



BIOLOGY OVERVIEW MYP 4

Unit title and teaching hours	Key concept	Related concepts	Global context	Statement of inquiry	Objectives	ATL skills	Content
Cell Biology 18 hours	Relationships	Function Systems	Identity and relationships AOE: human nature and human dignity, moral reasoning and ethical judgment, consciousness and mind	Your identity is determined by the relationship between different levels of organization in your body, which although differing in complexity share patterns and functions with all life on earth.	Criterion A: Knowing and Understanding Students will demonstrate their understanding of cell structure, function, and processes. Criterion B: Inquiring and Designing Students will plan and design investigations related to cell biology. Criterion C: Processing and Evaluating Students will analyze and evaluate data from investigations related to cell biology. Criterion D: Reflecting on the Impacts of Science Students will reflect on the broader implications of cell biology concepts and experiments.	Thinking Skills Critical Thinking: Analyze Cell Structures Creative Thinking: Design Investigations Research Skills: Information Literacy Data Collection and Analysis Communication Skills; Present Findings Self-Management Skills Time Management:	Cell theory Louis Pasteur's experiment Are viruses alive? Characteristics of cells. Observe cells under the microscope Cell organelles Cell membrane structure, function and properties. Difference between prokaryotic and Eukaryotic cells. Unicellular organisms. Tissues, organ, organ systems. Cell specialization Hierarchy of life- the levels of organization How are organisms grouped and organized? Protoctista Fungi Prokaryotes



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Photosynthesis and respiration-chemical processes that support life. 18 Hrs	Systems	Energy, Transformation	Scientific and technical innovation AOE: processes and solutions	The systems of life are supported by biochemical reactions and transformations of energy that occur within cells. Innovations in science could lead to these reactions being utilized to meet growing energy and food needs.	OBJECTIVE A: Knowing and understanding OBJECTIVE B: Inquiring and Designing Outline a testable hypothesis and explain it using scientific reasoning OBJECTIVE C: Processing and Evaluating Present collected data, interpret and describe results using scientific reasoning.	Thinking (Critical thinking skills) Learners analyze experimental data Research skills: Information literacy: learners will gather reliable sources about photosynthesis to support research or presentations. Social skills Collaboration: Learners will engage in peer discussions and group activities. Self-management Time management: plan and execute tasks for experiments ensuring deadlines are met.	What are some chemical reactions which occur inside cells What occurs in the process of cellular respiration Burning glucose Limiting factors in respiration and photosynthesis. How do substances needed for photosynthesis enter the leaf? Testing a leaf for starch. Why are enzymes needed: ; enzyme theory Should chemical reactions be manipulated in order to meet our food and fuel needs? Roles of chemoautotrophs in food chains. Experiments to show that plants carry both photosynthesis and cellular respiration. Summative assessment tasks



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Body systems: How organisms sustain themselves 8 WEEKS 24 HRS	systems	Energy Environment balance	Personal and cultural expression AOE: products, systems and institutions social constructions of reality; philosophies and ways of life; belief systems; ritual and play	Systems in living organisms transfer energy and nutrients from the environment to cells, where they are used to maintain the balance of life. Diet can be affected by personal and cultural choices	CRITERION A: Knowing and understanding objective: Demonstrate knowledge and understanding of the major body systems and their functions CRITERION B: Inquiring and Designing Objective: Analyse the interactions and interconnections between different body systems. CRITERION C: Processing and Evaluating Objective: Evaluate the impact of lifestyle choices and health conditions on body systems.	Thinking Skill: Critical Thinking: Analyze how different body systems interact and solve problems related to system dysfunction. Research Skills: Information Literacy: Find, evaluate, and use reliable sources to gather information about body systems. Self-Management Skills: Organization: Plan and manage tasks related to studying body systems, including organizing notes, assignments, and study materials. Social Skills: Interpersonal: Engage in discussions and share ideas. With peers about body systems.	Nutrients organisms need to survive. Modelling process of digestion. Process of gaseous exchange. Circulatory system Processes involved in movement and transport-review Homeostasis Transport Transpiration Translocation Dangers of using drugs to control weight



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Ecology/ecosystem how do species interact? 6 WEEKS 18 HRS	Systems	Balance Function	Globalization and Sustainability AOE: • consumption, conservation, natural resources	Ecosystems can be in balance when the species sharing their habitats have interconnected and sustainable functions and roles.	CRITERION A: :Knowing and understanding Explain scientific knowledge and concepts related to ecosystems and ecology CRITERION B: Inquiring and Designing Develop a clear research question related to an ecological topic Criterion C: Processing and Evaluating Analyze data and draw conclusions related to ecological studies. Criterion D: Reflecting on the Impact of Science Evaluate the social, ethical, and environmental implications of scientific work.	Communication Skills Oral and Written Communication: Promote effective communication through presentations, reports, and discussions on ecological topics. Collaboration: Foster group work where students collaborate on projects, share findings, and learn to work as a team to solve ecological problems. Social Skills: Interpersonal Relationships: Develop skills in working collaboratively with peers, respecting different viewpoints, and contributing constructively to group discussions and projects. Self-Management Skills: Organization: students will manage their time effectively, organize their research and findings, and keep track of their progress on various tasks and projects.	Habitats Ecosystems and balance Interdependency Unity and diversity in life forms Energy transfer and cycles classification



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Interactions with environment/how are organisms adapted to survive 4 WEEKS 12 HRS	Change	Environment Interaction	Orientation in space and time AOE: evolution, constraints and adaptation	Organisms are more likely to survive when they are adapted to Interact with their surroundings and respond to changes in their environment .	CRITERION A: Knowing and understanding Demonstrate an understanding of how humans perceive and respond to environmental stimuli. CRITERION B: Inquiring and designing Experimental Design: Students should design and carry out experiments or research projects to test hypotheses about the effects of environmental stimuli on human responses. CRITERION C: Processing and Evaluating Effectively communicate scientific findings	Research Skills: Information Literacy: Students will explore how different environmental stimuli (e.g., light, sound, temperature) affect human perception and behavior. Communication Skills: Oral and Written Communication: Students will present their findings on how different stimuli affect human behavior. They will write reports and give presentations, explaining their research methods, results, and implications. Social Skills: Interpersonal Relationships: By working in teams on experiments or projects, students will develop skills in negotiation, empathy, and effective communication, which are crucial for collaborative work and understanding diverse perspectives.	Tropism Senses Nervous system Receptors Hormones



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Human interaction with the environment: how do the choices people make affect the environment? 6 WEEKS 18HRS	Change	Environment Balance	Globalization and sustainability AOE: consumption, conservation, natural resources	As a result of the choices that human make, the environment has undergone and will continue to undergo change. Humans have the ability to understand the consequences of their actions and act to restore balance in ecosystems and work towards a sustainable future.	Criterion A: Knowledge and Understanding Objective: Students should demonstrate an understanding of the ways in which human activities impact the environment and recognize the importance of addressing these issues. Criterion B: Investigating: Students should be able to conduct research and investigation into environmental issues and propose solutions based on evidence and analysis. Criterion C: Processing and evaluating Students should be able to effectively communicate their findings and solutions regarding environmental issues to different audiences.	Social skills: Collaboration Skills Teamwork: Working collaboratively on projects related to environmental conservation and sustainable practices. Self-Management Skills Reflection: Reflecting on the impacts of human activities on the environment and evaluating personal and collective responsibility in mitigating these impacts. Social Skills Empathy: Understanding and considering the perspectives of different communities affected by environmental changes or policies.	Human influences Habitat change or destruction Pollution/conservation Overexploitation Mitigation of adverse effects.



MYP 5 BIOLOGY CURRICULUM OVERVIEW

Unit title and teaching hours	Key concept	Related concepts	Global context	Statement of inquiry	Objectives	ATL skills	Content
Genetics: How do characteristics pass from generation to another? 6 WEEKS 18HRS	Relationships	Evidence, Models Pattern	Identities and relationships AOE: identity formation	Your identity and relationships with other people are determined by genetic factors: evidence has led to models that help to understand observed patterns of inheritance.	Criterion A: Knowledge and Understanding Explain fundamental concepts of genetics, including Mendelian inheritance, codominance, incomplete dominance, and sex-linked traits. Criterion B: inquiring and designing Analyze genetic cross data and predict offspring genotypes and phenotypes using Punnett squares and probability. Criterion C: Processing and evaluating Draw well-supported conclusions from genetic data and scientific literature, addressing limitations and suggesting further research or applications.	Research Skills: Information Literacy: Ability to identify, evaluate, and use a variety of sources related to genetic concepts and research. Data Analysis: Skills in analyzing genetic data, interpreting results from experiments, and understanding statistical significance. Communication Skills: Collaboration: Working effectively in groups to design experiments, discuss genetic scenarios, and present findings. Thinking Skills: Reflection: Reflecting on the learning process, understanding the impact of genetic research on society, and considering personal learning goals.	DNA and genetics Inheritance and variation Chromosomes



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Evolution-How have different forms of life arisen? 6 WEEKS 18HRS	Change	Interaction Environment	Globalization and sustainability AOE: diversity and interconnection	Species change over time through interactions with their environment: the evolution of humans has impacted global biodiversity in ways that may not be sustainable	Criterion A: Knowledge and Understanding Demonstrate a comprehensive understanding of key concepts and principles of evolution. Criterion B: : inquiring and designing Apply the principles of evolutionary theory to explain the adaptations of organisms in specific environments. Criterion C: Processing and evaluating Discuss the implications of evolutionary theory for fields such as medicine, agriculture, and conservation.	Research Skills: Information Literacy: Finding, evaluating, and using diverse sources to understand evolutionary concepts, theories, and evidence. Critical Thinking Skills: Analysis: Examining evolutionary theories, such as natural selection and genetic drift, and understanding their implications Organization Skills: Time Management: Allocating time efficiently to complete research projects, assignments, and presentations related to evolution. Self-Management Skills: Self-Regulation: Managing workload, stress, and motivation while tackling challenging evolutionary concepts and assignments.	Natural selection Cell division Mitosis Meiosis Reproduction Biodiversity



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How does biotechnology create new options in industry and health? 6 WEEKS 18HRS	Change	Transformation Development	Fairness and development AOE: inequality, difference and inclusion	The development and use of biotechnology to change and transform genes helps create new options, choices and opportunities in industry and health; whether these developments are fair for all remains to be seen.	Criterion A: Knowledge and Understanding Objective: Students should demonstrate an understanding of the ways in which human activities impact the environment and recognize the importance of addressing these issues. Criterion B: Investigating: Students should be able to conduct research and investigation into environmental issues and propose solutions based on evidence and analysis. Criterion C: Processing and evaluating Students should be able to effectively communicate their findings and solutions regarding environmental issues to different audiences.	Social skills: Collaboration Skills Teamwork: Working collaboratively on projects related to environmental conservation and sustainable practices. Self-Management Skills Reflection: Reflecting on the impacts of human activities on the environment and evaluating personal and collective responsibility in mitigating these impacts. Social Skills Empathy: Understanding and considering the perspectives of different communities affected by environmental changes or policies.	Human influences Habitat change or destruction Pollution/conservation Overexploitation Mitigation of adverse effects.



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Factors that affect human health. 6 WEEKS 18HRS	Relationships	Consequence Interaction	Identities and relationships AOE: health and well-being, lifestyle choices	Human health is a consequence of relationships and interaction between biological processes in our bodies, our lifestyle and the conditions we live in.	Objective C: Processing and evaluating present collected and transformed data interpret data and explain results using scientific reasoning evaluate the validity of a hypothesis based on the outcome of the scientific investigation Objective D: Reflecting on the impact of science Explain the ways in which science is applied and used to address a specific problem or issue. Discuss and evaluate the various implications of the use of science and its application in solving a specific problem or issue.	Research Skills: Information Literacy: Students will learn to locate, evaluate, and use information from diverse sources about health factors. Data Analysis: They will analyze statistical data related to health outcomes and risk factors. Communication Skills Presentation Skills: Students will communicate their findings effectively, whether through presentations, reports, or discussions. Collaboration: Engaging in group work to share ideas and strategies about health issues will enhance teamwork skills. Thinking Skills Critical Thinking: Students will evaluate the reliability of information and consider various perspectives on health-related topics.	What is health? The world health organization. Is access to health care and a healthy lifestyle a right or a privilege? What happens inside our body for us to be healthy? What external conditions contribute to our health? Microorganisms Pathogenic invaders How do diseases get transmitted? Life expectancy



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What issues do larger organisms face? 6 WEEKS 18HRS	Relationship	Function Environment	Orientation in space and time. AOE: evolution, constraints and adaptation	The size of an organism determines their distribution in space and time, and the form and function of specialized structures in larger organisms develop from their relationship with the environment.	Objective A: Knowing and understanding: Discuss the impact of environmental factors (e.g., habitat, climate) on larger organisms and how these factors influence their survival and adaptation strategies. Objective B: Inquiring and designing outline a testable hypothesis and explain it using scientific reasoning Design scientific investigations. Objective C: Processing and evaluating present collected and transformed data interpret data and describe results using scientific reasoning	Research Skills Information Literacy: Students will learn to locate and evaluate scientific literature and resources related to larger organisms and their challenges. Communication Skills: Collaborative Communication: Engaging in group work will improve their ability to articulate ideas and listen to others' perspectives. Thinking Skills Critical Thinking: Analyzing and interpreting data related to larger organisms will enhance their ability to evaluate evidence and make informed conclusions. Creative Thinking: Students may brainstorm innovative solutions or adaptations that larger organisms use to cope with environmental challenges.	How the size of an organism plays an important role in its relationship with the environment, and issues they face as they get bigger How different animals and plants are adapted to the environment they live in. How endangered large animals, such as elephants, tigers, can be protected in the wild or in zoos, so as to meet their needs and support survival.



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