fuel. Electricity from coal is called thermal power. **Coal** is referred to as Buried Sunshine. Leading coal producers of the world are China, USA, Germany, Russia, South-Africa and France.

II. **Petroleum:** Found between the layer of rocks and is drilled from oil fields located in offshore and coastal areas. This is then sent to refineries which process the crude oil and produce variety of products such as petrol, diesel Kerosene oil and lubricants. Petroleum & its derivatives are known as black Gold.

Chief Petroleum Producing Countries: Iran, Iraq, Saudi Arabia, Qatar, Venezuela and Algeria.

III. **Natural Gas:** It is found with petroleum deposit & is released when crude oil is brought to the surface. Major Countries are Russia, Norway, UK and Netherland. In **India:** Jaisalmer, Krishna-Godavari Delta, Tripura and Some regions of Mumbai.

❖ **Hydel Power:** The energy in the flowing water can be used to produce electricity. Waves result from the interaction of the wind with the surface of the sea and represent a transfer of energy from the wind to the sea. Energy can be extracted from tides by creating a reservoir or basin behind a barrage and then passing tidal waters through turbines in the barrage to generate electricity. One – Fourth world's electricity is produced through hydel power.

❖ **Non-Conventional**

They are inexhaustible and Non – Polluting but presently are expensive to produce. Solar Energy is trapped in solar cells to produce electricity. Used in solar heaters, solar cookers, dryers & even traffic signals. World's first solar & wind powered bus shelter is in Scotland.

I. **Wind Energy:** - Wind power is the use of air flow through wind turbines to provide the mechanical power to turn electric generators. Wind power, as an alternative to burning fossil fuels, is plentiful, renewable, widely distributed, clean, produces no greenhouse gas emissions during operation, consumes no water, and uses little land. The net effects on the environment are far less problematic than those of fossil fuel sources.

II. **Nuclear Energy:** - Nuclear power is obtained from energy stored in nuclei of atoms of radioactive. Metals like Uranium & Thorium. These fuels undergo nuclear fission & emit power. In India Rajasthan & Jharkhand have large deposit of uranium & Thorium. Large quantities of Thorium can be found in Monazite sands of Kerala.

- III. Geothermal Energy:** - It is produced from the heat energy obtained from earth. This energy can be used to generate power. USA has world's largest Geothermal Power plant. In India it is produced in Himachal Pradesh and Ladakh.
- IV. Tidal Energy:** - Energy generated by tides by building dams by narrow Opening of seas. During high tides energy generated from tides is used to turn the turbines. Russia, France & Kutch region of India have huge tidal mill farms. The first tidal energy station was opened in France.
- V. Biogas:** - Energy can be produced by organic waste (Dead plants & animals, animals dumb & Kitchen waste). The organic is decomposed by bacteria to emit biogas (Methane + Carbon Dioxide).

AGRICULTURE

➤ Rice

- It is the most important food crop of India. It is predominantly a Kharif crop. It covers about one third of total cultivated area of the country and is staple food of more than half of the Indian population. Maximum population of India is of rice consumers. Hence many farmers in India cultivate rice round the year that is, it is also cultivated in Rabi season with the use of irrigation. Some of the geographical conditions are as follows:
- **Temperature:** Rice requires hot and humid conditions. The temperature should be fairly high i.e. 240C mean monthly temperature with average temperature of 220C to 320C.
- **Rainfall:** Rainfall ranging between 150 and 300 cm is suitable for its growth. In areas of Punjab, Haryana and Western Uttar Pradesh where rainfall is less than 100cm; rice is cultivated with the help of irrigation.
- **Soil:** Rice is grown in varied soil conditions but deep clayey and loamy soil provides the ideal conditions. Rice is primarily grown in plain areas like Gangetic plain, it is also grown below sea level at Kuttanad (Kerala), hill terraces of north eastern part of India and valleys of Kashmir.
- **Labour:** Rice cultivation requires easily available labour because, most of the activities associated with it are labour oriented and are not very well suited for mechanization.
- **Distribution:** Rice is grown in almost all the states of India. The three largest rice producing states are West Bengal, Uttar Pradesh and Andhra Pradesh. The other major rice producing states are Tamil Nadu, Bihar, Jharkhand, Uttarakhand, Chhattisgarh, Punjab, Orissa, Karnataka, Assam and Maharashtra. It is also grown in Haryana, Madhya Pradesh, Kerala, Gujarat and Kashmir Valley.

➤ Wheat

- Wheat is the second most important food crop of India next to rice. It is a Rabi or winter crop. It is sown in the beginning of winter and harvested in the beginning of summer. Normally (in north India) the sowing of wheat begins in the month of October-November and harvesting is done in the month of March-April. This is the staple food of millions of people particularly in the northern and north-western regions of India. Some of the geographical conditions are as follows:
- **Temperature:** It is primarily a crop of mid-latitude grassland. It requires cool climate. The ideal temperature is between 100C to 150C at the time of sowing and 210C to 260C at the time of ripening and harvesting.

- **Rainfall:** Wheat thrives well in areas receiving annual rainfall of about 75cm. Annual rainfall of about 100 cm is the upper limit for wheat cultivation. Like rice, wheat can also be grown by irrigation method in areas where rainfall is less than 75cm. Light drizzles at the time of ripening help in increasing the yield. But on the other hand, frost at the time of flowering and hailstorm at the time of ripening can cause heavy damage to the wheat crop.
- **Soil:** Although wheat can be grown in a variety of soils but well drained fertile loamy and clayey loamy soil is best suited for wheat cultivation. Plain areas are very well suited for wheat production.
- **Labour:** Wheat is extensive and highly mechanized and requires less labour.
- **Distribution:** The largest wheat producing states are U.P, Punjab and Madhya Pradesh. Other than that the main regions of wheat production in India are Haryana, Rajasthan, Gujarat, and Maharashtra.

➤ Millets

- Millets are short duration warm weather crops. These are coarse graincrops and are used for both food and fodder. These are Kharif crops though sometimes grown in rabi seasons too. These are sown in May-August and harvested in October-November. Today millets are mostly consumed by poor people as their staple food. In India, lots of millet is grown and these are known by various local names. Some of these are Jowar, Bajra, Ragi, Korra, Kodon, Kutki, Hraka, Bauti and Rajgira. In India, Jowar, Bajra and Ragi are grown on large areas but unfortunately area under these crops has drastically reduced over the years. Some of the geographical conditions for growing these crops are as follows:
- **Temperature:** These crops are grown where the temperature is high which ranges between 27°C to 32°C.
- **Rainfall:** As mentioned earlier that millets are 'dry land crop', therefore, rainfall ranging from 50 to 100 cm is ideal for their cultivation. These crops are rain-fed.
- **Soil:** Millets are less sensitive to soil deficiencies. They can be grown in inferior alluvial or loamy soil.
- **Distribution:** Jowar and Bajra are grown both in north and south India whereas ragi is generally concentrated in the southern India. Jowar and Bajra are grown in Madhya Pradesh, Gujarat, Rajasthan, Maharashtra, Karnataka, Tamil Nadu, Andhra Pradesh, Haryana and Punjab. Ragi is mostly concentrated in the southern India i.e. Tamil Nadu, Karnataka and Andhra Pradesh. In total, coarse cereals can be found in Rajasthan, Karnataka and Andhra Pradesh.
- Jowar(sorghum), Bajra (Pearl millet/Bull Rush millet) Ragi (Finger millet/Buck wheat) are the important millets grown in India. Though, these are known as coarse grains, they have very high nutritional value. For example, ragi is very rich in iron, calcium, other micro nutrients and roughage.

➤ Maize

- Maize is a crop which is used both as food and fodder. It is a kharif crop which requires temperature between 21°C to 27°C and grows well in old alluvial soil. In some states like Bihar maize is grown in rabi season also. Use of modern inputs such as HYV seeds, fertilisers and irrigation have contributed to the increasing production of maize. Major maize-producing states are Andhra Pradesh, Karnataka, Maharashtra, Uttar Pradesh, Bihar, Telangana and Madhya Pradesh.

➤ Pulses

- India is the largest producer as well as the consumer of pulses in the world. These are the major source of protein in a vegetarian diet. Pulses need less moisture and survive even in dry conditions. Being leguminous crops, all these crops except arhar (pigeon pea) helps in restoring soil fertility by fixing nitrogen from the air. Therefore, these are mostly grown in rotation with other crops. Most of these are green manure crops too. Major pulse producing states in India are Madhya Pradesh, Rajasthan, Maharashtra, Uttar Pradesh and Karnataka.
- Though gram and tur (arhar or pigeon pea/red gram) are the more important pulses, several other pulses such as urd (black gram), mung (green gram), masur (lentil), kulthi (horse gram), matar(peas), khersi, cow pea(black-eyed gram) and moth are also grown. Pulses are generally fodder crops too.
- **Gram:** It is the most important of all the pulses. It accounts for about 37% of the production and about 30% of the total area of pulses in India. It is a Rabi crop which is sown between September and November and is harvested between February and April. It is either cultivated as a single crop or mixed with wheat, barley, linseed or mustard. Some of the geographical conditions are as follows:
 - **Temperature:** It is grown in a wide range of climatic condition. Mild cool and comparatively dry climate with 20°C -25°C temperature.
 - **Rainfall:** 40-45 cm rainfall is favourable for gram cultivation.
 - **Soil:** It grows well on loamy soils.
 - **Distribution:** Although gram is cultivated in several parts of the country, however, 90% of the total production comes from 5 states. These states are Madhya Pradesh, Rajasthan, Maharashtra, Uttar Pradesh, and Haryana

➤ Sugarcane

- Sugarcane is a Kharif crop. It is the main source of sugar, gur and khandsari. It also provides raw material for the manufacturing of alcohol. Bagasse, the crushed cane residue, has also multiple uses. It is used for manufacturing of paper. It is also an efficient substitute for petroleum products and a host of other chemical products. A part of it is also used as fodder. Some of the geographical conditions for the growth of sugarcane are as follows:
 - **Temperature:** It requires hot and humid climate with an average temperature of 21°C to 27°C.
 - **Rainfall:** 75-150 cm rainfall is favorable for sugarcane cultivation. Irrigation is required in those areas where rainfall is less than the prescribed limit.
 - **Soil:** It can grow in a variety of soils. In fact sugarcane can tolerate any kind of soil that can retain moisture. But deep rich loamy soil is ideal for its growth. The soil should be rich in nitrogen, calcium and phosphorous but neither it should be too acidic nor alkaline. Flat, plain and level plateau is an advantage for sugarcane cultivation because it facilitates irrigation and transportation of cane to the sugar mills. Sugarcane cultivation requires heavy manures and fertilizers because it exhausts the fertility of soils quickly and extensively.
 - **Labour:** It is a labour-oriented cultivation and required cheap labour. Ample human hands are required at every stage, i.e. sowing, hoeing, weeding, irrigation, cutting and carrying sugarcane to the factories.
 - **Distribution:** India has the largest area under sugarcane cultivation in the world and the second largest producer next to Brazil. As far as distribution of sugarcane cultivation in

India is concerned, there are three distinct geographical regions in the country. These regions are:

- The Sutlej-Ganga plain from Punjab to Bihar containing 51% of the total area and 60% of the country's total production. Uttar Pradesh is the largest producer of sugar in India.
- The black soil belt from Maharashtra to Tamil Nadu along the eastern slopes of the Western Ghats. Coastal Andhra Pradesh and Krishna river valley.

➤ Cotton

- Cotton is the most important fibre crop not only of India but also of the entire world. It not only provides raw material for cotton textile industry but also its seed is used in Vanaspati oil industry. The cotton seed is also used as part of fodder for milch cattle for better milk production. Cotton is basically a kharif crop. Some of the geographical conditions are as follows:
 - **Distribution:** India has the largest area under cultivation and is the largest producer of cotton next only to China and the USA. Within the country two third of total area and production is shared by four states. The main states for cotton production are Andhra Pradesh, Telangana, Maharashtra, Gujarat, Punjab and Haryana.
 - **Labour:** As picking of cotton has not been made mechanized till now, therefore a lot of cheap and efficient labour is required at the time of picking.
 - **Soil:** Cotton cultivation is very closely related to Black soils of Deccan and Malwa plateau. However, it also grows well in alluvial soils of the Sutlej plain and red and laterite soils of the peninsular region.
 - **Rainfall:** It grows mostly in the areas having at least 210 frost free days in a year. It requires modest amount of rainfall of 50 to 100 cm. However, cotton is successfully grown with the help of irrigation in the areas where rainfall is less than 50 cm. High amount of rainfall in the beginning and sunny and dry weather at the time of ripening are very useful for a good crop.
 - **Temperature:** Cotton is the crop of tropical and sub-tropical areas and requires uniformly high **temperature** varying between **21°C and 30°C**.

➤ Jute

- Jute is an important natural fibre crop in India next to cotton. It is a kharif crop. It requires hot and humid climate with 120-150cm rainfall for its growth. Light sandy or clayey soils is best for its cultivation. It is labour intensive. In trade and industry, jute and mesta crop together known as raw jute as their uses are almost same. Raw jute plays an important role in the country's economy. Raw jute was originally considered as a source of raw material for packaging industries only. But it has now emerged as a versatile raw material for diverse applications, such as, textile industries, paper industries, building and automotive industries, use as soil saver, use as decorative and furnishing materials, etc. Raw jute being bio-degradable and annually renewable source, it is considered as an environment-friendly crop and it helps in the maintenance of the environment and ecological balance. Further attraction of Jute lies in its easy availability, inexhaustible quantity at a comparatively cheaper rate. Moreover, it can easily be blended with other natural and manmade fibres.

- Jute cultivation is mainly concentrated in the eastern and north eastern India especially in Gangetic Plain while that of mesta cultivation is spread almost throughout the country. The crop can be grown in low, medium and high land situation, both moisture stress and water stagnating condition. White Jute (*Corchorus capsularis*) can be grown comparatively in low land situation while that of Tossa Jute prefers medium and high land situation. Mesta is grown in almost all over the country. It being a hardy crop and can tolerate moisture stress; its cultivation is spread in different agro-climatic situations unlike jute which is concentrated only in eastern and north eastern States. Major jute and mesta producing states are West Bengal, Bihar and Assam. In a major part of Jute area, particularly in North Bengal, Bihar and North-Eastern States, the soil is acidic in nature. However, the Jute crop is growing in these areas in existing situation adjusting the crop sequence. It is a water intensive crop-not only for growth but for processing as well.

➤ Coffee

- It is the indigenous crop of Ethiopia (Abyssinia Plateau). From Ethiopia, it was taken to Arabia in 11th Century. From Arabia, the seeds were brought by Baba Budan in 17th Century and were raised in Baba Budan hills of Karnataka. But it was British planters who took keen interest and large coffee estates were established in the hills of Western Ghats. Some of the geographical conditions for the growth of coffee are as follows:
- **Temperature:** It requires hot and humid climate with temperature varying between 15°C and 28°C. It is generally grown under shady trees. Therefore, strong sun shine, high temperature above 30°C, frost and snowfall are harmful for coffee cultivation. Dry weather is necessary at the time of ripening of berries.
- **Rainfall:** Rainfall between 150 and 250 cm is favourable for coffee cultivation.
- **Soil:** Well drained, rich friable loamy soil containing good deal of humus and minerals like iron and calcium are ideal for coffee to increase productivity.
- **Labour:** Like tea, coffee cultivation also requires plenty of cheap and skilled labour for various purposes like sowing, transplanting, pruning, plucking, drying, grading and packaging of coffee.
- **Distribution:** Karnataka, Kerala and Tamil Nadu are the main states of coffee production in India.

➤ Tea

- India is famous for its tea gardens. Tea plantation in India was started by the Britishers in 1823 when wild tea plants were discovered by them in the hilly and forest areas of Assam. Tea is made from tender sprouts of tea plants by drying them. India is one of the leading tea producing country in the world. China and Sri Lanka are other leading producers of tea. Some of the geographical conditions for the growth of tea are as follows:
- **Temperature:** It requires hot and wet climate. The ideal temperature for the growth of tea bushes and leaf varies between 20°C to 30°C. If temperature either rises above 35°C or goes below 10°C, it would be harmful for the growth of tea bushes and leaves.
- **Rainfall:** As mentioned above tea requires a good amount of rainfall ranging between 150-300 cm and the annual rainfall should be well distributed throughout the year. Long dry spell is harmful for tea.
- **Soil:** Tea bush grows well in well drained, deep, friable loamy soil. However, virgin forest soil rich in humus and iron content are considered to be the best soils for the tea plantation. Tea is a shade loving plant and grows better when planted along with shady trees.

- **Labour:** Cheap and efficient labour is required for tea production.
- **Distribution:** Assam is the leading producer that accounts for more than 50% of tea production of India. Tea producing areas of Assam are the hill slopes bordering the Brahmaputra and Surma valleys. West Bengal is the second largest producer of tea where tea is mostly grown in the districts of Darjeeling, Siliguri, Jalpaiguri and Cooch Bihar districts. Tamil Nadu is the third largest producer where tea growing areas are mostly restricted to Nilgiri hills.

INDUSTRIES

Industries refer to an economic activity that is concerned with production of goods, extraction of minerals or the provision of services.

➤ Classification of Industries

Industries can be classified on the basis of raw material, size and ownership.

- ❖ **Raw Material:** Industries may be agro based mineral based, marine based & forest based depending on the type of raw materials they use
 - **Agro Based Industries:** They use plant & animal based products as their raw material. Food processing vegetable and leather industries are example of agro based industries.
 - **Minerals Based Industries:** They are primary industries that use minerals ores as their raw material. The products of these industries feed other industries. For example: Iron Industry.
 - **Marine Based Industries:** They use product from sea, ocean as raw material. Industries processing seafood or manufacturing sea oil are some examples.
 - **Forest Based Industries:** They utilize forest produce as raw material. The industries associated with forest are pulp and paper, Pharmaceuticals, furniture & buildings.
- ❖ **Size:** It refers to the amount of capital invested, number of people employed and the volume of production. Based on size, industries can be classified into small scale and large scale industries.
 - Cottage or household industries are a type of small scale industry where the products are manufactured by hand, by artisans
 - Small scale industry use less amount of capital & technology as compared to large scale industry that produce large volume of products
 - Investment of capital is higher & the technology used is superior in large scale industry.
- ❖ **Ownership:** Industries can be classified into
 - **Private Sector:** They are owned and operated by individuals or a group of individuals.
 - **State Owned/Public Sector:** PSI are owned & operated by the govt. such as “ Hindustan Aeronautics Limited” and Steel Authority of India.
 - **Joint Sector:** They are owned & operated by the state & individuals or a group of Individuals.
 - **Cooperative Sector:** They are industries owned & operated by producers and suppliers, raw material worker or both. **Example:** Indian Coffee House

➤ Industrial System

- An industrial system consist of inputs processes and outputs. The inputs are the raw material, labour, cost of Land, transport, power and other infrastructure. The processes include a wide range of activity that convert the raw material into finished product. The outputs are the end products & the income earned from it.

Input → Process → Output

❖ **Main Factors Affecting Location of Industries:** The factors affecting the location of industry are:

- The availability of raw material, land, water, Labour, Power, Capital, transport and market.
- Industries are situated where some or all of these factors are easily available
- Sometimes govt. provide incentives like subsidies power, lower transport cost & other infrastructure. So that industries may be located in backward areas.
- Industrialisation often leads to development of growth and towns in cities.

➤ **Sunrise and Sunset Industries**

I. Sun Rise Industries: Emerging industries are also known as sunrise industries. These include information technology, wellness, hospital & knowledge.

II. Sunset Industries: A sunset industry is an industry in decline or has passed its peak & boom period. The countries in which iron & steel are located are Germany, Japan, China, Russia. Textile industry is concentrated in India, Hong Kong, Japan, South Korea and Taiwan. The Major hubs of information technology industry are the Silicon Valley of central California and Bangalore Region of India.

➤ **Iron & Steel Industry**

Like other industries iron & steel industry too comprises various inputs processes & outputs. This is a "Feeder Industry" whose products are used as raw material for other industries. The inputs for the industry include raw material such as iron, coal and limestone along with labour, capital, site & other infrastructure. The process of converting iron ore into steel involves many stages. The raw material is put in the blast furnace where it undergoes melting. It is then refined. The output obtained is steel which may be used by other industries as raw material. Special alloys of steel can be made by adding small amount metals like AL, Ni & Cu. Alloys give steel unusual hardness, toughness or ability to resist rust. Steel is often called the Backbone of modern industry. Before 1800AD Iron & steel industry located where raw material, power supply & running water were easily available. Later the ideal location for the industry was near coal field & close to canals & railways. After 1950, iron & steel industry began to be located on large area of flat land near seaport. This is because by this time steel works had become very large and iron ore has to be imported from overseas. In India, iron and steel industries has developed taking advantage of raw material, cheap labour, transport & market.

➤ **Cotton Textile Industry**

The industry can be divided on the basis of raw materials used in them. Fibres are the raw material of textile industry. Fibres can be natural or man-made. Natural fibres include from wool, silk linen and jute. Man-made fibres include Nylon, Polyester etc. The cotton textile industry is one of the oldest industrial revolution in 18th century, it was being processed on spinning machines. The power looms facilitated the development of cotton textile industry first on Britain & later in other parts of the world.

Before the British rule, Indian Hand spun and hand-woven cloth already had a wide market. The muslins of Dhaka and Masulipatnam, calicos of Calicut & gold Bronte cotton of Bhuranpur, Surat and

Vadodara were known world-wide for their quality & design. But the production of hand-woven cotton textile was expensive and time consuming. The first textile mill in the country was established at Fort Gloster near Kolkata in 1818 but it closed down after some time. The first successful mechanised textile mill was established in Mumbai in 1854.

The warm, moist climate, port for importing machinery availability of raw material skilled labour resulted in rapid expansion of the industry in this region. Initially, this industry flourished in the state of MH and Gujarat be of favourable humid climate. But today humidity can be created artificially & raw cotton is a pure & not weight losing raw materials. So this industry has spread to other parts of India.

➤ Information Technology

The IT industry deals in the storage, processing & distribution of information. The main factors guiding the location of these industries are resources availability, cost & infrastructure. Major Hubs are: Silicon valley, California and Bangalore, India. Bangalore is located on the Deccan Plateau from where it gets the same silicon plateau. The city is known for its mild climate throughout the year. Silicon Valley is part of Santa Clara valley, located next to the Rocky mountains of north America. The area has temperate climate with temperature rarely dropping below 0° C.

HUMAN RESOURCES

Peoples are nation's greatest resource. It is the people with their demands & abilities that turn them into resources. Hence, human resource is the ultimate resource. Healthy, educated & motivated people develop resources as per their requirements.

❖ **Distribution of Population:** - Human resources like other resources are not equally distributed over the world. The way in which people are spread across the earth's surface is known as Pattern of Population distribution. More than 90% of world's population lives in about 80% of the land surface. The crowded areas are south & south-east Asia, Europe & North Eastern North America. Very few people live in high latitude areas, tropical deserts, high mountains and areas of equatorial forests. Many more People live on north of the equator than south of the equator. Almost three quarters of the world's people live in two continents: - Asia and Africa.

❖ **Density of Population:** - Population density is the number of people living in the unit area of the earth's surface. It is normally expressed as square per Km. The average density of population in the world is 51 persons sq.km. South central Asia has the highest density of population followed by east & south east Asia. Average density of population in India is 382 people per sq.km.

➤ Factors Affecting Distribution of Population

❖ Geographical Factors

- **Topography:** People always prefer to live on plains rather than mountains & plateaus because these areas are suitable for farming, manufacturing & service activities
- **Climate:** People usually avoid extreme climate that are very hot & very cold.
- **Soil:** Fertile soil provides suitable land for agriculture
- **Water:** People prefer to live in the areas where fresh water is easily available. The river valley of the world are densely populated while deserts have sparse population.
- **Minerals:** Areas with minerals deposits are more populated

❖ **Social, Cultural & Economic Factors**

- **Social:** Areas of better housing, education and health facilities are more densely populate.
- **Cultural:** Places with religion and cultural significance attract people.
- **Economic:** Industrial areas provide employment opportunity. Hence, large number of people are attracted to these areas.

➤ **Population Change**

The population change refers to change in the number of people during a specific time. For an extremely long period of human history, until the 1800's, the world population grew steady but slowly large numbers of babies were born, but they died early too. This was because there was no proper health facility & the food was not sufficient to feed all the people. The period of 1950 experienced a Population exploitation.

In 1999 the world population was 6 billion. The main reason for this growth was that with better food supplies and medicine, deaths were reducing while the number births still remained freely high.

Birth are usually measured using the birth rate i.e. the number of births per one thousand people. Deaths are usually measured using the death rate that is the number of people per thousand.

Migration is the most of people in an out of the area. The difference between birth rate & death rate of a country is called the natural growth rate. The population high in the world is mainly due to rapid high in natural growth rate. Emigrants are people who leave a country. Immigrants are those who arrive in a country

➤ **Population Composition**

How crowded a country is, has little to do with its level of economic development. For example: Both Bangladesh & Japan are very densely populated. But japan is far more economically developed then Bangladesh. People vary greatly in their age, sex, literacy level, health condition, occupation & income level. Population composition refers to the structure of the population. The composition of population helps us to know how many are males or females, which age group they belong to, how educated they are & what type of occupation they are employed in.

➤ **Age, Sex, Pyramid**

Total population divided into various age group. Percentage of the total population sub divided into males & females in each of those groups. The age of the population pyramid tells us the story of people living in that country. At the base are the children and at the peak are the aged people.

The population pyramid also tells us how many dependence there are in the country (children below 15yrs age) and elderly above 65 yrs.

The population pyramid of country in which birth & death are both are high is brought at the base & rapidly narrow towards the top.

In Countries where death rates (especially among very young) are decreasing, the pyramid is broad in the younger age group because more infants survived to adulthood.

In countries like japan, lower birth rate makes the pyramid narrow at base decreased death rates allow number of people to reach old age.