***IDENTIFYING REACTION TYPES***

***Questions you can ask yourself to identify reactions as the following types (+ general formulas):***

* Synthesis: *do my reactants combine to produce 1 product or a more complex product?*
* Decomposition: *does my reactant break apart into more than 1 product?*
* Combustion: : *is O2 a reactant? If O2 combines with a hydrocarbon (CxHy), do I produce CO2 + H20?*
* Single displacement: *Are my reactants a compound and a single element? Does the single element replace one of the elements in the compound?*
* Double displacement: *Do I have 2 compounds as reactants? Is there an exchange of elements between the 2 compounds?*
* ***A + B → AB Synthesis***
* ***AB → A + B Decomposition***
* ***AB + O2 → AxO + ByO Combustion***
* ***AB + C → CB + A Single Displacement***
* ***AB + CD → CB + AD Double Displacement***

**Identify the following reactions as either: *synthesis, decomposition, combustion, single displacement or double displacement***

1. 2K + 2H2O → 2KOH + H2 \_\_\_\_single displacement\_\_\_\_\_\_\_
2. BaCl2 + 2Na2SO4 → 2NaCl + BaSO4 \_\_\_\_double displacement\_\_\_\_\_\_\_
3. 2SO2 + 2O2 → 2SO3 \_\_\_\_\_synthesis (or combustion)\_\_\_\_\_\_\_
4. C6H6 + 15/2 O2 → 3H2O+ 6CO2 \_\_\_\_combustion\_\_\_\_\_\_\_\_\_
5. Pb(NO3)2 + 2H2S → PbS + 2HNO3 \_\_\_\_\_\_double displacement\_\_\_\_\_
6. 2KClO3 → 2KCl + 3O2 \_\_\_\_decomposition\_\_\_\_\_\_\_\_
7. SO3 + H2O → H2SO4 \_\_\_\_synthesis\_\_\_\_\_\_

Day 10 HW: Writing Chemical Equations

27)

A.) Write balanced equations and list the reaction type for each of the following word equations. *Please put these on a separate piece of paper.*

1. potassium chloride plus silver nitrate yields potassium nitrate plus silver chloride.

2KCl + Ag(NO3)2 🡪 2KNO3 + AgCl2

2. aluminum nitrate plus sodium hydroxide yields aluminum hydroxide and sodium nitrate

Al(NO3)3 + 3NaOH 🡪 Al(OH)3 + 3NaNO3

3. iron metal plus copper (II) sulfate yields iron (II) sulfate plus copper metal.

Fe+ CuSO4 🡪 FeSO4 + Cu

4. aluminum metal plus copper (II) chloride yields aluminum chloride plus copper metal.

2Al + 3CuCl2 🡪 2AlCl3 + 3Cu

5. sodium chlorate yields sodium chloride plus oxygen gas.

2NaClO3 🡪 2NaCl + 3O2

6. calcium carbonate yields calcium oxide plus carbon dioxide gas.

CaCO3 🡪 CaO + CO2

7. zinc metal plus oxygen gas yields zinc oxide.

2Zn + O2 🡪2 ZnO

8. chlorine gas plus sodium metal yields sodium chloride.

Cl2 + 2Na 🡪 2NaCl

9. aluminum sulfate plus barium chloride yields aluminum chloride plus barium sulfate.

Al2(SO4)3 + 3BaCl2 🡪 2AlCl3 + 3BaSO4

10. Copper (II) chloride reacts with Iron metal yielding Iron (II) chloride and copper metal

CuCl2 + Fe 🡪 FeCl2 + Cu

11. Sodium hydroxide plus hydrochloric acid yields sodium chloride plus water.

NaOH + HCl 🡪 NaCl + H2O

12. Potassium iodide plus silver nitrate yields silver iodide plus potassium nitrate.

2KI + Ag(NO3)2 🡪 2KNO3 + AgI2

B.) Predict the products and write a balance equation on *separate piece of paper*.

**I.) Synthesis reactions (Makes 1 complex product)**

1. calcium reacts with oxygen

2Ca + O2 🡪 2CaO

2. aluminum reacts with nitrogen

Al + 3N2 🡪 2Al2N3

3. sodium reacts with sulfur

2Na + S 🡪 Na2S

4. magnesium reacts with excess oxygen

2Mg + O2 🡪 2MgO

**II.) Decomposition reactions (1 reactant breaks into simpler products)**

5. silver oxide is heated

2AgO 🡪 2Ag + O2

6. water is decomposed by electricity

H2O🡪 H2 + O2

**III.) Single replacement reactions (A free metal will kick out the metal or a compound OR a free non-metal will kick out the non-metal of a compound)**

7. zinc metal reacts with copper (II) nitrate

Zn + Cu(NO3)2 🡪 Zn(NO3)2 + Cu (Metal kicks out a metal)

8. sodium iodide reacts with chlorine gas

2NaI + Cl2 🡪 2NaCl + I2 (Non-metal kicks out a non-metal)

9. potassium metal reacts with water.

2K + 2H2O 🡪 2KOH + H2 (Metal kicks out a metal- or at least substance that will form a + ion)

10. magnesium reacts w/ copper (II) chloride.

Mg + CuCl2 🡪 MgCl2 + Cu (Metal kicks out a metal)

11. Bromine reacts with sodium chloride.

Br2 + 2NaCl 🡪 2NaBr + Cl2 (Non-metal kicks out a non-metal)

**IV.) Double replacement reactions (Metals switch partners)**

12. aluminum sulfate reacts with calcium phosphate

Al2(SO4)3 + Ca3(PO4)2 🡪 2AlPO4 + 3CaSO4

13. magnesium chloride reacts with silver nitrate

MgCl2 + Ag(NO3)2 🡪 Mg(NO3)2 + AgCl2

14. copper (II) oxide reacts with sulfuric acid.

CuO + H2SO4 🡪 CuSO4 + H2O

15. silver nitrate reacts with hydrogen sulfide

Ag(NO3)2 + H2S 🡪 AgS + 2HNO3

16. lead (II) nitrate reacts with potassium chromate

Pb(NO3)2 + K2CrO4 🡪 PbCrO4 + 2KNO3

# V.) Combustion reactions (Burning something in the presence of oxygen will form oxide compounds. Hydrocarbons (compounds with only C and H in them) will ALWAYS form carbon dioxide gas and water)- You will not need to know how to find the formula for a hydrocarbon from the name. You will be given both.

17. octane reacts with oxygen

2C8H18 + 25O2 🡪 16CO2 + 18H2O

18. decane reacts with oxygen

2C10H22 + 21O2 🡪 20CO2 + 22H2O

19. propane reacts with oxygen

C3H8 + 5O2 🡪 3CO2 + 4H2O

20. methane reacts with oxygen

CH4 + 3O2 🡪 CO2 + 4H2O