

Reservoirs of carbon

Are areas that contain carbon without minding its form, for example

- Atmosphere => carbon as CO₂
- Biomass => organic matter / hydrocarbons
- Solids => limestone and coal (sedimentary rocks)
- Liquid => oil and hydrocarbon petroleum
- Gas => natural gas (methane, pentane, heptane, etc.)

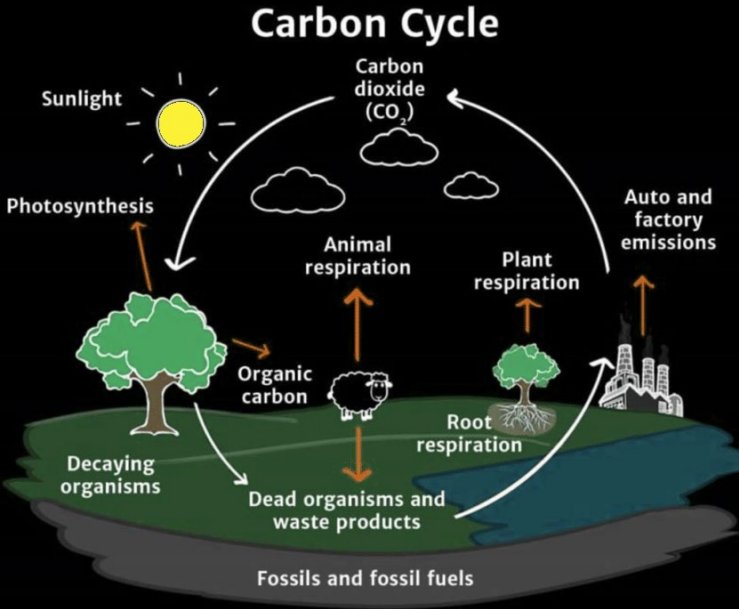
Fun fact : the ocean is the largest reservoir of carbon

CARBON CYCLE

It is the concept that many processes work together to create a global movement of carbon from one reservoir to another, basically how carbon changes forms

It goes like this

- Carbon dioxide exists in the atmosphere
- It gets turned into organic carbon in the form of biomass and what not by photosynthesis in the producers (photosynthesis)
- When consumers and other producers die, their organic makeup turns into fossil fuels by the decomposers
- When animals and plants consume organic compounds in respiration, they emit carbon dioxide (cellular respiration)
- When we burn fossil fuels, we emit carbon dioxide
- Sometimes volcanoes are also a substantial source of CO₂
- Cycle returns



Human influence on the carbon cycle

Humans contribute to the increase in carbon amount in the atmosphere, by burning fossil fuels for the industry

NOTE : the other cycles after it are just for fun, they are not mandatory in the learning outcome

WATER CYCLE

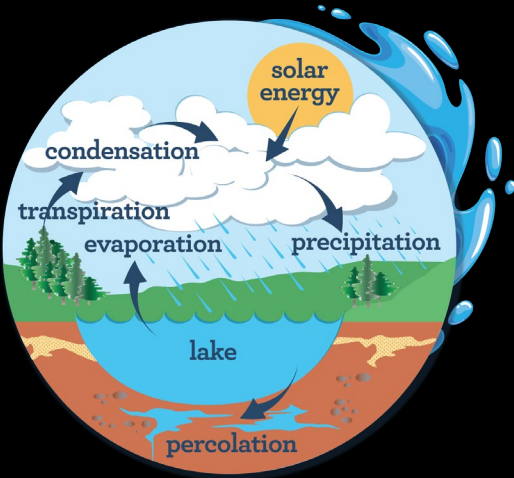
Water is essential to all organisms, and it is exchanged in different forms, the water cycle is the water going through all its forms and then back

Reservoirs of water

- Ocean contains 97% of the water
- Glaciers contain 2%
- The remaining 1% is in lakes, rivers, groundwater, and the atmosphere

The steps of the water cycle

- Water evaporates with solar energy
- Transpiration in plants let out water in the form of a gas
- Gas form water cools down in the sky and condenses into rain
- The water rains down and precipitates into the soil and lakes



PHOSPHORUS CYCLE

Organisms require phosphor for stuff like nucleic acid, phospholipids, ATP, bones, teeth, etc.

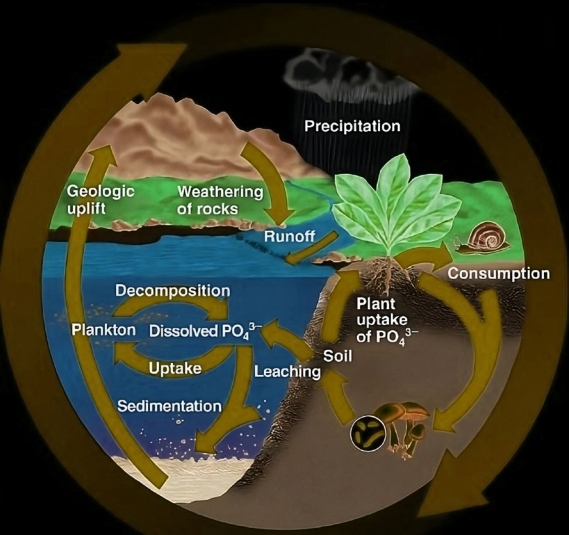
The most biologically important form of phosphorus is phosphate, which plants absorb and use in the synthesis of organic compounds

Reservoirs of phosphorus

- Sedimentary rocks of marine origin
- Soil
- In the ocean (in dissolved form)
- Organisms

The steps of phosphorus cycle

- Weathering of rocks adds PO₄ to the soil
- Some leaches into groundwater and surface water and may reach the sea
- Phosphate is taken by producers and goes to consumers when eating the producers
- Decomposition leads to phosphate returning to the soil, and then it goes back to the water
- The PO₄ In the ocean sediments into rocks
- The rocks are uplifted to be weathered again



NITROGEN CYCLE

Nitrogen is part of amino acids, proteins, and nucleic acids and is often a limiting plant nutrient

NITROGEN FORMS AVAILABLE TO LIFE

- Plants can assimilate (use) two inorganic forms of nitrogen
 - ammonium (NH_4^+)
 - nitrate (NO_3^-)
 - some organic forms, such as amino acids
- Various bacteria can use all of these forms as well as nitrite (NO_2^-)
- Animals can use only organic forms of nitrogen

RESERVOIRS OF NITROGEN

- Atmosphere (80% N_2)
- Soils
- Sediments of lakes, rivers, and oceans
- Surface water
- Ground water
- Biomass

STEPS OF NITROGEN CYCLE

- Nitrogen fixation** : conversion of N_2 into forms that are able to be made into organic nitrogen compounds
 - Certain bacteria, as well as lightning and volcanic activity, fix nitrogen naturally. Nitrogen inputs from human activities now outpace natural inputs on land
 - Industrially produced fertilizers and legume crops fix nitrogen via bacteria in their root nodules.
- Nitrification** : conversion of NH_3 to NO_3^-
- Nitrogen assimilation** : nitrogen stays in the organism
- Nitrogen ammonification** : nitrogen turns into ammonium ions after death
- Denitrification** : NH_4^+ turns into N_2 , and cycle continues

