The Nitrogen Cycle:

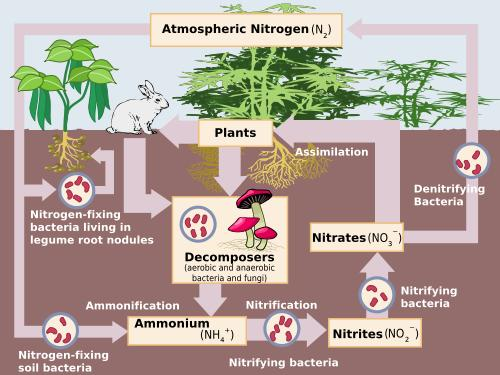
The Earth’s atmosphere is about \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ nitrogen gas (N2).

Although there is so much nitrogen in the atmosphere most organisms \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

A big part of the N-Cycle is how organisms have evolved together to \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

This is a very complicated process, but`s let`s look at some of the basics.

* Almost all nitrogen is removed from the atmosphere by \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
* This can happen in a couple of ways.
  + One way is a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ relationship between nitrogen fixing bacteria and a type of plant called a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. The bacteria live in small lumps on the roots of the legumes, called *nodules*. The bacteria pull nitrogen from the atmosphere and release it directly into the roots of the plant as NH4 (\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_). The legumes in turn, provide the bacteria with \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
  + Usually however the nitrogen-fixing bacteria live in the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. The NH4 they produce \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ by most plants. A second type of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ now comes to the rescue! Nitrifying bacteria convert NH4 to NO3- (\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_). Plants CAN \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ NO3- into their roots!
* The plants now make *amino acids* out of the nitrogen, which can then form \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
* Animals then eat the plants to get their nitrogen.
* When the plants and animals die \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ break them down and release \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ back into the soil.
* Now to be a full CYCLE the nitrogen needs to \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
* Some of the NO3- that is created by the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ is passed on to yet another type of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ called \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. These denitrifying bacteria convert NO3- back into \_\_\_\_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.



The Nitrogen Cycle:

The Earth’s atmosphere is about **78%** nitrogen gas (N2).

Although there is so much nitrogen in the atmosphere most organisms **cannot use N2 gas directly**

A big part of the N-Cycle is how organisms have evolved together to **remove N2 from the atmosphere**

This is a very complicated process, but`s let`s look at some of the basics.

* Almost all nitrogen is removed from the atmosphere by **bacteria**
* This can happen in a couple of ways.
  + One way is a **mutualistic symbiotic** relationship between nitrogen fixing bacteria and a type of plant called a **legume**. The bacteria live in small lumps on the roots of the legumes, called *nodules*. The bacteria pull nitrogen from the atmosphere and release it directly into the roots of the plant as NH4 (**ammonium**). The legumes in turn, provide the bacteria with **sugar**.
  + Usually however the nitrogen-fixing bacteria live in the **soil**. The NH4 they produce **cannot be absorbed** by most plants. A second type of **bacteria** now comes to the rescue! Nitrifying bacteria convert NH4 to NO3- ( **nitrate** ). Plants CAN **absorb** NO3- into their roots!
* The plants now make *amino acids* out of the nitrogen, which can then form **proteins**.
* Animals then eat the plants to get their nitrogen.
* When the plants and animals die **decomposers** break them down and release **NH4 (ammonium)** back into the soil.
* Now to be a full CYCLE the nitrogen needs to **be returned to the soil**.
* Some of the NO3- that is created by the **nitrifying bacteria** is passed on to yet another type of **bacteria** called **denitrifying bacteria**. These denitrifying bacteria convert NO3- back into **N2 (nitrogen gas)** and **release it to the atmosphere**.

