

# Unit 3: Ecology

Content Area: **Template**

Course(s):

Time Period:

Length:

Status: **Published**

## State Mandated Topics Addressed in this Unit

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N/A	N/A

## Unit 3: Ecology

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### Learning Objectives

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- How are biological communities structured to ensure their stability through time?
- How do we study life?
- How have human activities shaped local and global ecology?
- What is driving the flow of matter and energy through ecosystems?
- Why is the cycling of energy and matter important to life on earth?

### Essential Skills

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- Analyze the interrelationships and interdependencies among different organisms, and explain how these relationships contribute to the stability of the ecosystem
- Apply data representations and new models to revise predictions and explanations.
- Apply mathematical formulas to justify the concept of an efficient diet.
- Cite evidence that the transfer and transformation of matter and energy links organisms to one another and to their physical setting.
- Design a solution to a human-caused environmental problem, including a discussion of the populations affected, and reasoning why the general public should support such a movement.
- Engage in multiple forms of discussion in order to process, make sense of, and learn from others' ideas, observations, and experiences
- Model how natural and human-made changes in the environment will affect individual organisms and the dynamics of populations.
- Predict what would happen to an ecosystem if an energy source was removed.
- Reflect on and revise observations as new evidence emerges
- Represent ideas using literal representations, such as graphs, tables, journals, concept maps, and

## Standards

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9-12.HS-LS2-1	Use mathematical and/or computational representations to support explanations of factors that affect carrying capacity of ecosystems at different scales.
9-12.HS-LS2-2	Use mathematical representations to support and revise explanations based on evidence about factors affecting biodiversity and populations in ecosystems of different scales.
9-12.HS-LS2-3	Construct and revise an explanation based on evidence for the cycling of matter and flow of energy in aerobic and anaerobic conditions.
9-12.HS-LS2-6	Evaluate claims, evidence, and reasoning that the complex interactions in ecosystems maintain relatively consistent numbers and types of organisms in stable conditions, but changing conditions may result in a new ecosystem.
9-12.HS-LS2-8	Evaluate evidence for the role of group behavior on individual and species' chances to survive and reproduce.
9-12.HS-LS2-5	Develop a model to illustrate the role of photosynthesis and cellular respiration in the cycling of carbon among the biosphere, atmosphere, hydrosphere, and geosphere.
9-12.HS-LS2-4	Use mathematical representations to support claims for the cycling of matter and flow of energy among organisms in an ecosystem.

## Instructional Tasks/Activities

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- “Oh Deer” Lab (outdoors): students enact predator-prey relationships and population dynamics
- Biodiversity Campaign: Students research various populations in an area that has been affected by a negative human impact. Students summarize the impact on the ecosystem and design ways to fix the damage. Add on: students can design experimental tests/simulations/models to see if their solution would work in the real world to save biodiversity in that ecosystem.
- Biome Research Project: students identify a major problem and solution in that area of the world. Create a persuasive brochure/ poster/ presentation to convince others that your biome is worth saving.
- Chapter Tests
- Demography Internet Activity: students collect cemetery data and interpret change in human population growth over time
- Food Web Research Project: students research relationships between various producers and consumers in tropical rainforest provided. Organize organisms into an accurate food web, showing flow of energy
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- Human Population Research Project: students research the population growth of the country of their choice then identify type of human population growth according to current population characteristics. Explain why that population is growing in that way
- Population Biology Virtual Lab: students observe and interpret the simulation of varied population growth in bacteria under different conditions using laboratory procedures
- Review game
- Vocabulary Quizzes

## Assessment Procedure

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- “Musical Chairs” – in-class activity: students demonstrate relationship between population size and resources available in an ecosystem
- Biome color map of US: Students color each different biome found in the United States a different color.
- Biome Persuasive Presentations: Students use research and brochures to attempt to persuade other students that their biome is the most important to save
- Classroom Total Participation Technique
- Classwork
- DBQ
- Essay
- Exit Ticket/Entrance Ticket/Do Now
- Foldables – organization of material (biotic vs. abiotic, types of succession, weather vs. climate, major biome types)
- Food chains and food webs color coded pyramid: students color, label, define, and draw an example of each type of organism in ecological pyramids using vocabulary. Then assemble pyramids into pyramid shape
- Group discussion
- Human population growth Worksheet: students compare different countries and limiting factors; identify stage of growth for each country
- Identify biotic and abiotic factors in pictures of various biomes
- Journal / Student Reflection
- Kahoot
- Other named in lesson
- Peer Review
- Performance
- PowerPoint presentation of material
- Predator-Prey Card game: students use cards with various organisms in an ecosystem to show relationships between predators, prey, decomposers, and producers.
- Problem Correction
- Project
- Quiz
- Rubric
- Succession Scenarios: students listen to or read various scenarios of damage to an ecosystem (volcanic eruption, clear cutting a forest, etc.) then attempt explain how different ecosystems will recover after various levels of disturbance
- Teacher Collected Data
- Test
- Think, pair, share (read assigned section of text individually, discuss with a partner, present material in pairs to class – use PowerPoint as a reference)
- Water Carbon, Nitrogen, Phosphorous Cycles Diagrams: Students draw, label, color diagrams using examples of their own for each stage.

- Who eats Whom? (kit): students enact predator-prey relationships using manipulatives
- Worksheet

## **Recommended Technology Activities**

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- Appropriate Content Specific Online Resource
- Chromebook
- Copy/Paste Content Specific Link Here
- Copy/Paste Content Specific Link Here
- Copy/Paste Content Specific Link Here
- Gimkit
- GoGuardian
- Google Classroom
- Google Docs
- Google Forms
- Google Slides
- Kahoot
- MagicSchool AI
- Other- Specified in Lesson
- Quiziz
- Screencastify

## **Accommodations & Modifications & Differentiation**

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Accommodations and Modifications should be used to meet individual needs. Their IEP and 504 plans should be used in addition to the following suggestions.

## **Gifted and Talented**

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- Compare & Contrast
- Conferencing
- Debates
- Jigsaw
- Peer Partner Learning
- Problem Solving
- Structured Controversy
- Think, Pair, Share
- Tutorial Groups

## **Instruction/Materials**

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- alter format of materials (type/highlight, etc.)
- color code materials
- eliminate answers
- extended time
- extended time
- large print
- modified quiz
- modified test
- Modify Assignments as Needed
- Modify/Repeat/Model directions
- necessary assignments only
- Other (specify in plans)
- other- named in lesson
- provide assistance and cues for transitions
- provide daily assignment list
- read class materials orally
- reduce work load
- shorten assignments
- study guide/outline
- utilize multi-sensory modes to reinforce instruction

## **Environment**

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- alter physical room environment
- assign peer tutors/work buddies/note takers
- assign preferential seating
- individualized instruction/small group
- modify student schedule (Describe)
- other- please specify in plans
- provide desktop list/formula

## **Honors Modifications**

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N/A

## Resources

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- Resource 1
- Resource 2
- Resource 3
- Resource 4
- Resource 5