

Celebration Practice

# Chemical Reactions

there are 5 types...

Synthesis

Decomposition

Single Replacement

Double Replacement

Combustion

# Synthesis

Describe, and 2  
example reactions:

2 or more smaller chemical  
substances combine into a  
new, larger compound.

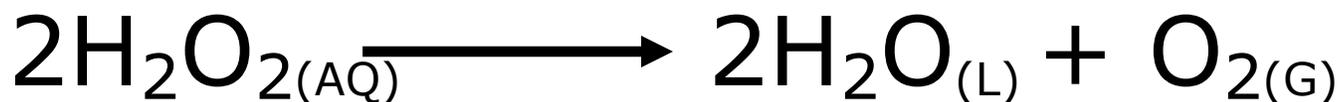
Hydrogen gas and oxygen  
gas combine into water.



## Decomposition

Describe, and 2  
example reactions:

One larger chemical  
compound breaking up  
into 2 or more  
smaller substances.



# Single Replacement

Describe, and 2  
example reactions:

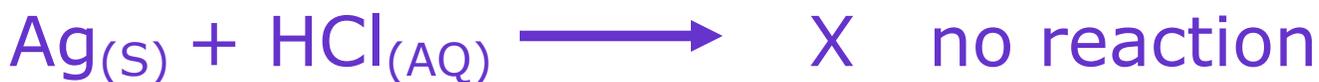
An atom bumps out one ion  
from an aqueous solution.  
Table J is used for these.



*The Mg bumps out the  $\text{H}^{+1}$  & forms  $\text{Mg}^{+2}$  ion in solution*



*The Li bumps out the  $\text{Na}^{+1}$  & forms  $\text{Li}^{+1}$  ion in solution*



*The Ag cannot bump out the  $\text{H}^{+1}$  ion from solution*

# Double Replacement

## Describe, and 2 example reactions:

You must start with  
2 AQUEOUS SOLUTIONS,  
the cations switch anions with each  
other. Use Table F to determine  
solubility in water.



Ammonium chromate and barium nitrate solutions react and form  
ammonium nitrate solution and barium chromate precipitate

*According to Table F, both ionic compounds in the reactants  
are soluble, or will dissolve in water (aqueous).*

*Only one product, ammonium nitrate, is aqueous.  
The other product, the barium chromate, is insoluble;  
insoluble means it will form a precipitate in water.*

# Combustion

## Describe, and 2 example reactions:

A hydrocarbon (any molecule of just hydrogen and carbon - in any ratio) combines rapidly with oxygen, releasing carbon dioxide, water, and lots of energy.

Butane combusts...



Octane combusts too...



*The only products of combustion are water  
and carbon dioxide.*

*Any hydrocarbon will do, balance slowly.*

# Name this reaction...

## answers on next slide

balanced reaction (no phases)	type of reaction
$\text{H}_3\text{PO}_4 + 3\text{KOH} \longrightarrow \text{K}_3\text{PO}_4 + 3\text{H}_2\text{O}$	
$\text{H}_2 + \text{O}_2 \longrightarrow \text{H}_2\text{O}_2$	
$\text{C}_{10}\text{H}_{22} + 31\text{O}_2 \longrightarrow 20\text{CO}_2 + 22\text{H}_2\text{O}$	
$3\text{Li} + \text{AlCl}_3 \longrightarrow 3\text{LiCl} + \text{Al}$	
$\text{C}_6\text{H}_{12}\text{O}_6 \longrightarrow 2\text{C}_2\text{H}_5\text{OH} + 2\text{CO}_2$	
$\text{Ti} + \text{NiSO}_4 \longrightarrow \text{TiSO}_4 + \text{Ni}$	
$\text{Al}(\text{OH})_3 + 3\text{HBr} \longrightarrow \text{AlBr}_3 + 3\text{H}_2\text{O}$	
$3\text{Rb} + \text{P} \longrightarrow \text{Rb}_3\text{P}$	

# Name this reaction...

## *answers*

balanced reaction	type of reaction
$\text{H}_3\text{PO}_4 + 3\text{KOH} \longrightarrow \text{K}_3\text{PO}_4 + 3\text{H}_2\text{O}$	double replacement
$\text{H}_2 + \text{O}_2 \longrightarrow \text{H}_2\text{O}_2$	synthesis
$\text{C}_{10}\text{H}_{22} + 31\text{O}_2 \longrightarrow 20\text{CO}_2 + 22\text{H}_2\text{O}$	combustion
$3\text{Li} + \text{AlCl}_3 \longrightarrow 3\text{LiCl} + \text{Al}$	synthesis
$\text{C}_6\text{H}_{12}\text{O}_6 \longrightarrow 2\text{C}_2\text{H}_5\text{OH} + 2\text{CO}_2$	decomposition
$\text{Ti} + \text{NiSO}_4 \longrightarrow \text{TiSO}_4 + \text{Ni}$	single replacement
$\text{Al}(\text{OH})_3 + 3\text{HBr} \longrightarrow \text{AlBr}_3 + 3\text{H}_2\text{O}$	double replacement
$3\text{Rb} + \text{P} \longrightarrow \text{Rb}_3\text{P}$	synthesis

## How to prepare for Friday...

Know 5 types of chemical reactions by name, know how to write the abstractions of these five reactions, know a real example reaction both as a word equation as well as a balanced chemical reaction.

Know the difference between coefficients, which you can change in balancing reactions, from subscripts, which you can't change once you write the compound correctly.

Know TOPIC-B, tests for gases in the lab, and how to use both Table J and Table F. Know when to use them too.

Know your vocabulary, aqueous, endothermic vs. exothermic, cation, anion, atom, phases, soluble, insoluble, synthesis, decomposition, combustion, single and double replacement, precipitate.

Know why some single replacement reactions DO NOT occur.

Know why chromium makes three different oxides, what the formulas and names for these three oxides are. (see next slide)

Chromium makes 3 different cations, +2, +3, and +6 as shown on your periodic table of elements.

Chromium II oxide is  $\text{CrO}$  - (in a 1:1 ratio)  
this chromium ion is  $\text{Cr}^{+2}$

Chromium III oxide  $\text{Cr}_2\text{O}_3$  - (in a 2:3 ratio)  
this chromium ion is  $\text{Cr}^{+3}$

Chromium VI oxide  $\text{CrO}_3$  - (in a 1:3 ratio)  
this chromium ion is  $\text{Cr}^{+6}$

The Roman Numeral matches the number of electrons lost by that particular cation.