<table>
<thead>
<tr>
<th>Strong Electrolyte</th>
<th>Weak Electrolyte</th>
<th>Nonelectrolyte</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dissociate 100%</td>
<td>Dissociate &lt; 10%</td>
<td>Do not dissociate</td>
</tr>
<tr>
<td>Strong Acids</td>
<td>Weak Acids</td>
<td>Molecular Compounds</td>
</tr>
<tr>
<td>Strong Bases</td>
<td>Weak Bases</td>
<td>Ionic - Insoluble (s)</td>
</tr>
<tr>
<td>Ionic - Soluble (aq)</td>
<td>Written as Ions</td>
<td>Written as Molecules</td>
</tr>
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<td>Written as Ions</td>
<td>Written as Molecules</td>
<td>Written as Molecules</td>
</tr>
</tbody>
</table>

1. Classify each of the following compounds as either a (S)trong electrolyte, (W)eak electrolyte or (N)onelectrolyte.

   (a) HF
   (b) NaOH
   (c) BaCl₂
   (d) H₂SO₄
   (e) BaCO₃
   (f) CaSO₄
   (g) Zn(C₂H₃O₂)₂
   (h) PbCl₂
   (i) CH₃CH₂OH
   (j) Al₂O₃
   (k) KOH
   (l) KNO₃
   (m) AgCl
   (n) C₆H₁₂O₆

**Solution:**

(a) WE  (b) SE  (c) SE  (d) SE  (e) NE  (f) NE  (g) SE  (h) NE  (i) NE  (j) NE  (k) SE  (l) SE  (m) NE  (n) NE
Molecular Equation:
- Write everything as molecules or compounds.
- Include states.
- Balance the reaction.

Total Ionic Equation:
- Write SE as ions. Include charges and states.
- Write WE and Nonelectrolytes as molecules. Include states.

Net Ionic Equation:
- Only include atoms, ions, and molecules that change states or charges.
- Do not include (cross out) spectator ions.
- Include states and balance the reaction.

On a separate sheet of paper write the Molecular, Ionic and Net Ionic equations for each of the following reactions.

2. potassium bromide + lead (III) nitrate → potassium nitrate + lead (III) bromide

Solution:
Molecular: $3 \text{KBr} \rightarrow 3 \text{KNO}_3 + \text{PbBr}_3$
Total Ionic: $3 \text{K}^+ + 3 \text{Br}^- + \text{Pb}^{3+} + 3 \text{NO}_3^- \rightarrow 3 \text{K}^+ + 3 \text{NO}_3^- + \text{PbBr}_3$
Net Ionic: $3 \text{Br}^- + \text{Pb}^{3+} \rightarrow \text{PbBr}_3$

3. sodium metal + hydrochloric acid → sodium chloride + hydrogen

Solution:
Molecular: $2 \text{Na} + 2 \text{HCl} \rightarrow 2 \text{NaCl} + \text{H}_2$
Total Ionic: $2 \text{Na} + 2 \text{H}^+ + 2 \text{Cl}^- \rightarrow 2 \text{Na}^+ + 2 \text{Cl}^- + \text{H}_2$
Net Ionic: $2 \text{Na} + 2 \text{H}^+ \rightarrow 2 \text{Na}^+ + \text{H}_2$

4. ammonium sulfate + sodium hydroxide → sodium sulfate + water + nitrogen trihydride

Solution:
Molecular: $(\text{NH}_4)_2\text{SO}_4 + 2 \text{NaOH} \rightarrow \text{Na}_2\text{SO}_4 + 2 \text{H}_2\text{O} + 2 \text{NH}_3$
Total Ionic: $2 \text{NH}_4^+ + 2 \text{SO}_4^{2-} + 2 \text{Na}^+ + 2 \text{OH}^- \rightarrow 2 \text{Na}^+ + 2 \text{SO}_4^{2-} + 2 \text{H}_2\text{O} + 2 \text{NH}_3$
Net Ionic: $2 \text{NH}_4^+ + 2 \text{OH}^- \rightarrow 2 \text{H}_2\text{O} + 2 \text{NH}_3$

5. hydrofluoric acid + magnesium chloride → magnesium fluoride + hydrochloric acid

Solution:
Molecular: $2 \text{HF} + \text{MgCl}_2 \rightarrow \text{MgF}_2 + 2 \text{HCl}$
Total Ionic: $2 \text{H}^+ + 2 \text{F}^- + \text{Mg}^{2+} + 2 \text{Cl}^- \rightarrow \text{Mg}^{2+} + 2 \text{H}^+ + 2 \text{Cl}^-$
Net Ionic: $\text{Mg}^{2+} + 2 \text{F}^- \rightarrow \text{MgF}_2$

6. aluminium nitrate + sodium hydroxide → aluminium hydroxide + sodium nitrate

Solution:
Molecular: $\text{Al(NO}_3)_3 + 3 \text{NaOH} \rightarrow \text{Al(OH)}_3(s) + 3 \text{NaNO}_3$
Total Ionic: $\text{Al}^{3+} + 3 \text{NO}_3^- + 3 \text{Na}^+ + 3 \text{OH}^- \rightarrow \text{Al(OH)}_3(s) + 3 \text{Na}^+ + 3 \text{NO}_3^-$
Net Ionic: $\text{Al}^{3+} + 3 \text{OH}^- \rightarrow \text{Al(OH)}_3$