

Predicting Products

AKA: Soap Opera Chemistry:
"Days of Our Chemistry"

Why are we learning this?

Chemistry Standard #3A:

Students know how to *describe and balance* chemical reactions

Five types of reactions:

1. Synthesis (Combination)
2. Decomposition
3. Single Replacement
4. Double Replacement
5. Combustion

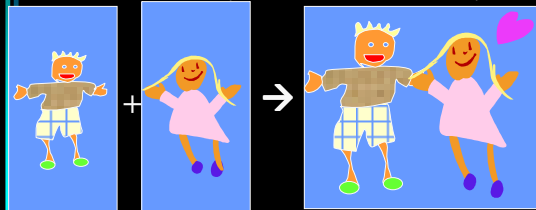
1. Synthesis (or Combination)

Two or more substances
react to form
ONE product



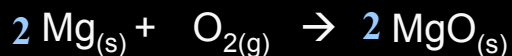
The soap opera begins . . .

Rob + Sally \rightarrow Rob/Sally



Demo #1: Synthesis Reaction

Remember to balance the equation!



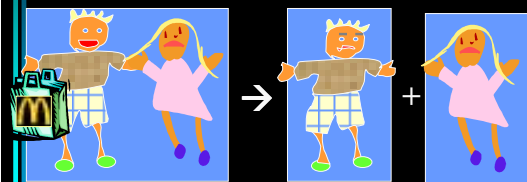
2. Decomposition

A compound breaks down
into simpler substances.

A decomposition reaction requires
heat, light, electricity, or a chemical
catalyst

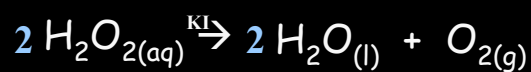


Drama with Rob and Sally . . .



Demo #2: Decomposition Reaction

Remember to balance the equation!



3. Single Replacement Reaction

- A single element atom replaces a "like" atom in a compound
- Single replacement reactions can be either cationic or anionic . . .
 - A metal element replaces the **cation** in the compound
 - A **nonmetal element** replaces the **anion** in the compound

Cationic SR: A is a metal element, B is cation (+)
 $A + BC \rightarrow B + AC$

Anionic SR: D is a non-metal element, C is anion (-)
 $D + BC \rightarrow C + BD$

How can you know if one metal will displace another?

- Look on the Activity Series of Metals Chart . . . Page ???.
- A reactive metal will replace any metal listed below it.

Will this React? **YES!**

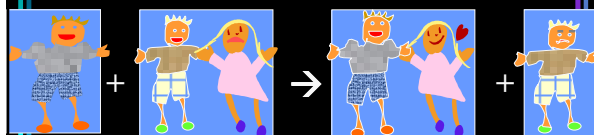


Will this React?



Li
K
Ca
Na
Mg
Al
Zn
...

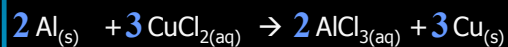
Along comes Brian . . .



Demo #3: Single Replacement Reaction



Demo #4: Single Replacement Reaction



Remember to balance the equation!

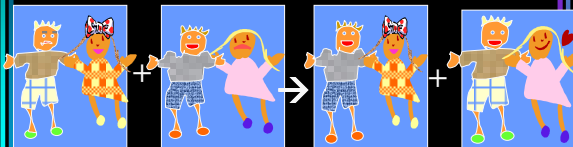
4. Double Replacement Reaction

Compounds exchange cations

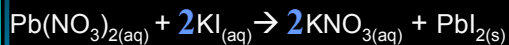


Drama at the prom . . .

Rob/Carrie + Brian/Sally \rightarrow Brian/Carrie + Rob/Sally



Demo #5: Double Replacement Reaction



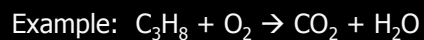
Remember to balance the equation!

5. Combustion

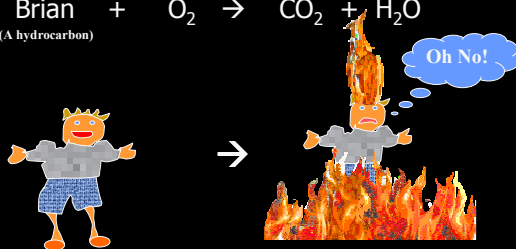
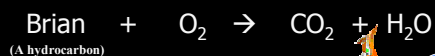
An element or compound reacts with O_2 producing energy as heat and light.



Complete combustion of a hydrocarbon yields CO_2 and H_2O



The Soap opera Ends ☹



Demo#6: Combustion

To get our H_2 , we will first do a single replacement reaction:



Remember to balance the equation!