ENZYMES AS CATALYSTS LOWERING ACTIVATION ENERGY

- For reactions to take place naturally:
 - Substrate must collide with sufficient energy to alter arrangement of atoms
 - Free energy of products just be less than substrates
 - Activation energy level must be overcome for reaction to proceed 0
- Enzymes lower the activation energy which enables metabolic processes to occur rapidly

ENZYME STRUCTURE

- Enzymes are globular proteins
- The active site is made of amino acids
- The molecule on which an enzyme acts is called a substrate. This fits into an • active site and forms an enzyme-substrate complex
- The substrate is held by bonds that temporarily form between amino acids
 - le.co.uk INDUCED FIT MODEL OF ENZYME ACTION
- The active site forms as the enzyme and sub-trace interact •
- The enzyme is flexible and cap nou b self around the substrate
- As the substrate charges sigge the enzyme juts strein on the substrate
 The strain distorts a particular bond win to substrate, this lowers the activation energy needed to know the oond

FACTORS AFFECTING ENZYME ACTION

MEASURING ENZYME - CATALYSED REACTIONS

- 2 changes most frequently measures are:
 - Formation of the products of the reaction
 - The disappearance of the substrate 0
 - What happens in enzyme-catalysed reactions:
 - At first there is a lot of substrate but no product
 - It is easy for substrate molecule to come into contact with active sites 0
 - All enzyme active sites are filled, and the substrate is broken down into 0 products
 - The amount of substrate decreases and the amount of product 0 increases
 - 0 It is more difficult for substrate molecules to come into contact with enzyme molecules
 - It takes longer for substrate molecules to be broken down and the rate of 0 reaction slows
 - The substrate has been used up and no new product can be produced

MEASURING THE RATE OF CHANGE

- ale.co.uk The rate of change can be measu a curve of a araph
 - Measure the gradient
 - Draw a tangen
 - calculated e gradient

RATURE ON ENZYME ACTION

- A rise in temperature increases the kinetic energy
 - Enzyme and substrate molecules come together more often which 0 means more effective collisions. This means more enzyme-substrate complexes are formed and the rate of reaction increases
 - A temperature rise can cause hydrogen and other bonds to break. This means the enzyme changes shape, meaning the substrate fits less easily into the active site, slowing the rate of reaction
- If temperature gets too high the enzyme denatures
- Many enzymes have an optimum temperature
 - Humans optimum temperature are 37 degrees this is because: 0
 - Other proteins may be denatured
 - Any further rise in temperature might denature enzymes
 - Higher body temperatures would increase metabolic rate so addition energy (food) would be needed