

# CIE Biology IGCSE

## 5 - Enzymes

### Flashcards

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# What is a catalyst?



# What is a catalyst?

A substance which increases the rate of reaction without being used up or changed itself



# What are enzymes?



# What are enzymes?

Enzymes are biological catalysts that speed up the rate of metabolic reactions



# Describe the structure of enzymes



# Describe the structure of enzymes

Enzymes are proteins that contain a highly specific active site that fits a specific substrate



# Why are enzymes necessary in biological systems?





# Why are enzymes necessary in biological systems?

They speed up reactions so that less energy is needed for the reaction to occur



# Describe enzyme action (Higher/Supplement)



## Describe enzyme action (Higher/Supplement)

A substrate that fits the specific active site of the enzyme binds to create an enzyme-substrate complex, a reaction occurs (catalysed by the enzyme) and then the products are released



What does the statement 'enzymes are highly specific' mean?  
(Higher/Supplement)



What does the statement 'enzymes are highly specific' mean? (Higher/Supplement)

The active site of the enzyme must bind to a substrate that has a complementary shape and so only specific reactions can be catalysed



State 4 factors that affect the rate of an enzyme-controlled reaction



State 4 factors that affect the rate of an enzyme-controlled reaction

- Temperature
- pH
- Substrate concentration
- Enzyme concentration



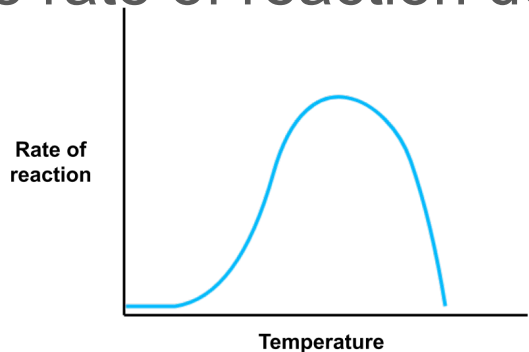
Describe the effect of temperature on the rate of an enzyme-controlled reaction





# Describe the effect of temperature on the rate of an enzyme-controlled reaction

- As the temperature increases, so does the rate of reaction
- Once the temperature exceeds the optimum, the enzyme denatures and the rate of reaction decreases



Why does the rate of an  
enzyme-controlled reaction increase  
when the temperature increases?  
(Higher/Supplement)



# Why does the rate of an enzyme-controlled reaction increase when the temperature increases? (Higher/Supplement)

- As the temperature increases the particles have more kinetic energy
- This increases the chance of collisions between molecules being successful and leading to a reaction



If temperature increases above the optimum, how does this affect enzyme function?  
(Higher/Supplement)



If temperature increases above the optimum, how does this affect enzyme function?  
(Higher/Supplement)

The active site will be distorted as the enzyme denatures and so it will no longer fit the substrate

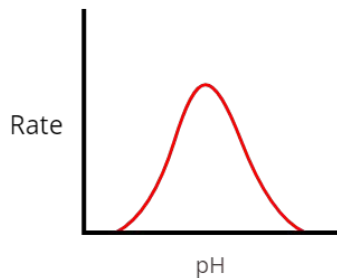


Describe the effect of pH on the rate of an enzyme-controlled reaction



# Describe the effect of pH on the rate of an enzyme-controlled reaction

- The rate of an enzyme catalysed reaction is fastest at the optimum pH
- If the pH is too high or low, the enzyme will work less efficiently and the active site may be denatured at extremes of pH



How does a pH that is very different to the optimum affect enzyme activity?  
(Higher/Supplement)





How does a pH that is very different to the optimum affect enzyme activity? (Higher/Supplement)

The change in pH will distort the enzyme's active site (denaturing it) so that it can no longer fit the specific substrate

