

2023/24 ANNUAL TEACHING PLANS: LIFE SCIENCES: GRADE 11 (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	BIODIVERSITY AND CLASSIFICATION OF MICROORGANISMS (CAPS P. 39)			BIODIVERSITY OF PLANTS (CAPS P. 40)			BIODIVERSITY OF ANIMALS (CAPS P. 41)			
CORE CONCEPTS, SKILLS AND VALUES	Baseline assessment based on Grade 10 topics needed for Term 1, e.g., classification schemes, the nitrogen cycle Revise scientific skills	Micro-organisms: Basic structure and general characteristics of the following • Groups • Viruses • Bacteria • Protista • Fungi The roles that these groups play in maintaining balance in the environment and web of life	Symbiotic relationships of bacteria such as nitrogen fixing bacteria in plants and <i>E. coli</i> in the human intestine The effect and management of one disease from each of the four groups: • viruses (rabies, HIV/AIDS, influenza) • Bacteria (blight, cholera, tuberculosis, anthrax) • Protists (malaria) • Fungi (rust, thrush, ringworm, athlete's foot)	Immunity, including plants and animals' immune responses against the infecting micro-organisms The use of drugs, e.g., antibiotics, effect on micro-organisms, vaccinations (discuss briefly) The use of micro-organisms to produce medicines (e.g., insulin and antibiotics) Traditional technology to produce, e.g., beer, wine and cheese	Grouping of Bryophytes and Pteridophytes Grouping of Gymnosperms and Angiosperms Use simple diagrams to identify an example of each group and a comparative table to demonstrate the presence/absence of following in the four groups: • Vascular tissue (xylem and phloem) • True leaves and roots • Seeds or spores • Fruit • Decreasing dependence on water for reproduction from Bryophytes to Angiosperm	Asexual and sexual reproduction , name advantages and disadvantages of each	Flowers as reproductive structures Adaptations for pollination through (different pollinators) wind, insects and birds (South African examples only) differences and similarities	The concept of a phylum Relationship between body plan and grouping of animals in phyla Six animal phyla: • Porifera • Cnidaria • Platyhelminthes • Annelida • Arthropoda • Chordata Use simple diagrams to identify an example of each phylum and a comparative table to demonstrate the following in the six phyla: Key features in respect of body plans: • Symmetry and cephalisation • The number of tissue layers • Developed from embryo • The number of openings in the gut • Coelom and blood systems The role of invertebrates in agriculture and ecosystems			
PRE-KNOWLEDGE	BIODIVERSITY, CLASSIFICATION & ECOSYSTEMS GRADE 10										
EXAMPLES OF INFORMAL/ DAILY ACTIVITIES		Activity Table on micro-organisms: names, basic structures, characteristics and diagrams	Activity Symbiotic relationships of nitrogen fixing bacteria in plants and <i>E. coli</i> in the human intestine Activity A table of ONE disease from each group indicating effect and management	Activity Immunity, vaccinations using articles Activity Effect of antibiotics on micro-organisms, use of micro-organisms to produce medicine, traditional technology to produce, e.g., beer, wine and cheese	Activity Phylogenetic trees and cladograms showing the evolutionary history of the four plant groups and major structural changes in their history of development Activity Table indicating the differences between Bryophytes, Pteridophytes, Gymnosperms and Angiosperms in terms of vascular tissue, leaves and roots, seeds or spores and fruit also including drawings of the macroscopic parts: Bryophytes: Moss plant Pteridophytes: Rhizome, frond with sori Gymnosperms: Needles, cones and seeds Angiosperms: Flower, fruit and seeds	Activity Table indicating the differences between asexual and sexual reproduction showing advantages and disadvantages		Activity Calculate approximate surface area to volume ratios of selected examples of different animals of the six phyla	Activity Construct a comparative table of these four key features in the six selected phyla and indicate the mode of living of each phyla Include as many diagrams or pictures as possible.	Activity The role of invertebrates in agriculture and ecosystems	
INVESTIGATIONS/ EXPERIMENTS							INVESTIGATION Dissect an example of each of the following types of flowers: wind pollinated, insect pollinated, and bird pollinated Record observations in a comparative table		INVESTIGATION Select one phylum and design a poster to show diversity in that phylum in South Africa		

Consolidation and revision

TERM 1	WEEK 1	WEEK 2	WEEK 3	WEEK 4	WEEK 5	WEEK 6	WEEK 7	WEEK 8	WEEK 9	WEEK 10	WEEK 11
		INVESTIGATION Growing cultures on agar plates, or bread mould (fungus) on bread									
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 11 (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	ORIENTATION	PHOTOSYNTHESIS (CAPS P. 42)			CELLULAR RESPIRATION (CAPS P. 45)		ANIMAL NUTRITION (CAPS P. 43)					
CORE CONCEPTS, SKILLS AND VALUES	Revise basic cell structure with focus on the chloroplast, leaf structure and mitochondria and plant and animal tissues from grade 9 and grade 10 Revise basic photosynthesis and respiration from grade 8	Process of photosynthesis using words and symbols: The intake of raw materials, trapping and storing of energy, formation of food in chloroplasts and its storage The release of oxygen Mention only of light and dark phase (no biochemical detail of light and dark phases is required) Importance of photosynthesis: release of oxygen, uptake of carbon dioxide from atmosphere, food production (trapping energy)	Effects of variable amounts of light, carbon dioxide and temperature on the rate of photosynthesis Improve crop yields in greenhouse systems, role of ATP as energy carrier in the cell ONE investigation to explain the principles of the scientific process: Light is necessary for photosynthesis (Infuse investigation throughout the topic)	Process of respiration: Aerobic respiration: In cytoplasm and mitochondria, use words and symbols: glycolysis, Krebs cycle and oxidative phosphorylation (no biochemical detail is required)	Anaerobic respiration: Production of lactic acid in muscles during exercise, word and symbols (no biochemical detail of process is required): The role of anaerobic respiration in the industry, e.g., beer brewing and bread making Comparison between aerobic and anaerobic respiration TWO investigations to explain the principles of the scientific process: O ₂ is required by respiration, CO ₂ is produced by living organisms during respiration (infuse investigations throughout the topic)	The differences in dentition for herbivorous, carnivorous and omnivorous lifestyles in terms of nutritional requirements and energy relationships (link with ecology – food chains) Human nutrition The macro-structure of the alimentary canal and associated organs and the functions of the different parts	The process of ingestion, digestion, absorption, assimilation and egestion and the significance of each: Mechanical or physical digestion: Types and functions of different kinds of teeth, processes of chewing Peristalsis Chemical digestion: Enzymes: functions of carbohydrases, proteases and lipases: Where produced, substrate, pH and end-products (Specific enzymes need not be named – link to enzyme activity)	Absorption: Small intestine as a region of most absorption of digested food, adaptations to increase surface area Structure (to tissue level) and significance of villi Importance of hepatic portal system in the transport of absorbed food to the liver and then through hepatic vein to the rest of the body Assimilation: Incorporation of glucose and amino acids, and the breakdown of alcohol, drugs and hormones Egestion	Homeostatic control, which involves the hormonal control of blood sugar levels (Links with Gr 12)	Consolidation and revision		
PRE-KNOWLEDGE	CELL STRUCTURE: CHLOROPLASTS & LEAF STRUCTURE (GR 10)				CELL STRUCTURE: CYTOPLASM & MITOCHONDRIA (GR 10)		HUMAN SYSTEMS (GR 9)					
EXAMPLES OF INFORMAL/DAILY ACTIVITIES	Activity Draw and label diagrams of the leaf Indicate the functions	Activity Use a diagram of a plant indicating the intake of raw materials, trapping and storing of energy, formation of food in chloroplasts and its storage and the release of oxygen Activity Draw a diagram of chloroplast. Indicate the location in the chloroplast where the light and dark phase take place		Activity Use graphs to show effects of variable amounts of light, carbon dioxide and temperature on the rate of photosynthesis Activity Case study on the role of carbon enrichment, optimum light and optimum temperatures in greenhouse systems to improve crop yield	Activity Diagram of a cell with cytoplasm and mitochondria Use words and symbols indicating glycolysis, Krebs cycle and oxidative phosphorylation Activity The process of anaerobic respiration and the role it plays in the food industry. (Suggested as an investigation)	Activity Table with the differences in dentition for herbivores, carnivores and omnivores' lifestyles in terms of nutritional requirements and energy relationships with diagrams	Activity Diagram of the human digestive system with labels and functions of each part Include mechanical and chemical digestion Activity Diagram of small intestine and villi to show adaptations for absorption of digested food	Activity Diagram of hepatic portal system explaining assimilation of products of digestion and breakdown of relevant substances Activity Schematic representation of the control of blood sugar levels				
INVESTIGATIONS/ EXPERIMENTS				INVESTIGATION Basic scientific investigation skills with demonstrations or data interpretation on: Investigate photosynthesis by showing that light is necessary for photosynthesis	INVESTIGATION Basic scientific investigation skills with demonstrations or data interpretation on: Investigate respiration by showing that CO ₂ is produced by living organisms during respiration	INVESTIGATION Explain the principles of the scientific process: CO ₂ is produced by living organisms during respiration	INVESTIGATION Obtain intestines of a sheep from a butcher and trace the passage that food will take Cut open the stomach, portion of the small intestine and a portion of the large intestine to compare the structure of the wall in each					

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				Informal test	
SBA (FORMAL ASSESSMENT)	TASK 3: ASSIGNMENT (minimum 50 marks) – SBA weighting: 20% TERM WEIGHTING: 25% TASK 4: JUNE EXAMINATION – SBA weighting: 20% TERM WEIGHTING: 75%										
DATE COMPLETED + SIGNATURE											

2023/24 ANNUAL TEACHING PLANS: LIFE SCIENCES: GRADE 11 (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	ORIENTATION	GASEOUS EXCHANGE (CAPS P. 46)			EXCRETION IN HUMANS (CAPS P. 48)			POPULATION ECOLOGY (CAPS P. 49)				
CORE CONCEPTS, SKILLS AND VALUES	Revise relevant body systems from Grade 9 and ecology from Grade 8	Gaseous exchange Distinguish between cellular respiration, breathing and gas exchange Requirements of efficient gas exchange organs: Large surface area, thin, moist, well ventilated, protected, transport system	Human gas exchange: The structure (macro and tissue level), location, adaptations and functioning of the ventilation system: Trachea, epiglottis, bronchi, bronchioles, lungs, ribs, intercostal muscles, diaphragm, alveoli Ventilation of the lungs: • Gaseous exchange in alveoli • The transport of gases around the body • Gaseous exchange in tissues • Composition of inspired air vs. expired air – analyse data	Homeostatic control of breathing (Links with Gr 12)	Excretion in various organs: Brief role of the following: • The lungs • The kidneys • Bladder • The liver • The alimentary canal (gut) • The skin Substances secreted by each and the origins of these substances	Urinary system The structure of the: • Urinary system: Position of kidneys, ureters, bladder, urethra • Kidney: structure and functioning, removal of urea and excess water and salts, re-absorption of glucose and some salts • Nephron: structure and functioning: Ultra-filtration, re-absorption, tubular excretion, pH control, formation of urine	Homeostatic control of water and salts: Role of ADH and aldosterone (Links with Gr 12)	Population size influenced by: Immigration, emigration, mortality, natality, fluctuations and limiting factors carry capacity Logistic and geometric growth curves with phases	Interactions in the environment: Predation: Two South African examples of predator-prey relationships: graphs Competition: Interspecific: for light, space, water, shelter and food Intraspecific: for food, access to mates, water, space, and shelter; survival is determined by access to the above, ecological niches Specialisation: Competitive exclusion and resource partitioning; discuss one example of co-existence in animals and one example in plants Parasitism: Two examples from South Africa; one species benefit Mutualism: Two examples from South Africa; both species benefit Commensalism: Two examples from South Africa	Human population Reasons for exponential growth: Age and gender distributions for different countries including South Africa Forecast of South Africa's population growth over the next twenty years and predict possible consequences for the environment	Consolidation and revision	
PRE-KNOWLEDGE		HUMAN SYSTEMS (GR 9) LUNGS & PULMONARY SYSTEM (GR 10)			HUMAN SYSTEMS (GR 9)							
EXAMPLES OF INFORMAL/ DAILY ACTIVITIES		Activity Tabulate the differences between cellular respiration, breathing and gas exchange Activity Requirements of efficient gas exchange organs	Activity Diagram of the human breathing system with labels and functions Including ventilation of lungs Activity Analyse and interpret data showing the effects of altitude on the number of red blood cells and the consequent effect on athletes at different altitudes	Activity Homeostatic control of breathing	Activity Tabulate various excretory organs and their secretions and excretions Include the substances secreted and their origin where applicable	Activity Diagram of the urinary system of the human with labels and functions Activity Longitudinal section through the kidney. Label and functions Activity Diagram of nephron with labels and functions Use arrows to indicate the direction of urine production	Activity Homeostatic control of water and salts: role of ADH and aldosterone	Activity Case study: Rationale for culling, e.g., elephants in the Kruger National Park as an example of an application of estimating population size	Activity Population size including graphs on logistic and geometric growth Activity Tabulate interactions in the environment Activity Draw a life cycle of the bilharzia parasite or tapeworm (simplify larval stages)	Activity Human population		

TERM 3	WEEK 1	WEEK 2	WEEK 3	WEEK 4	WEEK 5	WEEK 6	WEEK 7	WEEK 8	WEEK 9	WEEK 10	WEEK 11
INVESTIGATIONS/ EXPERIMENTS			INVESTIGATION Observe and investigate the structure of the lungs, diaphragm, associated pulmonary blood vessels and the heart of a pig or a sheep obtained from a butcher INVESTIGATION Construct a model of the human breathing system Explain the limitations of the model Demonstrate that expired air contains carbon dioxide	INVESTIGATION Measure and compare the depth of breathing of two or more learners and the effect of exercise on breathing/pulse rate. Interpret data on depth and rate of breathing	INVESTIGATION Dissection of a sheep's/pig's kidney Use a worksheet to identify capsule, cortex, medulla, pyramids, blood vessels, pelvis, ureter and hilum Draw and label the dissected kidney			INVESTIGATION Determine the size of a population by quadrant or simple sampling e.g., simulated mark/recapture Collect and record data, Interpret data Calculate/ estimate the population size			
INFORMAL TESTS				Informal test			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 11 (TERM 4)

TERM 4	WEEK 1	WEEK 2	WEEK 3	WEEK 4	WEEK 5-10
CAPS TOPICS	HUMAN IMPACT ON THE ENVIRONMENT (CAPS P. 51)				
CORE CONCEPTS, SKILLS AND VALUES	<p>Causes and consequences of the following (relate to conditions and circumstances in South Africa):</p> <p>The atmosphere and climate change</p> <ul style="list-style-type: none"> • Carbon dioxide emissions • Concept of “carbon footprint” and the need to reduce the carbon footprint • Deforestation • Greenhouse effect, enhanced • Greenhouse effect and global warming: desertification, drought and floods • Methane emissions • Ozone depletion 	<p>Water availability</p> <ul style="list-style-type: none"> • Construction of dams • Destruction of wetlands • Poor farming practices • Droughts and floods • Exotic plantations and depletion of water table • Boreholes and effects on aquifers • Wastage • Cost of water <p>Quality</p> <ul style="list-style-type: none"> • Water for domestic use, industry, agriculture and mining: Pollution, diseases, eutrophication and algal bloom • The effect of mining on quality of water • Thermal pollution • The need for water purification and recycling • Alien plants e.g., <i>Eichhornia</i> <p>Food security (link with population ecology dynamics)</p> <ul style="list-style-type: none"> • Human exponential population growth • Droughts and floods (climate change) • Poor farming practices: monoculture, pest control, loss of topsoil and the need for fertilisers • Alien plants and reduction of agricultural land • The loss of wild varieties: Impact on gene pools • Genetically engineered foods, wastage 	<p>Loss of biodiversity (the sixth extinction)</p> <ul style="list-style-type: none"> • Habitat destruction: Farming methods, e.g., overgrazing and monoculture, golf estates, mining, urbanisation, deforestation, loss of wetlands and grasslands • Poaching, e.g., for rhino horn, ivory and “bush meat” • Alien plant invasions: Control using mechanical, chemical and biological methods • Indigenous knowledge systems and the sustainable use of the environment e.g., devils’ claw, rooibos, fynbos, the African potato (<i>Hypoxis</i>) and Hoodia <p>Solid waste disposal</p> <p>Managing dumpsites for rehabilitation and prevention of soil and water pollution</p> <p>The need for recycling</p> <p>Using methane from dumpsites for domestic use: Heating and lighting</p> <p>Safe disposal of nuclear waste</p>	Revision paper 1 and 2	<p>FINAL EXAMINATION (Two papers)</p> <p>PAPER 1 Marks: 150 Time: 2½ hours Topics and marks: <i>Photosynthesis</i> – 32 <i>Animal nutrition</i> – 32 <i>Respiration</i> – 22 <i>Gaseous exchange</i> – 32 <i>Excretion</i> – 32</p> <p>PAPER 2 Marks: 150 Time: 2½ hours Topics and marks: <i>Biodiversity and classification of micro-organisms</i> – 29 <i>Biodiversity in plants and reproduction</i> – 29 <i>Biodiversity in animals</i> – 18 <i>Population ecology</i> – 37 <i>Human impact on the environment</i> – 37</p> <p>Cognitive levels</p> <p>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</p> <p>Easy - 30% Moderate - 40% Difficult - 25% Very difficult - 5%</p>
PRE-KNOWLEDGE	ECOSYSTEMS GRADE 10				
EXAMPLES OF INFORMAL/ DAILY ACTIVITIES		<p>Activity</p> <p>Case study on rhino poaching and suggestions on how it can be prevented</p>			
INVESTIGATIONS/ EXPERIMENTS		<p>INVESTIGATION</p> <p>Analyse the solid waste generated in the household in one week, including paper, metals and plastic</p> <p>Estimate the percentage that could be recycled or reused</p>			
INFORMAL TESTS		<p>Informal test</p>			
SBA (FORMAL ASSESSMENT)	SBA				End-of-year examination
DATE COMPLETED + SIGNATURE					