

Ball State University
Field Station and Environmental Education Center

Lesson Plan: Ecosystems and Homeostasis

Date:	Unit/Lesson: Life Sciences - Ecosystems
Grade: 6 th	Grouping: 4 - 6 students

Essential Question(s):

1. What is an ecosystem?
 - a. How do scientists make observations and classify organisms and habitats?
2. What do organisms need to survive within their ecosystem?
3. What is Homeostasis?
 - a. How is it maintained in an ecosystem?
 - b. What can “mess up” homeostasis in an ecosystem?
 - c. How can homeostasis adjust or be restored?

Learning Target(s):

1. Students should be able to:
 - a. Define an ecosystem.
 - b. Identify and put in order the following: organism, species, population, community, and ecosystem.
 - c. Give examples of the five things organisms need to survive: food, water, air, space, shelter
 - d. Define homeostasis and create a balanced ecosystem.

Background Information: To be addressed in presentation

1. What is an ecosystem?
 - a. Organism → Species → Population → Community → Ecosystem
 - i. Define each of these levels
 - ii. How do scientists make observations and classify organisms and habitats into these categories?
 - b. What is Ecology?
 - c. What do organisms need to survive within their ecosystem?
 - i. Food, water, shelter, space, air
 - ii. How do they achieve these things?
 1. Photosynthesis, relationships between organisms (predator/prey, consumer/producer, parasite/host), food webs/chains/trophic levels
2. What is Homeostasis?
 - a. How is it maintained in an ecosystem?
 - i. Examples, such as the cycles of hare and lynx populations over time
 - ii. Carrying capacity
 - iii. Limiting factors
 - b. What can “mess up” homeostasis in an ecosystem?
 - i. Human interactions
 - ii. Habitat destruction/alteration
 - iii. Invasive species

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- iv. Climate change
- c. How can homeostasis adjust or be restored?
 - i. Restoration and conservation efforts; Time

Agenda:

1. Present content to class
 - a. Students fill in worksheet throughout the presentation.
 - b. Two versions of worksheet with differing levels of difficulty.
2. Small Group Activity: Put your Ecosystem into Homeostasis
 - a. Each group will become an “ecosystem,” and receive a folder containing game sheets and a pouch containing game pieces
 - b. Total of six folders, two for each habitat:
 - c. They will be given a set of species, each of which will have a list of their niche requirements
 - i. Each niche requirement has a certain value (example = needs 1 tree, or 3 food)
 - ii. Based on the set of species, and their requirements, each group needs to figure out a way to have as many of each species as possible, without overshooting their ecosystem’s carrying capacity, and to make sure each species has what it needs to survive (food, water, space, air, shelter)
 - iii. Group will have a map of their habitat and a picture of each species, along with the list of niche requirements for each species
 - iv. Will require working together to compare each species, figure out how much of each one they will need, and how to best create their ecosystem

Assessment:

1. Small group worksheet

Modifications:

1. Introduce new levels of difficulty into the game, such as: invasive species; a natural disaster; human-caused problems, etc.,
2. Groups can present their ecosystems to the rest of the class

Indiana State Science Standards:

1. 6-LS-1. Investigate and describe how homeostasis is maintained as living things seek out their basic needs of food, water, shelter, space, and air.
2. 6-LS-3. Describe specific relationships (predator/prey, consumer/producer, and parasite/host) and symbiotic relationships between organisms. Construct an explanation that predicts why patterns of interactions develop between organisms in an ecosystem.
3. 6-LS-4. Investigate and use data to explain how changes in biotic and abiotic components in a given habitat can be beneficial or detrimental to native plants and animals.

Next Generation Science Standards:

1. 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.

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2. MS-LS2-4. Construct an argument supported by empirical evidence that changes to physical or biological components of an ecosystem affect populations.

- a. Common Core State Standards Connections:

- i. ELA/Literacy –

1. RST.6-8.1 Cite specific textual evidence to support analysis of science and technical texts. (MS-LS1-6),(MS-LS2-1),(MS-LS2-4)
 2. RST.6-8.7 Integrate quantitative or technical information expressed in words in a text with a version of that information expressed visually (e.g., in a flowchart, diagram, model, graph, or table). (MS-LS2-1)
 3. WHST.6-8.2 Write informative/explanatory texts to examine a topic and convey ideas, concepts, and information through the selection, organization, and analysis of relevant content. (MS-LS1-6)

3. MS-LS2-2. Construct an explanation that predicts patterns of interactions among organisms across multiple ecosystems.

4. MS-LS2-5. Evaluate competing design solutions for maintaining biodiversity and ecosystem services.

- a. Common Core State Standards Connections:

- i. ELA/Literacy – SL.8.4 Present claims and findings, emphasizing salient points in a focused, coherent manner with relevant evidence, sound valid reasoning, and well-chosen details; use appropriate eye contact, adequate volume, and clear pronunciation. (MS-LS2-2)