

3.2.1.1 Structure of eukaryotic cells	RED	AMBER	GREEN
explain the roles of different components and organelles within eukaryotic cells			
interpret pictures, diagrams and electron micrographs to identify cell organelles.			
identify examples of specialised eukaryotic cells			
apply knowledge of eukaryotic cells features in suggesting the role of cells based on their adaptations.			
3.2.1.2 Structure of prokaryotic cells and of viruses			
describe the structural differences between prokaryotic and eukaryotic cells			
explain the purpose of plasmids, capsules and flagella			
describe the structure of virus particles			
explain the role of the capsid and attachment protein			
3.2.1.3 Methods of studying cells			
describe how a light microscope and an electron microscope work			
Compare and contrast microscopes and explain the concepts of magnification and resolution			
prepare a slide to view under a microscope			
explain the use of a graticule			
calculate the actual size of cells based on measured size and magnification.			
describe the processes of cell fractionation and ultracentrifugation			
explain the use of low temperatures and buffers during cell fractionation			
3.2.2 All cells arise from other cells			
explain what the cell cycle is and why it does not occur in some cells from multicellular organisms			
describe the stages of the cell cycle.			
explain the appearance of cells in each stage of mitosis.			
explain what the mitotic index is and calculate the mitotic index from observed values			
explain the events involved in the formation of tumours and cancers, and why this is damaging to the body			
explain the processes within the cell cycle which are disrupted and which lead to cancer			
explain how cancer treatments often work to inhibit stages of the cell cycle			
interpret data relating to cancer treatments and their effects on the rate of cell division.			
explain what binary fission is and the organisms which carry out binary fission			
describe the process of binary fission.			
explain why viruses are not classified as being living organisms			
describe the sequence of events by which viruses replicate			

explain why viruses are so difficult to treat and develop medicines against.			
3.2.3 Transport across cell membranes			
describe the arrangement of proteins, glycoproteins, glycolipids, phospholipids and cholesterol in the fluid mosaic model of membranes			
explain the roles/importance of the constituent parts of the membrane			
apply knowledge of the fluid mosaic model to suggest how temperature/alcohol affects membrane permeability			
define osmosis in terms of water potential			
explain the terms hypotonic, hypertonic and isotonic			
explain the effect of osmosis on plant and animal cells.			
explain what a dilution series is, and produce one from stock solutions			
explain how the water potential of a plant tissue can be experimentally determined			
define what is meant by diffusion and facilitated diffusion			
explain the process of facilitated diffusion			
identify which substances rely on facilitated diffusion and why they cannot enter/leave cells by diffusion			
interpret data to identify when a substance is moving by facilitated diffusion or diffusion.			
define what is meant by active transport			
explain the process of active transport			
compare and contrast active transport and facilitated diffusion			
interpret data to identify when a substance is being actively transported.			
explain the adaptations of specialised cells maximising the rate of transport across their internal and external membranes			
describe the adaptations of small intestine epithelial cells to absorption			
define what is meant by co-transport			
explain the process of co-transport in the context of absorption of glucose (and amino acids).			
3.2.4 Cell recognition and the immune system			
explain what is meant by an antigen, and the types of molecules which can act as antigens			
explain why antigen recognition is important for the immune system			
describe the process of phagocytosis and antigen presentation			
explain what is meant by the specific immune response			
explain the cell-mediated (cellular) immune response			
explain the specificity of an antibody to a particular antigen			

explain how antibodies lead to the destruction of pathogens			
explain the humoral (antibody-mediated) immune response			
explain what is meant by a monoclonal antibody			
explain the roles of plasma cells in producing a primary response and memory cells in producing a secondary response			
explain why some diseases can be caught more than once			
explain how mutations can cause antigen variability and the consequences of antigen variability on the incidence of disease and the development of therapies against that disease.			
compare and contrast active and passive immunity, and apply your knowledge to given examples			
describe how antigens can be obtained for use within a vaccine			
explain why vaccination is able to protect against diseases caused by particular pathogens			
explain what is meant by herd immunity, and why it is able to protect unvaccinated individuals in a population			
evaluate methodology, evidence and data relating to the use of vaccines			
explain the structure of HIV in infecting and replicating inside helper T cells			
explain the distinction between being HIV positive and developing AIDS			
explain how HIV causes the symptoms of AIDS			
explain why antibiotics are ineffective against viruses (link to cell structure).			
explain the use of monoclonal antibodies in the direct and indirect ELISA technique			
interpret information to explain the accuracy and results of tests which use the ELISA technique			
evaluate methodology, evidence and data relating to the use of monoclonal antibodies			