3. Arrhenius Theory of Acids and Bases

a) Acids

i) Release $H^+_{(aq)}$ in water

ii) Any ionic species starting with "H". Eg.: **H**Cl, **H**NO_3

iii) Are electrolytes

iv) Taste sour

v) Turn Litmus paper red

vi) Produce $H_{2(g)}$ when react with most metals.

vii) Reacts with bases in a Neutralization reaction.

b) Bases

i) Release $OH^-_{(aq)}$ in water

ii) Any ionic species ending with "OH". Eg.: Na**OH**, Ca(**OH**)$_2$

iii) Are electrolytes

iv) Taste bitter

v) Turn litmus paper blue

vi) Feels slippery!

vii) Reacts with acids in a Neutralization reaction.

c) Salts

i) Any other ionic compound that is not an acid or base (no "H" or "OH" present)

ii) Are produced from a Neutralization reaction:

Eg.: Acid + Base $\rightarrow$ Salt + Water

Eg.: $HCl + KOH \rightarrow KCl + H_2O$

Do Questions: #1 and #2 page 110; #3 and #4 page 112

1. The Hydronium Ion

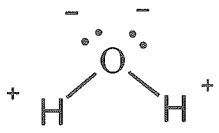
a) Acids release a proton (H^+) when mixed with water!

$$HCl_{(g)} \rightarrow H^+_{(aq)} + Cl^-_{(aq)}$$

b) What Happens to a Proton in Water?

i) H^+ is very positive and is therefore strongly attracted to anything negative.

ii) H_2O molecule has a negative "part"



iii) Any H+ in water will "attack" the water.

$$H^+ + H_2O \rightarrow H_3O^+$$

iv) Protons (H^+) do not exist alone in water. They all exist as H_3O^+.

c) Examples

i) Hydrochloric acid + H_2O

Step 1 $HCl \rightarrow H^+ + Cl^-$

Step 2 $H^+ + H_2O \rightarrow H_3O^+$

Overall **$HCl + H_2O \rightarrow H_3O^+ + Cl^-$**

ii) Sulphuric acid + H_2O

$H_2SO_4 + H_2O \rightarrow H_3O^+ + HSO_4^-$