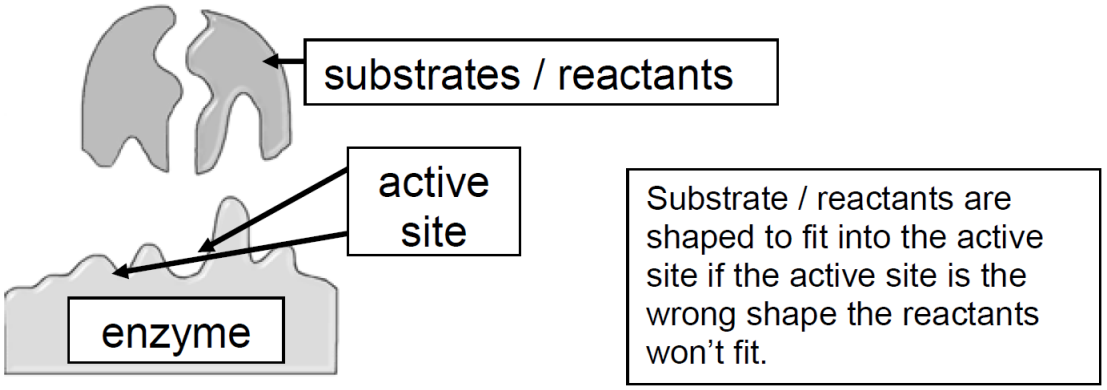
AS91156
Life Processes at the cellular level

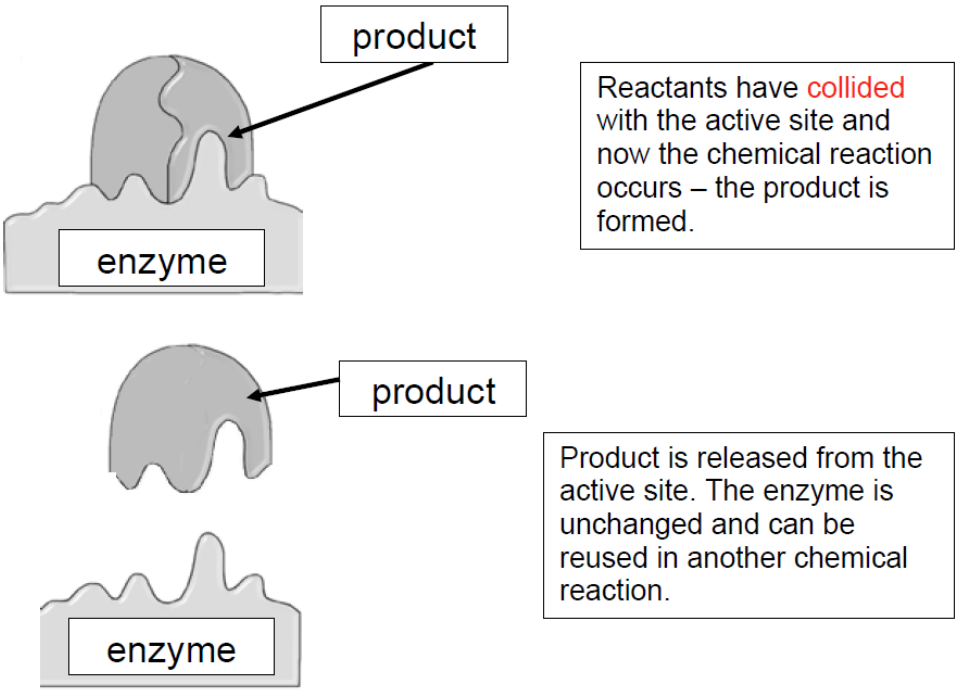
Enzyme Help Sheet

- Enzymes are biological catalysts which speed up chemical reactions while not themselves being used up in the process.
- Enzymes are specific meaning they only work on one type of reaction (due to the shape of their active sites)

Diagram of Lock and Key Model:



- For a reaction to work the substrate / reactants must collide correctly with the active site.



Factors which affect enzyme activity

- Temperature: At low temperatures both the enzyme and the reactants move slowly therefore there are less successful collisions between the enzymes active site and the reactants therefore slow rate of chemical reaction (less product is formed).

  As the temperature increases both the reactant and enzyme move more quickly therefore more successful collisions therefore a faster rate of reaction (more product is formed).

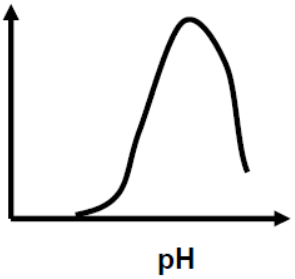
  At high temperatures the enzymes active site changes shape (is denatured) therefore the reactants can no longer fit into the active site and the enzyme stops working so the reaction rate decreases (less product is produced)

- Substrate/ Reactant Concentration: At low substrate/ reactant concentration there is less reactant so less chance of them colliding with the enzymes active site therefore a slow rate of reaction (less product is formed).

  As the substrate/reactant concentration increases there are more reactants so more chances of successful collisions with the enzymes active site therefore a faster rate of reaction (more product is formed)

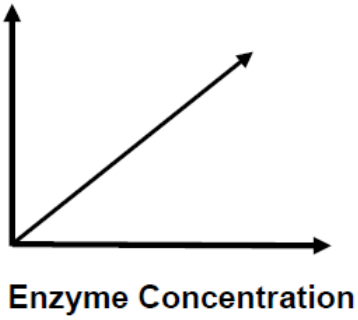
  At high substrate/ reactant concentration the enzymes become the limiting factor. There are not enough enzyme active sites for all the substrate/ reactants to fit intotherefore the rate of reaction levels off (the amount of product produced stays the same)

- pH: Enzymes work best at specific pH (acidity). If the pH changes, the enzymes shape is changed so the substrate can no longer fit and the reaction rate decreases (less product is formed). Pepsin is an enzyme that works best at a low pH (in our stomachs) and amylase is a enzyme that works best at a neutral pH (in our mouths)

- Enzyme Concentration: At low enzyme concentration there are less active sites for the substrate/ reactants to fit into so less product is produced.

  As the enzyme concentration increases there are more active sites available so the amount of substrate/ reactants that can now fit into the enzymes active sites increases (more product is produced).

  NOTE THIS ONLY WORKS IF THERE IS UNLIMITED SUBSTRATE.