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Spheres of the Earth



Our earth is unique in the solar family, earth is the only planet which has got favourable temperature, water and life, which is valuable gift to the earth. There is still no evidence that water and oxygen are available in the sufficient amount on the other planets.

Ordinarily we know that the earth was just a fire ball at the time of its origin. As this fireball cooled down slowly, it later transformed into many matters respectively, like liquid and solid. In this way the air gas around the earth surface came into existence. Huge ditches on this sphere were filled with water and turned into oceans. Thus the exact form of earth was created.

Spheres of the earth

There are four main spheres of the earth (1) Lithosphere (2) Hydrosphere (3) Atmosphere (4) Biosphere.

(1) Lithosphere : Upper layer of the earth surface is generally made-up of soil and solid matters. ‘Litho’ means soil that is why upper layer of the earth is known as ‘Lithosphere’. As this layer is also made up of rocks and solid matters, it is known as ‘the rock sphere’ or ‘the solid-sphere’.

Area and formation : Upper layer of the earth’s crust is approximately 64 to 100 km thick. Light matters like aluminium and silica are mainly found in that. This layer is thin in the deep sea. Lithosphere occupies about 29% of the earth’s surface. Mountains, plateaus and Plains etc. are there on this part of land. As we go into the depth of Lithosphere, the temperature increases gradually.

On moving towards the depth, generally per killometer 30° C temperature increases. Internal rocks are melted due to the intensive heat and turn into semi liquid form. This molten liquid is called ‘Magma’. It consists of various gases, here high pressure of the upper rocks is observed.

Thus, balance is maintained – between two opposite forces like pressure and heat, that is why earth crust does not burst.

Lithosphere has close relation with biosphere and vegetation. Our home, water, farming, industry and all are closely associated with Lithosphere. Minerals and crude oil is obtained from Lithosphere. Various crops are obtained thorough farming. Various industries and other economic activities are performed in the plain regions. Forests on the mountainous region is indebted to the Lithosphere. In short it can be said that the pillar, from food to dwelling and base of our existance means lithosphere.

(2) Hydrosphere : The proportion of water area is more on the earth than the land area. Area of the earth surface occupied by water is known as ‘Hydrosphere’. Approximately 71% of the total earth surface is covered with water. This area of the earth surface is so vast that continents appear as if island. Part of the earth having huge water mass are known as oceans. They are respectively



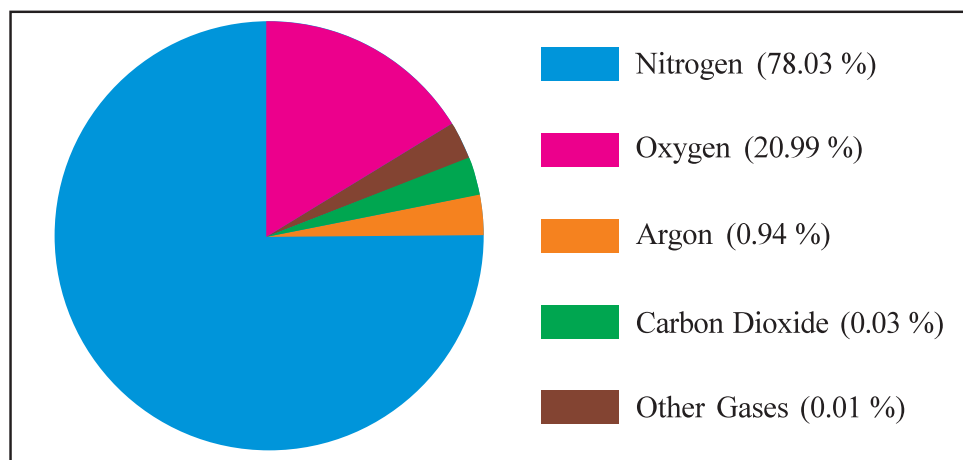
wellknown as the Pacific, the Atlantic, the Indian and the Arctic ocean. Oceans on the earth are very deep and huge. 10 to 11 km deep valleys are there in their bottom. Various Land forms like earth surface are there in the bottom of these oceans. 97% of the total earth's water is found in the oceans and it is saline water. Remaining water approximately two third part is in the form of ice-sheets on the poles and on the other high mountains like Himalayas. The water which is lying under earth crust, flows in the form of lake and rivers is very less in proportion.

Living creatures and plants on the earth can not survive without water; it is available through food or through 'Moisture' from the air. The existance of Hydrosphere is the existance of the living being. Most of the humidity for the earth's rain comes from the ocean. At the bottom of the sea there lies a large amount of precious minerals. Salt is obtained from the water and its bottom contains minerals like manganese, iron, tin etc. Ocean is also a stock of protein rich food for humans. There is enormous power in the sea and ocean waves, currents and tides of the oceans. By its management/usage electrical energy can be obtained. The oceans have developed as water ways. Water ways are also more favourable in the trade of different countries.

(3) Atmosphere : The earth is surrounded by a layer of gases up to the approximate height of 850 to 1000 km, the layer of various gases is called atmosphere.

The atmosphere can not be seen with the naked eye. Various gases, water vapours, dust particles, particles of asteroids, salt particles and even microorganisms-insects are mixed with the atmosphere.

Atmosphere is colourless, odourless and tasteless as well as transparent. Atmosphere comprises of solid, liquid and gaseous matters. Major gases in atmosphere are nitrogen, oxygen, argon, carbon-dioxide and ozone etc. The atmosphere near the earth surface is dense.

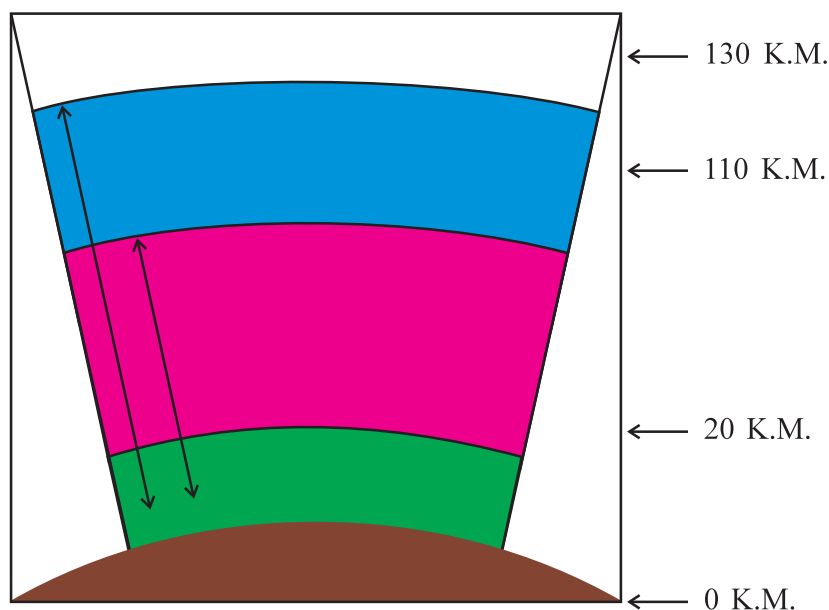


10.1 Ratio of Gases in The Atmosphere

As we go above the earth's surface ratio of most of the gases in the atmosphere decreases. Since carbon-dioxide is heavy gas, it is dense in the lower strata of the air and decreases in the above strata. The presence of carbon - dioxide after the height of about 20 kilometers, oxygen after the height



of 110 kilometers and nitrogen after the approximate height of 130 kilometers is seen decreasing. At high altitudes there are only light gases like Hydrogen and Helium..



10.2 Height of gases in Atmosphere

The ratio of ozone gas in the atmosphere is very less. This gas absorbs ultraviolet rays of sun and protects the planet from the excessive heat of the sun. This gas mostly prevails in the open ground at the time of early morning. In the same way its ratio is more in the air around the sea shore. That is why people go for morning walks in such places because ozone is healthier gas.

Think : Why do mountaineers carry oxygen bottles while climbing a mountain ?

Due to the various particles in the atmosphere sun-light is seen spreading on the earth. It does not become dark or bright suddenly. Sky colours of dawn before sunrise and dusk after sunset are because of the dust particles. The rays are reflected through the dust particles and we get sun light.

Sound can be heard with the medium of atmosphere. The waves of sound and light are reflected in the atmosphere and returns to the earth surface so that transmission of radio and television become possible. Heavenly objects such as meteorites burn due to the friction of atmosphere and get damaged. Thus atmosphere proves as a 'Natural shield' for the earth.

(4) Biosphere : The part of environment like Lithosphere, Atmosphere and Hydrosphere, wherever living being is seen alive is called Biosphere.

Biosphere is comprised of variety of life forms. This living sphere includes human, vegetation and animal life. Living being on the earth surface gets food from Biosphere. Organisms of Biosphere provide variety of food and raw material to the human world. Thus existence and subsistence of human life is based on Biosphere.



Impact of Human Activities

Biosphere is mostly in the balanced condition. But when human disturbance disrupts the equilibrium of the system then only many problems arise. Natural food chain is at risk because development is being done by exploiting the environment. This condition is harmful for human being as well as for environment.

Exercises

1. Answer the following questions in 1-2 lines each :

- (1) Which are the main spheres on the earth ?
- (2) What is meant by Lithosphere ?
- (3) What is hydrosphere made up of ?
- (4) Which are the main gases of atmosphere ?
- (5) Who is included in the biosphere ?

2. Fill in the following blanks with correct word :

- (1) sphere consists of mountains, plateaus and plains.
- (2) Stretch of atmosphere is upto K.m. above the earth surface.
- (3) gas is present in maximum proportion in the environment.

3. Explain whether the following statements are true or false :

- (1) Existence of oxygen in the environment is upto the height of 150 kilometres.
- (2) The oceans have become our water ways.
- (3) Biosphere consists of variety of life forms.
- (4) Biosphere develops on the earth surface because of water and air.
- (5) Ozone gas protects living being on earth surface from the ultraviolet rays of the sun.

4. Write Short Note :

- (1) Atmosphere (2) Hydrosphere (3) Importance of Lithosphere

Activity

- What can we do for the conservation of environment, discuss in the reference to four spheres.