

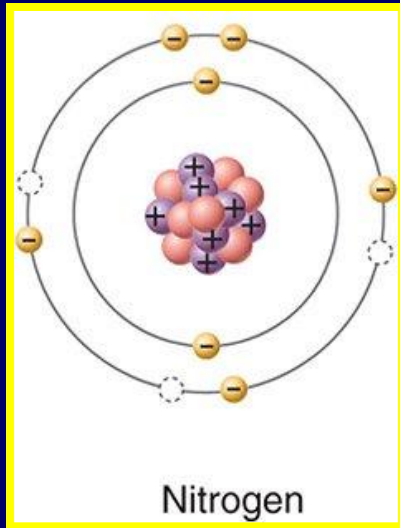
Nitrogen Cycle



Clarifying Objective 2.1.1

Analyze the flow of energy and cycling of matter, such as water, carbon, nitrogen, and oxygen through the ecosystem.

Nitrogen Cycle



Nitrogen is an essential element for all life and used to form proteins and nucleic acids.

Nitrogen makes up 78% of the atmosphere

Periodic Table of the Elements

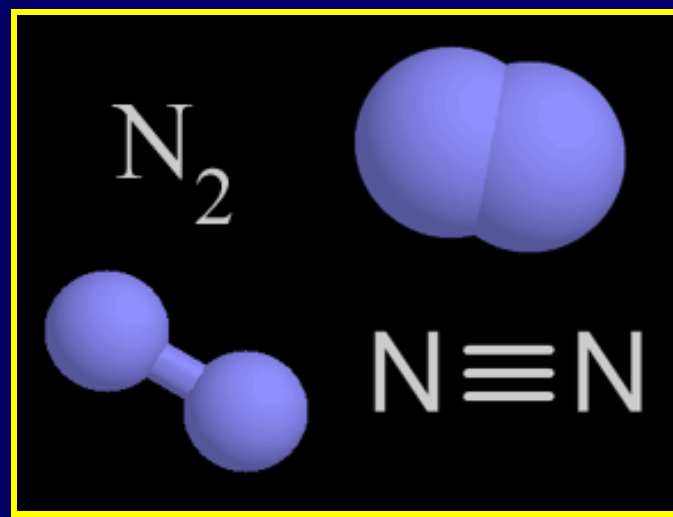
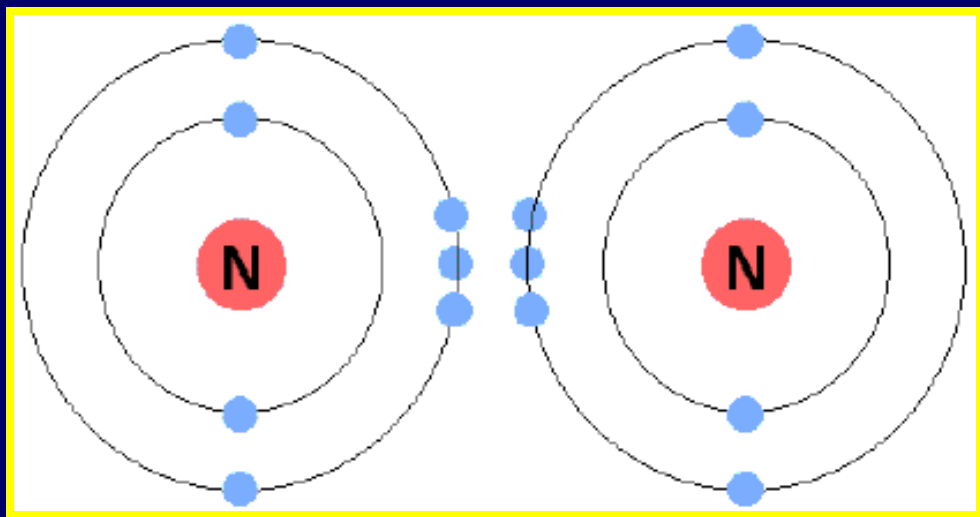
| | | | | | | | | | |
|---|--|--------------------------------------|---|---------------------------------------|---------------------------------------|---|--|---|---|
| 1 1A H Hydrogen 1.008 | 2 2A He Helium 4.002 | 3 3A Li Lithium 6.941 | 4 4A Be Beryllium 9.012 | 5 5A B Boron 10.811 | 6 6A C Carbon 12.011 | 7 7A N Nitrogen 14.007 | 8 8A O Oxygen 15.999 | 9 9A F Fluorine 18.998 | 10 10A Ne Neon 20.180 |
| 11 1A Na Sodium 22.990 | 12 2A Mg Magnesium 24.305 | 13 3A Al Aluminum 26.982 | 14 4A Si Silicon 28.086 | 15 5A P Phosphorus 30.974 | 16 6A S Sulfur 32.065 | 17 7A Cl Chlorine 35.453 | 18 8A Ar Argon 39.948 | 19 9A K Potassium 39.098 | 20 10A Ca Calcium 40.078 |
| 37 1A Rb Rubidium 85.468 | 38 2A Sr Strontium 87.62 | 39 Y Yttrium 88.906 | 40 4A Zr Zirconium 91.224 | 41 5A Nb Niobium 92.906 | 42 6A Mo Molybdenum 95.94 | 43 7A Tc Technetium 98.906 | 44 8A Ru Ruthenium 101.07 | 45 9A Rh Rhodium 102.906 | 46 10A Pd Palladium 106.42 |
| 55 1A Cs Cesium 132.905 | 56 2A Ba Barium 137.327 | 57-71 Lanthanide Series | 72 4A Hf Hafnium 178.49 | 73 5A Ta Tantalum 180.948 | 74 6A W Tungsten 183.84 | 75 7A Re Rhenium 186.207 | 76 8A Os Osmium 190.23 | 77 9A Ir Iridium 192.22 | 78 10A Pt Platinum 195.084 |
| 87 1A Fr Francium 223.019 | 88 2A Ra Radium 226.025 | 89-103 Actinide Series | 104 4A Rf Rutherfordium 261 | 105 5A Db Dubnium 262 | 106 6A Sg Seaborgium 266 | 107 7A Bh Bohrium 264 | 108 8A Hs Hassium 277 | 109 9A Mt Meitnerium 268 | 110 10A Ds Darmstadtium 285 |
| 119 1A Uut Ununennium unknown | 120 2A Uuq Unquadium unknown | 121-137 Lanthanide Series | 112 12A Cn Copernicium 285 | 113 13A Nh Nihonium 284 | 114 14A Fl Flerovium 289 | 115 15A Uup Ununpentium 288 | 116 16A Lv Livermorium 293 | 117 17A Uus Ununseptium 289 | 118 18A Uuo Ununoctium 294 |

Legend: Alkali Metal, Alkaline Earth, Transition Metal, Basic Metal, Semimetal, Nonmetal, Halogen, Noble Gas, Lanthanide, Actinide

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Nitrogen Cycle

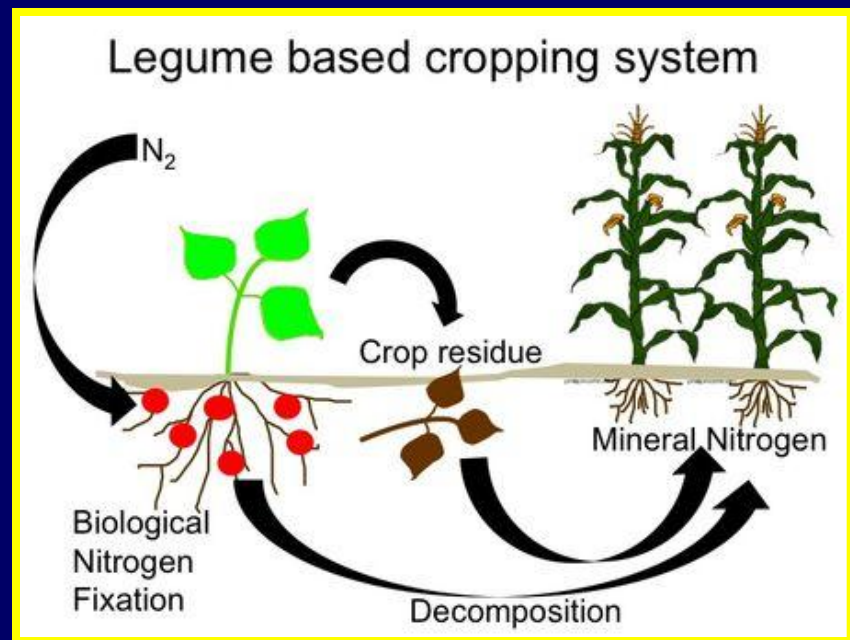
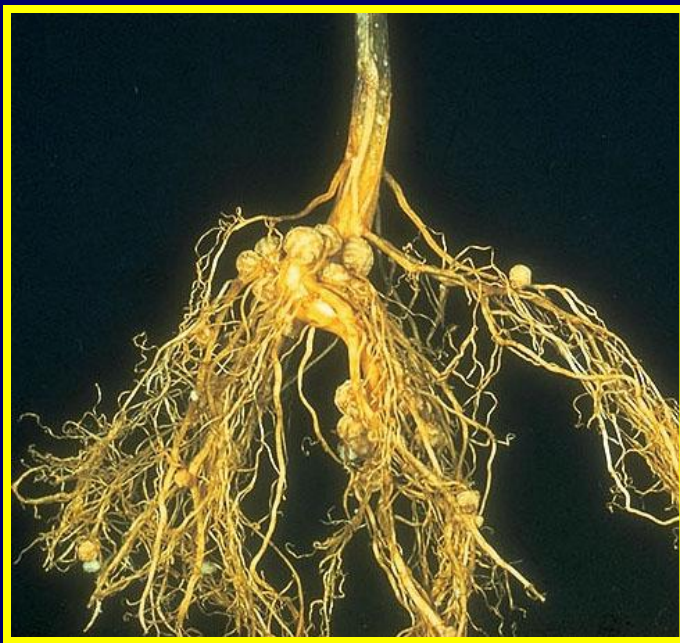
Atmospheric Nitrogen is triple bonded to another nitrogen atom to form N_2 .



Most organisms cannot break that triple bond, in order to use the nitrogen atom.

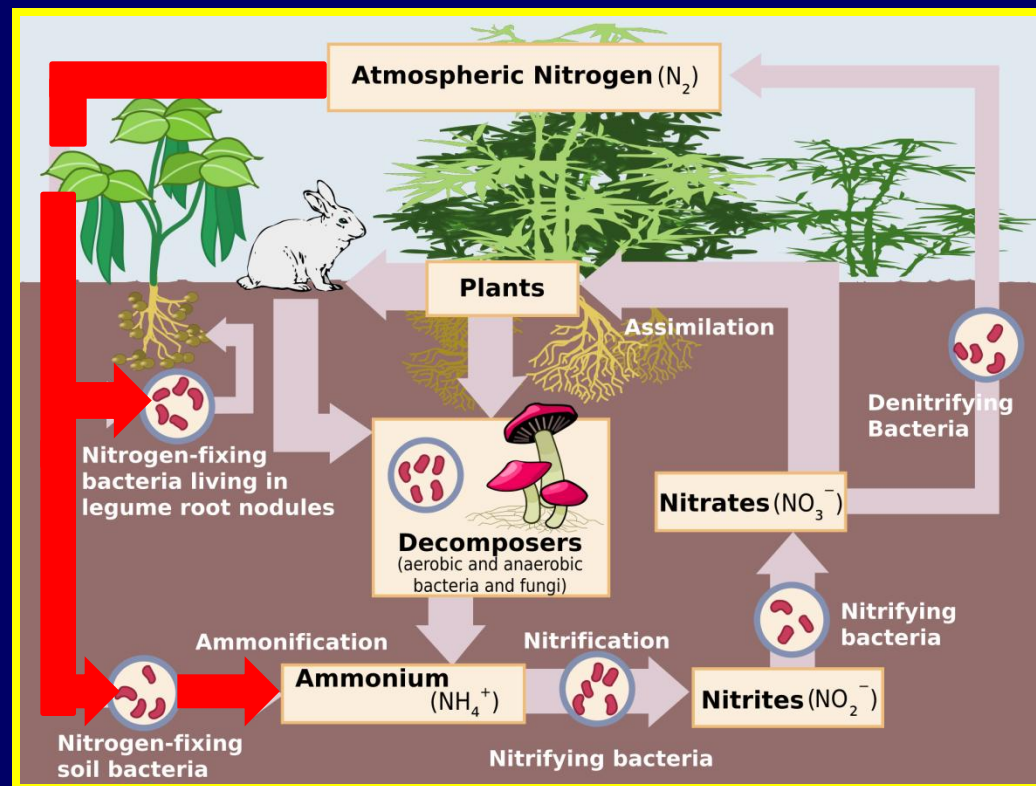
Nitrogen Cycle

The only organisms that can break the triple bonds in atmospheric nitrogen are symbiotic bacteria that live on the roots of legume plants (beans and peanuts).



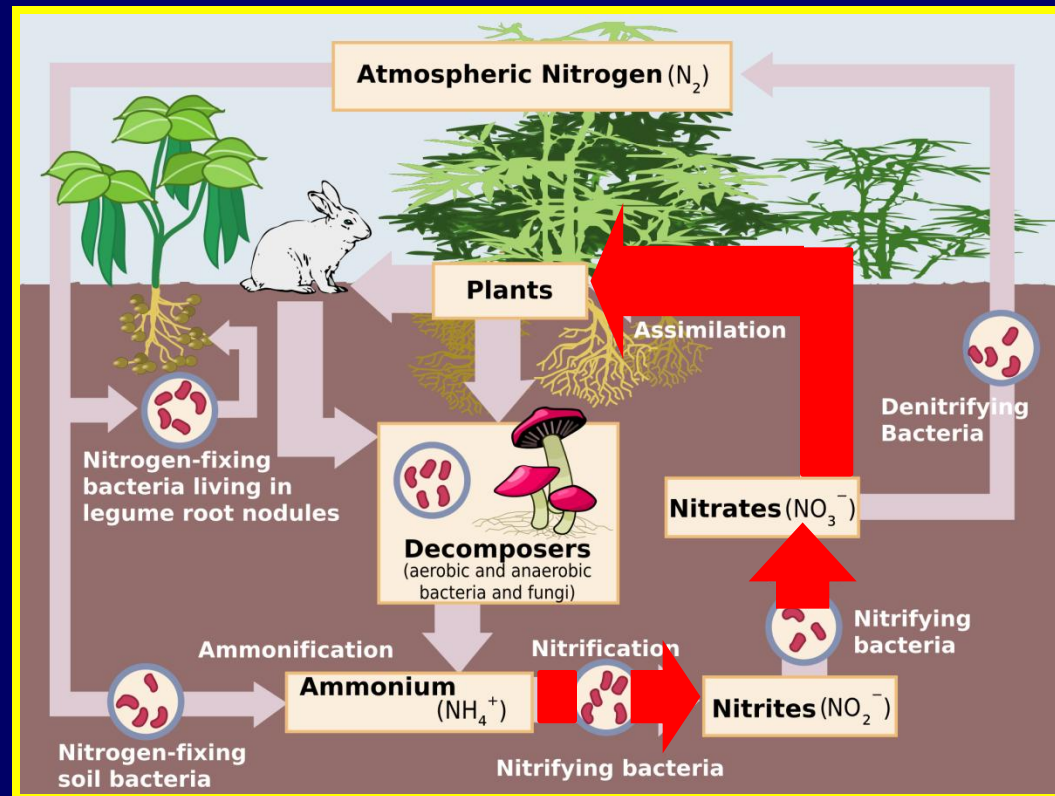
Nitrogen Cycle

The process by which symbiotic bacteria convert atmospheric nitrogen into ammonium (NH_4^+) is called nitrogen fixation



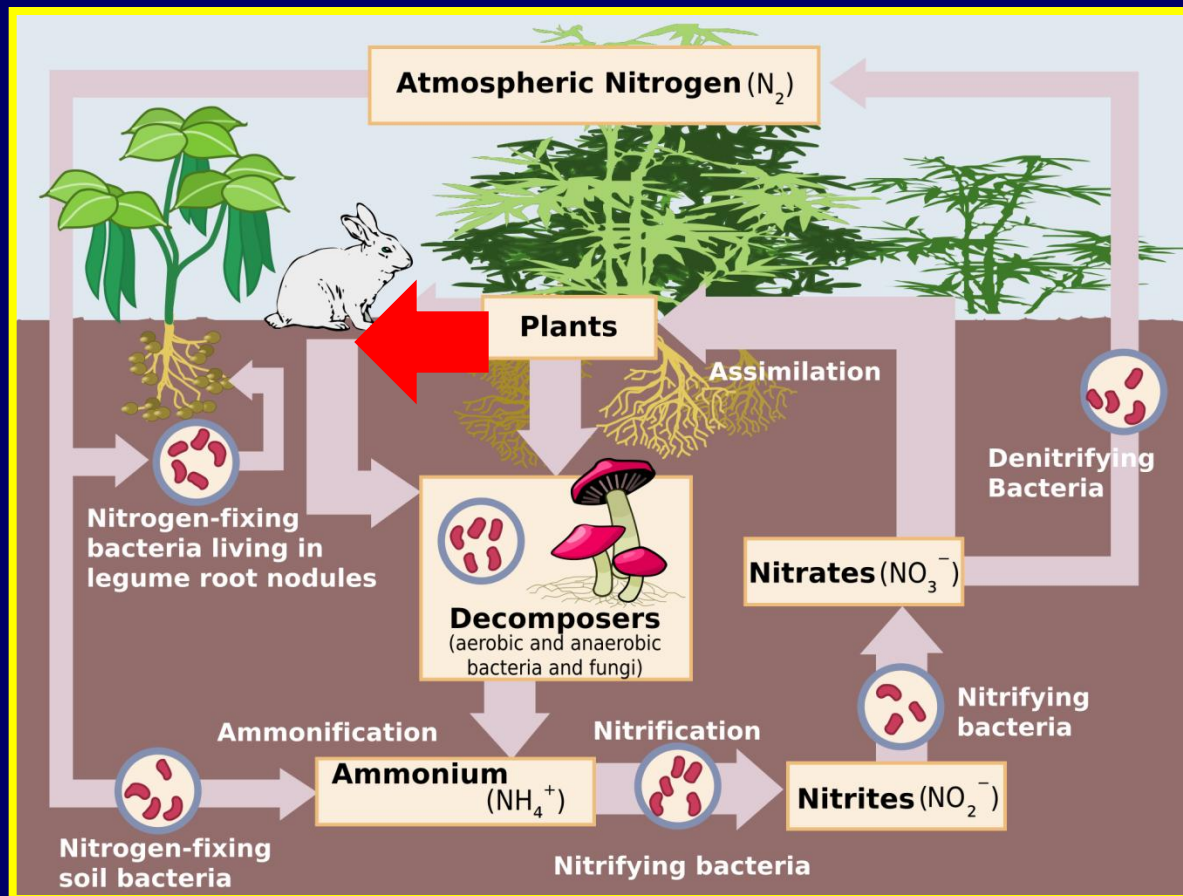
Nitrogen Cycle

Other bacteria in the soil, called nitrifying bacteria, convert the ammonium (NH_4^+) into nitrite (NO_2^-), then nitrate (NO_3^-), that plants can use, in a process called nitrification.



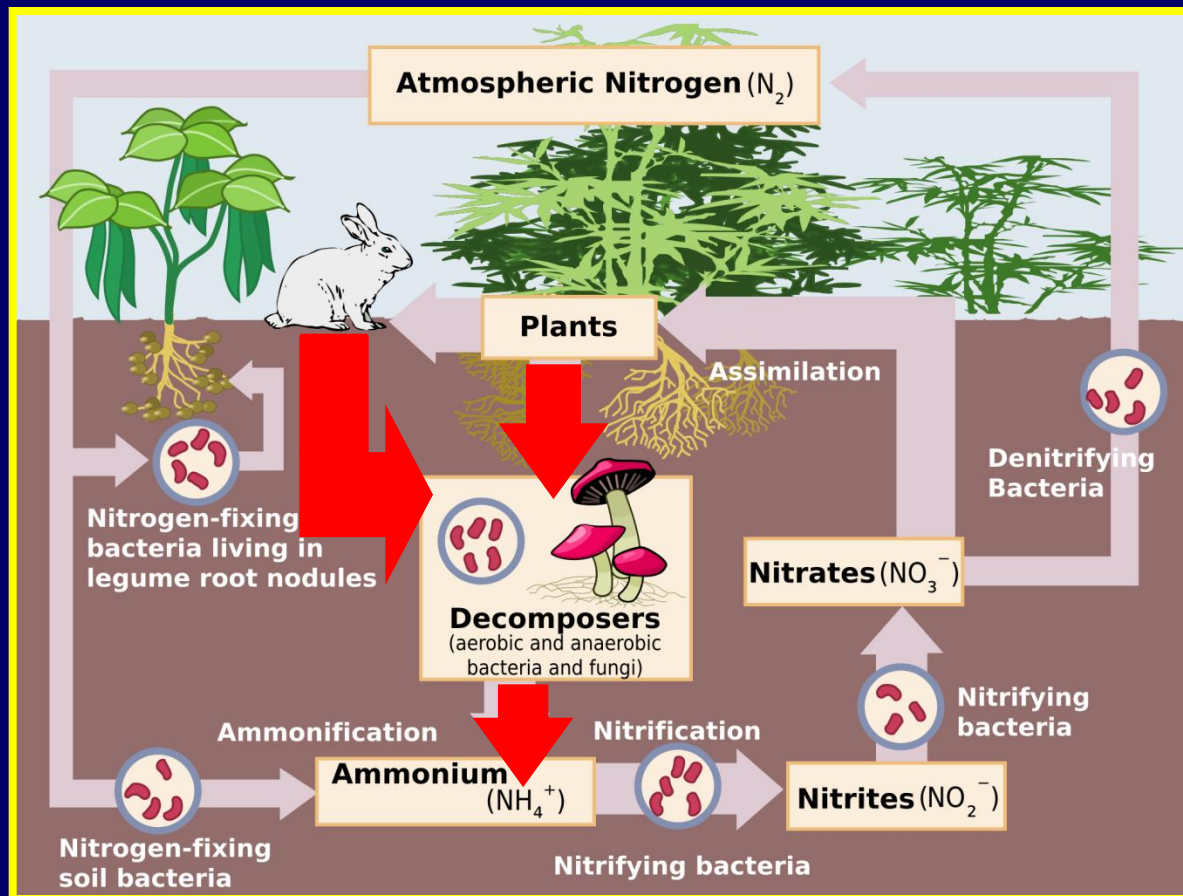
Nitrogen Cycle

Animals obtain nitrogen when they eat plants or eat other animals that ate plants.



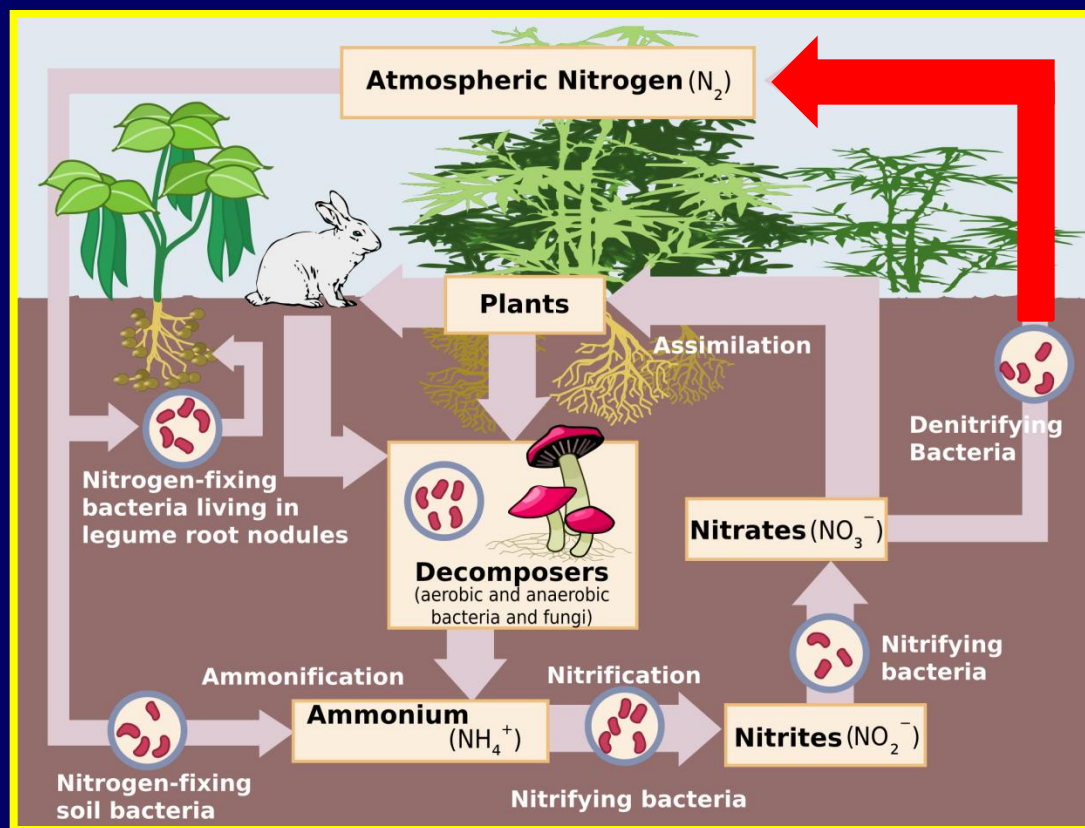
Nitrogen Cycle

Plant and animal wastes are recycled back into ammonium (NH_4^+) by decomposers.

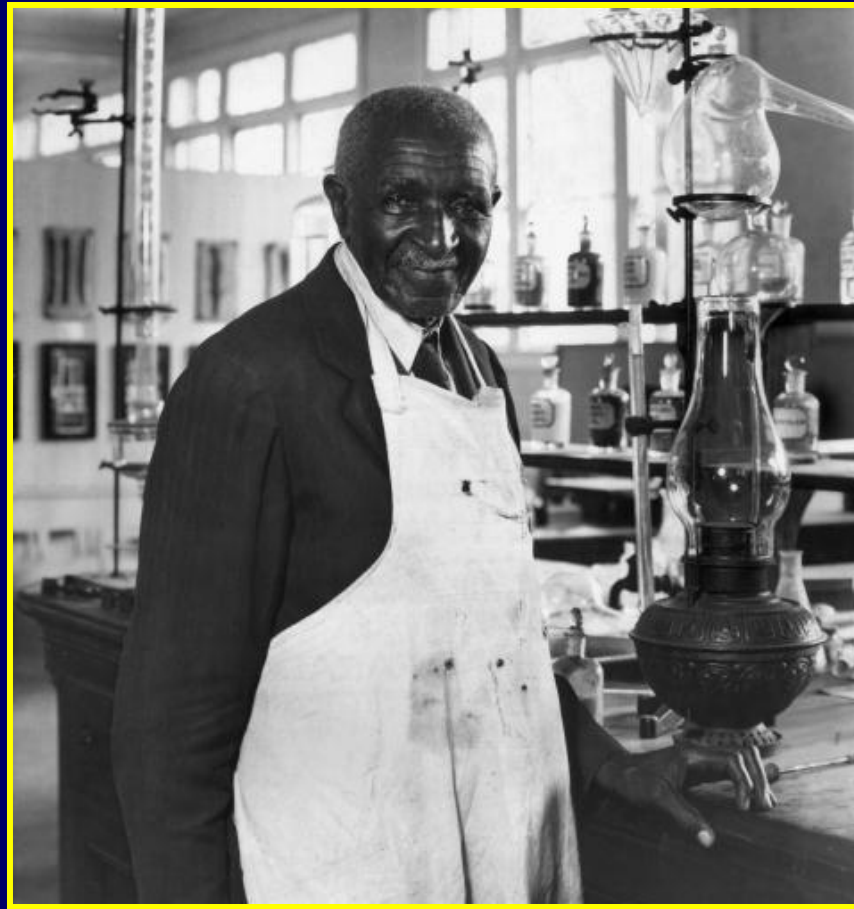


Nitrogen Cycle

Denitrifying bacteria, in the soil, convert nitrates (NO_3^-) back into atmospheric nitrogen (N_2) through a process called Denitrification.



George Washington Carver



<http://intotheoutdoors.org/topics/discovery-of-nitrogen-fixation/>