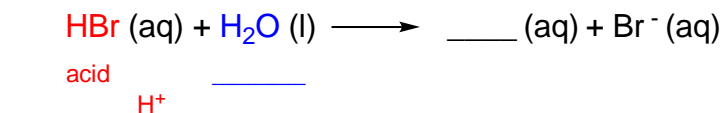


CONCEPT: BRONSTED-LOWRY ACIDS AND BASES

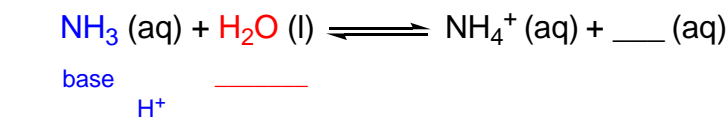
- In 1923, Johannes _____ and Thomas _____ developed a new definition for acids and bases.

□ **Bronsted-Lowry Acid:** a proton (H^+) _____

- acid donates H^+ to water producing H_3O^+ ion (hydronium)



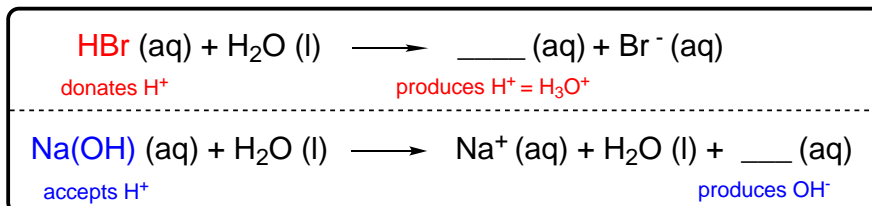
□ **Bronsted-Lowry Base:** a proton (H^+) _____



EXAMPLE: Identify each compound as either Bronsted-Lowry acid or base.

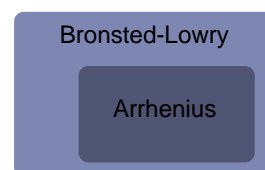
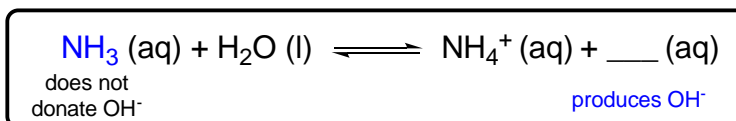
- | | |
|-------------------|---------------------|
| a) NH_4^+ _____ | c) CH_3NH_2 _____ |
| b) LiH _____ | d) H_2Te _____ |

- Are ALL Arrhenius acids and bases considered Bronsted-Lowry acids and bases? _____



- Are ALL Bronsted-Lowry bases considered Arrhenius bases? _____

□ Bases that do not contain _____ ion are NOT Arrhenius bases.



- Are ALL Bronsted-Lowry acids considered Arrhenius acids? _____

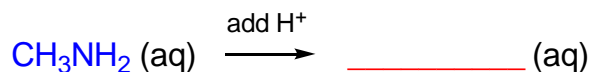
EXAMPLE: Identify each compound as either Bronsted-Lowry acid/base, Arrhenius acid/base or both.

- | | |
|---------------------|---------------------|
| a) H_2CO_3 _____ | d) $Sr(OH)_2$ _____ |
| b) CH_3NH_2 _____ | e) HF _____ |
| c) KNH_2 _____ | f) CaH_2 _____ |

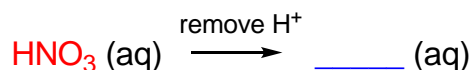
CONCEPT: BRONSTED-LOWRY ACIDS AND BASES

Conjugate Acid-Base Pairs

- Bronsted-Lowry acids and bases occur in _____ pairs.
 - When **base** accepts a proton, it transforms into a **conjugate** _____.



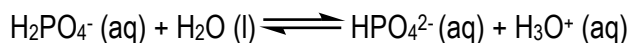
- When **acid** donates a proton, it transforms into **conjugate** _____.



EXAMPLE: Provide formulas of the conjugates for each of the following compounds.

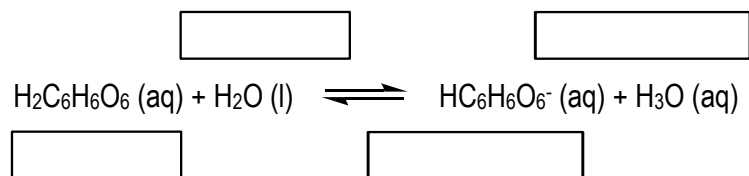
- a) NH_2NH_2 _____
- b) HCHO_2 _____
- c) HSO_4^- (base) _____
- d) HClO_2 _____

PRACTICE: Identify conjugate acid and conjugate base in the following reaction.



- a) HPO_4^{2-} (conjugate acid), H_3O^+ (conjugate base)
- b) HPO_4^{2-} (conjugate base), H_3O^+ (conjugate acid)
- c) H_2PO_4^- (conjugate acid), H_2O (conjugate base)
- d) H_2PO_4^- (conjugate base), H_2O (conjugate acid)

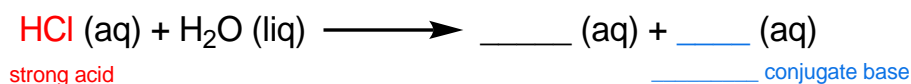
PRACTICE: In the following reaction, label Bronsted-Lowry acid and base, along with conjugate acid and base.



CONCEPT: BRONSTED-LOWRY ACIDS AND BASES

Strength of Conjugate Acids & Bases

- There is an _____ relationship between strength of acids & bases and their _____.
 - A strong acid will have a relatively _____ conjugate base.
 - stronger the acid = _____ the conjugate base - weak conjugate base has _____ affinity for proton



- A weak acid will have a relatively _____ conjugate base.
 - weaker the acid = stronger the conjugate base - stronger conjugate base has _____ affinity for proton



- Stronger the base = _____ conjugate acid □ weak conjugate acid _____ readily donates proton
- Weaker the base = _____ conjugate acid □ stronger conjugate acid _____ donates proton

EXAMPLE: Which of the following acids have relatively strong conjugate bases?

- a. HBrO_4 b. HCN c. HNO_3 d. HClO_4

PRACTICE: Which of the following is the strongest base?

- a. NO_3^- b. F^- c. Cl^- d. ClO_4^- e. H_2O

PRACTICE: Which of the following bases will have the weakest conjugate acid?

- a. CH_3COOH b. HCl c. CH_3NH_2 d. $(\text{CH}_3)_2\text{NH}$ e. LiOH