Science – Biology Paper 1 (Trilogy) Name: Target grade:

				Revised ✓
Cell Biology				
Cell Structure				
Use the terms 'eukaryotic' and 'prokaryotic' to describe types of 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, including standard form				
Recall the structures found in animal and plant (eukaryotic) cells including algal cells				
Use estimations and explain when they should be used to judge the relative size or area of sub-cellular structures				
Required practical 1: use a light microscope to observe, draw and label a selection of plant and animal cells				
Describe the functions of the structures in animal and plant (eukaryotic) cells				
Describe what a specialised cell is, including examples for plants and animals				
Describe what differentiation is, including differences between animals and plants				
Define the terms magnification and resolution				
Compare electron and light microscopes in terms of their magnification and resolution				
Carry out calculations involving magnification using the formula: magnification = size of image/ size of real object - including standard form				
Cell Division				
Describe how genetic information is stored in the nucleus of a cell (including genes & chromosomes)				
Describe the processes that happen during the cell cycle, including mitosis (including 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 (including diabetes and paralysis)				
Transport in Cells				
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 (including calculations)				
Explain how the effectiveness of an exchange surface can be increased, including examples of adaptations for small intestines, lungs, gills roots & leaves				
Describe the process of osmosis (including calculation of water uptake & percentage gain and loss of mass of plant tissue)				
Required practical 2: investigate the effect of a range of concentrations of salt or sugar solutions on the mass of plant tissue				
Describe the process of active transport, including examples - gut and roots				
Explain the differences between diffusion, osmosis and active transport				

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Science – Biology Paper 1 (Trilogy) Name: Target grade:

				Revised ✓
Organisation				
Principles of Organisation and Animal Tissues, Organs and Organ Systems				
Describe the levels of organisation within living organisms				
Describe the digestive system and how it works as an organ system (from KS3)				
Describe basic features of enzymes (including rate calculations for chemical reactions)				
Describe the lock and key theory as a model of enzyme action and explain how the shape a of the active sites makes the enzyme specific				
Explain the effect of temperature and pH on enzymes				
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				
Required practical 3: use qualitative reagents to test for a range of carbohydrates, lipids and proteins				
Required practical 4: investigate the effect of pH on the rate of reaction of amylase enzyme				
Describe the structure of the human heart and lungs (including how lungs are adapted for gaseous exchange)				
Explain how the heart moves blood around the body (including 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				
Use simple compound measures such as rate and carry out rate calculations for blood flow				
Describe blood and identify its different components, including 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 (including 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 health and the explain causes of ill-health and the relationship between health and disease				
Describe how different types of diseases may interact and translate disease incidence information between graphical and numerical forms				
Describe what risk factors are and give examples discussing human and financial costs of non-communicable diseases at local, national and global levels				
Describe what cancer is and explain the difference between benign and malignant tumours				
Describe the known risk factors for cancer, including genetic and lifestyle risk factors				
Plant tissues, organs and system				
Describe plant tissues (epidermal, palisade mesophyll, spongy mesophyll, xylem, phloem and meristem) and describe their functions				
Explain how the structure of plant tissues are related to their function within the leaf (plant organ) including stomata and guard cells				
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 (including naming the factors)				
Describe the role of stomata and guard cells in the control of gas exchange and water loss				

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Infection and Response				
Communicable Diseases				
Explain what a pathogen is and how pathogens are spread (inc how viruses, bacteria, protists and fungi are spread in animals and plants)				
Explain how pathogenic bacteria and viruses cause damage in the body				
Explain how the spread of diseases can be reduced or prevented				
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 prototist pathogen				
Describe defences that stop pathogens entering the human body (including skin, nose, trachea & windpipe, stomach)				
Recall the role of the immune system				
Describe how white blood cells destroy pathogens				
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 (including double blind trials and placebos)				
Bioenergetics				
Photosynthesis				
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)				
HT ONLY: Explain how the limiting factors of photosynthesis interact, inc graphical interpretation (two/three factors)				
HT ONLY: Explain how limiting factors are important to the economics of greenhouses, including data interpretation				
HT ONLY: Explain and use inverse proportion in the context of photosynthesis				
Required practical 5: investigate the effect of light intensity on the rate of photosynthesis using an aquatic organism such as pondweed				
Describe how the glucose produced in photosynthesis is used by plants				
Respiration				
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 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				
HT ONLY: Explain what happens to accumulated lactic acid in the body				
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				

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Keywords

You should be able to use the following words correctly and understand which parts of the content they link to

Cells and Cell structure
Eukaryotic
Prokaryote
Algae
Bacteria
Cell membrane
Mitochondria
Nucleus
Ribosome
Cytoplasm
Chloroplast
Chlorophyll
Vacuole
Cell wall
Specialised cell
Stem cells
Differentiated

Microscopes
Magnification
Resolving power
Micrometre (µm)
Nanometre (nm)

Cell transport
Diffusion
Osmosis
Active transport
Concentration gradient
Partially permeable membrane
Isotonic
Hypertonic
Hypotonic

Digestive system
Tissue
Organ
Organ system
Digestion
Stomach
Pancreas
Liver
Gall bladder
Small intestine
Large intestine
Villi
Carbohydrate
Glucose
Starch
Protein
Amino acids
Lipids
Fatty acids
Glycerol
Enzymes
Active site
Denatured
Metabolism
Optimum
Protease
Amylase
Lipase
Bile

Circulatory system
Red blood cell
White blood cell
Plasma
Platelets
Urea
Haemoglobin
Artery
Vein
Capillary
Heart
Atrium
Ventricle
Vena cava
Aorta
Coronary artery
Stent
Statins
Pacemaker
Valve

Respiratory system
Alveoli
Gas exchange
Diaphragm
Ventilation

Plant biology
Epidermis
Palisade
Mesophyll
Stomata
Guard cell
Xylem
Phloem
Transpiration
Translocation

Communicable disease
Pathogen
Virus
Protists
Vector
Agar
Hygiene
Antiseptic
Disinfectant
Malaria
Antibodies
Antitoxins
Chlorosis
Deficiency
Herd immunity
Vaccination
Painkillers
Antibiotics
Penicillin
Clinical trials
Placebo
Double-blind

Non-communicable disease
Risk factor
Carcinogen
Ionising radiation
Correlation
Benign tumour
Malignant tumour
Cancer
Obesity
Diabetes

Photosynthesis
Glucose
Limiting factor
Light intensity
Cellulose
Nitrogen

Respiration
Aerobic
Anaerobic
Glycogen
Heart rate
Lactic acid
Oxygen debt
Fermentation
Metabolic reactions

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