AgNO$_3$ (aq) + NaCl(aq) $\rightarrow$ AgCl(s) + NaNO$_3$(aq)

What happens when you put AgNO$_3$ and NaCl in water?

AgNO$_3$ (aq) + NaCl(aq) $\rightarrow$ AgCl(s) + NaNO$_3$(aq)

What really happens when you put AgNO$_3$ and NaCl in water?
AgNO₃ (aq) + NaCl(aq) → AgCl(s) + NaNO₃(aq)

complete ionic equation

Ag⁺ (aq) + NO₃⁻ (aq) + Na⁺ (aq) + Cl⁻ (aq) → AgCl (s) + NO₃⁻ (aq) + Na⁺ (aq)
These ions do not participate in the reaction. They are called SPECTATOR IONS.

\[
\text{Ag}^+ (aq) + \text{NO}_3^- (aq) + \text{Na}^+ (aq) + \text{Cl}^- (aq) \rightarrow \text{AgCl} (s) + \text{NO}_3^- (aq) + \text{Na}^+ (aq)
\]

The net ionic equation is constructed from the complete ionic equation:

\[
\text{Ag}^+ (aq) + \text{NO}_3^- (aq) + \text{Cl}^- (aq) \rightarrow \text{AgCl} (s) + \text{NO}_3^- (aq) + \text{Na}^+ (aq)
\]

NO\text{}_3^- and Na\text{}^+ are not participating in the reaction.

\[
\text{Ag}^+ (aq) + \text{NO}_3^- (aq) + \text{Cl}^- (aq) \rightarrow \text{AgCl} (s) + \text{NO}_3^- (aq) + \text{Na}^+ (aq)
\]

Ag\text{}^+ (aq) + \text{Cl}^- (aq)
Complete balanced chemical formula equation: 
\[ \text{AgNO}_3(\text{aq}) + \text{NaCl}(\text{aq}) \rightarrow \text{AgCl(s)} + \text{NaNO}_3(\text{aq}) \]

Complete ionic equation shows ions in solution 
\[ \text{Ag}^+(\text{aq}) + \text{NO}_3^-(\text{aq}) + \text{Na}^+(\text{aq}) + \text{Cl}^-(\text{aq}) \rightarrow \text{AgCl(s)} + \text{Na}^+(\text{aq}) + \text{NO}_3^-(\text{aq}) \]

Net ionic equation shows ions in rxn 
\[ \text{Ag}^+(\text{aq}) + \text{Cl}^-(\text{aq}) \rightarrow \text{AgCl(s)} \]
PREDICTING THE FORMATION OF A PRECIPITATE

• Consider the possibility that a precipitate may form.
• You must use the solubility rules to decide.
• Possible outcomes
  – No precipitate = No visible reaction (NR)
  – Formation of one ppt.
  – Formation of two ppt. (rare occurrence)