



Marietta City Schools

2024-2025 District Unit Planner

Science Grade 7 Advanced Studies

Unit title	<i>Capstone</i>	MYP year	2	Unit duration (hrs)	15 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.

c. Analyze and interpret data to provide evidence for how resource availability, disease, climate, and human activity affect individual organisms, populations, communities, and ecosystems.

S7L2. Obtain, evaluate, and communicate information to describe how cell structures, cells, tissues, organs, and organ systems interact to maintain the basic needs of organisms.

c. Construct an argument that systems of the body (Cardiovascular, Excretory, Digestive, Respiratory, Muscular, Nervous, and Immune) interact with one another to carry out life processes. (Clarification statement: The emphasis is not on learning individual structures and functions associated with each system, but on how systems interact to support life processes.)

S7L3. Obtain, evaluate, and communicate information to explain how organisms reproduce either sexually or asexually and transfer genetic information to determine the traits of their offspring.

c. Ask questions to gather and synthesize information about the ways humans influence the inheritance of desired traits in organisms through selective breeding.

S7L5. Obtain, evaluate, and communicate information from multiple sources to explain the theory of evolution of living organisms through inherited characteristics.

a. Use mathematical representations to evaluate explanations of how natural selection leads to changes in specific traits of populations over successive generations. (Clarification statement: Referencing data should be obtained from multiple sources including, but not limited to, existing research and simulations. Students should be able to calculate means, represent this data in a table or graph, and reference it when explaining the principles of natural selection.)

b. Construct an explanation based on evidence that describes how genetic variation and environmental factors influence the probability of survival and reproduction of a species.

MCS Gifted Standards K-12

MCS.Gifted.S2D. Apply components of creative thinking in finding, solving, and evaluating solutions to authentic real-world problems and dilemmas.

MCS.Gifted.S3A. Develop and apply core critical thinking skills of metacognition, observation, questioning, prediction, analysis, interpretation, inference, summarization, evaluation, synthesis, explanation, and transference.

MCS.Gifted.S6B. Establish and work toward short and long-term goals.

MCS.Gifted.S6D. Take initiative to pursue opportunities to share and use abilities.

Concepts/Skills to be Mastered by Students

- Interdependent relationships in ecosystems
- Ecosystem dynamics, functioning, and resilience
- Human impact on ecosystems
- Growth and development of organisms
- Organ systems

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 can we improve the health of our local ecosystems?

Key concept	Related concept(s)	Global context
<p style="text-align: center;">Relationships</p> <p>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 relationship brings consequences—some of which may occur on a small scale, while others may be far-reaching, affecting large networks and systems such as human societies and the planetary ecosystem.</p>	<p style="text-align: center;">Environment</p>	<p style="text-align: center;">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>

Statement of inquiry

Ecosystem sustainability is impacted by environmental changes locally and globally.

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.

Inquiry questions

Factual

- What is sustainability?
- What are the 17 Global Goals?
- What is a Capstone?
- What is an Action Plan?

Conceptual

- How can I make a difference in my home, school, or community?
- What 7th Science Georgia Standards of Excellence are you demonstrating your understanding of through your Action Plan?
- Why is your plan for action important?
- How do you hope to change or improve your topic of choice?
- What final outcome do you hope to see?

Debatable

- Is the Capstone topic sustainable?
- What consequences might result if the situation you are addressing does not change or improve?

MYP Objectives	Assessment Tasks	
<i>What specific MYP objectives will be addressed during this unit?</i>	Relationship between summative assessment task(s) and statement of inquiry:	<i>List of common formative and summative assessments.</i>
<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 B: Inquiring and Designing</p> <p>iii. describe how data will be collected</p>	<p>SOI: Ecosystem sustainability is impacted by environmental changes locally and globally.</p> <p>Students develop an Action Plan for their Capstone Idea, which will be crafted to enact sustainable change locally. Students will present their Action Plan to their peers, and potentially a panel of experts, who will evaluate their presentation based on the student's (1) Identification of their Problem/Need; (2) the Rationale to support the need as well as the action to be taken; (3) clarity and manageability for the Action to be taken; (4) the Scale/Potential Scale of Impact; and (5) student's Level of Engagement in the topic.</p>	<p>Formative Assessment(s):</p> <p>Action Plan Proposal Template (Sections A-G)</p> <p>Summative Assessment(s):</p> <p>Final Presentation Rubric</p>

Criterion C: Processing and Evaluating

- i. present collected and transformed data
- ii. interpret data and describe results using scientific reasoning

Criterion D: Reflecting on the Impacts of Science

- i. describe the ways in which science is applied and used to address a specific problem or issue
- ii. discuss and analyze the various implications of using science and its application in solving a specific problem or issue
- iii. apply scientific language effectively
- iv. document the work of others and sources of information used

Design:

Criterion A: Inquiring and Analyzing

- i. explain and justify the need for a solution to a problem
- ii. construct a research plan, which states and prioritizes the primary and secondary research needed to develop a solution to the problem

Criterion B: Developing Ideas

- i. develop a design specification which outlines the success criteria for the design of a solution based on the data collected.
- ii. develop a range of feasible design ideas which can be correctly interpreted by others.
- iii. present the chosen design and outline the reasons for its selection
- iv. develop accurate and detailed planning drawings/diagrams and outline requirements for the creation of the chosen solution

<p>Criterion C: Creating the Solution</p> <p>i. construct a logical plan, which outlines the efficient use of time and resources, sufficient for peers to be able to follow to create the solution</p> <p>iii. follow the plan to create the solution, which functions as intended</p> <p>iv. explain changes made to the chosen design and the plan when making the solution</p> <p>Criterion D: Evaluating</p> <p>ii. explain the success of the solution against the design specification</p> <p>iii. describe how the solution could be improved</p> <p>iv. describe the impact of the solution on the client/target audience</p>		
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Approaches to learning (ATL)

Category: Thinking
Cluster: Creative Thinking
Skill Indicator: Generating novel ideas and considering new perspectives. Combine knowledge, understanding, and skills to create products or solutions.

Learning Experiences
 Add additional rows below as needed.

Objective or Content	Learning Experiences	Personalized Learning and Differentiation
S7L4.a., b., c., d.	<ul style="list-style-type: none"> ● MMS Ecosystem Walk - Students identify biotic and abiotic factors around their school community. ● Biome in a Bottle - Students experiment with the sustainability of flora and fauna in different human-created ecosystems. ● Oh Deer - Students engage in live simulations to analyze factors that impact populations and ecosystems. 	<ul style="list-style-type: none"> ● Student choice of topic/content based on interest ● Individualized teacher feedback ● Chunking Capstone Action Plan Template ● Graphic Organizers provided for templates and scaffolding

	<ul style="list-style-type: none"> ● Levels of Ecological Organization Graphic Organizer - Students research the effects that each level of organization has on one another and how they work together to create a sustainable environment. ● Climate Refugees - Students examine how environmental threats result in the migration of populations. ● Symbiotic Relationship Scenarios - Students explore how relationships between and among organisms of different species help sustain an environment. ● Food Choices Project - Students research and develop a plan for sustainable food practices for school nutrition. 	
S7L2.a., b., c.	<ul style="list-style-type: none"> ● Exploring Phenomenon: Students investigate how various TikTok challenges impact the human body at the cellular and system levels. This includes the disruption of homeostasis. ● Observing the Impacts of Resource Availability on Yeast Respiration: Students use ecological principles learned in their previous unit to test how various factors, including the supply of food and water, impact the growth of a unicellular organism. They investigate the optimal conditions necessary for cell growth and reproduction in order to visualize how it is necessary for cells to take in and use needed materials. ● Mosa Mack Engineering Design Challenge: Medical Consultant: Students are tasked with designing a solution that addresses and improves a body system malfunction: blood vessels blocked by plaque, obstructed airways due to asthma, damaged nerve cells in the brain due to stroke, or weakened muscles due to muscular dystrophy. 	
S7L3.a., b., c.	<ul style="list-style-type: none"> ● Engineer a Solution to an Environmental Issue that Impacts Genetics: Students research environmental factors that influence growth, in addition to genetic factors. They will identify communities where genotypes for healthy growth exist, but where environmental factors may be inhibiting healthy growth. Students develop a plan to help children in those communities get access to the nutrients or vitamins they need that would support healthy growth. 	
Content Resources		
<ul style="list-style-type: none"> ● Capstone Manual ● Capstone Presentation Template ● Capstone Presentation Rubric 		

Capstone Connections

- **Final Capstone Presentation tied to the theme of Sustainability/United Nations Global Goal**