

IB Biology Y2 - MHS Subject Group Overview

Themes: A = Unity & Diversity, B = Form & Function, C = Interaction & Interdependence, D = Continuity & Change

Level of Organization: 1 = Molecules, 2 = Cells, 3 = Organism, 4 = Ecosystems

Unit Name	Internal Assessments (IA) (Ongoing through March)	Unit 1 Responding to the Environment: Body Systems	Unit 2 Responding to the Environment: Plant Systems	Unit 3 Biodiversity & Environment	Unit 4 Ecosystems: Interactions & Interdependence	Unit 5 Ecosystems: Human Impacts	Exams/ Review
Time	2 weeks, then Ongoing Due March 2024	S1: 7 weeks	S1: 4 weeks	S1: 5 weeks	S2: 6 weeks	S2: 6 weeks	6 Weeks May 2025 Exam
IB Topics	Theme = Letter Level of Organization = #	B3.1.1-3.1.6, B3.2.1-3.2.6, C2.2.1-2.2.7, C3.1.1-3.1.16, C3.2.1-3.2.18, D3.1.1-3.1.7, D3.3.1-3.3.6	B3.1.7-3.1.10, B3.2.7-B3.2.10, D2.3.1-2.3.5, D2.3.7, D3.1.8-3.1.12	A4.1.1-4.1.7, D4.1.1-4.1.8, A3.1.1-3.1.11, A4.2.1-4.2.8	B4.1.1-4.1.8, B4.2.1-4.2.13, C4.1.1-4.1.18, C4.2.1-4.2.22	D4.2.1-4.2.11, D4.3.1-4.3.8	All Topics
Content-Specific	Scientific investigation 20% of the final IB score in the class. 10 hours minimum Required Student work is internally assessed by the teacher and externally moderated by the IB. Internal	Statement of Inquiry: The physiology of the Immune, endocrine, and nervous systems allow humans to maintain homeostasis in a changing environment. *Sickle Cell Theme Phenomenon: The correction of	Statement of Inquiry: The structure of plant systems allows plants to respond to their environment in order to maintain homeostasis in a changing environment. Phenomenon:	Statement of Inquiry: Changing environments cause selective pressures on organisms resulting in the diversity of life on earth. Phenomenon: In some parts of the world, the infectious parasitic disease malaria and the genetic disease sickle cell anemia are intimately connected. Crosscutting Concepts:	Statement of Inquiry: In recent years, the underlying biochemical unity of all plants, animals and microbes has become increasingly apparent. Phenomenon: Plasmodium falciparum is a protozoan parasite that has adapted to live and reproduce in mosquitoes and humans. Crosscutting	Statement of Inquiry: Humans modify the environment which can cause benefits to some populations while harming others. Phenomenon: Humans spray insecticides and modify the environment to decrease the population of mosquitoes carrying malaria. Crosscutting	Review all Topics.

Published: August, 2024

Resources, materials, assessments not linked to SGO or unit planner will be reviewed at the local school level.

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	<p>Assessment Components</p> <p>Research Design 6 Marks</p> <p>Data Analysis *Statistics 6 Marks</p> <p>Conclusion 6 Marks</p> <p>Evaluation 6 Marks</p>	<p>anemia in Sickle Cell Disease requires careful balancing of the detrimental effects of anemia with the potential risks associated with increased blood viscosity.</p> <p>Crosscutting Concepts: Structure & Function Systems & System models Cause and Effect Stability and Change Patterns</p>	<p>The therapeutic potential of extracts from the leaves and seeds of <i>Cajanus cajan</i> (pigeon pea), leaves of <i>Zanthoxylum zanthoxyloides</i> (artar root) and leaves of <i>Carica papaya</i> (papaya) by extracting molecules in the structures and applying them to blood samples from Sickle Cell Disease patients is under investigation.</p> <p>Crosscutting Concepts: Structure & Function Systems & System models Cause and Effect Interactions & Equilibrium Stability & Change</p>	<p>Systems & System models Patterns Cause and Effect</p>	<p>Concepts: Energy and Matter: Flows, Cycles, and Conservation Stability and Change of Systems Patterns Scale, Proportion, and Quantity</p>	<p>Concepts: Stability and Change of Systems Cause and Effect Patterns</p> <p>Core Ideas: Stability of Ecosystems Deforestation Keystone Species Human Impact: Pollution and Climate Change Sustainability of Resource Harvesting Eutrophication Biomagnification Succession (HL Only)</p>	
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	<p>Crosscutting Concepts: ALL</p> <p>SEP: ALL</p> <p>Core Ideas: Can come from any topic in the course that interests the students, and a scientific investigation can be conducted</p>	<p>Core Ideas: Integration of Body Systems Levels of organization Responding to the Environment Hormones Feedback mechanisms Homeostasis Thermoregulation</p> <p>SEP</p> <ul style="list-style-type: none"> Asking Questions and Defining Problems Constructing Explanations Analyze & Interpret Data 	<p>Core Ideas: Gas Exchange Transport Neural Signaling Defense against Disease Reproduction/Germination Homeostasis</p> <p>SEP:</p> <ul style="list-style-type: none"> Analyze & Interpret Data Developing and Using Models Planning and Carrying out Investigations Use Mathematics and Computational Thinking 	<p>Core Ideas: Evolution and Speciation Natural Selection Diversity of Organisms Conservation of Biodiversity Extinction</p> <p>SEP:</p> <ul style="list-style-type: none"> Developing and Using Models Obtaining, Evaluating, and Communicating information Analyzing and Interpreting Data 	<p>Core Ideas: Adaptation to the Environment Ecological Niches Populations and Communities Transfers of Energy and Matter</p> <p>SEP:</p> <ul style="list-style-type: none"> Developing and Using Models Obtaining, Evaluating, and Communicating information Analyzing and Interpreting Data Planning and Carrying out Investigations 	<p>SEP:</p> <ul style="list-style-type: none"> Use Mathematics and Computational Thinking Obtaining, Evaluating, and Communicating information Analyzing and Interpreting Data 	
<p>Assessments/ Major Projects</p> <p>Unit Formative and Summative assessment(s)</p>		<p>Research Paper - How does sickle cell affect homeostasis?</p> <p>Homeostasis: Negative Feedback Pathways in the Human Body Activity</p> <p>Applications of Skills: B3.1.6 Measurement of lung volumes B3.2.2 Distinguish arteries and veins in micrographs B3.2.4 Measurement of pulse rate - carotid</p>	<p>Applications of Skills: B3.1.10 Use micrographs or perform leaf casts to determine stomatal density. B3.2.9 Distribution of tissues in a transverse section of the stem of a dicotyledonous plant from micrographs B3.2.10 Distribution of tissues in a transverse section of the root of a dicotyledonous plant from micrographs</p>	<p>Applications of Skills: D4.1.8 Modelling of sexual and natural selection based on experimental control of selection pressures -Interpret data from John Endler's experiments with guppies. A3.1.7 Karyotyping and karyograms -classify chromosomes by banding patterns, length and centromere position-</p>	<p>Applications of Skills: B4.1.4 Use transect data to correlate the distribution of plant or animal species with an abiotic variable from a natural or semi-natural habitat. B4.2.8 Students should examine models or digital collections of skulls to infer diet from the anatomical features. Examples may include <i>Homo sapiens</i> (humans), <i>Homo floresiensis</i> and <i>Paranthropus</i></p>	<p>Applications of Skills: D4.2.3 Deforestation of Amazon rainforest as an example of a possible tipping point in ecosystem stability - Calculate % change from original area of the forest</p>	<p>IB Biology Exam in May</p> <p>Final Internal Assessment complete</p>

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		<p>or radial - by hand and digital</p> <p>B3.2.6 Evaluate epidemiological data relating to the incidence of coronary heart disease.</p> <p>C2.2.4 Variation in the speed of nerve impulses - +/- correlations and apply correlation coefficients and the coefficient of determination</p> <p>C3.2.18 Evaluation of data related to the COVID-19 pandemic - calculate both percentage difference and percentage change</p>	<p>D2.3.4 Measure changes in tissue length and mass, and analyze data to deduce isotonic solute concentration -use standard deviation and standard error to help in the analysis of data.</p>	<p>evaluate the evidence for the hypothesis that chromosome 2 in humans arose from the fusion of chromosomes 12 and 13 with a shared primate ancestor</p> <p>A3.1.10 Extract information about genome size for different taxonomic groups from a database to compare genome size to organism complexity</p>	<p><i>robustus</i></p> <p>C4.1.3 Random quadrat sampling to estimate population size for sessile organisms (plants and animals) - number counts suitable - standard deviation of the mean</p> <p>C4.1.4 Capture-mark-release-recapture and the Lincoln index to estimate population size for motile organisms</p> <p>C4.1.7 Population Growth Curves - test the growth of a population against the model of exponential growth using a graph with a logarithmic scale for size of population on the vertical axis and a non-logarithmic scale for time on the horizontal axis</p> <p>C4.1.8 Modelling of the sigmoid population growth curve-collect data regarding population growth. Yeast and duckweed are recommended but other organisms that proliferate under experimental conditions could be used</p>		
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Level Specific Differentiation ALL UNITS	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	MCS Science Resources <ul style="list-style-type: none">● Textbook Pearson Biology for the IB Diploma Standard and Higher Level● IB Biology Guide First Assessment 2025● Van de Lagemaat, R. www.inthinking.net: Andorra la Vella, Andorra, 2019.● IB Biology Schoology Course● Discovery Education Biology and Chemistry Resources