



Course outline IGCSE Biology Year10 Second Term 2011-2012

Topic/Week	Learning outcomes	Assessment
6. Nutrition 6.1 Nutrients (week 1)	<ul style="list-style-type: none"> • Define <i>nutrition</i>. • List the chemical elements that make up: carbohydrates, fats, proteins. • Describe the synthesis of large molecules from smaller basic units, i.e. <ul style="list-style-type: none"> • simple sugars to starch and glycogen • amino acids to proteins • fatty acids and glycerol to fats and oils. • Describe tests for: starch (iodine solution), reducing sugars (Benedict's solution), protein (biuret test), fats (ethanol) • List the principal sources of, and describe the importance of: carbohydrates, fats, proteins, vitamins (C and D only), mineral salts (calcium and iron only), fibre (roughage) • Describe the use of microorganisms in the food industry, with reference to yoghurt and single cell protein • Describe the uses, benefits and health hazards associated with food additives, including colourings water • Describe the deficiency symptoms for: vitamins (C and D only), mineral salts (calcium and iron only) 	Home work#1 Quiz# 1 Lab#1
6.2 Plant nutrition 6.2.1 Photosynthesis (week 1-2)	<ul style="list-style-type: none"> • Define <i>photosynthesis</i> • State the balanced symbol equation and word equation for photosynthesis. • Investigate the necessity for chlorophyll, light and carbon dioxide for photosynthesis, using appropriate controls. • Describe the intake of carbon dioxide and water by plants. • Explain that chlorophyll traps light energy and converts it into chemical energy. • Investigate and state the effect of varying light intensity, carbon dioxide concentration and temperature on the rate of photosynthesis. • Define the term <i>limiting</i> factor. • Explain the concept of limiting factors in photosynthesis • Explain the use of carbon dioxide enrichment, optimum light and optimum temperatures in glasshouse systems. 	Home work#2
6.2.2 Leaf structure (week 2)	<ul style="list-style-type: none"> • Identify and label the structures of a dicotyledonous leaf, as seen in cross-section under the light microscope, and describe the significance of these features in terms of functions, to include: <ul style="list-style-type: none"> • <u>distribution of chloroplasts – photosynthesis</u> 	

	<ul style="list-style-type: none"> • stomata and mesophyll cells – gas exchange • vascular bundles (xylem and phloem) – transport and support. 	
6.2.3 Mineral requirements (week 3)	<ul style="list-style-type: none"> • Describe the importance of: <ul style="list-style-type: none"> ○ nitrate ions for protein synthesis ○ magnesium ions for chlorophyll synthesis • Describe the uses, and the dangers of overuse, of nitrogen fertilizers. • Explain the effects of nitrate ion and magnesium ion deficiency on plant growth 	
6.3 Animal nutrition. 6.3.1 Diet (week 3)	<ul style="list-style-type: none"> • State the term balanced diet and describe a balanced diet related to age, sex and activity of an individual • Describe the effects of malnutrition in relation to starvation, coronary heart disease, constipation and obesity 	Quiz#2 Home work#3
6.3.2 Food supply (week 3)	<ul style="list-style-type: none"> • Discuss ways in which the use of modern technology has resulted in increased food production. • Discuss the problems of world food supplies • Discuss the problems which contribute to famine. 	
6.3.3 Human alimentary canal (week 4)	<ul style="list-style-type: none"> • Define <i>ingestion</i>. • Define <i>egestion</i>. • Identify the main regions of the alimentary canal and associated organs. • Describe the functions of the regions of the alimentary canal. 	Home work#4
6.3.4 Mechanical and physical digestion (week 4)	<ul style="list-style-type: none"> • Define <i>digestion</i> both mechanical and chemical. • Identify the types of human teeth and describe their structure and functions • State the causes of dental decay and describe the proper care of teeth • Describe the process of chewing • Describe the role of longitudinal and circular muscles in peristalsis • Outline the role of in digestive process. • Describe how fluoride reduces tooth decay and explain arguments for and against the addition of fluoride to public water supplies. 	
6.3.5 Chemical digestion (week 4)	<ul style="list-style-type: none"> • State the significance of chemical digestion. • State where, in the alimentary canal, enzymes are secreted. • State the functions of a typical amylase, a protease and a lipase, listing the substrate and end-products. 	
6.3.6 Absorption (week 5)	<ul style="list-style-type: none"> • Define <i>absorption</i>. • Identify the small intestine as the region for the absorption of digested food • Describe the structure and significance of villi. • State the role of the hepatic portal vein in the transport of absorbed food to the liver 	Home work#5

	<ul style="list-style-type: none"> Identify the role of the small intestine and Colon. 	
6.3.7 Assimilation (week 5)	<ul style="list-style-type: none"> Define <i>assimilation</i>. Describe the role of the liver in the metabolism of glucose and amino acids. Describe the role of fat as energy storage. Define <i>deamination</i>. State that the liver is the site of breakdown of alcohol and other toxins. 	Test#1 Project#1
7. Transportation 7.1 Transport in plants (week 6)	<ul style="list-style-type: none"> State the functions of xylem and phloem Identify the positions of xylem and phloem tissues as seen in transverse sections of unthickened, herbaceous, dicotyledonous roots, stems and leaves. 	
7.1.1 Water uptake (week 6)	<ul style="list-style-type: none"> Identify root hair cells, as seen under the light microscope, and state their functions. State the pathway taken by water through root, stem and leaf. Investigate, using a suitable stain, the pathway of water through the above-ground parts of a plant. Relate the structure and functions of root hairs to their surface area and to water and ion uptake. 	
7.1.2 Transpiration (week 6)	<ul style="list-style-type: none"> Define <i>transpiration</i>. Describe how water vapour loss is related to cell surfaces, air spaces and stomata. Describe the effects of variation of temperature, humidity and light intensity on transpiration rate. Describe how wilting occurs. Explain the mechanism of water uptake and movement in terms of transpiration. Discuss the adaptations of the leaf, stem and root to three contrasting environments, to include pond, garden and desert, with emphasis on local examples. 	Lab#2 Quiz#3 Home work#6
7.1.3 Translocation (week 7)	<ul style="list-style-type: none"> Define <i>translocation</i> in terms of the movement of sucrose and amino acids in phloem; <ul style="list-style-type: none"> from regions of production to regions of storage OR to regions of utilisation in respiration or growth. Describe translocation throughout the plant of applied chemicals, including systemic pesticides Compare the role of transpiration and translocation in the transport of materials from sources to sinks, within plants at different seasons. 	
7.2 Transport in humans (week 7)	<ul style="list-style-type: none"> Describe the circulatory system in human. Describe the double circulation in terms of a low pressure circulation and a high pressure circulation and relate these differences to the different functions of the two circuits 	
7.2.1 Heart (week 7)	<ul style="list-style-type: none"> Describe the structure of the heart including the muscular wall and septum, chambers, valves 	

	<ul style="list-style-type: none"> and associated blood vessels. Describe the function of the heart in terms of muscular contraction and the working of the valves. Investigate, state and explain the effect of physical activity on pulse rate. Describe coronary heart disease in terms of the blockage of coronary arteries and state the possible causes (diet, stress and smoking) and preventive measures. 	
7.2.2 Arteries, veins and capillaries (week 7)	<ul style="list-style-type: none"> Name the main blood vessels to and from the heart, lungs, liver and kidney. Describe the structure and functions of arteries, veins and capillaries. Explain how structure and function are related in arteries, veins and capillaries Describe the transfer of materials between capillaries and tissue fluid. 	<p>Test#2</p> <p>Home work#7</p>
7.2.3 Blood (week 8)	<ul style="list-style-type: none"> Identify red and white blood cells. List the components of blood as red blood cells, white blood cells, platelets and plasma. State the functions of blood: red blood cells, white blood cells, platelets and plasma. Describe the immune system in terms of antibody production, tissue rejection and phagocytosis. Describe the function of the lymphatic system in circulation of body fluids, and the production of lymphocytes Describe the process of clotting (fibrinogen to fibrin only) 	<p>Quiz#4</p> <p>Project#2</p> <p>Home work#8</p>
8. Respiration (week 8)	<ul style="list-style-type: none"> Define <i>respiration</i>. State the uses of energy in the body of humans: muscle contraction, protein synthesis, cell division, active transport, growth, the passage of nerve impulses and the maintenance of a constant body temperature. 	
8.1 Aerobic respiration (week 8)	<ul style="list-style-type: none"> Define <i>aerobic respiration</i> State the word equation for aerobic respiration. State the equation for aerobic respiration using symbols. 	
8.2 Anaerobic respiration (week 8-9)	<ul style="list-style-type: none"> Define <i>anaerobic respiration</i> State the word equation for anaerobic respiration in muscles during hard exercise and the microorganism yeast. Describe the role of anaerobic respiration in yeast during brewing and bread-making Compare aerobic respiration and anaerobic respiration in terms of relative amounts of energy released. State the balanced equation for anaerobic respiration 	Home work#9

	<p>in muscles and the microorganism yeast using symbols</p> <ul style="list-style-type: none"> • Describe the effect of lactic acid in muscles • during exercise (include oxygen debt in outline only) 	
8.3 Gas exchange (week 9)	<ul style="list-style-type: none"> • List the features of gas exchange surfaces in animals • Identify on diagrams and name the larynx, trachea, bronchi, bronchioles, alveoli and associated capillaries • State the differences in composition between inspired and expired air. • Use lime water as a test for carbon dioxide to investigate the differences in composition between inspired and expired air. • Investigate and describe the effects of physical activity on rate and depth of breathing. • Describe the role of the ribs, the internal and external intercostal muscles and the diaphragm in producing volume and pressure changes leading to the ventilation of the lungs. • Explain the role of mucus and cilia in protecting the gas exchange system from pathogens and particles. • Explain the link between physical activity and rate and depth of breathing in terms of changes in the rate at which tissues respire and therefore of carbon dioxide concentration and pH in tissues and in the blood. 	<p>Home work#10</p> <p>Test#3</p> <p>Project#3</p>
Week 9 Week 10	<p>Revision</p> <p>Second term Examination</p>	50%