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## Geography of India – Part 3

### INDIAN MINERAL RESOURCES

#### Coal Resources in India

West Bengal ( Raniganj, Burdwan, Bankura, Purulio, Birbhum, Jalpaigudi, Darjeeling ), Jharkhand ( Jharia, Giridih, Kharhawadi, Bokaro, Hazaribagh, Kamapura, Rampur, Palamau ), Orissa ( Rampur, Hindgir, Talcher, Sambal ), Madhya Pradesh and Chhatisgarh ( Rewa, Pench valley, Umaria, Korba, Sohagpur, Mand river area, Kanha valley, Betul ), etc. Power sector is the largest consumer of coal in India followed by steel industry, cement industry, etc.

#### Manganese

Orissa, Maharashtra ( Nagpur, Bhandara, Ratnagiri ), Madhya Pradesh ( Balaghat, Chhindawara ), Karnataka ( Keonjhar, Bonai, Kalahandi ), Andhra Pradesh ( Kadur, Garibadi ).

#### Copper Minerals

Madhya Pradesh ( Balaghat ), Rajasthan ( Khetri ), Jharkhand ( Singhbhum, Masobani, Surda ), Karnataka ( Chitradurg, Hassan ).

#### Mica Minerals

Jharkhand ( Hazaribagh, Giridih, Kodarma ), Bihar ( Goya, Bhagalpur ), Andhra Pradesh ( Guntur, Vizag, Kurnool ), Rajasthan ( Bhilwara, Udaipur, Jaipur ).

### Petroleum Resources in India

Assam ( Digboi, Naharkatiya, Badarpur, Masinpur and Pallharia ), Gujarat, ( Ankleshwar, Khambhat, Kalol ), Mumbai High, Bassein ( south of Mumbai High ), etc. Recently oil has been discovered in Cauvery basin, Krishna and Godavary basin, Khambhat basin, etc.

### Iron Resources

India possesses Haematite, a very high – grade iron ore. In Madhya Pradesh ( Bailadila, Jabalpur ), Goa ( North Goa ), Karnataka ( Bababudan hills, Chikmagalur, Hospet ), Jharkhand ( Singhbhum, Naomundi ), Andhra Pradesh, Orissa.

India is the fifth largest exporter of iron ore in the world. Japan is the biggest buyer accounting for about 3/4th of India's total exports. Major ports handling iron ore export are Vishakhapatnam, Paradip, Marmagao and Mangalore.

### Bauxite Resources

Chief ore for producing aluminium. In Orissa ( Kalahandi, Koraput, Sundargarh, Bolangir, Sambalpur ), Jharkhand ( Lohardaga, Gumla ), Madhya Pradesh ( Jabalpur, Mandla, Shahdol, Kami, Balaghat ), Maharashtra, Andhra Pradesh, Gujarat, Tamil Nadu.

### Gold Resources in India

Karnataka ( Kolar, Hutti, Raichur ), Andhra Pradesh ( Ramgiri and Yeppamanna goldfields in Chittoor and Anantapur districts ).

### Silver, Zinc & Lead

Rajasthan ( Zawar mines near Udaipur ), Andhra Pradesh ( Mysore, Chitradurg ), Karnataka (Kolar mines ).

### Uranium Resources in India

Jharkhand ( Jaduguda ), Rajasthan ( Ajmer ), Andhra Pradesh ( Nellore, Nalgonda ), Karnataka ( Gulbarga ).

Thorium Resources in India

Kerala coast ( From Monazite sand ), rocks of Aravallis in Rajasthan.

### Oil Refineries

There are 19 refineries in India, 16 in public sector, one in joint sector and two in private sector. Public sector refineries are located at Digboi, Guwahati, Bongaigaon, Barauni, Haldia, Koyali, Mathura, Kochi, Chennai, Vishakhapatnam, Mumbai (2), Panipat, Narimanam, Numanigarh and Tatipaka. Joint sector refinery is at Mangalore. The private sector refinery of Reliance Limited is at Jamnagar, Gujarat and Essar Refinery at Vadinar, Gujarat.

1. Haldia Refinery ( IOC )
2. Mumbai Refinery ( HPCL )
3. Panipat Refinery ( IOC )
4. Vishakhapatnam Refinery ( HPCL )
5. Digboi Refinery ( IOC )
6. Mumbai Refinery Mahaul ( BPCL )
7. Gujarat Refinery ( IOC )
8. Nagapattnam Refinery ( CPCL )
9. Barauni Refinery ( IOC )
10. Kochi Refinery ( Kochi Refineries Ltd )
11. Guwahati Refinery ( IOC )
12. Numaligarh Refinery ( NRL )
13. Mathura Refinery ( IOC )
14. Mangalore Refinery ( MRPL )
15. Bongaigaon Refinery ( IOC )
16. Tatipaka Refinery ( ONGC )
17. Manali Refinery ( IOC )
18. Essar Refinery ( Essar )
19. Jamnagar Refinery ( Reliance Petroleum )

### INDIAN INDUSTRIES

Cotton Textile Industry in India

Most important industry in terms of employment and production of export goods. In Maharashtra (Mumbai, Sholapur, Pune, Kolhapur, Satara, Wardha, Hajipur), Gujarat

(Ahmedabad, Vadodara, Rajkot, Surat, Bhavnagar), Tamil Nadu (Coimbatore–Manchester of South India). Tamil Nadu has the largest number of cotton textile mills in India.

#### **Silk Textile Industry in India**

The location of silk industry is governed by two factors– prevalence of sericulture practices and availability of skilled labour. Karnataka is the leading producer, followed by West Bengal, Bihar, etc.

#### **Woolen Textile Industries**

In Punjab (Dhariwai, Amritsar, Ludhiana, Ferozpur), Maharashtra (Mumbai), UP (Kanpur, Mirzapur, Agra, Tanakpur), etc.

#### **Jute Industries India**

India manufactures the largest quantity of jute goods in the world. Mainly located in West Bengal, followed by Andhra Pradesh, Bihar, UP, MP.

#### **Iron and Steel Industries**

Located near the sources of raw materials and fuel (coal). In Jamshedpur (Jharkhand), Durgapur, Burnpur (W.B.), Bhadravati (Karnataka), Bokaro (Jharkhand), Rourkela (Orissa), Bhilai (Chhatisgarh), Salem (T.N.), Vishakhapatnam (A.P.).

#### **Aluminium Smelting in India**

Located mainly near the sources of raw materials, means of transport and cheap electricity. In Hirakud, Koraput (Orissa), Renukoot (UP), Korba (MP), Ratnagiri (Maharashtra), Mettur (TN), Alwaye

#### **Copper Smelting Industry**

In Khetri, Alwar, Jhunjhunu (Rajasthan), Singhbhum (Jharkhand), Agnigundala (A.P.).

#### **Heavy Machinery Industry**

In Ranchi, Vishakhapatnam, Durgapur, Tiruchirapalli, Mumbai, Kami.

### Machine Tools Industry

It forms the basis for the manufacturing of industrial, defence equipments, automobiles, railway engines and electrical machinery.

In Bangalore, Pinjore (Haryana), Kalamassery (Kerala), Hyderabad, Secunderabad, Srinagar, Ajmer.

### Heavy Electrical Equipments

Power generation equipments. In Bhopal, Tiruchirapalli, Jammu, Ramchandrapuram (Hyderabad), Hardwar, Bangalore and Jogdishpur (UP).

### Railway Equipments

Locomotives in Indian Railways: In Chittaranjan (WB), Varanasi, Jamshedpur, Bhopal. Coaches: Perambur (TN), Kapurthala (Punjab), also at Bangalore and Kolkata.

### Ship Building India

Hindustan Shipyard at Vishakhapatnam, Cochin Shipyard, Mumuai (Mazgaon Dock) and Kolkata (Garden Reach Workshop). For Indian Navy, only at Mazgaon.

### Cycles India

In Mumbai, Asansol, Sonapat, Delhi, Chennai, Jalandhar and Ludhiana.

### Tractors in India

At Faridabad, Pinjore, Delhi, Mumbai, Chennai.

### Fertilizers in India

The location of fertilizer industry is closely related to petro-chemicals. About 70% of the plants producing nitrogenous fertilizers use naphtha as raw material.

Naphtha is a by-product of oil refineries. Phosphate plants are dependent on mineral phosphate found in UP and MP. Now natural gas based fertilizer plants are also being set up.

The Fertilizer Corporation of India (FCL) was set up in 1961. National Fertilizer Limited (NFL) was set up in 1974.

In Sindri (Bihar), Nangal, Trombay, Gorakhpur, Durgapur, Namrup, Cochin, Rourkela, Neyveli, Varanasi, Vadodara, Vishakhapatnam, Kota and Kanpur.

#### Pharmaceuticals and Drugs

Antibiotics are prepared at Pimpri and Rishikesh. The Indian Drugs and Pharmaceuticals Limited has 5 plants at Hyderabad, Rishikesh, Chennai, Gurgaon and Muzaffarpur. A number of other units are concentrated in Mumbai, Baroda, Delhi, Kolkata and Kanpur.

#### Pesticides in India

Delhi and Alwaye

#### Sugar Industry

JP, Maharashtra, AP, TN, Karnataka and Bihar.

#### Aircraft Industry in India

Hindustan Aeronautics India Ltd. was formed by merging two aircraft factories at Bangalore and Kanpur. Four other factories are at Nasik, Hyderabad, Koraput (Orissa), Lucknow.

#### Rubber Industry in India

Bareilly (UP), Baroda (Gujarat Synthetic Rubber Units, Mumbai, Ahmedabad, Amritsar- Reclaimed Rubber Units

#### NUCLEAR POWER STATIONS IN INDIA

Power station	State	Type	Operator	Units	Total capacity ( MW )
<b>Kaiga</b>	Karnataka	PHWR	NPCIL	220 x 3	660
<b>Kalpakkam</b>	Tamil Nadu	PHWR	NPCIL	220 x 2	440
<b>Kakrapar</b>	Gujarat	PHWR	NPCIL	220 x 2	440
<b>Rawatbhata</b>	Rajasthan	PHWR	NPCIL	100 x 1 200 x 1	1180

				220 x 4	
<b>Tarapur</b>	Maharashtra	BWR ( PHWR )	NPCIL	160 x 2	1400
				540 x 2	
<b>Narora</b>	Uttar Pradesh	PHWR	NPCIL	220 x 2	440
<b>Total</b>	<b>19</b>	<b>4560</b>			

Some of the nuclear power plant projects which are under construction can be listed below

Power station	State	Type	Operator	Units	Total capacity ( MW )
<b>Kudankulam</b>	Tamil Nadu	VVER - 1000	NPCIL	1000 x 2	2000
<b>Kaiga</b>	Karnataka	PHWR	NPCIL	220 x 1	220
<b>Kalpakkam</b>	Tamil Nadu	PFBR	NPCIL	500 x 1	500
<b>Total</b>	<b>4</b>	<b>2720</b>			

**MAJOR THERMAL POWER PLANTS**

<b>Neyveli</b>	<b>Tamil Nadu</b>
<b>Korba</b>	Chhatisgarh
<b>Obra</b>	UP
<b>Harduaganj</b>	UP
<b>Rihand</b>	UP
<b>Singrauli</b>	UP
<b>Parichha</b>	UP
<b>Talcher</b>	Orissa
<b>Farakka</b>	West Bengal
<b>Satpura</b>	MP
<b>Ramagundam</b>	AP
<b>Vindhyanchal</b>	MP

**IMPORTANT RIVER VALLEY PROJECTS IN INDIA**

<b>Bhakra Nangal Project</b>	On Satluj in Punjab. Highest in India. Ht 226 m. Reservoir is called Gobind Sagar Lake
<b>Mandi Project</b>	On Beas in H.P
<b>Chambal Valley Project</b>	On Chambal in M.P & Rajasthan. 3 dams are there: Gandhi Sagar Dam, Rana Pratap sagar Dam and Jawahar Sagar dam
<b>Damodar Valley</b>	On Damodar in Bihar. Based on Tennessee Valley Project, USA

## Project

Hirakud	On Mahanadi in Orissa. World's longest dam. 4801 m
Rihand	On Son in Mirzapur. Reservoir is called Govind Vallabh Pant reservoir
Kosi Project	On Kosi in N. Bihar
Mayurkashi Project	On Mayurkashi in W.B
Kakrapara Project	On Tapi in Gujarat
Nizamsagar Project	On Manjra in A.P
Nagarjuna Sagar	On Krishna in A.P
Project	
Tungabhadra	On Tungabhadra in A.P & Karnataka
Shivasamudram Project	On Cauvery in Karnataka
Sardar Sarovar Project	In Gujarat, M.P., Rajasthan Maharashtra
Tata Hydel Scheme	On Bhima in Maharashtra
Sharavathi Hydel	On Jog Falls in Karnataka
Project	
Kundah & Periyar	In TN
Project	
Farakka Project	On Ganga in W.B. Apart from power and irrigation it helps to remove silt for easy navigation
Ukai Project	On Tapti in Gujarat
Mahi Project	On Mahi in Gujarat
Ghat Prabha project	In Andhra Pradesh and Karnataka
Salal Project	On Chenab in J & K
Mata Tila	On Betwa in U.P & M.P
Multipurpose Project	

### RAILWAYS OF INDIA

Indian railway system is the largest in Asia and the fourth largest in the world. It is the biggest departmental public undertaking in the country.

The first train ran in India between Bombay and Thane, a stretch of 34 km. on April 16 1853.

The Indian Railways celebrated its 150th anniversary on April 16, 2003. To commemorate the occasion, 16 January – Shatabadi inter – city express trains were announced to be inducted.



The second train ran between Howrah and Hooghly in 1854.

The headquarters of Indian Railway is in New Delhi.

The first electric train in India was 'Deccan Queen'. It was introduced in 1929 between Bombay and Poona.

Indian Railways has the second biggest electrified system in the world after Russia.

The fastest train in India is the Shatabadi Express whose maximum speed is 140 km/hr.

The total route covered is approx 63,000 km.

The total number of railway stations in India is 7,100.

The longest railway platform in India is at Kharagpur ( W.B. ).

Mumbai is the destination where maximum number of trains in India head for.

The longest train route is of 'Himsagar Express' from Jammu Tavi to Kanyakumari. It covers a distance of 3,726 km and passes through ten states.

The first Metro Rail was introduced in Kolkata ( W.Bengal ) on October 24, 1984. The two stations connected were Dumdum and Belgachhia.

The Indian Railways operate in three different gauges :

1. Broad Gauge Railway ( Distance between rails is 1.67 m ).
2. Metre Gauge Railways ( Distance between rails is 1.00 m ).
3. Narrow Gauge Railways India ( Distance between rails is 0.762 or 0.610 m ).

The broad gauge accounts for nearly 50% route followed by metre gauge ( 43% ) and the remaining by narrow gauge.

Indian railways are divided into 16 zones, headed by a General Manager who is responsible to the Railway Board, for all matters.

Railway Zones	Head Quarters
Central	Mumbai VT
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	Bhubaneswar
East Central	Hajipur
North Central	Allahabad
North Western	Jaipur
South Western	Bangalore (Hubli)
West Central	Jabalpur
South-East Central	Bilaspur

- Northern Railway ( NR ) is the largest railway zone having length of 10,995 km.
- North – East Frontier ( NEF ) is the smallest railway zone having just 3,860 km route length.
- **Konkan Railways India** : It is a project to shorten the distance between Maharashtra, Goa and Karnataka. The total route length is 786 km between Apta ( Maharashtra ) and Mangalore ( Karnataka )

#### Railway Manufacturing Units :

- **Chittaranjan Locomotive Works** : Located in Chittaranjan ( W.B ) and manufactures electric engines.
- **Diesel Locomotive Works** : Located in Varanasi (U.P) and manufactures diesel engines.
- **Integral Coach Factory in India** : Located in Perambur ( TN ) and manufactures rail coaches.
- **Wheel and Axle Plant** : Located at Yalahaka ( Bangalore, Karnataka ) and manufactures wheels and axles.
- **Diesel Component Works** : Located at Patiala (Punjab) and manufactures components of diesel engines.

- **Rail Coach Factory in India** : Located at Kapurthala ( Punjab ) and manufactures rail coaches.

#### AIR TRANSPORT OF INDIA

1. J.R.D. Tata was the first person to make a solo flight from Mumbai to Karachi in 1931.
2. In 1935, the 'Tata Air Lines' started its operation between Mumbai and Thiruvananthapuram and in 1937 between Mumbai and Delhi.
3. In 1953, all the private Airline companies were nationalised and Indian Airlines and Air India came into existence.
4. Air India administers international flights while Indian Airlines caters to the domestic circuit.
5. Indian Airlines is now known by the name of 'Indian'.
6. Vayudoot Limited started in 1981 as a private air carrier and later on it merged with Indian Airlines.
7. Pawan Hans Limited operates helicopter support services to oil sector, hill stations and remote areas.
8. A number of private airlines also operates in India. They are Jet Airways, Sahara, etc.
9. The Civil Aviation Centre in Fursatgarh near Allahabad provided, among other things, ground training to the pilots.

#### AIRPORTS IN INDIA :

There are 12 International Airports in India :

- Begumpet Airport, Hyderabad
- Calicut International Airport, Calicut
- Chatrapati Shivaji International Airport, Mumbai
- Chennai International Airport, Chennai
- HAL Airport, Bangalore
- Goa Airport in Vasco da Gama city, Goa
- Lokpriya Gopinath Bordolio International Airport, Guwahati
- Indira Gandhi International Airport, Delhi
- Netaji Subhash Chandra Bose International Airport, Kolkata
- Rja Sansi International Airport, Amritsar
- Sardar Vallabhbhai Patel International Airport, Ahmedabad
- Thiruvananthapuram International Airport, Thiruvananthapuram

The Indira Gandhi International Airport and the Chatrapati Shivaji International Airport handle more than half of the air traffic in South Asia. Besides these airports several other domestic airports are located in India.

In total, there are more than 334 civilian airports in India – 238 with paved runways and 108 with unpaved runways.

### WATER TRANSPORT OF INDIA

Most efficient, least costly and environment friendly means of transportation.

The total length of navigable waterways in Indian comprising rivers, canals, backwaters, etc, is 14,500 km out of which 3700 km is navigable by mechanised boats.

The government has recognised the following National Waterways of India.

- NW 1: Allahabad to Haldia – 1,629 km
- NW 2: Sadia to Dhubari (on Brahmaputra river) – 819 km
- NW 3: Kollam to Kottapuram – 186 km
- NW 4: Kakinada to Marakkanam (Along Godawari and Krishna river) – 1,100 km

### PORTS IN INDIA

- The Waterways Authority in India divides Indian ports into three categories, major, minor and intermediate.
- India has about 190 ports in all, with 12 major and the rest intermediate and minor.
- The 12 Major Ports are:

Port	State
Kolkata (including Haldia)	West Bengal
Paradip	Orissa
Vishakhapatnam	Andhra Pradesh
Chennai	Tamil Nadu
Ennore	Tamil Nadu
Tuticorin	Tamil Nadu
Cochin	Kerala
New Mangalore	Karnataka
Mormugao	Goa
Jawaharlal Nehru	Maharashtra
Mumbai	Maharashtra

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**Kandla**

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**Gujarat**

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- All these ports are administered by the respective Port Trusts, except the newly constructed Ennore port which is under the Ennore Port Ltd. Company.

**Salient Features :**

- **Kolkata Port (including Haldia)** : Kolkata is a riverine port, located about 128 km from the Bay of Bengal on the banks of river Hooghly. Haldia was developed because excessive silting prevented the entry of large marine vessels in Kolkata.
- **Paradip Port** : Located on the Orissa coast along the Bay of Bengal. India exports raw iron to Japan from here.
- **Vishakhapatnam Port** : The deepest port, located in Andhra Pradesh. It serves the Bhilai and Rourkela steel plants.
- **Chennai Port** : Oldest artificial harbour. This port ranks only second after Mumbai in terms of the traffic handling capacity.
- **Ennore Port** : Declared a major port in 2001. It is the first port with corporate participation. Provided with all the modern facilities for handling the thermal coal required for Tamil Nadu Electricity Board Power Station.
- **Tuticorin Port** : It came into existence during the reign of Pandya kings. It has an artificial deep sea harbour.
- **Cochin Port** : A fine natural harbour located on Kerala coast. Handles the export of tea, coffee and spices and import of petroleum and fertilisers.
- **New Mangalore Port** : The 'Gateway of Karnataka'. Handles the export of iron-ore of Kudremukh.
- **Marmugao Port** : It has a naval base. India's leading iron-ore port.
- **Mumbai Port** : A natural port, India's busiest. A new port, Nhava Sheva, is being developed near Mumbai port.

- **Jawaharlal Nehru Port** : Occupies the 5th position in the world's faster growing ports.
- **Kandla Port** : Called the 'offspring of partition' as it was developed after the partition as a substitute of Karachi port. It is a tidal port and a free trade zone located in the Rann of Kachchh.

### FAMOUS HILL STATIONS IN INDIA

Hill Stations	Height From Sea Level (m)	States
Gulbarga	750	Karnataka
Gulmarg	2400	kashmir ( Highest )
Uthagamandalam ( Ooty )	2290	Tamil Nadu
Shimla	2210	Himachal Pradesh
Pahalgam	2200	Jammu & Kashmir
Darjeeling	2135	West Bengal
Kodaikanal	2120	Tamil Nadu
Lansdowne	2120	Uttarkhand
Dalhousie	2035	Himachal Pradesh
Mussoorie	2006	Uttarakhand
Mukteshwar	1975	Uttarakhand
Nainital	1940	Uttarakhand
Kasauli ( Shimala )	1985	Himachal Pradesh
Yercaud	1500	Tamil Nadu
Hill Stations	Height From Sea Level (m)	States
Cherrapunji ( Shillong )	3524	Meghalaya
Coonoor ( Nilgiri hills )	1860	Tamil Nadu
Gangtok	1850	Sikkim
Manali	1830	Himachal Pradesh
Ranikhet	1830	Uttarkhand
Ranchi	1800	Jharkhand
Srinagar	1770	Jammu & Kashmir
Almora ( Kumaon hills )	1650	Uttarakhand
Shillang ( Khasi hills )	1500	Meghalaya
Mahabaleshwar	1370	Maharashtra
Kalimpong	1250	West Bengal
Mt. Abu	1220	Rajasthan

Kullu Valley	1200	Himachal Pradesh
Panchgani	1200	Maharastra
Mannar	1160	Kerala
Panchmarhi	1065	Madhya Pradesh
Periyar	915	Kerala
Mandi	709	Himachal Pradesh
Lonawala	620	Maharastra
Khandala	620	Maharastra

### TRIBAL GROUPS OF INDIA

Tribal Groups	Found in
Abhors	North-East
Adivasis	MP (Bastar distt.)
Angami	Manipur
Apatamis	Arunachal Pradesh
Badagas	Tamil Nadu
Baigas	M.P
Bakkarwals	J & K
Bhils	M.P & Rajasthan
Bhotias	Uttarakhand
Bhuia	M.P
Birhors	M.P and Bihar
Chang	North - East
Chenchus	A.P and Orissa
Tribal Groups	Found in
Chutia	Assam
Gaddis	Himachal Pradesh
Gallong	North-East
Garos	Assam and Meghalaya
Gonds	M.P and Bihar
Gujlars	J & K and H.P
Irula	Tamil Nadu

Jaintias	Meghalaya
Jarawas	Little Andamans
Kanikar	Tamil Nadu
Katkari	M.P
Kharia	M.P
Khond	M.P
Khas	U.P
Khasis	Assam and Meghalaya
Khonds	Orissa
Kol	M.P
Kolam	A.P
Kotas	Tamil Nadu
Kuki	Manipur
Lahaulas	Himachal Pradesh
Lepchas	Sikkim
Lushai	Tripura
Murias	M.P
Minas	Rajasthan
Moplahs	Kerala
Mundas	Bihar
Murias	M.P
Nishi	North - East
Nagas	Nagaland
Oarons	Bihar and Orissa
Onges	Andaman & Nicobar
Pho	North - East
Santhals	WB, Orissa and Bihar
Sangtam	North-East
Sema	Nagaland
Sentinelese	Andaman & Nicobar
Shompens	Andaman & Nicobar
Todas	Tamil Nadu



Uralis	Kerala
Wancho	North - East
Warlis	Maharashtra

## INDIAN TOWNS ASSOCIATED WITH INDUSTRIES

Town	State	Industries
Ahmedabad	Gujarat	Cotton Textiles
Agra	Uttar Pradesh	Stoneware, Marble, Leather, & Carpets
Aligarh	Uttar Pradesh	Locks
Ankleshwar	Gujarat	Oil
Ambernath	Maharashtra	Machine Tools, Prototype Factory
Amritsar	Punjab	Shawls, acid, Carpet, Woollen
Anand	Gujarat	Butter, Cheese & Baby Foods
Alwaye	Kerala	Aluminium, Monazite, Rare Earths
Ambala	Haryana	Scientific goods
Aliabet	Gujarat	Oil Well
Arvi	Maharashtra	T.V. Reception Station
Avadi	Tamil Nadu	Heavy Vehicles Factory
Bokaro	Jharkhand	Steel Plant
Bangalooru	Karnataka	Hindustan Aeronautics Ltd., Indian Telephone Industries Ltd. & Hindustan Machine Tools
Batanagar	West Bengal	Shoes
Bareilly	Uttar Pradesh	Resin, Industries, Woodwork
Town	State	Industries
Bhilai	Chhattisgarh	Steel Plant
Barauni	Jharkhand	Silk
Burnpur	West Bengal	Iron & Steel
Bhurkunda	Jharkhand	Glass Industries
Bhagalpur	Bihar	Silk industries
Bhandara	Maharashtra	Explosives
Bhadravati	Karnataka	Alloy Steel
Bongaigaon	Assam	Petroleum
Bhadoi	Uttar Pradesh	Carpets
Bhopal	Madhya Pradesh	Heavy Electricals

Bailadila	Madhya Pradesh	Iron ore, Mechanised mine
Bodra	West Bengal	Oil Refinery
Churk	Madhya Pradesh	Cement
Cyberabad	Andhra Pradesh	Electronics, Computers, Information technology
Chittaranjan	West Bengal	Locomotives
Cochin	Kerala	Ship building, coconut oil, rubber
Calicut	Kerala	Coffee, coconut
Coimbatore	Tamil Nadu	Cotton industries
Cambay	Gujarat	Petroleum
Chindwara	Madhya Pradesh	Limestone, Coal
Chennai	Tamil Nadu	IT, Car Manufacturing
Dhariwal	Punjab	Woolen goods
Durgapur	West Bengal	Steel Plant, Dry Ice
Digboi	Assam	Petroleum
Delhi	Delhi	DDT, Textiles & Housing Factory
Dalmianagar	Bihar	Cement
Darjeeling	W. Bengal	Tea
Dindigul	Tamil Nadu	Cigar, Tobacco
Damanjodi	Orissa	Aluminium
Debari	Rajasthan	Zinc
Dhuvaran	Gujarat	Thermal Power
Digboi	Assam	Petroleum
Ernakulam	Kerala	Cables
Firozabad	Uttar Pradesh	Glass
Guntur	Andhra Pradesh	Cotton Manufacture, Tobacco
Gwalior	Madhya Pradesh	Pottery, Textiles
Gomia	Jharkhand	Explosives
Haridwar	Uttarakhand	Heavy electricals
Hatia	Jharkhand	Heavy Engineering Corporation
Haldia	W. Bengal	Chemical fertilizer

Hazira	Gujarat	Artificial Rayon
Hissar	Haryana	Indo - Australian sheep farm
Hirzapur	Uttar Pradesh	Carpet, pottery, stoneware
Hoshangabad	Madhya Pradesh	Security Paper Mill
Jamshedpur	Jharkhand	Iron & Steel goods
Jalandhar	Punjab	Surgical goods and sports articles
Jaipur	Rajasthan	Embroidery
Jharia	Jharkhand	Coal
Jabalpur	Madhya Pradesh	Bidi industry
Jainakot	Jammu & Kashmir	H.M.T watch
Japla	Jharkhand	Cement
Jaduguda	Jharkhand	Uranium Ore Mill
Jalsindhi	Maharashtra	Hydro - electric
Jalahalli	Karnataka	Machine Tool Factory
Jharia	Jharkhand	Coal
Kolkata	West Bengal	Jute Manufacture, Electric lamps
Kanpur	Uttar Pradesh	Leather, Shoes
Katni	Madhya Pradesh	Cement
Korba	Chhattisgarh	Coal Mine, Aluminium
Koyna	Maharashtra	Aluminium
Koyali	Maharashtra	Power Generation
Kolar	Karnataka	Gold mine
Kota	Rajasthan	Atomic power plant
Kanchipuram	Tamil Nadu	Silk clothes
Karnal	Haryana	Dairy product
Kandla	Gujarat	Fertilizer
Khetri	Rajasthan	Copper industries
Kakrapara	Gujarat	Atomic Power Plant
Kalol	Gujarat	Fertiliser
Kalpakkam	Tamil Nadu	Atomic Power Plant
Kavalur	Tamil Nadu	Telescopic Observatory
Khari	Rajasthan	Lignite

Kirloskarvadi	Maharashtra	Agricultural Implements
Kochi	Kerala	Ship building
koodankulam	Tamil Nadu	Atomic Power Plant
Kozhikode	Kerala	Calico, Rubber coir
Kurukunta	Karnataka	Cement Plant
Ludhiana	Punjab	Hosiery
Lucknow	Uttar Pradesh	Gold, Silver, Lac
Madurai	Tamil Nadu	Cotton and Silk Weaving
Mirzapur	Uttar Pradesh	Carpet, Pottery, Brass industries
Moradabad	Uttar Pradesh	Utensils
Mathura	U.P	Oil refinery
Mysooru	Karnataka	Silk
Meerut	U.P	Publication work, Sports goods, Scissors making
Mumbai	Maharashtra	Cotton Textile & Industries
Modinagar	U.P	Nylon thread
Moorie	Jharkhand	Aluminium
Majhagaon	Maharashtra	Ship building
Manali	Tamil Nadu	Fertiliser / Oil Refinery
Mithapur	Gujarat	Fertiliser
Motipur	Uttar Pradesh	Mechanised Farming
Nagpur	Maharashtra	Cotton mills, Oranges
Nepanagar	Madhya Pradesh	Newsprint
Nasik	Maharashtra	Security Printing Press
Neyveli	Tamil Nadu	Lignite
Noonmati	Assam	Oil refinery
Narora	Uttar Pradesh	Atomic Power Plant
Nangal	Punjab	Fertilizer, Heavy Water Plant
Nagapattinam	Tamil Nadu	Oil Refinery
Ogalewadi	Maharashtra	Hurricane lanterns, Stoves
Panna	M.P	Diamond mining
Pinjore	Haryana	Machines Tools
Perambur	Tamil Nadu	Integral coach factory
Pimpri, Pune	Maharashtra	Antibiotics
Pilani	Rajasthan	Thermal Power
Panki	Uttar Pradesh	Fertilizer

Pinjore	Haryana	Machine Tools
Ranigunj	Jharkhand	Coal mining
Rourkela	Orissa	Steel plant
Rana Pratap Sagar	Rajasthan	Hydro Power Plant
Renukoote	Uttarakhand	Aluminium
Roopnarayanpur	W. Bengal	Cables
Rishikesh	Uttarakhand	Antibiotic Plant
Rangapur	Andhra Pradesh	Observatory
Renukoot	Uttarkhand	Aluminium
Rupanagar	West Bengal	Telephone Cables
Saharanpur	Uttar Pradesh	Mangoes, Cigarette factory
Sindri	Jharkhand	Chemical fertilizers
Srinagar	Kashmir	Woolen shawl, embroidery
Surat	Gujarat	Textiles
Surajpur	Haryana	Cement factory
Suratgarh	Rajasthan	Agriculture implements
Singhbhum	Jharkhand	Copper
Singareni	Andhra Pradesh	Coal
Salem	Tamil Nadu	Stainless Steel
Samastipur	Bihar	Jute, Paper, Tobacco, Sugar
Sivakasi	Tamil Nadu	Fire Works, Printing
Sriharikota	Andhra Pradesh	Satellite Station
Suriyur	Tamil Nadu	Small Arms
Tarapur	Maharashtra	Nuclear Power
Titagarh	West Bengal	Paper
Thiruvananthapuram	Kerala	Wood Carving, Coir matting
Trombay	Maharashtra	Atomic Reactors, Plutonium, Fertilizer, Thorium Plant
Tiruchirapalli	Tamil Nadu	Cigar, B.H.E.L
Tirupati	Andhra Pradesh	Scooter
Tanjore	Tamil Nadu	Silk clothes
Thumba	Kerala	Rocket launching

Tirupur	Tamil Nadu	Textiles
Tiruverumbur	Tamil Nadu	Pressure Boiler
Tuticorin	Tamil Nadu	Fertilizer, Thermal Power, Copper smelter plant
Udaipur	Rajasthan	Zinc Project
Vijaypur	M.P	Fertilizers
Viiaynagar	Karnataka	Steel Plant
Visakhapatnam	Andhra Pradesh	Ship building
Varanasi	Uttar Pradesh	Rail Engines and Saari industries
Worli	Maharashtra	Baby food
Zainkot	Jammu & Kashmir	HMT Watches

**IMPORTANT PLACES**

Name	Place	Built by
Ajanta - Ellora Caves	Aurangabad (Mah.)	Gupta rulers
Aram Bagh	Agra (UP)	Babur
Agra Fort	Agra (UP)	Akbar
Akbar's Mausoleum	Sikandra (UP)	Akbar
Itmod - ud - daula Fort	Agra (UP)	Noorjahan
Anand Bhawan	Allahabad (UP)	Motilal Nehru
Bada Imambara	Lucknow (UP)	Asaf-ud-daula
Bharatpur Fort	Bharatpur (Raj.)	Raja Surajmal Singh
Bibi Ka Maqbara	Aurangabad (Mah.)	Aurongzeb
Char - Minor Hyderabad (AP)	Quli	Qutub Shah
Charar - e - Sharif	Jammu & Kashmir	Zainul Abedin
Chhota Imambara	Lucknow (UP)	Muhammad Ali Shah
Name	Place	Built by
Dargah Ajmer Sharif	Ajmer (Raj.)	Sultan Shyasuddin
Dilwara's Jain Temple	Mount Abu (Raj.)	Siddharaja
Deewan - e - Khas	Agra Fort (UP)	Shahjahan
Adhai Din Ka Jhopra	Ajmer (Raj.)	Qutubuddin Aibak
Elephanfa's cave	Mumbai (Mah.)	Rashtrakuta rulers
Fatehpur Sikri	Agra (UP)	Akbar
Ferozshah Kotla	Delhi	Ferozshah Tughlaq

Golghar	Patna (Bih.)	British Government
Gateway of India	Mumbai (Mah.)	British Government
Hauz Khas	Delhi	Alauddin Khilji
Hawa Mahal	Jaipur (Raj.)	Maharaja Pratap Singh
Humayun's Tomb	Delhi	Hymayun's wife
Jama Masjid	Agra (UP)	Shahjahan
Jama Masjid	Delhi	Shahjahan
Jagannath Temple	Puri (Ori.)	Anantvarmun Ganga
Jantar – Mantar	Delhi	Sawai Jai Singh
Jaigarh Fort	Jaipur (Raj.)	Sawai Jai Singh
Jim Corbett Park	Nainital (Uttar.)	Sir Malcom Hqilley
Jodhpur Fort	Jodhpur (Raj.)	Rao Jodhoji
Kanheri's Fort	Mumbai (Mah.)	Buddhists
Khirki Masjid	Delhi	Ghyasuddin Tughlaq
Lai Bagh	Bangalore (Kar.)	Hyder Ali
Lakshmi Narayan Temple	Delhi	Birla Family
Makka Masjid	Hyderabad (AP)	Quli Qutub Shah
Moti Masjid	Agra Fort (UP)	Shahjahan
Moti Masjid	Delhi Fort	Aurangzeb
Nahargarh Fort	Jaipur (Raj.)	Sawai Jai Singh
Nishat Garden	Srinagar (J & K)	Asaf Ali
Parana Qila	Delhi	Shershah Suri
Pathar Ki Masjid	Patna (Bih.)	Pervez Shah
President House	Delhi	British Government
Qutub Minor	Delhi	Qutubuddin Aibak
Red Fort	Delhi	Shahjahan
Safdar Jung Tomb	Delhi	Shuja-ud-daula
Sabarmati Ashram	Ahmadabad (Guj.)	Mahatma Gandhi
Shantiniketan	West Bengal	Rabindra Nath Tagore
Shish Mahal	Agra (UP)	Shahjahan
Shalimar Garden	Srinagar (J & K)	Jahangir
Shershah's Tomb	Sasaram (Bih.)	Shershah's son
Saint George Fort	Chennai (TN)	East India Company
Sati Burj	Mathura (UP)	Raja Bhagwan Das
Sun Temple	Konark (Ori.)	Narsimhadeva
Swarna Mandir (Golden Temple)	Amritsar (Pun.)	Guru Ramdas

Taj Mahal	Agra (UP)	Shahjahan
Vellure Math	Kolkata (WB)	Swami Vivekanand
Victoria Memorial	Kolkata (WB)	British Government
Vishnupad Temple	Gaya (Bih.)	Rani Ahiliabai
Viiaya Stambha	Chittorgarh (Raj.)	Maharana Kumbha

### SANCTUARIES AND PARKS IN INDIA

Name	Location	Reserves for
Achanakmar Sanctuary	Bilaspur, ( Chhattisgarh )	Tiger, Bear, Chital, Sambar, Bison
Badla Wildlife Sanctuary	Goa	Tiger, Elephant
Bandhavgarh National Park	Shahdol, ( Madhya Pradesh )	Tiger, Panther, Chital, Nilgai, Wild bear
Bandipur Sanctuary	Border of Karnataka and Tamil Nadu	Elephant, Tigers, Panther, Sambar, Deer, Birds
Banerghatta National Park	Bangalore ( Karnataka )	Elephant, Chital, Deer, Gray Partridges, Green pigeon
Bhadra Sancturary	Chikmagalur, ( Karnataka )	Elephant, Chital, Panther, Sambar, Wild bear
Bhimabandh Sanctuary	Monger ( Bihar )	Tiger, Leopard, Sambar, Wild bear, Chital, Water birds
Bori Sanctuary	Hoshangabad ( Madhya Pradesh )	Tiger, Panther, Sambar, Chital, Wild bear, Barking Deer
Borivli National Park	Mumbai ( Maharastra )	Panther, Sambar, Langur, Wild bear, Chinkara
Chandraprabha Sanctuary	Near Varanasi ( Uttar Pradesh )	Lions, Chital and Sambar
Corbett National Park ( named in memory of Jim Corbett, famous sportsman )	Nainital, ( Uttarakhand )	Tiger, Leopards, Elephants, Sambar
Name	Location	Reserves for
Dachigam Sanctuary	Dachigam ( Kashmir )	Kashmiri Stag
Datma Sanctuary	Singbhum ( Jharkhand )	Elephants, Leopard, Wild bear, Barking deer



Dandeli Sanctuary	Dharwar ( Karnataka )	Tiger, Panther, Elephant, Chital, Sambar, Wild bear
Dudhwa National Park	Lakhimpurkheri ( U.P. )	Tiger, Panther, Sambar, Chital, Nilgai, Barking deer
Gandhi Sagar Sanctuary	Mandsaur ( M.P. )	Chital, Sambar, Chinkara, Barking deer, Wild birds
Garampani Sanctuary	Diphu ( Assam )	Elephant, Leopard, Wild Buffalo, Langur
Ghana Bird Sanctuary	Bharatpur, ( Rajasthan )	Water birds, Black-buck, Chital, Sambar
Gir Forest	Junagarh ( Gujarat )	India's biggest wildlife sanctuary famous for Gir Lions
Gautam Buddha Sanctuary	Gaya ( Bihar )	Tiger, Leopard, Sambar, Chital, Barking deer
Hazaribagh Sanctuary	Hazaribagh ( Jharkhand )	Tiger, Leopard, Chital, Nilgai, Sambar, Wild cat
Intangki Sanctuary	Kohima ( Nagaland )	Elephant, Gaur, Tiger, Panther, Barking deer, Wild bear
Jaldapara Sanctuary	West Bengal	Rhinoceros
Kangiorghat National Park	Chattisgarh	Tiger, Panther, Sambar, Chital
Kawal Sanctuary	Adilabad ( Andhra Pradesh )	Tiger, Panther, Gaur, Chital, Wild bear
Kaziranga National Park	Jorhat ( Assam )	Horned rhinoceros, Gaur, Elephant, Leopard, Wild Buffalo
Khangchandzenda National Park	Gangtok ( Sikkim )	Snow Leopard, Musk Deer, Himalayan bear
Kinnersani Sanctuary	Khamrsan ( Andhra Pradesh )	Tiger, Panther, Gaur, Chital, Sambar, Nilgai
Kolleru Pelicanary	Elluru ( Andhra Pradesh )	Pelicans, Painted stork
Nagerhole National Park	Coorg ( Karnataka )	Elephant, Tiger, Panther, Sambar, Chital
Namdafa Sanctuary	Tirap ( Arunachal )	Elephant, Panther, Sambar,

	Pradesh )	Tiger, Chital, King Cobra
Nawegaon National Park	Bhandara ( Maharashtra )	Tiger, Panther, Sambar, Chital, Nilgai
Orang Sanctuary	Near Dispur ( Assam )	Elephant, Panther, Sambar
Pachmarhi Sanctuary	Hoshangabad ( Madhya Pradesh )	Tiger, Panther, Bear, Sambar, Nilgai, Barking Deer
Pakhal Sanctuary	Warangal ( Andhara Pradesh )	Tiger, Panther, Sambar, Chital, Nilgai
Parambikulam Sanctuary	Palghat ( Kerala )	Tiger, Leopard, Gaur, Elephant, Nilgai, Chital
Pench National Park	Nagpur ( Maharashtra )	Tiger, Panther, Gaur, Sambar, Chital, Nilgai
Periyar Sanctuary	Idukki ( Kerala )	Elephant, Tiger, Panther, Gaur, Nilgai, Sambar, Wild bear
Ranganthittoo Bird Sanctuary	Islands in Cauvery river in Karnataka	Various Kinds of Birds can be seen
Rohla National Park	Kulu ( Himachal Pradesh )	Snow Leopard, Brown Bear, Musk Deer, Snow Cock, Snow Pigeon
Sariska Sanctuary	Alwar ( Rajasthan )	Tiger, Panther, Sambar, Nilgai, Chital, Chinkara
Sharaswathy Valley Sanctuary	Shimoga ( Karnataka )	Elephant, Tiger, Panther, Sambar, Gaur Chital, Wild Bear
Shikari Devi Sanctuary	Mandi ( Himachal Pradesh )	Black Bear, Musk Deer, Panther, Leopard, Partridge
Shivpuri National Park	Shivpuri ( Madhya Pradesh )	Tiger, Panther, Sambar, Hyena, Sloth Bear, Nilgai
Similipal Sanctuary	Mayurbhanj ( Orissa )	Elephant, Tiger, Leopard, Gaur, Chital
Someshwara Sanctuary	Canara ( Karnataka )	Tiger, Panther, Wild Boar, Leopard
Sunderban Tiger Reserve	South 24 parganas ( West Bengal )	Tiger, Deer, Wild Bear, Crocodile, Gangetic Dolphin

Sonai Rupa Sanctuary	Tezpur ( Assam )	Elephant, Sambar, Wild Bear, One-horned Rhinoceros
Tadoba National Park	Chandrapur ( Maharashtra )	Tiger, Panther, Sambar, Nilgai, Chinkara, Chital
Tadwai Sanctuary	Warangal ( Andhra Pradesh )	Tiger, Panther, Sambar, Gaur, Jungle Cat
Tansa Sanctuary	Thane ( Maharashtra )	Panther, Sambar, Chital, Four-horned Antelope
Tungabhadra Sanctuary	Bellary ( Karnataka )	Panther, Chital, Sloth bear, Four-horned Antelope
Ushakothi Wildlife Sanctuary	Orissa	Elephant, Tiger, Sambar
Valvadar National Park	Bhavnagar ( Gujarat )	Wolf, Black buck
Vedanthangal Bird Sanctuary	Vedanthangal near Chingleput ( Tamil Nadu )	Important bird sanctuary
Waynad Sanctuary	Cannanore and Kozhikode ( Kerala )	Elephant, Gaur, Sambar, Chital, Wild bear, Deer
Wild Ass Sanctuary	Little Rann of Kutch ( Gujarat )	Wild Ass, Wolf, Nilgai, Chinkara

### HEIGHTS OF SOME IMPORTANT INDIAN PEAKS

S No	Peak	Height in metres above mean Sea Level
1	K2	8,611
2	Kanchen Junga	8,598
3	Nanga Parvat	8,126
4	Gasher Brum	8,068
5	Broad Peak	8,047
6	Disteghil Sar	7,885
7	Masher Brum E	7,821
8	Nanda Devi	7,817
9	Masher Brum W	7,806
10	Rakaposhi	7,788
11	Kamet	7,756

12	Saser Kangri	7,672
13	Skyang Kangri	7,544
14	Sia Kangri	7,422
15	Chaukhamba (Badrinath Peak)	7,138
16	Trisul West	7,138
17	Nunkun	7,135
18	Pauhunri	7,128
19	Kangto	7,090
20	Dunagiri	7,066

### EARTH SOLAR SYSTEM

Earth solar system consists of :

- The Sun
- The Planets
- Dwarf Planets

and countless fragments of left – overs called asteroids, meteors, comets and satellites of the planets ( called small solar system Bodies ).

#### Origin of Solar System

Various theories have been given by different persons to explain the origin of Solar System.

Gaseous Hypothesis	Kant
Nebular Hypothesis	Laplace
Planetesimal Hypothesis	Chamberlin and Moulton
Tidal Hypothesis	James Jeans & Harold Jeffrey
Binary Star Hypothesis	H. N. Russel
Fission Hypothesis	Ross Gun
Cepheid Hypothesis	A.C. Banerji
Nova Hypothesis	Hoyle & Lyttleton
Electromagnetic Hypothesis	H. Alfven
Interstellar Dust Hypothesis	Schmidt
Nebular Cloud Hypothesis	Dr. Von Weizsacker
Protoplanet Hypothesis	G. Kuiper
Solar System Some Facts	
Biggest Planet	Jupiter
Smallest Planet	Mercury
Nearest Planet to Sun	Mercury

Farthest Planet from Sun	Neptune
Nearest Planet to Earth	Venus
Brightest Planet	Venus
Brightest star after Sun	Sirius
Planet with maximum satellites	Jupiter
Coldest Planet	Neptune
Hottest Planet	Venus
Heaviest Planet	Jupiter
Red Planet	Mars
Biggest Satellite	Gannymede
Smallest Satellite	Deimos
Blue Planet	Earth
Morning/Evening Star	Venus
Earth's Twin	Venus
Green Planet	Neptune
Planet with a big red spot	Jupiter
Lord of the Heavens	Jupiter
Greatest Diurnal Temperature	Mercury

### EARTH MOVEMENTS

The Earth also called Blue Planet. It is the densest of all planets.

Earth Circumference : 40,232 Kilometers.

Earth Area : 510 million Square Kilometers Average distance from sun: 149 million-Kilometers.

Earth Perihelion : Nearest position of earth to sun. The earth reaches its perihelion on January 3 every year at a distance of about 147 million-Kilometers.

Aphelion : Farthest position of earth from sun. The earth reaches its aphelion on July 4, when the earth is at a distance of 152 million Kilometers.

The shape of the earth is oblate spheroid or oblate ellipsoid (i.e. almost spherical, flattened a little at the poles with a slight bulge at the centre).

2 Types of Earth Movements:

1. Rotation or daily movement.
2. Revolution or annual movement.

### Earth Rotation

- Spins on its imaginary axis from west to east in 23 hrs, 56 min and 40.91 sec.
- Rotational velocity at equator is 1667 Kilometers/h and it decreases towards the poles, where it is zero.
- Earth's rotation results in

i . Causation of days and nights;

ii . A difference of one hour between two meridians which are  $15^\circ$  apart;

iii. Change in the direction of wind and ocean currents;

- Rise and fall of tides everyday.
- The longest day in North Hemisphere is June 21, while shortest day is on 22 Dec (Vice-versa in S. Hemisphere).
- Days and nights are almost equal at the equator.

### Earth Revolution

- It is earth's motion in elliptical orbit around the sun. Earth's average orbital velocity is 29.79 Kilometers/s.
- Takes 365 days, 5 hrs, 48 min and 45.51 sec. It results in one extra day every fourth year.
- Revolution of the earth results in

i . Change of seasons

ii . Variation in the lengths of days and nights at different times of the year

iii . Shifting of wind belts

iv . Determination of latitudes.

- Inclined Axis: The axis is an imaginary line running from north to south and passing through the centre of the earth. It always remains inclined at an angle of  $66\frac{1}{2}^\circ$  to the plane of the earth's orbit, and is tilted  $23\frac{1}{2}^\circ$  from a line perpendicular to this plane. The two facts, i.e., a fixed angle of the earth's axis to the plane of the orbit and the axis always pointing in the same direction, when combined with the earth's movements, results in varying lengths of days and nights, seasonality and changes in the altitude of sun at different times of the year.
- Earth Seasons are periods into which the year can be divided as a result of the climatic conditions, largely due to the changes in the duration and intensity of solar radiation.

The 4 Earth Seasons are:

- **Spring:** On March 21, the sun is directly overhead the equator. This is the season of spring in the northern hemisphere.
- **Summer:** On June 21, the sun is directly overhead the Tropic of Cancer. Thus, the northern hemisphere experiences summer.
- **Autumn:** On September 23, the sun returns to the equator, and the northern hemisphere experiences autumn.
- **Winter:** On December 22, the sun is at the Tropic of Capricorn, and the northern hemisphere experiences winter.

### EARTH SOME IMPORTANT FACTS

Age	4,60,00,00,000 years
Total surface area	51,01,00,500 Square Kilometers
Land area (29.08%)	14,89,50,800 Square Kilometers
Water area (70.92%)	36,11,49,700 Square Kilometers
Mean density	5.52 gm. per cc
Equatorial diameter	12,755 Kilometers
Polar diameter	12,712 Kilometers
Escape velocity	11.2 Kilometers/sec
Mass	5.880 10 <sup>24</sup> kg
Volume	10,83,20,88,40,000 kg <sup>3</sup>
Distance from Moon	3,82,200 Kilometers
Highest place on Earth	Mount Everest (8,850 m)
Deepest point in Ocean	Challenger Deep in Mariana Trench in Pacific Ocean near Philippines (11,033 m deep)
Deepest point on Land	Dead Sea (396 m deep)
Rotation time	23 hrs, 56 min, 40.91 sec
Revolution time	365 days, 5 hrs, 48 min, 45.51 sec
Satellite	1 (Moon)
Tilt of axis from Orbital Plane	23° 27'
Distance from Sun	14,94,07,000 Kilometers
Equatorial circumference	40,075 Kilometers
Polar circumference	40,024 Kilometers
Average Ocean depth	3,554 m
Date of perihelion (minimum)	Jan 3

distance from Sun)

Date of aphelion (maximum distance from Sun)

July 4

Orbital circumference

924,375,700 Kilometers

Average Orbital speed

29.783 Kilometers/sec. (107,218 Kilometers/h)

Minimum surface temperature

88° C

Mean surface temperature

14° C

Maximum surface temperature

58° C

## EARTH LATITUDE AND LONGITUDE

### Earth Latitude

Imaginary lines drawn parallel to the equator. Measured as an angle whose apex is at the centre of the earth

The equator represents 0° latitude, while the North Pole is 90° N and the South Pole 90° S

23½° N represents Tropic of Cancer while 23½° S represents Tropic of Capricorn.

66½° N represents Arctic Circle while 66½° S represents Antarctic Circle.

There are total 181 latitudes including the equator. Each parallel of latitude is a circle, but they are not equal.

The circle becomes smaller towards the poles. Equator is the 'Greatest Circle' that can be drawn on the earth's surface.

The distance between any two parallels of latitude is always equal.

### Earth Longitude

- It is the angular distance measured from the centre of the earth. On the globe the lines of longitude are drawn as a series of semicircles that extend from the North Pole to the South Pole through the equator. They are also called meridians.



- The distance between any two meridians is not equal. At the equator, 1 degree = 111 km. At 30°N or S, it is 96.5 km. It goes on decreasing this way until it is zero at the poles.
- There are 360 meridians of longitude. The prime meridian is a longitude of 00, passing through the Royal Observatory at Greenwich near London.
- This meridian is taken by geographers to divide the earth into the eastern and the western hemispheres.
- Each meridian of longitude is a semi-circle. 180° meridian (International Date Line) lies exactly opposite to 0° meridian. Such points are called Antipodal Points.
- The earth is divided into 24 longitudinal zones, each being 15° or 1 hour apart in time (4 minutes / degree).

### Longitude and Time

- Places that are on the same meridian have the same local (sun) time. Since the earth makes one complete revolution of 360° in 24 hours, it passes through 15° in one hour or 1° in 4 minutes.
- The earth rotates from west to east, hence places east of Greenwich see the sun earlier and gain time whereas places west of Greenwich see the sun later and lose time.
- A suitable memory acronym can be: East-Gain-Add (E.G.A.) and West-Lose-Subtract (W.L.S.). So, if it is noon in London (near 0°), 15° east will be one hour ahead of London or 1 p.m. and Chennai of 80°E will be 5 hours 20 minutes ahead. To avoid confusion about having many local times within one country, a particular Meridian is chosen for the whole country whose time is known as 'standard time'.
- Generally, the standard meridians are chosen to differ from the Greenwich meridian by the multiples of fifteen degree or seven and a half degree, i.e., by exact number of hours or half hours. The world is thus divided into a number of time zones. Larger countries like Russia, Canada, USA etc., have greater east-west extension, so they adopt several time zones. Russia has 11 time zones while USA and Canada have 5 time zones.
- India, whose longitudinal extent is approx. 30°, has adopted only one time zone, selecting the 82.5°E for the standard time which is 5 hours and 30 minutes ahead of GMT (Greenwich Mean Time).

### International Date Line

- It is the 180° meridian running over the Pacific Ocean, deviating at Aleutian Islands, Fiji, Samoa and Gilbert Islands.
- Travelers crossing the Date Line from west to east (i.e., from Japan to USA) repeat a day and travelers crossing it from east to west (i.e., from USA to Japan) lose a day.

### EARTH LUNAR ECLIPSE

When earth comes between sun and moon.

Occurs only on a full moon day. However, 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° with respect to the plane of the earth's orbit. It is for this reason that eclipses do not occur every month.

### EARTH SOLAR ECLIPSE

When moon comes between sun and earth.

Can be partial or total.

Occurs only on a new moon day when the moon is in line with the sun. However, due to the inclination of the moon's orbit, a solar eclipse doesn't occur on every new moon day.

### EARTH CLIMATE

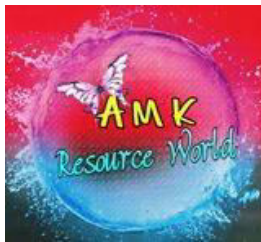
The average weather conditions over a large area is called the climate of a place. Weather conditions over a specific length of time, usually a period of 31 years, are taken into consideration.

On a large scale, the climate of a particular region is determined by:

- i. Latitude and tilt of the earth's axis, which determines the amount of solar radiation received by the area
- ii. The distribution of land and sea and proximity of ocean currents
- iii. The altitude and topography of the area
- iv. The location of the area in relation to the main circulation belts of the earth.

Climate can be classified on the basis of temperature, rainfall, evaporation, evapo transpiration and water balance. One of the universally accepted climate classifications is by Koeppen which is being described here.

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