Unit 2: Ecosystems: Interactions, Energy and Dynamics

Content Area: **Science**
Course(s):
Time Period: **Marking Period 2**
Length: **8-9 weeks**
Status: **Published**

Unit 2: Ecosystems: Interactions, Energy and Dynamics

INTRODUCTION:

Living things are classified based on similar characteristics. Every living depends upon certain biotic and abiotic factors that make up their ecosystem. Living things interact with each other forming food webs and interdependent relationships that are affected by competition for resources. Changes in the environment impact organisms. The most important cause of succession is the altering of the physical environment.

Students demonstrate age appropriate abilities to plan and carry out investigations to develop evidence of how ecosystems interact. Students gather information to support explanations of the relationship in energy transfer in an ecosystem . They are able to communicate an understanding of how different parts of an ecosystem interact. Students will be able to construct scientific explanations based on evidence for how environmental and genetic factors influence the growth of organisms. The crosscutting concepts of scale, proportion, and quantity and structure and function provide a framework for understanding the disciplinary core ideas. Students are expected to demonstrate proficiency in planning and carrying out investigations, analyzing and interpreting data, and developing and using models, Students are also expected to use these to use these science and engineering practices to demonstrate understanding of the disciplinary core ideas

Revision Date: July 2020

LA.RI.7	Reading Informational Text
LA.RI.7.1	Cite several pieces of textual evidence and make relevant connections to support analysis of what the text says explicitly as well as inferences drawn from the text.
LA.W.7	Writing
LA.W.7.1	Write arguments to support claims with clear reasons and relevant evidence.
MA.8.F.B	Use functions to model relationships between quantities.
MA.7.SP.A.1	Understand that statistics can be used to gain information about a population by examining a sample of the population; generalizations about a population from a sample are valid only if the sample is representative of that population. Understand that random

	sampling tends to produce representative samples and support valid inferences.
MA.8.SP.A.2	Know that straight lines are widely used to model relationships between two quantitative variables. For scatter plots that suggest a linear association, informally fit a straight line, and informally assess the model fit (e.g. line of best fit) by judging the closeness of the data points to the line.
MA.8.SP.A.4	Understand that patterns of association can also be seen in bivariate categorical data by displaying frequencies and relative frequencies in a two-way table. Construct and interpret a two-way table summarizing data on two categorical variables collected from the same subjects. Use relative frequencies calculated for rows or columns to describe possible association between the two variables.
LA.SL.7	Speaking and Listening
LA.SL.7.5	Include multimedia components and visual displays in presentations to clarify claims and findings and emphasize salient points.
SCI.MS-LS1	From Molecules to Organisms: Structures and Processes
SCI.MS-LS1-2	Develop and use a model to describe the function of a cell as a whole and ways parts of cells contribute to the function.
SCI.MS.LS1.A	Structure and Function
SCI.MS-LS1-4	Use argument based on empirical evidence and scientific reasoning to support an explanation for how characteristic animal behaviors and specialized plant structures affect the probability of successful reproduction of animals and plants respectively.
SCI.MS.LS1.B	Growth and Development of Organisms
	Animals engage in characteristic behaviors that increase the odds of reproduction.
SCI.MS-LS1-5	Construct a scientific explanation based on evidence for how environmental and genetic factors influence the growth of organisms.
SCI.MS-LS1-6	Construct a scientific explanation based on evidence for the role of photosynthesis in the cycling of matter and flow of energy into and out of organisms.
SCI.MS.LS1.C	Organization for Matter and Energy Flow in Organisms
SCI.MS-LS2	Ecosystems: Interactions, Energy, and Dynamics
SCI.MS-LS2-1	Analyze and interpret data to provide evidence for the effects of resource availability on organisms and populations of organisms in an ecosystem.
SCI.MS.LS2.A	Interdependent Relationships in Ecosystems
SCI.MS-LS2-2	Construct an explanation that predicts patterns of interactions among organisms across multiple ecosystems.
SCI.MS.LS2.A	Interdependent Relationships in Ecosystems
SCI.MS-LS2-3	Develop a model to describe the cycling of matter and flow of energy among living and nonliving parts of an ecosystem.
SCI.MS.LS2.B	Cycles of Matter and Energy Transfer in Ecosystems
SCI.MS-LS2-4	Construct an argument supported by empirical evidence that changes to physical or biological components of an ecosystem affect populations.
SCI.MS.LS2.C	Ecosystem Dynamics, Functioning, and Resilience
SCI.MS-LS2-5	Evaluate competing design solutions for maintaining biodiversity and ecosystem services.
	Engaging in Argument from Evidence
SCI.MS.LS2.C	Ecosystem Dynamics, Functioning, and Resilience
SCI.MS.LS4.D	Biodiversity and Humans
SCI.MS-LS4	Biological Evolution: Unity and Diversity

SCI.MS-LS4-1	Analyze and interpret data for patterns in the fossil record that document the existence, diversity, extinction, and change of life forms throughout the history of life on Earth under the assumption that natural laws operate today as in the past.
SCI.MS.LS4.A	Evidence of Common Ancestry and Diversity
SCI.MS-LS4-2	Apply scientific ideas to construct an explanation for the anatomical similarities and differences among modern organisms and between modern and fossil organisms to infer evolutionary relationships.
SCI.MS-ETS1	Engineering Design
SCI.MS-ETS1-4	Develop a model to generate data for iterative testing and modification of a proposed object, tool, or process such that an optimal design can be achieved.
CS.6-8.8.1.8.DA.5	Test, analyze, and refine computational models.
CS.6-8.DA	Data & Analysis
CS.K-2.8.1.2.AP.2	Model the way programs store and manipulate data by using numbers or other symbols to represent information.
CS.K-2.8.1.2.DA.1	Collect and present data, including climate change data, in various visual formats.
CS.K-2.8.1.2.DA.3	Identify and describe patterns in data visualizations.
CS.K-2.8.1.2.DA.4	Make predictions based on data using charts or graphs.
CS.K-2.8.2.2.EC.1	Identify and compare technology used in different schools, communities, regions, and parts of the world.
CS.K-2.8.2.2.ED.3	Select and use appropriate tools and materials to build a product using the design process.
CS.K-2.8.2.2.ITH.3	Identify how technology impacts or improves life.
CS.K-2.8.2.2.ITH.4	Identify how various tools reduce work and improve daily tasks.
CS.K-2.AP	Algorithms & Programming
CS.K-2.DA	Data & Analysis
CS.K-2.ED	Engineering Design
CS.K-2.IC	Impacts of Computing
CS.K-2.NT	Nature of Technology
WRK.9.2.8.CAP	Career Awareness and Planning
WRK.9.2.8.CAP.11	Analyze potential career opportunities by considering different types of resources, including occupation databases, and state and national labor market statistics.
TECH.9.4.8.CI	Creativity and Innovation
TECH.9.4.8.CI.3	Examine challenges that may exist in the adoption of new ideas (e.g., 2.1.8.SSH, 6.1.8.CivicsPD.2).
TECH.9.4.8.CI.4	Explore the role of creativity and innovation in career pathways and industries.
TECH.9.4.8.CT	Critical Thinking and Problem-solving
TECH.9.4.8.CT.3	Compare past problem-solving solutions to local, national, or global issues and analyze the factors that led to a positive or negative outcome.
TECH.9.4.8.DC.2	Provide appropriate citation and attribution elements when creating media products (e.g., W.6.8).
TECH.9.4.8.DC.6	Analyze online information to distinguish whether it is helpful or harmful to reputation.
TECH.9.4.8.TL	Technology Literacy
TECH.9.4.8.TL.3	Select appropriate tools to organize and present information digitally.
TECH.9.4.8.GCA	Global and Cultural Awareness

TECH.9.4.8.IML	Information and Media Literacy
TECH.9.4.8.IML.6	Identify subtle and overt messages based on the method of communication.
TECH.9.4.8.IML.12	Use relevant tools to produce, publish, and deliver information supported with evidence for an authentic audience.
TECH.9.4.8.IML.13	Identify the impact of the creator on the content, production, and delivery of information (e.g., 8.2.8.ED.1).
	Communication skills and responsible behavior in addition to education, experience, certifications, and skills are all factors that affect employment and income.
	Some digital tools are appropriate for gathering, organizing, analyzing, and presenting information, while other types of digital tools are appropriate for creating text, visualizations, models, and communicating with others.
	Digital tools allow for remote collaboration and rapid sharing of ideas unrestricted by geographic location or time.
	Technology has changed the way people live and work. Various tools can improve daily tasks and quality of life.
	There is a need to produce and publish media that has information supported with quality evidence and is intended for authentic audiences.
	An individual's strengths, lifestyle goals, choices, and interests affect employment and income.
	Digital tools make it possible to analyze and interpret data, including text, images, and sound. These tools allow for broad concepts and data to be more effectively communicated.

Essential Questions

Essential Questions:

What are the relationships among individuals, populations, communities, ecosystems and the biosphere?

How do biotic and abiotic factors affect an organism's survival in their environment?

In what ways do organisms interact within ecosystems that impact populations and the ecosystem itself?

How does energy flow through an ecosystem?

Enduring Understandings:

Relationships exist between different organisms and their environment that can affect the populations within a community.

Abiotic and biotic factors have an impact on organisms and the flow of energy through an ecosystem.

Objectives

Students will know that within the biosphere there are many different environments.

Students will know that abiotic and biotic factors have an impact upon organisms.

Students will know that eventually, an environment can reach its carrying capacity.

Students will know that less usable energy is available at the higher levels of the food web since much energy is used for life activities.

Students will know that when a community has reached the final stage of ecological succession, it is called a climax community.

Students will know that organisms are classified based on similar characteristics and DNA

Students will know that competition for resources can affect the populations of organisms in a community.

Students will know that relationships exist between different organisms and their environment.

Students will understand the effects of climate change on an ecosystem.

Learning Plan

Discuss how organisms interact in a community.

Discuss the components of an ecosystem.

Study the levels of organization in a biosphere.

Explain how living things interact with each other and nonliving things in the environment.

Describe how physical/limiting factors affect the organisms in an ecosystem.

Relate the carbon dioxide/oxygen cycles with the nitrogen cycle and explain how they are essential parts of all ecosystems.

Create Marine Food web

Simulate Weaving a Food Web

Graphing populations activity

View Cane Toad video

Conduct the “Here Today, Gone Tomorrow” Laboratory Activity.

Discuss populations, food chains, ecological changes

Demonstrate Succession Lab Activity

Participate in the Kaibob Activity

Assessment

Science courses are designed to promote skill attainment. Student progression and pace through which they proceed through the performance tasks is based on their affinity for and ability to reach skill attainment. The teacher will determine formative and summative skill attainment; alternative assessments will be incorporated for each student based on their strengths and challenges.

Formative Assessments:

Worksheets

Exit Tickets

Class Discussion

Quizzes:

Food Web/Food Chain quiz

Bench Marks:

Formal Lab Reports/Lab Write-ups

Demonstrating Succession Lab Work

Summative:

Unit Tests: Ecology Chapter

Alternative :

Marine Food Web

Graphing Population Data

Materials

Prentice Hall Life Science - Science Explorer

NEWSELA

Computer(s) **.**

Smartboard **.**

Powerpoints .

Relevant worksheets/notes .

Relevant videos .

Relevant virtual activities .

Relevant interactive programs .

Safety Equipment .

Meter Sticks/ metric rulers.

Marine Food Web pictures.

Colored pencils/scissors.

Food Web Model.

Models of Nitorgen cycle and oxygen cycle.

Ecosystem images.