ST MAARTEN ACADEMY

DEPARTMENT OF SCIENCE

BIOLOGY YEAR PLAN

CHRISTMAS TERM

FORM 3

2020/2021

Text – Atwaroo-Ali Linda (First published 2003) CXC Biology Macmillian publishers limited

Karen Morrison, Peta-Gay Kirby, Lucy Madhosingh and David Applin (published in 2014 by Nelson Thornes Ltd) Biology for CSEC (2nd Edition)

Biology for CSEC Examinations (3rd Edition) MACMILLAN

WEEK	TOPIC	OBJECTIVES	ACTIVITIES	ASSESSMENTS
1-3	LIVING THINGS IN THE ENVIRONMENT. -Animals - vertebrates - invertebrates -Plants -flowering -non-flowering	-Group living organisms according to observed similarities and differences -classify organisms into taxonomic groups based on physical similarities	-Nature walks, organize students in groups to observe organisms (plants and /or animals in their natural habitat. -Collect living organisms, observe and preserve specimens. -make drawing and construct tables to record observations.	Project In-class test Work-sheet Quizz
4-6	FOOD CHAINS AND FOOD WEBS. -Producer -consumers -decomposers	-carry out a simple ecological study using the most appropriate collecting and	Use quadrats to investigate the distribution of species in a particular habitat,	Quizz In- class test

	Types of food chains. -terrestrial -aquatic	sampling methods - distinguish between the following pairs of terms: (a) abiotic and biotic factors (b) niche and habitat (c) population and community, (d) species and population	estimate the density of a particular species. Calculate average (mean) Density = total no. of organisms per unit area. Use of pooters, bottles, jars, nets; sieves, quadrats, line and belt transect, mark, release and recapture methods to collect data on organisms from a named habitat.	
		-discuss the impact of the abiotic factors (soil, water, climate) on living organisms; -Identify the relative positions of producers and consumers in a food chains; - Identify from each habitat, a food chain containing at least four organisms; -Identify from each habitat: herbivore, carnivore and omnivore; -Identify for each habitat, predator	Components of soil air(O2) and, water-holding capacity, mineral nutrients, PH and salinity Provide a number of organisms from which to construct a food chain and a food web. Construct food chains using organisms in each habitat.	

		or prey relationships. -Construct a food web to include different trophic levels. -Explain the role of decomposers- fungi and bacteria. -assess the special relationships among organisms; Simple treatment of symbiotic relationships: parasitism, commensalism, mutualism. Eg; lice and ticks, epiphytes on trees, nitrogen fixing bacteria in roots of legumes. Give names of partners. -Explain energy flow within a food chain or food web.	Identify different trophic levels in food webs Action of mould on bread , production of biogas from domestic organic waste material. Observations from a large tree. Examine root nodules, on the peanut plant.	
7-8	<u>CYCLING NUTRIENTS</u> <u>THE CARBON CYCLE</u> — <u>THE NITROGEN CYCLE</u>	-Explain with examples the impact of the continual re-use of materials in nature; - discuss the importance of the difficulties encountered in recycling	Interpret data on waste management and pollution in the Caribbean (see Caribbean	

		manufactured materials; Consider biodegradable and non-biodegradable materials, collection, transport and storage; note economic factors.	Environmental outlook)	
9 - 12	<u>NATURAL RESOURCES</u> <u>HUMAN ACTIVITIES AND THEIR IMPACT ON NATURAL RESOURCES</u>	-describe the impact of human activities on natural resources; -explain the negative impact of human activity on the environment; Consider pollution by agricultural practices such as use of chemical fertilizers; products of industrialization and improper garbage disposal, impact on eco-tourism. Loss of habitat, species; impact on human health. -assess the implications of pollution of marine and wetland environments; Refer specifically to impact on the health of ecosystems, aesthetic and economic benefits	Research projects, (for example collect data on use of agricultural chemicals) Research and interpret data on pollution of marine environment in the Caribbean, eg coral reefs.	

		to small island states. -discuss current and future trends Regarding climate change; Refer to increase in green house gases, rising global temperatures, rising sea levels and ocean acidification. -suggest means by which the environment could be conserved and restored; Consider effect of the change in practices; example use of natural materials in agriculture, conservation methods, education, monitoring strategies, organic agriculture. -discuss the factors that affect the growth and survival of population including human populations Include competition for food and space; effects of disease, pests, invasive species, natural disasters.	Research projects (e.g describe a project involving conservation to include a listing of the various strategies). Research projects. Analyse graphical data showing effect of different factors on natural populations, e.g giant snails.	

13 -14	<u>CELL STRUCTURE, TRANSPORT IN CELLS.</u> -Animal cell -Plant cell -function -osmosis -diffusion	- Compare the structure of the generalized plant and animal cells, and selected microbes. -distinguish between cell wall and cell membrane; mitochondrion and chloroplast; Relate the structure of the organelles to their functions; -Differentiate between plant and animal cells; -Explain the importance of cell specialization in multi-cellular organisms; -Explain the processes of diffusion and osmosis; -Discuss the importance of diffusion and osmosis and active transport in living systems.	Make models of plant and animal cells. Draw and label the cells and cell structures. Examine and draw the cross section of a stem or root as seen under the light microscope. Carry out simple investigations to illustrate the movement of particles (molecules and ions) Identify everyday instances of these processes occurring.	Quizz Experiment on diffusion and osmosis in the potato. In class test
15	END	OF	YEAR	EXAM

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1 – 4	NUTRITION, -Definition of heterotrophic, autotrophic and saprophytic nutrition. -Photosynthesis Definition Structure of leaf to its function in photosynthesis	-distinguish among heterotrophic, autotrophic and saprophytic nutrition; -describe the process of photosynthesis in green plants;	Identify sources of food for a named organism for each type of nutrition. Test for evolution of oxygen using water plant. Carryout controlled experiments to demonstrate that light and chlorophyll are necessary for photosynthesis; Test for end products, starch or reducing sugar.	Quizz In class test

		-relate the structure of a flowering plant to its function in photosynthesis; -explain how environmental factors affect the rate of photosynthesis -Discuss the importance of minerals in plant nutrition using nitrogen and magnesium as examples; distinguish	Draw and label the external features and the internal structure of a dicotyledonous leaf as seen in cross section under the light microscope. Use green or variegated leaves of hibiscus. Investigations to include temperature, water and CO2. Investigate the effect of the lack of nitrogen on seedlings. Experiment on food test using different food samples. Test for proteins (biuret), fats (grease spot, ethanol- emulsion tests), starch (iodine), reducing sugars (Benedict's solution)	

		-Perform tests to distinguish among food substances;	Laboratory practicals	Laboratory reports
		-relate the structures of the human alimentary canal to their functions;	Simple drawings of the alimentary canal and the internal structure of the tooth.	Drawings
	<u>Enzymes</u> Definition types Importance	Explain the role and importance of enzymes; -Investigate the effects of temperature and pH on the activity of the enzyme catalase or amylase;	Laboratory practical	Test Laboratory report
	<u>Digestion</u> -Definition -Types -importance	-Describe what happens to the products of digestion after their absorption; Discuss the importance of a balance diet in	Diagram of the villus.	Drawing

		humans. -components of a balanced diet (including vitamins and minerals and their roles).		
5 - 7	<u>RESPIRATION</u> -definition -types -importance	-describe the process of aerobic respiration; -distinguish between aerobic and anaerobic respiration;	Laboratory practicals to show the products of anaerobic respiration in yeast.	Laboratory report Test Quizz
		-describe the mechanism of breathing in humans and gaseous exchange in flowering plants;	Simple diagrams to show the relationship between the trachea, the bronchi, alveoli and the lungs and the diaphragm and ribcage. Use the model of the thorax.	Drawing
		-identify characteristics common to gaseous exchange surfaces;	Examine lungs of a mammal, gills of fish and various types of leaves.	Drawing
		-discuss the effect of smoking. Eg. Nicotine addiction, marijuana addition, damage to the lining of the lungs, cancer causing effects	Interpret smoking data worldwide and for the Caribbean (cigarette use, death rates, cancer incidence).	

		and reduction in the oxygen carrying capacity of the blood.		
8 -11	TRANSPORT IN ANIMALS	-explain the need for transport systems in multi-cellular organisms;	Make models, such as, cubes of different sizes and compare their surface area/volume ratio.	Test Quiz
		-identify the materials which need to be transported in animals and plants;		
		-describe the structure and the function of the circulatory system in humans;	Draw diagrams of the arteries, veins and capillaries. Examine external and internal features of a mammalian heart.	Drawings
		-relate the structure of the components of blood to their function;	Draw diagrams of red and white blood cells	Use prepared slides only to show blood cells.
		-describe the role of blood in defending the body against disease;		
		-explain how the		

		principles of immunization are used in the control of communicable diseases;		
12 - 13	<u>TRANSPORT IN PLANTS</u>	-explain how the structure of xylem vessels is suited for their function; -discuss the role of the process of transpiration in plants; -describe the effect of external factors on transpiration; -discuss adaption in plants to conserve water -explain how the structure of the phloem is suited to its function -identify the products stored in plants and animals and the sites of storage; -discuss the importance of food storage in living organisms.	Diagram of xylem Laboratory practical (transpiration) Observe small herbaceous plant placed in coloured water. Observe succulent xerophytic plants Carryout food tests for starch, sugars and oil in storage organs. Draw and annotate stages in germinating seeds; draw buds from plant storage organs (stems and tubers).	Drawing Laboratory report Laboratory report Drawings

	END	OF	TERM	

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AUGUST TERM

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WEEK	TOPIC	OBJECTIVES	ACTIVITIES	ASSESSMENTS
1 – 3	EXCRETION -definition -importance	-distinguish between egestion and excretion; -discuss the importance of excretion in living organisms; -state how metabolic wastes are excreted from plants and animals -relate the kidney to its osmoregulatory and excretory functions.	Annotated simple diagrams of the kidney and the nephron	Quizz In class test Drawing

4 - 6	MOVEMENT	-distinguish between growth movement in plants and movement in animals -relate the structure of the skeleton to its function in humans; -discuss the importance of locomotion in animals. -describe the mechanisms of movement in a human fore limb	Germinate peanuts or kidney beans or any appropriate seeds. Examine a human skeleton Simple line drawing to show the relationship between antagonistic muscles . -draw ,label and annotate a simple diagram of the long bone of a fore limb.	Laboratory report Drawing
7 - 10	IRRITABILITY	-define 'stimulus' and 'response', Describe the response of: a)green plants to stimulus;	Carryout controlled investigations; make observations; record and report as appropriate (the response of stems and roots of seedlings to light, touch and gravity)	Laboratory report Test quizz

		b)invertebrates to variations in light intensity, temperature and moisture; -define receptor and effectors; -explain why the response to stimuli important for the survival of organisms; -explain the relationship among the receptor, the central nervous system and the effector; -explain a simple reflex action; -describe the functions of the main regions of the brain;	Construct simple choice chamber to show response of invertebrates for eg. Earthworms, millipedes and earthworms to light intensity, temperature and moisture. Reaction to hot objects, insect bites. Investigate changes in pupil size in response to changes in light intensity, using mirrors, or the knee jerk reflex. Use models and charts.	Laboratory report

		-discuss the physiological , social and economic effects of drug abuse;	Research and interpret data on drug abuse in your territory.	project
		-relate the structure of the human eye to its functions as a sense organ;	Examine and draw the cross section or the longitudinal section of the human eye	Drawing
		-explain accommodation; sight defects and the corrections of each		
		-relate structure of the human skin to its function in temperature regulation and protection.	Draw and label the human skin	Drawing

11	END	OF	YEAR	EXAM
