Mains Practice Question

Q. Discuss the evolution of the layered structure of the Earth along with the formation of the lithosphere, hydrosphere and atmosphere.

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Approach:

- Discuss the evolution of Earth.
- Explain the formation of layers.
- Conclude suitably.

Introduction

The planet earth initially was a barren, rocky and hot object with a thin atmosphere of hydrogen and helium. The present-day earth is the result of processes that are taking place from nearly 4,600 million years.

Body

Formation of the layered structure in the lithosphere:

- The earth was mostly in a volatile state during its primordial stage.
- Due to the gradual increase in density the temperature inside has increased. As a result of the material inside started getting separated depending on their densities.
  This process is called differentiation.
- This allowed heavier materials (like iron) to sink towards the centre of the earth and the lighter ones to move towards the surface.
- Due to this earth got divided into layers like the crust (outermost), mantle, outer core and inner core (innermost).
- From the crust to the core, the density of the material increases.

Evolution of Atmosphere and Hydrosphere:

- The early atmosphere, with hydrogen and helium, is supposed to have been stripped off as a result of the solar winds.
- Then, during the cooling of the earth, gases and water vapour were released from the interior solid earth. This started the evolution of the present atmosphere. **This process is called degassing.**
- Continuous volcanic eruptions contributed water vapour and gases to the atmosphere.
- As the earth cooled, the water vapour released started getting condensed.
- The carbon dioxide in the atmosphere got dissolved in rainwater and the temperature further decreased causing more condensation and more rains.
- The rainwater falling onto the surface got collected in the depressions to give rise to oceans.

Conclude

The evolution of the lithosphere, atmosphere and hydrosphere led to the evolution of photosynthesis

(someway around 2,500-3,000 million years before the present), this gave birth to the life on earth.