




<p style="text-align: center;">ADDITIONAL SCIENCE B3: BIOLOGY</p> <p style="text-align: center;">Higher content bold & labeled as HT</p> <p style="text-align: center;">Key words in bold</p>	Video	Exam Q	  
Dissolved substances move by diffusion & by active transport .			
Describe Osmosis as the diffusion of water from a dilute to a more concentrated solution through a partially permeable membrane.			
Sports drinks contain sugars to replace the sugar used in respiration. They also contain water & ions to replace the water & ions lost during sweating.			
Active transport is the movement of substances against the concentration gradient . This requires the use of energy from respiration .			
The effectiveness of an exchange surface is increased by large surface area, being thin, efficient blood supply, being well ventilated e.g. alveoli & villi .			
During ventilation the ribcage moves out & up & the diaphragm becomes flatter. This decrease the pressure in the thorax & the air goes into the lungs.			
Artificial aids can help breathing, including the use of artificial ventilators.			
In plants carbon dioxide enters leaves by diffusion through stomata , most of the water & mineral ions are absorbed by roots.			
The surface area of the roots is increased by root hairs & the surface area of leaves is increased by the flattened shape & internal air spaces.			
Water vapour is lost through the stomata, evaporation is more rapid in hot, dry, windy conditions (transpiration).			
Guard cells surround the stomata. Stomata can close to prevent water loss.			
Xylem tissue transports water & mineral ions from the roots to the stem & leaves (transpiration stream).			
Phloem tissue carries dissolved sugars from the leaves to the rest of the plant, including the growing regions & the storage organs.			
The wall of the heart is made from muscle tissue. There are four main chambers (left & right atria & ventricles).			
There are two separate circulation systems, one for the lungs & one for all other organs of the body.			
Blood travels from the (vena cava) to right atria , to ventricles , to lungs via pulmonary artery , back to heart via pulmonary vein to left atria , then ventricles then (aorta).			
Valves in the heart ensure that blood flows in the correct direction.			
Arteries have thick walls containing muscle & elastic fibres.			
Veins have thinner walls & often have valves to prevent back-flow of blood.			
In the organs, blood flows through very narrow, thin-walled blood vessels called capillaries .			
Damage to the coronary artery can result in damage to the heart.			
Blood is a tissue & consists of a fluid called plasma in which red blood cells , white blood cells & platelets are suspended.			
Blood plasma transports carbon dioxide from the organs to the lungs, products of digestion & urea from the liver to the kidneys.			
Red blood cells transport oxygen from the lungs to the organs. Red blood cells have no nucleus & are packed with a red pigment called haemoglobin .			
In the lungs haemoglobin combines with oxygen to form oxyhaemoglobin . In other organs oxyhaemoglobin splits up into haemoglobin & oxygen.			
White blood cells destroy pathogens as part of the immune system.			

Platelets are small fragments of cells. They have no nucleus. Platelets help blood to clot at the site of a wound.			
Waste products that have to be removed from the body include carbon dioxide, urea & excess water & mineral ions.			
Urea is produced in the liver by the breakdown of amino acids & removed by the kidneys in the urine, which is temporarily stored in the bladder.			
A kidney produces urine by filtering the blood, reabsorbing all the sugar, dissolved ions & water needed & releasing urea, excess ions & water as urine.			
In a dialysis machine a person's blood flows between partially permeable membranes. Dialysis fluid contains the same concentration of useful substances as blood.			
In kidney transplant a diseased kidney is replaced with a healthy one from a donor.			
Antigens are on surface of cells. The recipient's antibodies may attack antigens. Donors must have similar 'tissue type' & recipients should take drugs to avoid rejection .			
Body temperature is monitored by the thermoregulatory centre in the brain. This centre has receptors sensitive to the temp of the blood flowing through the brain.			
HT: If too hot - blood vessels dilate more heat is lost from capillaries in skin, sweat glands produce more sweat that evaporates.			
HT: If too cold- blood vessels constrict reducing flow of blood to capillaries in skin, muscles shiver & the contractions requires respiration & more energy released.			
The blood glucose concentration of the body is monitored & controlled by the pancreas. The pancreas produces the hormone insulin .			
HT: Glucagon is produced in the pancreas when blood glucose levels fall. This causes glycogen to be converted into glucose & be released into the blood.			
Type 1 diabetes is due to pancreas not producing enough insulin it can be controlled by diet, exercise & injecting insulin.			
Waste may pollute water (sewage, fertilizer or toxic chemicals) air (smoke & sulfur dioxide) & (pesticides & herbicides).			
Deforestation has increased the release of CO ₂ into the atmosphere & reduced the rate at which CO ₂ is 'locked up' in wood. Biodiversity also decreases.			
Deforestation occurs so crops can be grown for ethanol biofuel & cattle or rice fields for food. These increase methane levels.			
Destruction of peat bogs (for use in fertilizers) causes further carbon dioxide to be released.			
Increased carbon dioxide & methane levels lead to global warming , resulting in raised sea level, loss of biodiversity & changes to species migration & distribution.			
Biofuels can be made from natural products by fermentation. Biogas , mainly methane, can be produced by anaerobic fermentation of plant or waste material containing carbohydrates.			
The efficiency of food production can be improved by reducing the number of stages in food chains.			
The efficiency of food production can also be improved by restricting energy loss from food animals by limiting their movement & by controlling the temperature.			
It is important to maintain fish stocks at a level where breeding continues (sustainable food production). Net size & fishing quotas play a role in conservation of fish.			
Fusarium fungus is useful for producing mycoprotein . The fungus is grown on glucose syrup, in aerobic conditions, & the biomass is harvested & purified.			

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