

Biology 1		Foundation, Higher & Separate GCSE	
Red 	Amber 	Green 	
<b>1. Cell structure</b>	Use the terms 'eukaryotic' and 'prokaryotic' to describe cells.		
	Describe the features of bacterial (prokaryotic) cells.		
	Demonstrate an understanding of the scale and size of cells and be able to make order of magnitude calculations, inc standard form		
	Recall the structures found in animal and plant cells (eukaryotic)		
	Describe the functions of the structures in animal and plant (eukaryotic) cells		
	Describe what a specialised cell is, including examples for plants and animals		
	<i>Required practical: use a light microscope to observe, draw and label a selection of plant and animal cells</i>		
	Carry out calculations involving magnification using the formula: magnification = size of image/ size of real object -inc standard form		
	Define the terms magnification and resolution		
	Describe the process of diffusion, including examples		
	Explain how diffusion is affected by different factors		
	Define and explain "surface area to volume ratio", and how this relates to single-celled and multicellular organisms (inc calculations)		
	Explain how the effectiveness of an exchange surface can be increased, inc examples of adaptations for small intestines, lungs, gills, roots & leaves		
	Describe the process of osmosis		
	<i>Required practical: investigate the effect of a range of concentrations of salt or sugar solutions on the mass of plant tissue</i>		
Describe the process of active transport, including examples - gut and roots			
Explain the differences between diffusion, osmosis and active transport			
<b>2. Cell division</b>	Describe how genetic information is stored in the nucleus of a cell (inc genes & chromosomes)		
	Describe the processes that happen during the cell cycle, including mitosis (inc recognise and describe where mitosis occurs)		
	Describe stem cells, including sources of stem cells in plants and animals and their roles		
	Describe the use of stem cells in the production of plant clones and therapeutic cloning		
	Discuss the potential risks, benefits and issues with using stem cells in medical research/treatments		

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<b>3. Organisation &amp; the digestive system</b>	Describe the levels of organisation within living organisms		
	Describe the digestive system and how it works as an organ system		
	Describe basic features of enzymes		
	Describe the lock and key theory as a model of enzyme action and explain how the shape of the active sites makes the enzyme specific		
	Explain the effect of temperature and pH on enzymes and define denatured.		
	Describe the digestive enzymes, including their names, sites of production and actions		
	Describe how the products of digestion are used		
	Describe the features and functions of bile and state where it is produced and released from		
	<i>Required practical: use qualitative reagents to test for a range of carbohydrates, lipids and proteins</i>		
	<i>Required practical: investigate the effect of pH on the rate of reaction of amylase enzyme</i>		
<b>4. Organising animals &amp; plants</b>	Describe the structure of the human heart and lungs (inc how lungs are adapted for gaseous exchange)		
	Explain how the heart moves blood around the body (inc role and position of the aorta, vena cava, pulmonary artery & vein and coronary arteries)		
	Explain how the natural resting heart rate is controlled and how irregularities can be corrected		
	Describe the structure and function of arteries, veins and capillaries		
	Describe blood and identify its different components, inc identifying blood cells from photographs/diagrams		
	Describe the functions of blood components, including adaptations to function		
	Describe what happens in coronary heart disease and what statins are used for		
	Describe and evaluate treatments for coronary heart disease and heart failure (inc drugs, mechanical devices or transplant)		
	Recall that heart valves can become faulty and describe the consequences of this		
	Describe how patients can be treated in the case of heart failure		
	Describe plant tissues (epidermal, palisade mesophyll, spongy mesophyll, xylem, phloem and meristem) and describe their functions		
	Recall the plant parts that form a plant organ system that transports substances around the plant		
	Explain how root hair cells, xylem and phloem are adapted to their functions		
	Describe the process of transpiration and translocation including the role of the different plant tissues		
	Explain how the rate of transpiration can be affected by different factors (inc naming the factors)		
Describe the role of stomata and guard cells in the control of gas exchange and water loss			

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<b>B5. Communicable Disease</b>	Define the term 'communicable disease'		
	Explain what a pathogen is and how pathogens are spread.		
	Explain how pathogenic bacteria and viruses cause damage in the body		
	Explain how the spread of diseases can be reduced or prevented inc the work of Ignaz Semmelweis		
	Describe measles, HIV and tobacco mosaic virus as examples of viral pathogens		
	Describe salmonella food poisoning and gonorrhoea as examples of bacterial pathogens		
	Describe the signs, transmission and treatment of rose black spot infection in plants as an example of fungal pathogens		
	Describe the symptoms, transmission and control of malaria, including knowledge of the mosquito vector as an example of a protists pathogen		
	Describe defences that stop pathogens entering the human body (inc skin, nose, trachea & windpipe, stomach)		
	Recall the role of the immune system		
	Describe how white blood cells destroy pathogens		
	<b>Bio Only: Describe how bacteria reproduce</b>		
	<b>Bio Only: Describe how to prepare an uncontaminated culture</b>		
	<b>Bio Only: Calculate cross-sectional areas of colonies or clear areas around colonies using <math>\pi r^2</math></b>		
	<b>Bio Only: Calculate the number of bacteria in a population after a certain time if given the mean division time</b>		
	<b>Bio Only: Express answers for last two points in standard form</b>		
	<b><i>Bio Only: Required practical: investigate the effect of antiseptics or antibiotics on bacterial growth using agar plates and measuring zones of inhibition</i></b>		
	<b>Bio Only: Give examples of plant pathogens</b>		
<b>Bio Only: Give examples of plant ion deficiencies and their effects</b>			
<b>Bio Only: Describe physical, chemical and mechanical defence responses of plants</b>			

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<b>B6. Preventing &amp; Treating Disease</b>	Describe how vaccination works, including at the population level				
	Explain how antibiotics and painkillers are used to treat diseases, including their limitations				
	Describe how sources for drugs have changed over time and give some examples				
	Describe how new drugs are tested, including pre-clinical testing and clinical trials (inc double blind trials and placebos)				
	<b>Bio Only: Describe what monoclonal antibodies are and why they are useful</b>				
	<b>Bio Only: Describe how monoclonal antibodies are produced</b>				
	<b>Bio Only: Explain how monoclonal antibodies are used for diagnosis, research, chemical testing and disease treatments</b>				
	<b>Bio Only: Evaluate the advantages and disadvantages of monoclonal antibodies (inc side effects)</b>				
<b>B7. Non-communicable Diseases</b>	Describe health and explain the causes of ill-health				
	Describe how different types of diseases may interact and interpret information in graphical and numerical forms				
	Describe the difference between a correlation and casual link.				
	Describe what risk factors are and give examples discussing human and financial costs of noncommunicable diseases at local, national and global levels				
	Describe what cancer is and explain the difference between benign and malignant tumours				
	Describe how alcohol effects liver and brain function, unborn babies, and the risk of developing cancer.				
	Describe how smoking effects the risk of developing disease of the heart, lungs and the effect on unborn babies.				
Describe the effect of diet and exercise on the risk of developing obesity, cardiovascular disease and type 2 diabetes.					

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<b>B8. Photosynthesis</b>	Describe what happens in photosynthesis, including using a word equation and recognise the chemical formulas for carbon dioxide, water, oxygen & glucose		
	Explain why photosynthesis is an endothermic reaction		
	Recall the limiting factors of photosynthesis		
	Explain how limiting factors affect the rate of photosynthesis, including graphical interpretation (limited to one factor)		
	Describe the adaptations of leaves to maximise photosynthesis.		
	<i>Required practical: investigate the effect of light intensity on the rate of photosynthesis using an aquatic organism such as pondweed</i>		
	<b>HT only: Explain how the limiting factors of photosynthesis interact, inc graphical interpretation (two/three factors)</b>		
	<b>HT ONLY: Explain how limiting factors are important to the economics of greenhouses, including data interpretation</b>		
	<b>HT ONLY: Explain and use inverse proportion in the context of photosynthesis</b>		
Describe how the glucose produced in photosynthesis is used by plants			
<b>B9. Respiration</b>	Describe what happens in respiration including using a word equation and recognise the chemical formulas for carbon dioxide, water, oxygen & glucose		
	Describe aerobic and anaerobic respiration with regard to the need for oxygen, the differing products and the relative amounts of energy transferred		
	Recognise the equations for aerobic respiration, anaerobic respiration in muscles and anaerobic respiration in plants and yeast cells.		
	Recall what type of respiration fermentation is and its economic importance.		
	Describe and explain what happens to heart rate, breathing rate and breath volume during exercise and why these changes occur		
	Explain what happens when muscles do not have enough oxygen and define the term oxygen debt		
	<b>HT ONLY: Explain what happens to accumulated lactic acid in the body</b>		
	Explain the importance of sugars, amino acids, fatty acids and glycerol in the synthesis and breakdown of carbohydrates, proteins and lipids		
	Explain what metabolism is, including examples		