Living Organisms

Non-living

Different Reactions on Earth

Biotic components

Abiotic components

The movement of chemical substances among the living and non-living components of the Earth

Main biogeochemical cycles are Carbon cycle, Oxygen cycle, Hydrogen cycle, Nitrogen cycle, Phosphorus cycle, Sulphur cycle and Water cycle

Biogeochemical Cycles

Carbon Cycle

Carbon is exchanged among the biosphere, pedosphere, geosphere, hydrosphere and the atmosphere of the Earth through a biogeochemical cycle called Carbon Cycle.

All organic compounds have carbon

21% O₂ in air

Used for Respiration, Combustion, Oxidation and Decomposition

Atom in molecules like H₂O, CO₂

This biogeochemical cycle explains the movement of oxygen gas within the atmosphere, the ecosystem, biosphere and the lithosphere.

Oxygen Cycle

All green plants during the process of photosynthesis, release oxygen back into the atmosphere as a by-product.

All aerobic organisms use free oxygen for respiration.

Animals exhale carbon dioxide back into the atmosphere which is again used by the plants during photosynthesis. Thus oxygen is balanced in the atmosphere.
Nitrogen (N₂) Cycle

Nitrogen Cycle is a biogeochemical process which transforms the elemental nitrogen present in the atmosphere to a more usable form for living organisms.

**Process of Nitrogen Cycle**

1. **Nitrogen fixation**
   - Atmospheric nitrogen: 78% N₂ (elemental form)
   - Lightning converts nitrogen to ammonia and nitrate which return to soil & water by rain.

2. **Nitrification**
   - But animals & plants cannot utilize gaseous form of nitrogen.
   - Forest fires release N₂ from trees which then goes back to the atmosphere.

3. **Assimilation**
   - Animals eat plants to receive N₂ to be used to make DNA, RNA & proteins.
   - Animals excrete wastes.
   - Denitrifying bacteria convert nitrogen to an unusable form, return it to atmosphere.

4. **Ammonification**
   - Ammonia and other soluble forms as NO₃⁻ & NO₂⁻ can be used.
   - Algae converts unusable Nitrogen to usable form.

Too much nitrogen from fertilizers returns to soil, contaminates ground water.

Plants and animals die, return to the soil, are decomposed.

Fish dies, decompose.

Nitrogen from atmosphere returns to soil and water with the help of bacteria and algae.

**Phosphorus Cycle**

Phosphorus cycle involves both aquatic and soil reservoirs.

- Rocks contain phosphate (PO₄³⁻).
- Weathering or erosion of rocks.
- Urine.
- Waste decomposition.
- Plant Uptake.
- Geological Upheaval.
- Inorganic phosphate (HPO₄²⁻).
- Incorporation into sedimentary rocks (as phosphates of Ca, Mg and Fe).
- Dissolved Phosphates.
- Excretion & decomposition.