

Name: \_\_\_\_\_

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Chemistry 12  
ACID BASE Lesson #3+4  
**H<sub>3</sub>O<sup>+</sup> and BRØNSTED-LOWRY ACIDS AND BASES**

The water molecule is a *POLAR MOLECULE* that has a *DIPOLE* with one end being slightly **positive** and the other end being slightly **negative**. This characteristic can be illustrated with a LEWIS DOT STRUCTURE:

Any H<sup>+</sup> ion in water is so strongly attracted to the negatively charged side of the water molecule that following structure exists:

We refer to this structure as the **HYDRONIUM ION** or **HYDRATED PROTON**,  
NOTE: H<sup>+</sup> is often referred to as the \_\_\_\_\_. (remember this)

THEREFORE:

Example 1. In Chemistry 11 when we wrote the ionization reaction for HCl (g), the reaction looked like this:

Now we can re-write this as:

**BRØNSTED LOWRY THEORY OF ACIDS AND BASES**

As we saw in lesson #1 the Arrhenius definitions of acids and bases are slightly flawed. They do not account for acids and bases that exist in EQUILIBRIUM reactions, so a different definition had to be established.

ACID- \_\_\_\_\_

BASE- \_\_\_\_\_

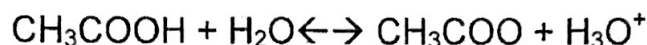
Examine a typical Bronsted-Lowry acid base reaction:



$\text{NH}_3$  is the \_\_\_\_\_ as it is \_\_\_\_\_.  
while

$\text{H}_2\text{O}$  is the \_\_\_\_\_ as it is \_\_\_\_\_.

Example 2. In the following reaction which reactant is the acid and which is the base?



**Notice that in the first example water is a \_\_\_\_\_ while in the second example it is a \_\_\_\_\_.**

Any substance that can act as either an acid or a base is said to be \_\_\_\_\_

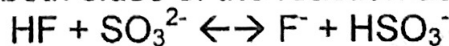
Apart from **water** there are TWO GUIDELINES that you can use to identify an AMPHIPROTIC substance:

- 1.
- 2.

Therefore the following substances are all amphiprotic:

In every Bronsted-Lowry reaction there is an acid and a base on BOTH sides of the equation.

Example 3. Label the species on both sides of the reaction as either an acid or a base.



- 1.
- 2.
- 3.

