Acids are substances that are characterized by their ability to donate hydrogen ions (H^+) to other substances in a solution. Acids can be strong or weak. **Acidity** is a measure of the amount of dissolved hydrogen ions, [H^+], in a solution. The greater number of hydrogen ions in a solution, the more acidic the solution. **Bases** are substances that are characterized by their ability to accept hydrogen ions or produce hydroxide ions (OH^-) in an aqueous solution. To determine if a substance is an acid or a base, a **pH scale** may be used. pH is a measure of the concentration of hydrogen ions [H^+] in a substance. The equation for pH is:

$$pH = -\log [H^+]$$

The logarithm for pH is based on a scale of 10. As pH is a negative logarithm, the pH of a substance increases as the concentration of hydrogen ions [H^+] decreases. For example, a pH of 2 is 10^2 times, or 100 times, more acidic than a pH of 4. The figure below illustrates the relationship between pH and the concentration of [H^+] in a solution.

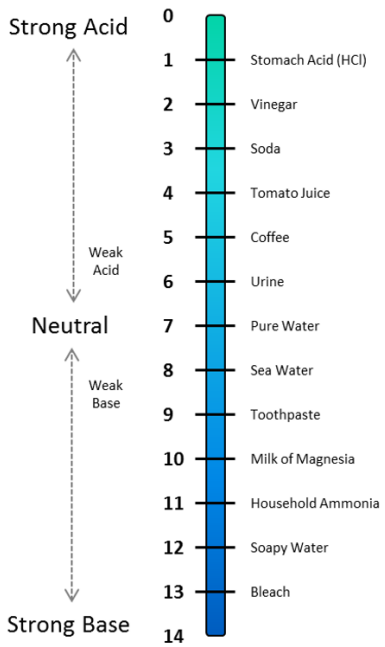

Figure 1. The pH Scale.

On the pH scale, a pH of less than 7.0 is acidic. A pH of 7.0 is neutral, and a pH greater than 7.0 is basic (alkaline). In addition to the concentration of [H^+] ions, bases can be measured by the presence of ions called a hydroxide ion (abbreviated as OH^-). For bases, the pH value increases as the amount of hydroxide ions in the solution increases. A **neutral** substance, with a pH of 7, is a substance that is neither an acid nor a base.