

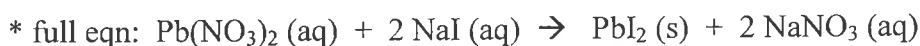
Background

Double replacement reactions occur when ions from two ionic compounds exchange creating new substances. One of these new substances will occur as a precipitate, gas, or liquid.

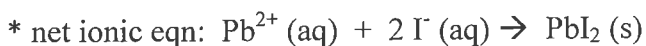
Recall that a precipitate is a substance that forms a solid in water, but is insoluble (meaning it doesn't dissolve in water). Precipitates are often confused with color changes because the solid nature of the precipitate can be difficult to observe at first since the particles of the new substance can form a suspension in the water. However, the precipitate will eventually settle out at the bottom of the water solution.

The ions that do not participate in the formation of the precipitate are called spectator ions. When spectator ions are omitted from the chemical equation, then what remains is called the net ionic equation. Note that the net ionic equation includes appropriate charges on the ions since the spectator ions have been omitted.

Example: Write the full chemical and net ionic equations for the formation of the precipitate lead (II) iodide from aqueous solutions of lead (II) nitrate and sodium iodide.



* which ions are spectator ions? Answer: sodium and nitrate ions (they are not part of the precipitate)



How can one tell when a precipitate will form? Your book discusses how to predict the formation of a precipitate using a list of simple guidelines called *solubility rules*. Read pages 371-372 in your book and study the table of solubility rules.

Pre-lab Assignment

In this laboratory experiment, you will mix together a variety of aqueous solutions given in the table below.

	$\text{Fe}(\text{NO}_3)_3 (\text{aq})$	$\text{AgNO}_3 (\text{aq})$	$\text{Ba}(\text{NO}_3)_2 (\text{aq})$	$\text{HCl} (\text{aq})$
$\text{NaCl} (\text{aq})$				
$\text{Na}_2\text{SO}_4 (\text{aq})$				
$\text{Na}_2\text{CO}_3 (\text{aq})$				

- Using the space on the back of this paper, write balanced chemical equations for the double replacement reaction between each aqueous solution given in the table above. You should have 12 chemical equations written.
- Study the products in each chemical equation and predict which ones will be precipitates. Use the solubility rules given in table 11.3 on page 372 of your text. Note that some combinations of solutions will *not* result in the formation of a precipitate. In this case, *no reaction* is said to have occurred.
- Using your results from (2), indicate in the table above which combinations of aqueous solutions produce a precipitate by writing PPT in the appropriate block. If you have predicted no precipitate, then write NR for no reaction.

Double Replacement Reactions (circle the products that will precipitate):

