

1.7 Enzyme Action

- Enzymes are globular proteins that act as catalysts
- They don't undergo permanent changes themselves
- Can be reused so therefore effective in small amounts

Enzymes are Catalysts Lowering Activation Energy

- For reactions to take place naturally a number of conditions must be satisfied:
 1. The reactant molecules must collide with sufficient energy to alter the arrangement of their atoms to form the products
 2. The free energy of the products must be less than that of the substrates
 3. The reactant molecules must have enough energy to overcome the activation energy
- Activation Energy = the minimum amount of energy needed to activate the reaction
- Enzymes allow reactions to take place at a lower temperature than normal

Enzyme Structure

- Each enzyme has a specific 3D shape as the result of their sequence of amino acids
- A specific region of the enzyme is functional = active site that is made up of a relatively small number of amino acids
- The active site forms a small depression within the much larger enzyme molecule
- Substrate = molecule on which the enzyme acts on
- Substrate fits neatly into the active site forming an enzyme-substrate complex
- Substrate is held within the active site by bonds that temporarily form between certain amino acids of the active site and groups on the substrate molecule

Induced Fit Model of Enzyme Action

- Scientific model = representation of observations trying to explain how something works
- Induced fit proposes that the active site forms as the enzyme and substrate interact
- The proximity of the substrate leads to a change in the enzyme that forms the functional active site
- The enzyme has a certain general shape but alters in the presence of the substrate
- As the enzyme changes shape it puts strain on the substrate molecule, the strain distorts a particular bond/s in the substrate and consequently lowers the activation energy needed to break the bond