BALANCING CHEMICAL EQUATIONS

reactants → products

Starting chemicals

Ending chemicals

"yields"

"produces"

LAW OF CONSERVATION OF MATTER

- In a chemical reaction, atoms are neither created nor destroyed.
- “The number of atoms that you start with is the SAME number that you will end with”.

TYPES OF #'S IN EQUATIONS

- **Coefficients**—tells you the # of compounds (ex. $3H_2O$ means 3 water molecules)
  - **These are the ONLY #'s you can change when balancing a reaction**
- **Subscripts**—tells the # of atoms for a given element (ex- H_2O means 2 atoms of H and one atom of O)
  - **Can NEVER change the subscripts. Why?**

PRACTICE

- Identify the numbers of atoms in each of the following:
- $3NaOH$
- $2CaCl_2$
- $4Mg(OH)_2$
- $2CaCO_3$
- $6Mg_3(PO_4)_2$

RULES FOR BALANCING EQUATIONS

- 1) Don't write the number 1!
- 2) Never change the subscript to change the number of atoms!
- 3) Balance OXYGEN LAST!
- 4) Simplify your coefficients when possible.
  - $4H_2O \rightarrow 4H_2 + 2O_2$
  - $2H_2O \rightarrow 2H_2 + O_2$

SYNTHESIS OF WATER

$$H_2O \rightarrow H_2 + O_2$$

COMBUSTION OF METHANE

$CH_4 + O_2 \rightarrow CO_2 + H_2O$

$$Al + CuO \rightarrow Al_2O_3 + Cu$$

$$Xe + F_2 \rightarrow XeF_6$$

$S_8 + F_2 \rightarrow SF_6$

$K_2CO_3 + HNO_3 \rightarrow KNO_3 + H_2O + CO_2$

$Sr + HNO_3 \rightarrow Sr(NO_3)_2 + H_2$