## **Dubai International School-Al Quoz**

## **Science Department (Grades 9-12)**

## **Curriculum Annual Plan**

Grade: 11 Subject: Honors Biology 2024-2025

## TERM-I

EMSAT Requirement	NGSS PE Code	DCIs	Unit /Topic	Learning Objectives	Week No. & Date	No. of Lessons
Section -2 This section includes inheritance of traits and heredity and genetic technology. Inheritance of traits focuses on cell growth and division emphasizing on the behavior of chromosomes during different phases and consequences of specific errors during these phases. It also encompasses gene	HS-LS1-1.	Structure and Function & Systems of specialized cells within organisms help them perform the essential functions of life. (HS-LS1-1) & All cells contain genetic information in the form of DNA molecules. Genes are regions in the DNA that contain the instructions that code for the formation of proteins, which carry out most of the work of cells. (HS-LS1-1)	Unit -6 Human Genetics – Chapter 22 22.1 : DNA and RNA structure and function. Chapter : 22.2	<ul> <li>Explain how models of DNA changed over time as new scientific evidence emerged, resulting in the final consensus model.</li> <li>Explain how the structure of DNA &amp;determines the structure of proteins which carry out the essential functions of life through systems of specialized cells.</li> <li>Elucidate transcription, post-transcriptional modifications and translation and relate these processes to gene expression in prokaryotes &amp;Eukaryotes.</li> </ul>	W1: 26/08/2024/ 30/08/2024	4

expression and regulation in eukaryotes and prokaryotes, genetic variations and modes of inheritance including		(HS -LS 3-1)		Apply genetic code rules to read the DNA sequence and to identify the amino acids in the polypeptide chain & describe genetic variation and population diversity.
Section -2 This section includes inheritance of traits and heredity and genetic technology. Inheritance of traits focuses on cell growth and division emphasizing on the behavior of chromosomes during different phases and consequences of specific errors during these phases. It also encompasses gene expression and regulation in eukaryotes and	HS-LS1-1 HS -LS 3-1	Structure and Function Isystems of specialized cells within organisms help them perform the essential functions of life. (HS-LS1-1) Is All cells contain genetic information in the form of DNA molecules. Genes are regions in the DNA that contain the instructions that code for the formation of proteins, which carry out most of the work of cells. (HS-LS1-1)  (HS-LS3-1)	Unit -6 Human Genetics – Chapter -21: Genetic inheritance. Chapter 22.2	Relate the role of DNA and chromosome in coding instructions.  Describe genetic variation and population diversity with respect to DNA.  Explain how the structure of DNA relates to an organism's phenotype and genotype.

prokaryotes, genetic variations and modes of inheritance including						
Section -2 This section includes inheritance of traits and heredity and genetic technology. Inheritance of traits focuses on cell growth and division emphasizing on the behavior of chromosomes during different phases and consequences of specific errors during these phases. It also encompasses gene expression and regulation in eukaryotes and prokaryotes, genetic variations	HS-LS3-2	In sexual reproduction, chromosomes can sometimes swap sections during the process of meiosis (cell division), thereby creating new genetic combinations and thus more genetic variation. Although DNA replication is tightly regulated and remarkably accurate, errors do occur and result in mutations, which are also a source of genetic variation. Environmental factors can also cause mutations in genes, and viable mutations are inherited. (HS-LS3-2)	Unit -6 Human Genetics  Chapter 22: 22.1: Gene Expression  Chapter 20: 20.1: cancer results from gene mutation	Collect evidence to support the idea of genetic variation  Infer that the gene regulation can take place at various steps of gene expression emphasizing Lac operon concept.  •Analyse the cause and effect of mutation.  •Explain the different environmental factors affecting mutation.  •Analyse data to make predictions about how changes in DNA affect an organism's phenotype.	W3: 09/9/2024- 13/9/2024	4

and modes of inheritance including Section -2 Mendelian and non-Mendalian genetics. Heredity and genetic technology focus on the importance of genetic engineering in medicine, industry and agriculture with the emphasis on their impact on human's life.	HS-LS1-1	Structure and Function ② Systems of specialized cells within organisms help them perform the essential functions of life. (HS-LS1-1) ② All cells contain genetic information in the form of DNA molecules. Genes are regions in the DNA that contain the instructions that code for the formation of proteins, which carry out most of the work of cells. (HS-LS1-1	Chapter 19: Patterns of chromosome inheritance 19.2: Cell cycle 19.3: Mitosis 19.4: Meiosis	<ul> <li>Explain the different stages of cell division mitosis &amp; meiosis.</li> <li>Explain the importance of cell growth and cell division and describe the possible errors occur during cell cycle.</li> <li>Explain why asexual reproductive strategies do not lead to genetic diversity.</li> <li>Explain the advantage(s) of asexual reproduction strategies for organisms.</li> <li>Explain how meiotic cellular division followed by fertilization leads to genetic diversity within a population.</li> </ul>	W4: 16/9/2024- 21/9/2024	4
Section -2 This section includes inheritance of traits and heredity and genetic technology. Inheritance of traits focuses on cell growth and division emphasizing on the	HS-LS1-4	Growth and Development of Organisms & In multicellular organism's individual cells grow and then divide via a process called mitosis, thereby allowing the organism to grow. The organism begins as a single cell (fertilized egg) that	Chapter 21: 21.3: Inheritance and genetic disorder 21.4: Beyond simple inheritance pattern 21.2: one and two trait inheritance	Evaluate the significance of mendelian genetics to determine the phenotype and genotype and predict the probable outcome of offspring.  Apply Punnett square to determine the genotypic and phenotypic ration in first and second generation.  Explain the various modes of inheritance including co-dominance,	W5: 23/9/2024- 27/9/2024 <b>29/9/2023</b> <b>Prophet's</b> <b>Birthday</b> )	4

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behavior of		divides successively to	0.4 = 0	sex linked polygenetic trait and		
chromosomes		produce many cells, with	21.5 : Sex	multiple alleles. (Non-Mendelian		
during different		each parent cell passing	linked	Inheritance)		
phases and		identical genetic material	inheritance			
consequences of		(two variants of each		Apply pedigree to predict the		
specific errors		chromosome pair) to		inheritance of a trait within a family.		
during these		both daughter cells.				
phases. It also		Cellular division and				
encompasses gene		differentiation produce				
expression and		and maintain a complex				
regulation in		organism, composed of				
eukaryotes and		systems of tissues and				
prokaryotes,		organs that work				
genetic variations		together to meet the				
and modes of		needs of the whole				
inheritance		organism.				
including		_				
Section -2	HS-LS1-4				W6:	4
This section		Growth and		Evaluate the importance of genetic	30/9/2024	
includes		Development of	Chapter 22.3:	engineering in medicine &agriculture,	04/09/2024	
inheritance of		Organisms 📤 In	DNA	citing its positive and negative effects		
traits and heredity		multicellular organism's	Technology	in different fields.		
and genetic		individual cells grow and				
technology.		then divide via a process				
Inheritance of		called mitosis, thereby		Describe different techniques ( PCR, gel		
traits focuses on		allowing the organism to		electrophoresis & DNA Profiling )used		
cell growth and		grow. The organism		to manipulate DNA		
division		begins as a single cell				
emphasizing on the		(fertilized egg) that				
behavior of		divides successively to		Explain how gene therapy is used to		
chromosomes		produce many cells, with		treat genetic disorders.		
during different		each parent cell passing				
phases and		identical genetic material				
1 *		(two variants of each				I

chromosome pair) to both daughter cells. Cellular division and differentiation produce and maintain a complex organism, composed of systems of tissues and prokaryotes, genetic variations and modes of inheritance including    HS-LS2-3			T	1	T	T	
phases. It also encompasses gene expression and regulation in eukaryotes and maintain a complex organism, composed of systems of tissues and organs that work together to meet the needs of the whole organism.  Section 1 Section 1: From molecules to living organisms: Structure and function. The chemistry of life focuses on the importance of biological macromolecules in the body and the properties of water to that allow life to to maintain a complex organism.  Cellular division and differentiation produce and maintain a complex organism. Treatment for illness.	'						
encompasses gene expression and regulation in eukaryotes and prokaryotes, genetic variations and modes of inheritance including  Section 1  Section 1: From molecules to living organisms:  Section 1: From molecules to living organisms:  The chemistry of life focuses on the importance of biological macromolecules in the body and the properties of water to at allow life to to the properties of water to make to go organisms organism domptowater organisms organism whole organism whole organism.  Idifferentiation produce and maintain a complex organism, composed of systems of tissues and organism that work together to meet the needs of the whole organism.  PROJECT WEEK  W7: 07/9/2024 11/09/2024  W8  8  14/09/204  Section 1: From cellular respiration (including anaerobic processes) provide most of the energy for life processes) provide most of the energy for life processes of photosynthesis converts light energy to stored chemical energy by converting carbon dioxide plus water into sugars plus released oxygen. (HS-LS1-5)  The sugar molecules in the body and the properties of water to its roles in living organisms.  In the body and the properties of water to its roles in living organisms.  In the body and the properties of water to its roles in living organisms.  In the sugar molecules thus formed contain the body and the thought of the properties of water to its roles in living organisms.	_		•				
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genetic variations and modes of inheritance including    Section 1	eukaryotes and		systems of tissues and				
and modes of inheritance including    PROJECT WEEK   W7: 07/9/2024   11/09/2024	prokaryotes,		organs that work				
inheritance including    PROJECT WEEK   W7: 07/9/2024   11/09/2024	genetic variations		together to meet the				
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Section 1: From molecules to living organisms: Structure and function.  The chemistry of life focuses on the importance of biological macromolecules in the body and the properties of water that allow life to  HS-LS1-5  (including anaerobic processes) (including anaerobic processes) provide most of the energy for life processes) provide most of the energy for life processes of the energy for life processes  The chemistry of life process of photosynthesis converts light energy to stored chemical energy by converting carbon dioxide plus water into sugars plus released oxygen. (HS-LS1-5) The sugar molecules thus formed contain  Torganization Chapter 2: Chemistry of life processes and primary functions in the body.  Explain the importance of ATP in the body.  Setting terms of composition, energy values, and primary functions in the body.  Explain the importance of ATP in the body.  Setting terms of composition, energy values, and primary functions in the body.  Explain the importance of ATP in the body.  Setting terms of composition, energy values, and primary functions in the body.  Explain the importance of ATP in the body.  Setting terms of composition, energy values, and primary functions in the body.  Explain the importance of ATP in the body.  Setting terms of composition, energy values, and primary functions in the body.  Explain the importance of ATP in the body.  Setting terms of composition, energy values, and primary functions in the body.  Explain the importance of ATP in the body.  Setting terms of composition, energy values, and primary functions in the body.  Explain the importance of ATP in the body.  Setting terms of composition and primary functions in the body.  Setting terms of composition and primary functions in the body.  Setting terms of composition and primary functions in the body.  Setting terms of composition and primary functions in the importance of ATP in			1	Human	-		
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macromolecules in the body and the properties of water that allow life to  sugars plus released oxygen. (HS-LS1-5) The sugar molecules thus formed contain  sugars plus released oxygen. (a. 2.7 : ATP , An energy carrier that allow life to	•		<u> </u>		, ,		
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properties of water that allow life to The sugar molecules thus formed contain energy carrier				2.7 : ATP . An	•		
that allow life to thus formed contain	-			-			
	1		_				
			carbon, hydrogen,				

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well as the role of		and oxygen: their		Explain the role and effect of enzymes		
enzymes in		hydrocarbon backbones		and other factors, such as pH and		
chemical reactions		are used to make	3.6:	temperature, in the chemical reactions		
carried out in living		amino acids and other	Metabolism	carried out in living organisms.		
organisms. It also		carbon-based molecules	and energy			
focuses on the		that can be	reaction			
major cellular		assembled into larger				
processes of		molecules (such as				
breaking energy		proteins or DNA),				
(photosynthesis		used for example to form				
and cellular		new cells. (HS-LS1-6)				
respiration) and		As matter and energy				
energy		flow through different				
transformation.		organizational				
		levels of living systems,				
		chemical elements are				
		recombined in				
		different ways to form				
		different product				
Section 1	HS-LS2-3	Photosynthesis and				
Living organisms'		cellular respiration	3.6:	Illustrate using models how light	W9	
organization and	HS-LS1-5	(including anaerobic	Metabolic	energy is transformed to chemical	17/10/2022	
development	HS-LS1-6	processes)	pathways	energy.		
focuses of the role		provide most of the			21/10/2022	
of the cell in		energy for life processes		Identify and summarize the major		
different living		The process of	Unit 1	cellular processes of breaking energy-		
organisms		photosynthesis converts		rich molecules to obtain energy.		
emphasizing on		light energy to stored	Chapter 3:			
cellular structures		chemical energy by	3.1:	transfer in cell occurs under anaerobic		
and their functions,		converting carbon	Microscopy	condition (fermentation)		
as well as the use		dioxide plus water into				
of microscopes in		sugars plus released				
cellular studies. In		oxygen. (HS-LS1-5)				
addition, this part						
Section 1 Living organisms' organization and development focuses of the role of the cell in different living organisms emphasizing on cellular structures and their functions, as well as the use of microscopes in cellular studies. In	HS-LS1-5	organizational levels of living systems, chemical elements are recombined in different ways to form different product  Photosynthesis and cellular respiration (including anaerobic processes) provide most of the energy for life processes The process of photosynthesis converts light energy to stored chemical energy by converting carbon dioxide plus water into sugars plus released	Metabolic pathways  Unit 1  Chapter 3: 3.1:	energy is transformed to chemical energy.  Identify and summarize the major cellular processes of breaking energyrich molecules to obtain energy.  transfer in cell occurs under anaerobic	W9 17/10/2022 21/10/2022	

focuses on major	2 The sugar molecules	Explain the three steps of cellular
body systems and	thus formed contain	respiration -Glycolysis, Krebs cycle and
processes in living	carbon, hydrogen,	Electron transport chain.
organisms. It	and oxygen: their	
emphasizes the	hydrocarbon backbones	Differentiate between aerobic and
role of body	are used to make	anerobic respiration and how energy
systems in	amino acids and other	, , , , , , , , , , , , , , , , , , ,
different living	carbon-based molecules	
organisms with	that can be assembled	Demonstrate a good understanding of
relation to the	into larger molecules	handling and using the light microscope
importance of the	(such as proteins or	for examination purposes, and
interaction	DNA), used for example	compare with electron microscope in
between the body	to form new cells. (HS-	terms of resolution, magnification and
systems in	LS1-6)	use
maintaining the	2 As matter and energy	
internal body	flow through different	
environment.	Organizational	
	levels of living systems,	
	chemical elements are	
	recombined in	
	different ways to form	
	different product	

EMSAT	NGSS PE	DCIs	Unit /Topic	Learning Objectives	Week No.	No. of
Requirement	Code				& Date	Lessons
		Q	UARTER- II			
Section 1 Living organisms' organization and development focuses of the role of the cell in different living organisms emphasizing on cellular structures and their functions, as well as the use of microscopes in cellular studies. In addition, this part focuses on major body systems and processes in living organisms. It emphasizes the role of body systems in different living organisms with relation to the importance of the interaction between the body systems in maintaining the internal body environment.  Section 3:	HS-LS1-2 HS-LS1-3	Genetic information, like the fossil record, provides evidence of evolution. DNA sequences vary among species, but there are many overlaps; in fact, the ongoing branching that produces multiple lines of descent can be inferred by comparing the DNA sequences of different organisms. Such information is also derivable from the similarities and differences in amino acid sequences and from anatomical and embryological evidence	UNIT 7: Human evolution and Ecology. Chapter 23.2: Biological evolution.	Discuss the early developed concepts of evolution by Lamarck.  Describe the scientific discoveries that informed the theory of natural selection.  Analyze the relationship between fossilized organisms and living organisms.  Explore how genetic variation of trait in population increases individuals' probability of survival.	W10: 28/10 /2024 1/11 /2024	4

Frank diament	1		1	<u> </u>	XX71.1	<del>                                     </del>
Evolution and					W11:	
Diversity of Life This	HS-LS4-1				5/11 2024	
section includes					8/11/2024	
evolution and						
diversity of life.						
Evolution focuses on						
theory and evidence						
of evolution to						
determine the						
evolutionary						
relationships among						
different species, as						
well as evolutionary						4
processes such as						
natural selection and						
genetic drift and their						
consequences on the						
populations' stability.						
Section 3:	HS-LS4-2	Natural Selection • Natural	Evolution &	Explore Charles Darwin's theory	W12	4
Evolution and		selection occurs only if there is	Natural	of evolution and the evidence	11/11/2024	
Diversity of Life This		both (1) variation in the genetic	selection	that lead to the discovery.	15/12/2024	
section includes		information between organisms	External			
evolution and		in a population and (2) variation	Resources			
diversity of life.		in the expression of that genetic				
Evolution focuses on		information — that is, trait				
theory and evidence		variation — that leads to				
of evolution to		differences in performance				
determine the		among individuals.		Analyze theory of evidence to		
evolutionary				support the modern theory of		
relationships among				evolution.		
different species, as						
well as evolutionary				Describe how selective		
processes such as				pressures in the		
natural selection and						

genetic drift and their consequences on the populations' stability.				environment can affect an organism's fitness.  Explain how selective pressures in the environment could cause shift in phenotypic and /or allelic frequency.		
Section 3: Evolution and Diversity of Life This section includes evolution and diversity of life. Evolution focuses on theory and evidence of evolution to determine the evolutionary relationships among different species, as well as evolutionary processes such as natural selection and genetic drift and their	HS-LS-4-2	Adaptation • Evolution is a consequence of the interaction of four factors: (1) the potential for a species to increase in number, (2) the genetic variation of individuals in a species due to mutation and sexual reproduction, (3) competition for an environment's limited supply of the resources that individuals need in order to survive and reproduce, and (4) the ensuing proliferation of those organisms that are better able to survive and reproduce in that environment.	Chapter 23.3: Classification of human Chapter 23.5: Evolution of human.	Analyze the relationship between homologous structures in different animals to infer evolutionary relationship.  Describe how living organisms are classified and categorize them according to specific structural and functional characteristics.  Create and explain a simple	W13: 18/11/2024 22/11/2024	4
consequences on the populations' stability.				cladogram to explain the evolutionary relationship.  Analyze the three types of homologies to provide evidence to support common ancestors		

Section 3:	HS-LS4-3	variation in the expression of that	Variation &	Distinguish between		2
Evolution and	113-134-3	genetic information — that is,	Genetic Drift	microevolution &	W14:	2
Diversity of Life This		trait variation — that leads to	defiette britt	macroevolution	25/11-2024	
section includes		differences in performance		Inacioevolution	29/11/2024	
evolution and		•		Explore the mechanism of	29/11/2024	
		among individuals.		· ·		
diversity of life.				evolution leading to variation.		
Evolution focuses on						
theory and evidence				Compare and contrast		
of evolution to				bottleneck effect and founder		
determine the				effect during genetic drift.		
evolutionary						
relationships among						
different species, as				Predict how allelic frequency in		
well as evolutionary				a population shift in response		
processes such as				to genetic drift .		
natural selection and						
genetic drift and their						
consequences on the						
populations' stability.						
Section 3:	HS-LS4-3	Speciation occurs when	<b>Speciation</b>		W15:	4
Evolution and		populations of the same		Explain how geographic	4/12/2024	
Diversity of Life This		species are separated, resulting		separation events	6/12/2024	
section includes		in reduced gene flow, which		can lead to the formation of		
evolution and		over time allows populations to		new species.( Galapagos island)		
diversity of life.		become genetically distinct				
Evolution focuses on		from one another.		Describe mechanisms that		
theory and evidence		a. Geographic separation: a		contribute to reproductive		
of evolution to		physical barrier (e.g., rivers		separation that could lead to		
determine the		changing course, glacial		speciation.		
evolutionary		movement, continental drift).				
relationships among		b. Habitat specialization: niche				
different species, as		differentiation from others in		Explore Wegener's idea of		
well as evolutionary		the population.		drifting continents and describe		
processes such as		the population.		diffiling continients and describe		
processes such as						

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natural selection and	c. Behavioral separation:		the evidence he cited to		
genetic drift and their	different mating habits, times,		support his hypothesis.		
consequences on the	or				
populations' stability.	locations from others in the				
	population.		Apply, evidence to support the		
	d. Mechanical separation:		claim that rates of speciation		
	structural differences in sex		have varied throughout Earth's		
	organs that make individuals		history.		
	within a population unable to		mscory.		
	reproduce with one another				
	reproduce with one another				
	<u> </u>			XX 11 C	1
	Project WEEK			W16:	4
	•			09/12/ 2024	
				13/12/2024	
	<b>Winter Break</b>			DEC 16 <sup>th</sup>	
				JAN 5 <sup>th</sup> 2025	
	FINALIZING LESSONS			W17	
	AND REVISION WEEK.				
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	WEEK 18 and 19:				
	SEMESTER ONE				
	FINAL/MAKEUP/BR				
	EAK BETWEEN				
	SEMESTER				
				]	