

| AQA TRILOGY Biology (8464) from 2016 Topic T4.1 Cell biology | | | | |
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| Topic | Student Checklist | R | A | G |
| 4.1.1 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, inc standard form | | | |
| | Recall the structures found in animal and plant (eukaryotic) cells inc algal cells | | | |
| | Use estimations and explain when they should be used to judge the relative size or area of sub-cellular structures | | | |
| | <i>Required practical 1: use a light microscope to observe, draw and label a selection of plant and animal cells</i> | | | |
| | 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 -inc standard form | | | |
| | <i>Required practical 2: investigate the effect of antiseptics or antibiotics on bacterial growth using agar plates and measuring zones of inhibition</i> | | | |
| 4.1.2 Cell division | 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 (inc diabetes and paralysis) | | | |
| 4.1.3 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 (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 (inc calculation of water uptake & percentage gain and loss of mass of plant tissue) | | | |
| | <i>Required practical 3: 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 | | | | |

| AQA TRILOGY Biology (8464) from 2016 Topic T4.2 Organisation | | | | |
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| 4.2.1 Principles of organisation & 4.2.2 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 (inc 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 | | | |
| | <i>Required practical 4: use qualitative reagents to test for a range of carbohydrates, lipids and proteins</i> | | | |
| | <i>Required practical 5: investigate the effect of pH on the rate of reaction of amylase enzyme</i> | | | |
| | 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 | | | |
| | Use simple compound measures such as rate and carry out rate calculations for blood flow | | | |
| | 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 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 | | | | |
| 4.2.3 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) inc 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 (inc naming the factors) | | | |
| | Describe the role of stomata and guard cells in the control of gas exchange and water loss | | | |

| AQA TRILOGY Biology (8464) from 2016 Topic T4.3 Infection and response | | | | |
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| 4.3.1 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 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 | | | |
| | 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) | | | | |

| AQA TRILOGY Biology (8464) from 2016 Topic T4.4 Bioenergetics | | | | |
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| 4.4.1 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 | | | |
| | <i>Required practical 6: investigate the effect of light intensity on the rate of photosynthesis using an aquatic organism such as pondweed</i> | | | |
| | Describe how the glucose produced in photosynthesis is used by plants | | | |
| 4.4.2 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 | | | |