The Nitrogen Cycle

Nitrogen is an element. It is found in living things like plants and animals. It is also an important part of non-living things like the air above and the dirt below. Atoms of nitrogen don't just stay in one place. They move slowly between living things, dead things, the air, soil and water. These movements are called the nitrogen cycle.

Most of the nitrogen on Earth is in the atmosphere. Approximately 80% of the molecules in Earth's atmosphere are made of two nitrogen atoms bonded together (N_2). 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. Organisms instead need it as NO_3 (nitrate), NO_2(nitrogen dioxide), or NH_3(ammonia). The process of converting nitrogen into usable forms is called ***nitrogen fixation***. The molecules of nitrogen in the atmosphere can become usable for living things using two methods.

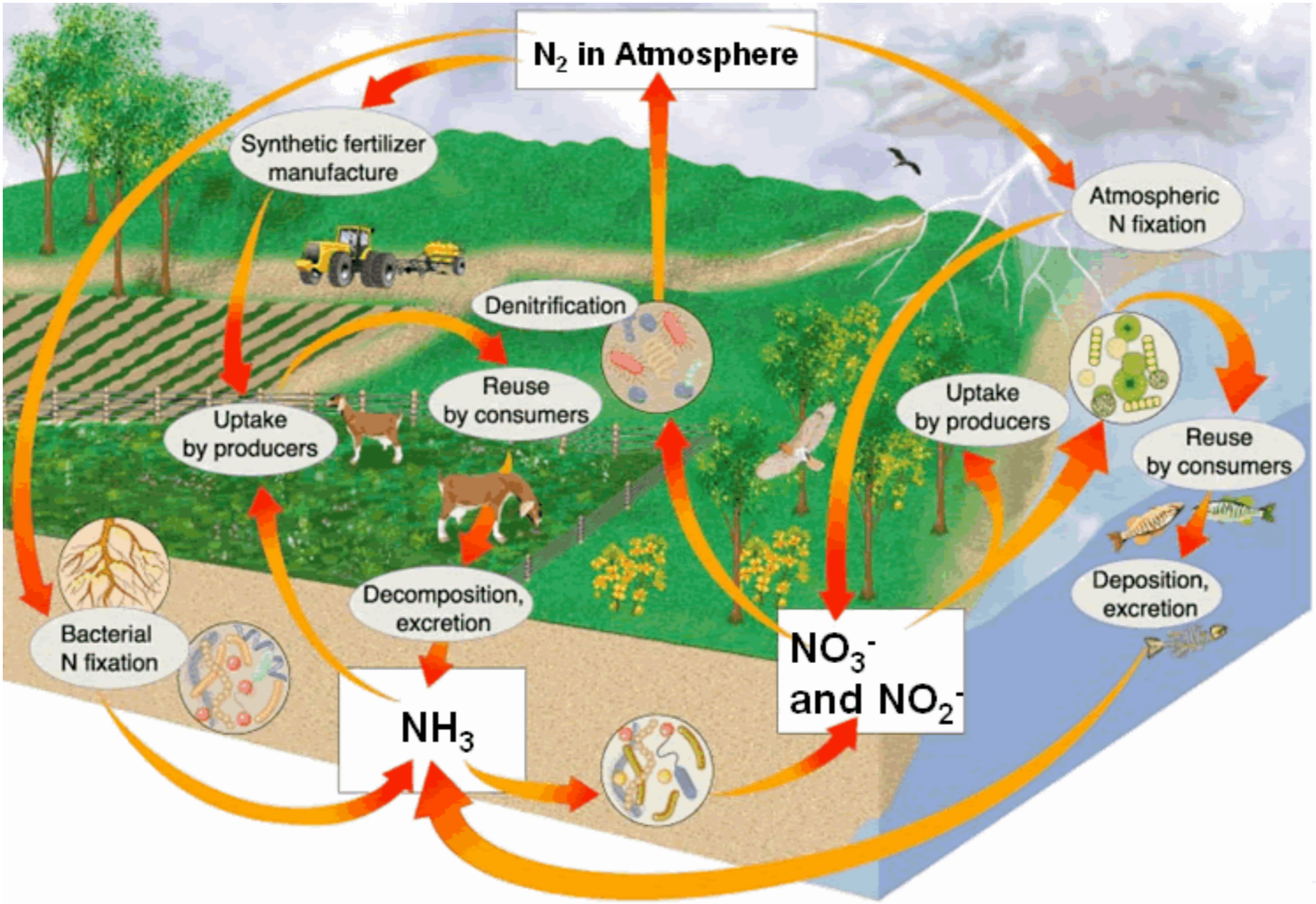
1) When they are broken apart during lightning strikes or fires. These nitrate then dissolve and enter the soil.

2) By certain types of bacteria, or by bacteria associated with bean plants.
   Symbiotic Relationship: bacteria are found in the soil or on roots. The plant provide the bacteria with sugar and the bacteria provide the plant with nitrogen.

Most plants get the nitrogen they need to grow from the soils or water in which they live. Animals get the nitrogen they need by eating plants or other animals that contain nitrogen. Organisms produce waster and eventually die. When organisms die, their bodies decompose bringing the nitrogen into soil on land or into ocean water. ***Decomposers*** break down the nitrogen in the waste or body into ***ammonia*** (NH_3) Bacteria in the soil then alter this ammonia back into nitrates which we can use.

Bacteria break down nitrates to nitrites (NO2), then to N2 which is released back into the atmosphere. This process is called ***denitrification***.

Certain actions of humans are causing changes to the nitrogen cycle and the amount of nitrogen that is stored in the land, water, air, and organisms. The use of nitrogen-rich fertilizers can add too much nitrogen in nearby waterways as the fertilizer washes into streams and ponds. The waste associated with livestock farming also adds large amounts of nitrogen into soil and water. The increased nitrate levels cause plants to grow rapidly until they use up the supply and die. The number of plant-eating animals will increase when the plant supply increases and then the animals are left without any food when the plants die.


N_2 in Atmosphere
Synthetic fertilizer manufacture
Atmospheric N fixation
Denitrification
Reuse by consumers
Uptake by producers
Uptake by producers
Reuse by consumers
Decomposition, excretion
Deposition, excretion
Bacterial N fixation
NH_3
NO_3^- and NO_2^-