Predicting Products

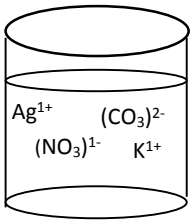
Step 1: Determine the type of reaction

Step 2: Check the Rules:

- **Single replacement**, look at the **<u>activity series</u>** (back of the polyatomic ion sheet)
  Not stronger = NO reaction (NR) = No product
- **Double replacement**, look at the **<u>solubility table</u>** (back of the polyatomic ion sheet)
  Metallic part of ionic compounds trade places, & a new substance is formed (solid)

$$\underset{\text{Ionic compound}}{AX(aq)} + \underset{\text{ionic compound}}{BY(aq)} \rightarrow \underset{\text{ionic compound}}{BX(\boldsymbol{s})} + \underset{\text{ionic compound}}{AY(aq)}$$

In solutions, the ions are free to move about the solution. So… all of the ions are in contact with each other. **To determine if a solid, a precipitate, will form when two of the ions "meet" look at solubility table.**



Example: What happens when K^{1+} meets $(NO_3)^{1-}$ & when Ag^{1+} meets $(CO_3)^{2-}$?

- aq = aqueous = **soluble**=dissolves in H_2O= ions break apart
- s= precipitate = **insoluble**= does not break apart= the new product

Practice: Determine whether each of the following compounds is soluble or insoluble by using your solubility table.

1. Lead (II) acetate
2. Copper (II) carbonate
3. Ammonium sulfide
4. Silver iodide
5. Potassium nitrate
6. Calcium sulfate
7. Nickel phosphate
8. Mercury (I) chloride
9. Magnesium chromate
10. Potassium hydroxide

Step 3: Determine the products

- **Do NOT carry subscripts …..**determine new ones by crisscrossing!!!

Step 4: Balance

	Rxn Type	Reactants	Products
1		____Na +____$MgCl_2$ ➔	
2		_____Al+ ____O_2➔	
3		___$Pb(NO_3)_2$+___KOH➔	
4		___Ca+___AgCl➔	
5		___C_7H_{14} + ___O_2➔	
6		___$CuCl_2$ + ___Na_2S➔	
7		___Zn+ ___$Pb(NO_3)_2$➔	
8		___Cu+___$FeSO_4$➔	

Reaction Rates: How to make a products faster

To **increase the rate** of a reaction,

- the number of collision needs to be increased

OR

- the effectiveness of the collisions needs to be increased

<u>Four ways to do this:</u>

1. Increase _____ = smaller particles=more areas to collide
2. Increase _____ = increasing in movement= more collisions
3. Increase _____(Bigger **M**) = Increase amount of a substance per area = more collisions
   Example: Which will cause a faster reaction: 3M or 0.4M
4. _____: speeds up reaction without being used
   - Less _____ is needed
   - _____ the activated complex