The Chemical Name Game Lab

Use these rules to predict the results of the following precipitation reactions.

Solubility Rules

NO_3^-	All nitrates are soluble.
Br^-	All bromides are soluble except AgBr, Hg_2Br_2, and $PbBr_2$.*
Cl^-	All chlorides are soluble except AgCl, Hg_2Cl_2, and $PbCl_2$.*
SO_4^{-2}	All sulfates are soluble except $CaSO_4$,* $SrSO_4$, $BaSO_4$, Hg_2SO_4, $HgSO_4$, $PbSO_4$, and Ag_2SO_4.*
CO_3^{-2}	All carbonates are insoluble except those of the Group 1A elements and NH_4^+.
OH^-	All hydroxides are insoluble except those of the Group 1A elements, $Sr(OH)_2$ and $Ba(OH)_2$. ($Ca(OH)_2$ is slightly soluble.)
S^{-2}	All sulfides except those of the Group 1A and 2A elements and NH_4^+ are insoluble.
CrO_4^{-2}	All chromates except those of Group 1A elements, Ca^{+2}, Mg^{+2}, and NH_4^+ are insoluble.

* Insoluble compounds are defined here as those which precipitate when equal volumes of solutions 0.1 M in the corresponding ions are mixed. Some compounds fail to precipitate at concentrations slightly less than 0.1 M. These compounds have been starred. At the 1 M concentrations used in this experiment, Ag_2SO_4 should precipitate.

Set-Up

1. Each chemical will meet every other chemical in its group or cluster.
2. Write the formulas of the first five compounds in order down the right side of the data table on the lines provided. Write the formulas of the last five compounds in reverse order across the top of the data table on the lines provided.
3. Identify the respective ions present in each compound and write these ions below the lines with the compound's formula written on it.
4. Swap components of the chemical formulas, matching the cation (positive ion) of one formula with the anion (negative ion) of the other formula to predict the end products of the reaction. Write these new formulae in the boxes provided.

Methodology

1. Place 3 to 4 drops of a listed chemical, from either the top or right side, in a watch glass, and then select another chemical from the counter direction. Place 3 to 4 drops of this second chemical on the same watch glass. Record your observations.
2. Rinse with tap water, then distilled water and repeat procedure until all chemicals on the grids have met each other.
3. By grid columns and rows, break the corresponding chemicals used into their respective ions.
4. In grid squares determine new chemical formulas that would likely occur.
5. Record if a precipitate formed with that reaction and its color; ex. White ppt., or record no reaction (NR).
6. Consult the solubility rules to determine which of the new chemicals is probably the insoluble chemical precipitate and underline it. Where no reaction occurs do not underline a chemical formula.

Report Sheet for the Chemical Name Game

Data Table 1 for Set I. Set I contains: $AgNO_3$, K_2CrO_4, $Al_2(SO_4)_3$, Na_2CrO_4, $Sr(NO_3)_2$, and $BaCl_2$.

Solutions	_____	_____	_____	_____	_____
_____					
_____					
_____					
_____					
_____					

Report Sheet for the Chemical Name Game

Data Table 2 for Set II. Set II contains: $Pb(NO_3)_2$, K_2SO_4, $MgBr_2$, $Co(NO_3)_2$, NaOH, and $Ca(NO_3)_2$.

Solutions	_____	_____	_____	_____	_____
_____					
_____					
_____					
_____					
_____					