Chemistry

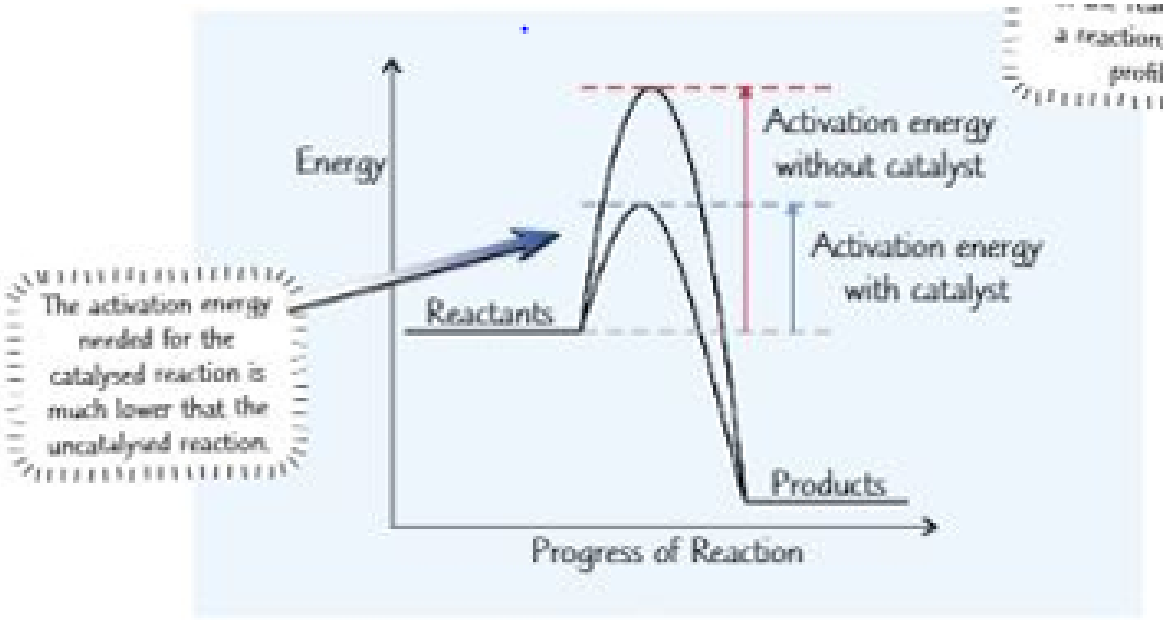
Catalyst

- They are very important for industry
- They make reactions happen faster and they reduce the energy cost in factories

A catalyst increases the rate of reaction

- A catalyst is a substance that increases the rate of reaction without being chemically changed or used of in a reaction
- A catalyst does not change the products of the reaction so the reaction equation stays the same
- Since a Catalyst is not used up you only need a very small amount to catalyse the large amount of reactants
- Catalyst are picky they only work for specific reaction like you cannot add any random catalyst and expect it to work
- Catalyst work by decreasing the activation energy needed for reaction to happen

- The lower the activation energy by giving the reaction a different pathway that requires less energy
- Because of this more particle have minimum energy needed for the reaction when they collide
- You can see this effect clearly on reaction profile



Reaction profiles

Reaction profile show the energy levels of reactants and products

They also show the activation energy

- Activation energy without the catalyst is high

- Activation energy with a catalyst is lower this is why the catalyse reaction happens faster

Enzymes control cell reactions

- Enzymes are biological catalyst
- This means this speed up chemical reactions inside living cells
- The catalyse reactions like respiration photosynthesis and Protein synthesis
- They Are used in fermentation to make alcoholic drinks
- They speed up the reaction that changes glucose into ethanol and carbon dioxide

Importance of catalyst

- Catalyst are very useful
- some reactions take very long time to happen by themselves which is not good for industry
- catalyst help produce a useful amount of product in a useful amount of time

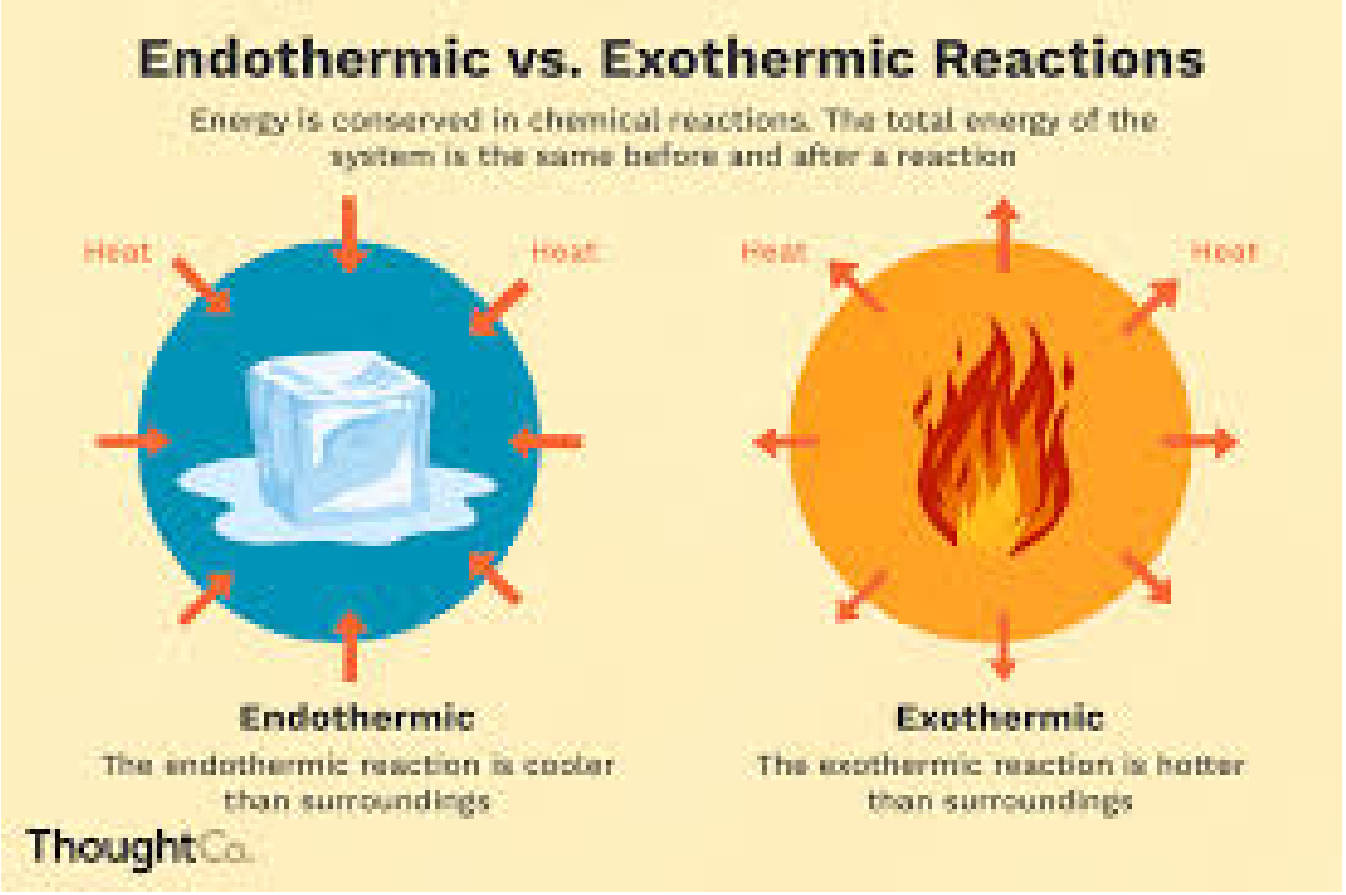
Endothermic and exothermic reactions

Endothermic and exothermic reactions are about energy transfer between reactions and the surroundings

Endothermic reactions are like selfish reaction because they keep taking energy

Reactions are either exothermic or endothermic

Combustion reactions that are burning in oxygen are always exothermic



Exothermic reaction

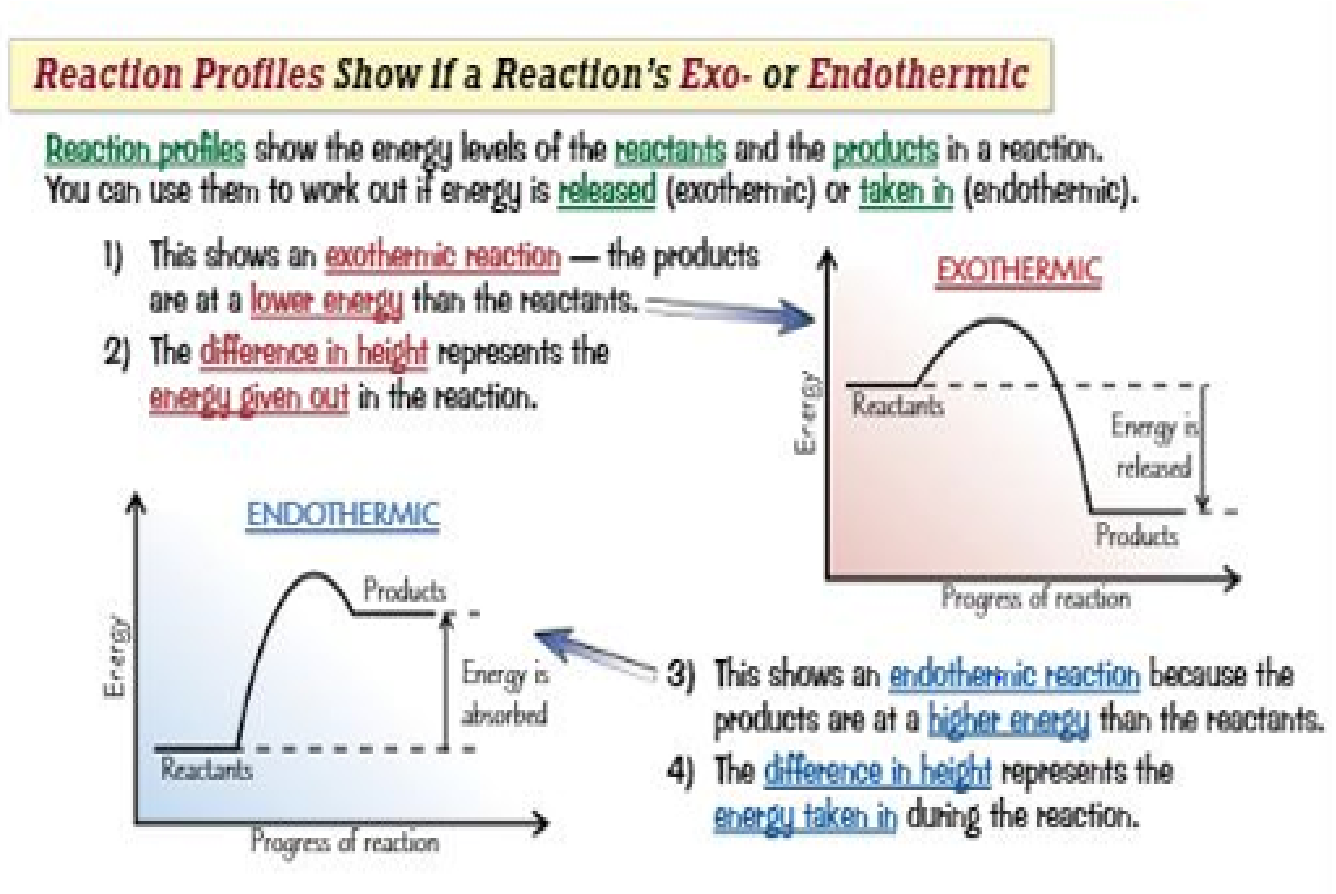
- Gives out energy to surrounding
- usually heat
- surrounding gets hotter and temperature increases

Endothermic reaction

- It takes in energy from surrounding
- usually heat
- surrounding get colder

Reaction profiles show if a reaction is Exo or Endo

- In an exothermic reaction products are at a lower energy level than reactants
- The height different shows how much energy is released
- in an endothermic reaction products are at Higher energy level then reactants
- The height difference shows how much energy is taken in



Activation energy- needed to start a reaction

- Activation energy is the minimum energy needed for bonds to break and a reaction to start
- On a reaction profile it is the difference between reactants energy and highest point of curve
- It's like climbing up one side of hell before you can slide down the other
- If energy supplied is less than activation energy ,the reaction does not start

Temperature changes in reaction

- Exothermic reaction means temperature increases
- endothermic reaction means temperature decreases

You can measure temperature using

- Polystyrene cup Inside cotton wool
- add first reactant
- Measure the starting temperature
- and second reactant
- Stir
- put lid on cup
- Record Maximum and minimum temperature
- calculate the temperature change

Temperature change depends upon reagents

Dissolving salts

- dissolving Ammonia Chloride temperature decreases this is endothermic
- dissolving calcium chloride temperature increases this is exothermic reaction

Neutralization reactions

Acid+ base= salt + water
exothermic

Acid+ metal carbonate
Endothermic

Displacement reaction

- **A more reactive element replace a less reactive element**
- **these reactions are exothermic**

Precipitation reactions

- **Mixing two solutions form an insoluble solid**
- **these reactions are exothermic**
- **example when you add Lead Nitrate and potassium iodide it will lead to lead iodide**