

Chapter – 03

Our Earth

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❖ *Introduction:*

Earth is the only planet of the Solar System where life exists. Although the other planets have their own moons, atmospheres and climates but there the overall environments do not exist which are required for life. In this way, the Earth keeps a distinct status.

With respect to the distance from Sun, the Earth stands on third place, and according to the volume the Earth is the fifth large Planet. It is being said that on Earth the signs of life and its favorable atmosphere started developing about one billion year before. If we look at the general physical environments and the geological history, here the favorable circumstance to life remain existent almost all the time. The Earth covers approximately 71% of area with sea-water. Its atmosphere always kept clouds flying all over.

Since the Earth is round in shape therefore it is called a Sphere or a Globe. Earth not only revolves on the orbit of the Sun but also takes rounds on its own axis. Despite considerable distances between Earth and the Sun and Earth and its Moon, all the three objects have mutual gravitational attractions in space. Consequently this provides an individual stability to these objects.

❖ *History:*

It is believed that some 4.5 billion years before the initial formation of this earth took place. In the beginning, it was in a liquid state. Then due to the magmatic activities and discharge of various gases, the production and accumulation of water in the shape of clouds began. Later, these clouds turned into rain-falls causing the crust of the earth cool and becoming hard. Moreover, the interaction between sunlight and various gases oozing from the earth has helped in the creation of Oxygen Gas. Afterwards this oxygen changed into ozone.

Gradually this ozone gas made a thick layer around Earth which has helped in stopping the ultra violet rays of the Sun. This protective layer all over the outer shell of the earth has facilitated the earth favorable to life.

It is also believed that after the formation of Earth, a collision of a mass equivalent to planet Mars took place with Earth. This mass is known as “Theia”. Some part of it joined with the Earth and some part gone away in the space. However, it could not go beyond the gravitational force of the Earth and still remains in the attraction of Earth. As such, it has become a sort of moon of Earth and still exists as its “Natural Satellite”.

For the complete formation of Earth and coming into the present shape it took different phases and considerable time. This geological process has been tabulated in the form of “Geological Time Scale”. It has been mainly divided into four major stretches that is known as “Era” These Eras are followed by different “Periods”, and “Epochs”. With this, it appears that the signs of life started just at the end of first Era, i.e. Precambrian.

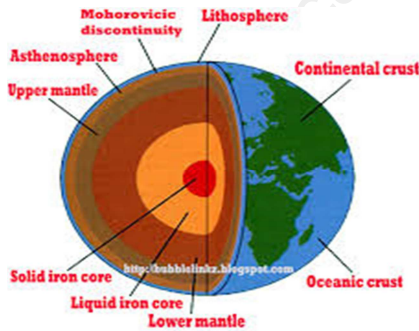
Geological History of Earth

<i>ERA</i>	<i>PERIOD</i>	<i>EPOCH</i>	<i>PLANT & ANIMAL DEVELOPMENT</i>	<i>AGE (Myr)</i>
Cainozoic	Quaternary	Holocene	Human Development	0.01
		Pleistocene		1.8
	Tertiary	Pliocene	Extinction of Dinosaurs and other species	5.3
		Miocene		23.8
		Oligocene		33.7
		Eocene		54.8
		Palaeocene		65.0
Mesozoic	Cretaceous		Birds	144
	Jurassic		Dinosaurs	206
	Triassic		Reptiles	248
Palaeozoic	Permian		Amphibians	290
	Carboniferous			677
	Devonian		Fishes	417
	Silurian			443
	Ordovician		Trilobites Invertebrates	490
	Cambrian			540
Precambrian			One Celled Organisms	4500
<i>ORIGIN OF EARTH</i>				

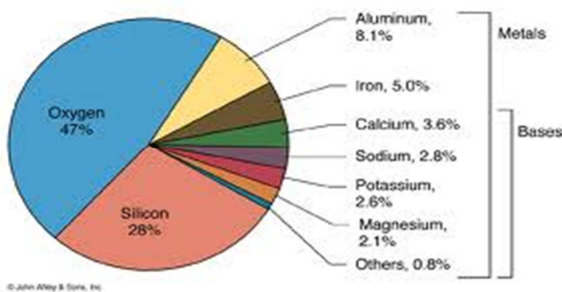
❖ **Earth's Structure:**

The sphere of the Earth is divided into different strata or zones. The four major zones are Solid Core, Lower Mantle, Upper Mantle and the Outer Crust. The central core and the inner mantle part is mainly having Iron and other heavy metals in liquid or semi liquid forms and are known as “Magma”. Due to the volcanic activities, when this magma comes out of the earth crust, it erupts and starts flowing, and then it is called “Lava”.

The Earth Crust and Upper Mantle are called “Lithosphere. Major part of the surface of Earth is covered with water. The dry part mainly comprises mountains, plateaus, deserts and plain areas. Mountains and plateaus are made up of igneous, sedimentary and metamorphic rocks. The sedimentary rocks are mostly exposed to the surface of the Earth. The deserts and plain areas are made up of fresh soil and sand.



The outer parts of the Earth primarily consist of silicates. Quartz, feldspar, amphibole, mica, pyroxene and olivine are the prominent minerals. Besides this, chemical elements are lime, magnesia, different oxides, water and carbon dioxide. Inside the Earth, the prominent heat-creating elements are Potassium-40, Uranium-238, Uranium-235 and Thorium-232.



❖ **Water and air on Earth:**

Among the members of the Solar System, the Earth is that part where water exists in abundance. As such, it has distinctiveness with other members. Therefore this Earth is also called as “Blue Planet”. This watery zone on Earth is known as Hydrosphere. It is basically comprised of prominent oceans. However, rivers, lakes, glaciers and subsurface waters are also included in it. If we collect and spread the whole water in one single pool then the depth of water will be approximately 2.7 kilometers.

All around the Earth there is a zone of air that has great significance. This zone is called Atmosphere. In this zone 78% Nitrogen, 21% Oxygen and the rest 1% carbon dioxide and other gases exist. Moreover, some suspended water particles are also widespread in this zone.

For Human being and other Creatures water and air is very important. Therefore, Hydrosphere and Atmosphere have a significant role for the life on Earth. Although the oceans contain salty water yet this is highly beneficial for the sea Creatures. Due to heat of the Sun, this salty water is converted into vapors and come into the shape of clouds, resulting into rainfall of valuable sweet water. This whole process is called Water Cycle.

Similarly, the Oxygen gas available in the air is highly significant for the life of Human being. For Plants, Nitrogen gas is very important. Moreover, variations in the atmospheric pressures also play a vital role on climatic changes. The widespread area of sea-waters also prominently effect on the climates.

Rotation of the Earth around the Sun and revolution of Earth on its own axis not only create day and night but also form different seasons. The Sun rays over the Earth also have significance. Rays of the Sun pass straight on the Equator and as a result these areas are hot. In the north and south hemisphere of the Earth, climatically the regions are Tropical. Here, rains predominantly occur. And on extreme north and south poles the angle of sun-rays are such that here hotness does not exist. Therefore, the regions of North Pole and South Pole are Ice-cold.

