



YBN University, Ranchi

Solar System

- Our solar system is a part of Milky Way galaxy. In ancient India, it was imagined to be a river of light flowing in the sky. Thus, it was named Akash Ganga
- A solar system consists of a sun at the centre and the eight planets, moons, asteroids, comets and meteoroids that revolve it. The gravitational attraction between the Sun and these objects keeps them revolving around it
 - The sun, the moon and all those objects shining in the night sky are called celestial bodies
- The study of universe is known as cosmology
- The size of the solar system has been estimated to at about 10^5 AU
- The eight planets, namely the Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus and Neptune, revolve around the sun in fixed elliptical paths known as 'orbits'.
- Pluto is dwarf planet
- The light-year is a unit of length used to express astronomical distances

SUN

- The sun is in the centre of the solar system.
- The sun is the ultimate source of heat and light for the solar system
- The sun is about 150 million km away from the earth.
- Light takes about 8.5 minutes to reach the earth from the sun
- Hydrogen and helium are the main gases present in the sun.

The boundary between the Sun's interior and the solar atmosphere is called the photosphere. It is the visible 'surface' of the Sun

The core is at the centre of the sun. It is the hottest region, where the nuclear fusion reaction takes place to give the sun power

- The outer layer of sun atmosphere made up of thin hot gases is called corona. Corona is visible only during a total eclipse of the sun
- Sun has a surface temperature of 6000 degree Celsius
- The temperature at the centre of sun is around 1.5×10^7 K

PLANETS

- The planets are classified in order of their distance from the sun and based on their characteristics. They are:
 1. The inner planets or terrestrial planets or rocky planets. Mercury, Venus, Earth and Mars are called inner or terrestrial planets.
 2. The outer planets or gaseous planets or giant planets. Jupiter, Saturn, Uranus and Neptune are called outer or gaseous planets.
- All the eight planets of the solar system move around the sun in fixed paths. These paths are elongated. They are called orbits
- A ninth planet has been recently discovered by NASA named as Carla

MERCURY

- Mercury is nearest to the sun and it is the smallest planet in the solar system
- Mercury has no satellite of its own
- It rotates on its own axis in 58.65 earth days while it takes 88 Earth days to complete one revolution around the sun
- The sunlight takes 3.2 minutes to travel from the Sun to Mercury
- Mercury has no protective blanket like Ozone around it to prevent us from harmful radiations

VENUS

- Venus is the second planet in distance from the sun
- Venus is earth's nearest planetary neighbour. It is the brightest planet.
- Venus has no moon or satellite of its own. Rotation of Venus on its axis is somewhat unusual. It rotates from east to west. Only Venus and Uranus have this backwards direction
- It completes one rotation in 243 Earth days which is the longest day of any planet in our solar system
- The Venus takes 224.7 Earth days to complete one revolution around the sun, and it has no natural satellites.
- Venus is 0.7 astronomical units away from the sun

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- Venus is considered as 'Earth's-twin' because its size and shape are very much similar to that of the earth. It's also called as 'Earth sister'
- Venus is known as the evening star as well as Morning star

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Venus is hotter than Mercury because Venus has an atmosphere which is thicker and made almost entirely of carbon dioxide.

The sunlight takes 6 minutes to travel from the sun to Venus

THE EARTH

- The earth is the third nearest planet to the sun. In size, it is the fifth largest planet
- The axis of rotation of the Earth is not perpendicular to the plane of its orbit. The Earth is 23.5 degrees tilted on its axis and thus makes 66.5 degrees angle. The tilt is responsible for the change of seasons on the Earth. The Earth has only one moon.
- The Earth rotates from west to east
- It is also known as the 'Blue Planet' because of the presence of water.
- Earth has only one natural satellite called the Moon.
- The Earth takes 365.25 days to complete one revolution around the Sun. It takes 23 hours 56 minutes and 4 seconds for the earth to complete one rotation on its own axis
- The sun light takes about 8.3 minutes to reach the earth
- Earth has a protective blanket of ozone layer high up in its atmosphere to save life from harmful ultraviolet radiations coming from the sun

THE MARS

- Mars is the fourth nearest planet to the sun and it is the second smallest planet in the Solar system
- It is also described as the "Red planet". It is reddish in colour due to the presence of iron oxide on its surface
- The landmass of Mars and Earth are very similar
- It takes 24 hours and 37 minutes to complete one rotation on its axis and its takes 687 days to complete one revolution around the Sun
- Mars has two satellites namely Phobos and Deimos.

THE JUPITER

- Jupiter is the largest planet in the solar system. It is made primarily of gases and is therefore known as 'Giant Gas planet'
- Jupiter is also known as winter planet
- It takes 9 hours 55 minutes to complete one rotation on its axis and it takes 11.86 years to complete one revolution
- Jupiter has the shortest day in the solar system.
- Jupiter has a faint ring system around it. They are mostly comprised of dust particles
- Jupiter has 67 confirmed satellites orbiting the planet. Ganymede, the satellite of Jupiter, is the largest natural satellite in the solar system (even bigger than the planet Mercury)

THE SATURN

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Saturn is the sixth planet from the sun and the second largest planet in the solar system. Saturn is called as the Ringed Planet

Saturn is the only planet in our solar system whose average density is less than water.

- The Saturn has 30 rings and 53 confirmed natural satellites
- The Saturn takes 10 hours 34 minutes to complete one rotation on its axis and it takes 29.4 years to complete one revolution around the sun
- Titan is Saturn's largest moon and the second largest (after Ganymede of Jupiter) in the solar system. It is the only moon in the solar system with clouds and a dense, planet-like atmosphere

THE URANUS

- Uranus is the seventh planet from the sun and it is not visible to the naked eye.
- Uranus rotates on its axis from east to west
- Uranus is inclined on its axis at an angle of 98 degrees.
- Hydrogen, helium and methane are the major gases of its atmosphere.
- It is very cold due to its great distance from the sun
- This planet appears greenish in colour because of methane gas present in its atmosphere
- Uranus also has rings and twenty-seven satellites
- Uranus is the first planet to have been discovered by the use of telescope

THE NEPTUNE

- Neptune is the eighth planet from the sun.
- It takes 16 hours to complete one rotation on its own axis and it takes nearly 165 years to revolve around the sun.
- It is the coldest planet in the Solar System because it is the farthest planet from the Sun.
- It has 13 natural satellites and 5 rings
- Neptune is surrounded by methane rings of subzero temperature

IMPORTANT FACTS ABOUT THE PLANETS

Biggest planet	Jupiter
Smallest plant	Mercury
Brightest planet	Venus
Brightest star	Dog Star
Planet having maximum number of satellite	Jupiter (67)
Coldest planet	Neptune
Red planet	Mars
Biggest satellite of solar system	Ganymede
Smallest satellite of solar system	Demos
Blue planet	Earth

Red planet	Mars
Sister of Earth	Venus
Morning star, Evening star	Venus
Greatest average density	Earth
Lowest average density	Saturn
Hottest Planet	Venus
Deepest Oceans	Jupiter
Strongest Magnetic fields	Jupiter
Retrograde revolution (East to west)	Venus, Uranus

DWARF PLANETS

- Dwarf planets are tiny planets in our solar system. Any celestial body orbiting around the sun, weighing for the self-gravity and nearly be round in shape is called 'Dwarf Planet'.
- It should not be a satellite of any planet
- Ceres, Pluto, Heumea, Makemake and Eris are dwarf planets

ASTEROIDS

- Asteroids are small rocky celestial bodies that revolve around the Sun, like other planets. They are also called 'Minor Planets'.
- Larger asteroids are called Planetoids. These are found in between the planets Mars and Jupiter. This belt is known as 'Asteroid belt'.
- The diameter of the asteroids varies from 100 km to a size of a pebble

COMETS

- They revolve around the Sun. But their orbits are irregular. Sometimes they get very close (Perihelion) to the sun and in other times they go far away (Aphelion) from the sun
- These are generally found in Kuiper Belt. They travel towards the sun
- The best known Comet, Halley's Comet, appears once in every 76 years. The Halley's Comet was seen last in 1986

METEORS

- The small pieces of rocks which move around the sun are called meteoroids
- They are the removed pieces of rocks mainly from the Asteroid belt. They are called Meteoroids before they enter into our atmosphere. They enter into the atmosphere with great speed. But most of them are burnt when they enter into the atmosphere. After entering into our atmosphere they are called as Meteors. Some pieces do not burn fully and they fall on the earth and make craters.

- Examples for Meteorite Fall: Meteor crater in Northern Arizona and Lake Lonar in Buldhana District of Maharashtra in India were created by meteor impacts.

SATELLITES

- The satellites move around a planet from West to East
- They have no atmosphere and water.
- Number of natural Satellite in solar system

Planet	Number of natural Satellite
Jupiter	63
Saturn	60
Uranus	27
Neptune	13
Mars	2
Earth	1
Venus	0
Mercury	0

Moon: The Earth's Satellite

- The moon is located at a distance of 384,401 km from the earth. The moon revolves around the earth.
- The moon takes 27 days and 7 hours and 43 minutes for both its rotation and revolution around the earth
- The moon is the fifth largest natural satellite in the solar system.
- The light which is reflected by the Moon will reach the Earth in just one and a quarter seconds • The moon is smaller than the earth and it has 1/6 of the gravitational pull of the earth
- Apollo 11 was the first manned mission to land on the Moon sent by NASA.

THE EARTH

- Pythagoras (582-507 B.C.) believed that the Earth was a sphere. The first to suggest that the earth was shaped like a globe.
- The earth has two basic movements: 1) Rotation and 2) Revolution.

ROTATION OF EARTH

- The earth completes one rotation in 23 hours, 56 minutes and 4.09 seconds. It rotates in an eastward direction opposite to the apparent movement of the sun
- The earth's axis is tilted at an angle of $23\frac{1}{2}^\circ$ from a perpendicular to the elliptic plane
- The velocity of earth's rotation varies depending on the distance of a given place from the equator. The rotational velocity at the poles is nearly zero. The greatest velocity of the rotation is found at the equator

Effects of earth's rotation

- The apparent rising and setting of the sun is actually caused by the earth's rotation which results in the alternate occurrence of day and night everywhere on the earth's surface
- Rotation of the earth is also responsible for the difference in time between different places on the earth
- Rotation causes the working of the Coriolis force which results in the deflection of the winds and the ocean currents from their normal path
- Tide is caused by the rotation of the earth apart from the gravitational pull of the sun and the moon

REVOLUTION OF THE EARTH

- The movement of the earth in its orbit around the sun in an anti-clockwise direction, that is, from west to east is called revolution of the earth
- The period taken by the earth to complete one revolution around the sun is 365 days and 6 hours
- The distance of the earth from sun varies time to time due to the elliptical shape of the orbit
- January 3rd the earth is closest to the sun and it is said to be at **Perihelion**. At Perihelion, the distance is 147 million km
- July 4th the earth is farthest from the sun and it is said to be at **Aphelion**. At Aphelion the distance of the earth is 152 million km away from the sun

Effects of revolution of the earth

The revolution of earth results

- Cycle of seasons,
- Variation in length of days and nights,
- Variation in distribution of solar energy over the earth and the temperature zones

SEASONS

- The seasons are caused due to the combined effect of the earth's revolution and the tilt of its axis in the same direction throughout the year
- The four seasons are spring, summer, autumn and winter
- The earth is moving around the sun on its tilted axis. It varies when observed on a daily and monthly basis, at different times of the year. On 21 March and 23 September the sun rises precisely in the east and sets exactly in the west

EQUINOXES

- During the equinoxes the periods of day light and darkness are equal all over the world. It happens on two days of the year 21 March and 23 September
- On 21 March the sun is directly overhead at the equator. This position of the sun is called spring equinox
- On 23 September the sun is directly overhead on the equator and it is called autumn equinox

SOLSTICE

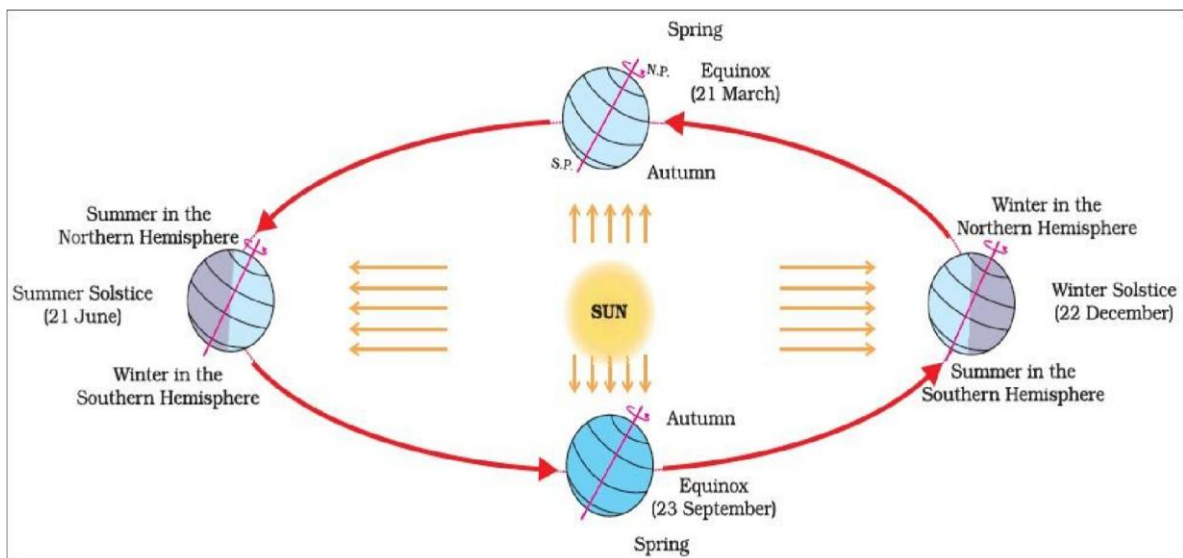
- Solstice is one of the two dates in the year on which the sun reaches greatest altitude north or south of the equator and is directly overhead along one of the lines of the tropics

SUMMER SOLSTICE

- On June 21 the earth is so located in its orbit that the sun is overhead on the tropic of cancer ($23\frac{1}{2}^{\circ}$ N). The day 21 June is known as summer solstice
- On this date the northern hemisphere is tipped towards the sun having the longest day. While southern hemisphere is tipped away from the sun having the shortest day
- On that day the North Pole is inclined or tilted towards the sun. It, therefore, experiences complete light for 24 hours. The South Pole is tilted away from the sun so it is in complete darkness for 24 hours.

WINTER SOLSTICE

- The sun is overhead on the tropic of Capricorn ($23\frac{1}{2}^{\circ}$ S). The day December 22 is known as winter solstice
- The greater part of the southern hemisphere gets the direct rays of the sun so the days are long and the nights are short here. In the northern hemisphere the nights are longer than the days at this time. The southern hemisphere has summer. The northern hemisphere has winter



EARTHY POSITION WITH RESPECT TO MOON

Apogee	Perigee
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The period of the farthest distance between the moon and the earth is called apogee	The period of the nearest distance between the moon and the earth is called perigee
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ECLIPSES

- An eclipse is a complete or partial obscuration of light from a celestial body and it passes through the shadow of another celestial body. The eclipses are of two types. They are:

Lunar eclipses	Solar eclipses
It is the situation when the earth comes between sun and moon	It is the situation when the moon comes between sun and earth
It occurs only on a full moon day. But it does not occur on every full moon day because the moon is so small and the plane of its orbit is tilted about 5 degree with respect to the earth's orbital plan	It occurs only on a New Moon day. But it does not occur on every new moon day because of the inclination of the moon's orbital plan

LATITUDE AND LONGITUDE

LATITUDE

- Latitude is the angular distance of a point on earth surface from the centre of earth. They are measured in degrees.
- The latitude specifies a location's distance north or south of the equator

Important Parallels of Latitudes

- Tropic of Cancer ($23\frac{1}{2}^{\circ}$ N) in the Northern Hemisphere
- Tropic of Capricorn ($23\frac{1}{2}^{\circ}$ S) in the Southern Hemisphere
- Arctic Circle at $66\frac{1}{2}^{\circ}$ north of the equator
- Antarctic Circle at $66\frac{1}{2}^{\circ}$ south of the equator
- Equator
- Equator is an imaginary line running on the globe that divides it into two equal parts.
- Northern half of the earth is known as the Northern Hemisphere and Southern half is known as the Southern Hemisphere.

LONGITUDES

- Longitude is the angular distance of a point on the earth surface along the equator, east or west from the prime meridian
- The semi-circles running from pole to pole or from north to south are known as meridians of longitude and distance between them is measured in degrees of longitude
- Prime meridian is the semi-circle from pole to pole, from which all the other meridians radiate east wards and west wards up to 180
- The time at 0° longitude is called Greenwich Mean Time. It is based on local time of the meridian passing through Greenwich near London
- 180 degree meridian (International date line) is exactly opposite to the prime meridian
- Indian government has accepted the meridian of 82.5 degree east for standard time, which is 5 hours 30 minutes ahead of the Greenwich Mean time
- The International Date Line running over the Pacific Ocean

LITHOSPHERE

- The lithosphere is the outermost rigid rocky shell of the earth. It comprises the crust and the upper portion of the mantle
- The earth is composed of lithosphere, atmosphere, hydrosphere, and biosphere
- The lithosphere is the solid outer part of the Earth.
- The atmosphere is a thin layer of gases that surrounds the Earth.
- The hydrosphere is the watery part of the Earth's surface including oceans, rivers, lakes and water vapour
- The biosphere is the layer of Earth where life exists

INTERIOR OF THE EARTH

- Earth's interior can be divided into the crust, upper mantle, lower mantle, outer core, and inner core

THE CRUST

- Crust is the outer layer of the Earth, where we live. It is the skin of our Earth, which ranges between 5 to 30 km
- The thickness of the crust is greater below the continents than the ocean floor
- Continental Crust is made up of SIAL and Oceanic Crust is made up of SIMA
- The boundary between the upper crust and the lower crust is termed as 'Conorod boundary'

THE MANTLE

- The mantle is composed of silica, magnesium and iron. It lies between the lower crust and the outer core, which is about 2,900 km thick
- It is divided into upper mantle and lower mantle. The mantle generally is in a solid state. The upper part of the mantle is called asthenosphere
- The asthenosphere is the part of the mantle that flows and moves the plates of the earth

THE CORE

- The core is the innermost and hottest layer of the Earth which lies below the mantle. It is composed mainly of Nickel (Ni) and Iron (Fe). Hence it is called NIFE
- The core is divided into Solid inner core and Liquid outer core
- The presence of large quantities of iron in the core is responsible for the Earth's gravitational force. As the Earth rotates on its axis, the liquid outer core spins over the solid inner core and generates the Earth's magnetic field

ROCKS

- The earth's crust (Lithosphere) is composed of rocks. An aggregate of minerals on the Earth's crust is called 'rock'. It may be hard and compact like 'granite' or soft as 'clay' or loose as 'sand'
- The scientific study of rocks is called **petrology**
- Based on formation, rocks are classified as
 1. Igneous,
 2. Sedimentary,
 3. Metamorphic.

IGNEOUS ROCKS

- The igneous rocks are formed by the solidification of molten magma. These rocks are also called as the 'Primary Rocks' or 'Parent Rocks' as all other rocks are formed from these rocks.
- They do not contain fossils
- They are associated with the volcanic activities
- These rocks are useful for construction work
- Granite, pegmatite, basalt, etc are some of the examples of igneous rocks

SEDIMENTARY ROCKS

- It is formed due to the aggregation and compaction of sediments derived from the older rocks, plants, animals and contain fossils of plants
- The bodies of plants and animals that fall on the deposits get embedded in the layers and form Fossils. Sandstone, limestone, chalk, gypsum, coal and conglomerate are examples of sedimentary rocks.

METAMORPHIC ROCKS

- These are changed form of igneous and sedimentary rocks

Sedimentary rocks	Metamorphic rocks
Lime stone	Marble
Sandstone	Quartzite
Shale/clay	Slate, Schist
Coal	Diamond

- When Igneous or sedimentary rocks are subjected to extreme heat and pressure, they undergo a complete change in their form and character
- Rocks are useful for making
 1. Cement
 2. Writing chalk
 3. Fire
 4. Building materials
 5. Bath scrub
 6. Kerb stone
 7. Ornament
 8. Roofing materials
 9. Decorative materials
 10. Rocks are valuable source of minerals such as gold, diamond, sapphire etc.

SOILS

- Soil is a mixture of organic matter, minerals, gases, liquids and organisms that together support life. It is known as the 'skin of the earth'.
- Soils are produced from rocks (parent material) through the processes of weathering and natural erosion
- World Soil Day is observed on 5th December.
- The basic components of soil are mineral, organic matter, water and air. It consists of about 45% mineral, 5% organic matter, 25% of water and 25% air
- Soils are classified on the basis of their formation, colour, physical and chemical properties. Based on these, soil is classified into six major types. They are: Alluvial soil, Black soil, Red soil, Laterite soil, Mountain soil, Desert soil

ALLUVIAL SOIL

- Alluvial soils are found in the regions of river valleys, flood plains and coastal regions.
- These are formed by the deposition of silt by the running water. It is the most productive of all soils
- It is suitable for the cultivation of sugarcane, jute, rice, wheat and other food crops.

BLACK SOILS

- These soils are formed by weathering of igneous rocks.
- Black soil is clayey in nature. It is retentive of moisture.
- It is ideal for growing cotton.

RED SOILS

- These soils are formed by weathering of metamorphic rocks and crystalline rocks.
- The presence of iron oxide makes this soil brown to red in colour.
- It is suitable for millet cultivation.

LATERITES SOILS

- These are the typical soils of tropical regions. These soils are found in the regions which experienced alternate wet and dry condition
- It is suitable for plantation crops of tea and coffee.

MOUNTAIN SOILS

- Mountain soils are found over the slopes of mountain

DESERT SOILS

- These are sandy soil found in the hot desert regions. These soils are porous and saline. Since it is infertile agriculture in these soils are not so successful.

LANDFORMS

RIVER LAND FORMS

- The place of origin of the river is known as its Source. The place where it joins a lake or sea or an ocean is known as the River mouth
- Falling of river water over a vertical step in the river bed is called waterfall
- The highest waterfall is Angel Falls of Venezuela in South America. The other waterfalls are Niagara Falls located on the border between Canada and USA in North America and Victoria Falls on the borders of Zambia and Zimbabwe in Africa
- Delta: The large of sediments a fan shaped by river deposition. Deltas are excellent productive lands. They have more minerals which favor cultivation. E.g. Cauvery delta, Ganges delta, Mississippi delta
- A flood plain is a flat area of land adjacent to a river. It stretches from the bank of its channel to the base of the enclosing valley walls which experiences flooding during the period of high discharge.
- Raised bed and a bank of the river due to frequent flooding and deposition of the sediments is called levees
- Oxbow lake is a free standing body of water formed when the meander is cut off from the main river. This landform is so named because it resembles horse shoe

GLACIER

- A large body of ice moving slowly down a slope or valley due to gravity is called a glacier. Glaciers are grouped into Mountain or Valley Glaciers and Continental Glaciers.
- Continental Glacier: The glacier covering vast areas of a continent with thick ice sheets. E.g. Antarctica, Greenland
- Mountain or Valley Glacier is a stream of ice, flowing along a valley. It usually follows former river courses and is bounded by steep sides. E.g. the Himalayas and the Alps.

COAST

- A part of the land adjoining or near the sea is called the Sea coast.
- The boundary of a coast, where land meets water is called the Coast line
- The sea waves deposit sediments of sand and gravel along the shores forming beaches
- The first longest beach in the world is the Miami Beach in South Florida in U.S.A. The second longest beach in the world is the Marina beach in Chennai

LAGOON

- Lagoon is a shallow stretch of water partially or completely separated from the sea. E.g. Chilka lake in Odisha, Pulicat lake in Tamil Nadu and Andhra Pradesh and Vembanad lake in Kerala are the famous lagoons in India.

ATMOSPHERE

- Atmosphere is a mixture of gases, water vapour and dust particles in different proportions.
- Nitrogen (78%) and Oxygen (21%) are permanent gases of the atmosphere. They constitute 99% of the total composition and their percentages always remain the same without any change. The remaining one percentage is occupied by Argon (0.93%), Carbon-di-oxide, (0.03%), Neon (0.0018%), Helium (0.0005%), Ozone (0.00006%) and Hydrogen (0.00005%).

STRUCTURE OF THE ATMOSPHERE

- The atmosphere is divided into five distinct layers based on the temperature variations.
 1. Troposphere
 2. Stratosphere
 3. Mesosphere
 4. Ionosphere (Thermosphere)
 5. Exosphere

TROPOSPHERE

- The troposphere is the lower most layer of the atmosphere. It extends approximately to a height of 8 km from the poles and 18 km from the equator. The height of the troposphere changes seasonally also. It increases during summer and decreases during winter
- The air we breathe exists here. Almost all the weather phenomena like rainfall, fog and hailstorm occur in this layer.
- This layer is the most important layer of the atmosphere

STRATOSPHERE

- Stratosphere lies above the troposphere. It extends to a height of about 50km above earth surface
- This layer is almost free from clouds and associated weather phenomenon, making conditions most ideal for flying Aero planes
- The temperature increases with increase in height in this layer. The upper limit of the stratosphere is called as stratopause.
- One important feature of stratosphere is that it contains a layer of ozone gas

MESOSPHERE

- This is the third layer of the atmosphere. It lies above the stratosphere. It extends up to the height of 80 km.

- Meteorites burn up in this layer on entering from the space.
- The temperature decreases with increase of altitude due to the absence of ozone

THERMOSPHERE

- Thermosphere exists above the mesosphere. It extends to about 80-400 km. In thermosphere temperature rises very rapidly with increasing height
- Ionosphere is a layer of the thermosphere that contains Ions and free electrons
- This layer helps in radio transmission. In fact, radio waves transmitted from the earth are reflected back to the earth by this layer.

EXOSPHERE

- The upper most layer of the atmosphere is known as exosphere
- This layer has very thin air. Light gases like helium and hydrogen float into the space from here.
- The exosphere extends beyond the thermosphere up to 960 Km

WEATHER AND CLIMATE

- Weather is the day today conditions(state) of the atmosphere at any place as regards sunshine, temperature, cloud cover, Wind fog condition, air pressure, humidity, precipitation and such other elements.
- The average weather condition of a place for a longer period of time represents the climate of a place
- Temperature is one of the key elements of weather and climate.
- Temperature varies with time due to changes in the level of radiation which reach the earth surface. This is due to motions of the earth (The rotation and revolution) and inclination of the earth's axis.
- Temperature varies both horizontally and vertically. Temperature decreases with increasing height is known as Lapse rate which is 6.5 degree celsius per 1000 meters in troposphere

HEAT ZONES OF THE EARTH

- The spherical shape of the earth along with its movement around the sun causes differences in the angles at which the sun's ray's fall on the earth's surface. This causes a difference in the distribution of heat on the earth's surface. Torrid Zone
- The mid-day sun is exactly overhead at least once a year on all latitudes in between the Tropic of Cancer and the Tropic of Capricorn. It therefore, receives the maximum heat.

Frigid Zones

- Areas lying between the Arctic Circle and the North Pole in the Northern Hemisphere and the Antarctic Circle and the South Pole in the Southern Hemisphere, are very cold. It is because here the sun does not raise much above the horizon.

Temperate Zones

- The mid-day sun never shines overhead on any latitude beyond the Tropic of Cancer and the Tropic of Capricorn. The angle of the sun's rays goes on decreasing towards the poles. and the Tropic of Capricorn and the Antarctic Circle in the Southern Hemisphere, They have moderate temperatures

AIR PRESSURE

- Air pressure is defined as the pressure exerted by the weight of air on the earth's surface. As we go up the layers of atmosphere, the pressure falls rapidly
- The air pressure is highest at sea level and decreases with height
- Horizontally the distribution of air pressure is influenced by temperature of air at a given place

WIND

- The movement of air from high pressure area to low pressure areas is called wind
- Winds can be broadly divided into three types.
 1. Permanent winds – The trade winds, westerlies and easterlies are the permanent winds. These blow constantly throughout the year in a particular direction.
 2. Seasonal winds – These winds change their direction in different seasons. For example monsoons in India.
 3. Local winds – These blow only during a particular period of the day or year in a small area. For example, land and sea breeze
- Clouds: A visible mass of Condensed water vapour floating in the air

CYCLONE

- Cyclone is an area of low pressure surrounded by high pressure ,,
- Anticyclone is an area of high pressure area surrounded by low pressure.
- Cyclones can be classified into
 1. Tropical cyclones
 2. Temperate cyclones
 3. Extra tropical cyclones

Tropical cyclones

- Tropical cyclones are known as '**cyclones**' in Indian ocean, '**Typhoons**' in the western pacific ocean, '**Hurricanes**' in the Atlantic and eastern Pacific ocean, '**Baguios**' in Philippine's and '**willy willy**' in Australia, '**Taifu**' in japan.

ISOLINES

- Isolines are those which join the places of equal values.
- Isolines are given different names based on the weather element they represent.

Isopleth	Reactions
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Isobars	Equal atmospheric pressure
Isohyet	Equal amount of rainfall
Isolobar	Equal pressure
Isohel	Equal sunshine
Isocryme	Equal lowest mean temperature for a specified period
Isotherm	Equal temperature
Isocline	Slope
Isodapan	Equal transportation cost distance
Isoneph	Cloudiness
Isonif	Snow
Isohypse	Elevation above sea-level
Isobaths	Equal depth sea
Isobronts	Thunder-storm at the same time
Isohaline	salinity

EARTHQUAKE AND VOLCANO

- A sudden movement of a portion of the earth's crust which produces a shaking or trembling is known as an earthquake
- The point where these vibrations originate is called the focus of the earthquake
- The point of the earth's surface directly above the focus is called the epicentre of the earthquake
- From the focus, the earthquake vibrations travel in different directions in the form of seismic waves. There are three types of earthquake waves:
 1. P waves or longitudinal waves
 2. S waves or transverse waves
 3. L waves or surface waves
- The earthquake waves are recorded by an instrument known as seismograph. The magnitude of an earthquake is measured by the Richter scale. The numbers on this scale range from 0 to 9
- The Ring of Fire is a major area in the basin of the Pacific Ocean where many earthquakes and volcanic eruptions occur
- A volcano is a vent or an opening on the surface of the Earth crust, through which hot solid, liquid and gaseous materials (Magma) erupt out to the surface from the Earth's interior
- Barren Island is situated in the Andaman Sea and lies about 138 km northeast of the territory's capital. It is only in active volcano along the chain from sumatra to myanmar. Last eruption occurred in 2017

INDIAN GEOGRAPHY

INDIA-SIZE AND LOCATION

- India is the seventh largest in terms of area (3287263 Km²) and second most populous nation after china, accounting 2.4 percent of total area
- The Indian peninsula is separated from mainland Asia by the Himalayas. The Country is surrounded by the Bay of Bengal in the east, the Arabian Sea in the west, and the Indian Ocean to the south.
- India has 6100 Km of mainland coastline (Total including Lakshadweep, and Andaman and Nicobar are 7516.6 km) and share 15200 km land border with nations
- India sharing border with Pakistan (3310 km), China(3917 km), Nepal (1752 km), Bhutan(587 km), Bangladesh(4096 km)
- India's longest border is with Bangladesh (4156 km)while the shortest border is with Afghanistan.(106 km)
- The Tropic of Cancer (23° 30'N) divides the country into almost two equal parts
- Tropic cancer passes through the eight states of India (Gujarat, Rajasthan, Madhya Pradesh, Chhattisgarh, Jharkhand, West Bengal, Tripura and Mizoram)
- Great channel separates India from Indonesia
- Sri Lanka is separated from India by a narrow channel of sea formed by the Palk strait and the Gulf of manner
- The Ten Degree Channel is separates the Andaman Islands and Nicobar Islands from each other in the Bay of Bengal
- India extends from 8°4 'N to 37°6 'N latitudes and 68°7 'E to 97°25 'E longitudes. Hence India is located of the north Eastern hemisphere
- Indian subcontinent was originally part of Gondwana Continent
- The southernmost point of main land of India is Cape Comorin (Kanniyakumari)
- The southernmost point of the country is Pygmalion Point or Indira Point (6°45'N latitude) located in the Andaman and Nicobar Islands
- The north-south extent of India is 3,214 km and it extends from Indira Col in Jammu and Kashmir in the north to Kanniyakumari in the south
- The east-west extension is 2933 km and it stretches from Rann of Kutch (Gujarat) in the west to Arunachal Pradesh in the east
- Standard Meridian of India (82°30'E) passing through Mirzapur (in Uttar Pradesh) is taken as the standard time for the whole country

LIST OF INDIAN STATES SHARE INTERNATIONAL BORDER WITH NEIGHBORING COUNTRIES

- 17 states of India have the common land borders with neighboring countries.

Country	Indian states having common borders	Number of states having common borders
Pakistan	Gujarat, Rajasthan, Punjab and Jammu & Kashmir	4

Afghanistan	Jammu and Kashmir	1
Nepal	Uttarakhand, Uttar Pradesh ,Bihar, Sikkim and West Bengal	5
Myanmar	Arunachal Pradesh, Nagaland , Manipur and Mizoram	4
Bhutan	Sikkim, West Bengal, Arunachal Pradesh and Assam	4
Bangladesh	West Bengal , Meghalaya, Mizoram, Tripura and Assam	5
China	Jammu & Kashmir, Uttarakhand, Himachal Pradesh, Sikkim and Arunachal Pradesh	5

THE PHYSICAL FEATURES OF INDIA

- The physical features of India can be grouped under the following physiographic divisions
 - 1 The Himalayan Mountains
 - 2 The Northern Plains
 - 3 The Peninsular Plateau
 - 4 The Indian Desert
 - 5 The Coastal Plains
 - 6 The Islands

THE HIMALAYAN MOUNTAINS

- The Himalayas, geologically young and structurally fold mountains stretch over the northern borders of India
- Aravalli range is the oldest fold mountain range in India.
- It stretches for a distance of 2,400 km from the Indus gorge in the west to Brahmaputra gorge in the east
- The width of the Northern Mountains varies from 400 km in Kashmir to 150 km in Arunachal Pradesh
- The Pamir Knot, popularly known as the “Roof of the World” is the connecting link between the Himalayas and the high ranges of Central Asia
- The Northern Mountains that function as a great wall is grouped into three divisions.
 1. The Trans-Himalayas, 2) Himalayas, 3) Eastern or Purvanchal hills.

THE TRANS-HIMALAYAS

- It is also known as western Himalaya’s.
- The Trans-Himalayas are about 40 km wide in its eastern and western extremities and about 225 km wide in its central part
- The rocks of this region contain fossils bearing marine sediments which are underlain by Tertiary granite
- The prominent ranges of Trans Himalayas are Zaskar, Ladakh, Kailash, and Karakoram.

THE HIMALAYAS

- It constitutes the core part of northern mountains. It is an young fold mountain
- The main divisions of the Himalayas are the (i) Greater Himalayas, (ii) the Lesser Himalayas and (iii) the Siwaliks

The greater or inner Himalayas or the Himadri

- The Greater Himalayas are about 25 km wide. Its average height is about 6,000 m. The Greater Himalayas receive lesser rainfall as compared to the Lesser Himalayas and the Siwaliks
- The folds of Great Himalayas are asymmetrical in nature. The core of this part of Himalayas is composed of granite
- Almost all the lofty peaks of Himalayas are located in this range. The notable ones are Mt. Everest (8,848 m) and Kanchenjunga (8,586 m). Mt. Everest is located in Nepal and Kanchenjunga is located between Nepal and Sikkim
- It is perennially snow bound
- Gangotri, Yamunothri and Siachen are some of the glaciers found in this region

The Lesser Himalayas or The Himachal

- It is the middle range of Himalayas. Height of this range varies from 3,700 to 4,500 m. Its width varies upto 80 km.
- The major rocks of this range are slate, limestone and quartzite
- Pir Panjal, Dhauladhar and Mahabharat are the mountain ranges found in this part.
- Major hill stations of the Himalayas are located in this range. Shimla, Mussoorie, Nainital, Almora, Ranikhet and Darjeeling are the familiar ones.

The Siwaliks or Outer Himalayas

- The Siwaliks extend from Jammu and Kashmir to Assam. It is partly made by the debris brought by the Himalayan rivers
- The altitude varying between 900-1100 metres elevation of this range is 1300 m. The width of Siwaliks vary from 10 km in the east to 50 km in the west
- The longitudinal valleys found between the Siwaliks and the Lesser Himalayas are called Duns in the west and Duars in the east

PURVANCHAL HILLS

- These are the eastern off-shoot of Himalayas. It extended in the north-eastern states of India.
- Most of these hills are located along the border of India and Myanmar while others are inside India.
- Dafla Hills, Abor Hills, Mishmi Hills, Patkai Bum Hills, Naga Hills, Manipur Hills, Mizo Hills, Tripura Hills,
Mikir Hills, Garo Hills, Khasi Hills and Jaintia Hills are the hills which are collectively known as purvanchal Hills

HIGHEST PEAKS IN HIMALAYAS

- Himalaya is the home of several high peaks. However, it holds the record of having the maximum number of highest peaks among any mountain range in world. Out of 14 heights peaks in this world, Himalayas holds 9.

Peak	Country	Height in metres
Mt. Everest	Nepal	8848
Mt.K2 or Godwin Austen	India	8611
Kanchenjunga	India	8598
Makalu	Nepal	8481
Dhaulagiri	Nepal	8172
Nanga Parbat	India	8126
Annapurna	Nepal	8078
Nanda Devi	India	7817
Kamet	India	7756
Namcha Barwa	India	7756
Gurla Mandhata	Nepal	7728

THE GREAT NORTHERN PLAINS

- This plain is one of the most extensive stretches of the alluvium in the world and is deposited by the rivers Indus, Ganga, Brahmaputra and their tributaries
- The length of the plain is about 2,400 km and the width varies from 240 to 320 km. Its width increases from east to west. It covers an area of over 7 lakh sq.km
- The Great Plains of India is remarkably a homogeneous surface with an imperceptible slope. They are formed mostly by the depositional process of the Himalayan and Vindhyan rivers. These rivers deposit enormous quantity of sediments deposited along the foothills and flood plains
- Northern Great Plains is divided into four as Rajasthan Plains, Punjab Haryana Plains, Gangetic Plains and Brahmaputra Plains.
- The great northern plains is a rich soil cover combined with adequate water supply and favorable climate it is agriculturally a very productive part of India
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- The rivers coming from northern mountains are involved in depositional work. In the lower course, due to gentle slope, the velocity of the river decreases which results in the formation of riverine islands. Majuli, in the Brahmaputra River is the largest inhabited riverine island in the world

THE PENINSULAR PLATEAU

- The Peninsular plateau is a tableland composed of the old crystalline, igneous and metamorphic rocks
- The plateau region lies to the south of the Great Northern Plains. This is the largest physiographic division of our country. It covers an area of about 16 lakh sq.km
- Aravalli hills mark the north-western boundary of the plateau region. Its northern and north-eastern boundaries are marked by the Bundelkhand upland, Kaimur and Rajmahal hills. The Western Ghats and the Eastern Ghats mark the western and eastern boundaries respectively
- The altitude of a large portion of the plateau is more than 600 m from mean sea level.
- The peak of Anaimudi is the highest point in the plateau. Its height is 2,695 m and is located in Anaimalai
- All the major rivers (Mahanadi, Godavari, Krishna, Kaveri etc.) lying to the south of the Vindhyas flow eastwards and fall into the Bay of Bengal.
- Narmada and Tapi are the two rivers situated to the south of the Vindhyas flow westward. Their movement towards west is due to the presence of a rift valley in the region
- The river Narmada divides the plateau region of India broadly into two parts. The region lying to the north of the Narmada is called the Central Highlands and the region lying to the south of Narmada is called the Deccan Plateau

CENTRAL HIGHLANDS

- The Central Highlands extend between the river Narmada and the Northern Great Plains.
- The Aravallis form the west and northwestern edge of the Central Highlands. These hills extend from Gujarat, through Rajasthan to Delhi in the northwesterly direction for a distance of about 700 km.
- **Gurushikhar** (1,722 m) is the highest peak of Aravallis range
- The Western part of the Central Highland is known as the Malwa Plateau. The rivers Chambal, Betwa and Ken drain the Malwa Plateau before they join the river Yamuna
- The part of the Central Highlands which extends to the east of Malwa Plateau is known as Bundelkhand and its further extension is known as Bagelkhand
- The eastern part of the Central High lands which lies in the north-eastern part of the Indian Plateau is known as Chhota-Nagpur Plateau. It covers much of Jharkhand, adjacent parts of Odisha, West Bengal, Bihar and Chhattisgarh. This region is very rich in mineral resources particularly iron ore and coal.

DECCAN PLATEAU

- This physiographic division is the largest part of the plateau region of India. The shape of this plateau is roughly triangular
- The area of this Plateau is about 7 lakh square km and the height ranges from 500 to 1000 m above sea level.
- The Western Ghats forms the western edge of the Peninsular Plateau. It runs parallel to the Arabian Sea coast. The northern part of this range is called as Sahyadris. The height of the Sahyadris increases from north to south

- Eastern Ghats run from southwest to northeast from the eastern edge of this Plateau. This range is also called as Poorvadri
- The Eastern Ghats join the Western Ghats at the Nilgiri hills, bordering Karnataka and Tamil Nadu.
- The Eastern Ghats are not continuous like the Western Ghats

THE INDIAN DESERT

- The Thar desert, also known as the Great Indian desert is a large arid region in the north western part of the Indian subcontinent that covers an area of 2,00,000 km² and forms a natural boundary between India and Pakistan
- It is the world 7th largest desert, and world 9th largest sub-tropical desert located in Western part of the India.
- This region receives very low rainfall below 150 mm per year. Luni is the only large river in this region.

THE COASTAL PLAINS

- The Indian coastal plains are divided into the following two divisions:
 1. The Western Coastal Plains and
 2. The Eastern Coastal Plains

THE WESTERN COASTAL PLAIN

- It lies between the Western Ghats and the Arabian Sea. It extends from Rann of Kutch in the north to Kanniyakumari in the south and its width varies from 10 to 80 km
- The northern part of the West Coastal Plain is known as Konkan Plain. The middle part of this plain is known as Kanara. The southern part of the plain is known as Malabar Coast which is about 550 km long and 20-100 km wide
- Along the west coast, there are numerous shallow lagoons and backwaters called Kayals and Teris. Vembanad is a famous back water lake found in this region.

THE EASTERN COASTAL PLAIN

- It lies between the Eastern Ghats and the Bay of Bengal
- The coastal plain between Mahanadi and Krishna River is known as the Northern Circars and the southern part lies between Krishna and Kaveri rivers is called Coromandal coast
- The Marina beach on this coast in Chennai and it is the second longest beach in the world
- Lake Chilka (Odisha) is the largest lake in India located to the southwest of the Mahanadi delta
- The Chilika Lake is the largest salt water lake in India. It lies in the state of Orissa, to the south of the Mahanadi delta.
- The Kolleru Lake which lies between the deltas of Godavari and Krishna
- The Pulicat Lake lies in the border of Andhra Pradesh and Tamil Nadu are the well-known lakes in the east coastal plain

THE ISLANDS

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- India has two major island groups namely Andaman and Nicobar and Lakshadweep. The Andaman and Nicobar group consists of 572 islands and are located in Bay of Bengal.
- Lakshadweep consists of 27 islands and are located in Arabian Sea.

ANDAMAN AND NICOBAR ISLANDS

- India's only active volcano is found on Barren Island in Andaman and Nicobar group of Islands. It is divided into two. They are Andaman in the north and the Nicobar in the south.
- Port Blair is the administrative capital of the Andaman and Nicobar islands.
- The Ten Degree Channel separates Andaman from Nicobar group.
- The southernmost tip, the Indira Point is a part of Nicobar Island.
- India's only active volcano is found on Barren Island in Andaman and Nicobar group of Islands.

LAKSHADWEEP ISLANDS

- This is a small group of coral islands located off the west coast of India. It covers an area of 32 sq. km. Kavaratti is its administrative capital.
- Lakshadweep islands are separated from the Maldives Islands by the Eight Degree Channel.
- The uninhabited "Pitt Island" of this group has a bird sanctuary.

DRAINAGE SYSTEM OF INDIA

- A drainage system is an integrated system of tributaries and a trunk stream which collects and drains surface water into the sea, lake or some other body of water.
- The drainage system of India is broadly divided into two major groups on the basis of their location. They are Himalayan Rivers and the Peninsular Rivers.
- The river system provides irrigation, drinking water, and navigation, power as well as grant livelihoods for a large number of populations.
- Perennial Rivers: The rivers which flow throughout the year and have permanent source of water.
- The Indus River system, the Ganga River system and the Brahmaputra River system have made the agricultural lands of north India as fertile land. These rivers are perennial in nature.
- Narmada, Tapi, Mahi and Sabarmathi rivers confluence with the Arabian Sea. • Mahanadi, Godavari, Krishna and Cauvery are the major east flowing rivers and drain into Bay of Bengal.

THE HIMALAYAN RIVERS

- The major Himalayan Rivers are the Indus, the Ganga and the Brahmaputra. These rivers are long, and are joined by many large and important tributaries.
- Perennial in nature.

The Indus River System

- The river Indus rises in Tibet, near Lake Mansarowar. Flowing west, it enters India in the Ladakh district of Jammu and Kashmir.
- Its length is about 2,880 km (Only 709 km is in India).

- Its major tributaries are Jhelum, Chenab (Largest tributary of Indus), Ravi, Beas and Sutlej. It enters into with the Arabian Sea.

The Ganga River System

- The Ganga River system is the largest drainage system of India it extend over and area of 8,61,404 sq km in India
- The river Ganga originates as Bhagirathi from the Gangotri Glacier in Uttar Khasi District of Uttarkhand state, at an elevation of 7,010 m
- The length of the river Ganga is about 2,525 km
- Its major tributaries from the north are Gomti, Gandak, Kosi and Ghaghra and from south, Yamuna (largest tributary of Ganga), Son, Chambal etc
- The river Yamuna rises from the Yamunotri Glacier in the Himalayas. It flows parallel to the Ganga and as a right bank tributary, meets the Ganga at Allahabad
- The Ganga flows eastwards till Farakka in West Bengal. This is the northernmost point of the Ganga delta. The river bifurcates here; the Bhagirathi-Hooghly (a distributary) flows southwards through the deltaic plains to the Bay of Bengal
- The river Ganga is known as the River Padma in Bangladesh.
- The combined river of Ganga and Brahmaputra creates the World's largest delta known as Sundarbans in Bangladesh before joining the Bay of Bengal

The Brahmaputra River System

- The river Brahmaputra originates from the Chemayungdung Glacier of the Kailash range to the east of Lake Manasarovar in Tibet at an elevation of about 5,150 m
- This river is known as Tsangpo (Purifier) in Tibet.
- The length of this river is about 2,900 km (900 km in India).
- It enters into India through a gorge in Arunachal Pradesh namely Dihang. It has many tributaries. Tista, Manas, Barak, Subansiri are some of them.
- This river is called as Jamuna in Bangladesh. After it joins with the river Ganga in Bangladesh, the river is called as Meghna.

PENINSULAR RIVERS

- The rivers in south India are called the Peninsular Rivers. Most of these rivers originate from the Western Ghats. These are seasonal rivers (non-perennial).
- Based on the direction of flow, the peninsular rivers are divided into the West flowing and East flowing rivers

WEST FLOWING RIVERS

Narmada

- The Narmada rises in the Amarkantak hills in Madhya Pradesh and flows for a distance of about 1,312 km. It flows towards the west in a rift valley formed due to faulting
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- It covers an area of 98,796 sq km and forms a 27 km long estuary before outfalling into the Arabian Sea through the Gulf of Cambay
- It is the largest among the west flowing rivers of Peninsular India
Its principal tributaries are Burhner, Halon, Heran, Banjar, Dudhi, Shakkar, Tawa, Barna and Kolar.

Tapti

- The Tapti is one of the major rivers of Peninsular India with the length of about 724 km. It outfalls into the Arabian Sea through the Gulf of Cambay
- Tapti River rises near Multai in the Betul district of Madhya Pradesh at an elevation of about 752 m.
- It is one of only the three rivers in Peninsular India that runs from east to west - the others being the Narmada and the Mahi. • The major tributaries are Vaki, Gomai, Arunavati, Aner, Nesu, Buray, Panjhra and Bori.

EAST FLOWING RIVERS

The Mahanadi Basin

- The river Mahanadi originates near Sihawa in Raipur district of Chattisgarh and flows through Odisha. Its length is 860 km
- The main stream of Mahanadi gets divided into several distributaries such as Paika, Birupa, Chitartala, Genguti and Nun
- The Mahanadi empties its water in Bay of Bengal

The Godavari Basin

- The Godavari is the largest Peninsular River. it is also known as the 'Dakshin Ganga'.
- It rises from the slopes of the Western Ghats in the Nasik district of Maharashtra.
- Its length is about 1500 km. It drains into the Bay of Bengal.
- Kolleru, a fresh water lake is located in the deltaic region of the Godavari.

The Krishna Basin

- Rising from a spring near Mahabaleshwar in the Western Ghats of Maharashtra, the Krishna flows for about 1400 km and reaches the Bay of Bengal
- It is the second longest Peninsular river. Bhima, Peddavagu, Musi, Koyna and Thungabhadra are the major tributaries of this river

The Kaveri Basin

- The river Kaveri originates at Talakaveri, Kudagu hills of Karnataka and it reaches the Bay of Bengal. Its length is 760 km
- Its main tributaries are Amravati, Bhavani, Hemavati and Kabini

LIST OF INDIAN RIVERS AND THEIR PLACE OF ORIGIN

River	Place of Origin	Fall into
Ganga	Gangotri (Uttarakhand)	Bay of Bengal
Sutlej	Lake Rakshastal in Tibet	Chenab
Indus	Indus rises in Tibet, near Lake Mansarowar	Arabian Sea
Jhelum	Verinag Spring	Chenab
Yamuna	Yamunotri (Uttarakhand)	Ganga
Narmada	Maikal Hills, Amarkantak (MP)	Gulf of Khambat
Tapti	Satpura Range, Betul (MP)	Gulf of Khambat
Mahanadi	Nagri Town (Chhattisgarh)	Bay of Bengal
Brahmaputra	Chemayungdung (Tibet)	Bay of Bengal
Sutlej	Mt Kailash (Tibet)	Chenab
Beas	Rohtang Pass (Himachal Pradesh)	Satluj
Godavari	Nasik (Maharashtra)	Bay of Bengal
Krishna	Mahabaleshwar (Maharashtra)	Bay of Bengal
Cauvery	Brahmagiri Hills, Coorg (Karnataka)	Bay of Bengal
Sabarmati	Udaipur, Aravalli Hills (Rajasthan)	Arabian Sea
Ravi	Chamba (Himachal Pradesh)	Chenab
Tungabhadra	Koodli	Krishna River
Pennar	Nandi Hills, Chickballapur (Karnataka)	Bay of Bengal
Luni	Pushkar, Aravalli Hills (Rajasthan)	Rann of Kachchh
Chambal	Janapav, Indore, Vindhyas (MP)	Yamuna

LIST OF DAMS IN INDIA

Dam	River	State
SardarSarover Dam	Narmada	Gujarat
Srisaillam Dam	Krishna	Telangana
RanjitSagar Dam	Ravi	Punjab
Koteshwar Dam	Bhagirathi	Uttarakhand
Gandhi Sagar Dam	Chambal	Madhya Pradesh
Omkareshwar Dam	Narmada	Madhya Pradesh
Mullaperiyar Dam	Periyar	Kerala (idukki district)

NagarjunaSagar Dam	Krishna	Telangna/Andhra Pradesh
Baglihar Dam	Chenab	Jammu & Kashmir
Salal Dam	Chenab	Jammu & Kashmir
Tehri Dam	Bhagirathi	Uttarakhand
Uri Dam	Jhelum	Jammu & Kashmir
Indira Sagar Dam	Narmada	Madhya Pradesh
Rihand Dam	Rihand	Uttar Pradesh
Ukai Dam	Tapi	Gujarat
Bhakra Dam	Sutlej	Himachal Pradesh
Lakhwar Dam	Yamuna	Uttarakhand
Hirakud Dam	Mahanadi	Odisha
RanaPratapSagar Dam	Chambal	Rajasthan
JawaharSagar Dam	Chambal	Rajasthan

LIST OF LAKES IN INDIA

- Largest freshwater lakes in Asia & India – Wular Lake, Kashmir
- Largest artificial lake in Asia – Govind Vallabh Pant Sagar (Rihand Dam)
- Largest saline water lake in India – Chika lake, Orissa
- Longest lake in India – Vembanad, Kerala
- Highest Lake in India – Cholamu Lake, Sikkim • The Sambhar lake in Rajasthan is a salt water lake

State	Name of the Lake
Andhra Pradesh	Kolleru Lake Pulicat Lake
Assam	Deepor Beel Lake Haflong Lake Son Beel Lake
Bihar	Kanwar Lake
Gujarat	Hamirsar Lake Kankaria Lake Nal Sarovar Lake Narayan Sarovar Thol Lake Vastrapur Lake Lakhota Lake Sursagar Lake
Haryana	Badkhal Lake Karna Lake Surajkund Lake Tilyar Lake Blue Bird Lake

Himachal Pradesh	Brighu Lake Dashir Lake Dhankar Lake Kareri (Kumarwah) lake Khajjiar Lake Macchial Lake Maharana Pratap Sagar Lake Manimahesh Lake Nako Lake Pandoh Lake Renuka Lake Rewalsar Lake Seruvalsar Lake Manimahesh Lake Suraj Taal Lake
Jammu and Kashmir	Dal Lake Wular Lake Manasbal Lake Mansar Lake Sheshnag Lake
Karnataka	Lalbagh Lake Puttenahalli Lake Madiwala Lake Agara Lake Karanji lake Kukkarahalli lake Lingambudhi Lake Pampa Sarovar Lake
Kerala	Vembanad Lake Shasthamkotta lake Vellayani Lake
Madhya Pradesh	Moti lake Sarang pani lake Shahpura lake Tawa Reservoir Upper Lake
Maharashtra	Gorewada Lake Khindsi Lake Lonar Lake Mehrun Lake Pashan Lake Powai Lake Rankala Lake Salim Ali Lake
Meghalaya	Umiam Lake

Manipur	Loktak Lake
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Mizoram	Palak dil Tam Dil
Odisha	Anshupa Lake Chilika Lake Kanjia lake
Punjab	Harike Lake Kanjli Lake Ropar Lake
Rajasthan	Talwara Lake Sambhar Salt Lake Fateh Sagar Lake Rangsagar lake Uday sagar Lake Nakki Lake
Sikkim	Gurudongmar Lake Khecheopalri Lake Lake Tsongmo Lake Cholamu
Telangana	Durgam Cheruvu (Secret Lake) Himayat Sagar
Tamil Nadu	Berijam Lake Chembarambakkam Lake Kaliveli Lake Kaveripakkam Lake Kodaikanal Lake Ooty Lake
Uttarakhand	Skeleton Lake (Roopkund Lake) Bhimtal Lake Dodital Nainital Lake Naukuchiatal Sat Tal
West Bengal	Santragachhi Lake Senchal Lake Rabindra Sarobar

CLIMATE OF INDIA

- There are six major controls of the climate of any place. They are: latitude, altitude, pressure and wind system, distance from the sea (continentality), ocean currents and relief features
- The Tropic of cancer divides the country into two equal halves
- The area located to the south of Tropic of cancer experiences high temperature and no severe cold season throughout the year whereas, the areas to the north of this parallel enjoys subtropical climate.
- When the altitude increases, the temperatures decreases. Temperature decreases at the rate of 6.50C for every 1000 metres of ascent

- Distance from the sea does not cause only temperature and pressure variations but also affects the amount of rainfall
- Air near the coast has more moisture and greater potential to produce precipitation
- Areas of central and north India experience much seasonal variation in temperature due to the absence of influence of seas
- A large area of India, especially the peninsular region, is not very far from the sea and this entire area has a clear maritime influence on climate
- The most dominant factor which affects the climate of India is the monsoon winds
- The climate of southeast India is also influenced by northeast monsoon
- The meteorologists recognize the four distinct seasons in India. They are; 1. Winter or cold weather season (January - February).
- 2. Pre Monsoon or summer or hot weather season (March - May).
- 3. Southwest monsoon or rainy season (June - September).
- 4. Northeast monsoon season (October - December).
- Mawsynram, the place which receives highest rainfall (1141 cm) in the world. It is located in Meghalaya.
- The average annual rainfall of India is 118 cm

NATURAL VEGETATION

- Natural vegetation refers to a plant community unaffected by man either directly or indirectly
- The term flora is used to denote plants of a particular region or period. Similarly, the species of animals are referred to as fauna • According to India State of Forest Report 2011, the forest cover in India is 21.05 per cent.

TYPES OF VEGETATION

- The following major types of vegetation may be identified in our country
 1. Tropical Evergreen Forests
 2. Tropical Deciduous Forests
 3. Tropical Thorn Forests and Scrubs
 4. Montane Forests
 5. Mangrove Forests

TROPICAL EVERGREEN FORESTS

- These forests are restricted to heavy rainfall areas of the Western Ghats and the island Groups of Lakshadweep, Andaman and Nicobar, upper parts of Assam and Tamil Nadu coast
- These forests are found in areas with 200 cm or more annual rainfall.
- The most important trees are rubber, mahogany, ebony, rosewood, coconut, bamboo, cinchona, candel, palm, iron wood and cedar

TROPICAL DECIDUOUS FORESTS

- These are found in the areas with 100 to 200cm. annual rainfall. These are called 'Monsoon Forests' • These are the most widespread forests of India
- On the basis of the availability of water, these forests are further divided into moist and dry deciduous
- The moist deciduous forests is found in areas receiving rainfall between 200 and 100 cm
- The dry deciduous forests are found in areas having rainfall between 100 cm and 70 cm

- The trees of these forests drop their leaves during the spring and early summer

THE THORN FORESTS AND SCRUBS

- The thorn forests are found in the regions which receive less than 70 cm of rainfall
- Trees are scattered and have long roots penetrating deep into the soil in order to get moisture. The stems are succulent to conserve water.
- Leaves are mostly thick and small to minimize evaporation
- This type of vegetation is found in the north-western part of the country including semi-arid areas of Gujarat, Rajasthan, Madhya Pradesh, Chhattisgarh, Uttar Pradesh and Haryana

MOUNTAIN OR MONTANE FOREST

- The wet temperate type of forests is found between a height of 1000 and 2000 metres.
- The common animals found in these forests are Kashmir stag, spotted deer, wild sheep, jack rabbit, Tibetan antelope, yak, snow leopard, squirrels, Shaggy horn wild ibex, bear and rare red panda, sheep and goats with thick hair
- Alpine Forest occurs all along the Himalayas with above 2400 m altitude. These are purely having coniferous trees. Oak, silver fir, pine and juniper are the main trees of these forests. The eastern parts of Himalayas has large extent of these forests

MANGROVE FORESTS

- The mangrove tidal forests are found in the areas of coasts influenced by tides
- The delta of the Ganga-Brahmaputra has the largest tidal forest. Sundari trees are found in this delta and Royal Bengal Tiger is the famous animal in these forests.
- The deltas of the Ganga, the Mahanadi, the Krishana, the Godavari and the Kaveri are covered by such vegetation

WILDLIFE

- The Government of India enacted Wildlife (Protection) Act in 1972
- Project Tiger , Project Rhino , Project Great Indian Bustard and many other eco developmental projects have been introduced
- Project Tiger was launched in April 1973 with the aim to conserve tiger population in specifically constituted “Tiger Reserves” in India
- Wildlife projects
 1. Hangul project-1970
 2. Gir Lion project-1972
 3. Project Tiger-1973
 4. Crocodile Breeding Project-1974
 5. Rhinos Conservation-1987
 6. Project Elephant-1992
 7. Red panda project-1996
- The Indian government has established 18 Biosphere Reserves in India
- Eleven of the eighteen biosphere of India fall under the list of Man and Biosphere Programme of UNESCO
 1. Gulf of Mannar, 2. Nandadevi, 3. The Nilgiris, 4. Nokrek, 5. Pachmarhi, 6. Simlipal, 7. Sundarbans,
 8. Agasthiyamalai, 9. Great Nicobar, 10. Kanjanjunga and 11. Amarkantak

BIOSPHERE RESERVES IN INDIA

S.No	Biosphere Reserves	State
1	Achanakmar-Amarkantak	Madhya Pradesh, Chattisgarh
2	Agasthyamalai	Kerala
3	Dibru Saikhowa	Assam
4	Dihang Dibang	Arunachal Pradesh
5	Great Nicobar	Andaman and Nicobar Islands
6	Gulf of Mannar	Tamil nadu
7	Kachch	Gujarat
8	Kanchenjunga	Sikkim
9	Manas	Assam
10	Nanda Devi	Uttarakhand
11	The Nilgiris	Tamil nadu
12	Nokrek	Meghalaya
13	Pachmarhi	Madhya Pradesh
14	Simlipal	Odisha
15	Sundarbans	West Bengal
16	Cold desert	Himachal Pradesh
17	Sesahachalam hills	Andhra Pradesh
18	Panna	Madhya Pradesh

LIST OF IMPORTANT NATIONAL PARKS IN INDIA

State	National Parks
Assam	Rajiv Gandhi Orange National Park Dibru-Saikhowa National Park Kaziranga National Park Manas National Park Nameri National Park
Arunachal Pradesh	Mouling National Park Namdapha National Park
Andhra Pradesh	Sri venkateshwar National Park

Andaman and Nicobar Islands	<p>Campbell Bay National Park</p> <p>Galathea Bay National Park</p> <p>Mahatama Gandhi Marine (Wandoor) National Park</p> <p>Middle Button Island National Park</p> <p>Mount Harriett National Park</p> <p>North Button Island National Park</p> <p>Rani Jhansi Marine National Park</p> <p>Saddle Peak National Park</p> <p>South Button Island National Park</p>
Bihar	Valmiki National Park
Chhattisgarh	<p>Guru Ghasi Das National Park</p> <p>Indravati National Park</p> <p>Kanger Valley National Park</p>
Gujarat	<p>Vansda National Park</p> <p>Blackbuck National Park</p> <p>Gir Forest National Park</p> <p>Marine National Park, Gulf of Kutch</p>
Goa	Bhagwan Mahavir National Park
Himachal Pradesh	Pin Valley National Park

	<p>Great Himalayan National Park</p> <p>Inderkilla National Park</p> <p>Khirganga National Park</p> <p>Simbalbara National Park</p>
Jammu & Kashmir	<p>Hemis National Park</p> <p>Kishtwar National Park</p> <p>Salim Ali National Park</p> <p>Dachigam National Park</p>
Jharkhand	Betta National Park

Karnataka	Anshi National Park Bandipur National Park Bannerghatta National Park Kudremukh National Park Nagarhole National Park
Kerala	Eravikulam National Park Anamudi Shola National Park Mathikettan National Park Pampaclum National Park Periyar National Park Silent Valley National Park
Meghalaya	Balphakram National Park Nokrek National Park
Maharashtra	Chandoli National Park Nawegaon National Park Tadoba National Park Gugamal national park Pench National Park Sanjay Gandhi (Borivilli) National Park
Manipur	Keibul Lamjao National Park
Meghalaya	Balphakram National Park

	Nokrek Ridge National Park
Mizoram	Murlen National Park Phawngpui National Park
Nagaland	Intanki National Park
Odisha	Bhitarkanika National Park Simlipal National Park

Rajasthan	Sariska National Park Ranthambore National Park Darrah National Park Desert National Park Keoladeo National Park
Sikkim	Khangchendzonga National Park
Tamil Nadu	Guindy National Park Indira Gandhi National Park Mukurthi National Park Mudumalai National Park Gulf of Mannar Marine National Park
Telangana	Mrugavani National Park
Tripura	Clouded Leopard National Park Bison (Rajbari) National Park
Uttar Pradesh	Dudhwa National Park
Uttarakhand	Corbett National Park Gangotri National Park Nanda Devi National Park Rajaji National Park Valley of Flowers National Park
West Bengal	Neora Valley National Park Singalila National Park Buxa National Park Sundarbans National Park

AGRICULTURE IN INDIA

SOILS

- Soil is the finest particle found on the earth surface.
- Soil is the uppermost layer of the land surface, usually composed of minerals, organic matter, living organisms, air and water
- Alluvial soil, black soil, red soil and laterite soil are the major types of soil in India
- Khadar- Newer alluvium soil found in valley flooded almost every year
- Bhangar- Older alluvium soil found in 30 mts above flood level

SOIL TYPES AND THEIR DISTRIBUTION IN INDIA

Soil Type	Distribution	Crops growing
Alluvial soil	Ganga and Brahmaputra river valleys; Plains of Uttar Pradesh, Uttarakhand, Punjab, Haryana, West Bengal and Bihar	Rice, Wheat, Sugarcane and Oilseeds
Black soils	Maharashtra and Malwa plateaus, Kathiawar peninsula, Telangana and Rayalaseema region of Andhra Pradesh and northern part of Karnataka	Cotton, Millets, Tobacco and Sugarcane
Red soils	Eastern parts of Deccan plateau, southern states of Kerala, Tamil Nadu, Karnataka and Chota Nagpur plateau (Jharkhand)	Wheat, Rice, Cotton, Sugarcane and Pulses
Laterite soils	Assam hills, hill summits of Kerala and Karnataka and eastern Ghats and region of Odisha	Coffee, Rubber, Cashew nut and Tapioca
Forest and mountain soils	Coniferous forest belts of Jammu and Kashmir, Himachal Pradesh, Uttarakhand and Sikkim. Eastern and Western Ghats	Coffee, tea, rice, maize, potato, barley, tropical fruits and various types of spices
Arid and desert soils	Rajasthan, Northern Gujarat and southern Punjab	millets, barley, cotton, maize and pulses
Peaty and marshy soils	Kottayam and Alappuzha districts of Kerala; and coastal areas of Odisha and Tamil Nadu, Sundarbans of West Bengal, in Bihar and Almora district of Uttarakhand	Paddy, jute

IRRIGATION

- The main sources of irrigation used in different parts of the country are Canal irrigation ,Well irrigation and Tank irrigation
- Canal irrigation is the second most important source of irrigation in our country. Percentage of area under canal irrigation in our country is 24%
- Well irrigation is the most important source of irrigation as it contributes about 62 percent of net irrigated area in India
- A tank is a natural or man-made hollow on the surface developed by constructing a small bund around it across a stream

CROPPING SEASONS IN INDIA

- India has three cropping seasons — Rabi, Kharif and Zaid

Cropping Seasons	Major crops cultivated in Northern States	Major crops cultivated in Southern States
Kharif Season June–September	Rice, Cotton, Bajra, Maize, Jowar, Tur	Rice, Ragi, Maize, Jowar, Groundnut
Rabi Season October–March	Wheat, Gram, Rapeseeds, Mustard, Barley	Rice, Maize, Ragi, Groundnut, Jowar
Zaid Season April–June	Vegetables, Fruits, Fodder	Rice, Vegetables, Fodder

MAJOR CROPS CULTIVATED IN INDIA

FOOD CROPS

- Rice, Wheat, Jowar, Bajra, Maize, Barley, Ragi, gram and Tur are some important food crops

RICE

- It is the staple food crop of a majority of the people in India.
- India is the second largest producer of rice in the world after China
- It is a kharif crop which requires high temperature, (above 25°C) and high humidity with annual rainfall above 100 cm.
- The first 10 leading rice producing states are West Bengal (First in India) Uttar Pradesh, Punjab, Tamil Nadu, Andhra Pradesh, Bihar, Chhattisgarh, Odisha, Assam, and Haryana.

WHEAT

- This is the second most important cereal crop. It is the main food crop, in north and north-western part of the country
- This rabi crop requires a cool growing season and a bright sunshine at the time of ripening
- The major wheat-producing states are Uttar Pradesh, Punjab, Haryana, Rajasthan and Madhya Pradesh.

MILLETS

- Jowar, bajra and ragi are the important millets grown in India
- Jowar is the third most important food crop with respect to area and production • Jowar is essentially a crop of the Peninsular India
- Major Jowar producing States were Maharashtra, Karnataka, Andhra Pradesh and Madhya Pradesh
- Bajra grows well on sandy soils and shallow black soil
- Bajra is a crop of dry region.
- Rajasthan is the largest producer of bajra followed by Uttar Pradesh, Haryana, Gujarat and Maharashtra
- Ragi is a crop of dry regions and grows well on red, black, sandy, loamy and shallow black soils.
- Major Ragi producing states are: Karnataka, Tamil Nadu, Himachal Pradesh, Uttarakhand, Sikkim, Jharkhand and Arunachal Pradesh.

MAIZE

- It is a kharif crop which requires temperature between 21°C to 27°C and grows well in old alluvial soil
- Major maize-producing states are Karnataka, Uttar Pradesh, Bihar, Andhra Pradesh, Telangana and Madhya Pradesh

PULSES

- India is the largest producer as well as the consumer of pulses in the world
- The major pulse growing areas are Madhya Pradesh, Uttar Pradesh, Rajasthan, Maharashtra and Andhra Pradesh

CASH CROPS

- Sugarcane, tobacco, fibre crops (cotton, jute, and mesta) and oilseeds are some important cash crops

SUGARCANE

- India is the second largest producer of sugarcane only after Brazil
- Uttar Pradesh is the leading producer of sugarcane in India followed by Maharashtra, Karnataka, Tamil Nadu and Gujarat
- It grows well in hot and humid climate with a temperature of 21°C to 27°C and an annual rainfall between 75cm. and 100cm
- Irrigation is required in the regions of low rainfall.

COTTON

- India ranks second next to China in the production of cotton
- Top cotton producing countries are Gujarat, Maharashtra, Andhra Pradesh and Punjab
- Cotton is the most important cash crop of India. It provides raw material to the largest industry of India
- It is a kharif crop and requires 6 to 8 months to mature

JUTE

- It is a tropical fibre crops, grows well in the alluvial soil
- West Bengal is the leading state both in cultivation and production of jute. The other cultivators of jute are Bihar, Assam and Meghalaya.
- It is known as the golden fibre

OIL SEEDS

- Main oil-seeds produced in India are groundnut, mustard, coconut, sesamum (til), soyabean, castor seeds, cotton seeds, linseed and sunflower
- Groundnut is a kharif crop and accounts for about half of the major oilseeds produced in the country. Gujarat was the largest producer of groundnut
- Linseed and mustard are rabi crops.
- Sesamum is a kharif crop in north and rabi crop in south India.
- Castor seed is grown both as rabi and kharif crop.

PLANTATION CROPS

- Tea, coffee, rubber and spices are the major plantation crops of India.

TEA

- Tea is an evergreen plant that mainly grows in tropical and subtropical climates
- India is the second largest producer of tea after China in the world.
- Assam is the larger producer of tea in India. Other states are Tamil Nadu, Kerala and West Bengal.

COFFEE

- Coffee is grown in shade and it grows effectively in the altitudes between 1,000 and 1,500 m above mean sea level.
- India is the 7th largest producer of coffee globally.
- Karnataka is the leading producer of coffee in India. It produces 71% in India, and 2.5 % in the world

SPICES

- Pepper, chillies, turmeric, ginger, cardamom, clove and areca nut are the major spices cultivated in India.
- Kerala is the leading producer of spices in India.

RUBBER

- Rubber plantation were first established in Kerala in 1902
- It needs hot and wet climatic conditions
- The major rubber growing areas are Tamil Nadu, Kerala, Karnataka and Andaman and Nicobar Islands.

HORTICULTURE CROPS

- It refers to the cultivation of fruits, flowers and vegetables
- India was the second largest producer of fruits and vegetables in the world after China
- India contributes about 13% of the world's production of vegetables.

LARGEST CROPS PRODUCING STATES

FOOD GRAINS

CROP	STATE
Rice	West Bengal
Bajra	Rajasthan
Wheat	Uttar Pradesh
Maize	Andhra Pradesh
Pulses	Madhya Pradesh

OIL SEEDS

CROP	STATE
Groundnut	Gujarat
Soya bean	Madhya Pradesh
Mustard	Rajasthan
Sunflower	Karnataka

CASH CROPS

CROP	STATE
Sugarcane	Uttar Pradesh

Cotton	Gujarat
Coffee	Karnataka
Tea	Assam
Silk	Karnataka
Rubber	Kerala
Tobacco	Andhra Pradesh

LIST OF IMPORTANT AGRICULTURAL REVOLUTIONS IN INDIA

Revolution	Related Product
Green Revolution	Food Grains
White Revolution	Milk Production
Round Revolution	Potato
Red Revolution	Meat Production / Tomato Production
Silver Fibre Revolution	Cotton
Silver Revolution	Egg Production / Poultry Production
Evergreen Revolution	Overall Production of Agriculture
Yellow Revolution	Oil seed Production (Especially Mustard and Sunflower)
Blue Revolution	Fish Production
Brown Revolution	Leather / Cocoa / Non-Conventional Products
Golden Fibre Revolution	Jute Production
Golden Revolution	Fruits / Honey Production / Horticulture Development
Grey Revolution	Fertilizers
Pink Revolution	Onion Production / Pharmaceuticals / Prawn Production

TOP MINERAL PRODUCING STATES IN INDIA

Name of the Minerals	Top producing State
Chromite	Orissa
Uranium	Kerala
Lead	Rajasthan

Iron ore	Odisha
Nickel	Orissa
Lignite	Tamil Nadu
Diamond	Madhya Pradesh
Copper	Madhya Pradesh
Natural Gas	Assam
Coal	Jharkhand
Manganese	Odisha
Bauxite	Odisha

Mica	Andhra Pradesh
Gold	Karnataka
Lime stone	Andhra Pradesh
Barytes	Andhra Pradesh

INDUSTRIES

- On the basis of the source of raw materials, Industries are classified into the Agro based industries, Forest based industries and Mineral based industries.

AGRO BASED INDUSTRIES

- These industries draw their raw materials from agricultural sector.

COTTON TEXTILE INDUSTRY

- The first cotton textile mill was established at Fort Gloster near Kolkata in 1818
- It is one of the largest sources of employment generation in the country
- Cotton textile industry is the largest organized modern industry of India. About 16% of the industrial capital, 14% of industrial production and over 20% of the industrial labour of the country are engaged in this industry
- The higher concentration of textile mills in and around Mumbai, makes it as “Manchester of India”
- The major cotton textile industries are concentrated in the states of Maharashtra, Gujarat, West Bengal, Uttar Pradesh and Tamil Nadu

JUTE TEXTILES

- India is the largest producer of jute goods contributing 35% of the world’s total output
- India tops in the production of raw jute and jute goods and second in the export of jute goods next to Bangladesh.
- The first jute mill in India was established at Rishra near Kolkata in 1854

SILK INDUSTRY

- CSTRI was established in the year 1983 by the Central Silk Board, Ministry of Textiles, Govt. of India having head quarter at Bangalore
- India is the second largest producer of raw silk next only to China
- Karnataka is the largest producer of silk in India. Other major producers of silk are West Bengal, Jammu Kashmir, Bihar, Jharkhand, Chhattisgarh, Uttar Pradesh, Punjab, Assam and Tamil Nadu

SUGAR INDUSTRY

- Presently is the second largest agro based industry of India after cotton textiles
- India is the world’s second largest producer of sugar cane after Brazil
- Uttar Pradesh is the largest producer of sugar in India

FOREST BASED INDUSTRIES

- Forest provides us with different types of material which are used as raw material for certain industries like paper, lac, sports goods, plywood etc.

PAPER INDUSTRY

- The first paper mill of India was started in 1812 at Serampore in West Bengal.
- West Bengal is the largest producer of paper in the country followed by Madhya Pradesh, Odisha and Tamil Nadu states.

IRON AND STEEL INDUSTRIES

- Iron and steel industry of India is mainly concentrated in the states of Jharkhand, West Bengal and Odisha

Name of Industry	Place	Establishment Year
Tata Iron and Steel Company(TISCO)	Jamshedpur, Jharkhand	1911
Visweshwaraya Iron Steel Ltd(VISL)	Bhadravati,Karnataka	1923
Hindustan Steel Ltd (HSL) Collaborated with Russia	Bhilai, Chattisgarh	1957
Hindustan Steel Ltd(HSL) Collaborated with Germany	Rourkela, Odisha	1965
Hindustan Steel Ltd(HSL) Collaborated with United kingdom	Durgapur, West Bengal	1959
Indian Iron and Steel Company (IISCO)	Burnpur,Hirapur, Kulti, West Bengal	1972
Hindustan Steel Ltd(HSL)	Bokaro, Jharkhand	1972

Collaborated with Russia		
Salem Steel Ltd	Salem, Tamil Nadu	1982
Vijayanagar Steel Plant	Tornagal,Karnataka	1994
Visakhapatnam Steel Plant(VSP)	Visakhapatnam, Andhra Pradesh	1981

TRANSPORTATION

- Transport is a system in which passengers and goods are carried from one place to another. Transport system is considered as the lifeline of a country

AIR TRANSPORT

- The Indian Airlines and Air India are the two airline services run by the government of India
- Domestic Airways fly within the boundaries of a country and International Airways connect major cities of the world.
- Airports Authority of India (AAI) was constituted in 1995. It provides security to Indian Airports
- Pavan-Hans Helicopter Ltd has been providing Helicopter support services to various state governments in India particularly north east India Inter Island, Ferry services in Andaman & Nicobar Islands, services to Lakshadweep Island etc.,

LIST OF INDIAN AIRPORTS (DOMESTIC AND INTERNATIONAL)

Name of the Airport	Location	State/Union Territory
Veer Savarkar International Airport	Port Blair	Andaman and Nicobar Island
Visakhapatnam International Airport	Visakhapatnam	Andhra Pradesh
Rajiv Gandhi International Airport	Hyderabad	Telangana
Lokpriya Gopinath Bardoloi International Airport	Guwahati	Assam
Indira Gandhi International Airport	New Delhi	Delhi
Goa International Airport	Goa	Goa
Sardar Vallabhai Patel International Airport	Ahmedabad	Gujarat
Kempe Gowda International Airport	Bengaluru	Karnataka
Mangalore International Airport	Mangalore	Karnataka

Cochin International Airport	Kochi	Kerala
Calicut International Airport	Kozhikode	Kerala
Trivandrum International Airport	Thiruvananthapuram	Kerala
Chhatrapati Shivaji International Airport	Mumbai	Maharashtra
Dr Babasaheb Ambedkar International Airport	Nagpur	Maharashtra
Bir Tikendrajit International Airport/	Imphal	Manipur

Biju Patnaik International Airport	Bhubaneshwar	Odisha
Sri Guru Ram Dass Jee International Airport	Amritsar	Punjab
Jaipur International Airport	Jaipur	Rajasthan
Chennai International Airport	Chennai	Tamil Nadu
Coimbatore International Airport	Coimbatore	Tamil Nadu
Tiruchirapalli International Airport	Tiruchirapalli	Tamil Nadu
Chaudhary Charan Singh International Airport	Lucknow	Uttar Pradesh
Lal Bahadur Shastri Airport	Varanasi	Uttar Pradesh
Netaji Subash Chandra Bose International Airport	Kolkata	West Bengal
Maharana Pratap Airport/ Dabok Airport	Udaipur	Rajasthan
Sheikh ul-Alam International Airport	Srinagar	Jammu & Kashmir
Birsa Munda Airport	Ranchi	Jharkhand
Swami Vivekananda Airport	Raipur	Chhattisgarh
Jai Prakash Narayan International Airport	Patna	Bihar
Dr. Babasaheb Ambedkar International Airport	Nagpur	Maharashtra
Mandakalli Airport	Mysore	Karnataka
Kushok Bakula Rimpochee Airport	Leh	Ladakh
Devi Ahilyabai Holkar international airport	Indore	Madhya Pradesh
Raja Bhoj Airport	Bhopal	Madhya Pradesh

ROAD TRANSPORT IN INDIA

- Roads in India have been classified as National Highways (NH), State Highways (SH), Major District Roads, and Rural Roads
- The National Highways Authority of India (NHAI), which is an autonomous body under the Ministry of Transport, The National Highways Authority of India (NHAI) was operationalized in 1995. The NHAI is responsible for the development, maintenance, and operation of National Highways .The National Highways constitute only 2.7per cent of the total road length, but carry about 40 per cent of the road traffic
- State Highways are constructed and maintained by the state governments.
- Border road and International highways maintained by Central Government
- About 80 per cent of the total road length in India are categorized as rural roads
- District Roads provide connectivity between the district and taluk headquarters with the state highways and national highways. District Roads are constructed and maintained by the Public Works Department of the states
- **NH 44** - 3,745 km (2,327 mi) from Srinagar to Kanyakumari. It is the longest national highway in India
- Golden Quadrilateral comprises the National Highways connecting the four metro cities, Delhi, Mumbai, Chennai and Kolkata. The component has a total length of 5846km
- Sher shah suri built the shahi (Royal) road to strengthen and consolidate his empire from the Indus valley to the Sonar valley in Bengal. This road from Kolkata to Peshawar was renamed as Grand Trunk(GT) road during the British period
- North South corridor aims at connecting Srinagar in Jammu and Kashmir with Kaniyakumari in Tamil Nadu with 4,076km long road. The East-West corridor has been planned to connect Silchar in Assam with the port town of Porbandar in Gujarat with 3,640km of road length. The two corridors intersect at Jhansi

WATERWAYS

- The water transport is of two types- Inland Waterways and Ocean water ways(sea routes).

INLAND NATIONAL WATERWAYS OF INDIA

- Inland Waterways Authority was set up in 1986 for the development, maintenance, and regulation of Inland national waterways in the country
- The total cargo carried by inland waterways is just about 0.1% of the total inland traffic of India

NW Number	River system	Route	Length of NW In KM
NW – 1	Ganga-Bhagirathi-Hooghly	Prayagraj – Haldia	1620
NW – 2	Brahmaputra	Sadiya-Dhubri	891
NW – 3	West Coast Canal, Champakara Canal and Udyogamandal Canal	Kottapuram – Kollam	205
NW – 4	Krishna and Godavari	Kakinada-Marakkanam	1095
NW – 5	Mahanadi, Brahmini	Magalgarhi to Pradeep and Talcher to Dhamra	623

OCEANIC ROUTES

- Oceanic routes play an important role in the transport sector of India's economy. About 95% of India's foreign trade by volume and 70 percent by value moves through ocean routes.
- Visakhapatnam port is known as Jewel of all port
- India has 13 major port

Port	State	Zone
Kolkata (Haldia)	West Bengal	Eastern Coast
Paradip	Odisha	Eastern Coast
Vishakapatnam	Andhra Pradesh	Eastern Coast
Ennore	Tamil Nadu	Eastern Coast
Chennai	Tamil Nadu	Eastern Coast
Tuticorin Port	Tamil Nadu	Eastern Coast
Kochi	Kerala	Western Coast
Mangalore	Karnataka	Western Coast
Mormugao port	Goa	Western Coast
Jawaharlal Nehru Port	Maharashtra	Western Coast
Mumbai Port	Maharashtra	Western Coast
Kandla	Gujarat	Western Coast
Port Blair port	Andaman and Nicobar	

RAILWAYS

- Railways was introduced to India in 1853
- The first railway line in India between Mumbai to Thane was constructed during the rule of Lord Dalhousie
- The headquarter of Indian Railways is New Delhi.

- The total length of Indian Railways network is 67368 km
- The first sub-urban railway was started in 1925 in Mumbai.
- Konkan Railways line runs parallel to the Arabian Sea
- Gorakhpur railway station has the world's longest railway platform
- Mumbai is the busiest suburban railway network in India
- Vivek Express (Dibrugarh to Kanyakumari) is the longest train route in the Indian Subcontinent
- Ahmedabad Mumbai Central Double Decker Express is the India's first double Decker train
- First female loco pilot of the Indian Railways in India is Surekha Shankar Yadav
- UNESCO World Heritage Sites on Indian Railways are
 1. The Darjeeling Himalayan Railway
 2. The Nilgiri Mountain Railway and
 3. The Kalka-Shimla Railway,
 4. The Chatrapati Shivaji Terminus
- India's first private train is Delhi - Lucknow Tejas Express
- The first Shatabdi Express train was introduced in 1988 between New Delhi and Jhansi Junction
- Shatabdi Express trains were introduced in 1989 to commemorate the 100th anniversary of Jawaharlal Nehru
 - Indian Railways was nationalized in 1951
- Uttar Pradesh has the longest route (in kilometers) of railway line in India
- National Rail Museum located in New Delhi
- Northern Railways is the largest zone in terms of route kilometers
- The Maitree Express Running between India with Bangladesh
- Great Indian Peninsula Railway ran the first train from Bori Bunder to Thane in 1853
- The width of broad gauge railway line in India is 5 feet 6 inches
- Siliguri station has all the three gauges viz. broad, metre and narrow
- The world's highest railway bridge in Kashmir being constructed over Chenab river
- India's first rail auto hub will be located in Chennai
- The National Rail and Transportation Institute (NRTI) is India's first and only transportation university located in Vadodara
- The Railway network is divided into 17 zones. The 17 zones and their respective headquarters are given below

Zonal Railways	Headquarters
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Central railway	Mumbai CST
Eastern railway	Kolkata
East Central Railway	Hajipur
East Coast Railway	Bhubaneswar
Northern Railway	New Delhi
North Central Railway	Prayagraj
North Eastern Railway	Gorakhpur
North Frontier Railway	Maligaon, Guwahati
North Western Railway	Jaipur
Southern Railway	Chennai
South Central Railway	Secunderabad
South Eastern Railway	Kolkata
South East Central Railway	Bilaspur
South Western Railway	Hubballi
Western Railway	Mumbai
West Central Railway	Jabalpur
Kolkata metro Railway	Kolkata

OIL AND GAS PIPELINES

- Pipelines are the most convenient and efficient mode of transporting liquids and gases over long distances. Even solids can also be transported by pipelines after converting them into slurry
- Oil India Limited (OIL) under the administrative set up of the Ministry of Petroleum and Natural Gas is engaged in the exploration, production and transportation of crude oil and natural gas. It was incorporated in 1959 as a company
- Asia's first cross country pipeline covering a distance of 1,157 km was constructed by OIL from Naharkatiya oilfield in Assam to Barauni refinery in Bihar. It was further extended up to Kanpur in 1966

POPULATION

- India covers only 2.4 percent of the land area of the world, but is the home of about 17.5 percent of the world's population
- In India the first census was carried out in the year 1872. But the first complete and synchronous census was conducted in 1881

- Census 2011 was the 15th census of India & 7th census after Independence
- The motto of census 2011 was “Our Census, Our future”.
- According to 2011, the average density of population of India is 382 persons per sq.km. India is one of the most thickly populated ten countries of the world
- The most densely populated state of India is Bihar and the state with least population density is Arunachal Pradesh. Among the union territories, Delhi is the densely populated one with 11,297 per sq.km, while Andaman and Nicobar Islands have the lowest density of population
- According to 2011 census, the sex ratio of the country is 940 females per 1000 males
- India’s literacy rate as per 2011 census is 74.04%. From this, the literacy rate of male is 82.14% and the female is 65.46%

TRIBES IN INDIA

1. Andhra Pradesh

Andh, Sadhu Andh, Bhagata, Bhil, Chenchus (Chenchawar), Gadabas, Gond, Goundu, Jatapus, Kammara, Kattunayakan, Kolawar, Kolam, Konda, Manna Dhora, Pardhan, Rona, Savaras, Dabba Yerukula, Nakkala, Dhulia, Thoti, Sugalis.

2. Arunachal Pradesh:

Apatanis, Abor, Dafla, Galong, Momba, Sherdukpen, Singpho.

3. Assam

Chakma, Chutiya, Dimasa, Hajong, Garos, Khasis, Gangte.

4. Bihar

Asur, Baiga, Birhor, Birjia, Chero, Gond, Parhaiya, Santhals, Savar.

5. Chhattisgarh

Agariya, Bhaina, Bhattra, Biar, Khond, Mawasi, Nagasia.

6. Goa

Dhodia, Dubia, Naikda, Siddi, Varli.

7. Gujarat

Barda, Bamcha, Bhil, Charan, Dhodia, Gamta, Paradhi, Patelia.

8. Himachal Pradesh

Gaddis, Gujjars, Khas, Lamba, Lahaulas, Pangwala, Swangla.

9. Jammu and Kashmir

Bakarwal, Balti, Beda, Gaddi, Garra, Mon, Purigpa, Sippi.

10. Jharkhand

Birhors, Bhumij, Gonds, Kharia, Mundas, Santhals, Savar.

11. Karnataka

Adiyan, Barda, Gond, Bhil, Iruliga, Koraga, Patelia, Yerava.

12. Kerala

Adiyan, Arandan, Eravallan, Kurumbas, Malai arayan, Moplabs, Uralis.

13. Madhya Pradesh

Baigas, Bhils, Bharia, Birhors, Gonds, Katkari, kharia, Khond, Kol, Murias.

14. Maharashtra

Bhaina, Bhunjia, Dhodia, Katkari, Khond, Rathawa, Warlis.

15. Manipur
Aimol, Angami, Chiru, Kuki, Maram, Monsang, Paite, Purum, Thadou.
16. Meghalaya
Chakma, Garos, Hajong, Jaintias Khasis, Lakher, Pawai, Raba.
17. Mizoram
Chakma, Dimasa, Khasi, Kuki, Lakher, Pawai, Raba, Synteng.
18. Nagaland
Angami, Garo, Kachari, Kuki, Mikir, Nagas, Sema.
19. Odisha
Gadaba, Ghara, Kharia, Khond, Matya, Oraons, Rajuar, Santhals.
20. Rajasthan
Bhils, Damaria, Dhanka, Meenas(Minas), Patelia, Sahariya.
21. Sikkim
Bhutia, Khas, Lepchas.
22. Tamil Nadu
Adiyan, Irular, Kadar, Kanikar, Aranadan, Eravallan, , Kotas, Todas.
23. Telangana Chenchus.
24. Tripura
Bhil, Bhutia, Chaimal, Khasia, Lushai, Mizel, Chakma, Halam, Namte.
25. Uttarakhand
Bhotias, Buksa, Jannsari, Khas, Raji, Tharu.
26. Uttar Pradesh
Bhotia, Buksa, Jaunsari, Kol, Raji, Tharu.
27. West Bengal
Asur, Ho, Parhaiya, Rabha ,Khond, Hajong, Santhals, Savar.
28. North-East
Abhors, Chang, Galaong, Mishimi, Singpho, Wancho.
30. Andaman and Nicobar
Oraons, Onges, Sentinelese, Shompens

LIST OF INDIAN CITIES ON RIVERS BANKS

Cities	Rivers
Sri Nagar	Jhelum
Surat	Tapti
Vijayawada	Krishna
Hyderabad	Musi
Badrinath	Alaknanda
Jabalpur	Narmada
Durgapur	Damodar
Gwalior	Chambal

Kota	Chambal
Dhaulpur	Chambal
Jhansi	Betwa
Jamshedpur	Subarnarekha
Nasik	Godavari
Ujjain	Kshipra
Kolkata	Hugli
Ahmedabad	Sabarmati
Aurangabad	Kauna
Agra	Yamuna
Delhi	Yamuna
Haridwar	Ganga
Kanpur	Ganga
Patna	Ganga
Srirangapatnam	Kaveri
Tiruchirapalli	Kaveri
Lucknow	Gomti
Jaunpur	Gomti
Dibrugarh	Brahmaputra
Ayodhya	Saryu
Panaji	Mandovi
Madurai	Vaigai
Sambalpur	Mahanadi
Cuttack	Mahanadi
Guwahati	Brahmaputra

IMPORTANT MOUNTAIN PASSES IN INDIA

Name	Connects	Place
Zojila Pass	Srinagar to Leh	Jammu and Kashmir
Bara Lacha-la Pass	Mandi to Leh	Himachal Pradesh
Shipki-la-Pass	Shimla to Garetok (Tibbet)	Himachal Pradesh

Pangsad pass	Dibrugarh to Myanmar	Arunachal Pradesh
Bhorghat	Bombay-Pune	Maharashtra
Palghat	Palkhad – Coimbtore	Kerala
Shenkota pass	Kollam – Madurai	Kerala
Aghil Pass	Ladakh & Xinjiang (China)	J&K (Karakoram Range)
Chang La Pass	Ladakh with Tibet	Jammu and Kashmir
Dongkha La	Sikkim with Tibet	Sikkim
Fotu La	Leh and Kargil	J&K

Nathu La	Sikkim & Tibet	Sikkim
Mana Pass	Tibet with Uttarakhand	Uttarakhand
Nama Pass	Kuthi and Darma Valley	Uttarakhand
Jelep La	Sikkim with Lhasa (Tibet)	Sikkim
Karakoram Pass	Ladakh & Xinjiang (China)	Jammu and Kashmir
Namika La	Kargil and Leh	Jammu and Kashmir
Rohtang Pass	Kullu Valley with the Lahaul and Spiti Valleys of Himachal Pradesh	Himachal Pradesh
Zoji la Pass	Connects Srinagar with Kargil and Leh	Jammu and Kashmir
Sasser Pass	Nubra & Siachen Glacier	Jammu and Kashmir
Shipki La	Himachal Pradesh with Tibet	Himachal Pradesh

UNESCO'S WORLD HERITAGE SITES IN INDIA

- In India there are 38 World Heritage sites which are recognized by UNESCO
- It's include 30 cultural sites, seven natural sites and one mixed-criteria site

CULTURAL (30)

1. Agra Fort (1983)
2. Ajanta Caves (1983)
3. Archaeological Site of Nalanda Mahavihara at Nalanda, Bihar (2016)
4. Buddhist Monuments at Sanchi (1989)
5. Champaner-Pavagadh Archaeological Park (2004)
6. Chhatrapati Shivaji Terminus (formerly Victoria Terminus) (2004)
7. Churches and Convents of Goa (1986)
8. Elephanta Caves (1987)
9. Ellora Caves (1983)
10. Fatehpur Sikri (1986)
11. Great Living Chola Temples (1987,2004)
12. Group of Monuments at Hampi (1986)
13. Group of Monuments at Mahabalipuram (1984)
14. Group of Monuments at Pattadakal (1987)
15. Hill Forts of Rajasthan (2013)
16. Historic City of Ahmadabad (2017)
17. Humayun's Tomb, Delhi (1993)
18. Jaipur City, Rajasthan (2019)
19. Khajuraho Group of Monuments (1986)
20. Mahabodhi Temple Complex at Bodh Gaya (2002)

22. Mountain Railways of India (1999,2005,2008)
23. Qutb Minar and its Monuments, Delhi (1993)
24. Rani-ki-Vav (the Queen's Stepwell) at Patan, Gujarat (2014)
25. Red Fort Complex (2007)
26. Rock Shelters of Bhimbetka (2003)
27. Sun Temple, Konârak (1984)
28. Taj Mahal (1983)
28. The Architectural Work of Le Corbusier, an Outstanding Contribution to the Modern Movement (2016)
29. The Jantar Mantar, Jaipur (2010)
30. Victorian Gothic and Art Deco Ensembles of Mumbai (2018)

NATURAL (7)

1. Great Himalayan National Park Conservation Area (2014)
2. Kaziranga National Park (1985)
3. Keoladeo National Park (1985)
4. Manas Wildlife Sanctuary (1985)
5. Nanda Devi and Valley of Flowers National Parks (1988,2005)
6. Sundarbans National Park (1987)
7. Western Ghats (2012)

MIXED (1)

1. Khangchendzonga National Park (2016)

WORLD GEOGRAPHY

OCEANS ON THE EARTH

- About 70 percent of the world covered by water, and 97 percent of this water lies in the oceans and seas
- They are salty while river and lakes are fresh water
- There are four major oceans. In order of their size, they are Pacific ocean, Atlantic Ocean, Indian Ocean, Arctic Ocean

PACIFIC OCEAN

- Pacific Ocean, taking up more than one-third of the planet's surface
- The Pacific Ocean is the largest ocean of the world
- It is the deepest ocean with an average depth of 4200 m
- The Marina Trench is the world's deepest trench with a depth of 11033 metres

ATLANTIC OCEAN

- The Atlantic Ocean is the second largest ocean in the world
- The Atlantic Ocean has the longest coastline

- The Atlantic Ocean is the busiest Ocean for trade and commerce since its shipping routes connect the two most industrialized regions ,namely Western Europe and North Europe and USA

INDIAN OCEAN

- The Indian Ocean is the only Ocean named after a country
- The India Ocean is deeper than the Atlantic Ocean
- It contains numerous continental islands; Madagascar and Sri Lanka are being the largest ones
- Some of the islands of volcanic origin are those of Mauritius, Andaman and Nicobar, Seychelles, Maldives and Lakshadweep are coral origin

ARCTIC OCEAN

- The Arctic Ocean is the smallest of all the Oceans
- It lies within the Arctic Circle, hence the name Arctic Ocean
- The North Pole lies in the middle of the Arctic Ocean
- Most of the parts of Arctic Ocean remain frozen with thick ice for most of the days every year
- It is the shallowest of all Oceans, with an average depth of 1500 m
- It has least salinity of all the Oceans. It has a salinity of 20 units per Thousand

OCEANS GREATEST DEPTH

Mariana Trench	Pacific Ocean	11033 m
Puerto Rico Trench	Atlantic Ocean	8605 m
Java Trench	Indian Ocean	7125 m
Arctic Basin	Arctic Ocean	5122 m

MAJOR SEAS OF THE WORLD

Sea	Area(Sq.km)	Location
Arabian Sea	3,862,000	Indian Ocean

South China Sea	3,500,000	Pacific Ocean
Caribbean Sea	2,754,000	Atlantic Ocean
Mediterranean Sea	2,500,000	Atlantic Ocean
Bay of Bengal	2,172,000	Indian Ocean
Bering Sea	2,000,000	Pacific Ocean
Sea of Okhotsk	1,583,000	Pacific Ocean
Gulf of Mexico	1,550,000	Atlantic Ocean
East China Sea	1,249,000	Pacific Ocean
Hudson Bay	1,230,000	Atlantic Ocean
Sea of Japan	977,980	Pacific Ocean

MAJOR STRAITS OF THE WORLD

Strait	Joining water bodies	Separates
Strait of Bab-el-Mandeb	Red Sea to Gulf of Aden	Yamen (Asia) from Djibouti & Eritrea (Africa)
Bass strait	Pacific Ocean	Tasmania from the Australian mainland
Bering Strait	Bering Sea (Pacific Ocean) to Chukchi Sea (Arctic Ocean)	Russia from Alaska
Palk Strait	Bay of Bengal to Gulf of Mannar	India from Sri Lanka
Gibraltar Strait	Atlantic Ocean to Mediterranean Sea	Spain (Europe) from Morocco (Africa)
Malacca Strait	The Pacific Ocean to the east with the Indian Ocean to the west	Malaysia and Sumatra
Sunda Strait	Indian Ocean to Java Sea	Islands of Java from Sumatra (Indonesia)
10 ^o Channel	Bay of Bengal to Andaman Sea	Island of Little Andaman from Car Nicobar Island (of India)
9 ^o Channel	Indian Ocean	Laccadive Islands of Kalpeni from Suheli Par, and Maliku Atoll
Denmark strait	Atlantic Ocean	Iceland from Greenland
Florida Strait	Gulf of Mexico to Atlantic Ocean	Florida (USA) from Cuba
Korea Strait	East China Sea and Sea of Japan	Japan and South Korea
Hormuz strait	Gulf of Oman to Persian Gulf	UAE & Oman from Iran
North Channel	Irish Sea & Atlantic Ocean	Ireland-England
Davis Strait	The Baffin Bay and the Labrador Sea	Between Greenland and Canada
Jamaica Channel	The Caribbean Sea and North Atlantic	Jamaica and Hispaniola
Hudson strait	Atlantic Ocean to Hudson Bay	Baffin Island from Quebec

IMPORTANT FACTS ABOUT STRAITS

- Strait that separates Asia from America-Bering strait
- Strait that separates Europe from Africa- Gibraltar Strait

- Strait that separates Australia from Tasmania-Bass Strait
- Longest strait: Strait of Malacca which separates Malay Peninsula and the Indonesian island of Sumatra •
Widest strait: Denmark strait which separates the Iceland from Greenland

LAKES

MAJOR LAKES OF THE WORLD

Lake	Area(Sq.Km)	Location
Caspian Sea	371,000	Asia
Lake Superior	82,100	North America
Lake Victoria	68,870	Africa
Lake Huron	59,600	North America
Lake Michigan	58,000	North America
Lake Tanganyika	32,600	Africa
Lake Baikal	31,500	Russia
Great Bear Lake	31,000	Canada
Aral sea	30700	Asia
Malawi	29,500	Africa
Great Slave Lake	28568	Canada
Balkhash	18300	Kazakhstan

DEEPEST LAKES

Lake Name	Depth(m)	Location
Baikal	1620	Asia(Siberia, Russia)
Lake Tanganyika	1463	Africa
Caspian Sea	1025	Asia
Malawi or Nyasa	706	Africa
Lake Vostok	900	Antarctica
Issyk-Kul	702	Kyrgyzstan

IMPORTANT RIVERS IN THE WORLD

LIST OF MAJOR RIVERS OF THE WORLD

River	Source	Outflow	Km
Nile	Tributaries of Lake Victoria, Africa	Mediterranean Sea	6690
Amazon	Glacier-fed lakes, Peru	Atlantic Ocean	6296
Mississippi-Missouri-Red Rock	Source of Red Rock, Montana	Gulf of Mexico	5970

Chang Jiang (Yangtze)	Tibetan plateau, China	China Sea	5,797
Ob	Altai Mts., Russia	Gulf of Ob	5567
Huang He (Yellow)	Eastern part of Kunlan Mts., West China	Gulf of Chihli	4667
Yenisei	Tannu-Ola Mts., western Tuva, Russia	Arctic Ocean	4506
Parana	Confluence of Paranaiba and Grande rivers	Río de la Plata	4498
Irtish	Altai Mts., Russia	Ob River	4,438
Zaire (Congo)	Confluence of Lualab and Luapula rivers, Congo	Atlantic Ocean	4371
Heilong (Amur)	Confluence of Shilka (Russia) and Argun (Manchuria) rivers	Tatar Strait	4352
Lena	Baikal Mts., Russia	Arctic Ocean	4268
Mackenzie	Head of Finlay River, British Columbia, Canada	Beaufort Sea (Arctic Ocean)	4241
Niger	Guinea	Gulf of Guinea	4184
Mekong	Tibetan highlands	South China Sea	4023
Mississippi	Lake Itasca, Minnesota	Gulf of Mexico	3779
Missouri	Confluence of Jefferson, Gallatin, and Madison rivers, Montana	Mississippi River	3726
Volga	Valdai plateau, Russia	Caspian Sea	3687
Purus	Peruvian Andes	Amazon River	3207
Yukon	Junction of Lewes and Pelly rivers, Yukon Territory, Canada	Bering Sea	3185
Brahmaputra	Himalayas	Ganges River	2897
Indus	Himalayas	Arabian Sea	2897
Danube	Black Forest, Germany	Black Sea	2842
Ural	Southern Ural Mts., Russia	Caspian Sea	2533
Ganges	Himalayas	Bay of Bengal	2506
Orange	Lesotho	Atlantic Ocean	2092
Don	Tula, Russia	Sea of Azov	1968

Tigris	Taurus Mts., Turkey	Shatt-al-Arab	1899
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THE CONTINENTS OF THE WORLD

Asia, Africa, North America, South America, Antarctica, Europe and Australia are the seven continents

CONTINENTS-AREAWISE

NAME	PERCENTAGE OF EARTH'S AREA
Asia	29.5
Africa	20.0
North America	16.3
South America	11.8
Europe	6.5
Australia	5.2
Antarctica	9.6

CONTINENTWISE HIGHEST POINT

Continent	Peak	Height(m)
Asia	Mt Everest	8848
Africa	Kilimanjaro	5963
North America	Mt.Mckinley	6194
South America	Aconcagua	6959
Europe	Mt Elbrus	5633
Australia	Puncak Jaya	4884
Antarctica	Vinson Massif	4897

CONTINENTWISE LOWEST POINT

Continent	Water body	Depth(m)
Asia	Dead Sea	-396.8
Africa	Lake Assal	-156.1
North America	Death Valley	-85.9
South America	Valdes Penin	-39.9
Europe	Caspian sea	-28.0
Australia	Lake Eyre	-15.8

LIST OF IMPORTANT COUNTRIES AND THEIR CAPITALS & CURRENCIES

Country	Capital	Currency
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Afghanistan	Kabul	Afghani
Albania	Tirane	Lek
Algeria	Algiers	Dinar
Argentina	Buenos Aires	Peso
Armenia	Yerevan	Dram
Australia	Canberra	Australian dollar
Austria	Vienna	Euro
Azerbaijan	Baku	Manat
Bahrain	Manama	Bahrain dinar
Bangladesh	Dhaka	Taka
Belgium	Brussels	Euro
Bhutan	Thimphu	Ngultrum
Bolivia	La Paz	Boliviano
Brazil	Brasilia	Brazilian real
Bulgaria	Sofia	Lev
Canada	Ottawa	Canadian dollar
Chile	Santiago	Chilean Peso
China	Beijing	Chinese Yuan
Colombia	Bogota	Colombian Peso
Croatia	Zagreb	Croatian
Cuba	Havana	Cuban Peso
Cyprus	Nicosia	Euro
Ecuador	Quito	U.S. dollar
Egypt	Cairo	Egyptian pound
Fiji	Suva	Fiji dollar
Finland	Helsinki	Euro
France	Paris	Euro
Germany	Berlin	Euro
Ghana	Accra	Cedi
Greece	Athens	Euro
Haiti	Port-au-Prince	Gourde
Iceland	Reykjavik	Icelandic króna
India	New Delhi	Indian Rupee
Indonesia	Jakarta	Rupiah
Iran	Tehran	Rial
Iraq	Baghdad	Iraqi Dinar
Ireland	Dublin	Euro
Italy	Rome	Euro
Japan	Tokyo	Yen
Jordan	Amman	Jordanian dinar
Kazakhstan	Nur Sultan	Tenge
Kenya	Nairobi	Kenya shilling

North Korea	Pyongyang	Won
South Korea	Seoul	Won
Kuwait	Kuwait City	Kuwaiti Dollar
Lebanon	Beirut	Lebanese pound
Libya	Tripoli	Libyan dinar
Luxembourg	Luxembourg	Euro
Madagascar	Antananarivo	Malagasy Ariary
Malaysia	Kuala Lumpur	Ringgit
Maldives	Male	Rufiyaa
Mauritius	Port Louis	Mauritian rupee
Mexico	Mexico City	Mexican peso
Mongolia	Ulaanbaatar	Togrog
Montenegro	Podgorica	Euro
Namibia	Windhoek	Namibian dollar
Nepal	Kathmandu	Nepalese rupee
Netherlands	Amsterdam	Euro
New Zealand	Wellington	New Zealand dollar
Nigeria	Abuja	Naira
Norway	Oslo	Norwegian krone
Oman	Muscat	Omani rial
Pakistan	Islamabad	Pakistani rupee
Papua New Guinea	Port Moresby	Kina
Paraguay	Asuncion	Guaraní
Peru	Lima	Nuevo sol
Philippines	Manila	Peso
Poland	Warsaw	Zloty
Portugal	Lisbon	Euro
Qatar	Doha	Qatari riyal
Russia	Moscow	Ruble
Saint Lucia	Castries	East Caribbean dollar
San Marino	San Marino	Euro
Saudi Arabia	Riyadh	Riyal
Serbia	Belgrade	Serbian Dinar
Seychelles	Victoria	Seychelles rupee
Singapore	Singapore	Singapore dollar
South Africa	Pretoria (administrative);Cape Town(legislative); Bloemfontein(judiciary)	Rand
South Sudan	Juba	Sudanese Pound
Spain	Madrid	Euro
Sri Lanka	Colombo	Sri Lankan rupee
Sudan	Khartoum	Sudanese Pound

Swaziland	Mbabane	Lilangeni
Sweden	Stockholm	Krona
Switzerland	Berne	Swiss franc
Syria	Damascus	Syrian pound
Thailand	Bangkok	Baht
Tunisia	Tunis	Tunisian dinar
Turkey	Ankara	Turkish lira
Uganda	Kampala	Ugandan new shilling
Ukraine	Kiev	Hryvnia
United Arab Emirates	Abu Dhabi	U.A.E. Dirham
United Kingdom	London	Pound sterling
United States of America	Washington D.C.	Dollar
Vatican City	Vatican City	Euro
Venezuela	Caracas	Bolivar
Vietnam	Hanoi	Dong
Yemen	Sanaa	Rial
Zimbabwe	Harare	United States dollar

LANDLOCKED COUNTRIES IN THE WORLD

Country Name	Location
Lesotho	Africa (Locked by South Africa)
Botswana, Burkina Faso, Chad, Czech Republic, Ethiopia, Malawi, Mali, Niger, Rwanda, South Sudan, Uganda, Zambia, Zimbabwe	Africa
Vatican City	Europe (Locked by Italy)
San Marino	Europe (Locked by Italy)
Mongolia	Asia (Locked by Russia & China)
Bhutan	Asia (Locked by India & China)
Nepal	Asia (Locked by India & China)
Andorra	Europe (Locked by France & Spain)
Liechtenstein	Europe (it is one of the double landlocked countries between Switzerland & Austria)
Moldova	Europe (Locked by Ukraine & Romania)
Swaziland	Africa (Locked by South Africa & Mozambique)
Bolivia	South America
Afghanistan, Armenia, Azerbaijan, Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan, Uzbekistan, Laos	Asia

Austria, Belarus, Hungary, Kosovo, Luxembourg, Macedonia, Moldova, Serbia, Slovakia, Switzerland	Europe
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COUNTRIES WITH MOST LAND BORDERS

Countries	Number of Bordering Countries
China	14
Russia	14
Brazil	10
Congo, Germany and	9
Austria, France, Turkey and Tanzania, Zambia	8
India, Sudan,	7
Afghanistan	6
Pakistan	4
Bangladesh	2

IMPORTANT INTERNATIONAL BOUNDARY LINES IN THE WORLD

- **The Radcliffe Line** – It is the Boundary Line Between India & Pakistan drawn by Sir Cyril Radcliffe in 1947
- **The McMahon Line**- It is the Boundary Line Between India & China
- **Durand Line**- It is the Boundary Line between Afghanistan and Pakistan
- **The Oder–Neisse line**- It is the Boundary Line Between Germany & Poland
- **The 24th Parallel**- This is the Line that Pakistan claims for the demarcation purpose, but India does not accept it
- **Maginot Line**- It is the Boundary Line Between France & Germany
- **The Line of Control (LoC)** - This is the military control line between India and Pakistan (in the state of Jammu & Kashmir)
- **The Siegfried Line**- It is the Boundary Line between France and Germany
- **The 49th Parallel (also The Medicine Line)** - It is the Boundary Line Between Canada & the USA
- **The 38th parallel**- It is the Boundary Line between North & South Korea (Before the Korean War)
- **The 17th Parallel**- It is the Boundary Line between North & South Vietnam
- **Blue Line** - It is the Boundary Line between Israel & Lebanon
- **Purple Line**- It is the Boundary Line between Israel and Syria
- **Mannar haime line** - It is the Boundary Line between Russia & Finland

IMPORTANT CITIES SITUATED ON THE BANKS OF RIVER (WORLD)

City	Country	River
Adelaide	Australia	Torrens
Amsterdam	Netherlands	Amsel
Alexandria	Egypt	Nile
Ankara	Turkey	Kazil
Bangkok	Thailand	Chao Praya
Basra	Iraq	Elupharates and Tigris
Baghdad	Iraq	Tigris
Berlin	Germany	Spree
Bristol	UK	Avon
Buenos Aires	Argentina	Laplata
Chittagong	Bangladesh	Maiyani
Canton	China	Si-Kiang
Cairo	Egypt	Nile
Dublin	Ireland	Liffy
Kabul	Afghanistan	Kabul
Karachi	Pakistan	Indus
Lahore	Pakistan	Ravi
Liverpool	England	Messey
London	England	Thames
Moscow	Russia	Moskva
Montreal	Canada	St. Lawrence
New Orelans	U.S.A.	Mississippi
New York	U.S.A.	Hudson
Ottawa	Canada	Ottawa
Paris	France	Seine
Perth	Australia	Swan
Rome	Italy	Tiber
Stalingrad	Russia	Volga
Sidney	Australia	Darling
Saint Luis	U.S.A.	Mississippi
Tokyo	Japan	Arakava
Washington D.C.	U.S.A.	Potomac
Yangoon	Myanmar	Irawaddy

DISTINCTIVE NAMES OF COUNTRIES & TOWNS (WORLD)

DISTINCTIVE NAMES	COUNTRIES / TOWNS
Britain of the South	New Zealand
The Battlefield of Europe	Belgium
City of the Golden Gate	San Francisco

City of Magnificent Distances	Washington D.C.
City of Popes	Rome
City of Seven Hills	Rome
City of Skyscrapers	New York
Cockpit of Europe	Belgium
Dark Continent	Africa
Dairy of Northern Europe	Denmark
Emerald Island	Ireland
Empire City	New York
Eternal City	Rome, Italy
Forbidden City	Lhasa (Tibet)
Garden of England	Kent(England)
Gate of Tears	Babel-Mandab, Jerusalem
Granite City	Aberdeen (Scotland)
Gift of Nile	Egypt
Gibraltar of the Indian Ocean	Aden
Herring Pond	Atlantic Ocean
Hermit Kingdom	Korea
Land of Cakes	Scotland
Land of the Golden Pagoda	Myanmar (Burma)
Land of Kangaroos	Australia
Land of Lilies	Canada
Land of the Midnight Sun	Norway
Land of the Rising Sun	Japan
Land of a Thousand Lakes	Finland
Land of Thunderbolt	Bhutan
Land of White Elephants	Thailand
Lady of Snow	Canada
Playground of Europe	Switzerland
Pearl of the Pacific	Guayaquil Port (Ecuador)
Quaker City	Philadelphia
Queen of the Arabian Sea	Kochi (India)
Roof of the World	Pamir (Tibet)
The Sea of Mountains	British Columbia
Sorrow of China	River Hwang Ho
Sugar Bowl of the World	Cuba
Venice of the North	Stockholm
Yellow River	Hwang Ho (China)
The Imperial City	Rome
City of Arabian Nights	Baghdad
The Modern Babylon	London

TRIBES AND RACES OF THE WORLD

Tribes	Area Inhabited
Abhors	Mongolians living in the Assam region
Afridis	Inhabitants of the north-west frontier in Pakistan (tribal area of Waziristan)
Afrikaner	Dutch-born South African race
Anglo-Saxon	People who invaded Britain after the withdrawal of the Romans AD 410. Now living in England, Canada, USA and Australia
Bantus	Negroes of central and south Africa (Black race)
Bedouins	Wandering tribe of Arabia and North Africa
Bhils	Ancient Dravidians of central India
Cossacks	Inhabitants of southern and eastern frontiers of Russia
Croats	Inhabitants of Croatia
Dravidians	Ancient people of South India (non-Aryans)
Eskimos	Inhabitants of the Arctic Circle and Greenland
Filipinos	Natives of Philippines
Flemish	Inhabitants of Belgium
Garos	Hill tribe of Assam
Gorkhas	Martial race of Nepal
Hottentots	Pastoral nomads of south-west Africa
Kaffris	Martial race of South Africa
Kardars	Descendants of Austric race, now living in the forests of central and northern India
Khasis	Tribes of Assam
Khirgiz	Tribe living in Central Asia
Kiwis	People of New Zealand
Magyars	Inhabitants of Hungary
Masuds	Tribe living in Waziristan (Pakistan)
Maoris	Natives of New Zealand
Moor	A mixed tribe of Arab and Berber people of Morocco
Negroes	Dark-skinned race of Africa
Nipponese	People living in Japan
Red Indians	Original inhabitants of North America. They were named so by Columbus who thought that he had discovered India
Sherpas	Tribe on the border of Tibet and Nepal
Slovenes	People of Slavic origin living in former Yugoslavia

Swahili	People living in parts of Kenya and Tanzania
Todas	Natives of Nilgiri Hills
Zulus	People living in South Africa, belonging to the Bantu family

ANCIENT CIVILIZATIONS

Civilization	Location
Indus Valley	River Indus
Egyptian	River Nile
Celtic	River Rhine
Roman	River Tiber
Sumerian	Tigris and the Euphrates

LARGEST PRODUCING COUNTRIES OF AGRICULTURAL COMMODITIES IN WORLD

PRODUCT	COUNTRY
Barley	Russia
Oat	Russia
Rice	China
Wheat	China
Grapes	China
Kiwifruit	China
Watermelon	China
Cucumber	China
Tea	China
Chestnut	China
Peanut	China
Egg	China
Honey	China
Tobacco	China
Cotton	China
Silk	China
Tomato	China
Potato	China
Spinach	China
Almond	United States
Maize	United States
Corn	United States
Soybean	United States
Apple	China

Avocado	Mexico
Banana	India
Mango	India
Papaya	India
Lemon	India
Guava	India
Okra	India
Pomegranate	India
Jackfruit	India
Milk	India
Jute	India
Ginger	India
Blueberry	United States
Cocoa	Ivory coast
Olive	Spain
Coconut	Indonesia
Cinnamon	Indonesia
Vanilla	Indonesia
Cloves	Indonesia
Avocado	Mexico
Cherry	Turkey
Fig	Turkey
Coffee	Brazil
Sugar cane	Brazil
Rubber	Thailand
Saffron	Iran
Wool	Australia
Black Pepper	Vietnam
Cashew nut	Vietnam
Dates	Egypt
Cardamom	Guatemala

LIST OF MINERALS AND THEIR LEADING PRODUCING COUNTRIES

Minerals	Largest Producers	Second Largest Producers
Coal	China	United States
Fluorite	China	Mexico
Aluminium	China	Russia
Bismuth	China	Mexico
Gold	China	Australia
Iron Ore	China	Australia
Tin	China	Indonesia

Zinc	China	Australia
Natural Gas	United States	Russia
Petroleum	United States	Saudi Arabia
Uranium	Kazakhstan	Canada
Diamond	Russia	Botswana
Palladium	Russia	South Africa
Bauxite	Australia	China
Lithium	Australia	Chile
Titanium	Australia	South Africa
Manganese	South Africa	China
Platinum	South Africa	Russia
Silver	Mexico	China
Nickel	Philippines	Russia

GEOGRAPHY ONE LINERS

- Loktak Lake situated in Manipur
- 10° Channel separates the Andaman from the Nicobar
- Standard Meridian of India (82°30'E) passing through Mirzapur (in Uttar Pradesh) is taken as the standard time for the whole country
- Mawsynram in Meghalaya receives the highest rainfall in the world
- Loo is the local name of the wind blowing in the northern plains during summers
- Reason of rainfall during winters in north-western part of India is Western disturbances
- 68° 7' E is the easternmost longitude of India
- The Southernmost Himalayas are known as Shiwaliks.
- Western Ghats is the another name of Sahyadris
- Palk Strait lies between India and Sri Lanka
- Aravali Mountains is the oldest mountain range in India
- Environmental degradation is the highlights of the 'Rally for Valley' programme in India
- Paleozoic is the era of the origin of the continental shelf
- Antarctica is the India's permanent research station Dakshin Gangotri
- The Duncan Pass is located between South Andaman and Little Andaman
- Secunderabad is popularly known as twin city of Hyderabad
- Uttar Pradesh is called the sugar bowl of India
- Tehri dam is the highest dam in India
- Western Ghats of Kerala is famous for the lion-tailed macaque
- Silent valley located in Kerala
- Chilka Lake is the largest lake in India

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- Digboi is the India's oldest oil Refinery in India
- Jog Falls is created by the Sharavathi River
- Godavari is the largest river basin of Indian peninsular region
- The Damodar river is called the ‘Sorrow of Bengal
- The Asia's largest fresh water lake "Wular lake" is located in Jammu and Kashmir
- River Narmada originated from Amarkantak
- Sambhar Lake is a salt water lake
- Krishna Raja Sagara Dam, located in Karnataka is built on river Cauvery
- Ganga river is the home for fresh water dolphins
- Godavari river is known as Dakshina Ganga
- Indira Sagar Dam located in Madhya Pradesh is built on Narmada
- Bhakra Nangal dam is situated on River Satluj
- River Koshi is known as “Sorrow of Bihar”
- The Radcliffe Line is the international border between India and Pakistan
- Duncan pass is located between South and little Andaman
- The average salinity of sea water is 3.50%
- Tropical Moist Deciduous Forest covers the maximum area in India
- Suez Canal joins Red & Mediterranean Sea
- Aravallis mountain range stretches from Gujarat in west to Delhi in the north
- Black Soil is also known as ‘Regur’
- Congo river crosses the equator twice
- Brazil is the only country that passes through both the equator and a tropic of Capricorn
- Strait of Gibraltar separates Africa from Europe
- The fertile land between two rivers is called Doab
- Limpopo river crosses tropic of Capricorn twice
- Madagascar is the largest island in the Indian Ocean
- Tropical Rain forests is found in silent valley of Kerala
- Gulf of Khambat separates the Daman & Diu
- Port Blair – the capital of Andaman and Nicobar Islands, is located in South Andaman
- Damodar river basin is called ‘Ruhr of India’
- “Valley of flowers” is located in Uttrakhand
- Atlantic ocean is called ‘Herring Pond’
- Jodhpur gets the least rainfall in India
- Guru Shikhar Peak located in Rajasthan
- Lake Superior is the largest fresh water lake in the world
- The Sivasamudram Falls is located on River Cauvery

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- Bering strait separates the Asia from North America
- Australia is the largest producer of Bauxite
- The cool temperate grasslands of South America are known as Pampas
- Tides are caused by the gravitational pull of the Sun and Moon on the Earth
- World's largest Mangrove forest is located in Sundarbans
- Highest railway bridge in the world constructed in Jammu & Kashmir on Chenab River
- Koyali oil refinery located in Gujarat
- The longest dam in India is Hirakund Dam
- Savannah is the tropical grassland
- The great Victoria Desert is located in Australia
- Earth is known as the 'Blue planet' due to Presence of huge amount of water on it
- Mount Etna, one of the world's most active volcanoes, is located in Italy
- Bab el-Mandeb strait connects Red Sea and Indian Ocean
- Lesotho is a country completely surrounded by South Africa
- The most densely populated island of the World is Java
- The Prime Meridian passes through Greenwich
- The atmospheric air is held to the Earth by Gravity
- The land between two rivers is called Doab
- Pachmarhi hill station is called as the Queen of the Satpuras
- The famous species of tree 'Sundari' is found in Sunderbans delta formed by the rivers Ganga and Brahmaputra in West Bengal
- The Nanda Devi Peak is located in Uttarakhand
- Majuli, the largest river island in the world is located in Assam
- Baglihar Dam is built on Chenab River in the Doda district of Jammu & Kashmir.
- Bum La Pass connects Tawang with Lhasa
- Alluvial soil is best suited for rice cultivation
- Diphu pass is located at the tri junction of India, Myanmar and china and it is located on the McMahon border line
- The 'Friendship Highway' is a road that connects China to Nepal
- **Gujarat** has the longest mainland coastline in India
- China has the world's largest number of International Borders
- The river Ganga emerges from Gangotri Glacier and drains into Bay Of Bengal
- Ganga is 2525 kilometres long and is the longest river of India
- The (western Ghats) Sahyadri mountains starts near the Songadh town of Gujarat and covers the states of Maharashtra, Goa, Karnataka, Kerala and Tamil Nadu
- Kibithu is the easternmost point of India. It is located in Arunachal Pradesh

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 - Rajasthan is the largest in terms of the total area covered
 - India has longest International border with Bangladesh
 - Red data book contains data of all plant endangered species
 - The final boundary between the Earth and the outer space is called magnetosphere created due to solar wind • Himalayan mountain range falls under Fold Mountain
- A difference between 2 longitudes at the equator is nearly equivalent to 111 km
- Alps is the highest mountain range that lies entirely in Europe and stretching across eight Alpine countries (from west to east): France, Switzerland, Italy, Monaco, Liechtenstein, Austria, Germany and Slovenia.
- Mount Blanc is the highest mountain peak of Alps.
 - Saddle Peak which has a height of 737 metres is the highest peak in Andaman and Nicobar islands. It is located in North Andaman Island and is covered by saddle national park which has a wide variety of flora and fauna
 - The Patkai hills belong to Purvanchal mountain ranges.
 - Kosi river originates in Nepal and flows into the Ganges
 - Dachigam National Park is located in Jammu and Kashmir
 - The Keoladeo National Park formerly known as the Bharatpur Bird Sanctuary in Rajasthan.
 - Gujarat is India's largest salt producing state
 - The Sankosh river forms boundary between Assam and Arunachal Pradesh
 - The northernmost point of India is Indira Col
 - Karnataka is largest producer of Coffee in India
 - Paradip Port is located on the delta of Mahanadi
 - The salal project is on the river Chenab River
 - The state having a largest area of forest cover in India is Madhya Pradesh
 - The oldest oil field in India is the Digboi field in Assam
 - Sugarcane crops needs maximum water per hectare
 - Deccan plateau is the most ideal region for the cultivation of cotton in India
 - Canada has longest coastline in world
 - The great Victoria Desert is located in Australia
 - khasi hills located in Meghalaya
 - Adam's bridge locate between India and Sri Lanka