

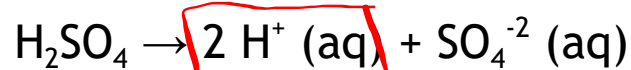
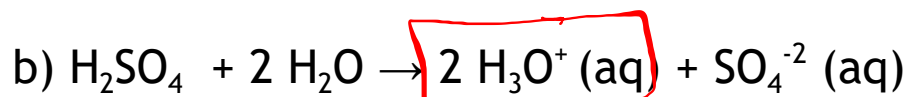
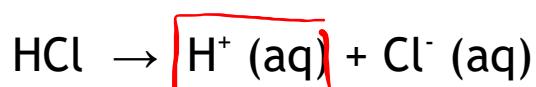
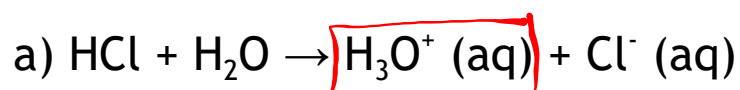
Acid and Base Theories

Aim: What are the differences between the Arrhenius and Alternate (Bronsted) acid-base theories?

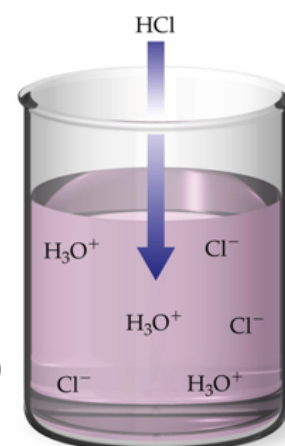
Arrhenius Definition of an Acid

Formula	Name
HCl(aq)	hydrochloric acid
HNO ₃ (aq)	nitric acid
H ₂ SO ₄ (aq)	sulfuric acid
H ₃ PO ₄ (aq)	phosphoric acid
H ₂ CO ₃ (aq) or CO ₂ (aq)	carbonic acid
CH ₃ COOH(aq) or HC ₂ H ₃ O ₂ (aq)	ethanoic acid (acetic acid)

Arrhenius Acids - a substance that yields hydronium ions, H₃O⁺, or Hydrogen ions, H⁺ as the only positive ion in solution.



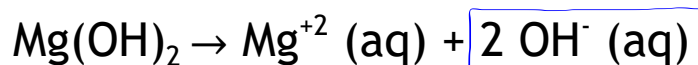
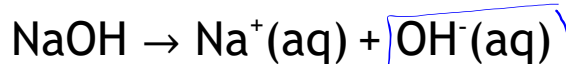
Stronger acid: gives off more H⁺ ions



Arrhenius Definition of a Base

Formula	Name
NaOH(aq)	sodium hydroxide
KOH(aq)	potassium hydroxide
Ca(OH) ₂ (aq)	calcium hydroxide
NH ₃ (aq)	aqueous ammonia

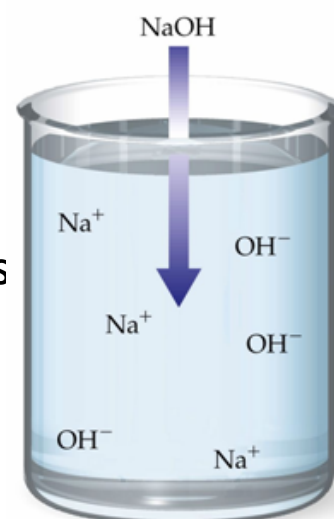
Arrhenius Base - a substance that yields hydroxide ions, OH⁻, as the only negative ion solution.



Strong bases will have a group 1 or 2 metals

alkali
base

alkaline
base



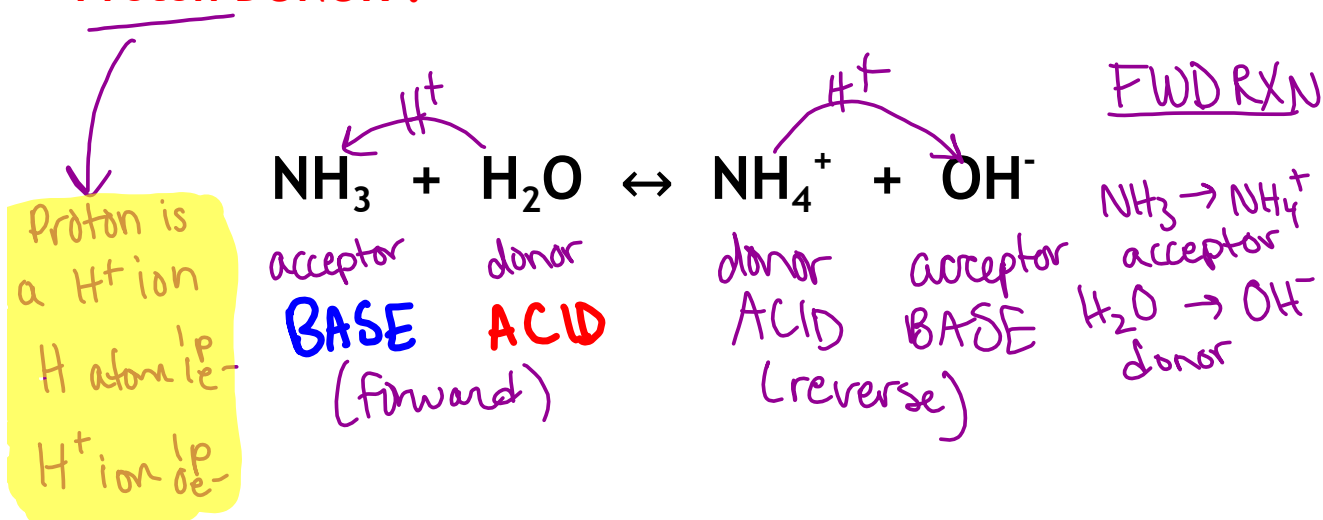
Alternate Theory of an Acid and a Base (Bronsted-Lowry Theory)

Alternate acid: A substance that donates a proton (H^+) to another substance.

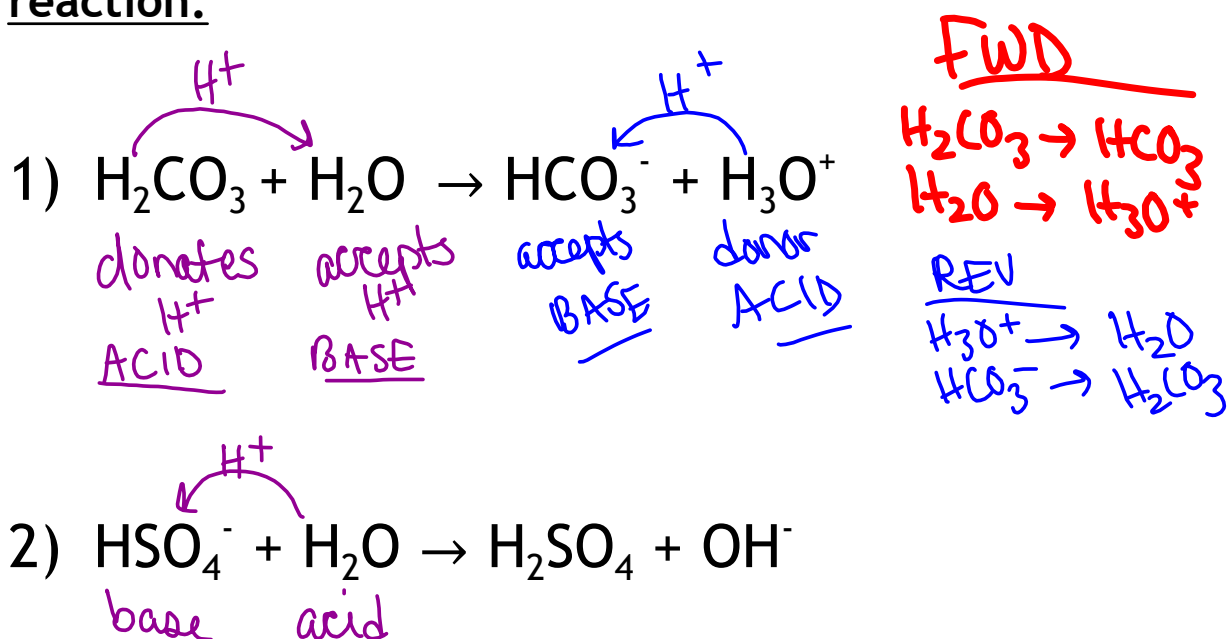
"Proton DONOR".

Alternate base: A substance that accepts a proton (H^+) from another substance.

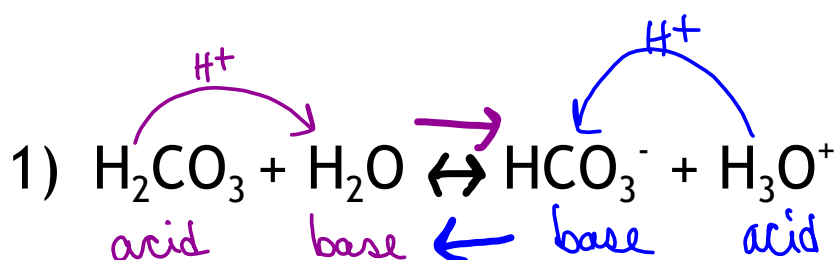
"Proton ACCEPTOR."



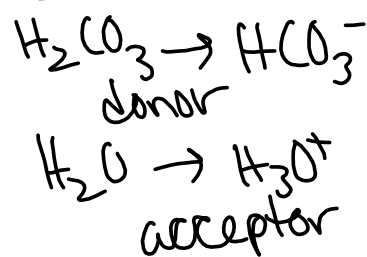
Identify the Alternate (Bronsted) Acid and Base in each reaction:



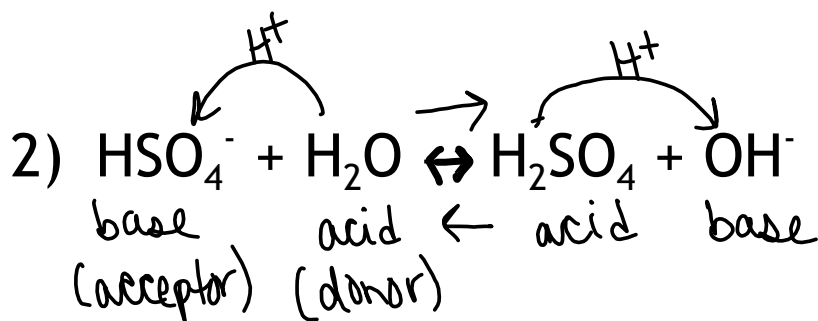
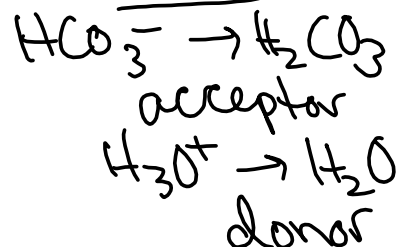
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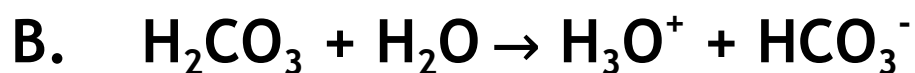
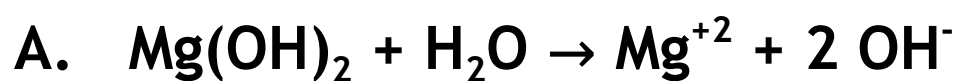
FWD



REV



Arrhenius Practice



1) Which equation represents the dissociation of an Arrhenius acid? **B**

2) Which equation represents the dissociation of an Arrhenius base? **A**

Practice Questions

- 1) Which species is classified as a Bronsted acid?
A) CH_3OH B) NaCl C) LiOH D) H_2SO_4
- 2) Which of the following substances will turn red litmus paper blue?
A) CH_3OH B) NaCl C) LiOH D) H_2SO_4
- 3) The compound NaOH can be described as an:
A) arrhenius base and an electrolyte C) arrhenius acid and a nonelectrolyte
B) arrhenius acid and an electrolyte D) arrhenius base and a nonelectrolyte
- 4) Which species donates H_3O^+ ions as the only positive ion in solution?
A) HCl B) $\text{Mg}(\text{OH})_2$ C) CH_4 D) BaF_2
- 5) Given the reaction:



In this reaction, ammonia molecules (NH_3) act as a base because they

- A) donate hydroxide ions (OH^-) C) accept hydrogen ions (H^+)
B) accept hydroxide ions (OH^-) D) donate hydrogen ions (H^+)

Identify the Bronsted-Lowry **Acid** and **Base** in each forward reaction and show the proton transfer.

