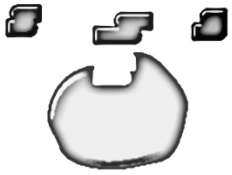
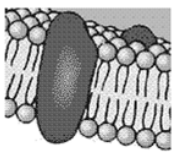
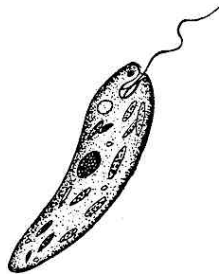
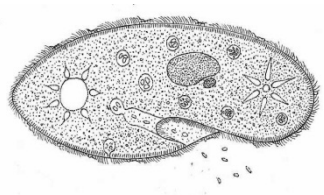
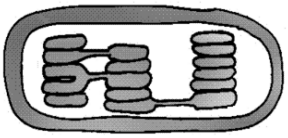
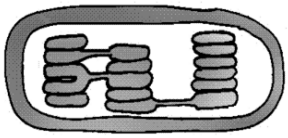
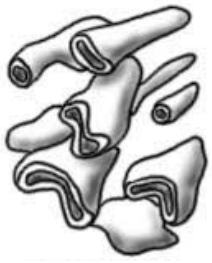
AS90464 Describe cell structure and function	<u>Organelle</u> involved in aerobic respiration releasing ATP / energy has a double membrane folded into cristae (to make large SA)	<u>Process</u> *mostly* occurs in mitochondria; needing glucose and (oxygen) to release energy / ATP	mitochondria occur in large numbers in cells using large amounts of energy such as….
	mitochondria	aerobic respiration	cells lining small intestine, muscle cells, sperm cells
muscle cells have numerous mitochondria to allow for	sperm cells have numerous mitochondria to allow for	cells lining the small intestine have numerous mitochondria to allow for	respiration releases energy in the form of ATP, this is necessary for ____ ___
movement / contraction	motility	active transport	cellular reactions
_____ increase the surface area *for a greater number of reactions* in mitochondria		<u>To label</u> • outer membrane • inner membrane • cristae • matrix 	<u>Organelle</u> modifies, packages, assembles, transports and secretes materials such as proteins including enzymes
cristae	mitochondrion	mitochondrion	Golgi (apparatus)
<u>Organelle</u> has a membrane, contains genetic information, has a nucleolus, has pores	<u>Organelle</u> detects or senses light or shadows DOES NOT SEE!!	ATP / energy	active site /cleft matches only one substrate & the wrong material will not fit explains enzyme _____
nucleus	eye spot	cellular respiration	specificity

 which substrate fits?	the factor in the least amount that limits the rate of photosynthesis e.g. light level OR CO_2 concentration OR amount of chlorophyll	<u>Organelle</u> site of photosynthesis where light energy in converted into chemical energy (as glucose or starch	more chloroplasts at the top of the palisade cells because…
enzyme + 	Limiting factor	chloroplast	more light so more photosynthesis / glucose produced
2 reasons why enzymes can be "reused"	inhibitors affect enzymes by either ___ the shape or ____ the active site	<u>Organelle</u> control cell activities contains genetic material on chromosomes	more chloroplasts near the cell membrane in the palisade cells because…..
catalysts are not used up enzyme shape unchanged	changing blocking	nucleus	less distance for CO_2 to diffuse so more photosynthesis / glucose produced
<u>Organelle</u> storage	<u>Organelle</u> contain enzymes that break down food / bacteria	• water moving from high conc. to low conc. across semi permeable membrane • water moves WITH conc. gradient • passive process / no energy needed	• movement of molecules/ions from low to high conc. • energy required • molecules moved AGAINST conc. gradient • uses carrier mechanism or pump
vacuoles	lysosomes	osmosis	active transport
<u>Structure</u> double (phospho) lipid layers  & protein molecules	movement of molecules from high to low concentration	effect of increasing the temperature to "optimum" on enzyme activity	effect of changing the pH on enzyme activity
cell membrane	diffusion	increase activity as more energy & more frequent collisions	decreased enzyme activity as denatures or alters the active site

• speed up biological reactions / processes within an organism • biological catalysts • lower activation energy	effect of low temperature on enzyme activity	<u>model of enzyme action</u> active site of enzyme matches substrate shape; brings about a change in the substrate	<u>model of enzyme action</u> the active site is flexible and changes slightly when combined with substrate; brings about a change in the substrate
enzymes	low activity as less frequent collisions & less energy in the collisions	Lock and key model	Induced fit model
effect of high temperatures on enzyme activity	two models on how enzymes "work" that explain how the substrate binds to the active site	<u>Water regulation</u> salt water unicellular organism water will ____ an organism that lives in salty water	temperature at which enzyme works fastest / rate of reaction is highest / is most activity
damaged active site / enzyme is denatured no activity as substrate can't bind to active site	lock and key induced fit	leave / have no movement in	optimum temperature
series of reactions controlled by specific enzymes to supply the energy needs of the cell	<u>Water regulation</u> fresh water unicellular organism water will ____ an organism that lives in fresh water	<u>Osmosis, diffusion or active transport?</u> plant roots draw water from soil	<u>Osmosis, diffusion or active transport?</u> ion pumps moving ions across cell membranes
respiration	enter	example of osmosis	example of active transport
metal ions e.g. Na^+, K^+, Mg^{2+} or Ca^{2+} require ion pumps to cross membranes and distribute through the body	responsible for the ability of plant roots to draw water from the soil	<u>Osmosis, diffusion or active transport?</u> expulsion of water in fresh water unicellular organisms by contractile vacuoles	<u>structure</u> fills with water water released to the outside acts as pump to remove excess water from cell
active transport	osmosis	active transport	contractile vacuole

<u>Osmosis, diffusion or active transport?</u> reabsorption of glucose by the kidney to be used in the body	<u>Osmosis, diffusion or active transport?</u> salt uptake by the roots of plants to gain essential nutrients for making of proteins	<u>Organelle</u> endoplasmic reticulum that has no ribosomes attached to it	<u>Organelle</u> endoplasmic reticulum that has a number of ribosomes attached to it
active transport	active transport	smooth endoplasmic reticulum (ER)	rough endoplasmic reticulum (ER)
greater water conc. OR lower solute conc.	lower water conc. OR greater solute conc.	increasing ___ conc. • more enzyme activity • increase number of reactions, until available enzyme molecules become 'saturated' and no. of reactions levels off	Increasing ___ conc. greater number of enzyme molecules so reaction rates increase NOTE: the actual enzyme activity does not increase
hypotonic	hypertonic	substrate concentration	concentration of enzyme
organic molecules that alter shape of active site so it more effectively combines with the substrate(s); without them enzymes will not work / at a very low rate	alter or block active site to prevent enzyme-substrate complex forming & stops / slows the reaction eg mercury or lead	<u>Organelle function</u> synthesises lipids / steroids / storage of calcium in muscles	<u>Organelle function</u> protein synthesis uses ribosomes
coenzymes	enzyme poisons (inhibitors)	smooth endoplasmic reticulum (ER	rough endoplasmic reticulum (ER)
		membrane that only allows certain substances to pass through it controls movement of substances in / out of the cell	why unicellular organisms e.g. *Euglena* and *Paramecium* are restricted to being microscopic in size
euglena	paramecium	semi-permeable membrane	movement of particles too slow when cell too big. SA to vol. ratio is a limitation

<u>Organelle</u> flat stacks of thylakoids / grana surrounded by stroma thin membranes / large surface area	mostly in leaves near top of leaf upper palisade layer near cell membranes	<u>Structure</u> removes the water that enters the organism through osmosis (down concentration gradient)	converts light energy (from the sun) into chemical energy (glucose/starch) for use in cellular processes e.g. respiration
chloroplast	chloroplast location	Contractile vacuole	role of photosynthesis
<u>chloroplast structure</u> stroma is a ____ fluid which doesn't block the light	<u>chloroplast structure</u> flat stacks of thylakoids have an increased ___ ____ for the absorption of light	Smooth ER in muscle cells is needed for	Rough ER in muscle cells is needed for
clear	surface area	lipid synthesis / carbohydrate metabolism / for energy or ATP	protein synthesis, growth & repair of cells, to make enzymes needed for respiration
<u>chloroplast structure</u> thin membranes / large surface area for _____ of light	fresh or salt water organism? pond is hypotonic compared with hypertonic organism	releases calcium to trigger muscle contraction	synthesis of steroids for muscle development
absorption	fresh water organism	smooth ER	smooth ER
chloroplasts near the top of the leaf and near (palisade) cell membrane lead to more light being received	cell wilts slightly due to osmosis as water leaves the cell; cell membrane shrinks away from the cell wall	differences between active transport and osmosis	similarities between active transport and osmosis
location of chloroplasts	flaccid	energy required concentration gradient mechanism	transport materials across membranes

		SA to V ratio is too low in _____ cells leads to decreased transport / osmosis / diffusion distances too long takes too long	process in plant cells where the plasma membrane pulls away from the cell wall due to the loss of water through osmosis
rough ER	golgi apparatus	large	plasmolysis
cell swells slightly due to osmosis as water enters the cell		<u>To label</u> • thylakoids /grana • stroma • inner/outer membrane 	
turgid	chloroplast	chloroplast structure	smooth ER