Unit 1: Ecosystems
7th Grade Science

18 Class Meetings

Revised November 2025

Essential Questions

- How does changing an ecosystem affect what lives there?
- How do organisms interact within an ecosystem?

Enduring Understandings with Unit Goals

EU 1: Resource availability affects organisms and populations of organism in an ecosystem.

- Explain how all living organisms in an ecosystem are interconnected and depend on each other for survival.
- Identify how Biodiversity is essential for a healthy ecosystem, a diverse range of species helps maintain the stability of the ecosystem.

EU 2: Organisms compete for resources and when space in an ecosystem is limited, resources become more limited.

- Determine how changes in one part of the ecosystem impact the whole system.

EU 3: Humans can use scientific methods to monitor and minimize human impact on people, organisms and ecosystems.

- Explore how human activity such as pollution, deforestation and urbanization can disrupt an ecosystem.
- Determine solutions and models that Humans need for sustainable practices and solutions to protect organisms and their habitat.

Standards

Next Generation Science Standards:

- **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.
- **MS-LS2-4:** Construct an argument supported by empirical evidence that changes to physical or biological components of an ecosystem affect populations.
- **MS-LS2-2:** Construct an explanation that predicts patterns of interactions among organisms across multiple ecosystems.
- **MS-LS2-5:** Evaluate competing design solutions for maintaining biodiversity and ecosystem services.
- **MS-ESS3-3:** Apply scientific principles to design a method for monitoring and minimizing a human impact on the environment.
- **MS-ETS1-1:** Define the criteria and constraints of a design problem with sufficient precision to ensure a successful solution, taking into account relevant scientific principles and potential impacts on people and the natural environment that may limit possible solutions.

Common Core State Standards:

- **RST.6-8.:** Cite specific textual evidence to support analysis of science and technical texts.

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- **RST.6-8.9:** Compare and contrast the information gained from experiments, simulations, video, or multimedia sources with that gained from reading a text on the same topic.
- **RI 7.1:** Cite textual evidence to support analysis of what the text says explicitly as well as inferences drawn from the text.
- **RI 7.3:** Analyze the interactions between individuals, events, and ideas in a text.
- **RI 7.8:** Trace and evaluate the argument and specific claims in a text, assessing whether the reasoning is sound and the evidence is relevant and sufficient to support the claims.
- **W 7.1:** Write arguments to support claims with clear reasons and relevant evidence.

ISAAC Vision of the Graduate Competencies

Competency 1: Write effectively for a variety of purposes.
Competency 2: Speak to diverse audiences in an accountable manner.
Competency 3: Develop the behaviors needed to interact and contribute with others on a team.
Competency 4: Analyze and solve problems independently and collaboratively.
Competency 5: Be responsible, creative, and empathetic members of the community.

Unit Content Overview

1. **Examine healthy ecosystems and populations**
    - Research the connection between purchasing chocolate and ecosystem dynamics.
    - Analyze how buying candy could impact the ecosystem.
    - Develop initial models to explain how buying candy can impact an ecosystem.

2. **Investigate how resource availability impacts ecosystems**
    - Model competition for available resources between populations

3. **Use models to predict and evaluate impact on biodiverse systems**
    - Evaluate and compare how disruptions would impact biodiverse or less biodiverse systems.
    - Construct arguments to prove more diverse ecosystems benefit an ecosystem.
    - Investigate more phenomena related to biodiversity, and how changing an ecosystem affects what lives there.

Key Terms and Vocabulary: biotic, abiotic factors, habitats, niche, producers, consumers, decomposers, food chain, water, population, pollution, deforestation, conservation, sustainability, model, design, biodiverse systems

Interdisciplinary Connection:
Language Arts, Humanities

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Daily Learning Objectives with TWPS

Students will be able to…

- Use the process of making claims, collecting evidence to support claims applying specific reasoning to connect evidence to claims.
  - *How do scientists collect information and make observations?*
- Analyze and interpret data to provide evidence on how the availability of resources affects a population. ***
  - *How could buying candy affect the orangutan populations in the wild? Explain.*
  - *Why is the number of oil palm trees increasing? Explain.*
  - *Can we replace palm oil with something else? Why or why not?*
- Define food chains and food webs.
  - *Identify producers, consumers, and decomposers from the food chains/webs.*
- Determine and predict patterns of how organisms interact across ecosystems.
  - *How can we grow palm oil trees somewhere else? How would that help or hurt the tropical rainforest?*
- Explain patterns of interactions of organisms across ecosystems.
  - *How have changes in our own community affected what lives there? Give examples and explain.*
- Develop logical arguments supported by evidence explaining that changes to physical or biological ecosystem affect populations. *
  - *How can we design palm tree farms to support orangutans and farmers?*
- Develop and map evidence from written and media sources to support the claim that chocolate production is impacting and changing the ecosystem and organisms in it.
  - *Why do orangutans need so much forest space?*
- Compare and critique two arguments emphasizing the same evidence about the impact of chocolate production and the organism's population and ecosystem.
  - *Would planting more rainforest fruit trees help the population to increase? Explain why or why not?*
- Evaluate solutions for maintaining biodiversity.
  - *How can we increase the population and biodiversity within the ecosystem?*
  - *How can we maintain a stable population?*
- Apply scientific principles for monitoring and minimizing human impact on the environment.
  - *How would scientists think about and solve this problem?*
- Develop a model of the universe that shows how to maintain biodiversity in an ecosystem.
  - *How would this model best increase the population?*
- Design and critique solutions and models for maintaining or restoring ecosystems.
  - *What worked? What would I change and why?*
- Create a model of how energy flows through a specific ecosystem. **
  - *Describe the different relationship between organisms in an ecosystem?*
  - *How does one depend on the other for survival?*

Instructional Strategies/Differentiated Instruction

- Guided notetaking
- Interactive Notebook

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- Warm up activities
- Flexible grouping
- Independent reading
- Lab Demonstrations
- Exit slips
- Graphic Organizers
- Whole group instruction
- Student-led instruction
- Independent problem-solving
- Collaborative problem-solving
- Cross-curricular problem solving (independent and collaborative)
- Accountable Talk
- Homework
- Word walls with visuals
- Investigations/labs
- CER (Claim, Evidence, Reasoning)

EL Differentiated Instruction:

- Sentence starters
- Simplified directions
- Prompting and questioning
- Alternate responses when needed
- Explicit modeling
- Key vocabulary
- Visuals
- Vocabulary word bank
- Reading and accountable talk discussions of texts
- Tiered Instruction
- Hands-on activities
- SIOP strategies- Teachers implement SIOP strategies

Assessments

FORMATIVE ASSESSMENTS:

- Interactive Notebook
- Labs
- Claim Evidence Reasoning Responses
- Guided notes
- Homework
- Daily Think-Write-Pair-Share (TWPS)
- Accountable Talk Discussions
- Oral questioning
- Exit slips
- Warm Up activities

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- NGSS Practice

SUMMATIVE ASSESSMENTS:
- Quiz EU 1, EU 2
- Unit 1 Performance Task EU1, EU2, EU3

Unit Task

Unit Task: Save the Species

Description: Students will choose a different endangered species from an approved list to research and propose a solution to protect the species. (EU1) Work will be completed individually or with a partner. The unit task will consist of background information on the species, identifying the habitat, and determining causes and threats to the population. (EU2) After compiling all the information, students will analyze and then propose an appropriate solution to protect or save the species. (EU3) The final part of the task will be sharing the possible solution(s) and proposed call to action. Students will share their solutions at the Save the Species class gallery walk.

Evaluation: Teacher Created Scoring Guide

Unit Resources

- Open Sci Ed unit resources
- Science notebooks
- Laptops
- NGSS Interim Assessments PE MS-LS2-1
- Diffit.com
- Newsela.com
- Readworks.com