

5. INTERNAL STRUCTURE OF EARTH

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- Various landforms on the surface of the Earth are very closely related to its internal structure
 - 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°C on first 100 KM.
 - Normally, the temperature increases by 1°C for every 32 mts. of depth.
- 2. Natural Sources–**
- **(a) Volcanicity–**
 - The molten lava comes out of the volcano during volcanic eruption.
 - 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 divided 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 divided 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 crust 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 in this part at the depth of 100-200Km.
- 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 mantle 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 Nickel and Iron (Ferrous) and so this layer is also called NIFE layer.

Fact File of Earth

- Average Relative Density - 5.52 (with respect to the density of water)
- Radius - 6371 Km
- Nick name - Blue planet
- temperature decreases by 1°C on going 32 mtrs below Earth's surface.
- Highest point - Mount Everest(8848 m)
- Deepest point - Mariana trench(11033m)
- Lowest place - Dead sea (Jordan)[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.	Magnesium	2.0%