Biology

Item No.	Content	Competencies	Description of Competencies	DOK level
1.	Introduction to biology	• Demonstrate understanding of biology as a science of life	• List the main branches in biology and state their importance • Make observations of the different body symmetries and orientations in biology • Relate the general features of a simple microscope to its functions • Apply rubrics in biological drawings • Apply the scientific inquiry method to solve problems in the natural world	1 2 2 4 4
2.	Cell biology	• Demonstrate knowledge on cell concept	• Draw, relate cell components to their functions • Explain the phenomena of movement of substances in and out of cells	2 3
3.	Life process in living things	• Be apprised with the basic life processes in some living organisms	• Explain the life processes in some living organisms (amoeba, rhizopus cockroach, mosquito, honey bee, tilapia, domestic fowl and toad)	3/4
4.	Diversity of living things	• Demonstrate understanding of the diversity of nature	• List and compare the 5-level system of classification of living things	1/2
5.	Interactions in nature	• Demonstrate understanding of ecological terminologies • Demonstrate understanding of basic terminologies in population dynamics	• Definition of ecological terminologies • Compare the different ecological habitats • Construct food chains, webs and pyramids in specified ecological habitats • Cite evidence of biological associations in nature • Explain basic terminologies in population dynamics	1 2 4 3 2 3/4 2/3 3/4

		• Understand basic principles of biological pest control • Demonstrate knowledge of ecological succession	• Apply biological concepts to control pest infestation • Explain and distinguish between the different types of ecological successions • Apply the principles of soil types to crop production	
6.	Humans and their environment	• Develop a logical argument of the use and impact of natural resources • Demonstrate knowledge of the relationship between humans and their environment	• Discuss the use, abuse and impact of natural resources • Identify patterns in natural cycles (C-, N-, H_2O) • Discuss some of the causative organisms of diseases common to humans and plants • Application of principles of personal health and hygiene to prevent diseases, injury and pollution	3 2 2 3/4
7.	Mammalian anatomy physiology	• Be apprised with the various organ-systems in mammals and their life processes	• Identify the different parts of organ-systems of mammals (movement, respiration, reproduction, excretion, irritability & nutrition) • Match the structure of the organs in these organ-systems to their functions • Explain the life process performed by these organ-systems	1/2 1/2/3 3
8.	Anatomy & physiology of plants	• Differentiate between the structure and various processes in monocotyledonous and dicotyledonous plant	• Compare monocotyledonous and dicotyledonous plants • Identify the internal structure of roots, stems and leaves • Explain the phenomena of photosynthesis and mineral nutrition in plants • Describe the various life processes in plants	2 2 3 3

			(gaseous exchange, transport, excretion and reproduction)	
9.	Cell biology, genetics and evolution	• Demonstrate knowledge of the structure of nucleic acids and their role in cells • Demonstrate understanding of the cell cycle • Show understanding of the basic principles of genetics and evolution	• Describe the structure of nucleic acids and their role in cells • Explain, describe the cell cycle and differentiate between the types of cell division(s) • Explain variation and differentiate between the types, citing examples • Use pedigree analysis to make inferences • Explain the different types of theories in evolution (Larmarck & Darwin) • Provide and critique evidence of evolution	3 3 3 4 3 4
10.	Biology and industry	• Apply basic biological principles to industry	• Describe the biological concepts used in these industries- water, fishing, food and agriculture • Explain phenomena in biological generation of fuel and concepts of biotechnology	3 3

Table of Specification GTLE SHS Biology

S/N	Content Areas	Course Objective (DOK)				
		Level 1	Level 2	Level 3	Level 4	Total
1	Introduction to Biology	1	2	3	2	8
2	Cell Biology	3	3	3	2	11
3	Life Processes in Living Things	3	3	3	1	10
4	Diversity of Living Things	3	1	4	2	10
5	Interactions in Nature	1	3	4	3	11
6	Humans and their Environment	3	2	2	2	9

7	Mammalian Anatomy and Physiology	2	4	4	2	12
8	Plant Structure and Physiology		2	5	2	9
9	Cell Biology, Genetics & Evolution	4	4	4	2	14
10	Biology & Industry		2	2	1	5
Total		**20%**	**25%**	**35%**	**20%**	**100**

Prepared by:
Dr John Ekow Mbir Amoah
Dr Yeboah Kwaku Opoku
Regina Akosua Henewa

NOTE

Level 1	Level 2	Level 3	Level 4	Total
1	2	3	2	8
3	3	3	2	11
3	3	3	1	10
3	1	4	2	10
1	3	4	3	11
3	2	2	2	9
2	4	4	2	12
	2	5	2	9
4	4	4	2	14
	2	2	1	5
20	26	34	19	99

BIOLOGY-TABLE OF SPECIFICATION

S/N	Content Areas	Course objective (DOK)				
		Level 1	Level 2	Level 3	Level 4	Total
1	**Introduction to Biology**					
	• Biology as a science of life	1		1		
	• Importance of biology		1		1	9
	• Body symmetry and orientation		1		1	
	• The microscope			2	1	
2	**Cell Biology**					
	• The cell as a unit of life	1		1		
	• Types of cells					
	• Specialized eukaryotic cells		1	1	1	11
	• Relationship of cell to tissue, organ and organ systems	1	1		1	
	• Movement of substances into and out of cells		1	1	1	
3	**Life Processes in Living Things**					
	• amoeba	1				
	• rhizopus	1				
	• cockroach		1			
	• weevil			1	1	10
	• honey bee		1	1		
	• tilapia		1		1	
	• domestic fowl			1		
4	**Diversity of Living Things**					
	• hierarchy of classification	1				
	• protoctista and fungi				1	
	• divisions and classes of kingdom plantae	1		1		9
	• phyla, classes and orders of kingdom animalia		1	1		
	• characteristics of some of the orders of class insecta		1	1	1	
5	**Interactions in Nature**					
	• Basic concepts in ecology		2			11
	• Aquatic and terrestrial habitats	1				

	• Biological Associations			1		
	• Population Dynamics				2	
	• Biological pest control			1		
	• Ecological succession			1	2	
	• Soil		2			
6	**Humans and their Environment**					
	• Natural resources	1	1			
	• Consequences of human interference in nature				1	9
	• Humans and harmful microbes			1	1	
	• Health and hygiene	1	1	1	1	
7	**Mammalian Anatomy and Physiology**					
	• Movement	1				
	• Transport			1		
	• Respiration		1		1	
	• Excretion		1	1		12
	• Reproduction		2			
	• Nutrition			1	1	
	• Control and Co-ordination	1			1	
8	**Plant Structure and Physiology**					
	• Morphology of monocots and dicots		1			
	• Internal structure of roots, stems and leaves		1			
	• Growth and development of plants			1		
	• Photosynthesis and mineral nutrition				1	9
	• Gaseous exchange			1		
	• Transport			1		
	• Excretion			1		
	• Reproduction			1	1	
9	**Cell Biology, Genetics and Evolution**					
	• Nucleic acids	1				
	• DNA structure, replication and RNA Transcription	1			1	13
	• Protein synthesis	1		1		
	• Cell cycle		1		1	

	• Heredity			1	2	
	• Variation		1	1		
	• Evolution				1	
10	**Biology and Industry**					7
	• Biology and water industry		1		1	
	• Biology and fishing industry		1			
	• Biology and food industry			1	1	
	• Biology and agriculture			1		
	• Biotechnology& Biological fuel generation				1	
	Total	**15%**	**25%**	**30%**	**30%**	**100%**