*All page numbers refer to Longman’s Biology for IGCSE (the* ***green*** *textbook)*

|  |  |  |  |
| --- | --- | --- | --- |
| **Topics Covered** | **Key Points to Know** | **Page Ref** | **Revised?**  **Y/N** |
| **Characteristics of living organisms** | \*Living things organisms share the eight basic characteristics (C MRS GREN) | 1 |  |
| **Variety of living organisms** | \*Biology classifies organisms on the basis of their structure and function  \*Describe common features shared by **plants, animals, fungi, bacteria, protoctists** and **viruses**  \*For each group describe examples and their features  Understand the term pathogen and know which groups contain them | 16  16 – 21  16 - 21 |  |
| **Levels of Organisation** | \*Describe the levels of organisation within organisms: organelles, cells, tissues, organs and systems | 12 - 13 |  |
| **Cell Structure** | \*Recognise cell structures, including the nucleus, cytoplasm, cell membrane, cell wall, chloroplast and vacuole  \*Describe the functions of the nucleus, cytoplasm, cell membrane, cell wall, chloroplast and vacuole  \*Describe the differences between plant and animal cells | 1 – 3  2 – 3  3 |  |
| **Movement of Substances Into and Out of Cells** | \*Understand definitions of diffusion, osmosis and active transport  \*Understand that the movement of substances into and out of cells can be by diffusion, osmosis and active transport  \*Describe simple experiments on diffusion and osmosis using living and non-living systems  \*Understand why simple, unicellular organisms can rely on diffusion for movement of substances in and out of the cell  \*understand the need for a transport system in multicellular organisms | 9 – 10  9 – 10  10, 122 – 124  53 – 54  53 – 54 |  |
| **Respiration** | \* understand that the process of respiration releases energy in living organisms  \*Describe the differences between aerobic and anaerobic respiration  \*Write the word equation and the balanced chemical symbol equation for aerobic respiration  \*Write the word equation for anaerobic respiration in plants and in animals  **\*Describe simple controlled experiments to demonstrate the evolution of carbon dioxide and heat from respiring seeds or other suitable living organisms** | 6 – 7  7  7  7 – 8  8 - 9 |  |
| **Biological Molecules** | \*Recall the chemical elements present in carbohydrates, proteins and lipids (fats and oils)  \*Describe the structure of carbohydrates, proteins and lipids as large molecules made up from smaller basic units: starch and glycogen from simple sugars; protein from amino acids; lipids from fatty acids and glycerol  \*Describe the tests for glucose and starch  \*Understand the role of enzymes as biological catalysts in metabolic reactions  \*Understand how the functioning of enzymes can be affected by changes in pH  \*Describe how to carry out simple controlled experiments to illustrate how enzyme activity can be affected by changes in temperature | 37 – 40  37 – 40  42 – 43  3 – 4  4 - 5  5 - 6 |  |
| **Photosynthesis** | \*Describe the process of photosynthesis and understand its importance in conversion of light energy to chemical energy  \*Write the word equation and the balanced chemical symbol equation for photosynthesis  \*describe how to test leaves for starch  \*Understand how carbon dioxide concentration, light intensity and temperature affect the rate of photosynthesis  \*Explain how the structure of the leaf is adapted for photosynthesis  \*Recall that plants require mineral ions for growth and that magnesium ions are needed for chlorophyll and nitrate ions are needed for amino acids  \* **describe experiments to investigate the effect of light on net gas exchange from a leaf, using hydrogen-carbonate indicator**  \*describe experiments to investigate photosynthesis, showing the evolution of oxygen from a water plant, the production of starch and the requirements of light, carbon dioxide and chlorophyll  \*understand how varying carbon dioxide concentration, light intensity and temperature affects the rate of photosynthesis  \*understand gas exchange (of carbon dioxide and oxygen) in relation to respiration and photosynthesis  \* **understand that respiration continues during the day and night, but that the net exchange of carbon dioxide and oxygen depends on the intensity of light**  \*understand the role of diffusion in gas exchange  \**understand the origin of carbon dioxide and oxygen as waste products of metabolism and their loss from the stomata of a leaf*  \*describe how plants make use of glucose | 112  112  43, 109-110  116  112 – 114  118 – 119  115 – 117, 109 – 111  116-117,109-112  116  114-115  114-115  113-114  117 |  |
| **Gas exchange**  **(not including Transpiration)** | \*Explain how the structure of the leaf is adapted for gas exchange  \*Describe the role of stomata in gas exchange | 129-130 |  |
| **Plant Hormones & Tropisms** | \*Understand that plants respond to stimuli  \*Describe the geotropic responses of roots and stems  \*Describe positive phototropism of stems  \*Understand that phototropic responses in stems are the result of differential growth caused by auxin  \*Recall controlled experiments to demonstrate phototropic and geotropic plant growth responses | 137 – 138  140 – 141  138 – 140  141 – 142  141 – 142 |  |

|  |  |  |  |
| --- | --- | --- | --- |
| **Topics Covered** | **Key Points to Know** | **Page Ref** | **Revised?**  **Y/N** |
| **Plant Reproduction** | ~~\*Describe the difference between sexual and asexual reproduction~~  ~~\*Understand that fertilisation involves the fusion of a male and female gamete to produce a zygote~~  ~~\*Describe the structures of an insect-pollinated and a wind-pollinated flower and explain how each is adapted for pollination~~  ~~\*Describe pollination and the growth of the pollen tube~~  ~~\*Understand how germinating seeds utilise food reserves until the seedling can carry out photosynthesis~~  ~~\*Understand that plants can reproduce asexually by natural methods (illustrated by runners), and by artificial methods (illustrated by cuttings)~~ | ~~143~~  ~~144~~  ~~144~~  ~~144 – 145~~  ~~147~~  ~~143~~ |  |
| **Ecology** | \*Understand the terms population, community, habitat and ecosystem  \*Describe the use of quadrats as a technique for sampling the distribution of organisms in their habitats  \*Recall the use of quadrats to estimate the population size of an organism in two different areas.  \*Recall the names given to different trophic levels to include producers, primary, secondary and tertiary consumers and decomposers  \*Understand the concepts of food chains, food webs, pyramids of number, pyramids of biomass and pyramids of energy transfer  \*Understand the transfer of substances and of energy along a food chain  \*Explain why only about 10% of energy is transferred from one trophic level to the next  ~~\*Describe the stages in the water cycle, including evaporation, transpiration, condensation and precipitation~~  ~~\*Describe the stages in the carbon cycle, including respiration, photosynthesis, decomposition and combustion~~  ~~\*Recall that water vapour, carbon dioxide, nitrous oxide, methane and CFCs are greenhouse gases~~  \*Understand how human activities contribute to greenhouse gases | 152 – 153  153 – 154  154  155 – 156  155 – 158  158  158  ~~161~~  ~~159~~  ~~170 – 171~~  170 – 171 |  |
| **Breathing & Circulation** | \*Describe the structure of the thorax, including the ribs, intercostal muscles, diaphragm, trachea, bronchi, bronchioles, alveoli and pleural membranes  \*Understand the role of the intercostal muscles and the diaphragm, in ventilation  \*Explain how alveoli are adapted for gas exchange by diffusion between air in the lungs and blood in capillaries  \*Understand the biological consequences of smoking in relation to the lungs and the circulatory system, including coronary heart disease.  \*Describe a simple experiment to investigate the effect of exercise on breathing in humans | 26 – 27  26 – 28  29 – 30  30 – 34  30 |  |
| **Nutrition & Digestion** | **\*Understand that a balanced diet should include carbohydrate, protein, lipid, vitamins, minerals, water and dietary fibre**  \*Recall sources and describe functions of carbohydrate, protein, lipid (fats and oils), vitamins A, C and D, and the mineral ions calcium and iron water and dietary fibre as components of the diet  **\*Understand that energy requirements vary with activity levels, age and pregnancy**  \* describe the structures of the human alimentary canal and describe the functions of the mouth, oesophagus, stomach, small intestine, large intestine and pancreas  \*Understand the processes of ingestion, digestion, absorption, assimilation and egestion  \*Explain how and why food is moved through the gut by peristalsis  \*Understand the role of digestive enzymes to include the digestion of starch to glucose by amylase and maltase, the digestion of proteins to amino acids by proteases and the digestion of lipids to fatty acids and glycerol by lipases  \* understand that bile is produced by the liver and stored in the gall bladder, and understand the role of bile in neutralising stomach acid and emulsifying lipids  \* describe the structure of a villus and explain how this helps absorption of the products of digestion in the small intestine  \* **describe an experiment to investigate the energy content in a food sample**. | 37  37 – 42  43 – 44  46 – 50  46 – 50  46  48  48 – 49  49 – 5  44-45 |  |