

# ST MAARTEN ACADEMY

## DEPARTMENT OF SCIENCE

### BIOLOGY YEAR PLAN

#### FIRST TERM

#### 6 FORM (CAPE) UNIT 2

WEEK	TOPIC	OBJECTIVES	ACTIVITIES	ASSESSMENTS
1 – 4	<u>PHOTOSYNTHESIS AND ATP SYNTHESIS</u>	<p>-relate the structure of a dicotyledonous leaf, a palisade cell and a chloroplast relating these structures to their roles in the process of photosynthesis;</p> <p>-make drawings from prepared slides of a transverse section of a dicotyledonous leaf and palisade cell.</p> <p>-explain the process of photophosphorylation; with respect to photosynthetic electron transport;</p> <p>-outline the essential stages of the Calvin cycle involving the light independent fixation of carbon dioxide;</p> <p>-discuss the concept of limiting factors in photosynthesis;</p> <p>-discuss how knowledge of limiting factors can be applied to the improvement of plant productivity.</p>	<p>Laboratory practicals (drawings)</p> <p>Laboratory practical</p> <p>-investigate the effect of</p>	<p>Quizz</p> <p>In class test</p> <p>Laboratory report</p> <p>Quizz</p> <p>In class test</p>

5 - 8	<u>CELLULAR RESPIRATION AND ATP SYNTHESIS</u>	<p>-explain the sequence of steps in glycolysis;</p> <p>-describe the structure of a mitochondrion, relating its structure to its function;</p> <p>-state the fate of pyruvate in the cytosol when the oxygen is available;</p> <p>-outline the Krebs cycle</p> <p>-explain the significance of the Krebs cycle in ATP formation</p> <p>-explain the process of oxidative phosphorylation with reference to the electron transport chain; and,</p> <p>- compare the fate of pyruvate in the absence of oxygen in animal and yeast.</p> <p>-distinguish among the terms ecosystem, habitat, ecological niche;(use examples)</p> <p>-discuss the way in which energy flows in an ecosystem;</p>	<p>limiting factors on the rate of photosynthesis</p> <p>diagram required</p> <p>investigate the rate of oxygen uptake during respiration using a simple respirometer.</p>	<p>Laboratory report</p> <p>Quiz</p> <p>In class test</p> <p>Laboratory report</p>
9 - 11	<u>ENERGY FLOW AND NUTRIENT CYCLING</u>	<p>-discuss the efficiency of energy transfer between trophic levels;</p> <p>-discuss the concept of biological pyramids;</p> <p>-describe how nitrogen is cycled within an ecosystem;</p> <p>-distinguish between energy</p>	<p>Laboratory practicals</p>	<p>Drawings</p>



# ST MAARTEN ACADEMY

## DEPARTMENT OF SCIENCE

### BIOLOGY YEAR PLAN

#### **SECOND TERM**

#### 6 FORM (CAPE) UNIT 2

WEEK	TOPIC	OBJECTIVES	ACTIVITIES	ASSESSMENTS
1	<u>THE UPTAKE AND TRANSPORT OF WATER AND MINERALS</u>	<ul style="list-style-type: none"><li>-explain the uptake of ions by active transport in roots;</li><li>-describe the entry of water into plant roots in terms of water potential;</li><li>-relate the structure of the xylem vessels to their function;</li><li>-make drawings from prepared slides of xylem vessels;</li><li>-explain the ascent of water in plants;</li><li>-discuss the impact of environmental factors on the rate of transpiration.</li></ul>	<ul style="list-style-type: none"><li>Laboratory practicals (drawings)</li><li>Laboratory practical on the rate of transpiration.</li></ul>	<ul style="list-style-type: none"><li>Quiz</li><li>In class test</li><li>Laboratory report</li></ul>
2	<u>TRANSPORT IN THE PHLOEM</u>	<ul style="list-style-type: none"><li>-relate the structure of sieve tubes and companion cells to their function;</li><li>-make drawings of sieve tubes and companion cells from prepared microscope slides;</li><li>-label pertinent features in an electron micrograph of a sieve tube and</li></ul>		<ul style="list-style-type: none"><li>Quiz</li><li>In class test</li><li>Laboratory report</li></ul>

3	<u>THE CIRCULATORY SYSTEM OF MAMMALS</u>	<p>companion cell;</p> <p>-explain how phloem loading in the leaves occurs against a concentration gradient;</p> <p>-discuss mass (pressure) flow as a possible mechanism of translocation.</p> <p>-describe the structure of arteries, veins and capillaries, relating their structures to their functions;</p> <p>-make drawings of arteries and veins from prepared microscope slides;</p> <p>-describe the structure of the heart;</p> <p>-make drawings of a longitudinal section of the heart;</p> <p>-explain the cardiac cycle and its initiation;</p> <p>-discuss the internal factors that control heart action;</p> <p>-define the terms blood pressure and pulse;</p> <p>-discuss factors affecting blood pressure;</p> <p>-make drawings of erythrocytes and leucocytes from prepared slides;</p>	<p>Laboratory practical (Drawings)</p> <p>experimental evidence for and against this hypothesis.</p> <p>Laboratory practicals (Drawings)</p> <p>annotated diagram of the heart and associated blood vessels</p> <p>Laboratory practicals (Drawings)</p>	<p>Quiz</p> <p>In class test</p> <p>Laboratory report</p> <p>Drawings</p> <p>Quiz</p> <p>In class test</p> <p>Drawing</p>
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4	<u>HOMEOSTASIS AND HORMONAL ACTION</u>	<p>-explain the role of haemoglobin in oxygen and carbon dioxide transport;</p> <p>-describe oxygen dissociation curves for adult haemoglobin;</p> <p>-explain the significance of the effect of carbon dioxide on oxygen dissociation curves (Bohr Effect)</p> <p>-discuss the concept homeostasis;</p> <p>-outline the general principles of hormonal action in animals;</p> <p>-explain how insulin and glucagon regulate blood glucose concentration;</p> <p>-explain the effect of the plant regular molecule, ethylene(ethene), on fruit ripening;</p> <p>-discuss the commercial use made of ethylene in supplying market-ready fruit.</p> <p>-explain the need to remove nitrogenous and other excretory products from the body;</p> <p>-describe the gross structure of the kidney and the detailed structure of the nephron and associated blood vessels;</p> <p>-make drawings of sections of the kidney from prepared slides;</p>	<p>Laboratory practicals (Drawings)</p> <p>Assignment on the Topic.</p>	<p>Drawings</p> <p>Quizz</p> <p>In class test</p> <p>Quizz</p> <p>In Class tests</p>
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5	<p><u>THE KIDNEY,</u> <u>EXCRETION AND</u> <u>OSMOREGULATION</u></p>	<p>-explain the function of the kidney in terms of excretion and osmoregulation;</p> <p>-discuss the clinical significance of the presence of glucose and protein in the urine</p> <p>-describe the structure of motor and sensory neurons;</p> <p>-explain the role of the nerve cell membranes in establishing and maintaining the resting potential;</p> <p>-describe the conduction of an action potential along the nerve cell membrane;</p> <p>-explain synaptic transmission; and,</p> <p>-outline the role of synapses.</p> <p>-discuss the meaning of the term 'health';</p> <p>-explain the categories of disease or illness; and</p> <p>-analyse data involving incidence and mortality rates of disease.</p> <p>-define the term "immune response",</p> <p>-distinguish between the humoral and the cell-mediated immune</p>	<p>Annotated diagrams required</p> <p>Laboratory practicals (Drawing)</p>	<p>Quiz</p> <p>In Class tests</p> <p>laboratory report</p> <p>Drawings</p>
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6	<u>NERVOUS CO-ORDINATION</u>	<p>responses; -explain the role of memory cells in long-term immunity;</p> <p>-compare the origin and the maturation of B- and T-lymphocytes; -describe the mode of action of phagocytes;</p> <p>-relate the molecular structure of a typical antibody molecule to its function;</p> <p>-state what is meant by a monoclonal antibody;</p> <p>-describe the use of monoclonal antibodies in diagnosis and treatment;</p> <p>-distinguish between active and passive immunity, natural and artificial immunity; and, -explain the role of vaccination in providing immunity.</p>	Annotated diagrams required.	In class test  Lab report
7	<u>HEALTH AND DISEASE</u>  <u>IMMUNOLOGY</u>	<p>-discuss the causative relationship among diet, obesity and diabetes;</p> <p>-describe the effects of fats on the cardiovascular system;</p> <p>-discuss the consequences of exercise on the body and the benefits of maintaining a physically fit body;</p> <p>-describe the mechanisms of infection for viral diseases and their causative agents</p> <p>-explain the modes of</p>	<p>Structure of cholinergic synapse. Annotated diagrams required.</p> <p>Model the transmission of communicable or social diseases by using a hands-on simulation.</p> <p>power point presentations</p>	

<p>8-10</p> <p><u>SOCIAL AND PREVENTATIVE MEDICINE</u></p>	<p>transmission of HIV and dengue virus;</p> <p>-discuss reasons for the regional distribution of Acquired Immune deficiency Syndrome (AIDS), diabetes and cancer;</p> <p>-assess the impact of communicable and non-communicable diseases regionally; and,</p> <p>-discuss the roles of social, economic and biological factors in the prevention and control of viral infections.</p> <p>-discuss the meaning of the term, “substance abuse”;</p> <p>-distinguish between psychological and physical dependence;</p> <p>-describe the short-term and long-term consequences of alcohol consumption on the nervous system and the liver;</p> <p>-discuss the social consequences of excessive alcohol use; and,</p> <p>-describe the effects of the components of cigarette smoke on the respiratory and cardiovascular systems.</p>	<p>Investigate the immediate effects of exercise on the body.</p>	<p>Test Lab report on exercise.</p>	<p>In class test</p>
<p>11</p> <p><u>SUBSTANCE ABUSE</u></p> <p><b>MOCK EXAMS</b></p>		<p>Power point presentations</p>		