

Bruce Taterka
West Morris Mendham High School
Lesson Plan

Title: Biodiversity Analysis and Comparison Within the New Jersey Highlands

Date: October 2009

Subject: AP Environmental Science

Class Description: Grades 11 & 12.

Duration of Lesson: two 75-minute periods

Rationale: To instruct students in field methodologies and introduce students to the concepts of species biodiversity and the biodiversity of interactions.

Materials: stakes, twine & 10m tape to construct grid; sampling and collecting equipment

Objectives:

1. SWBAT quantitatively assess and compare biodiversity of two distinct plant and animal communities within the larger deciduous forest ecosystem
2. SWBAT distinguish the concepts of biodiversity of species and biodiversity of trophic interactions

New Jersey Core Curriculum Standards (Science):

- 5.10.A.1, B.1 (12th Grade - Environmental Studies – Natural Systems & Interactions, Human Interactions & Impact)

Prior Knowledge: Students have an understanding of the fundamental biotic structure of the ecosystem and trophic (feeding) relationships

Activities (Active Participation):

- Warm-up: working in groups, students will attempt to identify as many types of plants and animals in two distinct communities: an unmowed meadow and a riparian forest. (Students will ID organisms descriptively only rather than formal genus and species ID.)
- Field discussion: Teacher will initiate a class discussion in the field to introduce the concept of biodiversity.
- Data Collection:
 - Students will be provided with materials for constructing sampling grids. Students will decide, based on field discussion, the appropriate dimensions of the grid and how many quadrats to analyze.
 - Students will identify the number of different species within each selected quadrat, both in the meadow community and the forest community.
 - Students will calculate biodiversity of each community in terms of species/area.
 - Teacher will initiate a discussion to interpret the results of the biodiversity analysis. Students will consider the differences in the results between the different communities, and between the various student groups. Students will

evaluate and attempt to identify: (1) the biotic and abiotic factors accounting for any differences/similarities observed between the two communities; and (2) the validity of the sampling methods used and its impact on the results.

- Biodiversity of Trophic Relationships:
 - Following the discussion of biodiversity, students will be introduced to the concept of biodiversity of trophic relationships. Each group will review its results and try to identify the trophic relationships within the two different communities studied, using specific examples of species identified during the biodiversity analysis.
 - Students will be asked to design a method to analyze the biodiversity of relationships within each community.

Closure: Teacher will give a short presentation on Caterpillars and Climate Change expedition, followed by class discussion.

Student Evaluation: Teacher will be observing, listening and assessing during field work. Students will write up formal lab report presenting and discussion their observations and conclusions.

Accommodations: Lesson uses multiple teaching methodologies to accommodate multiple learning styles.