

2023/24 ANNUAL TEACHING PLANS: LIFE SCIENCES: GRADE 10 (TERM 1)

TERM 1	WEEK 1	WEEK 2	WEEK 3	WEEK 4	WEEK 5	WEEK 6	WEEK 7	WEEK 8	WEEK 9	WEEK 10	WEEK 11
CAPS TOPICS	ORIENTATION TO LIFE SCIENCES		THE CHEMISTRY OF LIFE (CAPS P. 23)			CELLS: BASIC UNIT OF LIFE (CAPS P. 25)			CELL DIVISION: MITOSIS (CAPS P. 26)		
CORE CONCEPTS, SKILLS AND VALUES	How science works based on knowledge and scientific skills, careers and subject combinations • Graphs • Calculations • Percentage • Percentage increase/decrease • Average	•Scientific method Planning steps, identification of variables, ensuring validity and reliability Brief overview of the history of microscopy: • Light • Electron microscope • Scientific diagrams • Calculations • Actual size • Magnification	Molecules for Life Organic molecules made up of C, H, O, and some contain N and P Cells are made up of proteins, carbohydrates, lipids, nucleic acids and vitamins (only basic structural details required) Inorganic Compounds Water: 2 H and 1 O Minerals: e.g., Na, K, Ca, P, Fe, I, nitrates, phosphates, macro and micro elements: Main functions and deficiency diseases	Organic Compounds Carbohydrates Monosaccharide's (single sugars) glucose and fructose Disaccharides (double sugars) sucrose + maltose Polysaccharides (many sugars) starch, cellulose and glycogen Lipids (Fats and oils) 1 glycerol and 3 fatty acids: Unsaturated and saturated fats, cholesterol in foods, and heart disease	Organic Compounds Proteins: Amino acids (C, H, O and N and some have P, Se, Fe) – are sensitive to temperature and pH: • Loss of structure and function • The role of enzymes in breaking down/synthesising molecules • The influence of temperature and pH on enzyme action • The lock-and-key-model of how enzymes work • Enzymes in everyday life (for instance using washing powders): Nucleic acids: DNA and RNA consisting of C, H, O, N and P (No detail of structure required) Vitamins: A, one of the B vitamins, C, D and E	Cell structure Molecular make-up: Cells are mostly made of proteins, carbohydrates, lipids, nucleic acids and water Cell structure and function: Roles of organelles Cell wall – support structure in plant cells only Cell membrane boundaries and transport: Movement across membranes: Diffusion, osmosis and active transport	Cell structure and function: Roles of organelles Nucleus , chromatin material, nuclear membrane, nuclear pores, nucleolus: the control centre, heredity Differences between prokaryotes and eukaryotes Cytoplasm –storage, circulation of mater Mitochondria – release of energy during cell respiration Ribosomes – protein synthesis Endoplasmic reticulum (rough and smooth) - transport systems Golgi body – assemble secretions	Cell structure and function: Roles of organelles Plastids – production and storage of food, pigments Vacuole , lysosomes, vesicles – storage, digestion, osmoregulation Relate structure and location of organelles to their functions Cells differ in size, shape and structure in order to carry out specialised functions [<i>link to tissues</i>] Differences between plant and animal cells	Chromosomes In nuclei of all cells, two chromatids, centromere Cell division mitosis The cell cycle including mitosis: Interphase, mitosis (with names of phases), cytokinesis and growth Role of mitosis: Growth and repair. Reproduction in some simple organisms The continuous process of mitosis: The division of a cell to form two identical cells (<i>Simple description with diagrams to show chromosome changes so that one parent cell forms two identical daughter cells</i>) Difference in telophase between plant and animal cells	Cancer: (Only a brief description required) • Uncontrolled cell division and growth • Causes of cancer • Treatments of cancer Medical biotechnology e.g., radiotherapy, chemotherapy (no detail required)	Consolidation and revision
PRE-KNOWLEDGE	SCIENTIFIC SKILLS LINKED TO GRADE 9		MOLECULES FROM NATURAL SCIENCES GRADES 8 AND 9			ORGANIC AND INORGANIC COMPOUNDS GR 10			CELL STRUCTURE FROM GRADE 9 AND 10		
EXAMPLES OF INFORMAL/ DAILY ACTIVITIES	Activity Draw, line graph, bar graph, histogram and pie charts Activity Interpretation of graphs, identify trends/ relationships between variables	Activity Identification of variables Activity Differentiate between the planning and conducting steps of the investigation Activity Explain and demonstrate how a light microscope works using a diagram with labels and functions	Activity Table – minerals Activity Construct/draw models of water using coloured paper, and functions of water and the role of fertilisers in eutrophication	Activity Construct/ draw models of simple and more complex molecules (organic compounds) using coloured paper (learners need to know only basic structural details)	Activity Using data and interpreting graphs showing the influence of temperature and pH on enzyme action Diagram explaining the lock-and-key model Activity Tabulate the different vitamins, their functions, source and deficiency diseases Activity Compare Recommended Daily Allowance (RDA) with usual diet of individual learners for one week	Activity Explain and demonstrate how a light microscope works using a diagram with labels and functions Activity Calculate magnification of drawing by measuring the field of view under a microscope OR Calculate the size of specimen on a micrograph using the scale line provided	Activity Tabulate the different organelles indicating the structure (diagrams), function and location Activity Calculate the size of specimen on a micrograph using the scale line provided	Activity Compare the structure of plant and animal cells by using any visible example (e.g., a model, diagrams or poster including organelles) Draw a table to indicate the differences between these cells	Activity Use micrographs to observe and draw the different phases with descriptions of each phase Indicate the difference in telophase between plant and animal cells	Activity Research and present information on ONE of the cancers This must include causes, prevalence and treatment	

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					Draw a pie chart of the food types listed in learners' diet and discuss implications of the usual diet of learners Activity Analyse nutritional content indicated on food packaging: Vitamins, minerals and other nutritional content						
INVESTIGATIONS/ EXPERIMENTS				INVESTIGATION Food test for glucose INVESTIGATION Food test for starch INVESTIGATION Food test for lipids	INVESTIGATION Food test for proteins INVESTIGATION Investigation to test the working of a "biological" washing powder with enzymes OR Hydrogen Peroxide and chicken liver to demonstrate effect of enzyme OR Fresh pineapple juice, egg white in plastic drinking straw Observe, measure and record the results of the above experiment done at different temperatures	INVESTIGATION Use a microscope or micrographs to observe and draw the structure of a: Plant cell (wet mount of onion epidermis), and animal cell (cheek cells)		INVESTIGATION Investigate diffusion and osmosis			
INFORMAL TESTS					Informal test			Informal test		Informal test	
SBA (FORMAL ASSESSMENT)	TASK 1: PRACTICAL TASK (minimum 30 marks) TASK 2: FORMAL TEST (minimum 50 marks)										
DATE COMPLETED + SIGNATURE											

2023/24 ANNUAL TEACHING PLANS: LIFE SCIENCES: GRADE 10 (TERM 2)

TERM 2	WEEK 1	WEEK 2	WEEK 3	WEEK 4	WEEK 5	WEEK 6	WEEK 7	WEEK 8	WEEK 9	WEEK 10	WEEK 11
CAPS TOPICS	PLANT TISSUES (CAPS P. 26)	PLANT ORGANS (CAPS P. 28)		SUPPORT AND TRANSPORT SYSTEMS IN PLANTS (CAPS P. 29)		ANIMAL TISSUES (CAPS P. 28)	SUPPORT SYSTEM IN ANIMALS (CAPS P. 30)	TRANSPORT SYSTEM IN ANIMALS (CAPS P. 32)			
CORE CONCEPTS, SKILLS AND VALUES	Introduce concept of a tissue as a group of similar cells adapted for a particular function: Cell differentiation Plant tissues Emphasis on the relationship between basic structure and function Differentiate between meristematic and permanent tissue Permanent tissue: Epidermis (root hair, guard cells), parenchyma, collenchyma, sclerenchyma, vascular tissue: Xylem & phloem	Anatomy of dicotyledonous plants: Root and stem: Distribution of different tissues Structure of cells in different tissues (link to plant tissues)	Organs consist of a number of tissues e.g., leaf structure Leaf structure: Cross section of a dicotyledonous leaf to demonstrate and explain its structure in terms of its functions i.e., photosynthesis, gas exchange and transport Link with plant tissues, appropriate cell organelles, movement across membranes and movement of molecules into, through and out of the leaf	Transpiration Relationship between water loss and leaf structure Factors that affect the rate of transpiration: • Temperature • Light intensity • Wind • Humidity	Uptake of water and minerals into xylem in roots The transport of water and minerals to leaves Translocation of manufactured food from leaves to other parts of plant	Animal tissues: 4 basic types • Epithelial (squamous, cuboidal, columnar and ciliated) • Connective (blood, cartilage, tendons, ligaments, bone) • Muscle (skeletal, smooth and cardiac referring to voluntary and involuntary action) • Nerve tissue (sensory-, motor- and interneurons) Relationship between structure and function [no detail required – some tissues, e.g., blood and nerves in the reflex arc, will be covered in more detail in relevant sections]	Human skeleton: The axial skeleton: mention of facial bones, cranium, foramen magnum, palate and jaws appendicular skeleton Functions of skeleton- • Movement • Protection • Support • Storage of minerals • Hearing	Transport system/ circulatory system Blood circulation system Pulmonary and systemic (double, closed) circulatory systems heart and associated blood vessels heart: internal and external structure related to functioning, cardiac cycle: Flow of blood through the heart	Direction of blood flow: Difference between oxygenated and deoxygenated blood in different parts of the system (diagram or schematic drawing) Lungs and pulmonary system , associated blood vessels Major organs and systemic system: Associated major blood vessels of brain, small intestine, liver and kidney Blood vessels: structure and functioning of arteries, veins with valves and capillaries		Consolidation and revision
PRE-KNOWLEDGE	PLANT TISSUES, ORGANELLES, MOVEMENT ACROSS MEMBRANES (GR 10)			DIFFUSION AND OSMOSIS, PLANT TISSUES (GR 10)		BASIC CELL STRUCTURE (GR 10)	MUSCULOSKELETAL SYSTEM (GR 8) ANIMAL TISSUES (GR 10)	CIRCULATORY SYSTEM (GR 9) ANIMAL TISSUES (GR 10)			
EXAMPLES OF INFORMAL/DAILY ACTIVITIES	Activity Examine and identify the following plant tissues: Epidermis (root hair, guard cells) parenchyma, collenchyma and sclerenchyma using micrographs or posters Tabulate the different tissues by drawing the tissue to show specialised structure and functions	Activity Draw cross sections of root and stem (line diagram)	Activity Observe and draw a section of a dicotyledonous leaf: Labels and functions Options: Use prepared slides of cross section of a leaf or use micrographs	Activity Relationship between water loss and leaf structure Activity How to conduct a scientific investigation following the different steps	Activity Describe the uptake and movement of water through a plant (diagram) Activity Describe the translocation of organic substances from the leaves to other parts of the plant (diagram)	Activity Examine and identify the following animal tissues: Epithelial, connective, muscle, nerve tissue using micrographs or posters Tabulate the different tissues by drawing the tissue to show specialised structure and functions	Activity Observe and label the human skeleton with the main functions of the skeleton (model or photographs) Activity Observe and draw a typical long bone: Longitudinal section	Activity Draw and label (OR give a diagram) a blood circulatory system to indicate a double & closed system Schematic representation of the pulmonary and systemic circulation Activity The external structure of the heart including associated blood vessels. (with labels and functions) Activity Observe micrographs and draw blood cells Present it in a comparative table	Activity The internal structure of the heart Use different coloured arrows to indicate the flow of blood through the heart Activity Use diagrams to identify the phases of the cardiac cycle (systole & diastole) Activity Tabulate and draw with labels and functions to indicate the different types of blood vessels		
INVESTIGATIONS/ EXPERIMENTS				INVESTIGATION Design investigations to discover the effect of temperature, light intensity and humidity on transpiration rate (using a simple potometer)	INVESTIGATION Investigate water uptake through the roots and the movement of water through the xylem (use <i>Impatiens</i> if possible)			INVESTIGATION Dissection of mammal heart (sheep, cow or pig) obtained from a butchery Identify chambers, valves, muscle, blood vessels (supported by worksheet)	INVESTIGATION In pairs, measure the pulse of one learner before and after exercise Record, interpret and explain data presented as a graph		

TERM 2	WEEK 1	WEEK 2	WEEK 3	WEEK 4	WEEK 5	WEEK 6	WEEK 7	WEEK 8	WEEK 9	WEEK 10	WEEK 11
INFORMAL TESTS					Informal test				Informal test		
SBA (FORMAL ASSESSMENT)	TASK 3: ASSIGNMENT (minimum 50 marks) TASK 4: JUNE EXAMINATION										
DATE COMPLETED + SIGNATURE											

2023/24 ANNUAL TEACHING PLANS: LIFE SCIENCES: GRADE 10 (TERM 3)

TERM 3	WEEK 1	WEEK 2	WEEK 3	WEEK 4	WEEK 5	WEEK 6	WEEK 7	WEEK 8	WEEK 9	WEEK 10	WEEK 11	
CAPS TOPICS	HISTORY OF LIFE ON EARTH (CAPS P 36)			BIOSPHERE TO ECOSYSTEMS (CAPS P 33)						BIODIVERSITY AND CLASSIFICATION (CAPS P 35)		
CORE CONCEPTS, SKILLS AND VALUES	<p>Life's history: Change throughout the history of life on earth</p> <p>Different representations of the history of life on earth</p> <p>The relationship to changes in the composition of the atmosphere (e.g., increases in the levels of oxygen)</p> <p>Changes in the climate (e.g., Ice ages)</p> <p>Geological events (e.g., movements of continents) and their effect on the distribution of living organisms (biogeography)</p>	<p>Geological timescale: Meaning and use of timescales (<i>details not to be memorised</i>)</p> <p>The three eras: Palaeozoic, Mesozoic and Coenozoic Each era divided into periods (<i>names of periods not to be memorised</i>)</p> <p>Cambrian explosion: Origins of early forms of all animal groups</p> <p>Life-forms have gradually changed to become present life-forms</p> <p>In the last four million years significant changes have occurred in species occurring in Africa (e.g., humans)</p>	<p>Mass extinctions: There have been five, two of which are particularly important: 250 MYA (resulted in the extinction of about 90% of all life on earth) and 65 MYA (resulted in the extinction of many species, including the dinosaurs)</p> <p>The rate of extinction on the earth at present is higher than at any time in the past</p> <p>The present time has been called the sixth extinction</p> <p>Fossil formation and methods of dating, e.g., radiometric dating and relative dating</p>	<p>Biosphere</p> <p>Concept of the biosphere</p> <p>Inter-connectedness with and components of global ecosystem: Hydrosphere, lithosphere, atmosphere</p> <p>Biomes</p> <p>Terrestrial and aquatic biomes of southern Africa and give a general description of how climate, soil and vegetation influence the organisms found in the biomes</p> <p>Location of the different biomes in South Africa</p>	<p>Environment</p> <p>Concept of environment to show human activities in and interactions with the natural environment</p> <p>Abiotic and biotic factors: Effects on the community</p> <p>Ecosystems</p> <p>The concept of ecosystem, structure and ecosystem functioning</p>	<p>Abiotic factors</p> <ul style="list-style-type: none"> • Physiographic factors (aspect, slope, altitude) • Soil (pH, humus content, texture, water retention capacity and air content) • Light (day length and seasonal changes) • Temperature (effect of day/night and seasons) • Water (water cycle and the importance of wetlands) • Atmospheric gases • Wind <p>Biotic factors</p> <ul style="list-style-type: none"> • Producers • Consumers • Decomposers 	<p>Energy flow through ecosystems and relationship to trophic structure (food pyramids):</p> <p>Trophic levels: Producers, consumers (herbivores and carnivores and omnivores, decomposers)</p>	<p>Cycles</p> <p>Flow charts of the following cycles:</p> <ul style="list-style-type: none"> • Nutrient • Water • Oxygen 	<p>Cycles</p> <p>Flow charts of the following cycles: Carbon and nitrogen cycles (Names, e.g., nitrates are required but no detail of chemistry is necessary)</p>	<p>Classification schemes: a way of organising biodiversity</p> <p>Brief history of classification: Scientists attempt to classify organisms based on shared features</p> <p>As information increases classification changes</p> <p>One of the currently accepted classification systems is the five-kingdom system: Animalia, Plantae, Fungi, Protista and Monera (Bacteria)</p> <p>Naming things in science: Species concept and binomial system.</p> <p>Focus on Linnaeus (Carl von Linne) and his role in classification systems: Why do we use Latin?</p> <p>Differences between prokaryotes and eukaryotes (link to cell structure)</p>	Consolidation and revision	
PRE-KNOWLEDGE	BIOSPHERE AND BIODIVERSITY (GR 7)			ECOSYSTEMS (GR 9)					BIOSPHERE TO ECOSYSTEMS (GR 10)			
EXAMPLES OF INFORMAL/ DAILY ACTIVITIES	<p>Activity</p> <p>Construct a timeline showing the history of life on earth</p> <p>The timeline should show all the key events from the emergence of the earliest life forms to the present day to emphasise the long history of life</p>	<p>Activity</p> <p>Use a geological time scale to test the understanding of the three eras and the periods with emphasis on the Cambrian explosion</p>	<p>Activity</p> <p>Research the “missing link” between dinosaurs and birds (Archaeopteryx)</p> <p>Research the “link” between fish and amphibians (Coelacanth)</p> <p>Present a verbal or written report</p> <p>Activity</p> <p>Various hypotheses have been proposed for the extinction, 65 million years ago, such as the meteorite impact theory and the volcanism (in India) theory</p> <p>Select ONE of these hypotheses and describe the</p>	<p>Activity</p> <p>Draw a mind map to indicate the concept of the biosphere and the components of global ecosystems (spheres)</p> <p>Activity</p> <p>Use a map of Southern Africa to indicate the different terrestrial and aquatic biomes</p> <p>Activity</p> <p>Indicate the climate, soil and vegetation of each of the biomes</p>		<p>Activity</p> <p>Use illustrations of ecosystems to identify abiotic and biotic factors</p> <p>Activity</p> <p>Develop food chains and food webs by giving different examples</p>		<p>Activity</p> <p>Use flow charts to illustrate the 4 nutrient cycles</p>	<p>Activity</p> <p>Principles of classification</p> <p>Grouping everyday objects on the basis of shared similarities: A simple nested hierarchy</p> <p>Classify a selection of familiar organisms into groups based on visible evidence</p> <p>Use keys and identification guides</p>			

TERM 3	WEEK 1	WEEK 2	WEEK 3	WEEK 4	WEEK 5	WEEK 6	WEEK 7	WEEK 8	WEEK 9	WEEK 10	WEEK 11
			evidence scientists have gathered in support of it (Nature of science) Activity Describe fossil formation and interpretation of data based on methods of dating Activity Examine fossils at a museum or fossil site or look at photographs of fossils Optional: Use plaster of Paris to construct a "fossil"								
INVESTIGATIONS/ EXPERIMENTS				INVESTIGATION Fieldwork: Choose ONE ecosystem (close to the school) within a local biome for special study The study must deal with abiotic and biotic factors and the interactions between them, trophic relationships in an ecosystem, record and describe seasonal changes over 2 terms: Either term 1 and 2 or term 3 and 4, biodiversity within the ecosystem using field guides and keys, positive and/or negative human impact/influence on the ecosystem Different groups should investigate different factors Each group must plan, collect, record and present, analyse and evaluate data							
INFORMAL TESTS			Informal test						Informal test		
SBA (FORMAL ASSESSMENT)	TASK 5: PRACTICAL TASK (minimum 30 marks) TASK 6: FORMAL TEST (minimum 50 marks)										
DATE COMPLETED + SIGNATURE											

2023/24 ANNUAL TEACHING PLANS: LIFE SCIENCES: GRADE 10 (TERM 4)

TERM 4	WEEK 1	WEEK 2	WEEK 3	WEEK 4	WEEK 5-10			
CAPS TOPICS	BIODIVERSITY AND CLASSIFICATION (CAPS P 35)							
CORE CONCEPTS, SKILLS AND VALUES	Main groupings of living organisms are bacteria, protists, fungi, plants and animals Diagnostic features of each of the following: <ul style="list-style-type: none"> • Bacteria • Protists • Fungi • Plants • Animals 	Revision paper 1 and 2			FINAL EXAMINATION (Two papers) <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%; vertical-align: top;"> PAPER 1 Marks: 150 Time: 2½ hours <i>Learners must answer all 3 questions</i> <p>Topics and marks <i>Chemistry of life – 33</i> <i>Cells: Basic units of life- 19</i> <i>Cell division (mitosis) – 19</i> <i>Plant and animal tissues – 28</i> <i>Plant organs – 9</i> <i>Support and transport systems: Plants – 23</i> <i>Support systems: Animals – 19</i></p> </td> <td style="width: 50%; vertical-align: top;"> PAPER 2 Marks: 150 Time: 2½ hours <i>Learners must answer all 3 questions</i> <p>Topics and marks: <i>Transport systems in mammals – 32</i> <i>Biosphere to ecosystems – 54</i> <i>Biodiversity and classification – 21</i> <i>History of life on earth – 43</i></p> </td> </tr> </table> <p>Cognitive levels Knowing science – 40%; Understanding science – 25%; Applying scientific knowledge – 20%; Evaluating, analysing and synthesising science knowledge – 15%</p> <p>Degrees of difficulty for examination and test questions: Easy – 30% Moderate – 40% Difficult – 25% Very difficult – 5%</p>		PAPER 1 Marks: 150 Time: 2½ hours <i>Learners must answer all 3 questions</i> <p>Topics and marks <i>Chemistry of life – 33</i> <i>Cells: Basic units of life- 19</i> <i>Cell division (mitosis) – 19</i> <i>Plant and animal tissues – 28</i> <i>Plant organs – 9</i> <i>Support and transport systems: Plants – 23</i> <i>Support systems: Animals – 19</i></p>	PAPER 2 Marks: 150 Time: 2½ hours <i>Learners must answer all 3 questions</i> <p>Topics and marks: <i>Transport systems in mammals – 32</i> <i>Biosphere to ecosystems – 54</i> <i>Biodiversity and classification – 21</i> <i>History of life on earth – 43</i></p>
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EXAMPLES OF INFORMAL/DAILY ACTIVITIES	Activity Tabulate the diagnostic features of the following kingdoms: <ul style="list-style-type: none"> • Bacteria • Protists • Fungi • Plants • Animals 							
INFORMAL TESTS	Informal test							
SBA (FORMAL ASSESSMENT)	SBA				End-of-year examination			
DATE COMPLETED + SIGNATURE								