

# Acids & Bases

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*They are everywhere..*

*In your food*

*In your house*

***EVEN IN YOU!!!!***

# What is an acid?

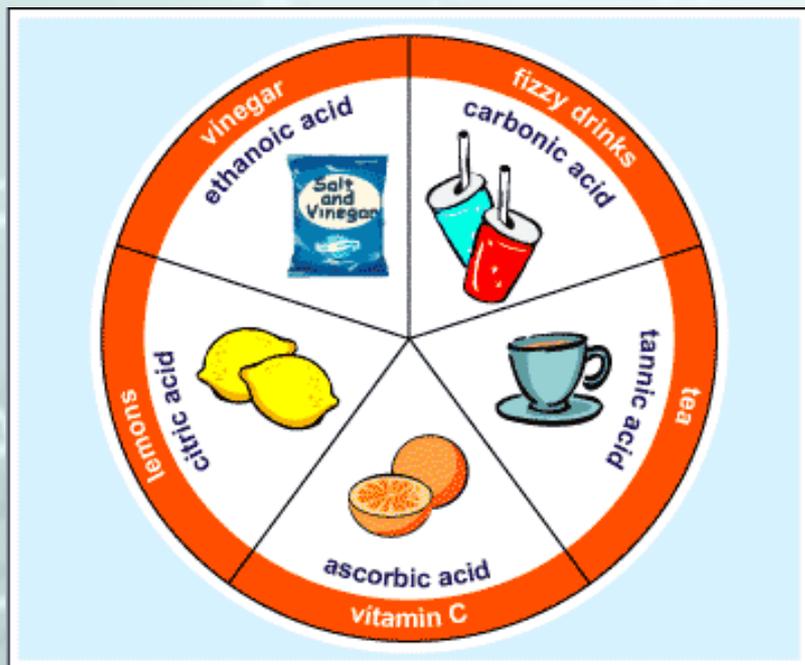
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- An acid is a solution that has an excess of  $H^+$  ions. It comes from the Latin word acidus that means "sharp" or "sour".
- The more  $H^+$  ions, the more acidic the solution.



# Properties of an Acid

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- Tastes Sour
- Conduct Electricity
- Corrosive, which means they break down certain substances. Many acids can corrode fabric, skin, and paper
- Some acids react strongly with metals
- Turns blue litmus paper red

Picture from BBC Revision Bites

[http://www.bbc.co.uk/schools/ks3bitesize/science/chemistry/acids\\_bases\\_1.shtml](http://www.bbc.co.uk/schools/ks3bitesize/science/chemistry/acids_bases_1.shtml)

# Uses of Acids

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Acids

- Acetic Acid = Vinegar
- Citric Acid = lemons, limes, & oranges. It is in many sour candies such as lemonhead & sour patch.
- Ascorbic acid = Vitamin C which your body needs to function.
- Sulfuric acid is used in the production of fertilizers, steel, paints, and plastics.
- Car batteries

# What is a base?

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- A base is a solution that has an excess of  $\text{OH}^-$  ions.
- Another word for base is alkali.
- **Bases** are substances that can accept hydrogen ions

# Properties of a Base

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**Bases**

- Feel Slippery
- Taste Bitter
- Corrosive
- Can conduct electricity. (Think alkaline batteries.)
- Do not react with metals.
- Turns red litmus paper blue.

# Uses of Bases

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- Bases give soaps, ammonia, and many other cleaning products some of their useful properties.
- The  $\text{OH}^-$  ions interact strongly with certain substances, such as dirt and grease.
- Chalk and oven cleaner are examples of familiar products that contain bases.
- Your blood is a basic solution.

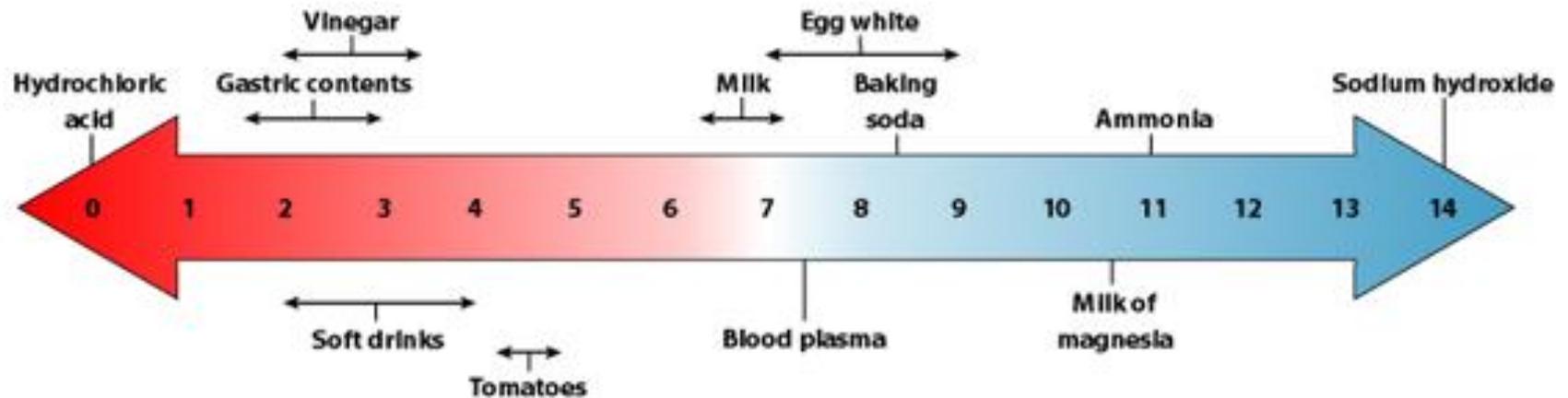
# pH Scale



- **pH** is a measure of how acidic or basic a solution is.
- The pH scale ranges from 0 to 14.
- Acidic solutions have pH values below 7
- A solution with a pH of 0 is very acidic.
- A solution with a pH of 7 is neutral.
- Pure water has a pH of 7.
- Basic solutions have pH values above 7.

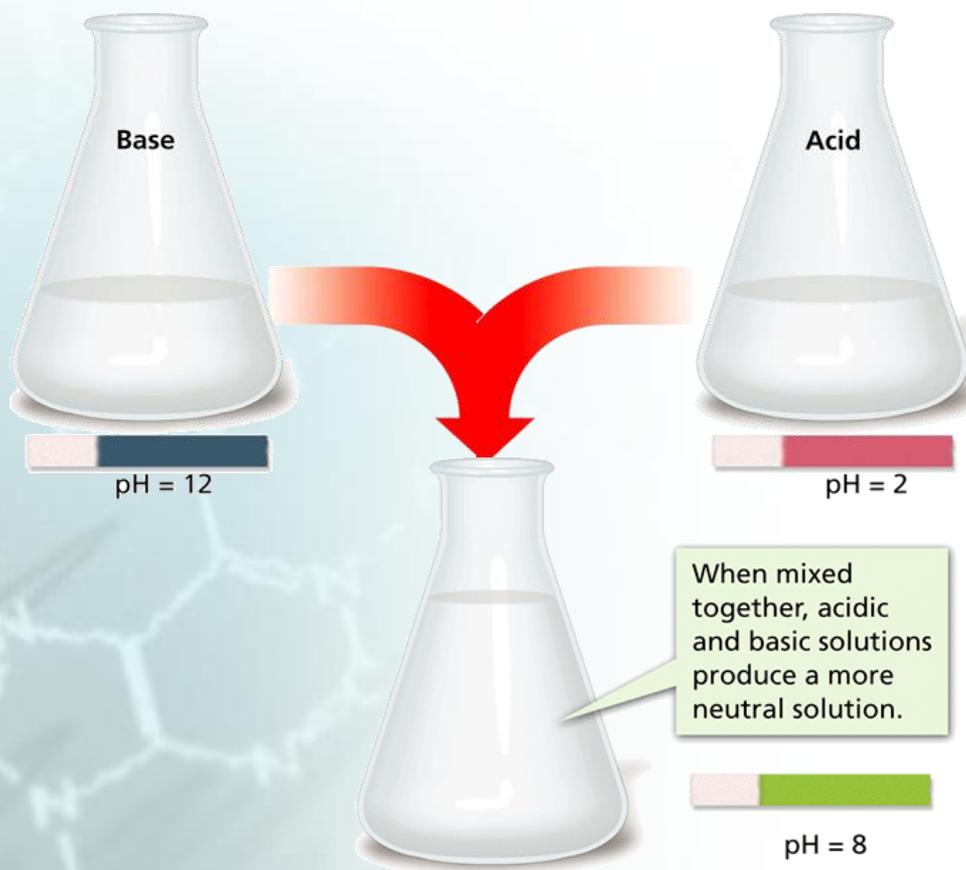
# pH Scale

- A change of 1 pH unit represents a tenfold change in the acidity of the solution.
- For example, if one solution has a pH of 1 and a second solution has a pH of 2, the first solution is not twice as acidic as the second—it is ten times more acidic.



# Acid – Base Reactions

A reaction between an acid and a base is called *neutralization*. An acid-base mixture is not as acidic or basic as the individual starting solutions.



# Acid – Base reactions

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Common Salts	
Salt	Uses
Sodium chloride NaCl	Food flavoring; food preservative
Potassium iodide KI	Additive in "iodized" salt that prevents iodine deficiency
Calcium chloride CaCl <sub>2</sub>	De-icer for roads and walkways
Potassium chloride KCl	Salt substitute in foods
Calcium carbonate CaCO <sub>3</sub>	Found in limestone and seashells
Ammonium nitrate NH <sub>4</sub> NO <sub>3</sub>	Fertilizer; active ingredient in cold packs

Each salt listed in this table can be formed by the reaction between an acid and a base.