The Swedish chemist Svante Arrhenius introduced the theory of ionization and used this theory to explain much about the behavior of acids and bases.

1. An Arrhenius acid is defined as any compound that dissociates in aqueous solution to form \[ \text{HNO}_3(aq) \rightarrow \text{H}^+(aq) + \text{NO}_3^-(aq) \] ions.

\[ \text{HCl}(aq) \rightarrow \text{ } \] ions.

2. An Arrhenius base is defined as any compound that dissociates in aqueous solution to form \[ \text{KOH}(aq) \rightarrow \text{K}^+(aq) + \text{OH}^-(aq) \] ions.

\[ \text{NaOH}(aq) \rightarrow \text{ } \] ions.

3. Salts are compounds that dissociate in aqueous solution releasing neither \[ \text{KCl}(aq) \rightarrow \text{K}^+(aq) + \text{Cl}^-(aq) \] ions nor \[ \text{NaCl}(aq) \rightarrow \text{ } \] ions.

4. Using the Arrhenius definition, classify the following examples as acids, bases, or salts:

- HBr
- KCl
- Mg(OH)_2
- H_3PO_4
- HCl
- HClO
- KNO_2
- Al(OH)_3
- HFO_4
- KC_2H_3O_2
- Ba(OH)_2
- NaCl
Acids and bases can also be identified using an operational definition. Operational definitions are simply a list of properties.

5. **ACIDS:**
   a. A _______________ taste is a characteristic property of all acids in aqueous solution.
   b. Acids react with some metals to produce _______________ gas.
   c. Because aqueous acid solutions conduct electricity, they are identified as _______________.
   d. Acids react with bases to produce a _______________ and water.
   e. Acids turn _______________ different colors.

6. **BASES:**
   a. Bases tend to taste _______________ and feel _______________.
   b. Like acids, aqueous basic solutions conduct _______________ and are identified as electrolytes.
   c. Bases react with _______________ to produce a salt and _______________.
   d. Bases turn _______________ different colors.

7. **NAMING ACIDS, BASES, AND SALTS:**
   a. Since bases and salts are _______________ compounds, they are named in the usual way:
      
      \[
      \begin{align*}
      \text{KNO}_3 & \quad \text{NH}_4\text{OH} \\
      \text{KNO}_2 & \quad \text{Al(OH)}_3
      \end{align*}
      \]
   b. Binary acids consist of _______________ elements, the first being _______________.
      Binary acids are named using the format:
      \[\text{hydro} – (\text{plus root word of second element}) – \text{ic acid}\]
   c. Ternary acids consist of _______________ elements. Do NOT use a prefix. Simply change the ending of the polyatomic ion’s name and add the word “acid”:
      Binary acids are named using the format:
      \[-\text{ate} \text{ becomes } \text{______________} \quad \text{and } -\text{ite} \text{ becomes } \text{______________}\]
   d. Name the following acids:
      
      \[
      \begin{align*}
      \text{H}_3\text{PO}_3 & \quad \text{HClO}_2 \\
      \text{H}_2\text{CO}_3 & \quad \text{HClO}_2 \\
      \text{HF} & \quad \text{H}_2\text{SO}_3
      \end{align*}
      \]