

Annual Teaching Plan - TERM ONE (10 weeks) - 46 DAYS (17 Jan – 20 March)

Week Number (Week Ending)	Completion Date	Topic for the week	INFORMAL ASSESSMENT		% Curriculum Coverage	SMT Signature and Date	FORMAL ASSESSMENT - SBA
			TASK/ACTIVITY	TICK			
Week 1 3 days (19/01)		Orientation to Life Sciences: (Pre-Knowledge - SCIENTIFIC SKILLS LINKED TO GRADE 9) <ul style="list-style-type: none"> How science works based on knowledge and scientific skills, careers and subject combinations Graphs, Calculations: Percentage, Percentage increase/ decrease, Average 	Activity Draw, line graph, bar graph, histogram and pie charts Activity Interpretation of graphs, identify trends/relationships between variables.	<input type="checkbox"/> <input type="checkbox"/>	7		Task 1: Practical (Minimum 30 marks) Term Weighting – 25% Year Weighting – 10%
Week 2 5 days (26/01)		Scientific method: <ul style="list-style-type: none"> Planning steps, identification of variables, ensuring validity and reliability. Brief overview of the history of microscopy: <ul style="list-style-type: none"> Light and Electron microscope Scientific diagrams Calculations: Actual size, Magnification	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 INFORMAL TEST: Life sciences skills and Investigations	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	18.6		

<p>Week 3 5 days (02/02)</p>	<p>The Chemistry of Life (Pre-Knowledge - MOLECULES FROM NATURAL SCIENCES GRADES 8 AND 9)</p> <p>Molecules for life: Organic molecules</p> <ul style="list-style-type: none"> made up of C, H, O and N, P. Cells are made up of proteins, carbohydrates, lipids, nucleic acids and vitamins. (Only basic structural detail required) <p>Inorganic compounds</p> <ul style="list-style-type: none"> Water: 2H and 1O Minerals: e.g. Na, K, Ca, P, Fe, I, nitrates, phosphates. Macro and micro elements. Main functions and deficiency diseases <p>Organic compounds</p> <ul style="list-style-type: none"> Carbohydrates- monosaccharides (single sugars) e.g. glucose, fructose; disaccharides (double sugars) e.g. sucrose, maltose; polysaccharides (many sugars) e.g. starch, cellulose, glycogen <p>INVESTIGATIONS: Food tests for glucose, Starch and Lipids</p>	<p>Activity Table – minerals</p> <p>Activity Construct/ draw models of water using coloured paper, and functions of water and the role of fertilisers in eutrophication.</p> <p>Activity Construct/ draw models of simple and more complex molecules (organic compounds) using coloured paper. (Learners need to know only basic structural details.)</p> <p>Activity State building units (monomers) and functions of carbohydrates and lipids. Draw a table of glucose and starch food tests showing colour changes</p>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<p>30.2</p>		
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<p>Week 4 5 days (09/02)</p>		<p>Organic compounds</p> <ul style="list-style-type: none"> • Lipids (fats and oils) - 1 glycerol and 3 fatty acids unsaturated and saturated fats. <p>Cholesterol in foods. Heart disease</p> <ul style="list-style-type: none"> • Protein – amino-acids (C, H, O and N and some have P, S, Fe). Proteins are sensitive to temperature and pH; loss of structure and function. • Role of enzymes in breaking down/synthesizing molecules • Influence of temperature and pH on enzyme action • Lock and key model of how enzymes work • Enzymes in everyday life, e.g., washing powders. • Mention of Nucleic acids: DNA and RNA – Consisting of C, H, O, N and P (No details of structure required). • Vitamins e.g. A, one of B vitamins, C, D and E <p>INVESTIGATION Food test for lipids 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</p>	<p>Activity State the building units (monomers) and functions of proteins.</p> <p>Activity Using data and interpreting graphs showing the influence of temperature and pH on enzyme action. Diagram explaining the lock-and key model</p> <p>Activity Tabulate the different vitamins, their functions, source and deficiency diseases.</p> <p>Activity Compare Recommended Daily Allowance (RDA) with usual diet of individual learners for one week.</p> <p>Draw a pie chart of the food types listed in learners’ diet and discuss implications of the usual diet of learners.</p> <p>INFORMAL TEST: Chemistry of Life</p>	<input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>	<p>41.8</p>		
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<p>Week 5 5 days (16/02)</p>		<p>• Microscope, microscopic skills</p> <p>Cells: The Basic Unit of Life (Pre-Knowledge - CELL STRUCTURE FROM GRADE 9)</p> <p>Cell structure</p> <ul style="list-style-type: none"> • Molecular make-up: • Cells are mostly made of proteins, carbohydrates, lipids, nucleic acids and water <p>Cell structure and function: roles of organelles</p> <ul style="list-style-type: none"> • Cell wall-support structure in plant cells only. • Cell membrane- boundaries and transport, movement across membranes: diffusion, osmosis and active transport <p>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)</p>	<p>Activity Calculate magnification of drawing by measuring the field of view under a microscope</p> <p>OR</p> <p>Calculate the size of specimen on a micrograph using the scale line provided.</p>	<input type="text"/>	<p>53.4</p>		
<p>Week 6 5 days (23/02)</p>		<p>Cell structure and function: roles of organelles</p> <ul style="list-style-type: none"> • Nucleus, chromatin material, nuclear membrane, nucleopore, nucleolus, the control centre, heredity. • Differences between prokaryotes and eukaryotes • Cytoplasm-storage, circulation of materials • Mitochondria-release of energy during cell respiration. • Ribosomes-protein synthesis • Endoplasmic reticulum (rough and smooth) transport systems • Golgi body-assemble secretion 	<p>Activity Make labelled drawings of plant and animal cell. State the functions of the various cell components</p> <p>Activity Tabulate the different organelles indicating the location, structure (diagrams), and function.</p> <p>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</p>	<input type="text"/> <input type="text"/> <input type="text"/>	<p>65</p>		

<p>Week 7 5 days (01/03)</p>		<p>Cell structure and function: roles of organelles</p> <ul style="list-style-type: none"> 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 specialized functions (<i>link to tissues</i>) Differences between plant and animal cells <p>INVESTIGATION Investigate diffusion and osmosis</p>	<p>between these cells</p> <p>INFORMAL TEST: Cells: Basic Unit of Life</p> <input type="text"/>		76.6		
<p>Week 8 5 days (08/03)</p>		<p>Chromosomes:</p> <ul style="list-style-type: none"> in nuclei of all cells, two chromatids, centromere <p>Cell Division: Mitosis The Cell cycle including mitosis:</p> <ul style="list-style-type: none"> Interphase, mitosis (with names of phases) cytokinesis, growth <p>Role of mitosis:</p> <ul style="list-style-type: none"> growth and repair. Reproduction in some simple organisms <p>Continuous process of mitosis:</p> <ul style="list-style-type: none"> 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 <p>Cancer: (Only a brief description required)</p> <ul style="list-style-type: none"> Uncontrolled cell division and growth Causes of cancer, Treatments of cancer Medical biotechnology <p>e.g., radiotherapy, chemotherapy (no detail required)</p>	<p>Activity Interpret the phases and events of mitosis from given diagrams</p> <input type="text"/> <p>Activity Describe the events of the various phases of mitosis Make a labelled drawing of selected phases of mitosis</p> <input type="text"/> <p>Activity Use micrographs to observe and draw the different phases with descriptions of each phase.</p> <input type="text"/> <p>Activity Indicate the difference in telophase between plant and animal cells.</p> <input type="text"/> <p>Activity Research and present information on ONE of the cancers. This must include causes, prevalence and treatment.</p> <input type="text"/> <p>INFORMAL TEST: Cell Division: Mitosis</p> <input type="text"/>		88.2		

Week 9 5 days (15/03)		Revision and Assessment	Activities for Revision and Assessment		100		
Week 10 3 days (20/03) Term Ends		Consolidation					

<p>Week 2 5 days (12/04)</p>		<p>(CAPS P28) Plant Organs</p> <ul style="list-style-type: none"> Anatomy of dicotyledonous plants: root and stem: distribution of different tissues structure of cells in different tissues (link to plant tissues) 	<p>Activity</p> <p>Draw cross sections of root and stem (line diagram)</p> <p>INFORMAL TEST:</p> <p>Plant Tissues, organelles,</p> <p>Movement across membranes</p>	<input type="checkbox"/> <input type="checkbox"/>	18.6		
<p>Week 3 5 days (19/04)</p>		<p>Organs consist of a number of tissues e.g., leaf structure.</p> <p>Leaf structure:</p> <ul style="list-style-type: none"> 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. 	<p>Activity</p> <p>Observe and draw a section of a dicotyledonous leaf. Labels and functions.</p> <p>Options: use prepared slides of cross section of a leaf or use micrographs.</p>	<input type="checkbox"/>	30.2		
<p>Week 4 5 days (26/04)</p>		<p>(CAPS p 29)</p> <p>Support and Transport systems in Plants</p> <p>Transpiration</p> <ul style="list-style-type: none"> Relationship between water loss and leaf structure Factors that affect the rate of transpiration: temperature, light intensity, wind and humidity <p>INVESTIGATION</p> <p>Design investigations to discover the effect of temperature, light intensity and humidity on transpiration rate (using a simple potometer).</p>	<p>Activity</p> <p>Relationship between water loss and leaf structure</p> <p>Activity</p> <p>How to conduct a scientific investigation following the different steps.</p> <p>Activity</p> <p>Describe the translocation of organic substances from the leaves to other parts of the plant. (Diagram)</p>	<input type="checkbox"/> <input type="checkbox"/>	41.8		

<p>Week 5 4 days (03/05)</p>	<p>Downloaded from Stanmorephysics.com</p>	<ul style="list-style-type: none"> • Uptake of water and minerals into xylem in roots; • Transport of water and minerals to leaves; • Translocation of manufactured food from leaves to other parts of plant. <p>INVESTIGATION Investigate water uptake through the roots and the movement of water through the xylem. (Use <i>Impatiens</i> if possible)</p>	<p>Activity Describe the uptake and movement of water through a plant. (Diagram)</p> <p>Activity Describe the translocation of organic substances from the leaves to other parts of the plant. (Diagram)</p> <p>INFORMAL TEST: Diffusion and Osmosis, Plant Tissues</p>	<input type="text"/> <input type="text"/> <input type="text"/>	<p>53.4</p>		
<p>Week 6 5 days (10/05)</p>		<p>(CAPS p 28) Animal Tissues (Pre-knowledge: Basic Cell Structure)</p> <p>Animal tissues: 4 basic types</p> <ul style="list-style-type: none"> • 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) <p>Relationship between structure and function</p> <p>[No detail required – some tissues, e.g., blood and nerves in the reflex arc, will be covered in more detail in relevant sections]</p>	<p>Activity Examine and identify the following animal tissues: Epithelial, connective, muscle, nerve tissue using micrographs or posters.</p> <p>Activity Tabulate different tissues by drawing the tissue to show specialised structure and functions.</p>	<input type="text"/> <input type="text"/>	<p>65</p>		

<p>Week 9 5 days (31/05)</p>		<p>Direction of blood flow:</p> <ul style="list-style-type: none"> • 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. <p>INVESTIGATION In pairs, measure the pulse of one learner before and after exercise. Record, interpret and explain data presented as a graph.</p>	<p>Activity</p> <p>The internal structure of the heart. Use different coloured arrows to indicate the flow of blood through the heart.</p> <p>Activity</p> <p>Use diagrams to identify the phases of the cardiac cycle (systole & diastole).</p> <p>Activity</p> <p>Tabulate and draw with labels and functions to indicate the different types of blood vessels and functions.</p> <p>INFORMAL TEST:</p> <p>Circulatory System, Animal Tissues</p>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<p>100</p>		
<p>Week 10 5 days (07/06)</p>		<p>Revision and Assessment</p>	<p>Activities for Revision and Assessment</p>				
<p>Week 11 5 days (14/06)</p>		<p>Consolidation</p>					

Annual Teaching Plan - TERM THREE (11 weeks) - 53 DAYS (09 July – 20 September)

Week Number (Week Ending)	Completion Date	Topic for the week	INFORMAL ASSESSMENT		% Curriculum Coverage	SMT Signature and Date	FORMAL ASSESSMENT - SBA
			TASK/ACTIVITY	TICK			
Week 1 4 days (12/07)		<p>(CAPS p 36) History of Life on Earth</p> <p>Life's history: Change throughout the history of life on Earth</p> <p>(Pre-knowledge: Biosphere and Diversity gr 7)</p> <ul style="list-style-type: none"> Different representations of the history of life on earth. The relationship to Changes in the composition of the atmosphere (e.g., Increases in the levels of oxygen) Changes in the climate (e.g., Ice ages) Geological events (e.g., movements of continents) and their effect on the distribution of living organisms (biogeography) 	<p>Activity</p> <p>Provide the correct term for various phrases/definitions related to Diversity, Change and Continuity Describe factors that have led to changes in life forms that have existed over millions of years</p> <p><input type="checkbox"/></p>		7		<p>Task 5: Practical (Minimum 30 marks)</p> <p>Term Weighting – 25%</p> <p>Year Weighting – 10%</p> <p>Task 6: September Controlled Test (1 hour - 50 marks)</p> <p>Term weighting – 75%</p> <p>Year weighting – 20%</p>

<p>Week 2 5 days (19/07)</p>		<p>Geological timescale: Meaning and use of timescales <i>(details not to be memorised)</i></p> <p>The three eras:</p> <ul style="list-style-type: none"> • Paleozoic, • Mesozoic and • Coenozoic. <p>Each era divided into periods <i>(Names of periods not to be memorised)</i></p> <p>Cambrian explosion:</p> <ul style="list-style-type: none"> • Origins of early forms of all animal groups. • Life-forms have gradually changed to become present life forms. • In the last four million years significant changes have occurred in species occurring in Africa (e.g., humans) 	<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><input type="checkbox"/></p> <p>Activity</p> <p>Interpret various forms of the geological time scale and representations of the history of life on Earth</p> <p><input type="checkbox"/></p> <p>INFORMAL TEST:</p> <p>History of Life on Earth</p> <p><input type="checkbox"/></p>		<p>18.6</p>		
<p>Week 3 5 days (26/07)</p>		<p>Mass extinctions:</p> <ul style="list-style-type: none"> • There have been five, two of which are particularly important: 	<p>Activity</p> <p>Research the “missing link” between dinosaurs and birds (Archaeopteryx)</p> <p><input type="checkbox"/></p>		<p>30.2</p>		

- 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).
- The rate of extinction on the Earth at present is higher than at any time in the past.
- The present time has been called the sixth extinction.

Fossil formation and methods of dating

- e.g., radiometric dating and
- relative dating

Research the “link” between fish and amphibians (Coelacanth).
Present a verbal or written report.

Activity
Various hypotheses have been proposed for the extinction, 65 million years ago, such as the meteorite impact theory and the volcanism (in India) theory. Select ONE of these hypotheses and describe the 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”.

<p>Week 4 5 days (02/08)</p>		<p>(CAPS p 33) Biosphere and Ecosystems</p> <p>Biosphere Concept of the biosphere. Inter-connectedness with and components of global ecosystem:</p> <ul style="list-style-type: none"> • hydrosphere, • lithosphere, • atmosphere <p>Biomes Terrestrial and aquatic biomes of southern Africa and</p> <ul style="list-style-type: none"> • give a general description of how climate, soil and vegetation influence the organisms found in the Biomes. • Location of the different biomes in South Africa 	<p>Activity Draw a mind map to indicate the concept of the biosphere and the components of global ecosystems (spheres). <input type="checkbox"/></p> <p>Activity Use a map of Southern Africa to indicate the different terrestrial and aquatic biomes. <input type="checkbox"/></p> <p>Activity Indicate the location, climate, soil, and vegetation of each of the biomes and how climate influence vegetation in each biome. <input type="checkbox"/></p>		41.8		
<p>Week 5 4 days (08/08)</p>		<p>Environment</p> <ul style="list-style-type: none"> • Concept of environment to show human activities in and interactions with the natural environment Abiotic and biotic factors: • effects on the community. <p>Ecosystems</p> <ul style="list-style-type: none"> • The concept of ecosystem, structure and ecosystem functioning: 	<p>Activity Provide the correct term for various phrases/definitions related to Environmental Studies <input type="checkbox"/></p> <p>Activity Interpret data/draw graphs showing the effect of the abiotic factors on living organisms <input type="checkbox"/></p>		53.4		
<p>Week 6 5 days (16/08)</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>Activity Use illustrations of ecosystems to identify abiotic and biotic factors. <input type="checkbox"/></p> <p>Activity Develop food chains and food webs by giving different examples <input type="checkbox"/></p> <p>Activity Interpret data based on food chains, food pyramids, food webs and energy flow <input type="checkbox"/></p>		65		

<p>Week 7 5 days (23/08)</p>	<p>Energy flow</p> <ul style="list-style-type: none"> through ecosystems and relationship to trophic structure (food pyramids): <p>Trophic levels:</p> <ul style="list-style-type: none"> producers, consumers (herbivores and carnivores and omnivores , decomposers) 	<p>Activity</p> <p>Describe trophic levels and their relationship to ecosystems</p> <p>Activity</p> <p>Use diagrams to show trophic levels and how energy is transferred from on level to the next (energy flow)</p>	<p><input type="checkbox"/></p> <p><input type="checkbox"/></p>	<p>76.6</p>		
<p>Week 8 5 days (30/08)</p>	<p>Nutrient Cycles:</p> <p>Flow charts of the following nutrient cycles :</p> <ul style="list-style-type: none"> water oxygen carbon and nitrogen <p>(Names e.g. nitrates are required but no detail of chemistry is necessary).</p> <p>INVESTIGATION</p> <p>Fieldwork</p> <p>Choose ONE ecosystem (close to the school) within a local biome for special study</p> <p>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.</p> <p>Different groups should investigate different factors. Each group must plan, collect, record and present, analyse and evaluate data.</p>	<p>Activity</p> <p>Describe nutrient cycles and give examples</p> <p>Activity</p> <p>Describe how water, oxygen, carbon and nitrogen is cycled through an ecosystem</p> <p>Activity</p> <p>Use flow charts to illustrate the 4 nutrient cycles</p> <p>Interpret flow diagrams based on the water, oxygen, carbon and nitrogen cycles</p> <p>Activity</p> <p>Define ecotourism.</p> <p>Describe positive and negative influences that humans may have on the environment</p> <p>Activity</p> <p>Describe the advantages and disadvantages of ecotourism</p> <p>INFORMAL TEST: Biosphere and Ecosystems</p>	<p><input type="checkbox"/></p> <p><input type="checkbox"/></p> <p><input type="checkbox"/></p> <p><input type="checkbox"/></p> <p><input type="checkbox"/></p> <p><input type="checkbox"/></p>	<p>88.2</p>		

Week 5-10

33 days

(01/11–
11/12)

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FINAL EXAMINATION (Two Papers)

Paper 1 Marks: 150 Time: 2½ hours		Paper 2 Marks: 150 Time: 2½ hours	
Chemistry of Life	33	Transport System (Animals)	32
Basic unit of Life	19	Biosphere to Ecosystem	54
Cell Division, Mitosis	19	Biodiversity and Classification	21
Plant and Animal Tissues	28	History of Life on Earth	43
Plant organs (leaf)	9		
Support and Transport Systems (Plants)	23		
Support system (Animals)	19		

Cognitive levels:

- Knowing science - 40%
- Understanding science - 25%
- Applying scientific knowledge - 20%
- Evaluating, analysing and synthesising science knowledge - 15%

Degrees of difficulty for examination and test questions:

- Easy - 30%
- Moderate - 40%
- Difficult - 25%
- Very difficult - 5%