

What Are Acids and Bases?

Definitions, conjugate pairs, strength and neutralization

Name _____ Class _____ Date _____

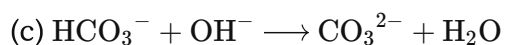
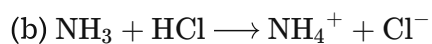
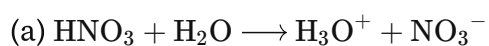
A. Definitions

1. Define a Brønsted–Lowry acid and a Brønsted–Lowry base.

2. Explain the difference between a **strong** acid and a **concentrated** acid.

B. Acids, bases and conjugate pairs

3. For each reaction, identify the acid and the base (Brønsted–Lowry):



4. Write the **conjugate base** of: (a) HF, (b) H_2SO_4 , (c) NH_4^+ , (d) H_2O .

5. Write the **conjugate acid** of: (a) NH_3 , (b) OH^- , (c) H_2O , (d) CO_3^{2-} .

C. Strong and weak

6. Classify each as a strong acid, weak acid, strong base or weak base: HCl , CH_3COOH , NaOH , NH_3 , HNO_3 .

D. Neutralization

7. Write balanced equations for these neutralizations:

- (a) hydrochloric acid with potassium hydroxide
- (b) sulfuric acid, H_2SO_4 , with sodium hydroxide
- (c) nitric acid with calcium hydroxide, $\text{Ca}(\text{OH})_2$

E. Challenge

8. Water acts as a base in reaction 3(a) but as an acid in $\text{NH}_3 + \text{H}_2\text{O} \rightleftharpoons \text{NH}_4^+ + \text{OH}^-$. What is the name for a substance that can do both, and how can water act both ways?