

## WHAT IS NITROGEN?

Nitrogen is chemical element number 7 on the periodic table of the elements. It is an essential nutrient for plants and animals and the most abundant naturally-occurring element in Earth's atmosphere. As a component of amino acids that build proteins and DNA, nitrogen is a critical part of these "building blocks of life." At appropriate levels, nitrogen is an important component of aquatic ecosystems.

## WHY DO WE MEASURE NITROGEN?

Nitrogen occurs in different forms in the environment; the processes that change it from one form to another are collectively known as "the nitrogen cycle." Different chemical forms of nitrogen behave differently in the ecosystem.



Ammonia, or  $\text{NH}_3$ , is one form of nitrogen. Ammonia is toxic to many aquatic organisms, so when this form of nitrogen is present in waterways, it can kill aquatic organisms directly. Other forms of nitrogen are only harmful when they are present in water in excess, which can disrupt an ecosystem. Because nitrogen is essential to plant growth, *too much* nitrogen in water can result in disproportionate growth of some aquatic plants, algae, and cyanobacteria which in turn can have cascading effects on the rest of the ecosystem.

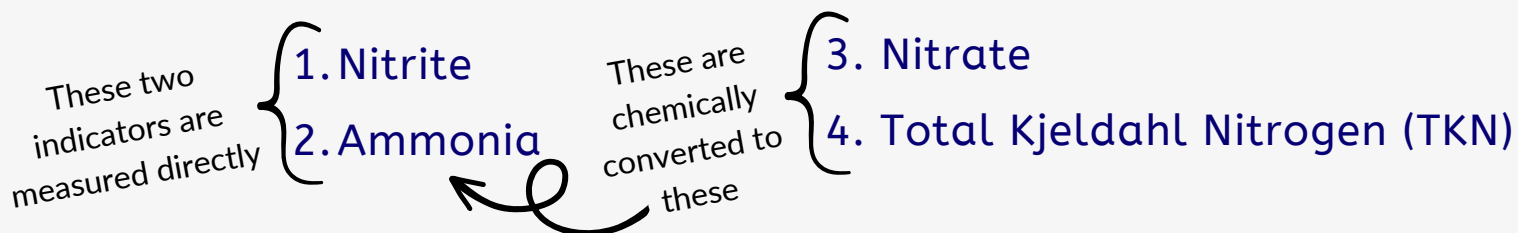


Many associate nitrogen with agriculture, as nitrogen is commonly present in fertilizers and manure that can be washed into waterways by rain. Nitrogen can also come from improperly functioning septic systems or sewage treatment plants or even directly from the atmosphere. Burning fossil fuels, like coal and gasoline, releases nitrogen compounds into the air. Besides being air pollutants, these compounds can eventually reach our soil and water, too.

## HOW DO WE MEASURE NITROGEN?

Because it is found in the environment in different forms, Community Science Institute has multiple lab analyses related to nitrogen. These tests can give clues about where it came from. For instance, excess organic nitrogen (nitrogen originating from living material) and ammonia are likely to be indicators of pollution from human or animal waste, while excess nitrates and nitrites may instead point to fertilizer application.

Community Science Institute tests for four different types of nitrogen:

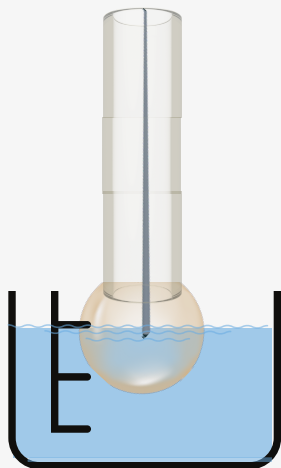
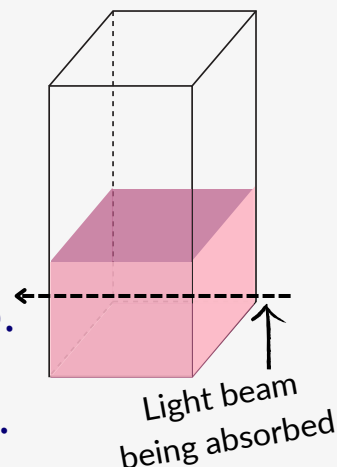


### Nitrite test

Once **nitrate** has been converted into **nitrite** in the lab, it can be tested using the following method.

A color-changing chemical is added to the water sample. In a process called "colorimetry," laboratory equipment measures light's interaction with the sample.

The deeper the color of the water, the more light it absorbs. This indicates a higher concentration of nitrite.



### Ammonia test

**TKN** is made up of organic nitrogen and ammonia. To measure it, organic nitrogen is first converted to **ammonia** through a process called "digestion" in which larger molecules are broken down.

Ammonia is tested using a probe, functioning similarly to a pH probe (see pH Fact Sheet).

For more in-depth descriptions of the various lab analyses for nitrogen and what they mean, see our fact sheets on nitrate and nitrite, total Kjeldahl nitrogen, and ammonia.