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3rd Form BIOLOGY YEARLY CURRICULUM

Text: Anne Tindale (2016) CSEC Biology Revision
Credit Hours: 5
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Course Description

Biology is very important and relevant; it deals with the study of living organisms. The knowledge and understanding of oneself and other organisms will undoubtedly improve the life of the individual as a whole.

During third form, students will build on the foundation they obtained in first and second forms. The materials to be presented will be so as to eventually prepare the students for CXC, however, such will normally be presented at a pace that allows the students to comprehend the information.

It is expected that students will participate in all laboratory exercise and make sure that all assignments are done and passed in on time. Students are strongly encouraged to pay keen attention to their laboratory exercises since the grading criteria to be used will be as recommended by CXC.

Grading Scheme	**1st, Semester**
Tests	30%
Quizzes	20%
Labs	15%
Presentation/Booklet	20%
Assignments/Forums	10%
Participation	5%
Total	100%

Grading Scheme	**2nd, Semester**
Tests	25%
Quizzes	15%
Labs	10%
Presentation/booklet	15%
Assignments/Forums	10%
Exam	25%
Total	100%

Semester 1 2019 — 3rd Form

Date	Topic	Objectives Students should be able to:	Assessment
Week 1 Aug 26 –30 and Week 2 Sept 2 - 6	**Introducing Biology** ** Looking at lab report requirements **Studying living things **Characteristics of living things **Collecting living things **Who's who in the world of living things	* Identify and apply rules of lab reports when drawing and doing graphs or tables.	Presentation #1 on Lab writing Class work on Drawing and Graphs Quiz on Lab reports - drawing - graphs - tables
Week 3 Sept 9th – 13th 10th holiday (The battle of St. Georges caye) Week 4 Sept 16-20 21st Holiday Week 5 Sept 23 - 27 Week 6 Sept 30 – Oct 4th	Living organisms and their environment Ecology Soil and microorganisms **useful microbes Quadrats and transects.	*Group living organisms according to observed similarities and differences. * Simple classification of all living organisms into the five kingdoms: plantae, Animalia, Fungi (mushroom), Prokaryotae (Bacteria) and Protista (amoeba). *Use a dichotomous key to identify an organism * construct a simple dichotomous key *describe main components of an ecosystem *Distinguish between and use in the correct context the following terms: (i) physical and biotic factors (ii) environment, niche and habitat (iii). Population and community. *Discuss the impact of the abiotic factors on living organisms *Understand what is meant by the term environment *appreciate the environment of an organism can supply many of its needs. *List the components of soil and explain how the balance of the different components can affect the properties of the soil. *Discuss the importance of different types of soil in providing water, mineral nutrients and oxygen to plants, animals and microorganisms. *Discuss the advantages and disadvantages of the use of natural and chemical fertilizers in the soil. *Discuss the importance of air in providing raw materials such as oxygen, carbon dioxide and nitrogen to living organisms. *Discuss the role of microorganisms to living organisms. *Describe how to estimate the numbers of a specified organism in an area. * Carry out a simple ecological study using the quadrats to investigate the distribution of species in a particular habitat.	Lab #1 on Animal kingdom - ORR Presentation #2 Five kingdoms Quiz #2 on animal kingdom Lab#2 soil Classwork #2 on soil Test#1 Lab#3 Quadrats and transects
Week 7 Oct 7-11 Week 8 Oct 14-18 Oct 14 Holiday	Food chains and food web **Feeding relationship **The wheel of life	*Identify the relative positions of producers and consumers in a food chain and relate the positions to their modes of feeding. *Identify, from a selected habitat, a food chain containing at least four organisms. *Identify, from the selected habitats, a herbivore, carnivore, and omnivore. *Identify, from the selected habitats, predator or prey relationships.	Quiz#4 food chains Poster on food chains

Week 9 Oct 21-25		*Construct a food web to include different trophic levels. *Discuss the advantages and disadvantages of special relationships to the organisms involved. *Discuss the interdependence of organisms within a food web. *Explain energy flow within a food web. *Explain, with examples, the continual reuse of materials in nature. * Explain illustrations of the water, carbon and nitrogen cycles. *Explain the role of decomposers and other bacteria in these nutrient cycles.	Presentation on the Biological cycles Test#2
Week 10 Oct 28- Nov 1 And Week 11 Nov 4-8	** Recycling ** Marine and wetland environments **Environment impact to climate change. *Population	*Describe how carbon and nitrogen are cycled through an ecosystem. *Explain the role of decomposers and other bacteria in these nutrient cycles. *Explain how biodegradable materials return nutrients to the environment. * Discuss the importance of and difficulties encountered in recycling manufactured materials. * Describe the impact of human activities on natural resources *Describe what resource is and state examples * Explain the negative impact of human activity on the environment * Assess the implications of pollution of marine and wetland environments * Discuss current and future trends regarding climate change. * suggest means by which the environment could be conserved and restored. * Discuss the factors that affect the growth and survival of populations including human populations.	Nature walk: collect biodegradable and non-biodegradable materials and classify them (school compound) Recycling project: create cans that collect only plastic water, on soft drinks and only juice bottles. Research on human impact of pollution, climate change, conservation and restoration, factors affect the growth and survival of population Test#3
Week 12 Nov 11-15 And Week 13 Nov 18-22 19th Holiday	***Cells, the brick of the body **Tissues, organs and organization **Molecules in motion	*Compare the structure of the generalized plant and animal cells, an selected microbes *Distinguish between cell wall and cell membrane, mitochondrion and chloroplast. *Draw and label simple diagrams to show the structure of unspecialized plant and animal cells. * Relate the structure of organelles to their functions *Differentiate between plant and animal cells. *Explain the importance of cell specialization in multi-cellular organisms. *Explain the processes of diffusion and osmosis in living systems. *Discuss the importance of diffusion, osmosis and active transport in living systems.	Lab#4 on Cells: diffusion and osmosis Quiz#5 cells Test#4
Week 14 Nov 25- 29	*The **Nutrition in plants** **The air around us	*Distinguish between heterotrophic, autotrophic nutrition and saprophytic nutrition. * List and describe the main components of photosynthesis. *Relate the structure of the leaf of a flowering plant to its function in photosynthesis.	Lab #5: leaf

Week 15 Dec 2-6 And Week 16 Dec 9-13	**Photosynthesis ** What controls the rate of photosynthesis **Chlorophyll, the miracle molecule **More about photosynthesis **The leaf, organ of photosynthesis	* Demonstrate the process of photosynthesis by writing it in its general and molecular formula thus differentiate between the Light and the Dark reactions. * Describe photosynthesis as the process by which green plants manufacture organic substances from inorganic substances. *Relate the structure of the leaf of a flowering plant to its function in photosynthesis. * Make a well labeled drawing of the external and internal structures of a hibiscus leaf hence describe its parts and the role they play in the process of photosynthesis. * Describe the role of the chloroplast as the site for photosynthesis and the stomata as the site of gaseous exchange between the plant and the environment. *Carry out simple controlled investigations to demonstrate that light and chlorophyll are necessary conditions for photosynthesis *Recognize chlorophyll as the molecule responsible for capturing sunlight to carry out photosynthesis. *Explain how environmental factors affect the rate of photosynthesis. * Describe the limiting factors in photo-synthesis hence compare the relationship between photosynthesis and respiration. *Discuss the importance of minerals in plant nutrition using nitrogen and magnesium as examples *Perform tests to distinguish among food substances. (reducing and non-reducing sugars)	Lab #6 : PD plan and design Photosynthesis Quiz#6 Test#5
Dec 14 – Jan 5	**Christmas Vacation**	**Three weeks**	
Week 17 Jan 6-10 And Week 18 Jan 13- 17 Needs to come first than the structure of the leaf.	Chemicals of life	*Identify the main elements that combine to make up the structure of living organisms. * Formulate a pie chart that illustrates the percentage of the main compounds which make up the human body. *Describe the chemical structure and physical properties of carbohydrates, lipids and proteins. * Formulate the basic structure of each organic nutrient in flow charts. * Describe the basic components of each compound as it forms from simple to complex compounds. *Describe the role of condensation and hydrolysis reactions in the building up and breaking down of organic molecules. Perform tests for the following substances: starch, proteins, lipids, reducing sugars and non-reducing sugars.	Lab # 7 PD: students choose from a list Lab#8: food testing

Semester 2 2020 — 3rd Form

Date 2018	**Topic**	**Objectives** Students should be able to:	
Week 1 Jan 20-24 Week 2 Jan 27- 31st	**Enzymes** **Lesson will be taught together with chemistry of life. (feb 4-8)**	* Explain the role and importance of enzymes in the natural processes of life within an organism. *Explain how enzymes catalyse reactions. *Describe the effects of different factors on the activity of enzymes, including: temperature, pH and concentration of enzyme and substrate. * perform experiments to show that these factors affect the rate of an enzyme-catalyzed reaction.	Lab# 9 enzymes: potato Test#6

Week 3 Feb 3-7 Week 4 Feb 10-14 Week 5 Feb 17 - 21 And Week 6 Feb 24 - 28	**Nutrition in Man** **Minerals and vitamins ***Vegetarianisms** ***Digestive system** **Chemical digestion ****** how energy is released	*Discuss the importance of a balanced diet in humans and how malnutrition can lead to deficiency diseases, obesity and other problems. *Recall the role of minerals and vitamins in a balanced diet. *Discuss the advantages and disadvantages of a vegetarian diet. *Describe the types of heterotrophic nutrition and the categories there are. * Use charts to describe the effects of deficiency of different food nutrients to man. * Relate the importance of the consumption of water and roughage in our diet to alleviate constipation. * Outline the different food additives, its use and its effects on health. * Discuss, using poster, pictures, charts, etc., what is balanced diet, vegetarianism, six food groups and malnutrition in groups in the form of oral presentation. * Value the importance of practicing good eating habits to avoid health problems. *Discuss the effects of age, sex and occupation on dietary needs, including energy requirements. * Investigate the energy content of foods by a simple calorimetric method. * Describe the structure and function of different regions of the human alimentary canal, including, mastication and the role of teeth, the internal structure of a tooth, peristalsis, role and importance of enzymes and the processes of digestions, absorption and egestion **Explain the role and importance of enzymes. *Investigate the effect of temperature and pH on the activity of the enzyme catalase or amylase. * Describe what happens to the products of digestion after their absorption, including transport to the liver, assimilation and the fate of products that are in excess of body requirements. *Construct a Visking tubing model of the ileum.	Lab# 10 Balanced diet Quiz#7 Posters on balanced diet Creating model of a tooth Test#7
Week 7 Mar 2-6 Week 8 Mar 9 -13	*__Breathing and Respiration__	*Understand the meaning of cell respiration and the difference between respiration and breathing. *Demonstrate knowledge and understanding of the products of respiration. *Describe the process of aerobic respiration *Understand the function of ATP as an energy 'currency' in the cell. *Distinguish between aerobic and anaerobic respiration. *Carry out controlled experiments to demonstrate the products of aerobic and anaerobic respiration. *Describe the structure of the respiratory system *Describe the mechanism of ventilation of the lungs. * Identify the characteristics common to gas exchange surfaces *Discuss the effects of cigarette smoking on the body.	Commercial presentation on smoking TEST #8
Week 9 March 16 - 20 Week 10 March 23-27	***Transport in Mammals** **Blood, the living fluid **More about blood	*Understand why small organisms do not need a transport system, but large organisms do. *Explain the need for transport systems in multi-cellular organisms. *Identify the types of materials which need to be transported in animals and plants.	Practical lab on mammalian heart Quiz

and Week 11 March 30 – April 3	**How does blood move around the body **Tissue fluid and lymph	*Describe the structure and function of the circulatory system in humans. *Describe the structure and function of the heart. *Explain how the structures of the three types of blood vessels are suited to their function. *List and Describe the composition and functions of blood in transport. *Describe the functions of the main components of blood. *Explain how immunization is used to control disease.	TEST
April 6 – 17	EASTER BREAK TWO WEEKS		
Week 12 April 20 - 24	**Transport in plants** - Uptake and transport in plants - How do plants support themselves. Transport in plants continue	*Describe the structure of xylem vessels, sieve tubes and companion cells. *Explain how the structure of xylem vessels suits them for their function. *Describe the process involved in transpiration. *Demonstrate the effects of external factors on transpiration. *State the function of phloem in the transport system of plants. *Discuss adaptations of plants to conserve water.	Lab on celery and food colouring Quiz
Week 13 April 27 – May 1st (holiday)	**Food storage**	* Identify the products stored in plants and animals and the sites of storage * Discuss the importance of food storage in living organisms	
Week 14 May 4-8 Week 15 May 11-15	**Growth in plants** ** Germination	Understand the different ways in which growth can be measured *Measure growth in a plants. * Make deductions from simple investigations designed to demonstrate growth in living organisms * Demonstrate the process of etiolation in germinating seedlings as an unhealthy growth in plants. *Describe the structure of a dicotyledonous seed. *Describe the processes taking place within a seed during germination.	Lab on drawing of fruits
Week 16 May 18 - 22 Week 17 May 25-29	**HOMEOSTASIS AND EXCRETION** **The liver **How do we get rid of waste substances	*Discuss the meaning of homeostasis and the concept of negative feedback *Discuss the importance of excretion in living organisms. *Give examples of substances excreted by animals and plants *State the means by which excretory products are eliminated from plants and animals. *Relate the structure of the kidney ton its osmoregulation and excretory function. *Explain the role of antidiuretic hormone (ADH) in osmoregulation. *Understand how dialysis can be used in the event of kidney failure.	Lab on germination A/I
Week 18 June 1-5	Review week		Lab ORR on Urine
Week 19 June 8-12	**Exam WEEK**		