



INTEGRATED PEST MANAGEMENT

Unit 3 Lesson 10 Biodiversity in Your Own Backyard

Focus Areas: Biodiversity; Science, Math

Focus Skills: Observation, estimation,
data collection, analysis, hypothesis
testing

Level of Involvement: MAXIMUM

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Unit 3 Lesson 10: Biodiversity in Your Own Backyard



University of
Connecticut
College of Agriculture
and Natural Resources
Cooperative Extension System



***Dedicated
to Reducing
Pesticides***

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Objectives

- * To make detailed and accurate observations of a land plot
- * To develop an understanding of the diverse populations of species and habitats that occur locally
- * To design an investigation to observe how human behavior impacts biodiversity

Essential Question

What is the impact of humans on the population in a natural environment?

Essential Understanding

There is a correlation between the amount of human activity and the populations of species of plants, arthropods and other animals.

Background

The activity is used to introduce the significance of environmental studies. The focus of the terrestrial biodiversity survey is to examine the impact of humans upon the environment. Through investigations, participants develop their own hypothesis about human impact and then test this on a previously examined site. Final analysis and discussion of the results allow the participants to develop a theory about the impact of humans upon the biodiversity. Participants are introduced to experimental design and the use of statistics to determine whether to accept or reject a hypothesis.



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Background

Biodiversity

Diversity is a fundamental characteristic of life itself. Biological diversity or biodiversity is an expression used to describe the richness or variety of living organisms found in an area or type of environment, including both the number and frequency of genes, species and ecosystems. Biodiversity is usually divided into three fundamental categories:

- * Genetic diversity: the genetic variation within each species
- * Diversity of species: the different species in a given area or habitat
- * Diversity of ecosystems: the natural environment comprises many different types of habitats

There are limits as to how much any biological resource can be exploited, and in many cases mankind is exceeding those limits. The elimination or change of habitats is the leading cause of loss of biodiversity. The introduction of non-native or alien species to the habitat also causes severe problems, like diseases and increased competition.

Overhunting and overharvesting, in addition to the factors already mentioned, may also cause extinction of some species. Others may become rare or disappear from the habitats locally.

Human encroachment, like urban settlements, roads, clearcutting of forests, dams and mass tourism tend to fragment the habitats, making it difficult for species needing large, continuous areas of habitat to survive.

Challenge

Determine the correlation between the amount of human activity and plant and animal populations



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Logistics

Time: 2 hours

Group size: one group with teams of 5 (1 recorder, 2 animal surveyors, 2 plant samplers)

Space: three to four sites will be needed for the survey in order to see patterns. One site should have little or low human impact. A second site should have moderate impact, and a third should have high human impact (This can be run in the parking lot or football field.). A fourth site is where the participants will check their predictions. It can have any level of impact you wish.

Materials

Golden Guide for Insects, Golden Guide for Weeds

thermometers

rope or twine

magnifying glasses

flag tape

hand lenses

bug viewers *

meter sticks

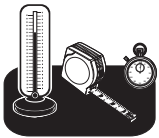
litmus paper

Handout 1 Species Count Table *

Handout 2 Sample Master Tally *

Handout 3 Biodiversity Assessment Worksheet *

* single copy provided





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Preparations

Walk the land surrounding your building or home to determine potential sites. Select 4 or 5 sites. The plot size may vary, depending on the time allotted for the activity. One meter by one meter can be as effective as larger plots. Use flag tape or meter sticks to define the area.

Activity

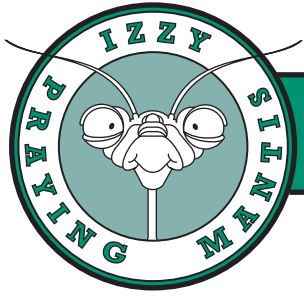
Counting Species

If a population of species is too large to count, then **ESTIMATE!** Begin by counting the size of the population in a small segment of your plot.

1. Mark out the plots.
2. Using Handout 1, record the number of plant and animal species (including arthropods) that you find. Identify them in the field guides. Sketch any not listed.
3. Collect information on the climatic and physical factors that could affect the species in your plot. Record the information on Handout 1. Remember, record data only in the column designated for your plot.
4. Identify other physical factors and any additional data describing the plants, arthropods and other animals found.
5. Have each group write their results in the appropriate place.

Follow Up

1. Tally and compare the findings for each plot and discuss them as a group (see Handout 2 Sample Master Tally).



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Follow Up (continued)

2. What environmental factors attracted these plants and animals to a specific plot? How do they interact with one another? How are they separated from interacting with other plots?
3. How does the biodiversity in a given plot compare with that of other plots?
4. What would happen if a herbicide (a chemical agent to destroy unwanted plants) were applied to a specific plot?
5. Develop a conservation strategy that could help protect species in a specific plot.
6. Did any patterns emerge in the biodiversity? What might they mean?
7. Can we use these patterns to predict biodiversity in other places in the country or world?

Assessment

Use Handout 3 Biodiversity Assessment Worksheet .

Follow Through

Based on the data collected, have interested participants develop a hypothesis about preserving biodiversity or accelerating the loss within their plot.

For example, will introducing sound from wind chimes cause an increase or decrease in species populations?



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Follow Through (continued)

Run the Experiment

Have the participants conduct their experiment and analyze the data. Present the data in a lab report and chart and display for group discussion. Did the results support the hypothesis? How can the results be checked mathematically?

Evaluation

Review and discuss as needed. Be encouraging, as this may be the first time the participants have ever designed their own experiment. Discuss how they will know if their hypothesis should be accepted or rejected. Avoid the use of We prove , We didn t prove , We suggest. Math teachers could introduce the ideas of sample sizes, significance and how math is used to decide what we accept or reject.



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Notes





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Species Count Table

Handout 1

Site number: _____ Date: _____

Team members: _____

Site description: _____

Measure/observe and record the following information about your site:

Temperature (ground level): _____ Soil color: _____

Soil pH: _____

Soil moisture: _____ Meteorological (weather) conditions: _____

Wind direction: _____

Use the Golden Guides to assist with identification of plant and arthropod species.

Plant Biodiversity Table

Common Name of Species	Number of Individuals Found	Percent Cover of Site

Arthropod Biodiversity Table

Common Name of Species	Number of Individuals Found	

Other Species Biodiversity Table

Common Name of Species	Number of Individuals Found	



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Handout 2

Sample Master Tally

Number of Plant Species	Number of Arthropods
5	2

Site 1

Location: park

Number of Plant Species	Number of Arthropods
4	6

Site 2

Location: field

Number of Plant Species	Number of Arthropods

Site 3

Location: _____

Number of Plant Species	Number of Arthropods

Site 4

Location: _____

Number of Plant Species	Number of Arthropods

Site 5

Location: _____

Number of Plant Species	Number of Arthropods

Site 6

Location: _____

Total # of Plant Species: _____

Total # of Arthropod Species: _____



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Handout 3

Biodiversity Assessment Worksheet

	Possible Points	Points Earned
1. Makes a detailed and accurate map of the plot.	_____	_____
2. Correctly identifies all plant, insect and other animal species.	_____	_____
3. Makes accurate drawings.	_____	_____
4. Explains the variation of populations between plots.	_____	_____
5. Describes how human interactions modify the environment and how these actions impact the world both locally and globally.	_____	_____

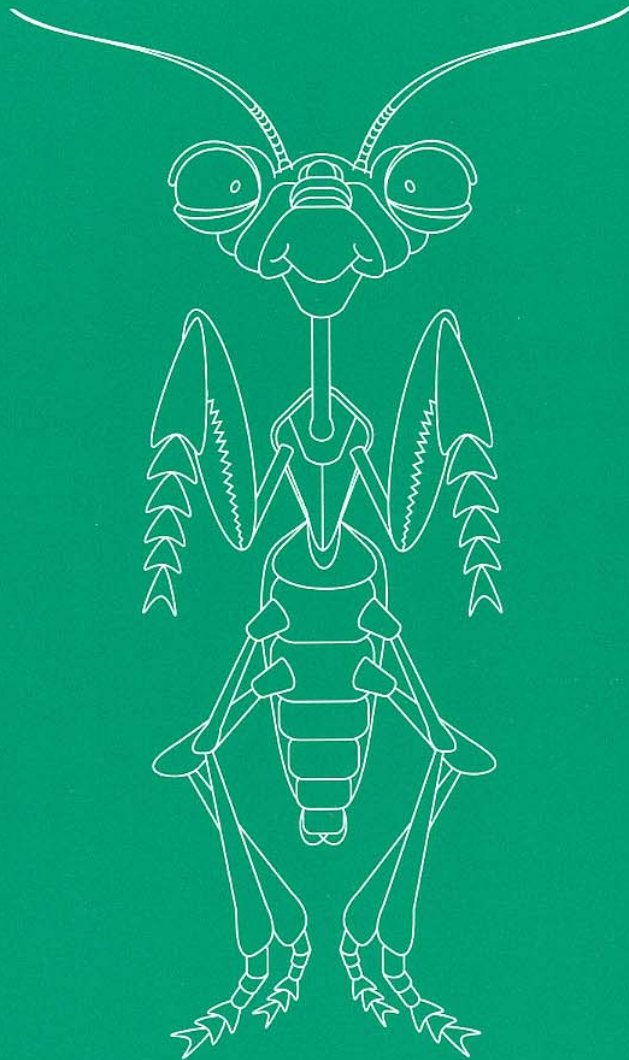
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