India has almost all physical features of the Earth. These features are found on its land area i.e. plain land in the Northern plains, uneven terrain with mountains valleys in the hilly regions, and varied terrain in the plateau areas.

Besides these, India also has vast deserts, large rivers, deltas and extensive forest land Different types of rocks are also found in India. These rocks are ranging from very hard rocks like marble (used for making Taj Mahal), granite etc, as well as very soft rocks like soap stone (used for making talcum powder).

Theory of plate tectonics: Many Earth scientists have tried to describe the formation of physical features with help of various theories. One such theory is the "Theory of Plate Tectonics". Plate Tectonics is a scientific theory that describes the large-scale motion of Earth lithosphere. According to this theory, the Earth's crust (upper part) is made up of Seven major and some minor lithosphere plates. Stresses within the plates and continental rocks above resulted in the movement of the plates. This movement of the plates leads to folding, faulting and volcanic activity.

The movement of the plates is classified into three type

- When two plates move towards each other, they form a convergent bound
- When two plates move away from each other, they form a divergent boundary.
- When two plates move horizontally past each other, they form a transform boundary.

'When two plates collide, they may break into small pieces, slide one under the a or move horizontally. This movement of plates causes earthquakes at the places where the plates meet.

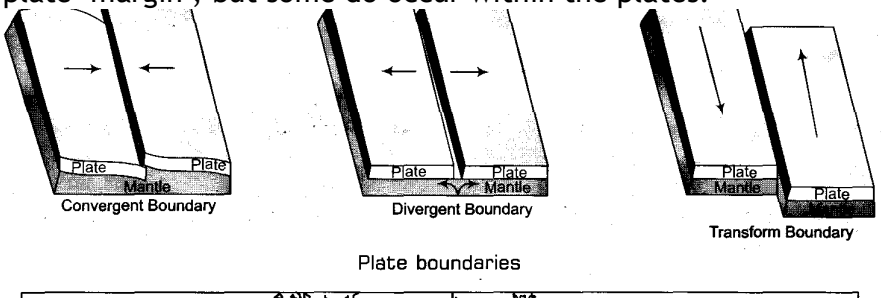
Rock formation This is the result of weathering and erosion of existing rocks.

Lithospheric plates Pieces of rigid landmass floatin over liquid magma.

Folding Warping of rocks due to compressional forces.

Faulting Development of cracks and factures on the Earth surface due to stress.

moveents of these plates have changed the position and size of the continents over millions of years. They have led to the evalution of the present landform features of India. Most volcanoes and earthquakes in the world are located at plate margin , but some do occur within the plates.



INDIA'S LANDMASS

India is a large landmass formed during different **geological periods** which have influenced its relief. Besides geological formation, a number of processes such as **weathering, erosion** and **deposition** have created and modified the relief to its present form.

Gondwana Land

The oldest landmass (the peninsula part) was a part of Gondwana land. This land included India, Australia, South Africa, America and Antarctica as one single landmass. The convectional currents split the crust into a number of pieces. This

currents led the drifting of Indo-Australian plate towards the North after being separated from Gondwana land,

The northward drift resulted in the collision of the plate with the much larger Eurasian plate. This collision resulted in accumlation of sedimentary rocks in the **geosyncline**, known as the Tethys. Tethys were folded to form the mountain system of Western Asia and Himalaya.

Geological periods A unit of geological time during which a system of rocks is formed. he variations in elevation of an area of the Earth's surface.

Weathering The mechanical and chemical breakdown of rocks by the action of rain, snow, wind, etc.

Erosion It is the natural process of weathering and transport of solids (sediment, soil, rock and other particles) in the natural environment from their source to else where, where they are deposited.on It is the geological process by which material is added to a landform or landmass.

Gondwana land It is the Southern part of the ancient super continent Pangaea with Angara land in the Northern part.

Geosyncline A term used for a subsiding linear trough that was caused by the accumulation of sedimentary rock strata deposited in a basin equently compressed, deformed and uplifted into a mountain range.

Formation of Major Landforms

The Himalayan mountains uplift out of the Tethys sea and subsidence of the Northern part of the Peninsular plateau . Gradually, the North-South flowing rivers deposited their sediments in this depression and made the plain fertile. This vast alluvial deposition on a flat land led to the formation of the Northern plains of India. The land of India displays great physical variation.

The Peninsular plateau of India is one of the ancient landmasses on the Earth' surface. It was supposed to be one of the most stable land blocks. On the other hand, the Himalayas and Northern plains are one of the most recent landforms The mountain system of the Himalayas is a symbol of a very youthful topography which consists of high peaks, 3- valleys and fast flowing rivers. It forms an unstable zone. The Northern plains are formed of alluvial deposits. Peninsular plateau is composed of igneous and metamorphic rocks with rising hills and wide valleys.

MAJOR PHYSIOGRAPHIC DIVISIONS

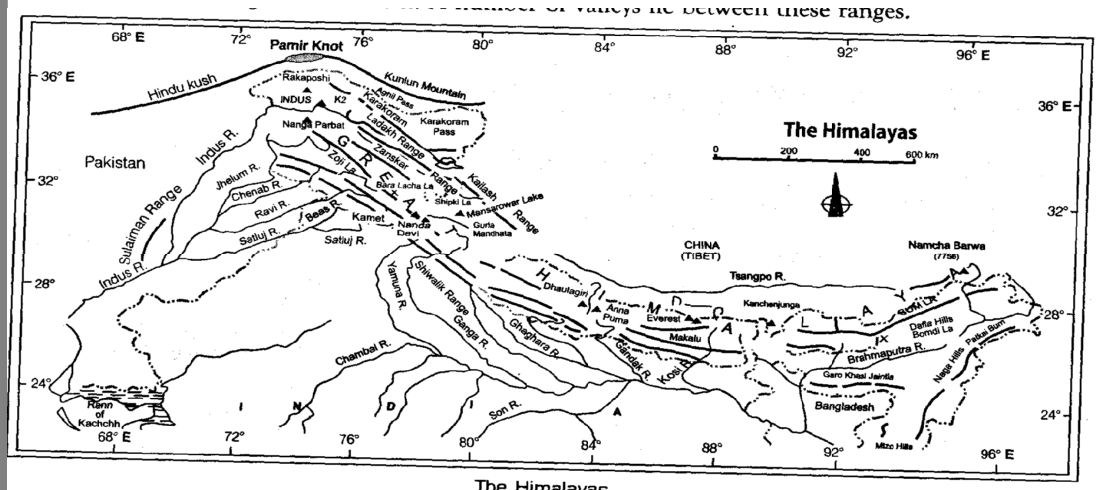
The physical features of India can be grouped under the following physiographic divisions

1. The Himalayan Mountains 2. The Northern Plains 3.The Peninsular Plateau
4. The Indian Desert 5. The Coastal Plains 6. The Islands

The Himalayan Mountains

The Himalayas are geologically young and structurally fold mountains. They stretch over the Northern borders of India. They form an arc, covering a distance about 2400 km. Their width varies from 400 km in Kashmir to 150 km Arunachal Pradesh, These mountain ranges run in West-East direction from the Indus to the Brahmaputra Rivers. The altitudinal variations in Himalayas are greater in the Eastern half than those in the Western half. The Himalayas consist of three parallel ranges in its longitudinal extent. A number of valleys lie between these ranges.

valleys lie between these ranges.



The Himalayas

Himadri or Inner Himalayas or Great Himalayas: The Northern most range is known as the Great or Inner Himalayas or the Himadri. It has an average height of 6000 m. It contains all the prominent Himalayan peaks like Mount Everest, Kanchenjunga, Makalu, etc. Kanchenjunga is the highest peak of the Himalayas in India a height of 8598 m. Whereas the highest peak Mount Everest (8848 m) lies in Nepal. Great Himalayas are snow covered all the year round. The core of this part is posed of granite. The fold of Great Himalayas is asymmetrical in nature.

Some High Peaks of the Himalayas

Peak	Country	Height in metres
Mount Everest	Nepal	8848
Kanchenjunga	India	8598
Makalu	Nepal	8481
Dhaulagiri	Nepal	8172
Nanga Parbat	India	8126
Annapurna	Nepal	8078
Nanda Devi	India	7817
Kamet	India	7756
Namcha Barwa	India	7756
Gurla Mandhata	Nepal	7728

Himachal or Lesser Himalayas: This range, lies to the South of the Himadri and forms the most rugged mountain system. It is composed of highly compressed rocks with height varying from 3700 to 4500 m. The average width of this range of the Himalayas is 50 km. It is composed of ranges like Pir Panjal, Dhaula Dhar. The Pir Panjal range is the longest and the most important range. They also contain the valleys having well-known hill stations in areas like Kashmir, Kangra, Kullu (in Himachal Pradesh Mussoorie, Nainital (Uttarakhand), etc.

Shiwalik Range: This is the outermost range of the Himalayas with height varying between 900 and 1100 m. The average width is 10 to 50 km. They are composed of coarse sediments brought down by rivers from the main Himalayan ranges. These valleys are covered with thick gravel and alluvium. The longitudinal valleys lying between the Lesser Himalayas and Shiwaliks are known as Duns with names like Dehra Dun, Kotli Dun and Path Dun.

Regional Division of Himalayas: The Himalayas are also divided on the basis of regions from West to East. This demarcation is done by river valleys, i.e. the Indus, Satluj, Kali, Teesta and Dihang rivers, Punjab, Kumaon and Assam Himalayas: In the West, the part of Himalayas lying between Indus and Satluj has been traditionally known as Punjab Himalaya . But it is also known regionally as Kashmir and Himachal Himalaya from West to East, respectively. The part of the Himalayas lying between Satluj and Kali rivers is known as Kumaon Himalayas. The

Kali and Teesta rivers demarcate the Nepal Himalayas and the part lying between Teesta and Dihang rivers is known as Assam Himalayas.

Purvachal or Eastern Range: The Brahmaputra marks the eastern most boundary of Himalayas. These hills are mostly composed of strong sandstones which are sedimentary rocks covered with dense forest. They mostly run as parallel ranges and valleys. Here, they are called Purvachal and include the Patkai hills, the Naga hills, the Manipur hills and the Mizo hills.

The Northern Plain: This plain is formed by three river systems, viz the Indus, the Ganga and the Brahmaputra, along with their tributaries. This plain is formed by alluvial soil. It spreads over an area of 7 lakh sq km. These plains are about 2400 km long and between 240 and 320 km broad. They are densely populated due to the fertile soil, adequate water supply, favorable climate and terrain. The rivers originating from the Northern mountains slow down due to the gentle slope, which results in the formation of riverine islands. Majuli is the largest inhabited riverine island in the world and lies in the Brahmaputra river. The rivers split into a number of channels in their lower courses due to deposition of silt. These channels are called distributaries. They are common features of river deltas.

Parts of Northern Plain: The three parts of the Northern plains are:

1. The Western part is called the Punjab plain. It has been formed by the Indus and its many tributaries. The larger part of this plain lies in Pakistan. The Indus and its tributaries – the Jhelum, the Ravi, the Satluj, the Beas and the Chenab, originate in the Himalayas. The Punjab plain is also dominated by doabs (meaning two waters).
2. The middle part is called the Ganga plain. It extends from the Ghaggar river (in Haryana) to the Teesta river (in West Bengal) through the states of Haryana, Delhi, Uttar Pradesh, Bihar and Jharkhand.
3. The Eastern part is called the Brahmaputra plain. It extends from West Bengal, through Assam and Bangladesh to India's Eastern border.

Regions of Northern Plain: Along its width, the Northern plain is divided into four regions according to variation in relief feature as follows

1. After descending from the mountains,the rivers deposit pebbles in a narrow belt of about 8 to 16 km in width lying parallel to the slopes of the Shiwaliks. It is known as *bhabar* belt. All the river disappear in the *bhabar* belt.
2. South of *bhabar* belt, the streams and rivers re-emerge and create a wet, swampy and marshy region known as terai. Earlier it was thickly forested with a lot of wildlife, but now most of the forests have been cleared for agriculture land and to settle migrants from Pakistan after independence. Some forest still remains here. Dudhwa National Park is located in this region.
3. The largest part of the Northern plain consisting of older alluvium and known as bhangar. It presents a terrace like feature and contains calcareous deposits known as kankars.
4. The lowest region is the flood plain known as *khadar*. The soil here is renewed whenever there is a flood (almost every year) so this area is fertile and best for intensive agriculture.

The Peninsular Plateau: This is a tableland composed of the old crystalline, Igneous and metamorphic rocks. It was formed due to the breaking up and drifting of Gondawa land; thus it is a part of the oldest landmass. The plateau has broad and shallow rounded hills.

ABHYAS Academy, Behind Pragat Shiv Mandir, Near Govt. College, Nishat Cinema Road, Ambala Cantt.
Ph No. +91-171-2631595, 9416541198, e-Mail: anusethi1968@yahoo.com Website: www. abhyasonline.in

1. This Plateau consists of two broad divisions: Central Highlands and Deccan Plateau Deccan plateau: This is the part lying North of the Narmada river which covers most of the Maiwa plateau. The Vindhyan range is bounded by the Central Highlands on the South and the Aravalis on the Northwest. Its further westward extension gradually merges with the sandy and rocky desert Rajasthan. It slopes from South-West to north-East, as indicated by the flow of the Chambal, Sind, Betwa and Ken rivers. Its Eastern edge is consists of areas known as Bundelkhand, Baghelkhand. Chota Nagpur plateau marks the further eastward extension drained by the Damodar river.

Deccan Plateau: This triangular landmass lies to the South of the river Narmada, The broad base of the Satpura range form its North while the Mahadev hills, the Kaimur hills and the Maikal range form its tern extensions. An extension of the plateau is also visible in the North-East, generally knows as the Meghalaya Karbi-Anglong plateau and North Cachar hills.

Western and Eastern Ghats: These ghats mark the East and West edges of the in plateau. The Western Ghats (also called the Sahyadri range) lie parallel to the Western coast. The Western Ghats are higher than the Eastern Ghats. Their average elevation is 900-1600 metres as against 600 metres of Eastern Ghats. The height of the Western Ghats increases north to South. Anai Mudi (2695 m) and Doda Betta (2637 m) are highest peaks found here. The famous hill is of Udagamandalam (popularly known as Ooty) and Kodaikanal are in these hills. The Western Ghats are continuous and can be crossed through passes only. The Eastern Ghats stretch from the Mahanadi valley to the Nilgiris in the South. The Eastern Ghats are discontinuous and irregular and dissected by rivers draining the Bay of Bengal. Mahendragiri (1501 m) is the highest peak in the Eastern Ghats. Shevroy hills and Javadi hills are located in the South-East of the Eastern Ghats. The Nilgiri hills in Tamil Nadu lie at the junction of the Eastern and Western Ghats. The Western part of the plateau known as the Deccan Trap contains black soil of volcanic origin. The rocks are igneous and denuded to form black soil, famous for cotton cultivation. The Aravali hills are highly eroded and broken hills. These are lie on the Western and North-Western margins of the Peninsular plateau. They extend from Gujarat to Delhi in a South-West to North-East direction.

Features of Western and Eastern Ghats

Western Ghats	*Eastern Ghats*
They mark the Western edge of the Deccan plateau.	They mark the Eastern edge of the Deccan plateau.
Continuous	Discontinuous and irregular
Average elevation is 900 to 1600 m.	Average elevation is 600 m.
Lie parallel to the Western coast along the Arabian sea.	Lie parallel to the Eastern coast along the Bay of Bengal.

The Indian Desert: This lies on the Western margins of the Aravali hills. It consists of an undulating sandy plain with various types of sand dunes. It receives less than 150 mm rainfall annually. It has arid climate with low vegetation streams appear only during the monsoon season, Luni is the only large river in this region. Crescent shaped sand dunes called Barchans cover most of this desert, but longitudinal dunes are also seen on the Western edge of this region near the Indo-Pakistan border. This desert is known as the Thar desert.

The Coastal Plains: The Peninsular plateau is bordered by narrow coastal strips running along the Arabian Sea on the West and the Bay of Bengal on the East. The Western coast which lies between the Western Ghats and Arabian sea, is a narrow plain. It consists of three sections:

1. Northern part of the coast is called the Konkan (Mumbai-Goa)
2. Central stretch is called the kannad plain.
3. Southern stretch is called as Malabar Coast.

The plains, which lies along the Bay of Bengal, is more wide and level. In Northern part, it is known as Northern Circar and in Southern part, it is called as Coromandel Coast. Rivers like the Mahanadi, Godavari, Krishna and Kaveri have formed extensive deltas on this coast. Lake Chilika is the largest salt water lake on the Eastern coast (Odisha). It famous as a winter home for migratory birds. It lies to the South of Mahanadi Delta.

The Islands: India has two island groups. These are:

1. The Lakshadweep islands group, which lies close to the Malabar coast (Kerala). This group of islands is composed of small coral islands. Earlier, they were known as Lacadive, Minicoy and Amindive. In 1973, these were named as Lakshadweep. They cover a small area of 32 sq km.

2. Kavaratti Island is the administrative headquarters of Lakshadweep. In this group, the Pitti Island has a bird sanctuary which is uninhabited.

3. The Andaman and Nicobar islands are two chains of densely forested islands. The Andamans are bigger in size. They are more numerous and scattered. The entire group of islands is divided into two broad categories: the Andamans in the North and the Nicobars in the South. These islands are believed to be an elevated portion of submarine mountains. The southernmost tip of these islands (called Indira Point) is more South than the Indian mainland.

India's only active volcano is found on Barren Island in the Andaman and Nicobar islands. These islands are of great strategic importance for the country. There is great diversity of flora and fauna in this group of islands. They lie close to equator and experience equatorial and climate with thick forest cover.

Corals: Coral polyps are short-lived microscopic organisms which live in colonies. They flourish in shallow, mud free and warm waters. They secrete calcium carbonate. The coral secretion and their skeletons form coral deposits in the form of reefs. The reefs are mainly of three kinds; barrier reef, fringing reef and atoll. The Great Barrier Reef of Australia is a good example of the first kind of coral reef.

Conclusion:

1. The mountains are the major sources of waters and forest wealth.
2. The Northern plains are the granaries of the country. They provided the base for early civilizations.
3. The plateau is a storehouse of minerals; whit has played a crucial role in the industrialization of the country.
4. The coastal regions and island groups provide sites for fishing and port related activities.

Thus, the diverse physical features of the land haw immense future possibilities for development.