



CREEK CONNECTIONS

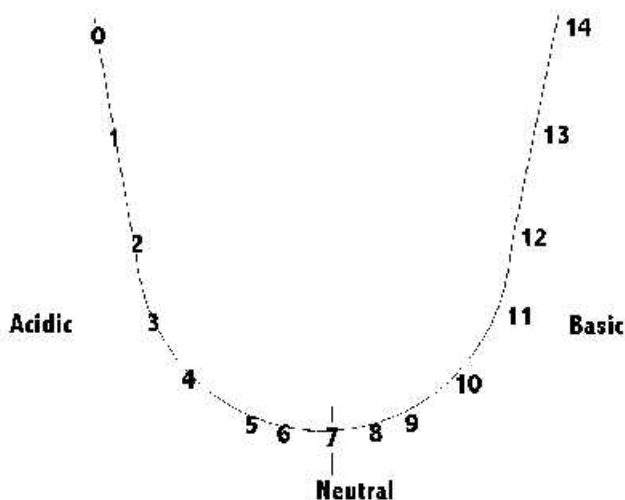
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pH Fact Sheet

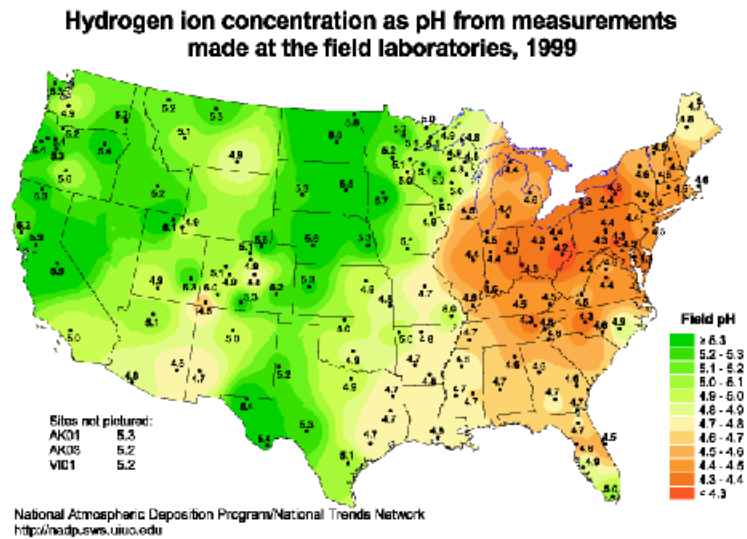
Definition: A measurement of hydrogen ion concentration (H^+) in liquids and other substances. The amount of H^+ can determine whether the substance is acidic or basic (alkaline).

Background:

- Water contains both H^+ (hydrogen) and OH^- (hydroxyl) ions.
- Pure distilled water has an equal number of hydrogen and hydroxyl ions, making the water neutral (pH of 7)
- More hydrogen than hydroxyl ions results in an acidic solution, (pH < 7)
- More hydroxyl than hydrogen ions results in a basic solution, (pH > 7)



- pH is expressed on a Log₁₀ scale from 1-14, thus a pH of 6 is *10 times* more acidic than pH of 7
- Natural rain has pH about 5.6, ($CO_2 + H_2O$ forms carbonic acid, which breaks off a H^+ and makes rain acidic)
- Organic acids in upper soil layer can lower pH by producing extra H^+
- Calcium carbonate ($CaCO_3$) rocks and soils can buffer changes in pH
- Photosynthesis removes CO_2 , and eventually carbonic acid, making water more basic
- Respiration/decomposition adds CO_2 , and eventually carbonic acid, making water more acidic
- carbon dioxide + water + **solar energy** = glucose + oxygen
- $6CO_2 + 6H_2O + \text{solar energy} = C_6H_{12}O_6 + 6O_2$
- *High pH* prevails in summer when more photosynthesis occurs and waterways are heavily influenced by groundwater flow and buffered by limestone soils



Source: *Environmental Effects of Acid Rain*
<http://www.epa.gov/acidrain/effects/enveffect.html>

Water Quality:

- Natural waters should have a pH between 5-8.5
- EPA's required pH levels for drinking water is 6.5-8.5