GEOGRAPHY

WORLD GEOGPRAHY

UNIVERSE

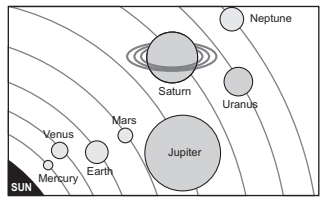
- The study of universe is known as **Cosmology.** The universe is commonly defined as the totality of everything that exists including all physical matter and energy, the planets, stars, galaxies and the contents of intergalactic space.
- **Galaxy** A galaxy is a vast system of billions of stars, dust and light gases bound by their own gravity. There are 100 billion galaxies in the universe and each galaxy has, on average, 100 billion stars.
- Our galaxy is **Milky Way Galaxy** (or the **Akash Ganga**) formed after the Big Bang.
- **Andromeda** is the nearest galaxy to the Milky Way.
- **The Big Bang Theory** Big Bang was an explosion of concentrated matter in the universe that occurred 15 billion years ago, leading to the formation of galaxies of stars and other heavenly bodies.
- It is believed that universe should be filled with radiation called the "cosmic microwave background." NASA has launched two mission to study these radiation, i.e. the Cosmic Background Explorer (COBE) and the Wilkinson Microwave Anistropy Probe (WMAP).
- **Stars** are heavenly bodies made up of hot burning gases and they shine by emitting their own light.
- **Black Hole** Stars having mass greater than three times that of the Sun, have very high gravitational power, so that even light can not escape from its gravity and hence called black hole.
- **Comets** Made up of frozen gases. They move around the Sun in elongated elliptical orbit with the tail always pointing away from the Sun.
- **Constellations** The sky is divided into units to enable the astronomers to identify the position of the stars. These units are called constellations. There are 88 known constellations.
- **Satellites** are the heavenly bodies that revolve around the planets. Moon is the natural satellite of the Earth.

Facts about the Moon

Diameter	3476 km
Average distance from Earth	384365 km
Rotation Speed	27 days, 7 h, 43 min and 11.47 sec
Revolution Speed	27 days, 7 h, 43 min and 11.47 sec
Time taken by moonlight to reach the Earth	1.3 sec

Solar System

- The solar system consists of the Sun, eight planets and their satellites (or moons) and thousands of other smaller heavenly bodies such as asteroids, comets and meteors.



- The **Sun** is at the centre of the solar system and all these bodies revolve around it. It is the nearest star to the Earth.

Facts about the Sun

Average distance from the Earth	149598900 km
Diameter	1391980 km
Temperature of the Core	15000000°C
Rotation Speed	25.38 days (with respect to equator); 33 days (with respect to poles)
Time taken by Sunlight to reach the Earth	8 min and 16.6 sec

Important Facts about Universe

Biggest Planet	*Jupiter*
Biggest Satellite	*Ganymede (Jupiter)*
Blue Planet	*Earth*
Green Planet	*Uranus*
Brightest Planet	*Venus*
Brightest Planet outside Solar System	*Sirius (Dog Star)*
Closest Star of Solar System	*Proxima Centauri*
Coldest Planet	*Neptune*
Evening Star	*Venus*
Farthest Planet from Sun	*Neptune*
Planet with maximum number of satellites	Saturn (Overtaking Jupiter)
Fastest revolution in Solar System	*Mercury*
Hottest Planet	*Venus*
Densest Planet	*Earth*
Fastest rotation in Solar System	*Jupiter*
Morning Star	*Venus*
Nearest Planet to Earth	*Venus*
Nearest Planet to Sun	*Mercury*
Red Planet	*Mars*
Slowest Revolution in Solar System	*Neptune*
Slowest Rotation in Solar System	*Venus*
Smallest Planet	*Mercury*
Smallest Satellite	*Deimos (Mars)*
Earth's Twin	*Venus*
Only Satellite with an atmosphere like Earth	*Titan*

Asteroids (or Planetoids)

Small planetary bodies that revolve around the Sun and found in between the orbits of Mars and Jupiter. Also known as minor planets.

Meteors and Meteorites

- Meteors are also called as **shooting stars**.
- **Meteors** are fragments of rocks coming towards the Earth.
- They are formed due to collision among the asteroids.
- Meteors that do not burn up completely in Earth's atmosphere and land on the Earth, are called **meteorites**.
- Meteorites are composed of various proportions of a nickel-iron alloy (10% nickel and 90% iron) and silicate minerals.

Classification of Planets

Inner Planets Include Mercury, Venus, Earth and Mars.

Outer Planets Include Jupiter, Saturn, Uranus and Neptune.

Inner Planet	*Outer Planet*
They are called as Terrestrial or Rocky planets.	They are called as Jovian or Gaseous planets.
They are nearer to the Sun.	They are far away from the Sun.

Dwarf Planet According to International Astronomical Union (IAU), it is a celestial body in direct orbit of the Sun, that is massive enough that its shape is controlled by gravitational forces, but has not cleared its neighbourhood. *e.g.*, Pluto, Ceres, Eris, Makemake and Haumea.

A **light year** is the distance light travels in one year at the speed of 3×10^8 m/s.
Astronomical unit mean distance between Earth and Sun.

Earth

- The Earth is an **oblate spheroid**. It is almost spherical, flattened a little at the poles with a slight bulge at the centre (equator).
- **Perihelion** Nearest position of the Earth to the Sun.
- **Aphelion** Farthest position of the Earth from Sun.
- The Earth's interior is composed of three major layers: the **crust**, the **mantle** and the **core**.

- Eduard Suess has explained the interior of Earth on the basis of chemical composition as SIAL, SIMA and NIFE.
- **SIAL** (Silicon-Aluminium) Upper part of the crust.
- **SIMA** (Silicon-Magnesium) Lower part of the crust.
- **NIFE** (Nickel-Iron) Outer part of the core.
- **Rotation of the Earth** Earth spins on its imaginary axis from West to East in one day. Result in causation of day and night, tides.
- **Revolution of the Earth** Earth's motion in elliptical orbit around the Sun in one year. Result in Change of seasons.

Statistics Data of the Earth

Age	4550 million years
Mass	5.976×10^{24} kg
Volume	1.083×10^{12} km^3
Mean Density	5.513 g/cm^3
Total Surface Area	510 million sq km
Land Area	29.2% of the total surface area
Water Area	70.8% of the total surface area
Rotation Speed	23 hr, 56 min and 4.100 sec
Revolution Speed	365 days, 5 hr and 45.51 sec
Dates when days and nights are equal	March 21 *(Vernal Equinox)*; 23rd September, *(Autumnal Equinox)*
Longest day	21st June, *(Summer Solstice)* Sun is vertically overhead at Tropic of Cancer
Shortest night	22nd December, *(Winter Solstice)* Sun is vertically overhead at Tropic of Capricorn
Escape velocity	11.2 km/sec
Mean surface temperature	14°C

Latitudes

Imaginary lines drawn on the Earth's surface parallel to the equator. Equator (0°) is the biggest latitude that divides Earth in two equal hemispheres (North and South).

Tropic of Cancer	23.5°N
Tropic of Capricorn	23.5°S
Arctic Circle	66.5°N
Antarctic Circle	66.5°S

- Each degree of latitude equals 111 km.
- The most important line of latitude is the Equator.

Longitudes (Meridians)

- Meridians are a series of semicircles that run from pole to pole passing through the equator.
- **Prime Meridian** passes through Greenwich near London, divides the Earth in Eastern and Western hemisphere. Its value is 0°.
- Longitude has very important function *i.e.*, it determines local time in relation to **Greenwich Mean Time** (GMT).
- 1° change of longitude corresponds to 4 minutes difference in time.

International Date Line (IDL)

- It is the longitude where the date changes by exactly one day when it is crossed.
- 180°East and 180° West meridians is the same line, which is called the International Date Line.
- Crossing Date line from West to East — addition of 1 day
  Crossing Date line from East to West — subtraction of 1 day
- Recently Samoa island decided to shift itself on west side of IDL.

Indian Standard Time (IST)

- The Earth takes approximately 24 hours to complete one rotation *i.e.*, it takes 24 hours to complete 360° of its rotation.
- Indian Standard Time is calculated on the basis of 82.5°E longitude which passes through Uttar Pradesh, Madhya Pradesh Odisha, Chhattisgarh and Andhra Pradesh.
- IST is 5 hr 30 min ahead of GMT.

Eclipses

When the light of the Sun or the Moon is blocked by another body, the Sun or the Moon is said to be in eclipse.

- **Solar Eclipse** It is caused, when the Moon revolving around the Earth comes in between the Earth and the Sun, thus making a part or whole of the Sun invisible from a particular part of the Earth. Thus, the eclipse can be partial or complete.
- **Lunar Eclipse** When the Earth comes between the Moon and the Sun, the shadow cast by the Earth on the Moon results in a lunar eclipse.

ROCKS

Rocks are made up of individual substances, called minerals, found mostly in solid state. *Rocks are classified into three major types*

- **Igneous rocks** are formed by the solidification of the molten magma, *e.g.*, Mica, Granite etc.
- **Sedimentary rocks** are formed due to accumulation of rock particles and organic matter in layers, under tremendous pressure, *e.g.*, Gravel, Peat, Gypsum etc.
- **Metamorphic rocks** were originally igneous or sedimentary but later changed due to pressure, heat or action of water, *e.g.,* Gneiss, Marble, Quartzite etc.

Type of Rock	*Original Rock*	*Metamorphic Rock*
Igneous	Granite	Gneiss
Igneous	Basalt	Green-stone
Sedimentary	Limestone	Marble
Sedimentary	Coal	Graphite, Coal
Sedimentary	Sandstone	Quartzite
Sedimentary	Shale/Clay	Slate, Mica, Schist

Weathering

The process by which rocks are chemically or physically disintegrated into fragments.

EARTHQUAKES

- Any sudden disturbance below the Earth's surface may produce **vibrations** or shaking in Earth's crust and some of these vibrations, when reach the surface, are known as earthquakes.
- The magnitude of an earthquake is measured by **Richter Scale**.
- The intensity of earthquake waves is recorded by **Seismograph**.
- Intensity of shaking is measured on the modified **Mercalli Scale**.
- **Focus** is the point beneath the Earth where earthquake originates.
- **Epicentre** is the point just above the focus on the Earth's surface.

VOLCANISM

- Sudden eruption of hot magma (molten rock), gases, ash and other material from inside the Earth to its surface.

Types of Volcanoes

- **Active** Which erupts frequently, *e.g.*, Mauna Loa *(Hawaii)*, Etna *(Sicily)*, Vesuvius *(Italy)*, Stromboli *(Mediterranean Sea)*.
- **Dormant** Not erupted for quite sometime, *e.g.*, Fujiyama *(Japan)*, Krakatoa *(Indonesia)*, Barren Island *(India)*.
- **Extinct** Not erupted for several centuries. *e.g.,* Arthur's Seat, Edinburgh, Scotland.
- **Ring of Fire** Hundreds of active volcanoes found on the land near the edges of the Pacific Ocean.

Tsunami

Large ocean wave that is caused by sudden motion on the ocean floor. Motion could be an earthquake, volcanic eruption or underwater landslide.

LANDFORMS

There are three major landforms mountains, plateaus and plains.

Mountains

An uplifted portion of the Earth's surface is called a hill or a mountain.

Mountains are classified into following four types

- **Fold Mountains** These are formed by folding of crustal rocks by compressive forces. *e.g.*, Himalayas (Asia), Alps (Europe).
- **Block Mountains** When great blocks of the Earth's crust are raised or lowered during the last stage of mountain building, block mountains are formed, *e.g.*, Vosges in France, Black Forest mountains in Germany.
- **Volcanic Mountains** These are formed by the matter thrown out from the volcanoes, and are also known as mountains of accumulation, *e.g.*, Mt Mauna Loa in Hawaii, Mt Popa in Myanmar.
- **Residual or Dissected Mountains** They are known as relict mountains or mountains of circum-denudation. They owe their present form to erosion by different agencies, *e.g.* Nilgiris, Girnar and Rajmahal.

Major Mountain Ranges

Range	*Location*	*Length (km)*
Andes	South America	7200
Himalayas, Karakoram and Hindukush	South Central Asia	5000
Rockies	North America	4800
Great Dividing Range	East Australia	3600
Atlas	North-West Africa	1930
Western Ghats	Western India	1610
Caucasus	Europe	1200
Alaska	USA	1130
Alps	Europe	1050

Major Mountain Peaks

Mountain Peak	*Location*
Mt Everest *(Highest in the world)*	Nepal-Tibet
K2 *(Godwin Austin)*	India *(PoK)*
Dhaulagiri	Nepal
Annapurna	Nepal
Gurla Mandhata	Tibet
Tirich Mir	Pakistan
Aconcagua	Argentina
Cotopaxi	Ecuador
Kilimanjaro	Tanzania

Plateaus

Plateaus are flat, table like, upland areas with rough top surface and steep side walls.

Famous Plateaus of the World

Plateau	*Situation*
Tibetan Plateau	Between Himalayas and Kunlun Mountains
Deccan Plateau	Southern India
Arabian Plateau	South-West Asia
Plateau of Brazil	Central-Eastern South America
Plateau of Mexico	Mexico
Plateau of Columbia	USA
Plateau of Madagascar	Madagascar
Plateau of Alaska	North-West North America
Plateau of Bolivia	Andes Mountains
Great Basin Plateau	South of Columbia Plateau, USA
Colorado Plateau	South of Great Basin Plateau, USA

Plains

A relatively low-lying and flat land surface with least difference between its highest and lowest points is called a Plain.

ATMOSPHERE

- The **vast expanse of air,** which envelops the earth all around is called the atmosphere. It extends to thousands of kilometres.
- It protects the Earth's surface from the Sun's harmful **ultraviolet rays**.

Structure of Earth's Atmosphere

Layer	*Height (km)*	*Feature*
Troposphere	0-18 km	Contains 75% of the gases in the atmosphere. As height increases, temperature decreases *(about 6.5°c/km ascent)*.
Stratosphere	18-50 km	This layer contains the ozone layer. The temperature remains fairly constant in the lower part but increases slowly with increase in height due to presence of ozone gas. At upper layer temperature is almost $0^{0}C$.
Mesosphere	50-80 km	This is the coldest region of the atmosphere. The temperature drops to about – 100°C.
Ionosphere	80-600 km	Radio waves are bounced off the ions and reflect waves back to the Earth. This generally helps radio communication.
Exosphere	Above 600 km	Upper part of exosphere is called Magnetosphere. The temperature keeps on rising constantly at high rate.

- It also regulates temperature, preventing the Earth from becoming too **hot** or too **cold**.
- The **major constituents of air** in the atmosphere are Nitrogen (78%), Oxygen (21%), Argon (0.93%) and Carbon dioxide (0.03%).
- Besides water vapour, dust particles, smoke, salts and other impurities are present in air in varying quantities.

Greenhouse Effect and Global Warming

- A **greenhouse gas** (sometimes abbreviated GHG) is a gas in the atmosphere that absorbs and emits radiation within the thermal infrared range. This process is the fundamental cause of the greenhouse effect.
- The primary greenhouse gases in the Earth's atmosphere are water vapour, carbon dioxide, methane, nitrous oxide and ozone.
- In the **solar system**, the atmosphere of Venus, Mars and Titan also contain gases that cause greenhouse effects.
- **Global warming** is the increase of Earth's average surface temperature due to effect of greenhouse gases, such as carbon dioxide emissions from burning fossil fuels or from deforestation. This is a type of greenhouse effect.

Pressure System of Earth

- The pressure exerted by the atmosphere due to its weight, above a unit area of the Earth's surface is called **atmospheric pressure**. It is measured by **Mercury Barometer**.
- Major pressure belts of the Earth are equatorial low, sub-tropical high, sub-polar low and polar high.

Winds

Due to horizontal differences in air pressure, air flows from areas of high pressure to areas of low pressure. **Horizontal movement** of the air is called wind.

The types of winds are given below

- **Planetary Winds** The winds blowing throughout the year from one latitude to another in response to latitudinal differences in air pressure are called planetary or prevailing winds.
- Planetary winds are divided into three types they are Trade winds, Westerlies and Polar winds.
  (i) **Trade Winds** They blow from the Sub-tropical High Pressure Belt to the Equatorial Low Pressure Belt in the tropics between 30° North and 30° South latitudes.
  (ii) **Westerlies** They blow from Sub-tropical High Pressure Belt to the Sub-Polar Low Pressure Belt in the temperate latitudes between 30°and 60°, on the either side of the Equator.
  These are also called **Roaring Forties**, the **Furious Fifties** and **Shrieking** or **Screaming sixties**.
  (iii) **Polar Winds** They blow from the Polar High Pressure Belt to the Sub-Polar Low Pressure Belt between 60° latitude and the Pole on both sides of the Equator.
- **Periodic Winds** They change their direction periodically with the change in pressure and temperature, e.g., Monsoon, Land and Sea Breeze.
- **Local Winds** Local winds develop as a result of local differences in temperature and pressure. e.g., Fohn, Chinook, Loo.
- **Cyclones** Rapid inward circulation of airmasses with a low pressure at centre. It is anticlockwise in the Northern Hemisphere and clockwise in the Southern Hemisphere.
- **Anticyclones** Rapid outward movement of air masses with a high pressure at centre.
- **Hurricane** This is also known as tropical cyclone or tropical storm. This is a disturbance of about 650 km across, spinning around a central area of very low pressure, with (with wind speed above) 140 km/h.

List of Local Winds

Name	*Nature of Wind*
Chinook	Hot, dry wind in Rockies, also called 'Snow Eater'.
Fohn	Hot, dry wind in the Alps.
Khamsin	Hot, dry wind in Egypt.
Sirocco	Hot, moist wind from Sahara to Mediterranean Sea. It is also known as Blood rain.
Solano	Hot, moist wind from Sahara towards Iberian Peninsula.
Harmattan	Hot, dry wind blowing outwards from the interior of Western Africa. Also called Guinea Doctor.
Bora	Cold, dry wind blowing outwards from Hungary to the North of Italy *(near Adriatic Sea)*.
Mistral	Very cold wind, which blows from the Alps over France.
Punas	Cold, dry wind blowing down towards the Western side of Andes.
Blizzard	Very cold winds in Tundra region.
Purga	Cold wind in Russian Tundra.
Levanter	Cold wind in Spain.
Norwester	Hot wind in New Zealand.
Santa Ana	Hot wind in South California in USA.

Major Rivers of the World

River	*Origin*
Nile	Victoria lake
Amazon	Andes *(Peru)*
Yangtze	Tibetan Kiang Plateau
Mississippi Missouri	Itaska Lake *(USA)*
Yenisei	Tannu-Ola Mountains
Huang Ho	Kunlun Mountains
Ob	Altai Mountains, Russia
Congo	Lualaba and Luapula rivers
Amur	North East China
Lena	Baikal Mountains
Mekong	Tibetan Highlands
Niger	Guinea

Cyclones of the World

Typhoons	China Sea
Tropical Cyclones	Indian Ocean
Hurricanes	Caribbean Sea
Tornadoes	USA
Willy Willies	Northern Australia

Important Canals of the World

Panama	Pacific Ocean with Caribbean Sea
Suez	Mediterranean Sea to Red Sea
Erie	Atlantic Ocean to Great Lakes
Kiel	North Sea to Baltic Sea

Deepest Point of Oceans

Oceans	*Deepest Point*
Pacific	Mariana Trench
Atlantic	Puerto Rico Trench
Indian	Java Trench
Arctic	Eurasian Basin

Important Straits of the World

Strait	*Water Bodies joined*	*Area*
Bab-el-Mandeb	Red Sea and Arabian Sea	Arabia and Africa
Bering	Arctic Ocean and Bering Sea	Alaska and Asia
Bosphorus	Black Sea and Marmara Sea	Turkey
Dover	North Sea and Atlantic Ocean	England and Europe
Florida	Gulf of Mexico and Atlantic Ocean	Florida and Bahamas Islands
Gibralter	Mediterranean Sea and Atlantic Ocean	Spain and Africa (Morocco)
Malacca	Java Sea and Bay of Bengal	India and Indonesia
Palk	Bay of Bengal and Indian Ocean	India and Sri Lanka
Magellan	South Pacific and South Atlantic Ocean	Chile
Sunda	Java Sea and Indian Ocean	Indonesia

Important Lakes of the World

Lake	*Location*
Caspian Sea	Asia
Superior	Canada and USA
Victoria	Africa
Huron	Canada and USA
Michigan	USA
Tanganyika	Africa
Baikal	Russia
Great Bear	Canada
Aral	Kazakshtan
Great Slave	Canada

Waterfalls

Waterfall	*Location*
Angel Falls	Venezuela
Tugela Falls	South Africa
Monge	Norway
Yosemite	United States
Catarata Yumbilla	Peru

Riverside Cities

Town	*River*
Akyab *(Myanmar)*	Irrawaddy
Baghdad *(Iraq)*	Tigris
Basara *(Iraq)*	Tigris and Euphrates
Belgrade	Danube
Berlin *(Germany)*	Spree
Bristol *(UK)*	Avon
Budapest *(Hungary)*	Danube
Cairo *(Egypt)*	Nile
Canton	Si-Kiang
Glasgow *(Scotland)*	Clyde
Hamburg *(Germany)*	Elbe
Jamshedpur	Subarnarekha
Kabul	Kabul
Karachi	Indus
Khartoum *(Sudan)*	Nile
Lahore	Ravi
Lisbon *(Portugal)*	Tangus
London *(UK)*	Thames
Lucknow	Gomti
Montreal *(Canada)*	Ottawa
New Castle *(UK)*	Tyre
New Orleans *(USA)*	Mississippi
New York *(USA)*	Hudson
Paris *(France)*	Seine
Philadelphia *(USA)*	Delaware
Rome *(Italy)*	Tiber
Shanghai	Yang-tse-Kiang
Srinagar	Jhelum
Warsaw *(Poland)*	Vistula
Washington DC	Potomac
Yangon *(Myanmar)*	Irawady

Great Deserts of the World

Name	*Country/Region*
Sahara *(Libyan, Nubian)*	North Africa
Australian *(Gibson, Simpson)*, Victorian Great Sandy)	Australia
Arabian *(Rub al Khali, An-Nafud)*	Arabia
Dasht-e-Lut *(Barren Desert)*	Iran
Dasht-e-Kavir *(Salt Desert)*	Iran
Desierto de Sechura	Peru
Atacama	North Chile
Patagonia	Argentina
Kalahari	Botswana
Namib	Namibia

Major Islands of the World

Rank	*Name*	*Area* (km^2)	*Country/Area*
1.	Greenland	2,175,600	Denmark
2.	New Guinea	785,753	Melanesia
3.	Borneo	748,168	Indonesia, Malaysia
4.	Madagascar	587,713	Madagascar
5.	Baffin Island	503,944	Canada
6.	Sumatra	443,066	Indonesia

Minerals of the World

Mineral	*Leading Producer*
Gold	China
Bauxite	Australia
Copper	Chile
Platinum	South Africa
Chromium	South Africa
Vanadium	China
Antimony	China
Tungsten	China
Phosphate	China
Manganese	China
Diamond	Russia (Botswana, in term of value)
Iron ore	China
Petroleum	USA

Famous Grasslands of the World

Grassland	*Country*
Steppe	Eurasia
Pustaz	Hungary
Prairie	USA
Pampas	Argentina and Uruguay *(South America)*
Veld	South Africa
Downs	Australia
Canterbury	New Zealand

Agriculture

Agricultural Produce	*Leading Producer*
Coffee	Brazil
Rubber	Thailand
Tea	China
Oil Palm	Indonesia
Cocoa	Ghana
Coconut	Indonesia
Date Palm	Egypt
Cotton	China
Wheat	China
Maize	USA
Fruits and Vegetables	China
Wool	Australia
Rice	China
Cloves	Zanzibar

Important International Boundary Lines

Name	*In Between*
Radcliffe Line (1947)	India and Pakistan (Indo-Pak)
McMahon Line (1914)	India and China (Indo-China)
Durand Line (1893)	Pakistan and Afghanistan
Hindenburg Line	Germany and Poland
Maginot Line	France and Germany
Oder Neisse Line	Germany and Poland
Siegfried Line	Fortification between Germany and France
38th Parallel Line	North and South Korea
49th Parallel Line	USA and Canada
24th Parallel Line	Pakistan claims that it is the boundary between India and Pakistan in Rann of Kachchh
17th Parallel Line	North Vietnam and South Vietnam

Highest and Lowest Points of the Continent

Continent	*Highest (m)*	*Lowest (m)*
Asia	Mt Everest (8850)	Dead Sea (–396)
Africa	Mt Kilimanjaro (5895)	Lake Assal (–151)
North America	Mt Mckinley (6190)	Death Valley (–87)
South America	Mt Aconcagua (6962)	Valdes Peninsula (–40)
Antarctica	Vinson Massif (4897)	Bentley Subglacial Trench (–2538)
Europe	Mt El' brus (5642)	Caspian Sea (–28)
Australia	Mt Kosciuszko (2228)	Lake Eyre (–16)

Important Industrial Cities

Anshan (China)	Iron and Steel
Baku (Azerbaijan)	Petroleum
Belfast (Ireland)	Ship-building
Birmingham (UK)	Iron and Steel
Chicago (USA)	Meat Packing
Detroit (USA)	Automobile
Havana (Cuba)	Cigars
Hollywood (USA)	Films
Johannesburg (South Africa)	Gold Mining
Kansas City (USA)	Meat Packing
Kawasaki (Japan)	Iron and Steel
Kimberley (South Africa)	Diamond Mining
Krivoi Rog (Ukraine)	Iron and Steel
Leeds (UK)	Woollen Textiles
Leningard (Russia)	Ship-building
Los Angeles (USA)	Petroleum
Lyon (France)	Silk Textiles
Magnitogorsk (Russia)	Iron and Steel
Manchester (UK)	Cotton Textile
Milan (Italy)	Silk Textile
Multan (Pakistan)	Pottery
Munich (Germany)	Lenses
Nagoya (Janpan)	Automobiles
Philadelphia (USA)	Locomotives
Pittsburg (USA)	Iron and Steel
Plymouth (USA)	Ship-building
Rourkela (India)	Iron and Steel
Sheffield (UK)	Cutlery
Vladivostok (Russia)	Ship-building
Wellington (New Zealand)	Dairy Products

INDIAN GEOGRAPHY

INDIA

- India is the **seventh largest country** in the world with an area of 3287263 sq km, which is 2.42% of world's area.
- India is the **second most populous** country in the world with a population of 1.21 billion, which is 17.44% of the world.
- Indian subcontinent is located in the Northern and Eastern hemisphere.
- India shares **longest boundary** with Bangladesh (4096 km), followed by China (3488 km), Pakistan (3323 km), Nepal (1751 km), Myanmar (1643 km), Bhutan (699 km) and Afghanistan (106 km).
- In India, the **Tropic of Cancer** (23.5° N latitude) passes through **8 states** (Gujarat, Rajasthan, Madhya Pradesh, Chhattisgarh, Jharkhand, West Bengal, Tripura and Mizoram).
- **Islands** Andaman and Nicobar Islands in the Bay of Bengal; Lakshadweep, Amindivi and Minicoy in the Arabian Sea.
- **Ocean** India lies midway between the Far East and Middle East. The trans-Indian Ocean routes connecting the industrially developed countries of Europe in the West and the under developed countries of East Asia pass close by Indian subcontinent.
  It is surrounded by Arabian Sea in the South-West and Bay of Bengal in the South-East.

Indian States UTs Situated on the Border

Country	*Border*
Pakistan (4)	Gujarat, Rajasthan, Punjab, Jammu and Kashmir
Afghanistan (1)	Ladakh
China (5)	Ladakh, Uttarakhand, Himachal Pradesh, Sikkim, Arunachal Pradesh
Nepal (5)	Uttar Pradesh, Uttarakhand, Bihar, West Bengal, Sikkim
Bhutan (4)	Sikkim, West Bengal, Assam, Arunachal Pradesh
Bangladesh (5)	West Bengal, Assam, Meghalaya, Tripura, Mizoram

Highest Peaks of India

Highest Peak	*Height (in m)*	*State/UTs*
Mt K2	8611	PoK (India)
Kanchenjunga	8598	Sikkim
Nanda Devi	7817	Uttarakhand
Saltoro Kangri	7742	Jammu and Kashmir
Kangto	7090	Arunachal Pradesh
Reo Purgyil	6816	Himachal Pradesh
Saramati	3841	Nagaland
Sandakphu	3636	West Bengal
Khayang	3114	Manipur
Anaimudi	2695	Kerala
Dodda Betta	2636	Tamil Nadu

Important Facts

Latitudinal extent	8°4' North to 37° 6' North
Longitudinal extent	68°7' East to 97° 25' East
North-South extent	*3214 km*
East-West extent	2933 km
Land Frontiers	15200 km
Total Coastline	7516.6 km
Number of States	28
Union Territories	8 (After bifurcation of J & K in Jammu and Kashmir and Ladakh and merger of Dadar and Nagar Haveli with Daman and Diu)
Land Neighbours	Pakistan, Afghanistan, China, Nepal, Bhutan, Bangladesh and Myanmar
Longest Coastline	Gujarat
Active volcano	Barren Island in Andaman and Nicobar Islands
Southern most point	Indira Point or Pygmalion point in Great Nicobar
Southern most tip	Kanyakumari
Northern most point	Indira Col
Western most point	West of Ghaur Mota in Gujarat
Eastern most point	Kibithu (Arunachal Pradesh)

Bhangar and Khadar

Bhangar	*Khadar*
▪ These are low plains. Formed of older alluvium	▪ The deposit of fresh alluvium every year brought by the Himalayas rivers makes this belt of Northern plains.
▪ This belt ends in Khadar.	▪ This belt ends in Terai.

Terai and Bhabar

Terai	*Bhabar*
▪ Terai is a broad long zone South of Bhabar plain.	▪ Bhabar is a long narrow plain along the foothills.
▪ It is a marshy damp area convered with thick forest.	▪ It is a pebble studded zone of porous beds.
▪ It is 20-30 km wide.	▪ It is 9-16 km wide.
▪ It is suitable for agriculture.	▪ It is unsuitable for agriculture.

South to North Doabs

Doab	*Region*
▪ Bist Doab	▪ Between Beas and Sutlej
▪ Bari Doab	▪ Between Beas and Ravi
▪ Rechna Doab	▪ Between Ravi and Chenab
▪ Chaj Doab	▪ Between Chenab and Jhelum
▪ Sind Sagar Doab	▪ Between Jhelum and Indus

The Coastal Plains

Eastern Coast	*Western Coast*
Smooth outline	Dissected outline
Occurence of deltas	Occurrence of estuaries
Broad	Narrow
Long rivers	Small rivers

Eastern *and* Western Ghats

Eastern Ghat	*Western Ghat*
Located East to Deccan Plateau.	Located West to Deccan Plateau.
They are parallel to Eastern Coast, *i.e.*, Coromandal, Northern Circar, etc.	They are parallel to Western Coast, *i.e.*, Konkan, Kannad, Malabar etc.
Mahanadi, Cauveri, Godavari, Krishna etc rivers are drawn in this land form.	Narmada, Tapi, Sabarmati and Mahi etc rivers are drawn in this land.
Jindhagada with an altitude of 1690 m is the highest peak.	Anaimudi with an altitude of 2695 m is the highest peak.

Important Indian Towns on Rivers

Town	*River*
Jamshedpur	Subarnarekha
Delhi	Yamuna
Kanpur	Ganga
Surat	Tapti
Ferozpur	Sutlej
Prayagraj	At the confluence of the Ganga and Yamuna
Varanasi	Ganga
Haridwar	Ganga
Badrinath	Alaknanda
Ludhiana	Sutlej
Srinagar	Jhelum
Ayodhya	Saryu
Ahmedabad	Sabarmati
Patna	Ganga
Kota	Chambal
Jabalpur	Narmada
Panji	Mandavi
Ujjain	Kshipra
Guwahati	Brahmaputra
Kolkata	Hooghly
Cuttack	Mahanadi
Hyderabad	Musi
Nasik	Godavari
Lucknow	Gomti

Some of the Important Waterfalls of India

Waterfall	*Height* (km)	*River*	*State*
Kunchikal	455	Varahi	Karnataka
Jog/Gersoppa	260	Sharavati	Karnataka
Rakim Kund	168	Gaighat	Bihar
Chachai	127	Bihad	Madhya Pradesh
Kevti	98	Mahana	Madhya Pradesh
Sivasamudram	90	Cauveri	Karnataka

Important Lakes of India

Name of Lake	*State/UTs*	*Important Fact*
Chilka Lake	Odisha	It is largest brackish water lake of India.
Kolleru Lake	Andhra Pradesh	It is a freshwater lake.
Loktak Lake	Manipur	It is a freshwater lake having inland drainage in Manipur.
Lonar Lake	Maharashtra	It is a meteorite crater lake in Buldhana area of Maharashtra. The water is highly charged with Sodium carbonates and Sodium chloride.
Pangong Lake	Jammu and Kashmir	It is a salty lake.
Pulicat Lake	Tamil Nadu & Andhra Pradesh border	It is a saline and lagoon lake.
Sambhar Lake	Rajasthan	It is a shallow lake which is saline, located near Jaipur.
Tso Moriri Lake	Jammu & Kashmir	It is a salty lake.
Vembanad Lake	Kerala	It is a lagoon lake and largest lake by surface area.
Wular & Dal Lakes	Jammu and Kashmir	Wular lake was created due to tectonic activities and is largest fresh water lake of India.

Important Rivers of India

Name	*Originates from*	*Falls into*
Ganges	Gangotri Glacier	Bay of Bengal
Sutlej	Mansarovar Rakas Lakes	Chenab
Indus	Near Mansarovar Lake	Arabian Sea
Ravi	Kullu Hills near Rohtang Pass	Chenab
Beas	Near Rohtang Pass	Sutlej
Jhelum	Verinag in Kashmir	Chenab
Yamuna	Yamunotri	Ganga
Chambal	Singar Chouri Peak, Vindhyan escarpment	Yamuna
Ghaghara	Matsatung Glacier	Ganga
Kosi	Near Gosain Dham Peak	Ganga
Betwa	Vindhyanchal	Yamuna
Son	Amarkantak	Ganga
Brahmaputra	Near Mansarovar Lake	Bay of Bengal
Narmada	Amarkantak	Gulf of Khambat
Tapti	Betul District in Madhya Pradesh	Gulf of Khambat
Mahanadi	Raipur District in Chhattisgarh	Bay of Bengal
Luni	Aravallis	Rann of Kachchh
Ghaggar	Himalayas	Near Fatehabad
Sabarmati	Mewar hill, Aravallis	Gulf of Khambat
Krishna	Western Ghats	Bay of Bengal
Godavari	Nasik district in Maharashtra	Bay of Bengal
Cauveri	Brahmagir Range of Western Ghats	Bay of Bengal
Tungabhadra	Western Ghats	Krishna

Important River Projects and their Beneficiary States

Project	*River*	*Purpose*	*Beneficiary States*
Bhakra Nangal Project	Sutlej	Power and irrigation	Punjab, Himachal Pradesh, Haryana and Rajasthan
Damodar Valley	Damodar	Power, irrigation and flood control	Jharkhand and West Bengal, shared by Madhya Pradesh
Hirakud	Mahanadi	Power and irrigation	Odisha
Tungabhadra Project	Tungabhadra	Power and irrigation	Andhra Pradesh and Karnataka
Nagarjunasagar Project	Krishna	Power and irrigation	Andhra Pradesh and Telangana
Gandak River Project	Gandak	Power and irrigation	Bihar, Uttar Pradesh, Nepal (joint venture of India and Nepal)
Kosi Project	Kosi	Flood control, Power and irrigation	Bihar
Farakka Project	Ganga, Bhagirathi	Power, irrigation, avoid accumulation of slit to improve navigation	West Bengal
Beas Project	Beas	Irrigation and power	Rajasthan, Haryana, Punjab and Himachal Pradesh
Indira Gandhi Canal Project (*Rajasthan Canal Project*)	Sutlej, Beas and Ravi	Irrigation	Rajasthan, Punjab and Haryana
Chambal Project	Chambal	Power and irrigation	Madhya Pradesh and Rajasthan
Kakrapara Project	Tapti	Irrigation	Gujarat
Ukai Project	Tapti	Power and irrigation	Gujarat
Tawa Project	Tawa (Narmada)	Irrigation	Madhya Pradesh
Poochampad Project	Godavari	Irrigation	Telangana
Malaprabha Project	Malaprabha	Irrigation	Karnataka
Durgapur Barrage	Damodar	Irrigation and navigation	West Bengal and Jharkhand
Mahanadi Delta Project	Mahanadi	Irrigation	Odisha
Iddukki Project	Periyar	Hydroelectricity	Kerala
Koyna Project	Koyna	Hydroelectricity	Maharashtra
Ramganga Multipurpose Project	Chisot stream near Kala	Power and irrigation	Uttar Pradesh and Uttarakhand
Matatila Project	Betwa	Multipurpose power and irrigation	Uttar Pradesh and Madhya Pradesh
Tehri Dam Project	Bhilangana, Bhagirathi	Hydroelectricity	Uttarakhand
Rihand Scheme	Rihand	Hydroelectricity	Uttar Pradesh
Kundah Project	Kundah/Bhavani	Hydroelectricity and irrigation	Tamil Nadu

Natural Vegetation of India

Name	*Climatic Requirement*	*Feature*	*Important Species*	*Found in Area*
Tropical Wet Evergreen	Rainfall > 250 cm Temperature 25-27°C Humidity 80% or more	Dense forest, tall trees	Mesa, Dhup, White cedar, Jamun, Bamboo, Agar and Hopea	Noth-East India, Western slopes of Western Ghats, Andaman and Nicobar Islands
Tropical Semi-Evergreen	Rainfall > 200-250 cm, Temperature 24-27°C Humidity 80%	Evergreen mixed with deciduous, Height 24-36 m	Semul, Rosewood, Indian Chestnut, Kusum, Mesua	Lower slopes of Eastern Himalayas, Odisha Coast
Tropical Dry Evergreen	Areas receive rain from North-East Monsoon, Temperature 28°C, Humidity 74%	Presence of canopy, low height, about 9-12 m	Khirni, Jamun, Tamarind, Neem, Cane	Coromandal Coast of Tamil Nadu
Tropical Moist Deciduous	Moderate rainfall of 150-200 cm, Temperature 26-27°C, Humidity 60-80%	Trees shed their leaves in the dry season	Sal, Teak, Sandalwood, Ebony, Mahua, Shisham	Western Ghats, Eastern coastal plains, Eastern Plateau
Tropical Dry Deciduous	Rainfall < 150 cm, Dry season	Undergrowth is shrubby and grassy, trees shed their leaves in the dry season	Sal, Teak, Khair, Palash, Tendu, Laurel	Uttar Pradesh, Tamil Nadu, Western Ghats, Rajasthan and West Bengal
Tropical Thorny	Rainfall 50-70 cm, Temperature 25-27°C, Humidity < 47%	Trees are stunted (6-9 m), trees have long roots, sharp spines and glossy leaves to conserve water	Babul, Acacia, Khair, Khejri	South-Western Punjab, Western Haryana and Uttar Pradesh, Western Madhya Pradesh, Kachchh and Saurashtra, Rajasthan
Tidal/Littoral Mangrove	Rainfall > 200 cm, high water salinity and areas are flooded regularly	Trees are evergreen, breathing roots called pneumatophores	Keora, Amur, Sundari, Agar, Bhendi, Nipa	Delta regions of Ganga, Mahanadi, Godavari and Krishna

Soils in India

Types	*States where Found (Occurrence)*	*Composition*	*Crops Grow*
Alluvial	Punjab, Haryana, Uttar Pradesh, Bihar and Jharkhand	Rich in potash and lime but deficient in nitrogen and phosphorus.	Large variety of rabi and kharif crops such as wheat, rice, sugarcane, cotton and jute etc.
Black soil (Regur soil)	Deccan Plateau, Valleys of Krishna and Godavari, Andhra Pradesh, Madhya Pradesh and Tamil Nadu.	Rich in iron, lime, aluminium, magnesium, calcium, but lacks in nitrogen, phosphorus and humus.	Cotton sugarcane, jowar, tobacco, wheat and rice.
Red	Eastern parts of Deccan Plateau, Tamil Nadu, Goa, Odisha and Meghalaya.	Rich in iron and potash, but deficient in lime, nitrogen, phosphorus and humus.	Wheat, rice, cotton, sugarcane and pulses.
Laterite	Summits of Eastern and Western Ghats, Assam hills, Andhra Pradesh, Karnataka, West Bengal and Odisha.	Rich in iron but poor in silica, lime, phosphorus, potash and humus.	Tea, coffee, rubber, cashew and millets.
Desert	West and North-West India, Rajasthan, North Gujarat and Southern Punjab.	Rich in soluble salts, but deficient in organic matter.	Generally unsuitable for cultivation, but with irrigation useful for cultivation of drought-resistant lime, millets, barley, cotton, maize and pulses.
Mountain	Hills of Jammu and Kashmir, Uttarakhand and Assam hills.	Rich in iron and humus, but deficient in lime.	with fertilisers, tea, fruits and medicinal plants can be grown.
Saline (Reh, Kallar, Usar, Thur, Rukar) and Alkaline	Drier parts of Bihar, Jharkhand, Uttar Pradesh, Haryana, Punjab, Rajasthan and Maharashtra.	Many salts such as sodium, magnesium and calcium.	Unfit for agriculture.
Peaty and Marshy	Kerala, coastal regions of Odisha, Tamil Nadu and Suderbans of West Bengal.	Contain large amount of soluble salts and organic matter, but lack in potash and phosphates.	Useful for rice and jute cultivation.

Forests of India

Forest Type	*Distribution*	*Climatic Conditions*	*Characteristics*	*Species*
Tropical Evergreen Forests	▪ Rainy slopes of Western Ghats. ▪ NE India except Arunachal Pradesh. ▪ Eastern part of West Bengal and Odisha. ▪ Andaman and Nicobar Islands.	▪ Rainfall > 200 cm ▪ Relative Humidity > 70% ▪ Average temperature is about 24°C. ▪ Hot and humid climate.	▪ Height of trees is 40 to 60 m. ▪ Leaves are dark green and broad.	Mahogany, Mahua, Bamboo, Cones, Ironwood, Kadam, Irul, Jamun, Hopea, Rubber tree, Toon, Telsur etc.
Tropical Moist Deciduous Forests	▪ Eastern parts of Sahyadris (Western Ghats). ▪ North Eastern part of Peninsula. ▪ Middle and lower Ganga valley. ▪ Foothills of Himalayas in Bhabar and Tarai region. ▪ These cover about 20% India's forest area.	▪ 100 to 200 cm rainfall per annum. ▪ Moderate temperature.	▪ 30 to 40 m high trees. ▪ Due to deficiency of water, they shed their leaves in spring (onset of summer).	Sal, Teak, Arjun, Mulberry, Kusum, Sandalwood, Siris, Haldi, Khair, Mango, Banyan tree etc.
Tropical Dry Deciduous Forests	▪ Large parts of Maharashtra and Andhra Pradesh. ▪ Parts of Punjab, Haryana and Eastern parts of Rajasthan. ▪ Northern and Western parts of Madhya Pradesh. ▪ Tamil Nadu. ▪ Southern parts of Uttar Pradesh.	▪ 50 to 100 cm rainfall. ▪ Moderate humidity.	▪ 6 to 15 m high. ▪ Roots are thick and long.	Teak, Sal, Bamboo, Mango, Acacia, Neem, Shisham etc.
Dry Forests or Arid Forests	▪ Rajasthan and adjoining areas of Haryana, Gujarat and Punjab. ▪ Rainshadow area of peninsular India.	▪ Low rainfall (less than 50 cm per annum). ▪ Relative humidity is less.	▪ Thorny vegetation. ▪ Roots are very long. ▪ Leaves are small.	Cactus, Thorny bushes, Kikar, Babool, Date palm, Acacia, Khair, Euphorbias etc.

CLIMATE

Monsoon

A type of wind system, in which there is almost complete reversal of prevailing wind direction.

Types

1. South West Monsoon *(June and July)*
2. North East Monsoon *(Sept. to Dec.)*

Seasons of India

- Winter Season Mid December to Mid March
- Summer Season Mid March to May
- Rainy Season June to September
- Season of Retreating Monsoon October to Mid December

Climatic Regions of India

Type	*Area*	*Characteristic*
Tropical Rain Forests	Western Ghats, West Coastal Plains, Parts of Assam	High temperature throughout the year, heavy seasonal rainfall, annual rainfall 200 cm annually (May to November)
Tropical Savana Climate	Most of Peninsular region (except leeward side of Western Ghats)	Dry winters, annual rainfall varies from 76 cm to 150 cm.
Tropical Semi-Arid- Steppe Climate	Rainshadow belt running Southward from Central Maharashtra to Tamil Nadu.	Low rainfall varies from 38 cm to 80 cm and temperature from 20° to 30°C.
Tropical and Sub-tropical Steppes	Punjab, Haryana and Kachchh region	Temperature varies from 12°-35°C.
Tropical Desert	Western parts of Barmer, Jaisalmer and Bikaner districts of Rajasthan and parts of Kachchh	Scanty rainfall (mostly in form of cloud burst), high temperature.
Humid Sub-tropical Climate with dry winters	South of Himalayas	Mild winters and extremely hot summers.
Mountain Climate	Mountainous region (above 6000 m or more)	Rainfall varies from 63.5 cm to 254 cm. (Mostly during South-West Monsoon)

AGRICULTURE

India is essentially an agricultural land. Two-thirds of its population still lives on agriculture. It includes farming, animal rearing and fishing.

Agricultural Seasons in India

There are three major crop seasons in India

Kharif

Sown in June/July, harvested in September/October, e.g., rice, jowar, bajra, ragi, maize, cotton and jute.

Rabi

Sown in October/December, harvested in April/May e.g., wheat, barley, peas, rapeseed, mustard, sesame.

Zaid

Sown in February/March harvested in May/June, e.g., urad, moong, melons etc.

Green Revolution

It is the phrase generally used to describe the spectacular increase that took place during 1968 and is continuing in the production of foodgrains in India.

The components of Green Revolution are

High Yield Variety Seeds, Irrigation, Use of Fertilisers, Use of Insecticide and Pesticide, Command Area Development, Programme Consolidation of Holdings etc.

Chief Crops and Producing States

Type	*Name*	*Major Producers*
Cereals	Wheat	Uttar Pradesh, Punjab and Madhya Pradesh
	Rice	West Bengal and Uttar Pradesh
	Gram	Madhya Pradesh, Maharashtra and Rajasthan
	Barley	Maharashtra, Uttar Pradesh and Rajasthan
	Bajra	Rajasthan, Maharashtra and Gujarat
Cash Crops	Sugarcane	Uttar Pradesh and Maharashtra
	Poppy	Uttar Pradesh and Himachal Pradesh
Oil Seeds	Coconut	Kerala and Tamil Nadu
	Linseed	Rajasthan, Madhya Pradesh and Haryana
	Groundnut	Gujarat, Andhra Pradesh and Tamil Nadu
	Rape seed and mustard	Rajasthan, Madhya Pradesh and Haryana
	Sesame	Gujarat, West Bengal and Karnataka
	Sunflower	Karnataka, Andhra Pradesh and Maharashtra
Fibre Crops	Cotton	Maharashtra and Gujarat
	Jute	West Bengal and Bihar
	Silk	Karnataka and Kerala
	Hemp	Madhya Pradesh and Uttar Pradesh
Plantations	Coffee	Karnataka and Kerala
	Rubber	Kerala and Karnataka
	Tea	Assam and Kerala
	Tobacco	Gujarat, Maharashtra and Madhya Pradesh
Spices	Pepper	Kerala, Karnataka and Tamil Nadu
	Cashewnuts	Kerala, Tamil Nadu and Andhra Pradesh
	Ginger	Kerala and Uttar Pradesh
	Turmeric	Andhra Pradesh and Odisha

MINERAL RESOURCES

Types of Minerals

Metallic Iron ore, copper, aluminium, tin, lead, gold and silver.
Non-metallic Coal, mica, manganese, petroleum and sulphur.
Radioactive Uranium and thorium
Gondwana rocks (Chhotanagpur Plateau) are the richest mineral deposits in India.

Mineral Resources of India

Mineral	**States**
Coal	West Bengal, Jharkhand, Odisha, Madhya Pradesh and Chhattisgarh
Copper	Madhya Pradesh, Rajasthan, Jharkhand, Karnataka
Gold	Karnataka, Andhra Pradesh
Iron	Karnataka, Chhattisgarh and Jharkhand
Bauxite	Odisha, Jharkhand, Gujarat and Madhya Pradesh
Mica	Jharkhand, Andhra Pradesh and Rajasthan
Petroleum	Assam, Gujarat, Mumbai High, Bassein (South of Mumbai High)
Uranium	Jharkhand, Rajasthan, Andhra Pradesh and Karnataka
Thorium	Kerala Coast, Rocks of Aravalli in Rajasthan
Silver, Zinc and Lead	Rajasthan, Andhra Pradesh, Karnataka (Kolar mines)
Diamond	Panna (Madhya Pradesh), Banda (Uttar Pradesh)

TRANSPORTATION IN INDIA

Railways

- Indian Railway system is the second largest in Asia and the fourth largest in the world.
- The longest railway platform in India is now **Gorakhpur** with a stretch of around **1.3 km**.

Railway Zone	*Headquarters*
Central	Mumbai (CST)
Eastern	Kolkata
Northern	New Delhi
North-Eastern	Gorakhpur
North-East Frontier	Maligaon-Guwahati
Southern	Chennai
South Central	Secunderabad
South-Eastern	Kolkata
Western	Mumbai Churchgate
East Coast	Bhubaneshwar
East Central	Hajipur
North Central	Prayagraj
North-Western	Jaipur
South-Western	Hubli
West Central	Jabalpur
South- East Central	Bilaspur
Kolkata Metro	Kolkata
South Coast Railway	Visakhapatnam

- **The first train** ran in India between Bombay and Thane, a stretch of 34 km on 16th April, 1853.
- **The second train** ran between Howrah and Hooghly in 1854.
- The first electric train in India was **Deccan Queen**. It was introduced in 1929 between Bombay and Poona.
- **The longest train** route is 'Vivek Express' from Dibrugarh in Assam to Kanyakumari in Tamil Nadu. It covers a distance of 4273 km (2655 miles).
- The first Metro train was introduced in Kolkata (West Bengal) on **24th October, 1984**. The two stations connected were Dumdum and Belgachhia.
- In 1990, Konkan Railway has been started between Goa, Maharashtra and Karnataka.
- Delhi metro rail was started in 2002 on 25th December between Shahdra and Tees Hazari.
- Rapid metro train has been started in Gurgaon (Haryana) on 14th November 2013.
- The newest metro opened is Nagpur Metro on March 8, 2019.
- Vande Bharat Express also known as Train 18, is an Indian semi-high speed electric (India's fastest train) train made by Integral Coach Factory, Chennai, under make in India Programme.
- Delhi-Meerut Regional Rapid Transit System (RRTS) is an 82.15 km long, under-construction, semi-high speed rail corridor connecting Delhi, Ghaziabad and Meerut.
- The Lucknow-New Delhi Tejas Express is the first Indian train operated by private operators, IRCTC, a subsidiary of Indian Railway.
- As of January, 2021 there are 13 operational rapid transit (Metro rail) in India. Delhi Metro is the largest and busiest metro in India.
- The Indian Railways operate in three different gauges i.e. Broad Gauge (distance between rails is 1.676 m), Metre Gauge (distance between rail is 1.00 mm) and Narrow Gauge (distance between rails is 0.762 or 0.610 m).

Road Transport

- India has one of the largest road networks in the world (48 lakh km approx). It consists of National highways, State highways; major/other district roads and rural roads.
- **NH 44** (3745 km) is the longest highway of India (Srinagar to Kanyakumari).
- **NH 548** is the shortest National Highways with the length of 5 km.
- The **North-South** and **East-West Corridor** (NS-EW) is the largest ongoing expressway project in India. It is the **second phase** of the National Highways Development Project (NHDP) and involves building **7300 km** of six lane expressway connecting Srinagar, Kanyakumari, Porbandar and Silchar.
- **Maharashtra** has the maximum length of surfaced roads in India.
- Eastern Peripheral Expressway or Kundli-Ghaziabad-Palwal Expressway is a 6-lane expressway passing through the states of Haryana and Uttar pradesh.
- India's longest greenfield 6 lane expressway, named as Agra-Lucknow expressway has been inaugurated in Uttar Pradesh.

Bharat Mala

It is a major highway, economic corridor and expressway development scheme of Government in India, launched in 2015, it is the biggest road Construction Plan in the country (approximately 83,677 km). Government of India has decided to construct a greenfield major port at Vadhavan in Gujarat under Sugarmala Project.

Important National Highways
(New numbering)

NH	*Connects*
NH *1*	Uri-Baramula-Srinagar-Kargil-Leh
NH *4*	Mayabandar-Port Blair-Chiriyatapu
NH *7*	Fazilka-Patiala-Rudraprayag-Mana
NH *10*	Siliguri-Gangtok
NH *21*	Jaipur-Agra-Bareilly
NH *32*	Chennai-Puducherry-Nagapatinam
NH *40*	Kurnool-Chittoor-Ranipet
NH *44*	Srinagar-Ludhiana-Agra-Sagar-Hyderabad-Kanyakumari

Water Transport

As per the National Waterways Act, 2016, 111 Waterways have been declared as National Waterways including the five existing NWs given below:

NW*1*	Allahabad to Haldia on Ganga river	1620 km
NW*2*	Sadia to Dhubri on Brahmaputra river	891 km
NW*3*	Kollam to Kottapuram (along Champakara and Udyogmandal Canal)	168 km
NW*4*	Kakinada to Marak-kanam along Godavari and Krishna river	1095 km
NW*5*	Mangalgarhi to Paradeep and Talcher to Dhamara along Mahanadi and Brahmini	623 km
NW*6*	Lakhipur to Bhanga on Barak river	121 km

13 Major Ports in India

Western Coast	*Eastern Coast*
Kandla (*child of partition*) Gujarat	**Paradip** (*exports raw iron to Japan*) Odisha
Mumbai (*busiest and biggest*) Maharashtra	**Vishakhapatnam** (*deepest port*) Andhra Pradesh
JL Nehru (*fastest growing*) Maharashtra	**Chennai** (*oldest and artificial*) Tamil Nadu
Marmugao (*naval base also*) Goa	**Ennore** (*most modern in private hands*) Tamil Nadu
Mangalore (*exports Kudremukh iron-ore*) Karnataka	**Tuticorin** (*Southernmost*) Tamil Nadu
Cochin (*natural harbour*) Kerala	**Port Blair** (*strategically important*) Andaman and Nicobar Islands
	Enayam Port (Tamil Nadu)

Note Kandla port was renamed as Pt. Deen Dayal Upadhyay port in 2017.

Air Transport

- In 1935, the 'Tata Air Lines' started its operation between Mumbai and Thiruvananthapuram and in 1937 between Mumbai and Delhi.
- In 1953, all the private airline companies were nationalised and Indian Airlines and Air India came into existence.
- Vayudoot Limited started in 1981 as a private air carrier and later on it merged with Indian Airlines.
- International Airports Authority of India and National Airports Authority were merged on 1995 to form Airports Authority of India.
- The Authority manages the Civil Aviation Training College at Allahabad and National Institute of Aviation Management and Research at Delhi.

Major international airports in India

International Airports	*City*
Rajiv Gandhi International Airport	Hyderabad
Calicut International Airport	Calicut
Chhatrapati Shivaji International Airport	Mumbai
Kempe Gowda International Airport	Bengaluru
Goa Airport in Vasco di Gama City	Goa
Netaji Subhash Chandra Bose International Airport	Kolkata
Thiruvananthapuram International Airport	Thiruvanan-thapuram
Lokpriya Gopinath Bordoloi International Airport	Guwahati
Sardar Vallabhbhai Patel International Airport	Ahmedabad
Indira Gandhi International Airport	Delhi
Chennai International Airport	Chennai
Shri Guru Ram Dass Jee International Airport	Amritsar
Pakyong Airport (First green field airport in Northeast region)	Sikkim

ENVIRONMENT AND ECOLOGY

Environment All external conditions, factors, matter and energy living and non-living that affect any living organism or other specified system.

Ecology Biological science that studies the relationships between living organisms and their environment; study of the structure and functions of nature.

Ecosystem It is defined as a unit which include all the organisms (biological components) in a given area interacting with the enviornment (physical component), so that the flow energy leads to a clearly defined trophic structure, biotic diversity and material cycles.

Biome Terrestrial regions characterised by certain types of vegetation and other forms of life. Examples include various types of deserts, grasslands and forests.

Wetland Land that is covered all part of the time with saltwater or freshwater, excluding streams, lakes and the open ocean.

Biodiversity Variety of different species (species diversity), genetic variability among individuals within each species (genetic diversity), variety of ecosystems (ecological diversity) and functions such as energy flow and matter cycling needed for the survival of species and biological communities (functional diversity).

Biosphere Zone of the Earth where life is found. It consists of parts of the atmosphere (the troposphere), hydrosphere (mostly surface water and groundwater) and lithosphere (mostly soil and surface rocks and sediments on the bottoms of oceans and other bodies of water) where life is found.

Wildlife All free, undomesticated species. Sometimes the term is used to describe animals only.

Threatened Species Wild species that is still abundant in its natural range but is likely to become endangered because of a decline in numbers.

Ozone (O_3) Colourless and highly reactive gas and a major component of photochemical smog. Also found in the ozone layer in the stratosphere and protect us from ultra violet rays.

Smog Originally, a combination of smoke and fog but now used to describe other mixtures of pollutants in the atmosphere.

Acid Rain When fossil fuel is burnt, oxides are formed in the atmosphere. The oxides formed of sulphur and nitrogen get dissolve in water and cause acid rain.

Global Warming Warming of the Earth's lower atmosphere (troposphere) because of increases in the concentrations of one or more greenhouse gases. It can result in irreversible climate change that can last for decades to thousands of years.

Ecomarks The Ministry of Environment Forest and Climate change, Government of India instituted a scheme, that is operating on a national basis and provides accreditation and labelling for household and other consumer products which meet certain environmental criteria.

Coral Bleaching Coral bleaching occurs when the relations between the coral host and zooxanthallae, which give coral much of their colour, breaks down. Without the zooxanthallae, the tissue of the coral animal appears transparent and the coral's bright white skelton is revealed.

Sustainability Ability of Earth's various systems, including human cultural systems and economies, to survive and adapt to changing environmental conditions indefinitely.

Important Sanctuaries and National Parks

Name	*Location*	*Reserve For*
Kaziranga National Park	Assam	One-horned rhinoceros, gaur, elephant, leopard and wild buffalo
Sonai Rupai Wildlife Sanctuary	Assam	Elephant, sambhar, wild boar and one-horned rhinoceros
Namdapha National Park	Arunachal Pradesh	Elephant, panther, sambhar, tiger, cheetal and king cobra
Gautam Buddha Sanctuary	Bihar	Tiger, leopard, sambhar, cheetal and barking deer (Indian Muntgac)
Achanakmar Sanctuary	Chhattisgarh	Tiger, boar, cheetal, sambhar and bison
Velvadore National Park	Gujarat	Wolf and black buck
Wild Ass Sanctuary	Gujarat	Wild ass, wolf, nilgai and chinkara
Gir Forest	Gujarat	India's biggest wildlife sanctuary famous for Gir lions
Dachigam National Park	Jammu and Kashmir	Kashmiri stag, Long tailed marmot, Himalayan serow
Banerghatta National Park	Karnataka	Elephant, cheetal, deer and grey partridge and green pigeon
Bhadra Sanctuary	Karnataka	Elephant, cheetal, panther, sambhar and wild boar
Bandipur National Park Dandeli Sanctuary	Karnataka and Tamil Nadu	Elephant, tiger, panther, sambhar, deer and birds
Tungabhadra Sanctuary	Karnataka	Tiger, panther, elephant, cheetal, sambhar and wild boar
Nagarhole National Park	Karnataka	Panther, cheetal, sloth bear and four-horned antelope
Pachmarhi Sanctuary	Madhya Pradesh	Tiger, leopard, wild bear, cheetal, sambhar reshus maccaque
Gandhi Sagar Sanctuary	Madhya Pradesh	Tiger, panther, boar, sambar, nilgai and barking deer
Bandhavgarh National Park	Madhya Pradesh	Cheetal, sambhar, chinkara and wild birds
Simlipal Sanctuary	Odisha	Tiger, panther, cheetal, nilgai and wild boar
Ghana Bird Sanctuary	Rajasthan	Water birds, black buck, cheetal and sambar
Khangchendzonga National Park	Sikkim	Snow leopard, musk deer and Himalayan boar
Vedanthangal Bird Sanctuary	Tamil Nadu	Important bird sanctuary
Chandraprabha Sanctuary	Uttar Pradesh	Gir lions, cheetal and sambhar
Dudhwa National Park	Uttar Pradesh	Tiger, panther, sambar, cheetal, nilgai and barking deer
Corbett National Park	Uttarakhand	Tiger, leopard, elephant and sambhar (named in memory of Jim Corbett)
Jaldapara Sanctuary	West Bengal	Rhinoceros, Elephant
Sunderban Tiger Reserve	West Bengal	Tiger, deer, wild boar, crocodile and Gangetic dolphin

Biosphere Reserves of India

Name	*States*	*Type*	*Area (km^2)*
Manas	Assam	East Himalayas	2837
Dibru-Saikhowa	Assam	East Himalayas	765
Seshchalam Hills	Andhra Pradesh	Eastern Ghats	4755.997
Great Nicobar (UNESCO)	Andaman and Nicobar Islands	Islands	885
Dihang-Dibang	Arunachal Pradesh	East Himalayas	5112
Great Rann of Kachchh	Gujarat	Desert	12454
Cold Desert	Himachal Pradesh	Western Himalayas	7770
Agasthyamalai (UNESCO)	Kerala, Tamil Nadu	Western Ghats	1828
Pachmarhi (UNESCO)	Madhya Pradesh	Semi-Arid	4926
Achanakamar- Amarkantak (UNESCO)	Madhya Pradesh, Chhattisgarh	Maikala Range	3835
Nokrek (UNESCO)	Meghalaya	East Himalayas	820
Simlipal (UNESCO)	Odisha	Deccan Peninsula	4374
Khangchendzonga (UNESCO)	Sikkim	East Himalayas	2620
Nilgiri (UNESCO)	Tamil Nadu, Kerala and Karnataka	Western Ghats	5520
Gulf of Mannar (UNESCO)	Tamil Nadu	Coasts	10500
Nanda Devi (UNESCO)	Uttarakhand	West Himalayas	5860
Sunderbans (UNESCO)	West Bengal	Gangetic Delta	9630
Panna (UNESCO)	Madhya Pradesh	Semi-Arid	2998

Environment Related Important International Agreement/Conference

UN Conference on the Human Environment	Stockholm (1972)
Convention on Migratory Species	Bonn (1979)
Convention for the Protection of the Ozone Layer	Vienna (1985)
Pototocol on Substances that Deplete the Ozone Layer	Montreal (1987)
Convention on the Transboundary Movement of Hazardous Wastes	Basel (1989)
Earth Summit (UN Conference on Environment and Development)	Rio-de-Janeiro (1992)
Convention on Prior Informed Consent	Rotterdam (1998)
UN Conference on Sustainable Development	Rio-de-Janeiro (2012)
Nagoya Protocol on Genetic Resources (Nagoya Protocol)	Nagoya (2010)
Convention on Biological Diversity (CBD-CoP-11)	Hyderabad (2012)
Lima Climate Change Conference (CoP-20)	Lima (2014)
Paris Agreement (CoP-21)	Paris (2015)
Marrakech Conference (CoP-22)	Marrakech, Morocco (2016)
Bonn Conference (CoP-23)	Bonn (2017)
Katowice Conference (CoP-24)	Katowice, Poland (2018)
Madrid Conference (CoP-25)	Madrid, Spain (2019)
CoP-26	Scheduled in Glasgow (2021)

Wildlife Conservation in India

Project	*Year*
Project Hangul	1970
Project Gir	1972
Project Tiger	1973
Project Olive Ridley Turtles	1975
Crocodile Breeding Scheme	1975
Project Manipur Thamin	1977
Project Rhino	1987
Project Elephant	1992
Project Red Panda	1996
Project Sea Turtle	1999
Project Vulture	2006
Project Snow Leopard	2009
Project Dolphin	2020
Project Asiatic Lion	2020

Endangered Species of India

Birds	Great Indian Bustard, Forest Owlet, Vulture, Bengal Florican, Himalayan Quail, Siberian Crane
Mammals	Flying Squirrel, Red Panda, Pygmy Hog, Kondana Rat, Snow Leopard, Asiatic Lion, One-Horned Rhinoceros
Reptiles	Gharial, Hawksbill Turtle, River Terrapin, Sispara Day Gecko
Amphibians	Flying Frog, Tiger Toad