LOWER SECONDARY CURRICULUM

BIOLOGY SYLLABUS

TERM	TOPIC	CONTENT
I	THEME: DIVERSITY OF LIVING THINGS	
	Introduction to biology (8 periods)	• Definition • Why study biology • Characteristics of living things • Branches of biology
	Cells (12 periods)	• Definition of a cell • Structure of typical plant and animal cells • Function of parts of plant and animal cell • Structure and function of specialized cells • Levels of organisation
	Classification (16 periods)	• Concept of classification • Why classify organisms • Nomenclature (scientific name)
II	5 kingdoms of living things (5 periods)	• 3 xtics (cell structure, organisation, mode of feeding) of; • Uses and harmful effects of; i) Monera ii) Protoctista iii) Fungi • 3 characteristics of plantae with examples from vascular/ non vascular; angiosperms/ gymnosperms; monocots/ dicots • 3 characteristics of Animalia • Common characteristics and examples of all phyla (arthropoda and chordata include up to class) • Chordata (types of teeth, temperature regulation, habitat, reproduction (no details) gas exchange
	Viruses (18 periods)	• Main characteristics • Similarities to other organisms • Symptoms, transmission and prevention of HIV, Ebola, Hepatitis, Cassava mosaic
III	Insects (20 periods)	• Housefly, Cockroach, Mosquito ,Termite , Bee ,Butterfly

		• (classification, features, habitat, mode of life) • Drawings of insect parts (except details of mouth parts) • Useful, harmful effects • Methods of control of the insects
	Flowering plants (16 periods)	• Parts of a typical dicot plant (drawing) • Parts of a typical monocot plant (drawing) • How structures of monocot, dicot root, stems, leaves, flowers and fruit suit their functions • Parts of a flower

SENIOR TWO

Term	Topics	CONTENT
I	THEME: SOIL	
	soil composition (4)	• Function and importance of soil in plant growth and nutrition • Soil constituents and properties • Types of soil
	Physical and chemical properties of soil (18)	• Retention, drainage, capillarity, PH • Percentage of air, water humus in soil • Importance of air and water in soil
	Soil erosion and conservation: causes, effects and prevention (10)	• Features of fertile soil • Processes and factors leading to soil erosion • Causes of reduced fertility • Methods of soil conservation
	Nitrogen cycle (4)	• Role of organisms in nitrogen cycle • Processes in nitrogen cycle
II	THEME: NUTRITION IN PLANTS AND ANIMALS	
	Nutrition types and nutrient compounds (11)	• Definition of nutrition • Food nutrients, sources, importance to humans. (minerals- Ca, P, Fe, I. vitamins- B, C, D, K) • Food tests • Balanced diet • Nutrient deficiency • BMI and implications (bulimia, anorexia, obesity)

		• Plant mineral nutrients, their roles and symptoms.
	Nutrition in green plants (10)	• Meaning of autotrophic nutrition and heterotrophic nutrition • Process of photosynthesis • Experiments to investigate the factors that affect rate of photosynthesis • Structure and adaptations that enable a leaf carry out photosynthesis
	Nutrition in animals (13)	• Role of enzymes, factors that affect enzyme activity • Effect of pH, temperature, SA on enzyme activity • Mode of feeding in amoeba, insects and birds • Mammalian teeth, structure, position adaptations • Oral hygiene and care for teeth • Alimentary canal and role in food digestion • Absorption and assimilation of food • Role of caecum in non-ruminants, stomach in ruminants.
	Nutrition in a mould (2)	• Structures used by moulds for nutrition • Compare intracellular and extra cellular digestion
III	THEME; TRANSPORT IN PLANTS AND ANIMALS	
	Movement in and out of cells (11)	• Importance and methods movement of materials (diffusion, osmosis, active transport) • Investigate (by experiment) ways in which materials move in and out of cells • Diffusion, osmosis, active transport
	Transport in animals (16)	• SA:V ratio • Need for a transport system, components of a transport system • Structure of heart and functions • Compare arteries, veins, capillaries (structure and function) • Functions of blood. Relate functions to components of blood • Causes and prevention of diseases

		associated with the heart. (coronary heart disease, blood pressure, stroke) • Blood groups and transfusion • Role of blood in the defence of the human body • How immunity is weakened by various diseases eg HIV • Formation of lymph and its flow around the body • Function of the lymphatic system in maintaining healthy body
	Transport in plants (9)	• Internal structure of monocot and dicot stem and root • Adaptations of root hair for absorption of water and mineral salts • Transpiration and translocation

SENIOR THREE.

Term	TOPIC	CONTENT
I	THEME: RESPIRATION	
	Gaseous exchange (10)	• Need for gaseous exchange • Adaptations of gaseous exchange surfaces • Structure of gill and mechanism of exchange in bony fish • Human respiratory system and mechanism of exchange • Variation of percentage of inhaled and exhaled air • Artificial respiration • Stomata and gaseous exchange • Lenticels and gaseous exchange • Dangers of smoking, air pollution to gas exchange surfaces • Causes, symptoms, treatment of; bronchitis, emphysema, lung cancer, throat cancer, chronic cough • Respiratory organs for insects and amphibians. (no details)
	Aerobic and anaerobic respiration (15)	• Meaning of Aerobic and anaerobic respiration • Process and site of aerobic respiration

		• Relationship between plants and animals in relation to aerobic respiration • Circumstances in which organisms use anaerobic respiration • Investigations to find products of anaerobic respiration in plants and animals • Applications of anaerobic respiration in everyday life • Comparisons between aerobic and anaerobic respiration
	THEME; EXCRETION IN PLANTS AND ANIMALS	
	Excretion in lower organisms (2)	• Need for excretion • Excretion in amoeba and paramecium
	Excretion in plants (2)	• Plant excretory products, how they are excreted • Oxygen as a waste product • Respiration in plants with no light
	Excretion in animals (13)	• Process of excretion in animals (sweat, urine and breathing) • How and why body reacts to raised levels of carbon dioxide • Causes, symptoms and treatment of kidney failure • Tests for glucose and protein in urine and their implications • Need for proper disposal of human waste
II	THEME: CO-ORDINATION IN PLANTS AND ANIMALS	
	Reception and response in plants (14)	• Irritability, stimuli and response • Detection, response by plants to changes in the environment • Experiments on phototropism, geotropism • Role of hormones in plant growth
	Reception, response and behavior in animals (4)	• Detection, response to changes in environment • Conduct an experiment on a tactic response
	Chemical coordination in humans (15)	• Differentiate between hormones and enzymes

		• Know and understand effects of various hormones in the human body • Describe symptoms of common hormonal diseases in humans • Role of diet in managing hormonal diseases in humans.
	Nervous coordination in humans (15)	• Nervous system (brain, spinal cord and nerves) • Parts of the brain (cerebrum, cerebellum, medulla oblongata, pituitary gland and hypothalamus) • Reflex actions; 5 components and explanation • Differentiate between voluntary and involuntary responses • Distinguish between substance / drug use and abuse • Common substances and drug abuse in Uganda. Physiological, social, economic effects of substances and drug abuse • Prevention, control and involvement in substance and drug abuse
	Receptor organs in man (6)	• Roles and functions of the human eye, ear as sense organs • Sense and long sightedness
III	THEME: LOCOMOTION IN ANIMALS	
	Locomotion in insects, bony fish and birds (13)	• Meaning of locomotion, types • Structures used by insects for locomotion and how they function • Features used in locomotion in a bony fish • Adaptations of bony fish to its habitat • Features of a bird that enable it to move • Adaptations of a bird to locomotion (how wings cause lift, hovering)
	Locomotion in mammals (15)	• Structure and function of the skeleton in supporting the human body • Identify and describe bones that form the skeleton • Action of muscles on the skeleton causing movements • Causes, effects and preventive measures of muscle cramps

	THEME: GROWTH AND DEVELOPMENT IN PLANTS AND ANIMALS	
	Growth in plants and animals (12)	• Distinguish between growth and development • Mitosis and growth • Internal and external structure of seed • Experiments on conditions of growth • Role of water, oxygen and temperature in germination process • Types of seed germination • Seed dormancy, causes, importance • Meristems and their importances
	Development in plants and animals (8)	• Need for differentiation • Secondary growth in dicots • Metamorphosis (complete and incomplete in insects) • Stages of development in insects (lifecycles of housefly, cockroach, mosquito, bee, butterfly) • Stages of human development from birth to adulthood. (physical, behavioural, cognitive) • Changes associated with adolescence and puberty and myths. (physical, physiological, psychological / emotional, behavioural) • Coping with changes related to secondary sexual characteristics. • Features related with aging.

SENIOR FOUR.

term	topic	CONTENT
I	THEME: REPRODCTION IN ORGANISMS	
	Asexual reproduction in lower organisms (4)	• Asexual reproduction • Forms of asexual reproduction in amoeba, mucor, yeast, spirogyra i) Binary fission ii) Fragmentation iii) Spore formation

		iv) budding
	Asexual reproduction in plants (vegetative reproduction) (10)	• asexual reproduction in plants • commercial application of asexual reproduction in plants
	Sexual reproduction in humans (18)	• structure of the male and female reproductive systems in humans • changes during menstrual cycle • male and female gametes • process of fertilization of ovum, development of zygote to birth • role of placenta • importance of antenatal medical care • care of the baby (breast feeding, balanced diet, immunization, hygiene. • Health risks with early pregnancy • Common birth control methods in Uganda. (emphasis on abstinence for young people) • Common problems associated with reproductive systems • Cause, signs, symptoms of STI's (syphilis, gonorrhea, HPV, hepatitis B, HIV/ AIDS • Preventive measures of STI's (Abstinence for young) • Challenges faced by those living with HIV and how to overcome them.
	Sexual reproduction in plants. (14)	• The flower • Process of pollination, fertilization and fruit formation • Difference between cross and self fertilization- advantages of each method • Difference between seeds and fruits (structural and functional) • Adaptations to dispersal. Importance of dispersal
	THEME: GENETICS AND EVOLUTION	
	Meiosis and its importance (2)	• Process and significance of meiosis
II	THEME: GENETICS AND EVOLUTION	
	Genetics and monohybrid inheritance (14)	• Concept of monohybrid inheritance • Meaning of terms used in genetics

		• Sex determination in humans • Sex linkage in humans • Examples of complete and incomplete dominance
	Applied genetics (6)	• Applications of genetics in agriculture
	Mutation and variation (6)	• Variation • Importance of mutations • Diseases associated with genetic disorders (sickle cell anaemia, albinism, down's syndrome)
	Evolution (6)	• Theories of origin of life • Natural selection as a mechanism of evolution • Evidences of evolution
	THEME: INTERRELATIONSHIPS	
	Concept of ecology (3)	• Meaning of ecology • Concept of community, habitat and ecosystems.
	Food chains and webs (12)	• Feeding relations in food chains and webs and pyramids (details of pyramids of biomass and energy not required) • Carbon cycle and balance of carbon dioxide in the atmosphere
III	THEME: THEME: INTERRELATIONSHIPS	
	Sampling	• Importance of sampling techniques • Diversity of organisms in the environment • Direct count, line transect, quadrats, capture mark recapture method, sweep net, pooter, pitfall trap
	Changes in population (8)	• Meaning of population and population growth • Factors affecting population growth • Necessity to control animal populations
	Associations in biological communities (14)	• Competition • Predator prey relationship • Symbiosis, mutualism, commensalism, parasitism: their roles in a community • Role of parasites and vectors in disease transmission (malaria, bilharzias, nagana,

		sleeping sickness • Adaptations of parasites to mode of life
	Humans and the natural environment	• Sustainability and its importance • Natural resources in Uganda • Factors impacting on ecosystems • How to preserve the natural environment • Sources, effects and control of air, land and water pollution

"LET SCIENCE BE, SINCE WE ARE"... ... ...JBR