

Tips for Measuring Nitrogen Deposition in Rainwater

Rainwater collection

Ideally, students should collect the rainwater for this experiment themselves. To do this, have students make simple rain gauges using a jar or bottle, masking tape, and a ruler to mark off the height on the bottle. You can find many “how to” videos on the internet on how to make simple or more complex rain gauges. Some guides suggest putting water in the bottom of the jar to weight it before setting it out. Be sure that your rain gauge is empty when you set it out because you only want to test rainwater.

Form students into groups, and have each group make a rain gauge with their initials on it. Assign each group a number to write on their gauge as well. When you set out rain gauges, choose a variety of locations, and be sure to mark the gauges as part of an experiment so they are not disturbed. You can also have students set up gauges at their houses. If so, make a plan for students to transport the water to the school by putting a lid or plastic wrap on the tops of the gauges.

Since precipitation is unpredictable, consider collecting rainwater well before you need it. Rainwater should be frozen to prevent any pollutants from evaporating or breaking down before testing. Just thaw the rainwater in advance of testing. If you can be flexible about when to do the test, wait until it rains, then perform the test the next day without freezing the water.

Rainwater testing

You may choose to have all students do both tests (nitrate and ammonia), one test, or split the class so that some groups do one test and other groups do the other. Make sure students know what test(s) they are performing.

Once you have results, use the color scales that come with the kit to have each group determine the concentration of nitrate or ammonium in their water. Make sure each group records their data next to the correct group number of their data sheet.

Converting units

Most chemical tests give results in the amount of nitrogen. To find the concentration of nitrate, you must multiply your results by 4.43. This is because one molecule of nitrate weighs 4.43 times as much as one atom of nitrogen. To find the concentration of ammonium, you need to multiply by 1.29 because one molecule of ammonium weighs 1.29 times as much as one atom of nitrogen.