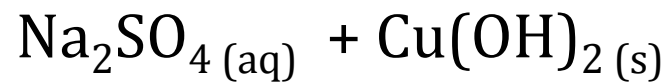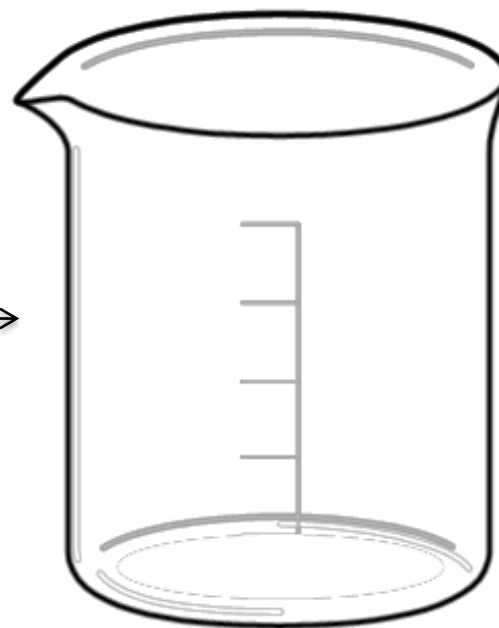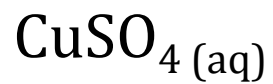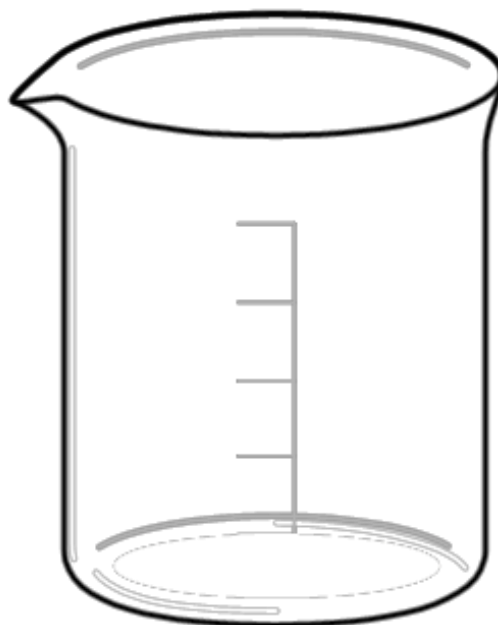| Topic	Ionic equations and precipitation reactions	Level	Key Stage 3 (or any course for students aged 11-16)
Outcomes	1. Students can draw accurate particle pictures for precipitation reactions 2. Students can write ionic equations and identify spectator ions		
Information for teachers	This activity has been designed to help students understand why we use ionic equations in chemistry. It is important that students are fluent with stating the formula and charges of common ions before they complete this task.		

This equation is very misleading!

Sodium may never meet sulphate...
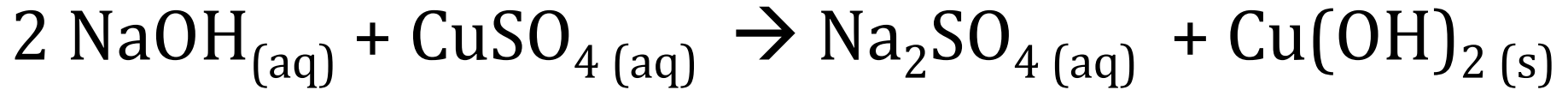
$$2 \text{ NaOH}_{(aq)} + \text{CuSO}_{4\ (aq)} \rightarrow \text{Na}_2\text{SO}_{4\ (aq)} + \text{Cu(OH)}_{2\ (s)}$$

Let's draw what is **actually** inside these beakers.

$NaOH_{(aq)}$ + $CuSO_{4\ (aq)}$ → $Na_2SO_{4\ (aq)}$ + $Cu(OH)_{2\ (s)}$
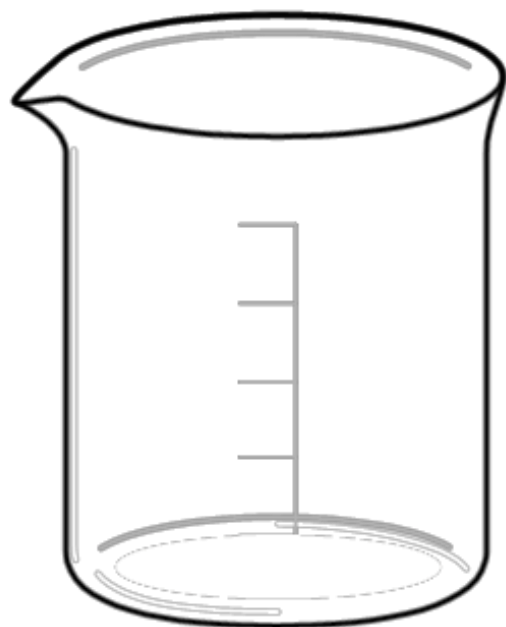
Let's draw what is **actually** inside these beakers

Which of the ions has actually reacted?!
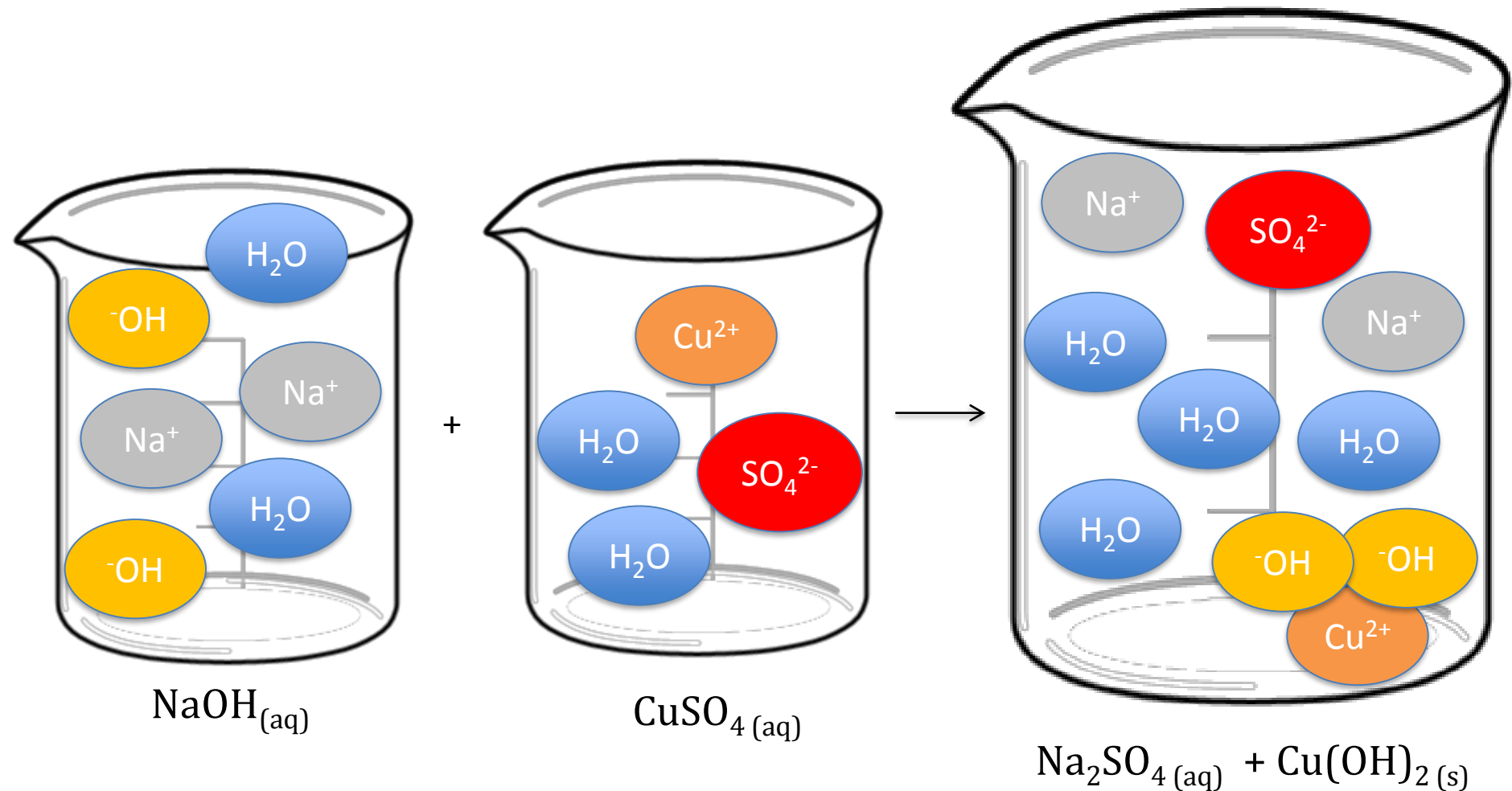
$NaOH_{(aq)}$

$+$

$CuSO_{4\ (aq)}$

$Na_2SO_{4\ (aq)}$ $+$ $Cu(OH)_{2\ (s)}$

Let's draw what is **actually** inside these beakers

Ionic equations only show the ions that are reacting.
$$2\ ^{-}OH_{(aq)} + Cu^{2+}{}_{(aq)} \rightarrow Cu(OH)_{2\ (s)}$$

The other ions are spectator ions.
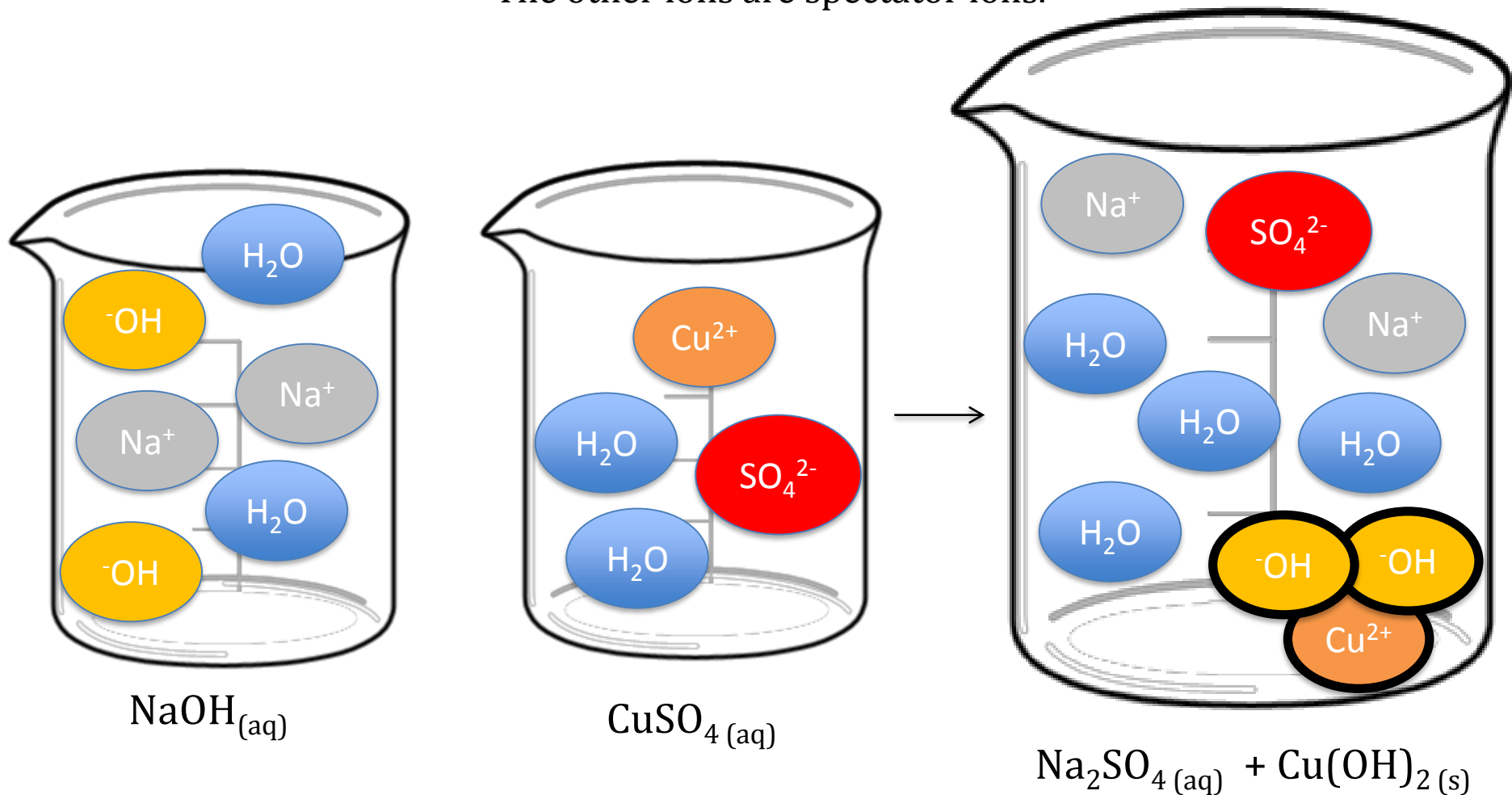

$NaOH_{(aq)}$ $CuSO_{4\ (aq)}$ $Na_2SO_{4\ (aq)} + Cu(OH)_{2\ (s)}$
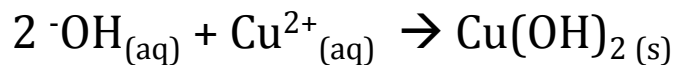
Let's draw what is **actually** inside these beakers

Ionic equations only show the ions that are reacting.
$$2\ ^-OH_{(aq)} + Cu^{2+}{}_{(aq)} \rightarrow Cu(OH)_{2\ (s)}$$
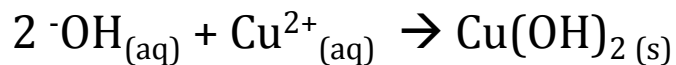
The other ions are spectator ions and just float around in solution.

$NaOH_{(aq)}$ $CuSO_{4\ (aq)}$ $Na_2SO_{4\ (aq)} + Cu(OH)_{2\ (s)}$

$NaOH_{(aq)}$ $FeSO_{4\ (aq)}$

$FeSO_{4\ (aq)} + Fe(OH)_{2\ (s)}$
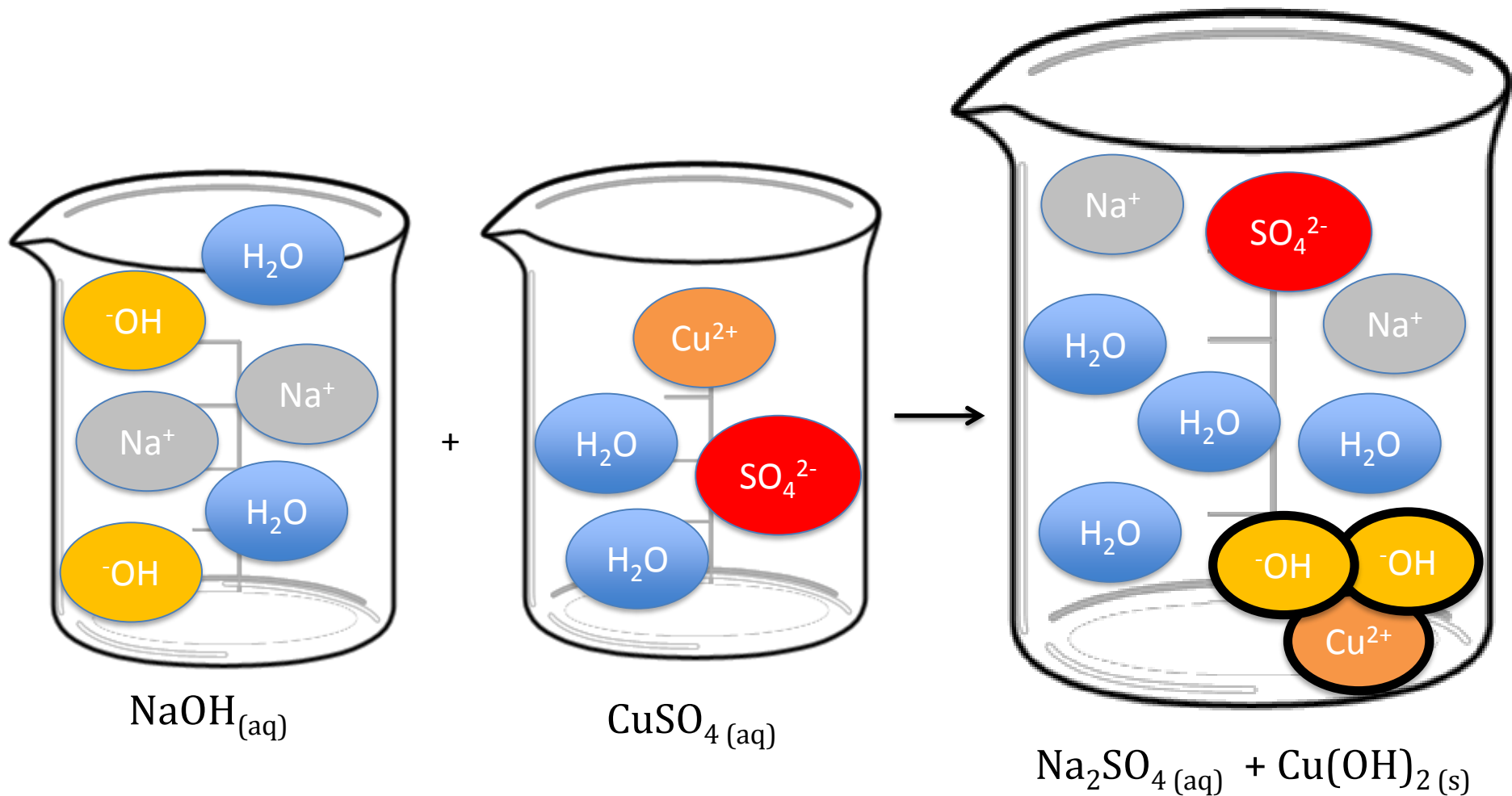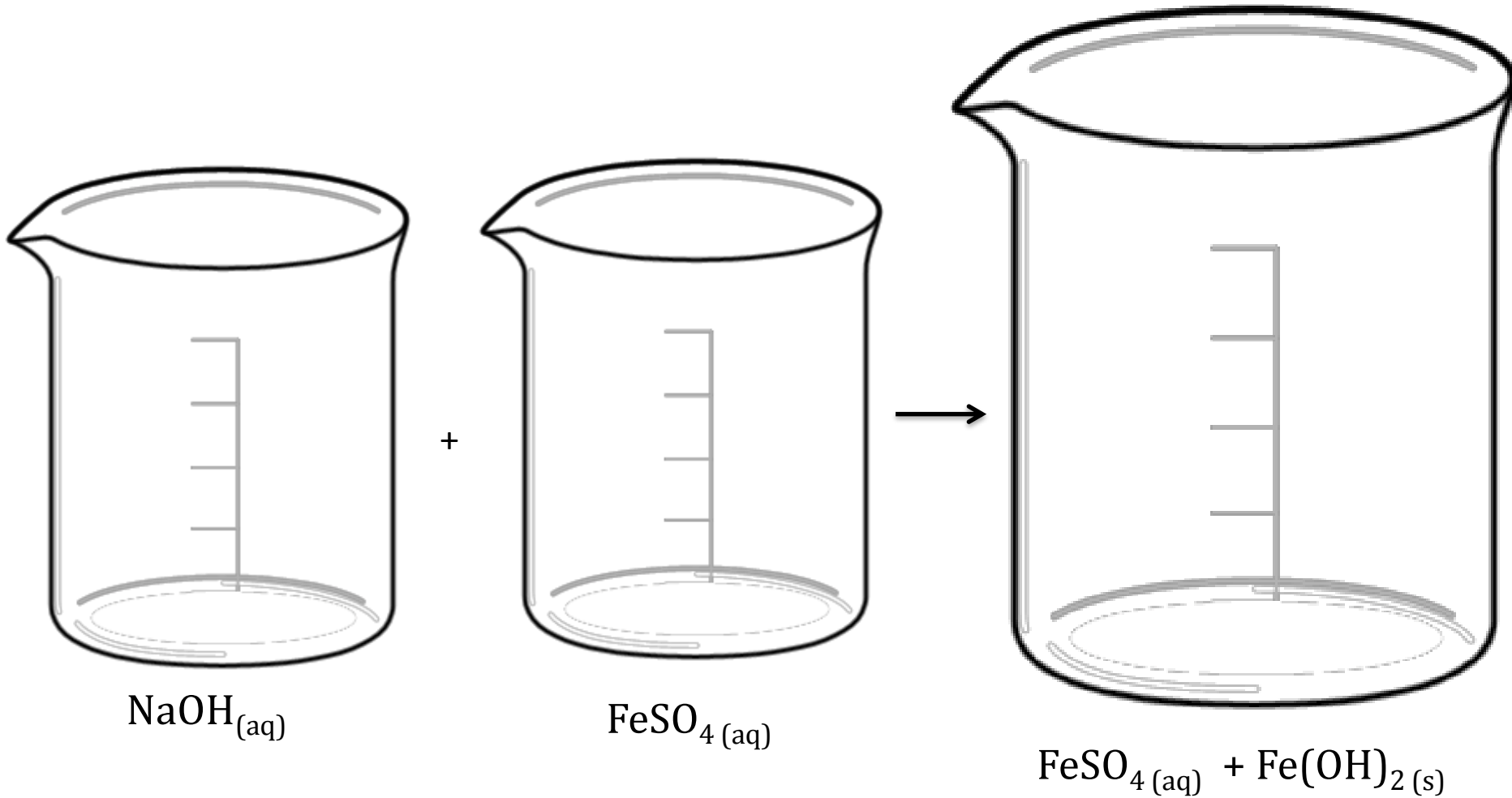
Overall molecular equation: _____

Ionic equation: _____
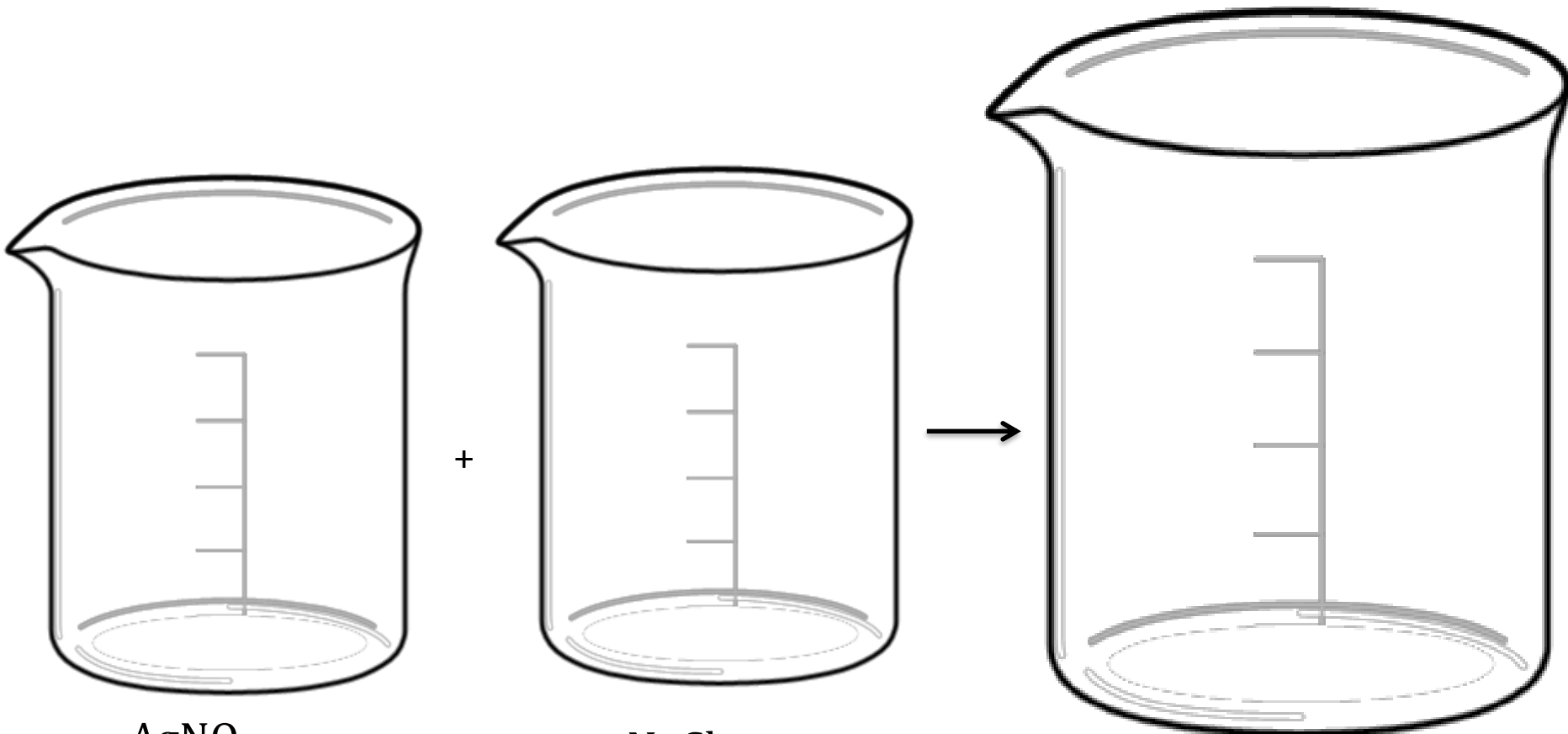
Spectator ions: _____

AgNO$_{3(aq)}$ +   NaCl$_{(aq)}$ →   NaNO$_{3\,(aq)}$ + AgCl$_{(s)}$

Overall molecular equation: _____

Ionic equation: _____

Spectator ions: _____

$BaCl_{2(?)}$ $+$ $CuSO_{4\,(aq)}$ $\rightarrow$ $?\ +\ ?_{\,(s)}$

Overall molecular equation: _____

Ionic equation: _____

Spectator ions: _____