B1b: Biology key concepts

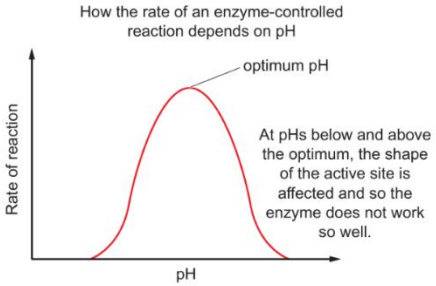
1.How enzymes work

Substrate	The chemical(s) that an enzyme works on.
Active site	An area of an enzyme with the same shape as the substrate.
Lock and key mechanism	The substrate moves into the active site and reacts to form the products. The products leave the active site so another substrate can then enter and so on.
Specificity	Each enzyme can only work on one substrate because the shape of the active site has to match.
Denature	When the shape of the active site changes shape so the enzyme stops working.

Enzyme name	Where found	Reaction catalysed
amylase	saliva and small intestine	breaking down starch to small sugars, such as maltose
catalase	most cells, but especially liver cells	breaking down hydrogen peroxide made in many cell reactions to water and oxygen
starch synthase	plant	synthesis of starch from glucose
DNA polymerase	nucleus	synthesis of DNA from its monomers

2. Factor affecting enzymes

Optimum temperature	The temperature when an enzyme works fastest (about 37^{O} for human enzymes).
Changing the temperature	**Increasing to optimum**: rate increases because particles move faster **Increasing past optimum:** rate decreases as enzyme denatures
Increasing substrate concentration	At first the rate increases, but then it levels out as the enzyme is working as fast as possible and there are no more available active sites



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

3. Digestive enzymes

Digestion	Breaking large food molecules down into ones small enough to absorbed by the small intestine.
Catalyst	A substance that speeds up a chemical reaction without being used up.
Enzyme	A protein that works as a catalyst to speed up the reactions in our cells.
Digestive enzymes	Enzymes that break large food molecules down into smaller ones.
Amylase	**Where found:** saliva, small intestine **What it does:** breaks down starch into simple sugars such as maltose
Lipase	**Where found:** small intestine **What it does:** breaks down fats into fatty acids and glycerol
Protease	**Where found:** stomach (pepsin), small intestine (trypsin) **What it does:** breaks down proteins into amino acids

4. Cell transport

Concentration	The number of particles in a given volume (the strength of a solution).
Concentration gradient	The difference in concentration between two neighbouring areas.
Diffusion	The movement of particles from high to low concentration (down a concentration gradient).
Partially permeable membrane	A membrane that allows some molecules but not others to pass through it (like a cell membrane).
Osmosis	The movement of water across a partially permeable membrane from high water/low solute conc to low water/high solute conc.
Active transport	Using energy to move substances from low to high concentration (up a concentration gradient).