

MCS MYP Advanced Studies 7 Science Subject Group Overview

Unit Name	Ecology and Biomes	Cells and Human Body	Genetics	Natural Selection	Classification	Capstone
CAPSTONE Connective Theme	Conserving Ecosystems	Maintaining Homeostasis	Genetics and Health	Influence of Genetic Variation and Environmental Factors on Population Health		Sustaining Healthy Systems
Time Frame	9 Weeks	9 Weeks	7 Weeks	4 Weeks	4 Weeks	3 Weeks
Standards	S7L4.a., b., c., d.	S7L2.a., b., c.	S7L3.a., b.	S7L3.c. S7L5.a., b., c.	S7L1.a., b.	S7L2.c S7L3.c S7L4.c S7L5.b
Science & Engineering Practices	<p>Science & Engineering Practices</p> <ul style="list-style-type: none"> Students will construct an explanation for the patterns of interactions observed in different ecosystems in terms of the relationships among and between organisms and abiotic components of the ecosystem. Students will develop a model to describe the cycling of matter and the flow of energy among biotic and abiotic components of an ecosystem. Students will analyze and interpret data to provide evidence for how resource availability, disease, climate, and human activity affect individual organisms, populations, communities, and ecosystems. Students will ask questions to gather and synthesize information from multiple sources to differentiate between Earth’s major terrestrial biomes and aquatic ecosystems. 	<p>Science & Engineering Practices</p> <ul style="list-style-type: none"> Students will develop a model and construct an explanation of how cell structures contribute to the function of the cell as a system in obtaining nutrients in order to grow, reproduce, make needed materials, and process waste. Students will develop and use a conceptual model of how cells are organized into tissues, tissues into organs, organs into systems, and systems into organisms. Students will construct an argument that systems of the body interact with one another to carry out life processes. 	<p>Science & Engineering Practices</p> <ul style="list-style-type: none"> Students will construct an explanation supported with scientific evidence of the role of genes and chromosomes in the process of inheriting a specific trait. Students will develop and use a model to describe how asexual reproduction can result in offspring with identical genetic information while sexual reproduction results in genetic variation. 	<p>Science & Engineering Practices</p> <ul style="list-style-type: none"> Students will ask questions to gather and synthesize information about the ways humans influence the inheritance of desired traits in organisms through selective breeding. Students will use mathematical representations to evaluate explanations of how natural selection leads to changes in specific traits of populations over successive generations. Students will construct an explanation based on evidence that describes how genetic variation and environmental factors influence the probability of survival and reproduction of a species. Students will analyze and interpret data for patterns in the fossil record that document the existence, diversity, and extinction of organisms and their relationships to modern organisms. 	<p>Science & Engineering Practices</p> <ul style="list-style-type: none"> Students will develop and defend a model that categorizes organisms based on common characteristics. Students will evaluate historical models of how organisms were classified based on physical characteristics and how that led to the six kingdom system (currently archaea, bacteria, protists, fungi, plants, and animals). 	<p>Science & Engineering Practices</p> <ul style="list-style-type: none"> Students will construct an argument that systems of the body interact with one another to carry out life processes. Students will ask questions to gather and synthesize information about the ways humans influence the inheritance of desired traits in organisms through selective breeding. Students will analyze and interpret data to provide evidence for how resource availability, disease, climate, and human activity affect individual organisms, populations, communities, and ecosystems. Students will construct an explanation based on evidence that describes how genetic variation and environmental factors influence the probability of survival and reproduction of a species.

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Approaches To Learning Instructional Strategies	<p>Critical Thinking: Use models and simulations to explore complex systems and issues. Gather and organize relevant information to formulate an argument.</p> <p>Research: Finding, interpreting, judging and creating information.</p> <p>Collaboration: Working effectively with others.</p> <p>Research: Collect and analyze data to identify solutions and make informed decisions.</p>	<p>Critical Thinking: Use models and simulations to explore complex systems and issues. Gather and organize relevant information to formulate an argument.</p> <p>Research: Finding, interpreting, judging and creating information.</p> <p>Collaboration: Working effectively with others.</p> <p>Research: Collect and analyze data to identify solutions and make informed decisions.</p>	<p>Critical Thinking: Use models and simulations to explore complex systems and issues. Gather and organize relevant information to formulate an argument.</p> <p>Research: Collect and analyze data to identify solutions and make informed decisions.</p> <p>Collaboration: Working effectively with others.</p> <p>Research: Finding, interpreting, judging and creating information.</p>	<p>Critical Thinking: Use models and simulations to explore complex systems and issues. Gather and organize relevant information to formulate an argument.</p> <p>Communication: Collaborate with peers and experts using a variety of digital environments and media.</p> <p>Collaboration: Working effectively with others.</p> <p>Research: Collect and analyze data to identify solutions and make informed decisions.</p>	<p>Critical Thinking: Use models and simulations to explore complex systems and issues.</p> <p>Research: Collect and analyze data to identify solutions and make informed decisions.</p> <p>Collaboration: Working effectively with others.</p> <p>Research: Collect and analyze data to identify solutions and make informed decisions.</p> <p>Research: Finding, interpreting, judging and creating information.</p>	<p>Creative Thinking: Generating novel ideas and considering new perspectives.</p> <p>Transfer skills: Combine knowledge, understanding and skills to create products or solutions.</p> <p>Research: Collect and analyze data to identify solutions and make informed decisions.</p> <p>Communication: Collaborate with peers and experts using a variety of digital environments and media.</p>
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<p>Statement of Inquiry</p>	<p>Ecosystem sustainability is impacted by environmental changes locally and globally.</p> <p>Phenomenon: How do the choices we make impact our ecosystems? Why do we see variations in climate, flora, and fauna in different areas throughout the world?</p> <p>CER: Students answer the phenomenon in a Claim-Evidence-Reasoning constructed response as a formative assessment. Allow students to make edits to their constructed response throughout the unit for a final summative submission.</p>	<p>Advances in science and technology have led to a greater understanding of how cellular and body systems interact to function and maintain balance within an organism.</p> <p>Phenomenon: How does Coronavirus impact the human body at the cellular and body system levels?</p> <p>CER: Students answer the phenomenon in a Claim-Evidence-Reasoning constructed response as a formative assessment. Allow students to make edits to their constructed response throughout the unit for a final summative submission.</p>	<p>The relationship between chromosomes, genes, alleles, and traits can be understood by examining patterns of inheritance.</p> <p>Phenomenon: How is my phenotype influenced by my parents’ genotypes?</p> <p>CER: Students answer the phenomenon in a Claim-Evidence-Reasoning constructed response as a formative assessment. Allow students to make edits to their constructed response throughout the unit for a final summative submission.</p>	<p>The fossil record can be used as evidence to determine the relationships, patterns, and changes in organisms over time.</p> <p>Phenomenon: How do modern day organisms compare in structure, function, and appearance to their ancestors?</p> <p>CER: Students answer the phenomenon in a Claim-Evidence-Reasoning constructed response as a formative assessment. Allow students to make edits to their constructed response throughout the unit for a final summative submission.</p>	<p>Structure and function can be used to identify and classify organisms based upon similar characteristics.</p> <p>Phenomenon: How/why do we classify all life into six kingdoms?</p> <p>CER: Students answer the phenomenon in a Claim-Evidence-Reasoning constructed response as a formative assessment. Allow students to make edits to their constructed response throughout the unit for a final summative submission.</p>	<p>Ecosystem sustainability is impacted by environmental changes locally and globally.</p> <p>Advances in science and technology have led to a greater understanding of how cellular and body systems interact to function and maintain balance within an organism.</p> <p>Phenomenon: How can we improve the health of our community ecosystems?</p>
<p>Global Context</p>	<p>Globalization and Sustainability</p> <p>Students will explore the interconnectedness of human-made systems and communities; the relationship between local and global processes; how local experiences mediate the global; the opportunities and tensions provided by world interconnectedness; the impact of decision-making on humankind and the environment.</p>	<p>Scientific and Technical Innovation</p> <p>Students will explore the natural world and its laws; the interaction between people and the natural world; how humans use their understanding of scientific principles; the impact of scientific and technological advances on communities and environments; the impact of environments on human activity; how humans adapt environments to their needs.</p>	<p>Identities and Relationships</p> <p>Students will explore identity; beliefs and values; personal, physical, mental, social and spiritual health; human relationships including families, friends, communities and cultures; what it means to be human.</p>	<p>Orientation in time and space</p> <p>Students will explore personal histories; homes and journeys; turning points in humankind; discoveries; explorations and migrations of humankind; the relationships between, and the interconnectedness of, individuals and civilizations, from personal, local and global perspectives.</p>	<p>Identities and Relationships</p> <p>Students will explore identity; beliefs and values; personal, physical, mental, social and spiritual health; human relationships including families, friends, communities and cultures; what it means to be human.</p>	<p>Globalization and Sustainability</p> <p>Students will explore the interconnectedness of human-made systems and communities; the relationship between local and global processes; how local experiences mediate the global; the opportunities and tensions provided by world interconnectedness; the impact of decision-making on humankind and the environment.</p>

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Key Concepts	Change (MYP/CCC) Change is a conversion, transformation or movement from one form, state, or value to another. Inquiry into the concept of change involves understanding and evaluating causes, processes and consequences.	Systems and system models (MYP/CCC) Systems are sets of interacting or interdependent components. Systems provide structure and order in human, natural and built environments. Systems can be static or dynamic, simple or complex.	Relationships (MYP) Relationships are the connections and associations between properties, objects, people and ideas - including the human community's connections with the world in which we live. Any change in a relationship brings consequences.	Change (MYP/CCC) Change is a conversion, transformation or movement from one form, state, or value to another. Inquiry into the concept of change involves understanding and evaluating causes, processes and consequences.	Relationships (MYP) Relationships are the connections and associations between properties, objects, people and ideas - including the human community's connections with the world in which we live. Any change in a relationship brings consequences.	Relationships (MYP) Relationships are the connections and associations between properties, objects, people and ideas - including the human community's connections with the world in which we live. Any change in a relationship brings consequences.
Related Concepts	Patterns (MYP/CCC) Environment (MYP)	Form/Structure (MYP/CCC) Function (MYP/CCC) Interaction (MYP)	Patterns (MYP/CCC) Transformation (MYP)	Patterns (MYP/CCC) Evidence (MYP)	Form/Structure (MYP/CCC) Function (MYP/CCC)	Environment (MYP)
Disciplinary Core Ideas	<u>Connecting Core Ideas</u> <ul style="list-style-type: none"> ● Interdependent relationships in ecosystems ● Cycles of matter and energy transfer in ecosystems ● Ecosystem dynamics, functioning, and resilience ● Human impact on ecosystems ● Biomes 	<u>Connecting Core Ideas</u> <ul style="list-style-type: none"> ● Cell structure and function ● Levels of organization ● Organ systems ● Growth and development of organisms ● Sexual and asexual reproduction 	<u>Connecting Core Ideas</u> <ul style="list-style-type: none"> ● Inheritance of traits ● Genes and chromosomes ● Sexual and asexual reproduction ● Variation of traits ● Selective breeding (artificial selection) 	<u>Connecting Core Ideas</u> <ul style="list-style-type: none"> ● Inheritance of traits ● Variation of traits ● Natural selection ● Adaptation ● Evidence of common ancestry and diversity 	<u>Connecting Core Ideas</u> <ul style="list-style-type: none"> ● Cell structure and function ● Levels of organization ● Energy transfer ● Diversity ● Variation of traits 	<u>Connecting Core Ideas</u> <ul style="list-style-type: none"> ● Interdependent relationships in ecosystems ● Ecosystem dynamics, functioning, and resilience ● Human impact on ecosystems ● Growth and development of organisms ● Organ systems

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MYP Assessments/ Performance Tasks	Common Assessments Title and Criterion:	Common Assessments Title and Criterion:	Common Assessments Title and Criterion:	Common Assessments Title and Criterion:	Common Assessments Title and Criterion:	Common Assessments Title and Criterion:
	Ecology Lab Report (Science: B,C)	Cells Common Formative Assessment	Genetics Common Formative Assessment	Natural Selection Common Formative Assessment	Classification Common Formative Assessment	Culminating Capstone Product/Presentation MYP Design B.iii. MYP Design C.iv. MYP Science A.ii. MYP Science D. ii., iii.
	Ecology Common Formative Assessment	Passive Transport Lab Report (Science: B,C)	Genetics Unit Assessment Paper I and Paper II (Science: A,D)	Natural Selection Labs & SIMS (Science: B,C)	Classification Unit Assessment Paper I (Science: A)	
	Ecology Unit Assessment Paper I and Paper II (Science: A,D)	Cells & Cell Processes Unit Assessment Paper I and Paper II (Science: A,D)	Capstone Action Proposal MYP Design A.i., ii., iv. MYP Design B.i., iv. MYP Design C.i.	Natural Selection Unit Assessment Paper I and Paper II (Science: A,D)	Capstone Project Summary MYP Design C.iii. MYP Design D.ii., iii., iv.	
	Food Choices: Designing a Sustainable Cafeteria Menu (Design: A-C)	The Bionic Leg/Arm (Design: A-D)				
	Biome in a Bottle (Design: A-D)	Human Body Common Formative Assessments				
	Biomes Common Formative Assessment	Human Body Unit Assessment Paper I and Paper II (Science: A,D)				
	Climate Migrant Project					
	Biomes Unit Assessment Paper I and Paper II (Science: A,D)					

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	Differentiation For Tiered Learners	<p>Capstone Connections</p> <p>Discovery Education High School Biology Techbook</p> <p>NGSS Case Study 7: Gifted and Talented Students</p> <p>NGSS: All Standards, All Students</p> <p>Extensions - Enrichment Tasks/Projects</p>	<p>Capstone Connections</p> <p>Discovery Education High School Biology Techbook</p> <p>NGSS Case Study 7: Gifted and Talented Students</p> <p>NGSS: All Standards, All Students</p> <p>Extensions - Enrichment Tasks/Projects</p>	<p>Capstone Action Proposal</p> <p>Discovery Education High School Biology Techbook</p> <p>NGSS Case Study 7: Gifted and Talented Students</p> <p>NGSS: All Standards, All Students</p> <p>Extensions - Enrichment Tasks/Projects</p>	<p>Capstone Connections</p> <p>Discovery Education High School Biology Techbook</p> <p>NGSS Case Study 7: Gifted and Talented Students</p> <p>NGSS: All Standards, All Students</p> <p>Extensions - Enrichment Tasks/Projects</p>	<p>Capstone Project Summary</p> <p>Discovery Education High School Biology Techbook</p> <p>NGSS Case Study 7: Gifted and Talented Students</p> <p>NGSS: All Standards, All Students</p> <p>Extensions - Enrichment Tasks/Projects</p>	<p>Culminating Capstone Product/Presentation</p>
	Capstone Elements	<p>Aquanaut Adventure Mobile Classroom Reflection</p> <p>Ecosystems of Change Field Trip Reflection</p> <p>Evolving Ecosystems Live Virtual Outreach Reflection</p> <p>MMS Ecosystem Walk</p> <p>Biome in a Bottle</p> <p>Climate Migrants</p> <p>Balancing Ecotourism and Ecosystem Preservation</p>	<p>Disappearing Diversity Outreach Reflection</p> <p>How Sharks Work Virtual Field Trip Reflection</p> <p>*Additional elements TBD</p>	<p>Capstone Action Proposal</p> <p>*Additional elements TBD</p>	<p>*Additional elements TBD</p>	<p>Capstone Project Summary</p> <p>*Additional elements TBD</p>	<p>Culminating Capstone Product/Presentation</p>

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