# ST MAARTEN ACADEMY

# DEPARTMENT OF SCIENCE

# BIOLOGY YEAR PLAN

# CHRISTMAS TERM

# FORM 4

# 2020/2021

**Text – Atwaroo-Ali Linda (First published 2003) CXC Biology Macmillian publishers limited**

**Karen Morrison, Peta-Gay Kirby, Lucy Madhosingh and David Applin (published in 2014 by Nelson Thornes Ltd) Biology for CSEC (2nd Edition)**

**Linda Atwaroo-Ali Biology for CSEC Examinations (3rd Edition)**

| WEEK | TOPIC | OBJECTIVES | ACTIVITIES | ASSESSMENTS |
|---|---|---|---|---|
| 1 – 3 | EXCRETION<br>-definition<br>-importance | -distinguish between egestion and excretion;<br><br>-discuss the importance of excretion in living organisms;<br><br>-state how metabolic wastes are excreted from plants and animals<br><br>-relate the kidney to its osmoregulatory and excretory functions. | Annotated simple diagrams of the kidney and the nephron | Quizz<br><br>In class test<br><br>Drawing |
| 4 - 6 | MOVEMENT | -distinguish between growth | Germinate peanuts or kidney | |

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| | | movement in plants and movement in animals<br><br>-relate the structure of the skeleton to its function in humans;<br><br>-discuss the importance of locomotion in animals.<br><br>-describe the mechanisms of movement in a human fore limb | beans or any appropriate seeds.<br><br>Examine a human skeleton<br><br>Simple line drawing to show the relationship between antagonistic muscles .<br>-draw ,label and annotate a simple diagram of the long bone of a fore limb. | Laboratory report<br><br>Drawing |
| 7 - 10 | <u>IRRITABILITY</u> | -define 'stimulus' and 'response', Describe the response of:<br>a)green plants to stimulus;<br><br>b)invertebrates to | Carryout controlled investigations; make observations; record and report as appropriate ( the response of stems and roots of seedlings to light, touch and gravity) | Laboratory report<br><br>Test<br>quizz |

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| | | variations in light intensity, temperature and moisture;<br><br>-define receptor and effectors;<br><br>-explain why the response to stimuli important for the survival of organisms;<br><br>-explain the relationship among the receptor, the central nervous system and the effector;<br><br>-explain a simple reflex action;<br><br>-describe the functions of the main regions of the brain;<br><br>-discuss the | Construct simple choice chamber to show response of invertebrates for eg. Earthworms, millipedes and earthworms to light intensity, temperature and moisture.<br><br>Reaction to hot objects, insect bites.<br><br>Investigate changes in pupil size in response to changes in light intensity, using mirrors, or the knee jerk reflex.<br><br>Use models and charts.<br><br>Research and | Laboratory report |

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| | | physiological , social and economic effects of drug abuse; | interpret data on drug abuse in your territory. | project |
| | | -relate the structure of the human eye to its functions as a sense organ; | Examine and draw the cross section or the longitudinal section of the human eye | Drawing |
| | | -explain accommodation; sight defects and the corrections of each | | |
| | | -relate structure of the human skin to its function in temperature regulation and protection. | Draw and label the human skin | Drawing |
| 11 - 13 | <u>GROWTH</u> | -make deductions from simple investigations designed to demonstrate growth in living organisms; | Conduct simple exercise to investigate patterns of growth.<br><br>Draw and interpret graphs (growth curves, histograms) from given data. | Test<br><br>Quiz<br><br>Laboratory practical |
| | | -describe the structure of a dicotyledonous seed; | Draw, label and annotate the external and internal structures of a seed. | Drawing |
| | | -describe the processes taking | Use food tests to compare the food | |

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| | | place within a seed during germination | substances found in cotyledons before and after germination | |
| 14 | REVISION FOR END OF TERM EXAMINATION | | | |
| 15 | END OF TERM EXAMINATION | | | |

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# ST MAARTEN ACADEMY

# DEPARTMENT OF SCIENCE

# BIOLOGY YEAR PLAN

# EASTER TERM

# FORM 4

# 2020/2021

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| WEEK | TOPIC | OBJECTIVES | ACTIVITIES | ASSESSMENTS |
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| 1 - 5 | REPRODUCTION<br>-Definition<br>-Types of reproduction in plants and animal : sexual and asexual.<br>-Structure and function of the male and female reproductive systems in humans. | -Compare sexual and asexual reproduction explaining that sexual reproduction leads to variation in the offspring while asexual reproduction is conservative- offspring is identical to parent.<br><br>-Describe the structure and function of the male and female reproductive systems in humans. | Use model charts | Quizz<br>In class test<br><br>Drawing |

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| | -<u>Menstural cycle</u><br>-role of estrogen and progesterone.<br>-effects of pregnancy on the menstrual cycle.<br>-Development of the embryo in humans.<br>-functions of the amnion, placenta and umbilical cord.<br><br><u>-Birth control</u><br>-methods of birth control.<br>-advantages and disadvantages of birth control | -Describe the menstrual cycle; explain the role of estrogen and progesterone and the effects of pregnancy on the menstrual cycle.<br>-Outline the mechanism for bringing gametes together, their fusion and the development of the embryo in humans; to include implantation, functions of the amnion placenta and umbilical cord.<br>-Discuss the advantages and the disadvantages of various methods of birth control.eg. barrier, hormonal and surgical methods.<br>Social aspect to be considered.<br>Discuss the transmission and control of Acquired Immune Deficiency Syndrome (AIDS) and gonorrhea;<br><br>-Compare the structure of an insect pollinated flower and | | |

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| | <u>Pollination</u><br>-definition<br>-types of pollination<br>-agents of pollination<br>-fertilization<br>-process<br>-fruit formation<br>-function of the fruit and seed.<br>Structure of a dicotyledonous seed.<br>-<u>Germination</u><br>-definition<br>-types<br>- importance<br>-<u>Seed dispersal</u><br>-types<br>-importance | a wind pollinated flower and relate these to their functions in pollination.<br>-Describe the means by which gametes are brought together and their fusion to form the zygote of a flowering plant.<br>Note that pollination ,growth of the pollen tube and fertilization are distinct processes.<br>-Relate the function of the fruit and seed to the structure of the flower in a dicotyledonous plant.<br>-Describe the structure of a dicotyledonous seed.<br>-Describe the process taking place within a seed during germination; include breakdown of food store and translocation to growing points.<br>-Describe fruit structure including adaptations for seed dispersal- water, wind, and animal. | -Draw and label the reproductive parts of the flower and the internal and external structures of the bean seed. | Drawing |
| 6 – 9 | <u>DISEASES</u> | Distinguish among pathogens, deficiency, hereditary and physiological diseases;<br>Include examples of each.<br><br>-identify the stages | | Quizz<br>In class test |

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| | | in the life cycle of the mosquito;<br><br>-discuss the role of the mosquito as a vector in the transmission of pathogenic diseases;<br><br>-suggest appropriate methods of control of each stage of the life cycle of the mosquito;<br><br>-discuss the treatment and control of the four main groups of diseases;<br><br>-discuss the social, environmental and economic implications of disease with reference to both plant and animal diseases. Emphasize the loss of human life, livestock and agricultural crops.<br><br>-distinguish among DNA, chromosomes, genes and alleles; | Draw and label the life cycle Collect the eggs and larvae of mosquitoes and make observations.<br><br>Collect and analyse data on the incidence of these diseases in the territory.<br><br>Display and interpret statistical data from local examples. | Drawing<br><br>Project |
| 10 - 13 | <u>MITOSIS AND MEIOSIS</u> | -describe the process of osmosis;<br><br>-explain the role of | Construct models of the structure of DNA and | Drawings |

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| | | mitosis in asexual reproduction;<br><br>-explain why asexual reproduction gives rise to genetically identical offspring;<br><br>-describe the process of meiosis;<br><br>-state the importance of halving of chromosomes number in the formation of gametes;<br><br>-explain the role meiosis in the transmission of inheritable genetic characteristics;<br><br>-explain the meaning of the following terms:<br>Dominant trait, recessive trait, codominance, genotype,phenotype, homozygous and heterozygous;<br>-explain the inheritance of traits(dominant and recessive genes)<br>Genetic diagrams must be used.<br>-predict the results of crosses involving one pair of alleles in the heterozygous, homozygous dominant and recessive conditions;<br>Include punette | chromosomes.<br><br>Construct models<br><br>Construct models | Quizz<br><br>Test<br><br>drawings |

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| | | square and pedigree charts.<br>-describe the mechanism of sex determination and inheritance of sex linked diseases in humans;<br>Include haemophilia and night blindness. | | |
| | END | OF | TERM | |

# ST MAARTEN ACADEMY

# DEPARTMENT OF SCIENCE

# BIOLOGY YEAR PLAN

# AUGUST TERM

# FORM 4

# 2020/2021

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| WEEK | TOPIC | OBJECTIVES | ACTIVITIES | ASSESSMENTS |
|---|---|---|---|---|
| 1 – 3 | GENETIC VARIATION<br>-Definition<br>-importance<br>Genetic variation is inheritable, environmental variation is not.<br><br>-distinguish between continuous and discontinuous | -explain how genetic variation arises<br>-explain why genetic variation is important; | Observe and record plant and animal variations in your community, for example hibiscus flowers, frogs, fishes, birds. Stress variations within a species, for example, humans and tomatoes.<br><br>Carryout a survey on appropriate characteristics; for example observe | Quizz<br>Test.<br><br>Laboratory report |

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| | variation in populations; eg foot size, tongue rolling and leaf size | | and record the range of variation in a particular feature of any kind of organism. | |
| 4 - 5 | <u>SPECIATION</u> | -define a species<br><br>-Describe how new species are formed<br>Two types:<br>speciation caused by physical geographical separation such as river forming, colonizing a new island or rise of a mountain range<br>-speciation caused by ecological and behavioral differences such as courtship behavior/ differences in coloration. | Make drawings to depict both types of speciation mechanism | Quizz<br>Test |
| 6 - 8 | <u>NATURAL SELECTION</u> | -explain how natural selection plays a role in biological evolution<br><br>-define natural selection as a process by which a population retains those genes which makes it adapted to its habitat. | Research how natural selection has played a role in the evolution of cassava plants, sea turtles, and Caribbean lizards. | Quizz<br>Test<br>Lab report<br>Project on natural selection. |

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| | The peppered moth, the Galapagos finches, bacterial resistance to antibiotics, pesticides resistance, the radiation of the Caribbean lizards. | -describe one example of a single characteristic which can be changed by natural selection;<br><br>-distinguish between natural and artificial selection; | | |
| 9 - 11 | <u>GENETIC ENGINEERING</u><br><br>-changing the traits of one organism by inserting genetic material from a different organism. Include food production and medical treatment.<br><br>-Social, ethical and ecological implications. | -describe how genetic engineering can be used to change the traits of an organism;<br><br>-discuss the possible advantages and disadvantages of humans changing the characteristics of organisms through genetic engineering. | | Test<br><br>Quizz |

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| END OF YEAR EXAM | | | | |

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