

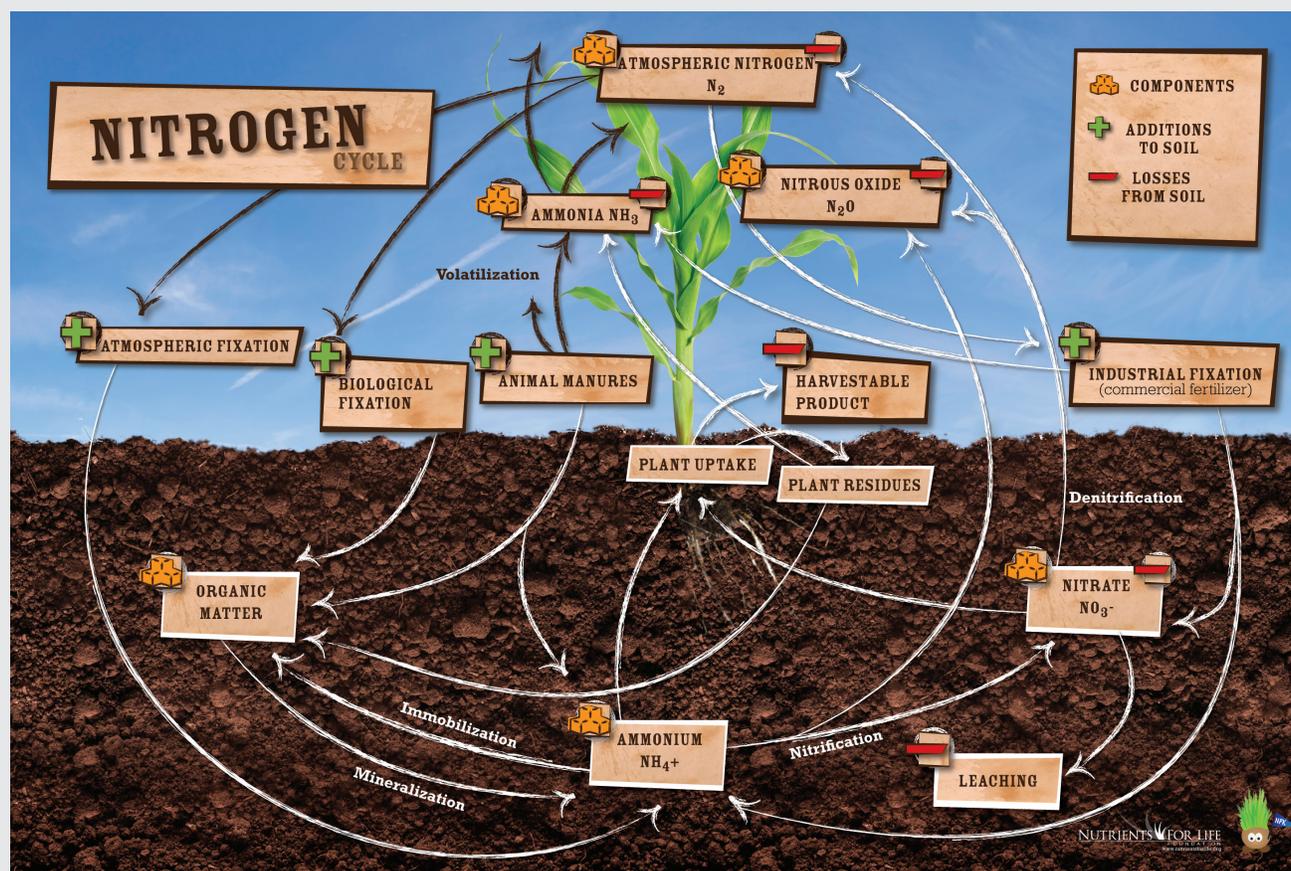
MASTER 1.6

USING NITROGEN

NAME

DATE

For many plants, the availability of nitrogen limits their growth. This fact is surprising since the air is nearly 80 percent nitrogen. However, neither plants nor animals can use the nitrogen gas (N_2) in the air. First, it must be fixed, or combined with other elements, such as hydrogen or oxygen, before plants can use it. Lightning strikes are one way that nitrogen can be fixed. In this case, nitrogen gas combines with oxygen to form NO_3^- . Free-living bacteria in the soil convert the largest amounts of atmospheric nitrogen by combining it with hydrogen. When combined with oxygen or hydrogen, plants can take in and use the nitrogen in these forms as an essential element. Industrial processes also fix nitrogen to produce nitrogen-based fertilizers. Animals take in the nitrogen they need by eating plants. When animals expel waste, or when plants or animals die and decompose, the nitrogen returns to the soil. Other bacteria in the soil convert the nitrogen back to nitrogen gas (N_2) which then returns to the atmosphere. This completes the nitrogen cycle.



QUESTIONS

1. Look at the graphic of the nitrogen cycle. What do you think is responsible for converting most of the nitrogen used by plants into a usable form?
2. Plants of the legume family, such as peas and beans, live in a symbiotic relationship with bacteria that live in their roots. The bacteria use sugars from the plants to produce energy. In return, the bacteria take nitrogen from the air and convert it to a form that the plants can use. Why is this ability of legumes to use nitrogen this way important to farmers?