5. INTERNAL STRUCTURE OF EARTH

- Various landforms on the surface of the Earth are very closely related to its internal structureE
- The study of the Earth's interior is the Subject of Geology.
- The internal part of the Earth is not visible directly.
- We have to rely totally on indirect sources so as to know Earth's internal structure.
- These indirect sources can be classified into two groups-
  (1) Artificial Sources
  (2) Natural Sources

1. Artificial Sources–

(a) Density–

- The average density of the earth is 5.52
- Whereas the density of the earth's crust is about 3.0
- This indicates that the inner parts are more denser than the crust.

(b) Pressure–

- It should be noted that density increases with increasing pressure inside Earth's interior .
- This shows that the high density in the core is the result of its heavy metallic materials of high density.

(c) Temperature–

- Temperature increases by 12^{0}C on first 100 KM.
- Normally, the temperature increases by 1^{0}C for every 32 mts. of depth.

2. Natural Sources–

(a) Volcanicity–

- The molten lava comes out of the volcano during volcanic erruption.
- This condition Indicates that there is at least a layer below the Earth's crust which is in liquid or semi-liquid state.

(b) Seismology–

- It is the scientific study of the seismic waves generated during an Earthquake.
- The intensity of seismic wave is recorded by the seismograph.
- According to **Suess** Earth's interior has been devided into three Parts **-**
  (a) Sial :- Its rich in Silica and Aluminium.
  (b) Sima:- Its rich in Silica and Magnesium.
  (c) Nife:- Its rich in Nickle and Ferrous(Iron).
- **According to recent studies Earth's interior has been devided into three main layers :**

1. The Crust–

- It is the outermost layer of Earth.
- According to the IUGG, the average thickness of this uppermost layer of the earth is about 30 km.
- Some other sources estimate its thickness around 100 Km.
- The speed of the P waves in the upper part of the crulst is 6.1 Km/sec and in the lower parts it is 6.9 km/sec.
- The average density of the upper crust 2.8 and that of the lower crust is 3.0
- This difference in density is due to the pressure.
- Silica and Alluminium are the main constituent elements of the crust.
- Therefore, it is also known as the SIAL.

2. The Mantle-

- At the lower end of the crust the speed of the seismic waves increases suddenly and reaches upto 7.9 to 8.1 km/sec.
- There is a 'Moho-discontinuity' which is in between the crust and the mantle.
- The mantle extends upto a depth of about 2900 Km from the Moho discontinuity.
- The volume of the mantle is about 83% of the total volume of the earth.
- its mass is about 68% of the total mass of the earth.
- Silica and Magnesium are the major constituting elements of this layer.
- Other name of mantle is SIMA due to presence of silica and magnesium in large amount.
- Asthenosphere is found is this part at the depth of100-200Km.

3. The Core–

- At the lower end of the lower mantle, the velocity of the P waves suddenly increases to 13.6 km/sec.

- There is a 'Weichert - Gutenberg Discontinuity' which is between mentle and core.
- The core extends upto a depth of 6371 km from the Gutenberg discontinuity.
- S waves cannot penetrate into the outer core.
- Its relatively liquid or semi-liquid due to excessive temperature.
- It is in semi-liquid or plastic state.
- The volume of the core is merely 16% of the Earth's volume.
- The mass of the core is about 32% of the Earth's mass.
- Core is mainly made-up of Nickle and Iron(Ferrous) and so this layer is also called NIFE layer.

Fact File of Earth

- Average Relative Density - 5.52 (with respect ot the density of water)
- Radius - 6371 Km
- Nick name - Blue planet
- temperature decreases by 1^0C on going 32 mtrs below Eath's surface.
- Highest point - Mount Everest(8848 m)
- Deepest point - Mariana trench(11033m)
- Lowest place - Dead sea (Jordon)[400m below sea level]

Account of different elements in earth's surface

	Elements	Amount (in%) in crust
1.	Oxygen	46.8%
2.	Silicon	27.7%
3.	Aluminium	8.1%
4.	Iron	5.0%
5.	Calcium	3.6%
6.	Sodium	2.8%
7.	Potassium	2.5%
8.	Magnessium	2.0%