

Definitions and Concepts for CAIE Chemistry IGCSE

Topic 7 - Chemical Reactions

Definitions in **bold** are for extended supplement only

Definitions have been taken, or modified from the [CAIE Specification for GCSE Chemistry, 0971, Version 1 September 2020](#)

Chemical change: Requires a chemical reaction and the products must have a different chemical composition to the reactants.

Effect of concentration on equilibrium: If the concentration of a reactant is increased, more products will be formed until equilibrium is reached again. If the concentration of a product is decreased, more reactants will react until equilibrium is reached again.

Effect of concentration on reaction rate: Increasing the concentration of reactants in solution means the reacting particles will be closer together. This means they will collide more often so there will be a higher rate of successful collisions and a faster rate of reaction.

Effect of pressure on equilibrium: An increase in pressure causes the equilibrium position to shift towards the side with the smaller number of moles of gas. A decrease in pressure causes the equilibrium position to shift towards the side with the larger number of moles of gas.

Effect of pressure on reaction rate: Increasing the pressure of gaseous reactants means the reacting particles will be closer together. This means they will collide more often so there will be a higher rate of successful collisions and a faster rate of reaction.

Effect of surface area on reaction rate: Increasing the surface area of the reactants means there are more exposed reacting particles. This means there are more frequent successful collisions so the rate of reaction increases.

Effect of temperature on equilibrium: An increase in temperature will shift the equilibrium position in the direction of the endothermic reaction. A decrease in temperature will shift the equilibrium position in the direction of the exothermic reaction.

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Effect of temperature on reaction rate: Increasing the temperature means the particles will have more kinetic energy and so will move faster. If the molecules are moving faster they will collide more often and, since they've gained kinetic energy, a larger proportion of the particles will have at least the activation energy. For both these reasons the rate of reaction increases.

Equilibrium: Reached by a reversible reaction in a closed system when the rate of the forward reaction is equal to the rate of the backward reaction. At equilibrium, the concentration of reactants and products remains constant.

Le Chatelier's principle: If a reaction at equilibrium is subjected to a change in concentration, temperature or pressure, the position of equilibrium will move to counteract the change.

Oxidation: A reaction involving the gain of oxygen. **Oxidation is the loss of electrons.**

Oxidation state: The charge of an element/ion in a compound which relates to the electrons gained or lost by the element/ion during the formation of the compound.

Oxidising agent: A species which brings about oxidation by gaining electrons. The oxidising agent is itself reduced.

Photochemical reaction: A chemical reaction which takes place due to the presence of light energy (usually from the sun). Photosynthesis is a photochemical reaction.

Photosynthesis: The reaction which takes place in plants in the presence of chlorophyll and sunlight (energy), where carbon dioxide and water react to produce glucose and oxygen: $6\text{CO}_2 + 6\text{H}_2\text{O} \rightarrow \text{C}_6\text{H}_{12}\text{O}_6 + 6\text{O}_2$

Physical change: Requires energy and involves a change in state. The form of the chemical is changed but the chemical composition remains the same.

Rate of reaction: The measure of the amount of product formed or reactant used over time. The units of rate of reaction may be given as g/s, cm^3/s or mol/s.

Redox reaction: A reaction in which both oxidation and reduction occur simultaneously.

Reducing agent: A species which brings about reduction by losing electrons. The reducing agent is itself oxidised.

Reduction: A reaction involving the loss of oxygen. **Reduction is the gain of electrons.**

Reversible reaction: A reaction in which the products can react together to reform the reactants. Reversible reactions are denoted by the symbol \rightleftharpoons .

