

Module map

GCSE Science	Module story	Science ideas and explanations	GCSE Additional Science
Homeostasis is introduced very briefly in B3 <i>Life on Earth</i> .	<p>Automatic control systems</p> <p>↓</p> <p>Negative feedback</p> <p>↓</p> <p>Temperature control responses</p> <p>↓</p> <p>Enzymes</p> <p>↓</p> <p>Diffusion and osmosis</p> <p>↓</p> <p>Water balance</p> <p>↓</p> <p>Extreme conditions</p>	<p>Artificial and body control systems are compared in terms of stimuli, receptors, processing centre, effectors, response.</p> <p>Negative feedback between the effector and receptor of a control system reverses any changes to the body's steady state. A more sensitive response is achieved when two effectors work antagonistically.</p> <p>Energy gain and loss must be balanced to maintain constant body temperature. The body utilizes a range of responses to retain or lose heat to the environment. These responses are regulated by the temperature control centre (hypothalamus) in the brain.</p> <p>Enzymes are proteins. Each has a specific structure with an active site that is complementary to the substrate molecule(s). Protein structure is disrupted by high temperatures. High temperatures alter the shape of an enzyme's active site, preventing it from binding to the substrate. At low temperatures, the rate of enzyme reaction is increased with an increase in temperature, owing to increased frequency and energy of collisions between enzyme and substrate molecules.</p> <p>Diffusion is the passive overall movement of molecules from a region of their high concentration to a region of their low concentration. Water molecules move in and out of cells by osmosis. Some chemicals are also moved by active transport.</p> <p>Water is gained and lost from the body. A balanced water level is needed for correct cell activity. Kidneys remove waste urea from the body and balance the levels of water and other useful chemicals by filtering the blood and reabsorbing useful chemicals back into the bloodstream. Waste products are excreted from kidneys as urine. Urine concentration is controlled by ADH.</p> <p>Extreme temperatures can result in hypothermia or heatstroke. Strenuous exercise, scuba-diving and mountain climbing can affect homeostatic mechanisms. Alcohol and Ecstasy affect the body's production of ADH, and so disrupt the body's water balance.</p>	<p>Reflex actions are explained in B6 <i>Brain and mind</i>.</p> <p>Protein structure and synthesis is described in B5 <i>Growth and development</i>.</p> <p>The effects of certain drugs on synapse action are explained in B6 <i>Brain and mind</i>.</p>
Enzymes as an important group of proteins are introduced in B1 <i>You and your genes</i> .			
Energy release by respiration is introduced in P2 <i>Radiation and life</i> .			