

Study Note

GEOGRAPHY STD- VII

CHAPTER-3 THE CHANGING FACE OF THE EARTH

Define “Lithospheric Plates.

According to the theory, the lithosphere is broken up into number of pieces called tectonic or lithospheric plates. It consists of crust and outer parts of upper mantle. There are six major and 20 minor plates, all of which floats independently.

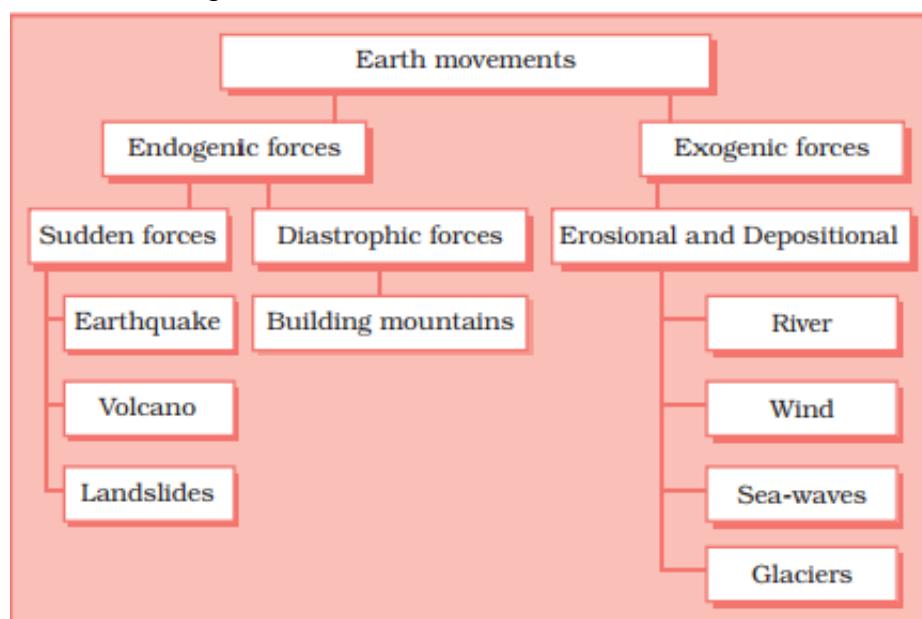
This is because of the movement of the molten magma inside the earth.

- The movement of these plates causes changes on the surface of the earth.
- The earth movements are divided based on the forces that cause them on the basis of the forces which cause them
- Endogenic forces: The forces which act in the interior of the earth.
Endogenic forces sometimes produce abrupt movements due to which earthquakes and volcanoes occur and cause mass destruction over the surface of the earth and at the other times to produce slow movements.
- Volcano: It is an opening or a vent in the earth's crust through which molten material erupts.

Earthquakes: Lithospheric plates move, the surface of the earth vibrates. The vibrations can travel all around the earth. These vibrations are called earthquakes

- **Exogenic forces:** The exogenic forces work on the surface of the earth.

Changes in Land Forms by process of gradation and erosion by natural agents like rivers , winds, waves, and glaciers



Endogenic Force

Formation of Cells- The heat from the core set off disturbances called **convection cells** in the mantle.

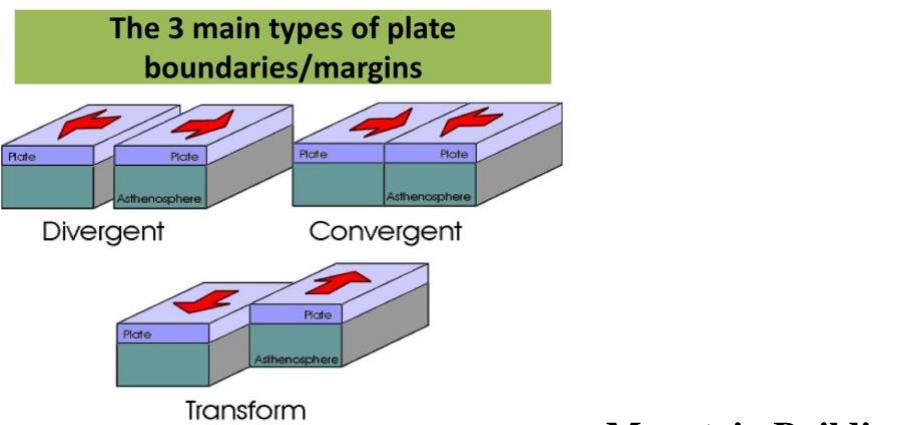
These convection cells are formed by rising current of heated magma. On reaching the top, the magma cools, becomes heavy and sinks, only to get heated and rise once more. These rising current of heated magma cause the tectonic plate floating on the asthenosphere to move around in three directions:-

Convergent:- Plates moving towards each other.

Divergent :- Plates moving away from each other.

Transform :- Plates moving parallel motion.

These movements of tectonic plates causes earthquake, Volcanic activities, and formation of mountain.



Forces of Process:-

Mountain Building

Mountains are magnificent and inspiring features. Just thinking of mountains conjures up beautiful images of places like the Rockies, the Andes, Hawaii and the Alps. But, not all mountains are the same. It is a slow and continuous though they all take a very long time to form, mountains are created in different ways depending on where they are on Earth. Some mountains are created by land pushing together, while others are formed over hotspots on Earth. Let's take a closer look at the mountain building process to better understand how these incredible structures come to be.

There are different kinds of mountains:

- Fold Mountains (Folded Mountains)
- Fault-block Mountains (Block Mountains)

Fold Mountains

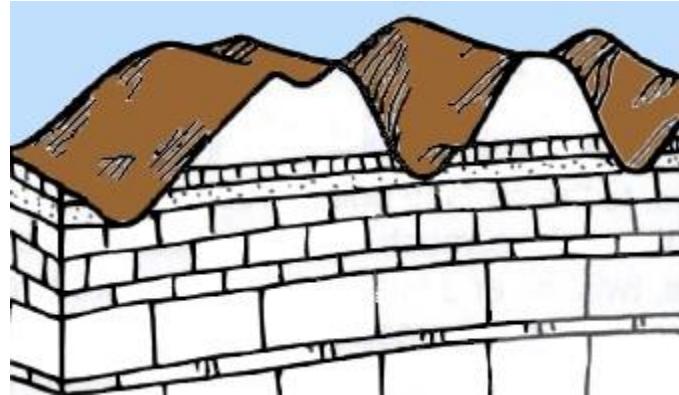
Fold mountains are the most common type of mountain. The world's largest mountain ranges are fold mountains. These ranges were formed over millions of years.

Fold mountains are formed when two plates collide head on, and their edges crumbled, much the same way as a piece of paper folds when pushed together.

The upward folds are known as anticlines, and the downward folds are synclines.

Examples of Fold Mountains include:

- Himalayan Mountains in Asia
- the Alps in Europe
- the Andes in South America
- the Rockies in North America
- the Urals in Russia



The Himalayan Mountains were formed when India crashed into Asia and pushed up the tallest mountain range on the continents.

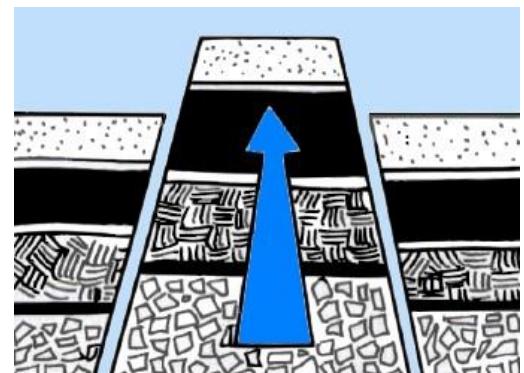
In South America, the Andes Mountains were formed by the collision of the South American continental plate and the oceanic Pacific plate.

Fault-block Mountains

These mountains form when faults or cracks in the earth's crust force some materials or blocks of rock up and others down.

Instead of the earth folding over, the earth's crust fractures (pulls apart). It breaks up into blocks or chunks. Sometimes these blocks of rock move up and down, as they move apart and blocks of rock end up being stacked on one another.

- Often fault-block mountains have a steep front side and a sloping back side.
- **Examples of fault-block mountains include:**
- the Sierra Nevada mountains in North America
- the Harz Mountains in Germany.



Earthquake:-

- ✓ All natural earthquakes occur in the lithosphere.
 - ✓ Seismic waves studies offer a full picture of the layered interior.
 - ✓ An earthquake is, simply put, shaking of the earth's crust.
 - ✓ It is caused due to the energy release, which triggers waves that travel in all directions.
 - ✓ The emanation of energy occurs along a fault.
 - ✓ A fault is a sharp break in the crustal rocks.
- Rocks along a fault generally move in opposing directions.

Causes of Earthquakes:-

- It is caused due to the tectonic movements of the earth.
- The energy release produces waves which travel in all directions.
- The point where energy is released is called the focus or hypocentre. It is generally located at a depth of 60 km.
- This causes a release of energy, and the energy waves travel in all directions.
- The point where the energy is released is called the focus of an earthquake or hypocenter.

The point on the surface of the earth which is vertically above the focus is called the epicenter.

It is the first place to experience the waves. **There are two types of waves P waves(primary waves) S waves (Secondary waves) s- waves are more destructive waves.**

All earthquakes are different in their intensity and magnitude. The instrument for the measurement of the vibrations is known as Seismograph.

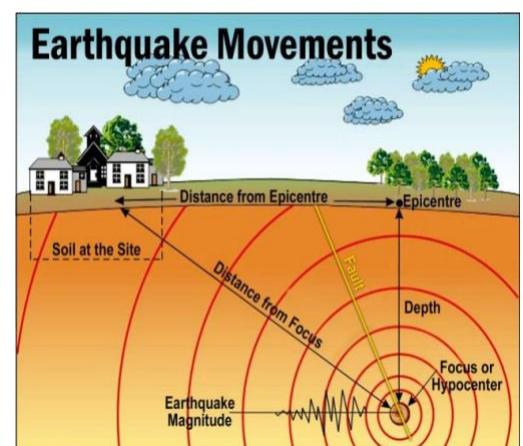
Magnitude scale

- **Richter scale** is used to measure the magnitude of the earthquake
- The energy released during a quake is expressed in absolute numbers of 0-10.

Intensity scale

- The Mercalli scale is used to measure the intensity of an earthquake
- It measures the visible damage caused due to the quake.

It is expressed in the range of 1-12.



What are Volcanoes?

A volcano is a landform, a mountain, where molten rocks erupt through the surface of the planet. The volcano mountain opens downwards to a pool of molten rocks underneath the surface of the earth.

A pressure builds up in the earth's crust and this is the reason why eruptions occur. Gases and [igneous rocks](#) shoot up and splash over or fill the air with lava fragments. The volcano eruption can cause hot ash, lateral blasts and lava flow, mudslides and more.

Magma is the hot molten rock that builds in pressure and explodes from the volcano as lava. So a volcanic eruption is a way for the earth to blow off a little steam and at the same time pull materials from deeper layers of the earth to form new crust on the surface. The way a volcano erupts and the materials that make up the magma and lava of a particular volcano have a lot to do with the formation of the volcanic landforms, such as craters, calderas, lava domes and lava plateaus.

Volcanoes are categorized into three main categories:

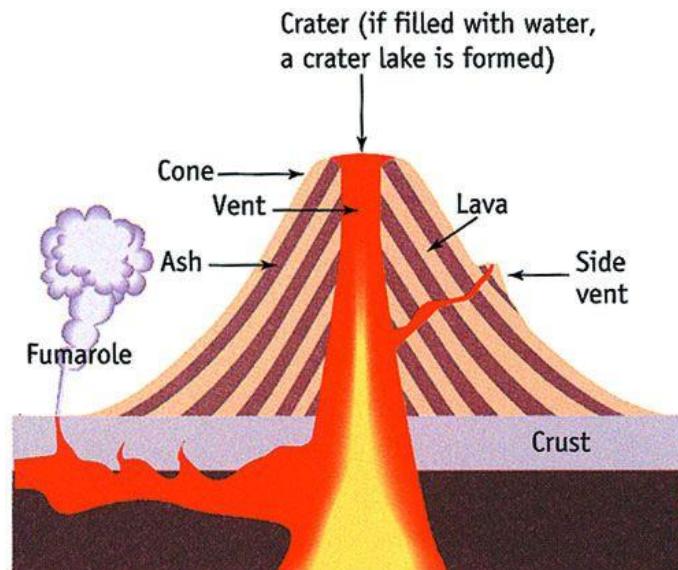
- Active
- Dormant
- Extinct

An **active volcano** is one which is recently erupted and there is a possibility that it may erupt soon.

Example:- Mt.Etna and Mt. stromboli

A **dormant volcano** is one which has not erupted in a long time but there is a possibility it can erupt in the future. Example:- Mt. Vesuvius

An **extinct volcano** is one which has erupted thousands of years ago and there's no possibility of an eruption. Example:- Mt. Kilimanjaro in Tanzania.



Exogenic Forces

The forces that **work on the surface of the earth**, such as wind, water, ice, and impacts of celestial objects (comets, etc.), are called exogenic forces.

They drive the processes of **weathering, erosion, and deposition of rocks and sediments, creation of mountains and valleys**, etc.

Weathering is the natural wearing down of mountains, etc. by wind, water, and other elements in the environment.

Erosion is the process of transporting weathered materials (soil, sand, etc.) with the help of various agents like winds, glaciers, water, etc., **and their deposition**.

Major Landforms

The landscape is being continuously worn away by two processes – weathering and erosion. Weathering: Weathering is the breaking up of the rocks on the earth's surface. Erosion: Erosion is the wearing away of the landscape by different agents like water, wind and ice. The eroded material is carried away or transported by water, wind, etc. and eventually deposited. This process of erosion and deposition creates different landforms on the surface of the earth.

Work of a River (Stages of river life)

There are three sections in a river they are called:

The upper Course, The Middle Course and The Lower Course.

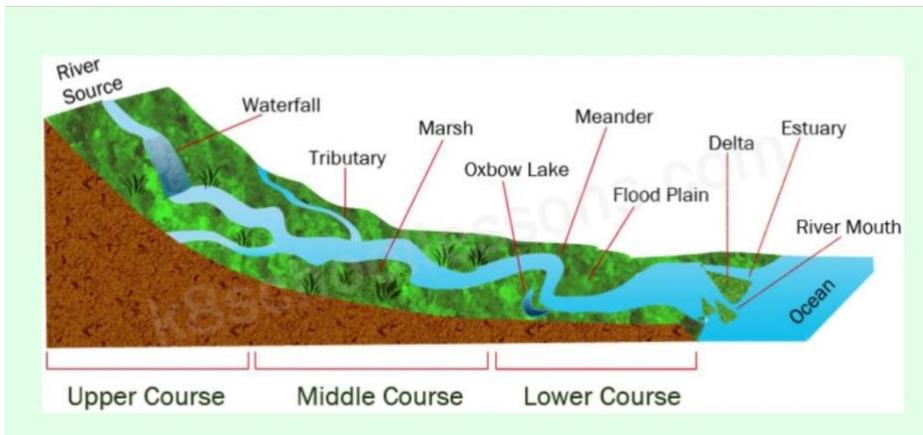
The upper Course, is the steepest part of land in the river. It is usually small, but flows very fast. The energy levels are high and the river cuts away at its bed. As it does it quickly deepens its valley through down cutting. This creates a steep sided V- shaped valley. Downward erosion is the dominant process.

In The Middle Course, the river starts to flow slowly because it starts to transport lots of sediment, as rivers look muddy. As a river moves down its valley, a number of changes occur. The river gets wider, as more tributaries join together.

The valley sides become less steep, giving the shape of a open V.

The river begins to erode sideways, into its banks. This opens out the valley floor and a flood plain that starts to develop.

The lower Course, is when the valleys V shape is so wide that the valley sides have been disappeared. The river approaches its mouth. The river now winds its way slowly across a large floodplain. Deposition is now dominant process.



Erosion work:-

Valley:- valley of different shapes are formed by the erosive action of a river in its upper and middle course.

➤ I-Shape Valley or Canyons:-

These are formed when a river cuts out a narrow valley with steep walls.

➤ V- Shape valley:-

These are formed when the river is still young and its flow rapid. The erosion is predominantly vertical and forms V-shape valley.

➤ U- Shape Valley:-

Valleys formed in the middle course of the river when it widen and horizontally erode valley floor. It forms U-shape valley.

➤ Waterfall: When the river tumbles at steep angle over very hard rocks or down a steep valley side, it forms a waterfall.

Depositional Work:-

- **Meanders:** As the river enters the plain it twists and turns forming large bends known as meanders.
- **Cut-off Lake:** Due to continuous erosion and deposition along the sides of the meander, the ends of the meander loop come closer and closer. In due course of time the meander loop cuts off from the river and forms a cut-off lake, also called an ox-bow lake.
- **Floodplain:** As it floods, the river deposits layers of fine soil and other material called sediments along its banks.
- **This leads to the formation of a flat fertile floodplain.** The raised banks are called levees.
- **Distributaries:** When the river approaches the sea, the speed of the flowing water decreases and the river begins to break up into a number of streams called distributaries.
- **Delta:** The river becomes so slow that it begins to deposit its load. Each distributaries forms its own mouth. The collection of sediments from all the mouths forms a delta.

Work of Sea Waves Sea caves:

The erosion and deposition of the sea waves give rise to coastal landforms and they continuously strike at the rocks developing cracks. The cracks become larger and wider over time.

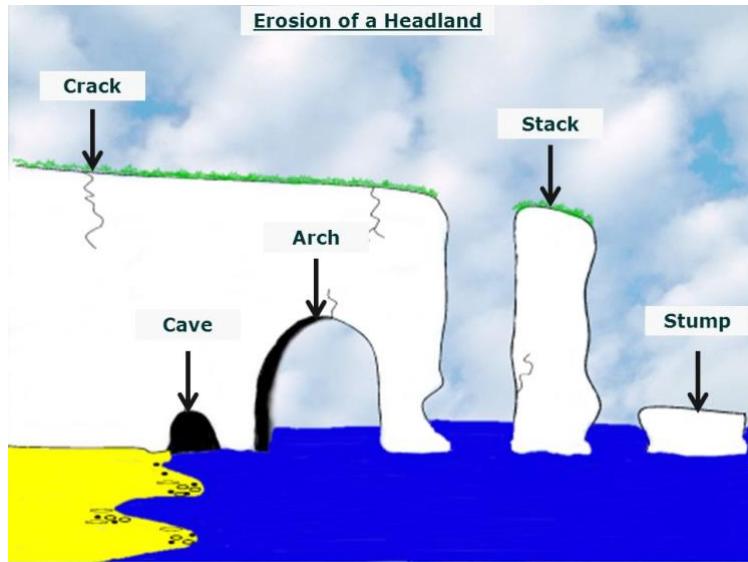
Erosion work of sea waves:-

sea caves :-Due to which, hollow like caves are formed on the rocks. They are called sea caves.

Sea Arches: When these cavities become bigger and bigger only the roof of the caves remain, it forms sea arches. :

sea stacks. :Erosion breaks the roof and only walls are left and these wall-like features are called stacks.

Sea cliff - The steep rocky coast rising almost vertically above seawater is called sea cliff.



Depositional Work:

Beaches are formed when the sea deposits eroded materials like sand, pebbles and boulders along the coast.

Wind: In the desert, an active agent of erosion and deposition is wind.

- **Mushroom Rocks:** In deserts, rocks can be shaped like a mushroom, commonly called mushroom rocks. The base of the rock is eroded vigorously from all sides by the suspended sharp dust particles in the lower layers of the wind.

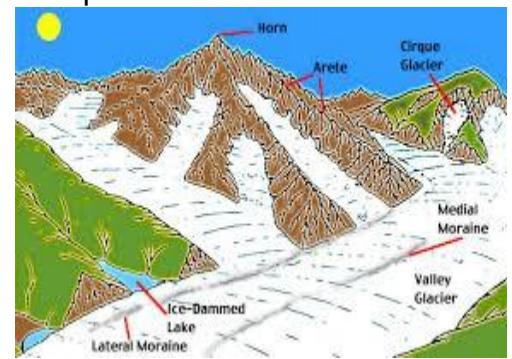
- **Loess:** When the grains of sand are very fine and light, the wind can carry it over very long distances. When such sand is deposited in large areas, it is called loess.

Depositional Work:

Sand Dunes: When the wind blows, it lifts and transports sand from one place to another. When it stops blowing the sand falls and gets deposited in low hill like structures. These are called sand dunes.

Glaciers: Glaciers are “rivers of ice” which erode the landscape by bulldozing soil and stones to expose the solid rock below. Glaciers carve out deep hollows there. As the ice melts they get filled up with water and become beautiful lakes in the mountains.

Cirques:- A cirque is an armchair-like depression caused by the erosive action of a glacier. Corries or cirques are mountain valley heads which have been shaped into deep hollows by the erosion of small **glaciers**.



Depositional Work:

Glacial Moraines: The material carried by the glacier such as rocks big and small, sand and silt gets deposited on the floor of valley and forms glacial moraines.