

SECOND TERM SS 2 BIOLOGY WEEK THREE (3)

23 – 27 TH JANUARY, 2023

Nutrient Cycling in Nature

CONTENT

Definition, Carbon Cycle, Process of Cycling, Importance of Carbon, Carbon-oxygen balance

Meaning of Nutrient Cycling

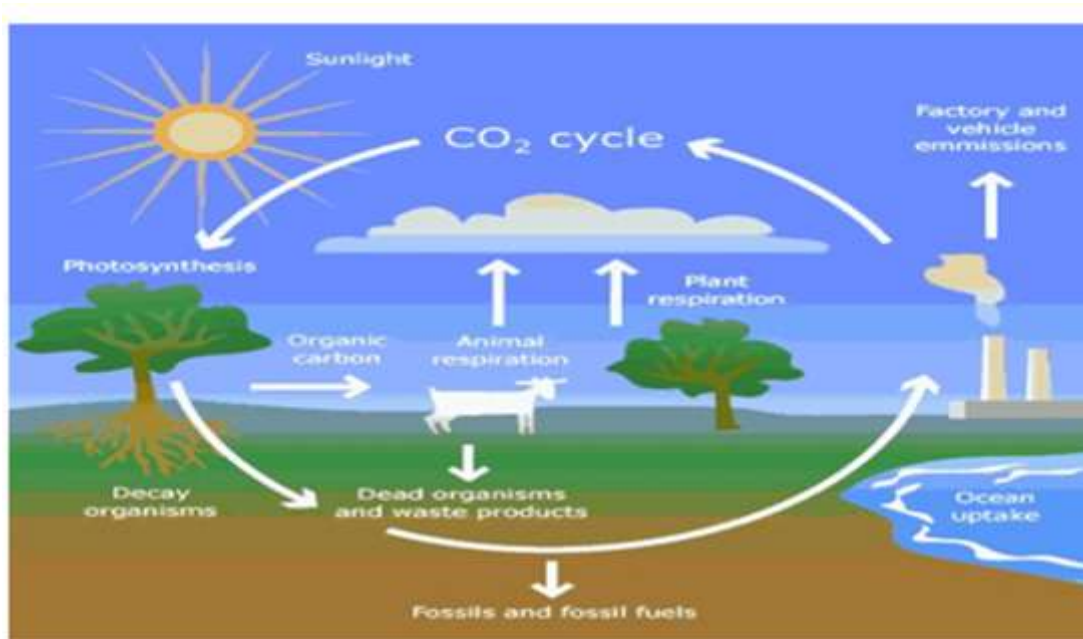
Nutrient cycling refers to the movement of certain nutrients like nitrogen, carbon, water, oxygen and other elements from the environment into various organisms and back into the environment. The path along which the atoms or elements pass is called a cycle. The popular well-known nutrients cycles are nitrogen cycle, carbon cycle, water cycle and decomposition in nature.

Carbon Cycle

Carbon Cycle is the cycle of carbon usage by which energy flows through the Earth's ecosystem. The basic cycle begins when photosynthesizing plants use carbon dioxide (CO_2) found in the atmosphere or dissolved in water.

The atmosphere gains carbon dioxide through:

1. Combustion of organic materials such as coal, wood and petroleum
2. The action of volcanoes which releases carbon dioxide
3. The respiration by plant and animals
4. The death, decay and putrefaction of plants and animals
5. Diffusion of carbon dioxide from seas and other bodies of water acting as a reservoir of carbon dioxide.



CARBON CYCLE

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Importance of Carbon in Nature

1. Plants use carbon dioxide obtained from the air to manufacture their food during photosynthesis.
2. It provides carbon which is the major building block of all organic matter.
3. It helps to purify the atmosphere and maintain the atmospheric level of carbon dioxide
4. Organic matter which is made from carbon helps to replenish soil nutrient.

CARBON-OXYGEN BALANCE

Oxygen constitutes 21% of the gases in the atmosphere. Respiration, decay and combustion are the processes which remove oxygen from the atmosphere while photosynthesis is the process that releases oxygen into the atmosphere. Human activities such as deforestation lead to the release of less oxygen into the atmosphere while less carbon dioxide is removed from the atmosphere. Increase in the combustion of fuel, respiration and decay leads to the removal of more oxygen from the atmosphere while more carbon dioxide is added. As a result of the activities mentioned above, oxygen level in the atmosphere decreases while carbon dioxide level increases. A decrease in the atmospheric oxygen level by 2-8% does not cause any significant effect but a slight increase in the atmospheric carbon dioxide may cause the greenhouse effect, i.e., increase in the retention of the sun's radiant (heat) energy. This results in the warming of the atmosphere of the earth. So to prevent this, there is the need to balance the carbon-oxygen level in the atmosphere.

EVALUATION

1. What is the importance of carbon?
2. Explain carbon-oxygen balance.

Water Cycle

Definition: Water cycle is the continuous movement of water from the earth to the atmosphere by evaporation, transpiration and perspiration and back from the atmosphere to the earth by precipitation.

Process of Water Cycling in Nature

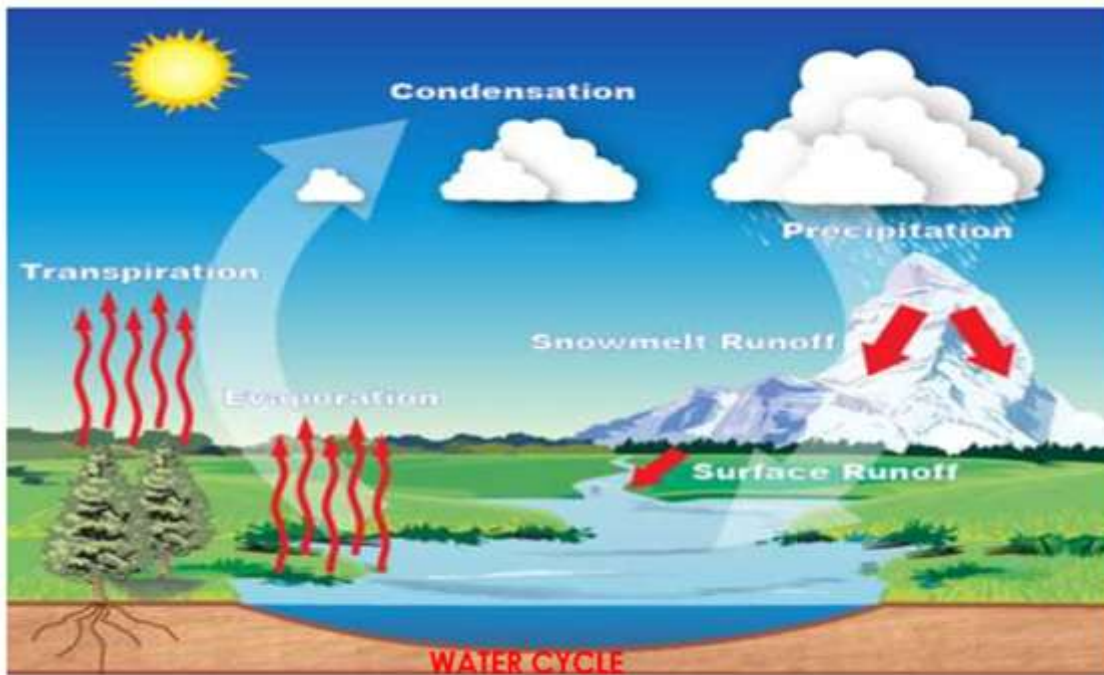
The solar energy causes water to evaporate from the hydrosphere into the atmosphere. When the water vapour cools, it condenses. At high altitude, the condensed water forms clouds. The clouds precipitate as rain returning to the hydrosphere.

Evaluation

1. Define water cycle.
2. State the major processes that bring about the water cycle

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Importance of Water to plants

Water is very important to living organisms, both plants and animals, in a number of ways:

- Water provides the medium for absorption of dissolved mineral salts by plants.
- Water is an essential raw material in the process of photosynthesis.
- It acts as a medium of transport for plants nutrients.
- It maintains osmotic content of body tissues.
- Water is the main component of plant protoplasm.
- Water is required for germination.

Importance of Water to animal

- It acts as a solvent for soluble food substances in the digestion of food.
- it constitutes a large portion of the blood.
- Water aids excretion-of waste products by animals.
- Water regulates body temperature.
- Water provides a natural habit for aquatic organisms.

General Evaluation

1. Mention three processes that involve carbon.
2. Mention three importance of water to animals.
3. Explain the following terms: Hypertonic, Hypotonic and Isotonic solution.
4. Outline the process of the water cycle in nature.
5. List the constituents of air in nature.

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WEEKEND ASSIGNMENT

1. Which of the following processes removes water from the water cycle? (a) Condensation (b) Perspiration (c) Photosynthesis (d) Transpiration.
2. What type of energy causes water to evaporate from the hydrosphere (a) mechanical energy (b) chemical energy (c) solar energy (d) hydro-electric power.
3. Water is returned to the atmosphere from animals through the following processes except _____ (a) excretion (b) respiration (c) condensation (d) perspiration.
4. When organisms die, water returns to the atmosphere by (a) decay (b) sweating (c) respiration (d) condensation.
5. Atmosphere gains carbon through the following processes except _____ (a) Photosynthesis (b) Decay (c) Respiration (d) Volcano

THEORY

1. Water is essential for living organism, discuss.
2. Describe the process of carbon cycling in nature.