

Equations for Acids & Bases

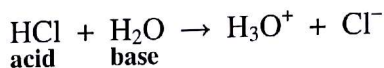
Chem Worksheet 19-1

Name _____

An **acid** is defined as a substance that donates a proton (written H⁺) while a **base** is the substance that receives a proton. Typically the chemical formula can be used to determine the acid, because it will begin with the symbol H. For example in the following equation HCl is the acid and it donates a proton to water.

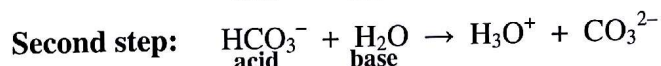
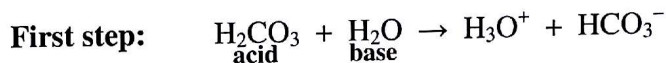
Acids donate protons
Bases accept protons

A proton is a hydrogen ion



In this reaction the HCl is the acid, while the H₂O acts as the base. This creates two new products: **hydronium**, H₃O⁺, and the chloride ion, Cl⁻.

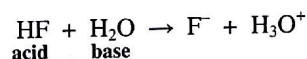
Some acids have the ability to donate two or three protons and these are known as **diprotic** or **triprotic acids** respectively. For these acids each successive step of hydrogen donation is represented with its own equation. Consider the diprotic acid called carbonic acid, H₂CO₃.



Example

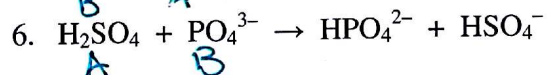
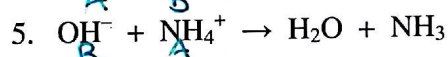
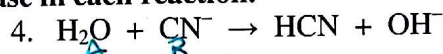
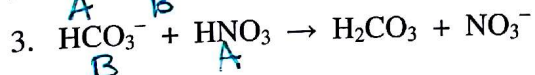
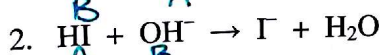
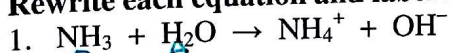
Write the chemical equation that shows what happens when HF (acid) is added to water.

- write the equation



- check to make sure **the atoms** and the **charge** are balanced

Rewrite each equation and label the acid and the base in each reaction.



Fill in the following table.

	Acid	Base	Equation
7	HNO ₃	OH ⁻	HNO ₃ + OH ⁻ → H ₂ O + NO ₃ ⁻
8	H ₂ O	CH ₃ NH ₂	CH ₃ NH ₂ + H ₂ O → OH ⁻ + CH ₃ NH ₃ ⁺
9	HCN	H ₂ O	HCN + H ₂ O → H ₃ O ⁺ + CN ⁻
10	HBr	H ₂ O	HBr + H ₂ O → H ₃ O ⁺ + Br ⁻
11	HPO ₄ ²⁻	NH ₃	HPO ₄ ²⁻ + NH ₃ → NH ₄ ⁺ + PO ₄ ³⁻
12	H ₂ S	OH ⁻	OH ⁻ + H ₂ S → H ₂ O + HS ⁻
13	H ₂ C ₂ O ₄	OH ⁻	H ₂ C ₂ O ₄ + OH ⁻ → H ₂ O + HC ₂ O ₄ ⁻
14	HClO	NH ₃	HClO + NH ₃ → NH ₄ ⁺ + ClO ⁻
15	HSO ₄ ⁻	CO ₃ ²⁻	HSO ₄ ⁻ + CO ₃ ²⁻ → HCO ₃ ⁻ + SO ₄ ²⁻