

What is pH?

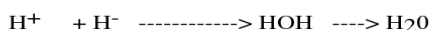
pH is a measurement of how acidic or how basic a solution is. The pH scale starts at 0 and goes up to 14. Halfway between 0 and 14 is 7, which is neutral. Compounds are acidic if they have a pH lower than 7. Compounds with a pH higher than 7 are said to be basic or alkaline.

Exactly what makes a compound an acid or a base?

To understand this you must understand water. Water is a molecule made up of three atoms covalently bonded together. Think of water as HOH.

Some compounds can cause water molecules to break apart into H⁺ and OH⁻ ions. The H⁺ ion is called a hydrogen ion. It is actually proton with no electrons. The OH⁻ ion is called a hydroxide ion.

If you mixed hydroxide and hydrogen ions together, they would immediately pair up and make water molecules.



This is called a neutralization reaction. Hydroxide ions neutralize hydrogen ions.

If, after the neutralization reaction is complete, there are H⁺ ions left over, then the solution is acidic.

If, after the neutralization reaction is complete, there are OH⁻ ions left over, then the solution is basic.

Why is pH important to biology?

Most cells can only survive within a certain range of pH. For example, human blood has a pH of about 7.2, which is slightly basic. Any higher or lower and the blood cells would be injured or killed. So you could say that a healthy person's blood has a pH range of 7.2 to 7.4.

Acids denature, or change the shape of proteins in much the same way heat does. As a matter of fact, strong acids like vinegar and lemon juice can be used to actually cook meats like fish and eggs. Seviche is a dish made by mixing raw fish and lime juice and letting it sit for a few hours. Acids are used by your digestive system to break down food molecules into simpler monomers.

Bases cause oils and fats to fall apart. Your digestive system uses bile, a basic compound to help in the digestion of fats and grease. Oven cleaners and drain cleaners contain lye, a strong base that dissolves baked on grease and burned fats.

Questions.

1. A student mixes strawberry koolaid and water. A pH meter is used to measure pH of 5.4. What kind of solution is strawberry Koolaid? **
2. In the koolaid mixture, what must there be more of, hydrogen ions or hydroxide ions? **
3. A student adds an alka-seltzer to the koolaid and stirs. The pH meter now reads 8.3. What was released by the alka-seltzer tablet to cause this change? **
4. Baking soda is a weak base. Hydrochloric acid is a strong acid. What would happen if these two were mixed? **
5. A student takes large glass of tapster and measures the pH after three things are done to the water: **