

MCS IB Biology Year 1 Subject Group Overview

Unit Name	Cells	Molecular Biology: Structure and Function	Molecular Biology: Cell Energetics	Genetics	Ecology: Ecosystems	Exam Review
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Time	6 weeks	5 weeks	6 weeks	8 weeks	8 weeks	2 weeks
IB Topics	1.1-1.6	2.1-2.4, 2.6	2.5, 2.7-2.9	3.1-3.5	4.1-4.3; C.1, C.2	
Content Specific Information (texts, documents, methods)	<p>Statement of Inquiry: All living things are composed of cells with similar structures and life cycles.</p> <p>Phenomenon: Smoking and cell division—smoking disrupts programmed cell division leading to negative health outcomes and ultimately cancer.</p> <p>Crosscutting Concepts</p> <ul style="list-style-type: none"> ● Structure and Function ● Interactions ● Stability and Change ● Patterns <p>CORE IDEAS</p> <ul style="list-style-type: none"> ● Prokaryotic / Eukaryotic Cells, ● Animal/Plant Cells, Functions of Life, ● Cell Theory, Endosymbiosis ● Stem Cells and Treatment 	<p>Statement of Inquiry: Various Functions of a cell can be predicted through the complex structures of their molecules.</p> <p>Phenomenon: Human health and diet—The health of a human body is correlated to the presence or absence of certain molecules. For example, the scientific evidence of the risk of ingesting trans fats and saturated fatty acids.</p> <p>Crosscutting Concepts</p> <ul style="list-style-type: none"> ● Structure and Function ● Interactions ● Stability and Change ● Patterns <p>CORE IDEAS</p> <ul style="list-style-type: none"> ● Properties of Water, ● Carbon: Functional Groups and bonding ● Metabolism, ● Macromolecules 	<p>Statement of Inquiry: Research is continuously being conducted to find novel applications for enzymes that will promote human health and wellness.</p> <p>Phenomenon: Industrial production of lactose-free milk – Enzymes have become more important to the production of items that are needed by populations around the world.</p> <p>Crosscutting Concepts</p> <ul style="list-style-type: none"> ● Stability and Change ● Cause and Effect ● Patterns <p>CORE IDEAS</p> <ul style="list-style-type: none"> ● Enzymes, ● Cellular Energy: Photosynthesis, Respiration, Fermentation ● Protein Synthesis 	<p>Statement of Inquiry: Advancements in biotechnology supports complex research into the inheritance patterns and genetics of all living things.</p> <p>Phenomenon: The causes and effects of sickle cell anemia – A base substitution mutation drives significant phenotypical change in humans.</p> <p>Crosscutting Concepts</p> <ul style="list-style-type: none"> ● Structure and Function ● Systems and System models ● Patterns <p>CORE IDEAS</p> <ul style="list-style-type: none"> ● Meiosis, Asexual Reproduction ● Mendel and Inheritance, ● Chromosomal Inheritance Patterns and Abnormalities, ● Regulation of Gene expression, ● Biotechnology Applications 	<p>Statement of Inquiry: In recent years, the underlying biochemical unity of all plants, fungi, animals and microbes has become increasingly apparent.</p> <p>Phenomenon: Organisms depend on the environment to survive—The cycling of matter and transformation of energy depends on the interactions of living and non-living components of an ecosystem.</p> <p>Crosscutting Concepts</p> <ul style="list-style-type: none"> ● Systems and System models ● Patterns ● Stability and Change ● Interactions and Equilibrium <p>CORE IDEAS</p> <ul style="list-style-type: none"> ● Ecosystem Structure and function, 	All Topics

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					<ul style="list-style-type: none"> ● Species and communities ● Nutrient Cycling and Energy Flow, Community Ecology 	
	SEP <ul style="list-style-type: none"> ● Asking Questions and Defining Problems ● Developing & Using Models ● Constructing Explanations 	SEP <ul style="list-style-type: none"> ● Asking Questions and Defining Problems ● Carry out Investigations ● Engage in Argument from Evidence 	SEP <ul style="list-style-type: none"> ● Asking Questions and Defining Problems ● Developing & Using Models ● Constructing Explanations 	SEP <ul style="list-style-type: none"> ● Asking Questions and Defining Problems ● Carry out Investigations ● Engage in Argument from Evidence 	SEP <ul style="list-style-type: none"> ● Asking Questions and Defining Problems ● Constructing Explanations ● Analyze & Interpret Data 	Practice IB Exam
Assessments / Major Projects	<ul style="list-style-type: none"> ● Unit Summative assessment ● Practicum: Calculation of magnification of drawings, actual size of structures from drawings or micrographs ● Practicum: Estimation of osmolarity in tissues 	<ul style="list-style-type: none"> ● Unit summative assessment ● Practicum: Investigation of a factor affecting enzyme activity 	<ul style="list-style-type: none"> ● Unit summative assessment ● Practicum: Liquid Chromatography and pigmentation of spinach leaves. 	<ul style="list-style-type: none"> ● Unit summative assessment ● Design Lab: Survival of the black fin icefish and anti-freeze proteins ● Data analysis: Human Genome project: base sequencing analysis 	<ul style="list-style-type: none"> ● Unit summative assessment ● Design Lab: Quadrat study and chi-square analysis to determine biodiversity ● Practicum: Designing a mesocosm experiment 	Unit summative assessment; practice IB Exam; Prepare for IA
Level Specific Differentiation	Marietta City Schools teachers provide specific differentiation of learning experiences for all students. Details for differentiation for learning experiences are included on the district unit planners.					
Resources	<ul style="list-style-type: none"> ● Damon, A.; McGonegal, R.; Tosto, P.; Ward, W. <i>Standard level biology</i>; Pearson Education Limited: Harlow, Essex, 2014. ● Greenwood, T.; Pryor, K.; Bainbridge-Smith, L.; Allan, R. <i>Environmental science: student workbook</i>; Biozone International: Hamilton, New Zealand, 2013. ● Van de Lagemaat, R. www.inthinking.net; Andorra la Vella, Andorra, 2019. ● IB Biology Schoology Course ● Pearson Campbell Biology Online Textbook and Resources ● Discovery Education Biology and Chemistry Resources ● Hodder Study and Revision Guide for the IB Diploma ● Hodder IA Internal Assessment for Biology 					

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