$$Mg(ClO_3)_2$$

Chemical Reactions

→ yield

$$2\,NaCl\,(s) + H_2SO_4\,(aq) \longrightarrow Na_2SO_4\,(aq) + 2\,HCl\,(aq)$$

⎵ Reactants ⎵   ⎵ Products ⎵
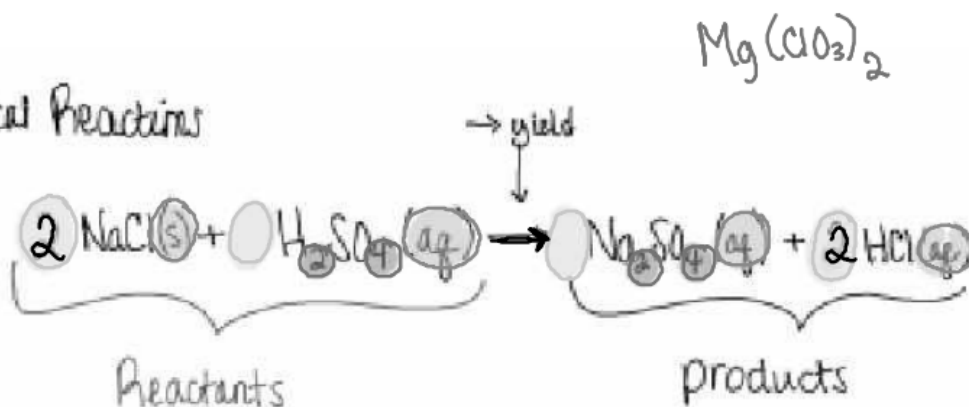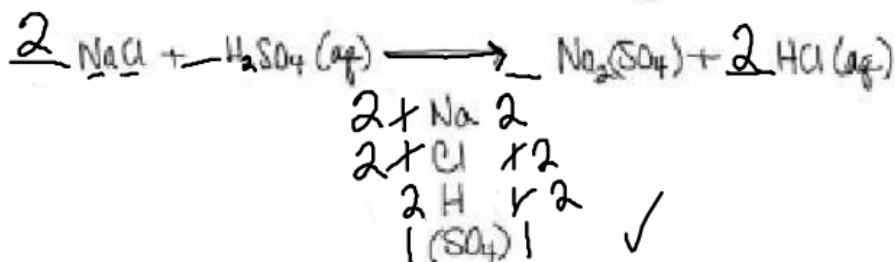
○ <u>Coefficient</u> = multiply all elements in compound or atom behind it.

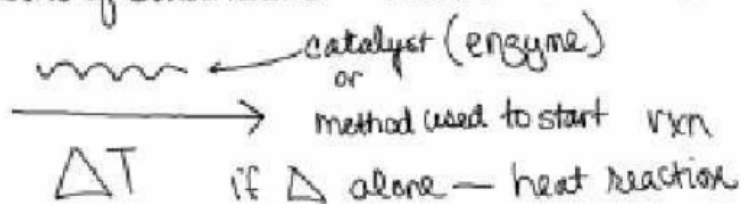● <u>Subscripts</u> = multiply only the element they touch

If both are present multiply together for individual atom

◐ <u>States of matter</u> (s) (ℓ) (g) (aq) (ppt) precipitate

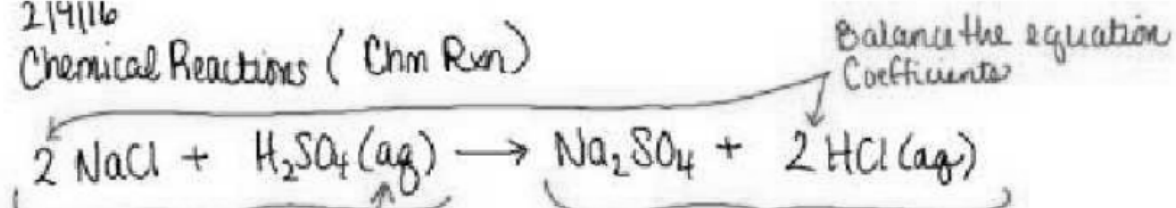The # of atoms present as reactants must equal the # of atoms in products

$$2\,NaCl + \underline{}H_2SO_4\,(aq) \longrightarrow \underline{}Na_2(SO_4) + 2\,HCl\,(aq)$$

2+ Na 2
2+ Cl ↑2
2 H ↑2   ✓
1 (SO₄) 1

Law of Conservation : matter can not be created or destroyed

~~~~ ← catalyst (enzyme)
            or
———→ method used to start rxn
ΔT   if △ alone — heat reaction

△ change

2/4/16
Chemical Reactions (Chm Rxn)

Balance the equation
Coefficients

$$2\ NaCl + H_2SO_4\ (aq) \longrightarrow Na_2SO_4 + 2\ HCl\ (aq)$$

reatants   yields   products
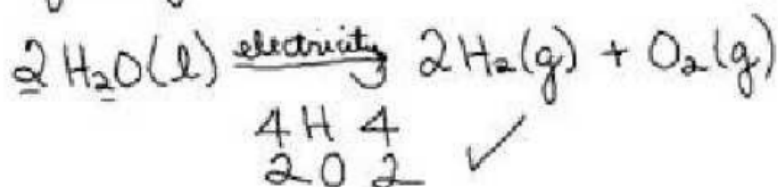
State of matter
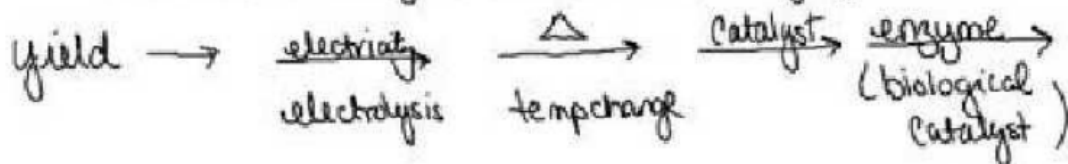(s) solid (l) liquid (g) gas
(aq) aqueous (ppt) precipitate

Coefficients balance equations
  Subscripts balance formulas)
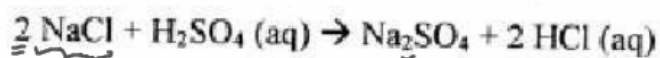• if both are present multiply these together to determine
     quantity.

$$2\ H_2O\ (l) \xrightarrow{\text{electricity}} 2\ H_2\ (g) + O_2\ (g)$$
         4 H 4
         2 O 2 ✓

   Law of Conservation of matter — matter can not be
        created or destroyed — it can only change form

   yield $\longrightarrow$ $\underset{\text{electrolysis}}{\text{electricity}}$ $\xrightarrow{\triangle}$ $\underset{\text{tempchange}}{}$ $\xrightarrow{\text{Catalyst}}$ $\underset{\binom{\text{biological}}{\text{catalyst}}}{\text{enzyme}} \rightarrow$

Steps to writing a balanced equation:
① record balanced formulas (based on names)
② balance equations using coefficients
③ Double check work — did you include catalysts or state of matter

Practice: If we go back to the equation from earlier, we can determine its various parts.

$$\underline{2}\,NaCl + H_2SO_4\,(aq) \rightarrow Na_2SO_4 + 2\,HCl\,(aq)$$

1. What are the reactants? _2NaCl + H₂SO₄(aq)_
2. What are the products? _Na₂SO₄ + 2 HCl (aq)_
3. How many atoms of sodium enter the reaction? _2_
4. How many atoms of sodium are produced? _2_
5. What does the → stand for? _yield_
6. How many moles of hydrogen go into the reaction? _2_
7. How many moles of hydrogen are produced? _2_
8. How many molecules of HCl are produced? _2_
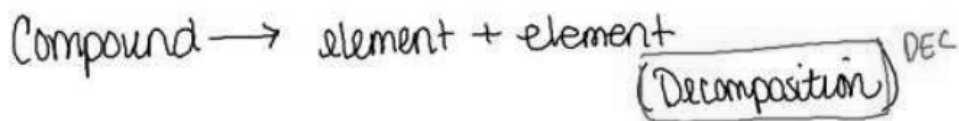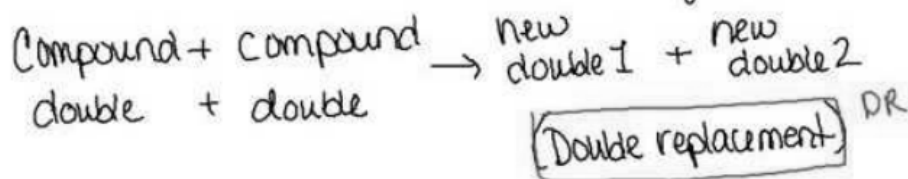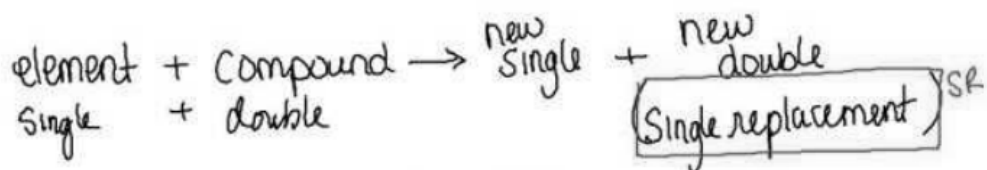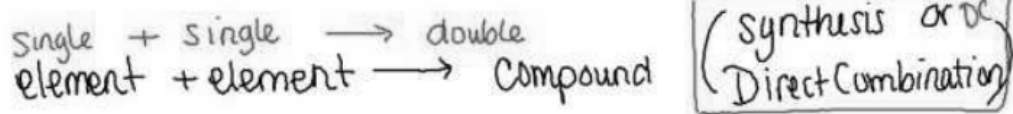9. What are the coefficients for NaCl? _2_ H₂SO₄? _1_ Na₂SO₄? _1_ HCl? _2_

Balance the following equations.

10. __ Zn + _2_ HCl → __ ZnCl₂ + __ H₂ (g)
11. _2_ KClO₃ → _2_ KCl + _3_ O₂ (g)
12. _1_ S₈ + _24_ F₂ (g) → _8_ SF₆
13. __ Fe + __ O₂ (g) → __ Fe₂O₃
14. __ C₂H₆ + __ O₂ (g) → __ CO₂ + __ H₂O
15. __ Mg + __ O₂ (g) → __ MgO
16. __ H₂O + __ N₂O₃ → __ HNO₂ (aq)
17. __ Na₂O + __ H₂O → __ NaOH (aq)
18. __ Fe + __ H₂O → __ Fe₃O₄ + __ H₂ (g)

understanding reaction terminology

element or a diatomic molecule — it is considered "single"

molecule or compound — both refered to as "double" or compound

single + single ⟶ double
element + element ⟶ Compound   (Synthesis or DC, Direct Combination)

element + Compound ⟶ new single + new double
single + double   (Single replacement) SR

Compound + compound ⟶ new double 1 + new double 2
double + double
(Doulde replacement) DR

Compound ⟶ element + element
(Decompasition) DEC

26) $\underline{92.26\% \, C}$ $\underline{7.74\% \, H}$
    12.01 1.01

$\boxed{}$ circled: 7.68 7.66) molar ratio
         7.66 2.66 divide all by
                              smallest
    $\boxed{1 \qquad\qquad 1}$
                     ← subscripts

Emp. Formula CH

Emp. Mass $13.02 \, g/mol$

Molecular Mass $26.06 \, g/mol$ ← given

$26.06 / 13.02 = 2$

$CH \times 2 \rightarrow \boxed{C_2H_2}$

molecular Formula

$.8 \uparrow$

$.75 \; (3/4) \quad \times 4$

$.6 \; (1/3) \quad \times 3$

$.5 \; (1/2) \qquad \times 2$

$.3 \qquad\qquad \times 3$

$.25 \qquad\qquad \times 4$

$.2$

<u>The student will be able to:</u>
1. Identify the parts of an chemical reaction.
2. Balance an equation using cofficients.
3. Calculate quantities of a substance in a
   chemical reaction.
4. Write a chemical equation starting with the
   chemical names -> written formulas ->
   balanced reaction
5. Identify the type of reaction.
6. Predict the products.