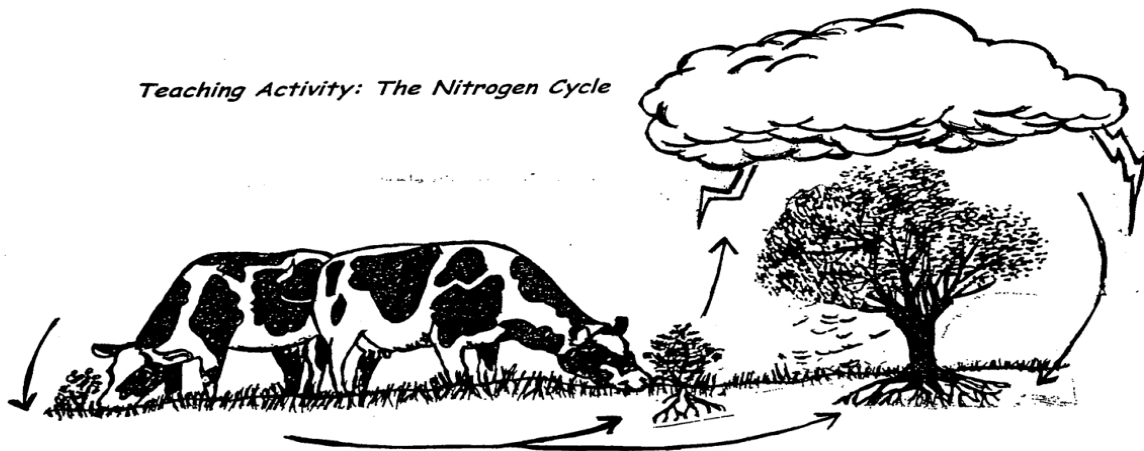


Teaching Activity: The Nitrogen Cycle



Introduction: About 78% of the Earth's atmosphere is made up of "free" nitrogen (N_2), produced by biological and chemical processes within the biosphere and not combined with other elements. All living things need nitrogen to build proteins and other important body chemicals. However, most organisms, including plants, animals and fungi, cannot get the nitrogen they need from the atmospheric supply. They can use only the nitrogen that is already in compound form.

Certain types of bacteria are able to use the free nitrogen in the air to make nitrogen compounds through a process called *nitrogen fixation*. Most of the nitrogen fixation on Earth occurs as a result of bacterial activity. Some of these bacteria live in the soil, others live in water. Still others grow inside structures on the roots of certain plants called *legumes*, which include beans, clover, alfalfa, peas and peanuts.

One family of nitrogen compounds produced by *nitrogen - fixing bacteria* are called *nitrates*. Nitrates are taken directly from the soil by plants and used by the plant to make other compounds, such as proteins. The compounds made from the plants are then used by other organisms that cannot use nitrates directly.

Nitrogen is returned to the atmosphere by the activity of organisms known as *decomposers*. Some bacteria are decomposers and break down the complex nitrogen compounds in dead organisms and animal wastes. This returns simple nitrogen compounds to the soil where they can be used by plants to produce more nitrates.

Nitrogen is continually moving back and forth between the soil, plants and animals. Eventually, however, the complex compounds are broken down to produce free nitrogen, which is then returned to the atmosphere. This continual transfer of nitrogen from the nonliving part of the environment to the living part and back again is called the *nitrogen cycle*.