

**Ministry of Higher Education
and Scientific Research
University of Ishik
College of education
Department of Biology**

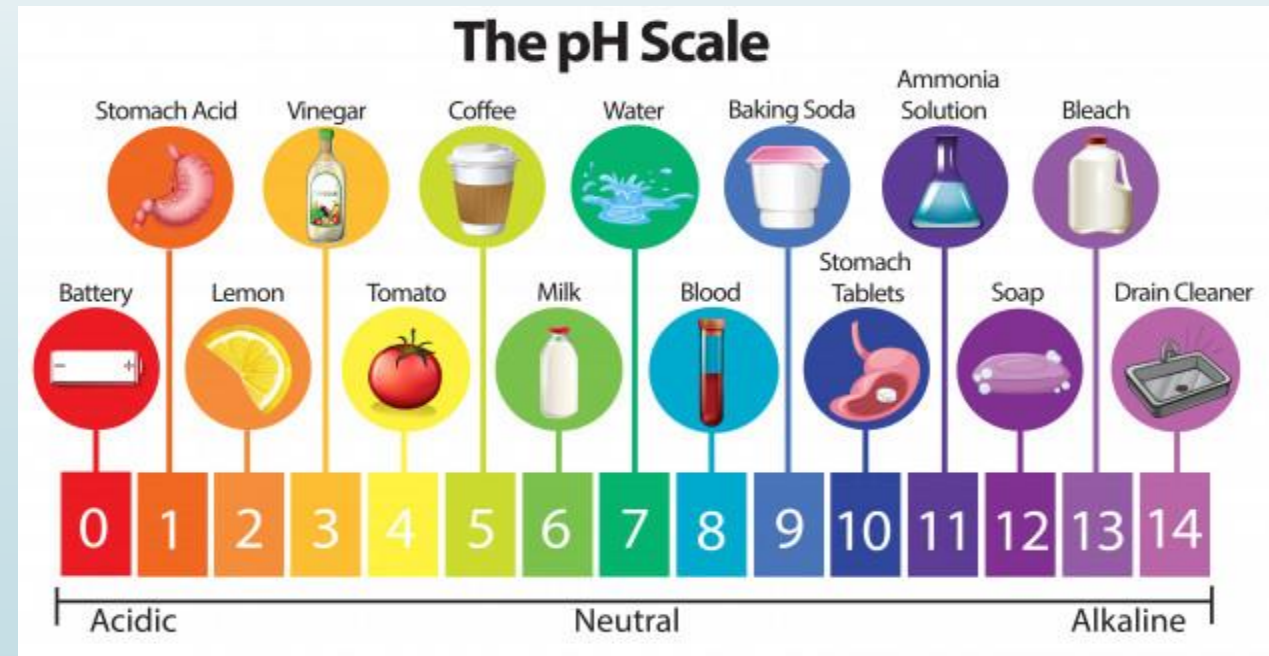


**Practical Ecology
Water and Soil pH
4th lab.
2017- 2018 (3rd Grade)**

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What is pH ?

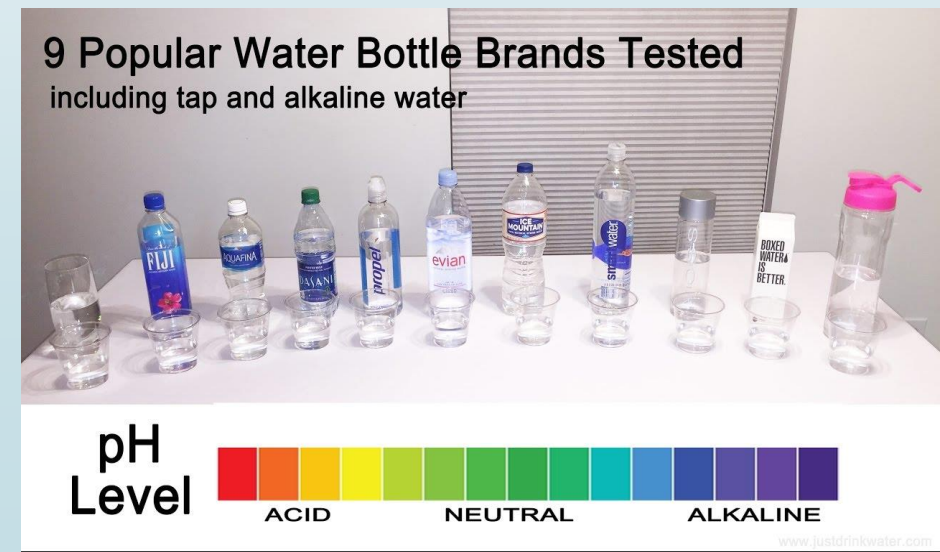
PH, quantitative measure of the acidity or basicity of aqueous or other [liquid](#) solutions. The term, widely used in [chemistry](#), [biology](#), and [agronomy](#), translates the values of the concentration of the [hydrogen ion](#)—which ordinarily ranges between about 1 and 10^{-14} gram-equivalents per liter—into numbers between 0 and 14



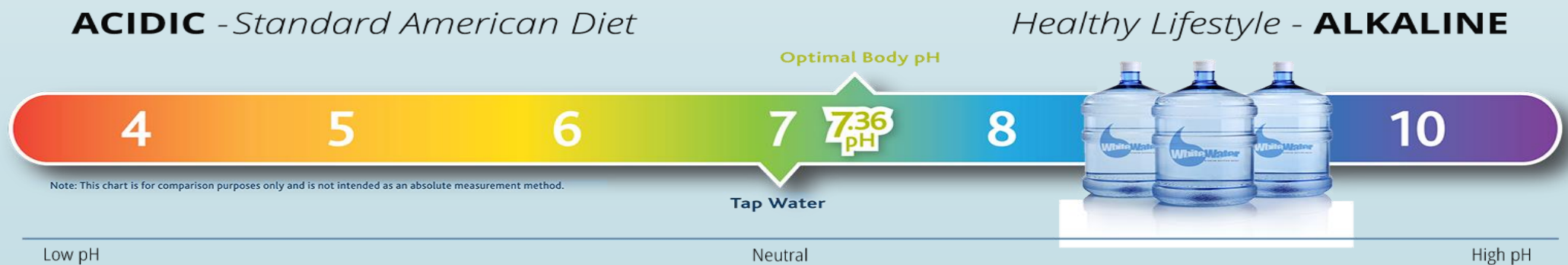
Water pH ?

pH value is a good indicator of whether water is [hard](#) or [soft](#). The pH of pure water is 7. In general, water with a pH lower than 7 is considered acidic, and with a pH greater than 7 is considered basic.

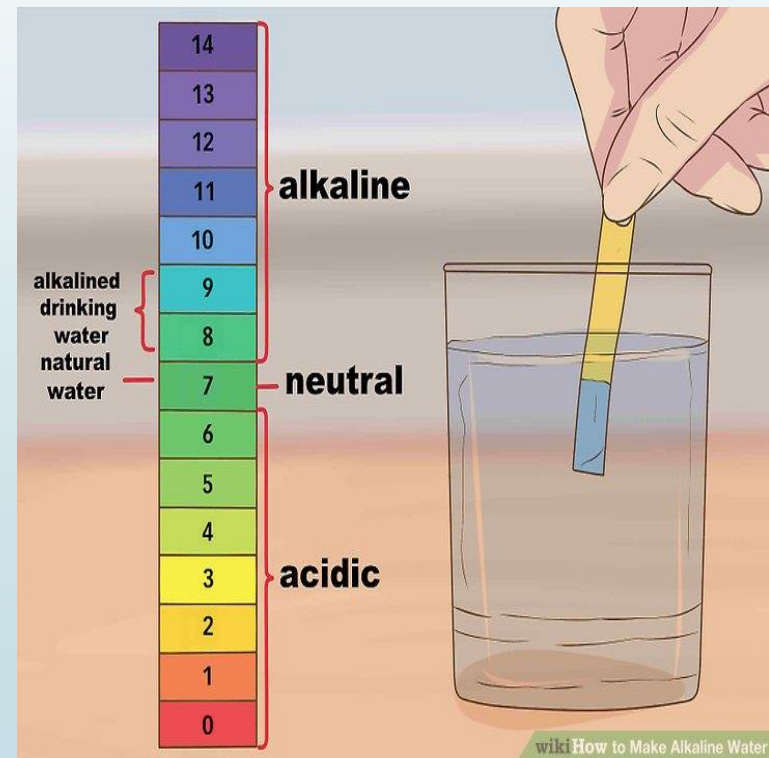
The normal range for pH in [surface water](#) systems is 6.5 to 8.5, and the pH range for [groundwater](#) systems is between 6 to 8.5. Alkalinity is a measure of the capacity of the water to resist a change in pH that would tend to make the water more acidic. The measurement of alkalinity and pH is needed to determine the corrosiveness of the water.



- ▶ In general, water with a pH < 6.5 could be acidic, soft, and corrosive. Acidic water could contain metal ions such as [iron](#), [manganese](#), [copper](#), [lead](#), and [zinc](#). In other words, acidic water contains elevated levels of toxic metals
- ▶ Acidic water can cause premature damage to metal piping, and have associated aesthetic problems such as a metallic or sour taste. It can also stain laundry and cause "blue-green" color staining on sinks and drains. More importantly, there are health risks associated with these toxins.



In pure [water](#), which is neutral (neither acidic nor alkaline), the concentration of the hydrogen ion is 10^{-7} gram-equivalents per liter, which corresponds to a pH of 7. A [solution](#) with a pH less than 7 is considered [acidic](#); a solution with a pH greater than 7 is considered [basic](#), or alkaline.

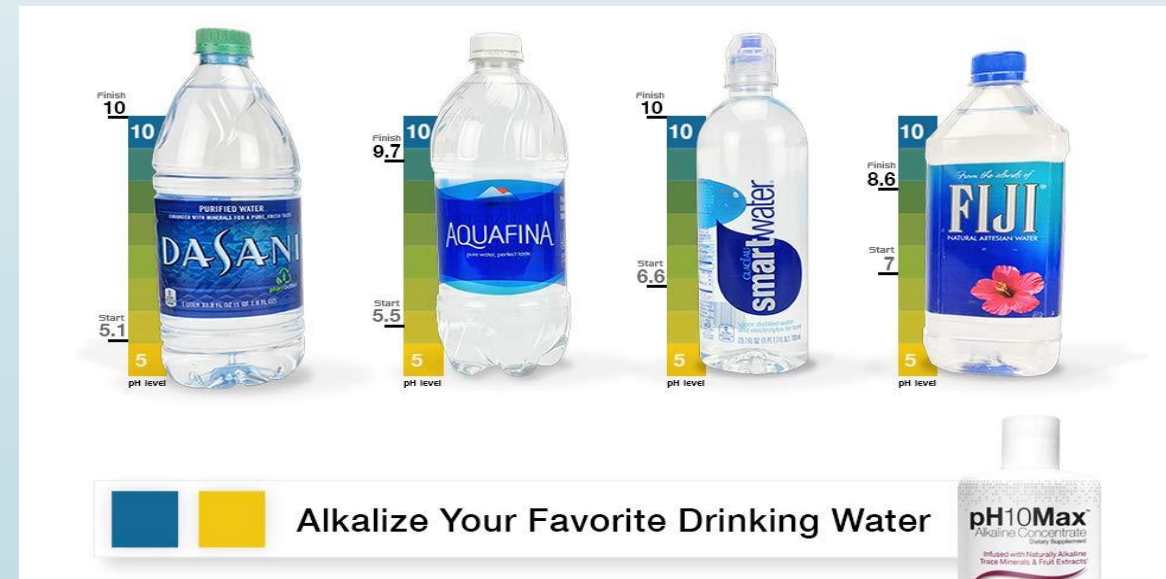


How to treat low pH water ?

- ▶ The primary way to treat the problem of low pH water is with the use of a neutralizer. The neutralizer feeds a solution into the water to prevent the water from reacting with the household plumbing or from contributing to electrolytic corrosion. A typical neutralizing chemical is soda ash. Also known as [sodium carbonate](#), soda ash works to increase the sodium content which increases pH. Water with a pH > 8.5 could indicate that the water is hard.
- ▶ Hard water does not pose a health risk, but can also cause aesthetic problems. These problems include an alkali taste to the water (making that morning coffee taste bitter!), formation of [scale deposits](#) on dishes, utensils, and laundry basins, difficulty in getting soaps and detergents to lather, and the formation of insoluble precipitates on clothing.

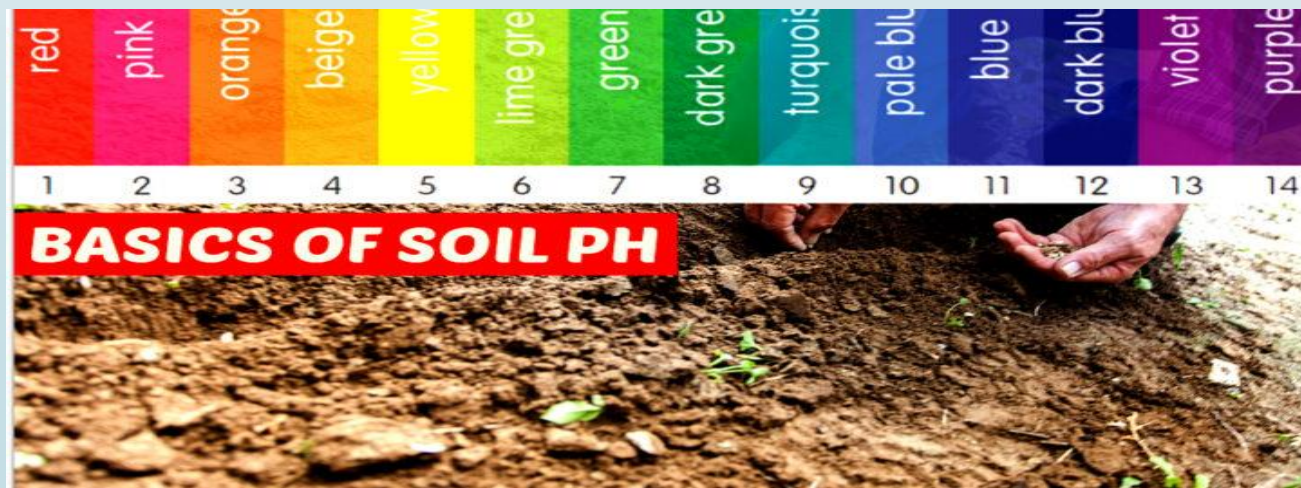
Ideal pH of water ?

- While the ideal pH level of drinking water should be between 6-8.5, the human body maintains pH equilibrium on a constant basis and will not be affected by water consumption. For example, our stomachs have a naturally low pH level of 2 which is a beneficial acidity that helps us with food digestion.



Soil pH ?

- Soil pH is a measure of hydrogen ions (H^+) in the soil. In other words, a soil pH value is a measurement of the concentration of ions held to soil particles and organic matter
- The pH is important because it influences the availability of essential nutrients. Most horticultural crops will grow satisfactorily in soils having a pH between 6 (slightly acid) and **7.5** (slightly alkaline).



pH Affects Nutrients, Minerals and Growth

- ▶ The effect of soil pH is great on the solubility of minerals or nutrients. Fourteen of the seventeen essential plant nutrients are obtained from the soil. Before a nutrient can be used by plants it must be dissolved in the soil solution. Most minerals and nutrients are more soluble or available in acid soils than in neutral or slightly alkaline soils.



- ▶ The soil pH can also influence plant growth by its effect on activity of beneficial microorganisms. Bacteria that decompose soil organic matter are hindered in strong acid soils. This prevents organic matter from breaking down, resulting in an accumulation of organic matter and the tie up of nutrients, particularly nitrogen, that are held in the organic matter.

PROPER pH



Soils tend to become acidic as a result of

- ▶ 1-rainwater leaching away basic ions (calcium, magnesium, potassium and sodium)
- ▶ 2-carbon dioxide from decomposing organic matter and root respiration dissolving in soil water to form a weak organic acid
- ▶ 3-formation of strong organic and inorganic acids, such as nitric and sulfuric acid, from decaying organic matter and oxidation of ammonium and sulfur fertilizers.

Strongly acid soils are usually the result of the action of these strong organic and inorganic acids.

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THANK YOU FOR YOUR ATTENTION ?

► Any Questions ??????????