

# What are acids and bases?

## Acids

- Have the ability to act as strong or weak electrolytes in aqueous solution
- Have a sour taste
- Have the ability to change the color of substances known as indicators
- Have the ability to produce hydrogen gas when reacted with certain active metals
- May be corrosive

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Causing damage to metals or other materials through a chemical process.

## Bases

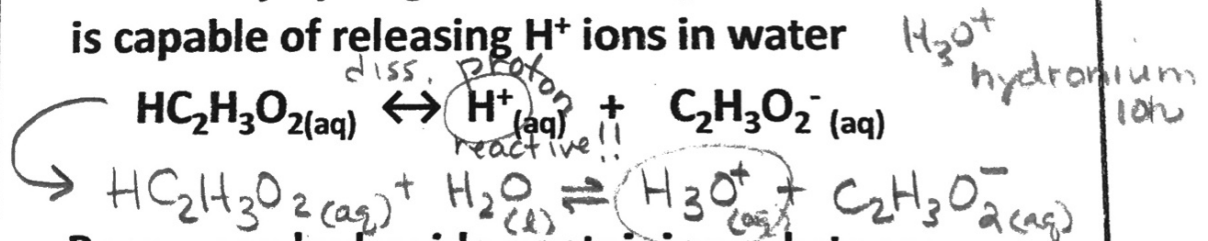
- Have the ability to function as strong or weak electrolytes in aqueous solution
- Have a bitter taste
- Are slippery to the touch
- Have the ability to change the color of substances known as indicators
- May be caustic

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able to burn or corrode organic tissue through a chemical process.

# What are acids and bases?

## Arrhenius Definition (1887)

**Acid** – any hydrogen containing substance that is capable of releasing  $H^+$  ions in water



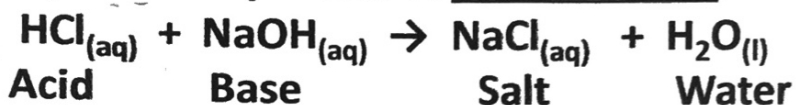
**Base** – any hydroxide-containing substance that releases  $OH^-$  ions in water



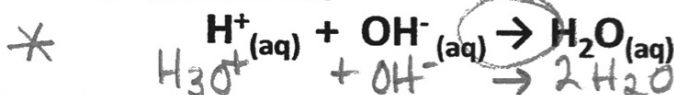
The Arrhenius model is useful for two reasons:

1) It relates all acidic properties to the production of  $H^+$  ions and all basic properties to the production of  $OH^-$  ions.

2) It explains the process of neutralization:



Net ionic equation for neutralization:

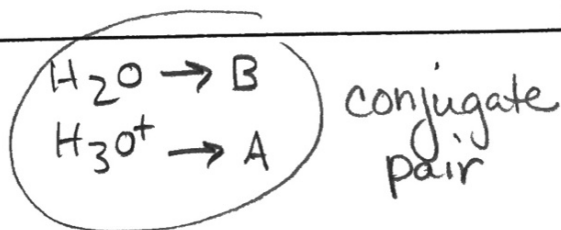
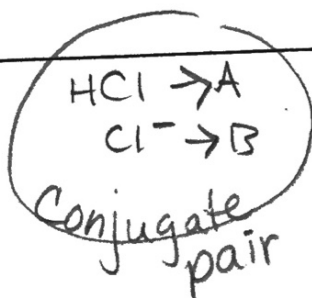
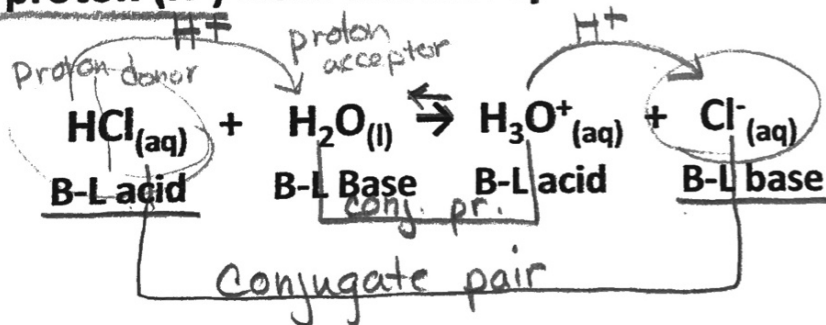


This reaction goes virtually to completion and it explains why the acidic and basic properties of the original solutions disappear.

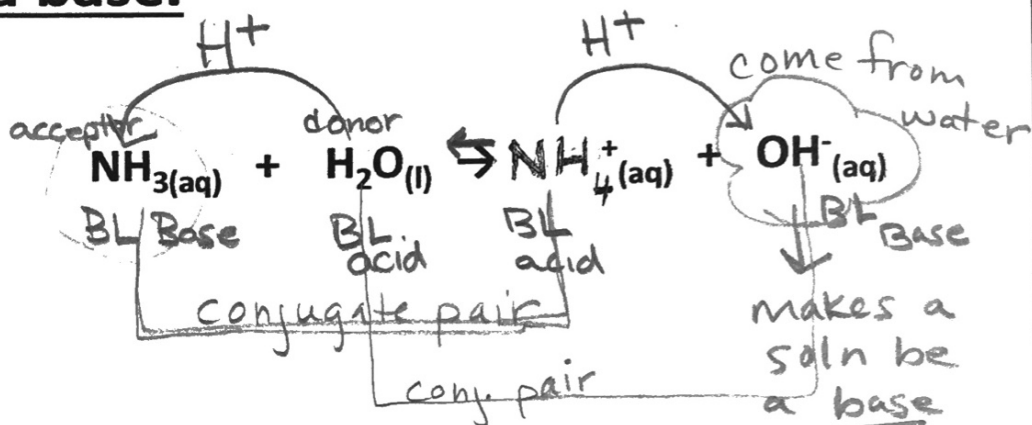
## Bronsted-Lowry Definition (1923)

Acid - any species that is capable of donating a proton ( $H^+$ ) to another species.

Base - any species that is capable of accepting a proton ( $H^+$ ) from another species



One result of the Bronsted –Lowry definition is that any reaction that contains an acid must also contain a base.



dual nature  
**Amphoterism**

Any species capable of either donating or accepting a proton ( $\text{H}^+$ ) is said to be amphoteric. Many ions are capable of amphoterism.

