



## Marietta City Schools

### District Unit Planner

Everything on the unit planner must be included on the unit curriculum approval statement.

#### Science Grade 7 Advanced Studies

Unit title	Ecology and Biomes	MYP year	2	Unit duration (hrs)	45 Hours
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**Mastering Content and Skills through INQUIRY (Establishing the purpose of the Unit):** *What will students learn?*

#### GSE Standards

##### Standards

##### **S7L4. Obtain, evaluate, and communicate information to examine the interdependence of organisms with one another and their environments.**

- 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. (Clarification statement: The interactions include, but are not limited to, predator-prey relationships, competition, mutualism, parasitism, and commensalism.)
- Develop a model to describe the cycling of matter and the flow of energy among biotic and abiotic components of an ecosystem. (Clarification statement: Emphasis is on tracing movement of matter and flow of energy, not the biochemical mechanisms of photosynthesis and cellular respiration.)
- Analyze and interpret data to provide evidence for how resource availability, disease, climate, and human activity affect individual organisms, populations, communities, and ecosystems.
- Ask questions to gather and synthesize information from multiple sources to differentiate between Earth's major terrestrial biomes (i.e., tropical rainforest, savanna, temperate forest, desert, grassland, taiga, and tundra) and aquatic ecosystems (i.e., freshwater, estuaries, and marine). (Clarification statement: Emphasis is on the factors that influence patterns across biomes such as the climate, availability of food and water, and location.)

##### **Gifted**

S1A., B. S2A., D. S3C. S6B.

##### **Prior Student Knowledge: (REFLECTION – PRIOR TO TEACHING THE UNIT)**

In fourth grade, students should have mastered the following:

##### **S4L1. Obtain, evaluate, and communicate information about the roles of organisms and the flow of energy within an ecosystem.**

- Develop a model to describe the roles of producers, consumers, and decomposers in a community. (Clarification statement: Students are not expected to identify the different types of consumers – herbivores, carnivores, omnivores, and scavengers.)
- Develop simple models to illustrate the flow of energy through a food web/food chain beginning with sunlight and including producers, consumers, and decomposers.
- Design a scenario to demonstrate the effect of a change on an ecosystem. (Clarification statement: Include living and nonliving factors in the scenario.)
- Use printed and digital data to develop a model illustrating and describing changes to the flow of energy in an ecosystem when plants or animals become scarce, extinct, or

over-abundant.

### **Concepts/Skills to be Mastered by Students**

- Interdependent relationships in Ecosystems and Biomes
- Cycles of matter and energy transfer in ecosystems.
- Ecosystems dynamics, functioning, and resilience
- Human Impact on ecosystems

### **Key Vocabulary: (KNOWLEDGE & SKILLS)**

Interdependence, interaction, abiotic, biotic, organism, population, community, ecosystem, biome, biosphere, predator, predation, prey, competition, symbiosis, symbiotic relationships, mutualism, commensalism, parasitism, matter, energy, food chain, food web, producer, consumer, herbivore, omnivore, carnivore, decomposer, primary, secondary, tertiary, carbon cycle, nitrogen cycle, climate, resources, terrestrial, tropical rainforest, savanna, temperate forest, desert, grassland, taiga, tundra, aquatic, freshwater, estuary, marine, limiting factors, carrying capacity.

### **Year-Long Anchoring Phenomena: (LEARNING PROCESS)**

Humans have the ability to positively and/or negatively impact biological and ecological systems.

### **Unit Phenomena (LEARNING PROCESS)**

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?

**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 submission.

**Capstone Connective Theme:** Factors that Influence the Health of Ecosystems and Biomes

### **UN Sustainable Development Goals:**

**Goal 7** - Ensure access to affordable, reliable, sustainable and modern energy for all.

**Goal 15** - Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss.

### **Possible Preconceptions/Misconceptions: (REFLECTION – PRIOR TO TEACHING THE UNIT)**

Students may confuse the terms “matter” and “energy,” along with the cycling of matter and the flow of energy.

Students may confuse predation with parasitism.

Students may have difficulty distinguishing between the different types of symbiotic relationships.

Students may forget that the original source for all energy in ecosystems comes from the sun.

Key concept	Related concept(s)	Global context
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<p><b>Systems</b></p> <p>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.</p>	<p>Energy (MYP/CCC) Balance (MYP/CCC)</p>	<p><b>Globalization and Sustainability</b></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><b>Statement of inquiry</b></p>		
<p>Ecosystem sustainability is impacted by environmental changes locally and globally.</p>		
<p><b>Inquiry questions</b></p>		
<p><b>Factual</b></p> <p>What are biotic and abiotic factors?  What are examples of symbiotic relationships?  What are the levels of ecological organization?  What is a food web in an ecosystem?  What are the characteristics of Earth's terrestrial biomes and aquatic ecosystems?</p> <p><b>Conceptual</b></p> <p>What is the difference between biotic and abiotic factors?  How do organisms interact with one another and their environments?  How do biotic factors interact with abiotic factors to obtain resources from the environment?  How does resource availability, disease, climate, and human activity affect organisms, populations, communities, and ecosystems?  What models can be used to determine the cycling of matter and the flow of energy?  How are species adapted for life within a certain biome?</p> <p><b>Debatable</b></p> <p>Is it possible to repair a damaged ecosystem?  What is our role in preserving, protecting, and maintaining ecosystems locally and globally? What is the best way to model a sustainable ecosystem?  How can an organism's natural environment be replicated in a human-designed environment?  How are biomes influenced by patterns such as climate, food and water availability, and location? How do human impacts influence biomes?  What steps can we take to support sustainable ecosystems?</p>		
<p><b>MYP Objectives</b></p>	<p><b>Assessment Tasks</b></p>	

<p><i>What specific MYP <b>objectives</b> will be addressed during this unit?</i></p>	<p><i><b>Relationship</b> between summative assessment task(s) and statement of inquiry:</i></p>	<p><i>List of common formative and summative assessments.</i></p>
<p>Science:</p> <p>Criterion A: Knowing and Understanding</p> <p>i. describe scientific knowledge</p> <p>ii. apply scientific knowledge to solve problems set in familiar and unfamiliar situations</p> <p>iii. analyze information to make scientifically supported judgments</p> <p>Criterion C: Processing and Evaluating</p> <p>i. present collected and transformed data</p> <p>ii. interpret data and describe results using scientific reasoning</p> <p>Criterion D: Reflecting on the Impacts of Science</p> <p>i. describe the ways in which science is applied and used to address a specific problem or issue</p> <p>ii. discuss and analyze the various implications of using science and its application in solving a specific problem or issue</p>	<p>Students will plan and carry out investigations, run simulations, and develop models to demonstrate their understanding of the interdependence of organisms with one another and their environments.</p> <p>Students will be provided with multiple scenarios to analyze and determine how resource availability, disease, environmental changes, and human impact would influence the populations found in an ecosystem.</p>	<p><b><u>Formative Assessment(s):</u></b></p> <p>Ecology Common Formative Assessment</p> <p>Biomes Common Formative Assessment</p> <p><b><u>Summative Assessment(s):</u></b></p> <p>Ecology Unit Assessment Paper I and Paper II</p> <p>Biomes Unit Assessment Paper I and Paper II</p>

<p>iii. apply scientific language effectively</p> <p>Design:</p> <p>Criterion A: Inquiring and Analyzing</p> <p>i. explain and justify the need for a solution to a problem</p> <p>Criterion B:</p> <p>i. develop a design specification which outlines the success criteria for the design of a solution based on the data collected</p> <p>iii. present the chosen design and outline the reasons for its selection</p> <p>Criterion C:</p> <p>iii. follow the plan to create the solution, which functions as intended</p> <p>v. present the solution as a whole</p> <p>Criterion D:</p> <p>i. explain the success of the solution against the design specification</p> <p>iii. describe how the solution could be improved</p>		
Approaches to learning (ATL)		
<p><b>Category:</b> Thinking</p> <p><b>Cluster:</b> Critical-Thinking</p>		

**Skill Indicator:** Use models and simulations to explore complex systems and issues. Gather and organize relevant information to formulate an argument.

**Learning Experiences**

Add additional rows below as needed.

Objective or Content	Learning Experiences	Personalized Learning and Differentiation
S7L4.a 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.	<p><b>Food Choices:</b> Students choose a particular food provided by food vendors for the cafeteria and use the questions generated by the class to conduct research about the agricultural practices (by vendors and farmers) used to produce the food. Students should consider the impact on resources, disease, and human activity in each level of organization from the organism to the ecosystem. Students should then use the data from their research to draw a conclusion about how the food production practices impact the ecosystem and create a sustainable menu of their choice.</p>	<ul style="list-style-type: none"> <li>Capstone Connections</li> <li>Discovery Education High School Biology Science Techbook</li> <li>NGSS Case Study 7: Gifted and Talented Students</li> <li>Next Generation Science Standards: "All Standards, All Students"</li> <li>Extensions – Enrichment Tasks/Projects</li> </ul>
S7L4.c. Analyze and interpret data to provide evidence for how resource availability, disease, climate, and human activity affect individual organisms, populations, communities, and ecosystems.	<p><b>Food Choices:</b> Driving Question: How do our meal or food choices impact the ecosystem?</p> <p>Individual task: Students will develop an argument for the driving question. They will analyze the data from research conducted about agricultural practices both locally and foreign to develop their claim. Their claim must be supported by evidence and should focus on impacts on the ecosystem. Students' arguments should have claim, evidence, and reasoning (justification), and a conclusion.</p> <p>Students develop a model that communicates how their food choices impact the ecosystem. The model will represent the scoring system developed by the student to determine how sustainable their meal choices are. Their final conclusions on their food choices will be supported by evidence.</p> <p><b>Climate Migrants:</b> Students will analyze and interpret data to provide evidence of the human impact on the climate. Students will create policies that they believe the government can adopt to tackle the challenges of climate-related human migration.</p>	<p>Task-Specific Differentiation</p> <ul style="list-style-type: none"> <li>Choice of Menu Items</li> <li>Mind Map Design</li> <li>Multiple Research Resources</li> <li>Scaffolding</li> <li>Extended Learning</li> <li>Mode/Method of Presentation</li> <li>Type of Product</li> </ul>

S7L4.d. Ask questions to gather and synthesize information from multiple sources to differentiate between Earth's major terrestrial biomes and aquatic ecosystems.	<b>Climate Migrants:</b> Students will explore the characteristics of the world's biomes and identify environmental and human-influenced factors that impact biome health.	
<b>Content Resources</b>		
Georgia Grade 7 Science Stability and Change in Living Systems Instructional Segment  Mosa Mack: Food Webs, Interaction of Organisms  Discovery Education Grade 7 Science Techbook  Discovery Education High School Biology Techbook		
<div><b>Capstone Connection</b></div> Ecosystems of Change Field Trip Reflection  MMS Ecosystem Walk  Food Choices: Designing a Sustainable Cafeteria Menu (Design: A-C)  Climate Migrants  Capstone Brainstorming		