Chemical Reactions

Chemical Equations

- A **chemical equation** is a representation of a chemical reaction; the formulas of the reactants (on the left) are connected by an arrow with the formulas of the products (on the right).
- Skeleton Equation does not indicate the amounts of reactants or products.
  - No coefficients
- Example

$$Fe + O_2 \rightarrow Fe_2O_3$$

All chemical reactions

- have two parts
- Reactants - the substances you start with (the ones reacting)
- Products- the substances you end up with (the ones produced)
- The reactants turn into the products.
- Reactants $\rightarrow$ Products

Word Equations

- Example

  Methane + Oxygen → Carbon dioxide + Water

- The arrow means yields, gives, or reacts to produce.

Rules for balancing

1. Write the correct formulas for all the reactants and products
2. Count the number of atoms of each type appearing on both sides
3. Balance the elements one at a time by adding coefficients (the numbers in front)
4. Check to make sure it is balanced.

Never

- Change a subscript to balance an equation.
- If you change the formula you are describing a different reaction.
- H_2O is a different compound than H_2O_2
- Never put a coefficient in the middle of a formula
- 2 NaCl is okay, Na2Cl is not.

Practice

__ H_2 + ___ O_2 → ___ H_2O

__ SO_2 + ___ O_2 → ___ SO_3

Answers

2 H_2 + O_2 → **2** H_2O

2 SO_2 + O_2 → **2** SO_3

Try to balance this reaction:

$2\ Al(OH)_3 + 3\ H_2SO_4(aq) \rightarrow \_\_ Al_2(SO_4)_3 + 6\ H_2O$

Al	~~1~~	2		Al	2	
S	~~1~~	3		S	3	
H	~~5~~	~~8~~	12	H	~~2~~	12
O	~~7~~	~~10~~	18	O	~~13~~	18

Balance these equations

- __ Mg + __ O_2 → __ MgO
- __ $KClO_3$ → __ KCl + __ O_2
- __ Cu + __ $AgNO_3$ → __ $Cu(NO_3)_2$ + __ Ag
- __KOH + __ H_3PO_4 → __ K_3PO_4 + __ H_2O

ANSWERS

- **2** Mg + O_2 → **2** MgO
- **2** $KClO_3$ → **2** KCl + **3** O_2
- Cu + **2** $AgNO_3$ → $Cu(NO_3)_2$ + **2** Ag
- **3** KOH + H_3PO_4 → K_3PO_4 + **3** H_2O