Unit 4: Ecosystems

Content Area: **Science**
Course(s): **Science**
Time Period: **Generic Time Period**
Length: **Weeks**
Status: **Published**

Unit Overview

In the Ecosystems unit, students will learn that life science principles are powerful tools for making sense of the complexity, diversity, and interconnectedness of life on Earth. They will study how living things interact with the environment, cause changes, reproduce, and grow. Students will explore slow and rapid changes in ecosystems and how these changes can affect all life forms, including humans. Students will study the lifecycles of specific plants and animals. They will understand how populations of organisms in any ecosystem may thrive, decline, or become extinct.

Standards

SCI.3-4.5.1.4.D.4	Handle and treat organisms humanely, responsibly, and ethically.
SCI.3-4.5.3.4.A.1	Develop and use evidence-based criteria to determine if an unfamiliar object is living or nonliving.
SCI.3-4.5.3.4.A.2	Compare and contrast structures that have similar functions in various organisms, and explain how those functions may be carried out by structures that have different physical appearances.
SCI.3-4.5.3.4.B.1	Identify sources of energy (food) in a variety of settings (farm, zoo, ocean, forest).
SCI.3-4.5.3.4.C.1	Predict the biotic and abiotic characteristics of an unfamiliar organism's habitat.
SCI.3-4.5.3.4.C.2	Explain the consequences of rapid ecosystem change (e.g., flooding, wind storms, snowfall, volcanic eruptions), and compare them to consequences of gradual ecosystem change (e.g., gradual increase or decrease in daily temperatures, change in yearly rainfall).
SCI.3-4.5.3.4.D.1	Compare the physical characteristics of the different stages of the life cycle of an individual organism, and compare the characteristics of life stages among species.
SCI.3-4.5.3.4.E.1	Model an adaptation to a species that would increase its chances of survival, should the environment become wetter, dryer, warmer, or colder over time.
SCI.3-4.5.3.4.E.2	Evaluate similar populations in an ecosystem with regard to their ability to thrive and grow.

Essential Questions

- What are the differences between a *biotic* and an *abiotic* environment?
- What criteria can be used to determine if an unfamiliar object is living or non-living?
- What positive and negative effects do living things have on their environment?
- What could happen to a living thing if its ecosystem is changed?
- What could happen to a living thing if its ecosystem remained the same?

Application of Knowledge and Skills...

Students will know that...

- 1. Flooding, wind storms, snowfall, and volcanic eruptions cause rapid change to an ecosystem.
- 2. Gradual increases and decreases in daily temperatures and changes in yearly rainfall cause gradual change to an ecosystem.
- 3. Organisms have different physical characteristics and require different sources of energy.
- 4. Organisms reproduce, develop, and have predictable life cycles.
- 5. Different species go through different life stages.
- 6. Species survive changes to their environment through adaptation.
- 7. Habitats have biotic and abiotic components.
- Vocabulary: abiotic, adaptation, biotic, ecosystem, environment, nutrients, organism, population, species, structures, waste.

Students will be able to...

- B. Predict the abiotic characteristics of an unfamiliar organism's habitat.
- C. Explain the consequences of rapid change to an ecosystem.
- D. Explain the consequences of gradual change to an ecosystem.
- E. Compare and contrast the consequences of rapid and gradual change to an ecosystem.
- F. Compare and contrast the physical characteristics of the different stages of the life cycle of an individual organism.
- G. Compare and contrast the characteristics of life stages among species.
- H. Model an adaptation to a species that would increase its chances of survival should the environment change over time.
- I. Determine why some populations in an ecosystem thrive while others do not.
- Predict the biotic characteristics of an unfamiliar organism's habitat.

Assessments

KWL Chart

Diagnostic: Other written assessments

Students will write what they know, want to know, and learn about ecosystems.

Lifecycles Quiz

Formative: Written Test

Students will take a quiz on lifecycles of butterflies and frogs. (5.3.4.A.2, 5.3.4.D.1)

Ecosystems Quiz

Formative: Written Test
Quiz on foodchain (5.3.4.B.1)

Terrarium Test
Summative: Written Test
Students will be tested on their knowledge relative to the class-made terrarium/ecosystem. (5.3.4.A.1, 2, B.1, D.1, E.1, E.2)

Ecosystems Benchmark Assessment
Summative: Written Test
Test on all topics covered in ecosystems unit. (5.1.4.D.4, 5.3.4.A.1, 2, B.1, C.1,2, D.1, E.1, E.2)

Activities

- Use picture cards to create your own food web
- Duckweed, Elodea, and Algae: Why are they imporant? comprehension questions based on reading
- Ecology of Finding Nemo- watch Finding Nemo and answer questions about the ocean biome
- Creeps of the Deep- activity to learn about the adaptations of ocean animals (includes worksheet)
- Make models of the cycles of the frog and the butterfly using the life cycle graphic organizer
- Raise a class set of butterflies and observe each of the stages in the life cycle
- Make class terrarriums to demonstrate and observe the processes at work in an ecosystem
- HSP Labs: Animal Life Cycles, Eating Like A Bird, Train A Fish, Modeling an Ecosystem, Make a Food Chain

Activities to Differentiate Instruction

- Graphic organizers (Cycle Organizer)
- Outline of class notes
- Student-completed and teacher-completed study guides
- Modified grading rubric
- Modified tests and quizzes
- Tier 1, 2, and 3 classwork and homework assignments
- Real-world problem solving
- Technology project/research

Integrated/Cross-Disciplinary Instruction

- Writing Assignment- Rewrite A Tiny Seed story by Eric Carle by creating an adventure story for a seed.
- Art project- Can You Find Me? use an animal card and a magnifying glass to draw a scene depicting that particular animal utilizing camouflage for survival.
- Guest presenter, *The Butterfly Man*, Rick Mikula

- Techology - research biomes of the world and make presentations

Resources

HSP Science Materials

Carolina Biological Materials

NJASK Grade 4 Coach books