

Nutrient cycles essay

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Nutrient Cycles This paper summarizes the text book Chapter 3 on the Nutrient Cycles.

The Carbon cycle, Nitrogen cycle, Phosphorous cycle, Sulfur cycle and Hydrologic cycle have been discussed in detail. The impact of human activities on these cycles has also been reviewed. Carbon cycle Carbon dioxide gas makes up 0.

038% of volume of the troposphere and is also found dissolved in water. Carbon dioxide is therefore a very important ingredient of the Carbon cycle. Removal of Carbon dioxide from the Carbon cycle causes the atmosphere to cool and adding of Carbon dioxide causes the atmosphere to get warmer. Therefore, any slight changes drastically affect the climate and the life forms on earth. Terrestrial and aquatic producers remove Carbon dioxide from the atmosphere and water respectively and then use photosynthesis to convert Carbon Dioxide into glucose. The glucose is then broken down into Carbon Dioxide.

Photosynthesis and aerobic respiration keeps circulating throughout in the biosphere (Chapter 3, p. 55). Humans are affected by the Carbon cycle in the following ways.

First, clearing of trees and plants and not replanting it again causes slower absorption of Carbon Dioxide through photosynthesis. Second, burning of fossil fuels and wood emits huge quantities of Carbon dioxide into the environment. Climate systems show that natural greenhouse effect warms the environment, but global warming damages wildlife, food production, changes temperature and precipitation, even changing sea levels all over

(Chapter 3, p. 55). Nitrogen cycle Nitrogen gas makes up 78% of the volume of the stratosphere in the earth's atmosphere. Electrical discharges such as lightning and bacteria in aquatic life, soil and in roots of plants all convert Nitrogen into useful nutrients that can be absorbed and used. The Nitrogen cycle starts off with nitrification wherein bacteria in soil, converts ammonia to Nitrite ions and then to Nitrate ions, which is taken in by roots of plants.

Animals get Nitrogen by feeding on these plants. Plant and animal wastes and dead bodies cause ammonification that is conversion of decomposed bacteria into Ammonia and Ammonium ions. Denitrification then occurs where, Ammonia and Ammonium ions are converted back into nitrites and nitrate ions and then again into Nitrogen gas and Nitrogen oxide gas.

This is the Nitrogen cycle (Chapter 3, p. 55, 56). Humans are affected by the Nitrogen cycle in the following ways. First, Acid rain or acid deposition release larger amounts of Nitric oxide into the atmosphere. Second, Nitrous oxide in the atmosphere depletes the ozone layer. Third, the use of inorganic fertilizers easily contaminates groundwater making drinking it unsuitable. Fourth, Destruction of forests, grasslands and wetlands release huge quantities of Nitrogen in the environment.

Fifth, Agriculture runoff and sewage upsets aquatic life. Sixth, irrigation, clearing, burning of forests and grasslands cause removal of Nitrogen from top soil (Chapter 3, p. 56, 57). Phosphorous cycle Phosphorus cycle is a slow process through earth's water, soil and life forms. Phosphate salts are found as Phosphate ions in rock formations and ocean sediments.

Running water erodes these inorganic compounds and washes it into lakes, streams, rivers and oceans. Phosphorus limits the growth of plants and also producer population in the water bodies as it is not completely soluble in water (Chapter 3, p. 57, 58). Humans are affected by the Phosphorous cycle in the following ways. First, Phosphate mining is done for making commercial inorganic fertilizers and detergents. Second, Phosphate in tropical soils is reduced when tropical forests are destroyed. Third, Aquatic life is affected due to animal wastes and fertilizers that contain Phosphates (Chapter 3, p. 58, 59).

Sulfur cycle Sulfur is present in underground water in rocks and minerals and also as ocean sediments. Sulfur is released as Sulfates, Hydrogen Sulphides (from active volcanoes and organic matter in swamps, bogs and anaerobic decomposers causing tidal flats) and Sulfur dioxide (active volcanoes) into the atmosphere. In the Sulfur cycle, Sulfur dioxide from human activity and natural sources is converted to Sulfur trioxide. This reacts with chemicals in the atmosphere to give Sulfate salts.

This chemical reaction causes acid deposition which affects trees, plants and aquatic systems (Chapter 3, p. 59). Humans are affected by the Sulfur cycle in the following ways. First, the burning of coal and oil to get electric power uses Sulfur. Second, the making of gasoline, heating oil and many useful other products use Sulfur containing petroleum.

Third, Sulfur dioxide is given out when sulphur containing metallic mineral ores are converted to free metals like copper, zinc and lead (Chapter 3, p.

59, 60). Hydrologic cycle Water vapor forms 84% of earth's water from oceans and from land.

Evaporation occurs due to the solar energy and during returning the precipitation gets into glaciers, infiltration and percolation in soil and rocks also occurs. These are called aquifers. Surface runoffs also occur with water flowing into streams, lakes, ultimately joining the oceans. Throughout the Hydrologic cycle or the Water cycle there is a constant process of collections, evaporation and purification of the earth's water takes place (Chapter 3, p.

53, 54). Humans are affected by the Hydrologic cycle in the following ways. First, using huge amounts of fresh water from underground, streams, lakes, for various purposes one of them being drinking. Second, the clearing of land for purposes such as agriculture, roads, mining and construction causes reduction in infiltration of groundwater and increases the chances of flooding, soil erosion and land slides, as this acts like a sponge in absorbing and holding water overflow.

Third, Nutrients are added into the soil by the usage of fertilizers that contain phosphates and nitrates. Pollutants and nutrients together overload the nutrients present in the plants causing imbalance in the natural ecological process (Chapter 3, p. 54, 55).

ReferencesChapter 3. Ecosystems: What are they and how do they work?
Environmental ScienceNow. <http://biology.brookscole.com/miller11>