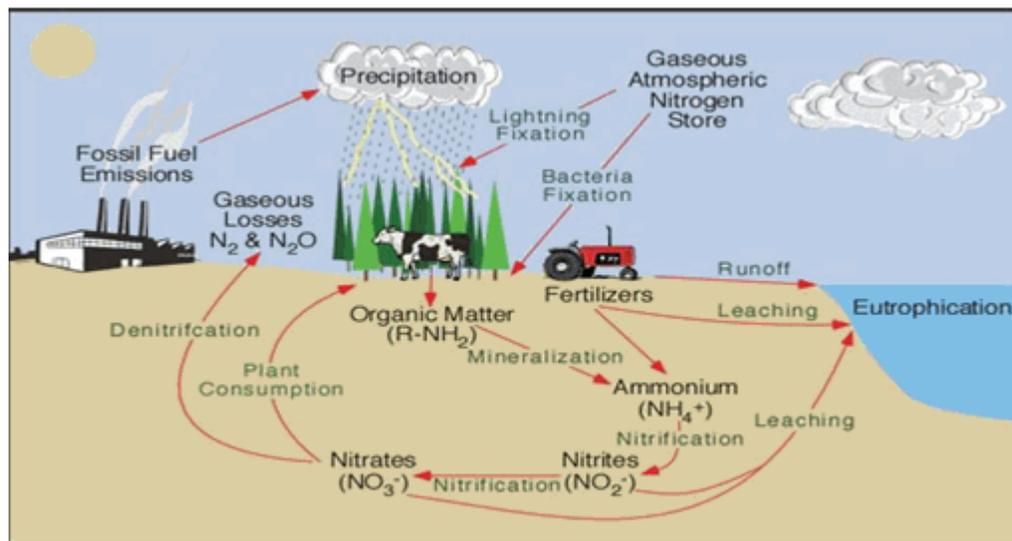


Name _____ Class _____ Date _____

The Nitrogen Cycle (Student Worksheet)



Nitrogen is an important element that is found in both the organic (living things) and the inorganic (nonliving) parts of the Earth system. Most of the nitrogen on Earth is found in the atmosphere. It comprises approximately 80% of our atmosphere where it exists as N_2 gas. Nitrogen can also be found in a variety of forms in plants, animals, soils, ocean, and other reservoirs in the environment. All plants and animals need nitrogen to make amino acids, proteins, and DNA, but the nitrogen in the atmosphere is not in a form that they can use. This gas must first be converted into a usable form during a process known as nitrogen **fixation**. Only specialized bacteria in soil and certain types of algae in water can fix nitrogen. Lightning strikes can also result in some nitrogen fixation.

Plants get the nitrogen that they need from the soil or water in which they live. This nitrogen is usually in the form of inorganic **nitrate (NO_3^-)**. Nitrate is easily dissolved in water and often leaches out of the soil. Animals get the nitrogen that they need by consuming plants or other animals which contain nitrogen within organic molecules. When organisms die, their bodies decompose bringing the nitrogen into soil or into the oceans. As these dead organisms decompose, nitrogen is converted into inorganic forms such as **ammonium salts (NH_4^+)** by a process known as **mineralization**. These ammonium salts are absorbed by the clay in the soil and are chemically altered by bacteria into **nitrite (NO_2^-)** and then **nitrate (NO_3^-)**. The different paths in which nitrogen may follow as it cycles throughout the earth is known as the **nitrogen cycle**.

Human activities have had a huge impact in global nitrogen cycles by causing changes in the amount of nitrogen stored in reservoirs. The use of nitrogen-rich fertilizers can lead to nitrates from the fertilizers washing into waterways. This increase in nitrate level can cause the rapid growth of aquatic plants during a process known as **eutrophication**. These plants will eventually die, decompose and deplete the water of available dissolved oxygen which can have disastrous effects on the entire food chain. Additionally, humans are altering the nitrogen cycle by burning fossil fuels and forests, which release nitric oxide, nitrous oxides, and other by-products into the atmosphere where they combine with water to form acid rain and enhance the greenhouse effect.

Test Your Understanding

