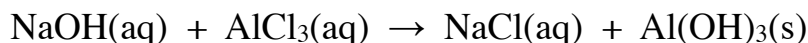


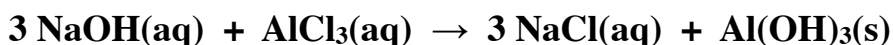
Balancing Net Ionic Equations

1. Balance the **molecular equation**. Find stoichiometric coefficients; do not change the subscripts or states of matter.

Example: Balance the double displacement reaction between sodium hydroxide and aluminum chloride.

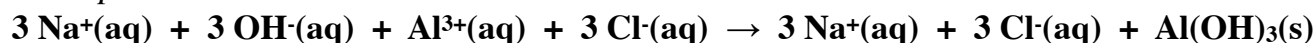


NaOH, AlCl₃ and NaCl are strong electrolytes; Al(OH)₃ is insoluble in water, so:



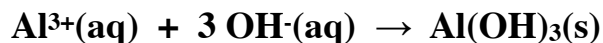
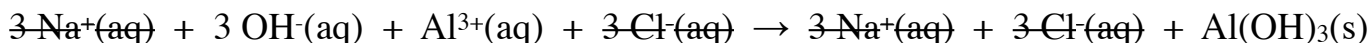
2. Write the **total ionic equation** by rewriting the molecular equation with the strong electrolytes separated into ions. Do not "ionize" solids, liquids or gases; only aqueous species should be separated.

Example:



3. Write the **net ionic equation** by rewriting the total ionic equation and canceling the **spectator ions** (the species that appear on both the product and reactant sides of the total ionic equation.) Remember that atoms are *not* the same as ions (i.e. Mg_(s) is not the same as Mg²⁺_(aq).)

Example: Na⁺ and Cl⁻ appear on both sides of the equation, so they are spectator ions



4. **Check** that the **total ionic charge** on the reactant side balances the total ionic charge on the product side. The equation will now be balanced for both mass and charge.

Example: $\text{Al}^{3+}\text{(aq)} + 3 \text{OH}^-\text{(aq)} \rightarrow \text{Al(OH)}_3\text{(s)}$ To check the total ionic charge:

Reactant side: **+3** (from Al³⁺) **+3(-1)** (from OH⁻) = **0**

Product side: **0** (no charge on molecular solids)

Since the charge on the reactant side equals the charge on the product side, the total ionic charge for this reaction is balanced.