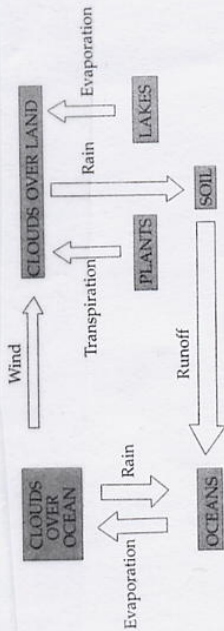


R-NEEDWIDEK HONORS BIO: NUTRIENT CYCLING FLOW CHARTS 10F2

10F2 3/25/2008, 2009

The Water Cycle

Water is obviously essential to living organisms—without it they die. Most of the water on the planet is NOT found in living organisms, however, it is found in the oceans. Because land-dwelling organisms need water, there must be a way to cycle the water from the oceans to the land and back. Here's how it works:

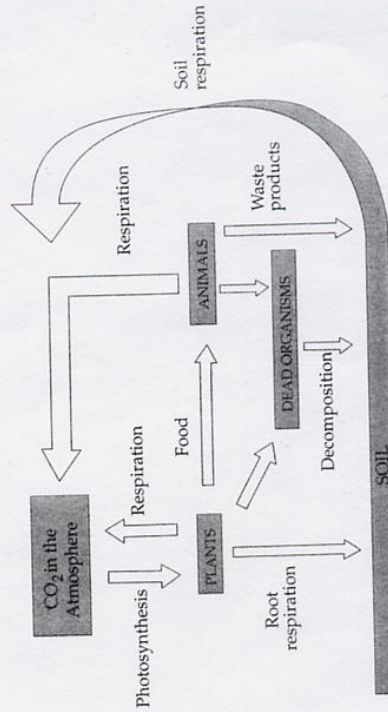


The Water Cycle

To sum up the water cycle, we can say that most water is taken up into clouds by evaporation and transpiration. The water returns to the oceans, land, and lakes by rainfall. Water that enters the soil returns to the oceans through runoff.

The Carbon Cycle

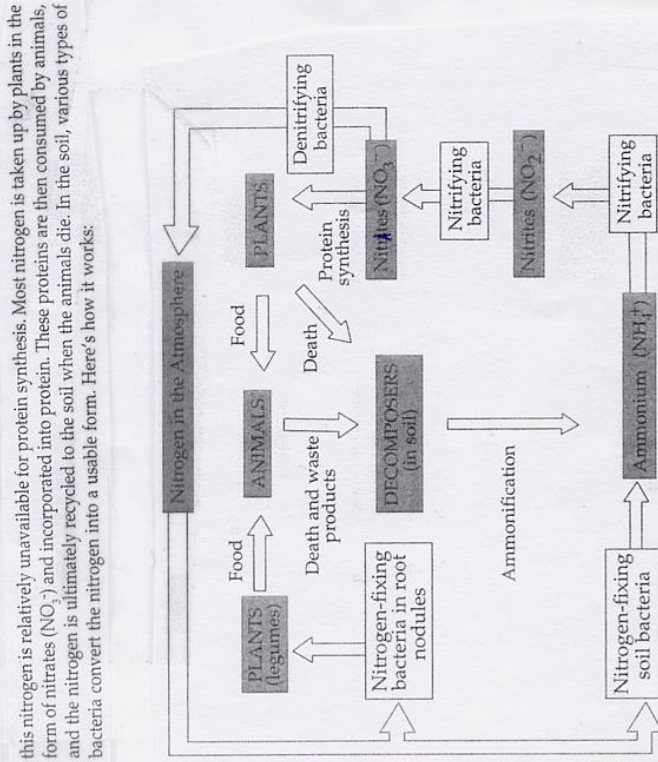
Carbon is the basic building block of all organic material. Most carbon is found as carbon dioxide in the atmosphere. Carbon is also used by plants to form organic molecules (sugars), which are then eaten by animals. The carbon is recycled to the atmosphere by respiration. Here's the picture:



The Carbon Cycle

The Nitrogen Cycle

Nitrogen is an important nutrient for the production of protein—as you may recall, it's found in all amino acids. Every organism—from bacteria to plants to fungi to animals—requires nitrogen for protein production. Even though most of the nitrogen on Earth is found as a gas in the atmosphere, this nitrogen is relatively unavailable for protein synthesis. Most nitrogen is taken up by plants in the form of nitrates (NO₃⁻) and incorporated into protein. These proteins are then consumed by animals, and the nitrogen is ultimately recycled to the soil when the animals die. In the soil, various types of bacteria convert the nitrogen into a usable form. Here's how it works:



The Nitrogen Cycle

At first glance the nitrogen cycle seem complex, but really, you only have to remember the basics:

- ◆ When animals and plants die, the nitrogen in their bodies is released to the soil.
- ◆ The nitrogen in the soil is converted by bacteria into a usable form for plants. Some plants (legumes) have their own "resident" bacteria.
- ◆ Some bacteria release nitrogen from the soil into the atmosphere, some take it out of the atmosphere and put it into the soil.
- ◆ Plants use the nitrogen from the soil to produce protein.
- ◆ Animals eat the plants and use the proteins to make their own proteins.
- ◆ When animals and plants die, the cycle begins again.