

Solutions

2.1 A group of cells with a similar structure and function; e.g. glandular/muscular/epithelial tissue.

2.2 Amylase; salivary glands and pancreas / small intestine; glucose / simple sugars.

2.3 Alkaline – neutralises hydrochloric acid from the stomach so lipase works; emulsifies fat into small droplets – a larger surface area for lipase to work on, so a faster rate.

3.1 At 80 °C the enzyme has denatured – the active site's shape changed permanently, so starch no longer fits; this is irreversible, so it stays inactive on cooling. At 5 °C the enzyme is undamaged, just low kinetic energy – fewer successful collisions, so the reaction is slow but restarts when warmed.

3.2 (a) Starch (iodine blue-black, B1) but no sugar and no protein. (b) Benedict's only turns brick-red when heated.

3.3 Indicative content: set up water bath at constant temperature; mix amylase, starch and buffer at each pH value; start timing; sample at regular intervals onto iodine in a spotting tile (continuous sampling); record when iodine stays orange-brown (all starch digested); shortest time = fastest rate; repeat at each pH and use means; controls – temperature, volumes of enzyme and starch, same concentration. Level 3 (5–6): all key steps, sampling method, controls and repeats. Level 2 (3–4): most steps with a gap. Level 1 (1–3): isolated steps.