Chemistry
Rates of reaction and energy changes

Reaction rates

rate of reaction
It means how fast reactants are used up or product is formed

Formula
Rate= Amount of reactant used or product form / time

Methods to measure the rate
- Precipitation, Two clear solutions form up precipitate, how long it takes to obscure a mark
- Change in mass, loss if gas is produced and faster mass loss means faster reaction, safety needed if gases harmful
- Volume of the gas faster gas release means the reaction is faster

Factors affecting the rate
- Surface area smaller solid particles and large surface area there will be more collision and faster reaction

- Pressure, if pressure is high there will be more collision and the speed Of reaction is faster
- Temperature, Higher temperature means faster movement of particles and there is more collision and faster reaction

Graphing rates

- If there is a stepper gradient so it means that there is a faster reaction
- for curve we draw a tangent at the point to find the rate

Collision theory

- Particles must collide with enough energy for our reaction
- More collisions means higher reaction rate
- Factors that will affect our concentration pressure temperature and surface area

Catalysts

- Catalyst at the substances that increases the reaction rate without being used up
- It works by lowering the activation energy allowing more successful collision
- only small amounts needed .reaction products stay the same

- Example is biological catalyst for example in respiration photosynthesis Protein synthesis and fermentation

Energy changes

Exothermic

- Exothermic means release energy
- surrounding gets hotter
- products lower energy than reactants
- Sun , Heaters , lamps

Endothermic

- Endothermic means it absorbs energy from the surrounding
- Surrounding get cooler
- products higher energy than reactants
- Examples are photosynthesis melting of ice

Activation energy

It is an amount of energy needed to start a reaction is called activation energy

Measuring temperature change

- Use a polystyrene cup with cool wool and lead to minimise heat loss

- Record the maximum and minimum temperature during the reaction
- examples
- Dissolving salts; The temperature will Decrease of Ammonium chloride so it is endothermic
- The temperature of calcium chloride increases so this is exothermic

Neutralization

- Usually exothermic
- HCL + NaOh = NaCl + H20
- Displacement and precipitation reactions are exothermic

Bond energies

- Bond breaking is the endothermic because energy is required
- Bond forming this will be exothermic because energy is released
- over all energy change will be
- Change in energy= energy to break bonds - energy released forming bonds
- Positive change in energy will be equal to endothermic
- Negative change in energy will be equal to exothermic