

## Defining Acids and Bases

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

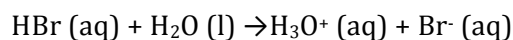
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**Directions:** Answer the following questions about acids and bases.

1. Complete the chart by placing an X in each box that each substance can act as.

Substance	Arrhenius Acid	Arrhenius Base	Bronsted-Lowry Acid	Bronsted-Lowry Base
HCl				
NaOH				
NH <sub>3</sub>				
H <sub>2</sub> O				

2. For the following reaction identify the acid, the base, the conjugate acid, and the conjugate base.



3. What does it mean to be amphoteric? What common substance is Amphoteric?
4. Methylamine (CH<sub>3</sub>NH<sub>2</sub>) forms hydroxide ions in aqueous solution. Why is methylamine a Bronsted-Lowry base but not an Arrhenius base?
5. An unknown substance stays clear when phenolphthalein indicator is added. Is the substance safe to drink? Support your response.
6. Define the following:
- Strong Acid:
  - Weak Acid:
  - Concentrated Acid:
  - Dilute Acid:
7. Explain how it is possible for an acid to be both weak and concentrated.

8. Assume each box below has the same total volume of solution. In the box depict the molecular model of the solution using the following symbols:

$\text{HA}$  Undissociated acid molecule

$\text{H}^+$  Hydrogen ion

$\text{A}^-$  Conjugate base of an acid

Concentrated Strong Acid



Concentrated Weak Acid



Dilute Strong Acid



Dilute Weak Acid



9. pH is a measure of the hydrogen ion concentration in a solution. The greater the hydrogen ion concentration (the more hydrogen ions present in the solution), the lower the pH of the solution will be. Using this information, predict which solution in each of the following pairs would have a lower pH and support your prediction.
- A dilute strong acid or a concentrated strong acid
  - A dilute weak acid and a concentrated weak acid
  - A dilute weak acid and a concentrated strong acid
  - A dilute strong acid and a concentrated weak acid
10. For each of the following solutions, tell whether it is an acid, base, or neutral. If it is an acid or base, tell whether it is strong or weak.

