

# My Backyard Stream

## Water Quality 5 in 1

### Testing water chemistry using a test strip

My Backyard Stream kit provides a test strip that measures for five different parameters using one test strip. We can call this a “5-in-1 test strip”. The five parameters are pH, total alkalinity, total hardness, nitrite, and nitrate.



**Safety: Never go into a stream to test water quality. Make sure you have a solid place to stand before bending down to put your strip in the water.**

### Instructions for use of 5-in-1 Test Strips

#### STEP 1



Use a paper towel to dry your hands.

#### STEP 2



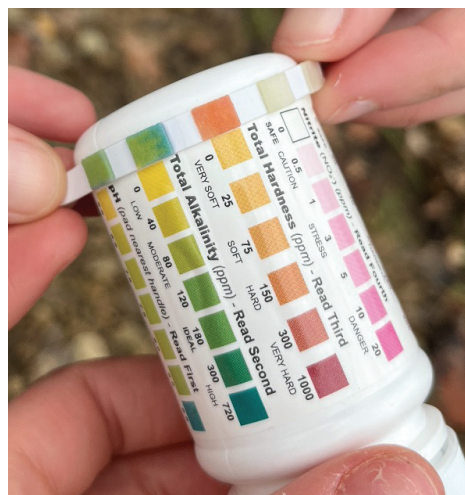
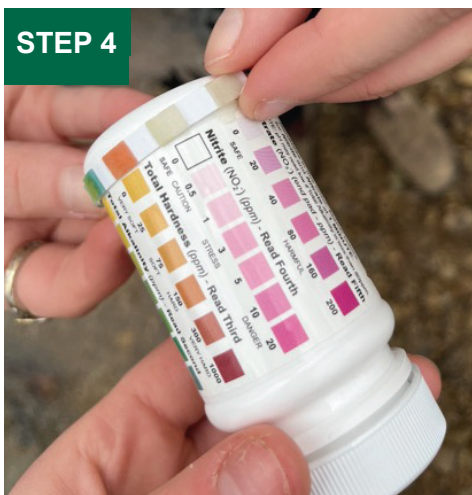
Secure a 5-in-1 testing strip from the ziploc bag, seal bag and continue. Taking the test strip, dip it in the water for ~2 seconds, remove it, and gently shake it off.

#### STEP 3



Allow the testing strip to process for ~25 seconds.

#### STEP 4



After the allotted time, compare the hue of the testing strip to the various scales printed on the testing strip canister for alkalinity, hardness, pH, nitrate, and nitrite.

Record the corresponding measurement for each variable in the table of the field notetaking sheet

# What is pH?

pH is the measure of hydrogen in water. It is important to measure pH because it can detect problems within the water. If a pH is too high or too low, we have a problem. The highest pH measurement can be 14, meaning it is really basic.

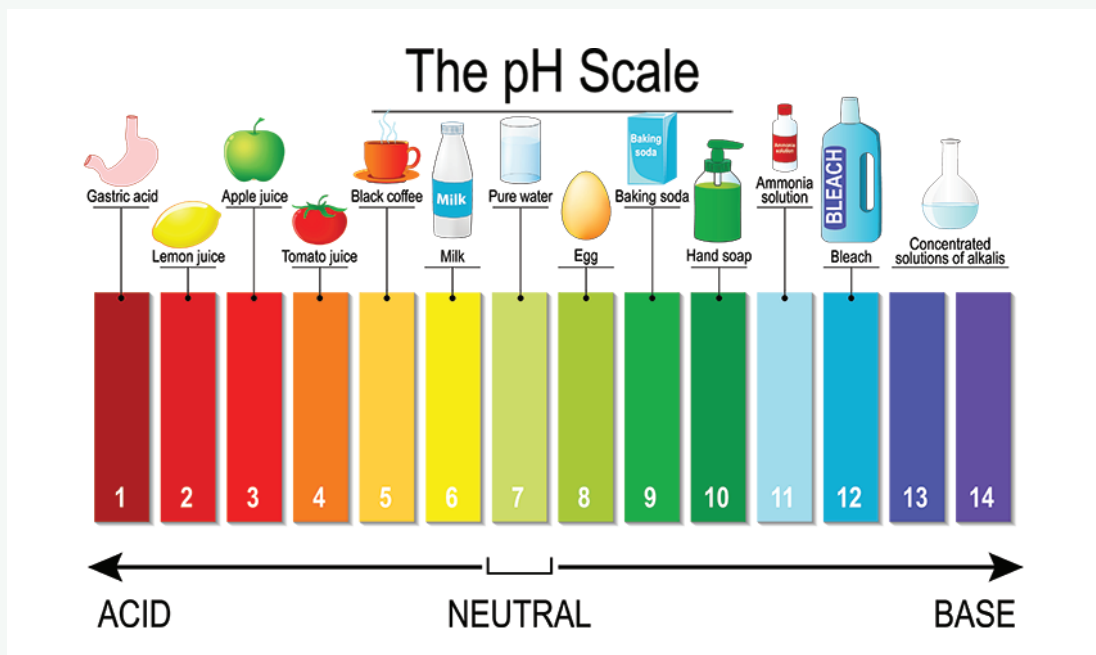
The lowest pH measurement can be 0, meaning it is really acidic. The water you drink typically has a pH between 6 and 8. Why does that matter? The plants, animals, and other creatures that live in the streams may really like a certain pH and can't survive if it changes dramatically.

A high pH also can mean that there are more metals in the water, which is dangerous to our bodies in high amounts. That means that we can't use bodies of water with a high pH to swim or drink.



## Key Terms:

**pH** - The measure of the acidity or basicity of water; the number of hydrogen atoms in a liquid.



### Acidic

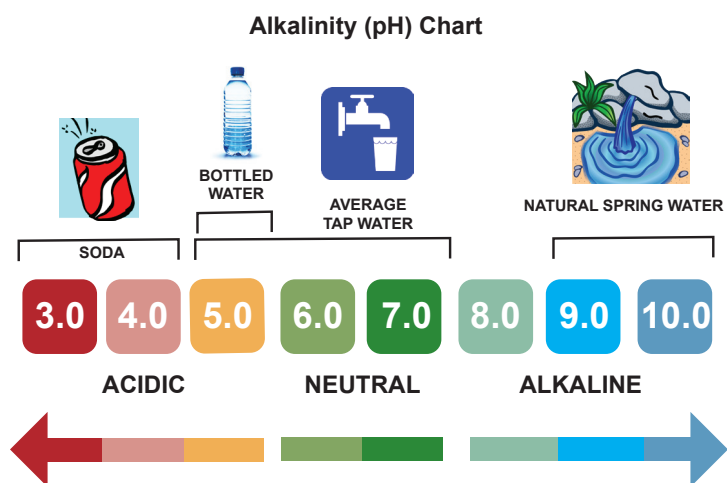
Having the properties of an acid; or having a pH below 7

### Basic

Having the properties of a base; or having a pH above 7

# What is Total Alkalinity?

Alkalinity works by buffering or reacting with ions in the water to make the water more basic. Fun fact: this process is also called “neutralizing acids”! Compounds that contribute to how alkali water is comes from sources like rocks, salts, soils, and some industrial discharges.



The normal range for alkalinity in drinking water is 30 to 400 ppm or mg/l.

## Key Terms:

### Alkali

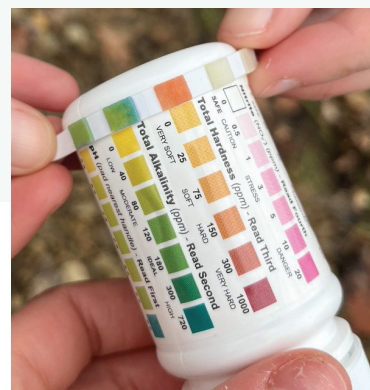
A chemical that can dissolve in water, combine with acids to form salts, and makes acids less acidic.

### Buffer

A buffer is a solution containing either a weak acid and its salt or a weak base and its salt, which is resistant to changes in pH.

### Ppm

Parts per million



# What is Total Hardness?

Hardness is a measure of the dissolved calcium and magnesium in the water, which is called calcium carbonate. Alkalinity is strongly related to hardness. If the alkalinity is equal to or greater than the hardness, all of the hardness is carbonate. Hard water creates deposits of magnesium and calcium.

Grains/Gal	mg/L & ppm	Classification
Less than 1	Less than 17.1	Soft
1–3.5	17.1–60	Slightly Hard
3.5–7	60–120	Moderately Hard
7–10	120–180	Hard
over 10	over 180	Very Hard

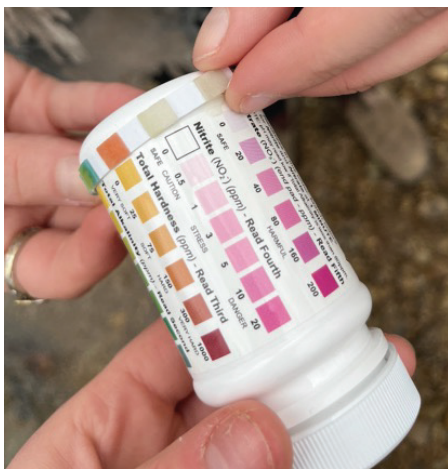
**Did you know?** hardness is taken into consideration for infrastructure and equipment purposes as well because hard water can sometimes damage or deteriorate items involved?



# What is Nitrate and Nitrite?

Nitrate and Nitrite are both molecules that are commonly found in soil and are essential for plants and animals to make protein. High amounts of these molecules in the water can cause eutrophication, which can damage water systems and make it hard for the organisms that live there to survive. This process can lower the amount of oxygen available in the water causing a hypoxic event, which makes the water toxic for humans and other organisms.

**Did you know?** that nitrate and nitrite levels may be elevated after a storm event due to the rain carrying run-off into the stream? Completing nitrate and nitrite testing right after a storm event may not show a good representation of what the stream's baseline levels are.

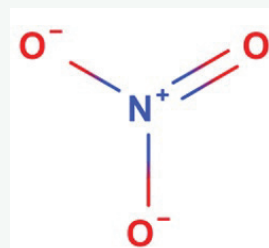


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## Key Terms:

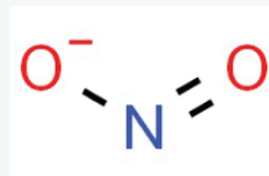
### Nitrate ( $\text{NO}_3^-$ )

a form of nitrogen with one nitrogen atom and three oxygen atoms



### Nitrite ( $\text{NO}_2^-$ )

a form of nitrogen with one nitrogen atom and two oxygen atoms.



## Molecule

a group of two or more atoms held together by attractive forces known as chemical bonds

## Eutrophication

excessive richness of nutrients in a lake or other body of water, frequently due to runoff from the land, which causes a dense growth of plant life and death of animal life from lack of oxygen