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Energy Flows and Material Cycling

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The energy flows through the ecosystem in the form ofcarbon-carbon bonds(C-C bond). Inorganic nutrients also flow through the ecosystem. During respiration the C-C bonds are broken and the released carbon is will be added to the atmospheric oxygen and become carbon dioxide.

Energy Intake

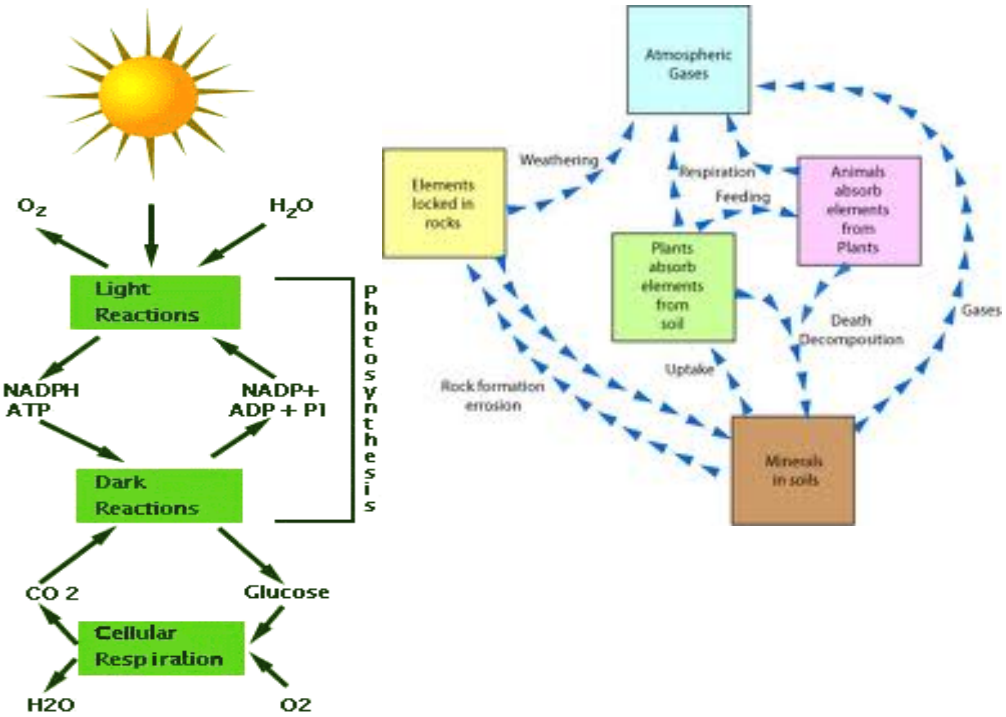
The energy taken in by theorganisms in a trophic level:

- Passed on to the next trophic level in the food chain when the organism is eaten.
- Stored in detritus. This energy is passed on to decomposers when the detritus decays.
- Converted to heat energy by inefficientchemical reactions.

Energy is used up and lost as heat as it moves through ecosystems and new energy is continually added to the earth in the form of solar radiation.

Nutrients and other organic materials are continually recycled within ecosystems. There is the possibility of a new addition to an ecosystem and loss to the same ecosystem. As per researches, Earth is a closed system. So materials as well as energy are essential for the function structure and composition of ecosystem.

In the carbon cycle, materials and energy can be inter-converted.



Energy Flow and material cycling

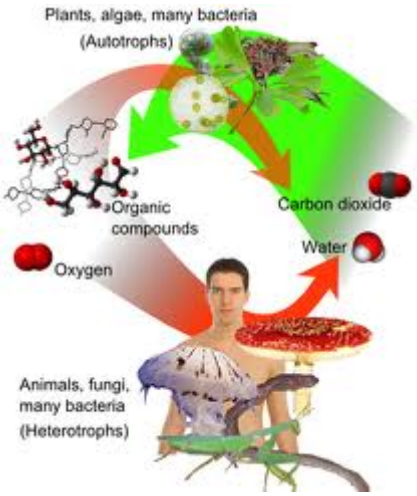
Autotrophs Vs Heterotrophs

We know that some organisms only can produce their own food. These are called autotrophs. They are independent and referred as primary producers.

The organisms which depend on plants and animals for food and can’t make their own food are called as Heterotrophs. These are calledconsumers.

Chemosynthesis
Chemosynthetic organisms can only obtain their energy by feeding on other organisms. These are called heterotrophs for example, animals, and microbes. These are also called as consumers.

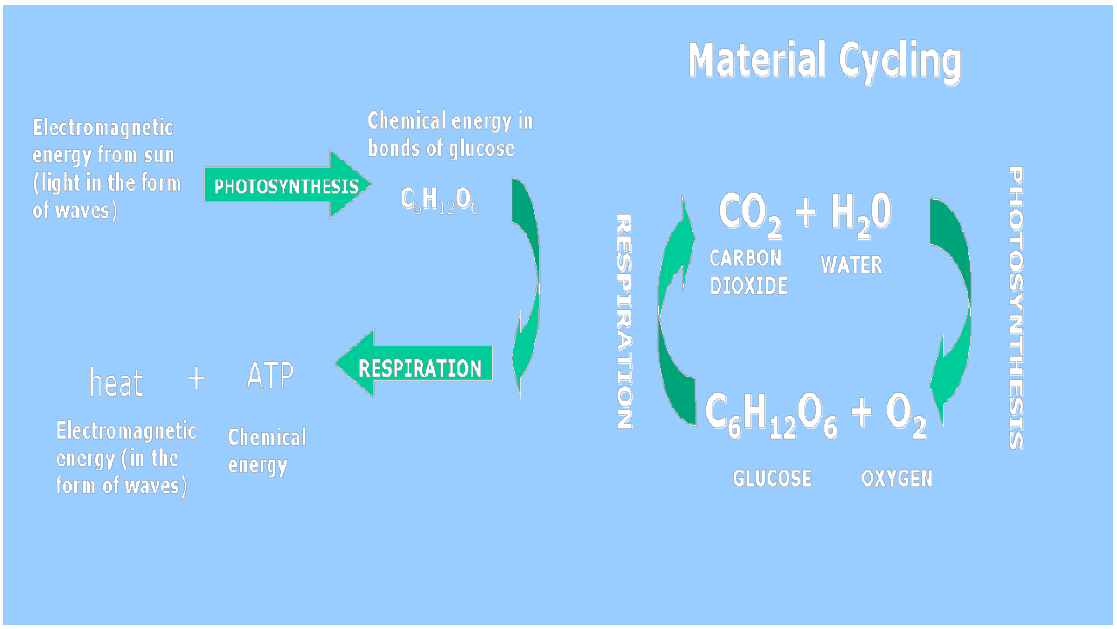
Some producer organisms like bacteria can convert inorganic nutrients to organic compounds in the absence of light energy. This is called chemosynthesis. In marine and freshwater environments different types of chemosynthetic bacteria are present.



Energy Flow

Photosynthesis
In the photosynthesis process, complex organic molecules have been manufactured from the simple organic molecules like water, CO_2 and nutrients. ‘Photo’ synthesis name itself depicting the requirement of light for the process.

During photosynthesis the rate at which the individual plant increases in mass it is called as primary production and it results in the addition of new plant biomass to the system. Consumers obtain this directly or indirectly.



Energy Flow & Material Cycling

To summarize:

- carbon dioxide intake
- water to produce sugars
- Photosynthesis gives off oxygen gas as a byproduct
- chemosynthesis produces sulfur

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Reference Links:

- http://science.nasa.gov/science-news/science-at-nasa/2001/ast13apr_1/
- http://www.schools.utah.gov/curr/science/sciber00/8th/energy/sciber/ecosys.htm

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