

Subject: Biology 2019-2020

Scheme of work/Term wise syllabus breakup

Class Level: 9th O - LEVEL

FIRST TERM				
Strand	Unit	Topic	Objective	Week
1	Cell and cell processes	1. Cell Structure and Organisation	(a) examine under the microscope an animal cell (e.g. from fresh liver) and a plant cell (e.g. from Elodea, a moss, onion epidermis, or any suitable, locally available material), using an appropriate temporary staining technique, such as iodine or methylene blue	1
		1.1 Plant and animal cells	(b) draw diagrams to represent observations of the plant and animal cells examined above	
		1.2 Specialised cells, tissues and organs	(c) identify, from fresh preparations or on diagrams or photomicrographs, the cell membrane, nucleus and cytoplasm in an animal cell (d) identify, from diagrams or photomicrographs, the cellulose cell wall, cell membrane, sap vacuole, cytoplasm, nucleus and chloroplasts in a plant cell (e) compare the visible differences in structure of the animal and the plant cells examined (f) state the function of the cell membrane in controlling the passage of substances into and out of the cell (g) state the function of the cell wall in maintaining turgor (turgidity) within the cell (h) state, in simple terms, the relationship between cell function and cell structure for the following: • absorption – root hair cells • conduction and support – xylem vessels • transport of oxygen – red blood cells (i) identify these cells from preserved material under	1

			the microscope, from diagrams and from photomicrographs	TOTAL: 2
2	Diffusion And Osmosis	2.1 Diffusion 2.2 Osmosis 2.3 Active transport	(a) define diffusion as the movement of molecules from a region of their higher concentration to a region of their lower concentration, down a concentration gradient (b) define osmosis as the passage of water molecules from a region of higher water potential to a region of lower water potential, through a partially permeable membrane (c) describe the importance of a water potential gradient in the uptake of water by plants and the effects of osmosis on plant and animal tissues (d) define active transport as the movement of ions into or out of a cell through the cell membrane, from a region of their lower concentration to a region of their higher concentration against a concentration gradient, using energy released during respiration (e) discuss the importance of active transport as an energy-consuming process by which substances are transported against a concentration gradient, as in ion uptake by root hairs and glucose uptake by cells in the villi.	1 1 TOTAL: 2
3	Enzymes	3.1 Enzyme action 3.2 Effects of temperature and pH	(a) define catalyst as a substance that speeds up a chemical reaction and is not changed by the reaction (b) define enzymes as proteins that function as biological catalysts (c) explain enzyme action in terms of the 'lock and	1 1

			key' hypothesis (d) investigate and describe the effects of temperature and of pH on enzyme activity	TOTAL:2
4	Animal nutrition	5.1 Nutrients 5.2 Diet 5.3 World food supplies 5.4 Human alimentary canal 5.5 Chemical digestion 5.6 Absorption and assimilation	<p>(a) list the chemical elements that make up: • carbohydrates • fats • proteins</p> <p>(b) describe tests for: • starch (iodine in potassium iodide solution) • reducing sugars (Benedict's solution) • protein (biuret test) • fats (ethanol emulsion test)</p> <p>(c) list the principal sources of, and describe the dietary importance of carbohydrates, fats, proteins, vitamins (C and D only), mineral salts (calcium and iron only), fibre (roughage) and water</p> <p>(d) name the diseases and describe the symptoms resulting from deficiencies of vitamin C (scurvy), vitamin D (rickets), calcium (rickets) and iron (anaemia)</p> <p>(e) understand the concept of a balanced diet</p> <p>(f) explain why diet, especially energy intake, should be related to age, sex and activity of an individual</p> <p>(g) state the effects of malnutrition in relation to starvation, heart disease, constipation and obesity</p> <p>(h) discuss the problems that contribute to famine (unequal distribution of food, drought and flooding, increasing population)</p> <hr/> <p>(i) identify the main regions of the alimentary canal and the associated organs: mouth (buccal) cavity, salivary glands, oesophagus, stomach, duodenum, pancreas, gall bladder, liver, ileum, colon, rectum and anus</p> <p>(j) describe the main functions of these parts in relation to ingestion, digestion, absorption, assimilation and egestion of food, as appropriate</p>	<p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p>

			(k) identify the different types of human teeth and describe their structure and functions (l) state the causes of dental decay and describe the proper care of teeth (m) describe peristalsis (n) explain why most foods must be digested (o) describe: • digestion in the alimentary canal • the functions of a typical amylase, protease and lipase, listing the substrates and end-products (p) describe the structure of a villus, including the roles of capillaries and lacteals (q) describe the significance of villi in increasing the internal surface area (r) state the function of the hepatic portal vein as the route taken by most of the food absorbed from the small intestine (s) state: • that large molecules are synthesised from smaller basic units: glycogen from glucose proteins from amino acids lipids (fats and oils) from glycerol and fatty acids • the role of the liver in the metabolism of glucose and amino acids • the role of fat as a storage substance • that the formation of urea and the breakdown of alcohol occur in the liver.	1
TOTAL: 6				
TWO WEEKS FOR REVISION				
SECOND TERM				
Strand	Unit	Topic	Objective	Week
5	Plant nutrition	4.1 Photosynthesis 4.2 Leaf structure 4.3 Mineral nutrition	(a) understand that photosynthesis is the fundamental process by which plants manufacture carbohydrates from raw materials (b) investigate the necessity for chlorophyll, light and carbon dioxide for photosynthesis, using appropriate controls	1

			<p>(c) state the equation (in words or symbols) for photosynthesis</p> <p>(d) investigate and state the effect of varying light intensity, carbon dioxide concentration and temperature on the rate of photosynthesis (e.g. in submerged aquatic plants)</p> <p>(e) understand the concept of limiting factors in photosynthesis</p> <p>(f) describe the intake of carbon dioxide and water by plants</p> <p>(g) understand that chlorophyll traps light energy and converts it into chemical energy for the formation of carbohydrates and their subsequent storage</p> <p>(h) explain why most forms of life are completely dependent on photosynthesis</p> <p>(i) identify and label the cuticle, cellular and tissue structure of a dicotyledonous leaf, as seen in cross section under the microscope, and describe the significance of these features in terms of function, i.e.</p> <ul style="list-style-type: none"> • distribution of chloroplasts – photosynthesis • stomata and mesophyll cells – gas exchange • vascular bundles – transport <p>(j) understand the effect of a lack of nitrate and magnesium ions on plant growth</p>	<p>1</p> <p>1</p> <p>1</p> <p>TOTAL: 4</p>
	Transport in flowering plants	<p>6.1 Water and ion uptake</p> <p>6.2 Transpiration and translocation</p>	<p>(a) relate the structure and functions of root hairs to their surface area and to water and ion uptake</p> <p>(b) state that transpiration is the evaporation of water at the surfaces of the mesophyll cells followed by the loss of water vapour from the leaves through the stomata</p> <p>(c) describe: • how water vapour loss is related to cell</p>	<p>1</p> <p>1</p>

			<p>surfaces, air spaces and stomata • the effects of air currents (wind), and the variation of temperature, humidity and light intensity on transpiration rate • how wilting occurs</p> <p>(d) investigate, using a suitable stain, the pathway of water in a cut stem (e) explain the movement of water through the stem in terms of transpiration pull</p> <p>(f) identify the positions of xylem and phloem tissues as seen in transverse sections of unthickened, herbaceous, dicotyledonous roots, stems and leaves</p> <p>(g) state the functions of xylem and phloem.</p>	<p>1</p> <p>1</p> <p>TOTAL: 4</p>
	Transport in humans	7.1 Circulatory system	<p>(a) describe the circulatory system as a system of tubes with a pump and valves to ensure one-way flow of blood</p> <p>(b) describe the double circulation in terms of a low pressure circulation to the lungs and a high pressure circulation to the body tissues and relate these differences to the different functions of the two circuits</p> <p>(c) name the main blood vessels that carry blood to and from the heart, lungs, liver and kidneys</p> <p>(d) describe the structure and function of the heart in terms of muscular contraction and the working of valves</p> <p>(e) compare the structure and function of arteries, veins and capillaries (f) investigate and state the effect of physical activity on pulse rate</p> <p>(g) describe coronary heart disease in terms of the occlusion of coronary arteries and state the possible causes (diet, stress and smoking) and preventive measures</p>	<p>1</p> <p>1</p> <p>1</p> <p>1</p>

			<p>(h) identify red and white blood cells as seen under the light microscope on prepared slides, and in diagrams and photomicrographs</p> <p>(i) list the components of blood as red blood cells, white blood cells, platelets and plasma</p> <p>(j) state the functions of blood: • red blood cells – haemoglobin and oxygen transport • white blood cells – phagocytosis, antibody formation and tissue rejection • platelets – fibrinogen to fibrin, causing clotting • plasma – transport of blood cells, ions, soluble food substances, hormones, carbon dioxide, urea, vitamins and plasma proteins</p> <p>(k) describe the transfer of materials between capillaries and tissue fluid.</p>	<p>1</p> <p>1</p> <p>TOTAL: 6</p>
TWO WEEKS REVISION				