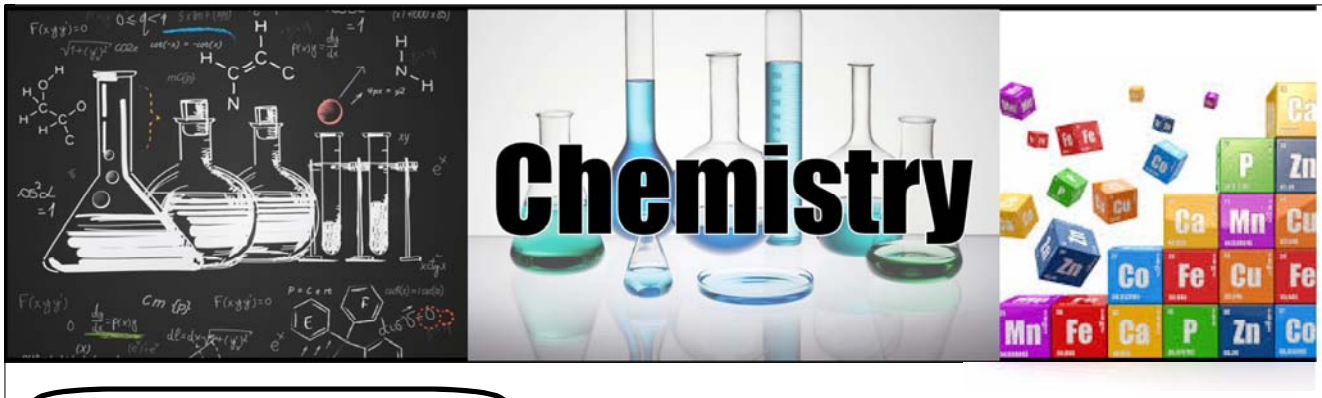

Lesson 9: Chemical Change

Chemical reaction- when a substance(s) react to create new substance(s) accompanied by either energy flowing into the system or out of the system.

precipitate for example

Reactants- products that react

Products- what the reaction makes

States in Chemical Formulas

- Solid - (s); Liquid –(l); Gas (g); Aqueous (aq)
- $CO_2(g)$ at 25°C or $CO_2(s)$ is dry ice
- Table salt; $NaCl_{(s)}$ dissolved in water is $NaCl_{(aq)}$
- Elements;
  - All metals are solid except mercury,
  - Non metals; $H_{2(g)}$ $N_{2(g)}$ $O_{2(g)}$ $F_{2(g)}$ $Cl_{2(g)}$ $Br_{2(l)}$ $I_{2(s)}$, sulfur, carbon and phosphorous are solids
- Compounds
  - Ionic are solids
  - If it is dissolves in water it is aqueous, if not it is a solid
  - Molecular are hard to predict, although the larger they are the more they tend to be liquids and solids.

CH_4- natural gas

C_6H_{14} – liquid component of gas

$C_{18}H_{38}$- bees wax

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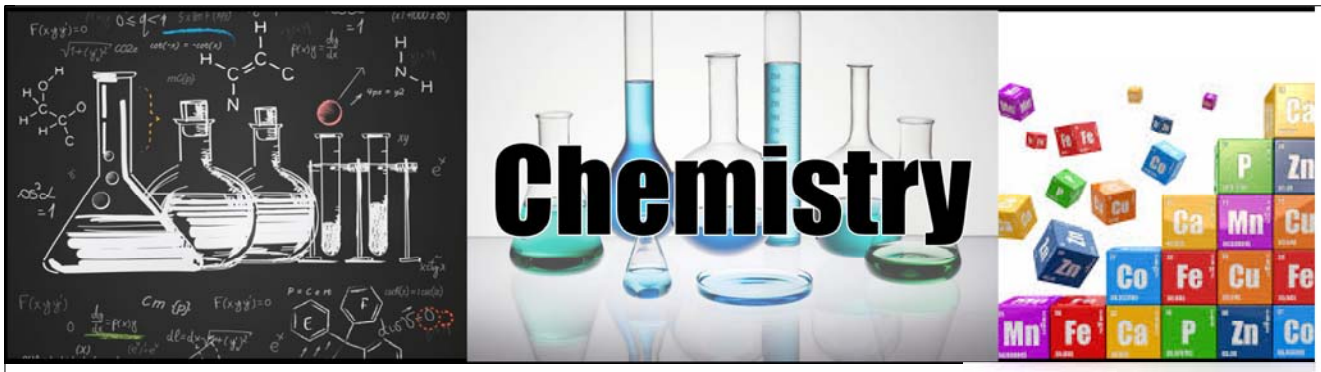

Energy Changes

Exothermic - energy is released in the form of heat, light, or electricity

Combustion - oxygen reacts rapidly with a new substance and gives off energy

Endothermic - absorbs energy

Photosynthesis - an endothermic reaction that captures the Sun's rays and turns them into sugar. The oxygen is expelled for us to breathe.

$$\text{Energy} + 6\ CO_{2(g)} + 6\ H_2O_{(l} \rightarrow C_6H_{12}O_{6(aq)} + 6\ O_{2(g)}$$

Cellular Respiration - an exothermic reaction that releases energy for plants and animals to use in other tissues and organs

$$C_6H_{12}O_{6(aq)} + 6\ O_{2(g} \rightarrow \text{energy} + 6\ CO_{2(g)} + 6\ H_2O_{(l)}$$

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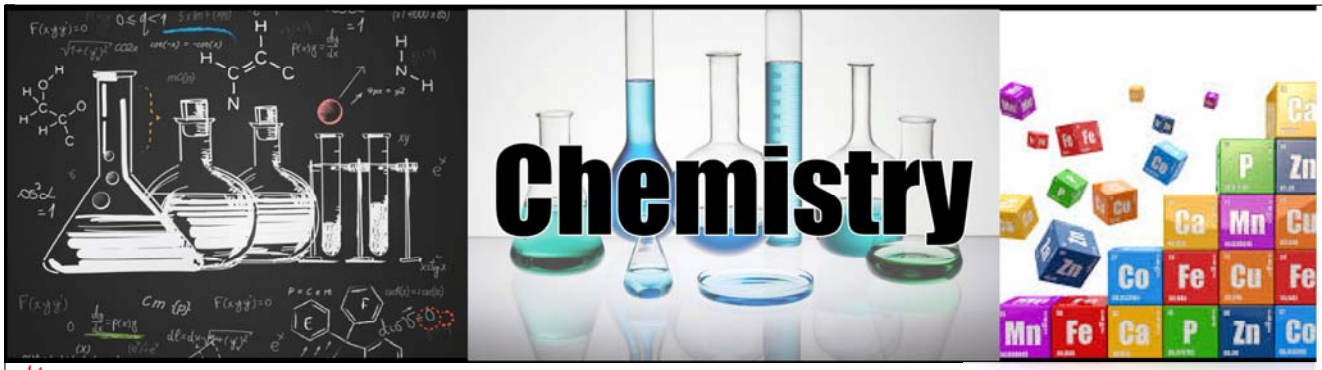

Characteristics of Chemical Reactions

1. Produces new substances with own properties
2. Involve energy flow (change in temperature)
3. Change of state may be observed (sometimes)
4. Mass is conserved

Conservation of Mass

- Total mass of the system is conserved (reactants and products) reactants = products
- Example; burning magnesium. 23.0 g of magnesium metal is burned in pure oxygen (16.0g). The product is weighed and 39.0g of magnesium oxide is collected. Where did the extra 16.0 g come from? That is the pure oxygen that reacted with the magnesium metal.

① Finish homework.

② Lab Prep: procedure questions.