

# CAIE Biology A-level

## Topic 3 - Enzymes

### Definitions and Concepts

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**Activation energy** - The amount of energy needed for a reaction to happen.

**Active site** - A specific region on an enzyme where the substrate binds and the reaction takes place.

**Amylase** - An enzyme that catalyses the extracellular breakdown of starch.

**Catalase** - An enzyme that catalyses the intracellular breakdown of hydrogen peroxide into oxygen and water.

**Catalyst** - A substance that increases the rate of reaction, often by offering an alternative reaction pathway with a lower activation energy. It is unchanged at the end of the reaction.

**Colorimeter** - A light-sensitive device that measures the absorbance of transmission of certain wavelengths of light by a solution. A colorimeter can be used to investigate the rate of a reaction that involves colour changes.

**Competitive inhibitor** - A molecule which binds to the active site of an enzyme and prevents the substrate from binding.

**Enzyme** - A globular protein molecule that acts as a biological catalyst and increases the rate of biochemical reactions. Some enzymes work intracellularly and others work extracellularly.

**Enzyme/substrate complex** - The temporary complex formed when the substrate binds to the active site of the enzyme.

**Extracellular enzyme** - An enzyme that is secreted by cells and functions outside of cells, e.g. amylase.

**Extracellular reaction** - A reaction that occurs outside of cells e.g. in the tissue fluid.

**Immobilised enzymes** - Enzymes which are attached to an inert, insoluble material over which the substrate passes and the reaction takes place.

**Induced-fit hypothesis** - A model of enzyme action that describes how enzymes undergo subtle conformational changes which exert a strain on bonds in the substrate.

**Intracellular enzyme** - An enzyme that acts within cells, e.g. catalase.

**Intracellular reaction** - A reaction that occurs within cells.

**Lock and key hypothesis** - A model of enzyme action that describes how the enzyme will only fit a substrate that has the correct complementary shape to the active site.

**Michaelis-Menten constant ( $K_m$ )** - A value which indicates how strong the affinity between an enzyme and its substrate is.

**Non-competitive inhibitor** - An inhibitor which binds to a part of an enzyme which is not the active site (an allosteric site) and prevents the enzyme from functioning.



**Substrate specificity** - The ability of an enzyme to catalyse only a specific reaction or set of reactions which have substrates complementary to the active site of the enzyme.

**$V_{\max}$**  - The maximum reaction rate.

