Name:_____ Date:_____ Block:_____

Precipitation Reactions Mini Lab

A precipitation reaction is a double replacement reaction in which a precipitate is formed. A precipitate is an insoluble solid. When a precipitate forms, the solution turns cloudy.

Pre-lab:

For each reagent in Data Table 1, write the particles (ions) present in solution.

Directions:

1. Six mixtures will be made. Each mixture will be placed into one well. To make each mixture, add the appropriate reagent using the data table below. For example, mixture #1 will consist of $CuSO_4(aq)$ and $NaOH(aq)$. Mixture #2 will consist of $CuSO_4(aq)$ and $Pb(NO_3)_2(aq)$.
2. It is important to not mix up the droppers as this would lead to contamination of the dropper bottles. Do not let the dropper touch neither the well plate nor any solution in the plate.
3. Place three to four drops of each reagent into the specified well of the well plate.
4. Use a clean stirring rod to mix the reagents thoroughly. Wipe clean the stirring rod with a damp paper towel after each use.
5. Record observations in the Data Table 1 below. If a reaction occurs, note the color of the solid formed as well as any other observations. Write "no reaction" if no visible reaction is observed.

Data:

Table 1

Write the Particles in Solution →

↓	**NaOH(aq)**	**$Pb(NO_3)_2(aq)$**
$CuSO_4(aq)$	Cu^{2+} ion, SO_4^{2-} ion (blue)	Mixture #1 Observations: light blue solids, cloudy
	Na^{1+} ion, OH^{1-} ion (clear)	Mixture #2 Observations: pale blue solids, cloudy
$NaC_2H_3O_2(aq)$	Na^{1+} ion, $C_2H_3O_2^{1-}$ ion (clear)	Mixture #3 Observations: no change, clear
		Mixture #4 Observations: no change, clear
$AlCl_3(aq)$	Al^{3+} ion, Cl^{1-} ion, Cl^{-1} ion, Cl^{1-} ion (clear)	Mixture #5 Observations: cloudy
		Mixture #6 Observations: white solids

Data Analysis:

Table 2: Write the chemical formulas of the reactants and products for each mixture. Be sure to include the state of matter for each reactant and product. Answer the questions about each mixture.

	Reactants			Products			Did a Precipitate Form?	Did a Rxn Occur?
Mixture #1	$NaOH(aq)$	+	$CuSO_4(aq)$	→	$Cu(OH)_2(s)$	+	$Na_2SO_4(aq)$	Yes	Yes
Mixture #2	$Pb(NO_3)_2(aq)$	+	$CuSO_4(aq)$	→	$Cu(NO_3)_2(aq)$	+	$PbSO_4(s)$	Yes	Yes
Mixture #3	$NaOH(aq)$	+	$NaC_2H_3O_2(aq)$	→	No Reaction			No	No
Mixture #4	$Pb(NO_3)_2(aq)$	+	$NaC_2H_3O_2(aq)$	→	No Reaction			No	No
Mixture #5	$NaOH(aq)$	+	$AlCl_3(aq)$	→	$Al(OH)_3(s)$	+	$NaCl(aq)$	Yes	Yes
Mixture #6	$Pb(NO_3)_2(aq)$	+	$AlCl_3(aq)$	→	$Al(NO_3)_3(aq)$	+	$PbCl_2(s)$	Yes	Yes

insoluble = precipitate (ppt) = tiny solids = (s)

Table 3: For each mixture write the particles present in solution after the two reagents have been mixed together.

Mixture #1 $Cu(OH)_2$ – insoluble – ppt – (s) – product Na_2SO_4 – soluble – dissolve – Na^+, Na^+, SO_4^{2-} ions	Mixture #2 $Cu(NO_3)_2$ – soluble – Cu^{2+}, NO_3^-, NO_3^- ions in H_2O $Na_2(SO_4)$ – insoluble – ppt – (s) – product
Mixture #3 no reaction Na^+, OH^-, Na^+, $C_2H_3O_2^-$ ions in H_2O	Mixture #4 no reaction Pb^{2+}, NO_3^{-1}, NO_3^{1-}, Na^+, $C_2H_3O_2^-$ ions in H_2O
Mixture #5 $Al(OH)_3$ – insoluble – ppt – (s) – product $NaCl$ – soluble – Na^+, Cl^- ions in H_2O	Mixture #6 $Al(NO_3)_3$ – soluble – Al^{3+}, NO_3^-, NO_3^-, NO_3^- ions in H_2O $PbCl_2$ – insoluble – ppt – (s) – product

Conclusion: Why do some mixtures result in a chemical reaction and others do not?

The mixtures that result in an insoluble, precipitate (ppt) result in a product thus a chemical reaction occured.