

Interior of the earth (Geography)

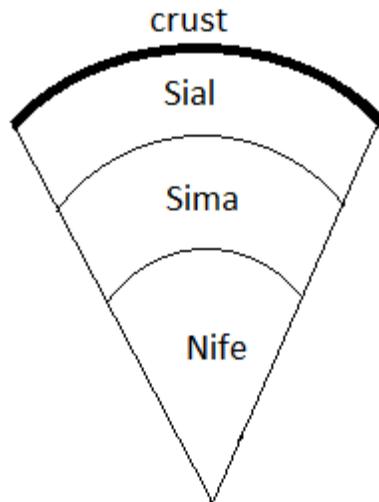
From the surface of the earth as we go downward –

1. The temperature increases at the rate of $1^{\circ}\text{C}/32\text{m}$ up to 2900 km. At core, temperature is $5,500^{\circ}\text{C}$
2. Rock density increases
3. There is gradual change in the physical conditions of the constituents

These general characteristics are based upon empirical observations and scientific discoveries. Some drilling operations, mining information and satellite information provides knowledge about the physical conditions of the interior of the earth. There are two views regarding it.

Classical View - It is principally based upon empirical methods of assessment. Main works are: Edward

Suess – He has divided earth into three concentric layers as follows:



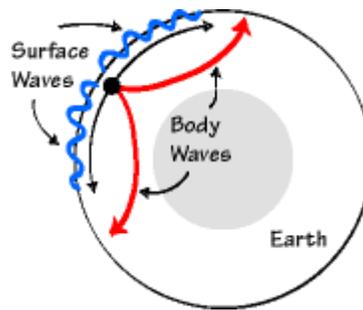
1. Sial – (Si + Al) solid crust with density 2.75 to 2.90 gm/cm^3
2. Sima – (Si + Mg) in molten and liquid state with density 2.90 to 4.50 gm/cm^3
3. Nife – (Ni + Fe) in gaseous state with density 11 to 12 gm/cm^3

Problems – He did not explain the sudden increase in density, how concentric layers are formed and how the inner part was in gaseous state.

Other classical works are those of Van Der Gracht, Arthur Holmes and Phillip Lake's. All of them divided interior of earth into concentric layers of different mineral compositions and of different densities.

All the classical works are not scientific, while modern views are based on scientific grounds based on Seismology. Thus they provide acceptable explanation.

Modern view – They are based on study of Earthquake waves (seismic waves) passing through interior of the earth. Seismic two are of three types. Surface waves and body waves. Body waves are further categorized into two types – Primary (P) waves and secondary (S) waves. P and S waves pass through interior of the earth whereas surface waves pass only along surface of the earth. An earthquake radiates P and S waves in all directions and the interaction of the P and S waves with Earth's surface produces surface waves.

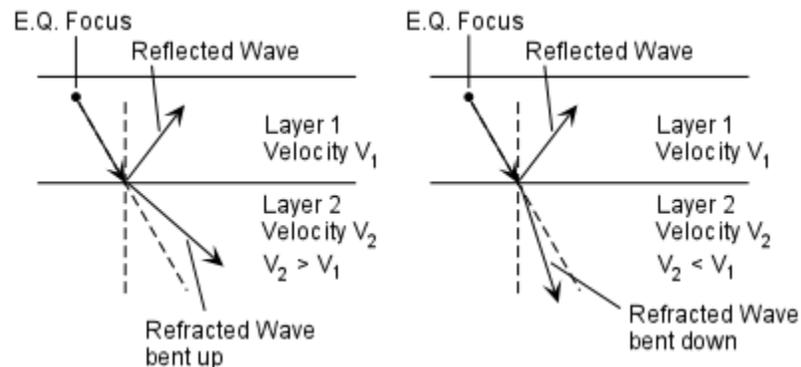


P waves are fastest moving longitudinal waves (to and fro motion) and they pass through all the physical conditions of the earth. S waves are intermediate fast, transverse waves (i.e. movement of particles is perpendicular to the direction of wave propagation) and they can pass only through solid state and never through liquid or gaseous state.

It has been observed that these waves seldom follow straight paths rather they adopt curved and refracted paths. Thus it becomes obvious that there are variations of density inside the earth.

Reflection and Refraction of Seismic Waves

If composition (or physical properties) change abruptly at some interface, then seismic wave will both reflect off the interface and refract (or bend) as they pass through the interface. Two cases of wave refraction can be recognized.



- ☐ If the seismic wave velocity in the rock above an interface is less than the seismic wave velocity in the rock below the interface, the waves will be refracted or bent upward relative to their original path.
- ☐ If the seismic wave velocity decreases when passing into the rock below the interface, the waves will be refracted down relative to their original path.
- ☐ If the seismic wave velocities gradually increase with depth in the Earth, the waves will continually be refracted along curved paths that curve back toward the Earth's surface as shown below.

Population

Census

The Indian Census is the most credible source of information on Demography (Population characteristics), Economic Activity, Literacy & Education, Housing & Household Amenities, Urbanization, Fertility and Mortality, Scheduled Castes and Scheduled Tribes, Language, Religion, Migration, Disability and many other socio-cultural and demographic data since 1872, when first census was conducted. Census 2011 is the 15th National Census of the country. This is the only source of primary data at village, town and ward level. It provides valuable information for planning and formulation of policies for Central & State Governments and is widely used by National & International agencies, scholars, business people, industrialists, and many more. The delimitation/reservation of Constituencies-Parliamentary/Assembly/Panchayats and other Local Bodies is also done on the basis of the demographic data thrown up by the Census. Census is the basis for reviewing the country's progress in the past decade, monitoring the on-going schemes of the Government and most importantly, plan for the future. That is why the slogan of Census 2011 is "Our Census, Our Future".

The Census is a statutory exercise conducted under the provisions of the Census Act 1948 and Rules made there under.

Growth of population

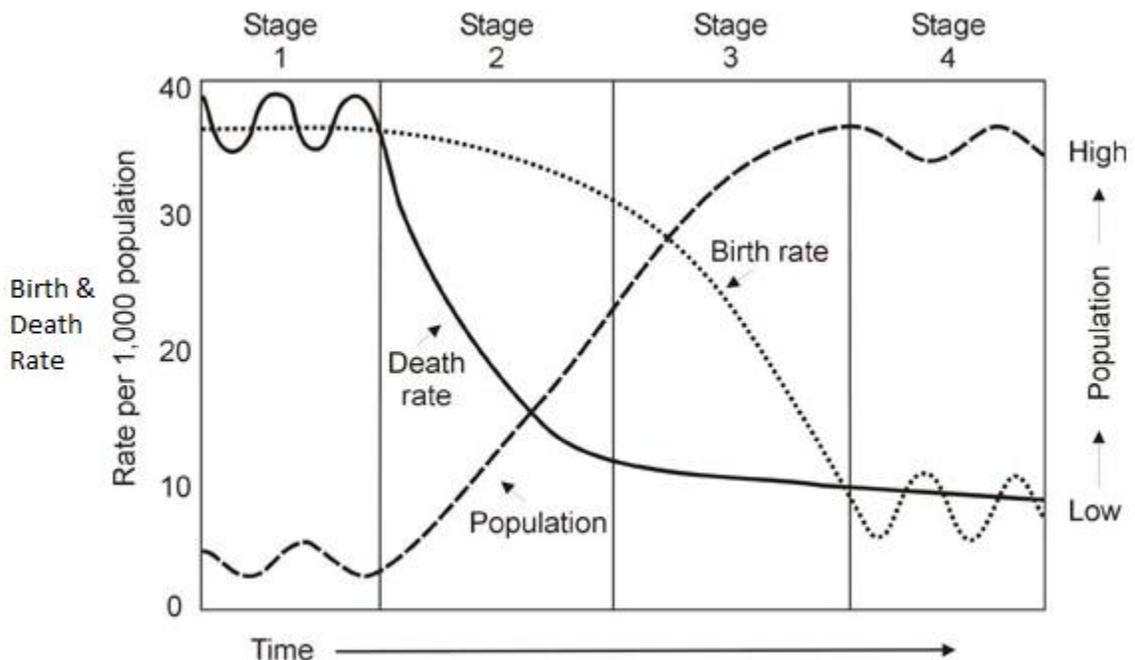
Census of India - Figures at a glance:

Population	Persons	1,21,01,93,422	
	Males	62,37,24,248	
	Females	58,64,69,174	
Decadal Population Growth 2001-2011		Absolute	Percentage
	Persons	18,14,55,986	17.64
	Males	9,15,01,158	17.19
	Females	8,99,54,828	18.12
Density of Population (per sq. km.)		382	
Sex Ratio (females per 1000 males)		940	
Literate		Absolute	Literacy rate
	Persons	77,84,54,120	74.04
	Males	44,42,03,762	82.14
	Females	33,42,50,358	65.46

Phases of population growth in India

India's population has grown steadily since 1901 except during 1911 – 21 when it declined slightly. At the same time, the decadal rate of population has been consistently increasing till 1981. It started declining thereafter. The Indian demographic history can thus be divided into the following four phases:

1. Phase I: The period from 1901-1921 is referred to as a period of stagnant or stationary phase of growth of India's population, since in this period growth rate was very low, even recording a negative growth rate during 1911-1921. Both the birth rate and death rate were high keeping the rate of increase low. Poor health and medical services, illiteracy of people at large and inefficient distribution system of food and other basic necessities were largely responsible for a high birth and death rates in this period. Before 1921 the increase in population was sporadic, irregular and slow. After 1921 it has increased steadily. Hence the year 1921 is called *demographic divide* in the population study of India.
2. Phase II: The decades 1921-1951 are referred to as the period of steady population growth. An overall improvement in health and sanitation throughout the country brought down the mortality rate. At the same time better transport and communication system improved distribution system. The crude birth rate remained high in this period leading to higher growth rate than the previous phase. It is called *mortality induced growth*.
3. Phase III: The decades 1951-1981 are referred to as the *period of population explosion* in India, which was caused by a rapid fall in the mortality rate but a high fertility rate of population in the country. The average annual growth rate was as high as 2.2 per cent. It is in this period, after the Independence, that developmental activities were introduced through a centralised planning process and economy started showing up ensuring the improvement of living condition of people at large. Consequently, there was a high natural increase and higher growth rate. It was *fertility induced growth*. Besides, increased international migration bringing in Tibetans, Bangladeshis, Nepalese and even people from Pakistan contributed to the high growth rate.
4. Phase IV: In the post 1981 till present, the growth rate of country's population though remained high, has started slowing down gradually. A downward trend of crude birth rate is held responsible for such a population growth. This was, in turn, affected by an increase in the mean age at marriage, improved quality of life particularly education of females in the country.



World Physical Geography

Asia



Asia, the largest of the continents; it occupies about 30 per cent of the earth's land area. Asia is also the most populous continent, holding approximately 60 per cent of the world's population. Yet some two-thirds of the continent is either too dry or too cold to support anything but a sparse population. An outstanding feature of this huge continent is diversity—in physical features and in the economic, political, and cultural ways of the people.

Asia and Europe are not separated by an ocean or strait but form a single landmass, called Eurasia. The dividing line between the two continents is usually considered to run down the Ural Mountains and Ural River to the Caspian Sea and then across the Caucasus Mountains. At the Isthmus of Suez, Asia connects with Africa. North America lies within 97 km of Asia at the Bering Strait.

Physical Geography of Asia

The Asian landmass stretches from the Equator to far above the Arctic Circle. It reaches almost halfway around the globe (about 165 degrees of longitude) from Asia Minor (Turkey) on the Mediterranean Sea to the eastern tip of Siberia on the Bering Strait.

Numerous arms of the Indian, Pacific, and Arctic oceans reach far inland, creating great peninsulas. On the Indian Ocean are the Arabian Peninsula and the Indian subcontinent. Bordering waters include the Red Sea, the Arabian Sea, the Persian Gulf, and the Bay of Bengal. In the southeast, between the Andaman Sea and South China Sea are the Malay and Indochinese peninsulas. Kamchatka and Korea are the principal peninsulas in northeastern Asia; Korea lies between the Yellow Sea and the Sea of Japan, and the Kamchatka Peninsula between the Sea of Okhotsk and the Bering Sea. Other large peninsulas are the Taimyr Peninsula, in the Arctic Ocean, and Asia Minor, between the Black Sea and the Mediterranean.

Great island groups fringe much of the continent, particularly on the south and east. The largest is occupied mainly by Indonesia. Other islands or groups of islands that form countries include the Philippines, Japan, Taiwan, and Sri Lanka.

Mountains

In the great interior highlands of the Asian landmass, towering mountains enclose large plateaus and basins. The highest range is that of the Himalayas. Here is the Mount Everest (8,848-m), the world's loftiest peak. The Pamirs, situated where the borders of Tajikistan, Afghanistan, and China meet, form another great highland area. Converging here are such ranges as the Karakoram, which runs along the China-India boundary; the Hindu Kush, principally in Afghanistan; the Kunlun Mountains of western China; and the Tien Shan, shared by China, Kyrgyzstan, and Kazakhstan.

Southwest Asia, sometimes called the Middle East, is largely an arid region of mountains, plateaus, and deserts. The high, dry Plateau of Iran is rimmed on the west by the Zagros Mountains and on the north by the Elburz Mountains. Between the Caspian Sea and the Black Sea rise the ranges of the Caucasus Mountains.

In the Arabian Peninsula, principal mountain ranges are Hejaz and Asir along Red Sea coast, Hadramawt Mountain along the coast of Gulf of Aden and Akhdar Mountain along Gulf of Oman coast.

The mountains of the south Asian peninsulas are lower than those of the interior. Along the Indian coasts are the Western and Eastern Ghats; both ranges are edges of the Deccan Plateau. Long, curving mountain ranges extend through Indochina, the Malay Peninsula, and the principal islands of Indonesia. Much of China is hilly or mountainous and threaded by numerous river valleys. The most extensive flatlands are the Manchurian and North China plains. Toward China's northwest, the land rises to the high Mongolian Plateau, much of which is occupied by the desert wastes of the Gobi. Major mountain ranges in China are Kailash Mountain in Tibet, Kunlun Shan, Altun Shan and Tien Shan in western China and Great Khingan Mountain in north eastern China.

Eastern and central Siberia comprises numerous North-South mountain ranges of various ages. These mountains extend up to almost three thousand meters in elevation, but above a few hundred meters they are almost completely devoid of vegetation. Main Mountain ranges are Altai Mountains, Anadyr Range, Baikal Mountains, Chersky Range, Dzhugdzhur Mountains, Kolyma Range, Koryak Mountains, Sayan Mountains, Verkhoyansk Mountains and Yablonoi Mountains. On the western edge of Siberia is Ural Mountain which is also the border between Asia and Europe. The highest point in Siberia is the active volcano Klyuchevskaya Sopka, on the Kamchatka Peninsula. Its peak is at 4,649 meters.

Some of the other mountain ranges in Asia are Al Hajar Mountains (Oman & UAE), Annamite Range (Laos, Vietnam, Cambodia), Arakan Yoma (Myanmar), Barisan (Indonesia), Caucasus (Russia, Georgia, Azerbaijan, Armenia, Northern Iran), Japanese Alps, Taurus Mountains (Turkey),

Plateaus

Of the interior plateaus enclosed by the ranges, the world's largest and highest is the Plateau of Tibet, north of the Himalayas. Several major rivers have their source in the Tibetan Plateau such as Indus and Brahmaputra. Tibet has numerous high-altitude lakes referred to in Tibetan as tso or co. These include Qinghai Lake, Lake Manasarovar, etc. The atmosphere is severely dry for much part of the year, and average annual rainfall (snowfall) is only 46 cm, due to the rain shadow effect.

The Deccan Plateau is a largest plateau in India, making up most of the southern part of the country. It is located between two mountain ranges: the Western Ghats form its western boundary, and the Eastern Ghats its eastern boundary.

In the middle part of Asia there are plateaus such as Mongolian plateau, plateau of Kobdo and Vitim plateau. The Mongolian plateau includes the Gobi Desert as well as dry steppe regions. In South West Asia, Plateau of Iran and Anatolia Plateau are important. Iranian plateau encompasses the greater part of Iran, Afghanistan and Balochistan (Pakistan) on an area roughly outlined by the quadrangle formed by the cities of Tabriz, Shiraz, Peshawar and Quetta. Shan plateau in Myanmar is famous for sapphires, rubies and other gems.

The Central Siberian Plateau is made up of sharply demarcated surfaces of varying altitudes occupying most of Siberia between the Yenisei and Lena rivers. The climate is continental with short warm summers and long and very cold winters. Most of the territory is covered with conifer forests (larch is especially abundant). Known geologically as the Siberian Traps, mineral resources here are very rich and include coal, iron ore, gold, platinum, diamonds and natural gas.

Plains

Asia's largest lowland is that of western Siberia. This vast flatland extends southward through the steppes and deserts of Central Asia, ending in the deserts of Kara Kum and Kyzyl Kum. The West Siberian Plain is a large plain that occupies the western portion of Siberia, between the Ural Mountains in the

west and the Yenisei River in the east, and by the Altay Mountains on the southeast. Much of the plain is poorly drained and consists of some of the world's largest swamps and floodplains. Important cities include Omsk, Novosibirsk and Chelyabinsk. It has been described as the world's largest unbroken lowland—more than 50 percent is less than 330 feet (100 m) above sea level.

The Northeast China Plain also known as the Manchurian Plain, is located in Northeast China. It lies between the Greater and Lesser Khinggan and Changbai mountains. It is China's largest plain, with an elevation of lower than 200 meters. It is suitable for mechanized farming, and huge areas are planted with wheat, corn, soy beans, rice, sugar beets, sunflowers. The Chengdu Plain is an alluvial plain located in the western part of Sichuan Basin in Sichuan, China. The Yangtze Plain is made up of a series of alluvial plains of along the Yangtze River and its major tributaries. This plain is somewhat swampy, made up of a large number of lakes and rivers, making it suitable for rice growing and freshwater fish, and it is therefore known as the "land of fish and rice". The area also produces tea, silk, rapeseed, broad beans, and tangerines.

Great Northern Plain in India is made up of alluvial sediments brought by major Himalayan river viz. Ganga, Indus, Brahmaputra and their tributaries. In the coastal region of India, especially Eastern coast alluvial plains are formed by series of deltas.

Mesopotamia plains in Iraq are formed due to alluvial sediments brought by rivers Tigris and Euphrates. The southern part of the plain is flat and marshy.