

Ecosystem Dynamics

Strand	Ecosystems
Topic	Investigating the impact of humans on ecosystem dynamics
Primary SOL	LS.11 The student will investigate and understand the relationships between ecosystem dynamics and human activity. Key concepts include a) food production and harvest; b) change in habitat size, quality, or structure; c) change in species competition; d) population disturbances and factors that threaten or enhance species survival; and e) environmental issues.
Related SOL	LS.1 The student will demonstrate an understanding of scientific reasoning, logic, and the nature of science by planning and conducting investigations in which d) models and simulations are constructed and used to illustrate and explain phenomena. LS.7 The student will investigate and understand that interactions exist among members of a population. Key concepts include b) influence of behavior on a population. LS.8 The student will investigate and understand interactions among populations in a biological community. Key concepts include c) competition and cooperation. LS.10 The student will investigate and understand that ecosystems, communities, populations, and organisms are dynamic, change over time, and respond to daily, seasonal, and long-term changes in their environment. Key concepts include b) factors that increase or decrease population size.

Background Information

In this culminating activity for LS.11, students will create a pop-up book depicting the human impact on the environment. Students should be familiar with topics relating to the destruction of natural habitat and its effects on native organisms. Activities that may be conducted prior to this lesson include completing a KWL chart about human impact and the effects of pollution on environment; reviewing habitat destruction within local communities, such as clear-cutting for a new neighborhood; demonstrating how agricultural pollution affects local water sources; and researching species that have become endangered due to human activity. Students should have a firm understanding of the terminology listed and be encouraged to use the vocabulary in their books.

Materials

- A DVD on environmental change such as Dr. Seuss' *The Lorax* movie
- Printer paper

- Construction paper
- Scissors
- Glue
- Instructions to create pop-up books (such as online resources or printed packets)
- Colored pencils or markers
- Textbooks, library references, access to the Internet
- Examples of a variety of pop-up books

Vocabulary

air quality, carrying capacity, clear-cutting, commensalism, competition, conservation, ecology, endangered species, energy production, habitat destruction, habitat preservation, keystone species, nonrenewable resources, overfishing, poaching, pollution, renewable resources, resources, selective cutting

Student/Teacher Actions (what students and teachers should be doing to facilitate learning)

1. Open with a discussion of the knowledge students have gained about humans' effect on ecosystems.
2. Allow students to watch a movie on environmental change such as *Dr. Seuss' The Lorax* movie. Encourage them to take notes on the many ways humans affect the natural environment in the video. After watching, discuss the types of destruction observed in the video. Ask students what biome the movie's setting most closely represented.
3. Arrange students into pairs or groups of three to create a pop-up (or illustrated) book depicting how humans have affected the environment, specifically a biome, in both positive and negative ways. Allow students to choose any biome to use as the setting, but require them to choose a species that could realistically survive in this type of climate. A cohesive plot must be developed, using appropriate vocabulary. Students should strive to teach a lesson and promote environmental awareness.

Assessment

- **Questions**
 - What types of environmental destruction did you observe in the movie?
 - What organisms were affected by the destruction? Explain how and why they suffered?
 - Which biome was most clearly represented in the video? What evidence led you to this conclusion?
 - What types of food are produced in your chosen biome? How will negligent human activity affect the harvest of this food?
 - How can pollution affect the behavior of animals within an ecosystem?
 - Is it possible for the activities of humans to change how organisms cooperate and compete with each other for resources? Explain your answer.
- **Journal/Writing Prompts**
 - Speculate how you can make a difference in the amount of pollution in your area.
 - Describe the environmental topic featured in your ecosystem book, and explain what new information you discovered when completing your research.

Extensions and Connections (for all students)

- Schedule a field trip to a nearby elementary school and share the books with younger students. This lesson would be an excellent opportunity to teach younger students about conservation. Enabling students to become the “teacher” promotes ownership of the learning process.

Strategies for Differentiation

- Have groups choose a form of habitat destruction and create posters relating to that topic. Students can place their posters around the school to promote environmental awareness.
- Modify grading rubric based on learning readiness.
- Books can be created using computer software.

Sample Rubric

Name: _____ Date: _____

Item	Criteria				Points
	Poor	Fair	Average	Excellent	
Vocabulary usage 25 pts	Contains 3 or fewer vocabulary terms	Contains 4 vocabulary terms	Contains 5 vocabulary terms	Contains 6 or more vocabulary terms	
Plot, grammar, and spelling 15 pts	Has little or no focus on plot, mechanics, formatting, and spelling	Demonstrates inconsistent focus on plot, mechanics, formatting, and spelling	Demonstrates reasonable control of, plot, mechanics, formatting, and spelling	Exhibits consistent control of plot, mechanics, formatting, and spelling	
Understands biome and threats from human interaction 25 pts	Writing shows little understanding of chosen biome/threats	Writing reflects a basic understanding of chosen biome	Writing reflects a detailed understanding of chosen biome	Writing reflects a sophisticated understanding of chosen biome	
Illustrations and pop-ups 20 pts	Illustrations show little effort	Some illustrations are original and enhance story content	Most illustrations are original and enhance story content	All illustrations are original and enhance story content	
On task behavior 15 pts	Student was often off task during project	Student was off task occasionally during project	Student was rarely off task during project	Student was never off task during project	
Total					

Teacher Comments: