Sweeping Discoveries

Activity Overview
Students will conduct insect surveys in the interior, edge and outside of a prairie restoration, and compare their results.

Objectives
Students will:
- Practice observation skills
- Perceive the relationship between insects and their environment
- Consider the impact of humans on the environment

Subjects Covered
Science

Grades
3 through 12

Activity Time
1-2 hours, depending on time spent observing, distinguishing and identifying insects

Season
Spring, summer or fall

Materials
Sweep nets, white sheet or large white paper, bug box and/or magnifying glass

State Standards
Science:
Decide which data should be collected (A.4.3)

Decide on changes that have occurred (A.4.5)

Use models to predict actions and events (A.8.6)

Design investigations to test models (A.8.7)

Reexamine evidence & reasoning (A.12.7)

Use scientific vocabulary & themes (C.4.1)

Ask questions, plan investigations, make observations, predictions (C.4.2)

Background

Scientists are learning something about the plants that were once native to the North American prairies; however, very little is known about the insect life associated with the native prairies and grasslands. Historical records often give us information about native plants; little is written in the historical records of the insect life. We know insects play an extremely important role in any ecosystem as pollinators, decomposers and food sources. In a natural area, the habitat at the edge of the area's boundary is very different ecologically from its interior.

The edge of a prairie can differ from the interior with respect to:
- temperature
- relative humidity
- penetration of light
- exposure to wind
- availability of pollinators
- availability of seed dispersers
- success of seed dispersal
- competition from exotic species
- suitable animal habitat
- soil organism populations

If the majority of our remaining natural prairie is in small remnants, there will be more "edge" habitat and less "interior" habitat and the proportions of various species will be modified. Today we are going to compare insect populations at the edge of a prairie with populations in the interior and exterior of the prairie.

Activity Description

Today we are going to compare insect populations at the edge of a prairie with populations in the interior and exterior of the prairie.

1. Starting at the restoration's edge, pace off about 20 feet (7 meters) into and out of the prairie. These are the three sampling areas — interior, edge, exterior.
2. Sample an area by sweeping the net, in a single direction, six times. Empty the contents on a white sheet and examine. Record your findings on the data sheet. This is one "sweep."
3. Repeat process three more times and record.
4. Compile class findings and discuss.

Select multiple information sources (C.4.3)

Use data to answer questions (C.4.5)

Identify questions using available resources (C.8.1)

Identify data and sources to answer questions (C.8.2)

Design and conduct investigations (C.8.3)

Ask questions, build hypotheses, design investigations (C.12.1)

Identify issues, questions, research; design & conduct investigations (C.12.2)

Evaluate data (C.12.3)

Choose & evaluate data collection methods (C.12.4)

Investigate how organisms respond to internal/external cues (F.4.2)

Find connections among living and non-living things (F.4.4)

Show organism's place in ecosystems (F.8.8)

Explain survival and population growth of species (F.8.9)

Investigate cooperation & competition (F.12.7)

Infer changes in ecosystems (F.12.8)

Extensions

- Keep tallies of the number of individuals of each type of insect; students can create names to distinguish species or use books to identify species to order (e.g. grasshopper, beetle), then create names to distinguish species within an order (e.g. green fly with long legs). Graph the results. In most ecosystems, there are a few abundant species and many uncommon ones. Discuss the concept of endangered species.

- See http://www.dnr.state.wi.us/org/land/er/factsheets/etlist3. htm#INSECTS for a list of threatened and endangered insects in Wisconsin.

- Repeat these same methods at a remnant prairie. Compare the insect communities in the restoration and the remnant. Were any of the insect species present in one environment, but not the other? Did you find any species in both environments? Speculate on these findings. Design a research project to address your hypotheses.

- Repeat the same methods in a woodland. Compare the insect communities.

- Have student groups observe blooming plants. Are the same species of insects found on different plant species?

Additional Resources

- Borror, Donald and Richard White. *Field guide to the insects of America north of Mexico.*

- Covell, Charles V., Jr. (1984). *Field guide to the moths of Eastern North America.* Houghton Mifflin.

- Legler, Karl; Legler, Dorothy; Westover, Dave. (1996). *Guide to Common Dragonflies of Wisconsin.* Self Published: Karl Legler, 429 Franklin St., Sauk City, WI 53583.

- Mitchell, Robert and Zim, Herbert. (1987). *Golden guide: Butterflies and moths.* Golden Press.

- Pyle, Robert M. (1985). *The Audubon Society handbook for butterfly watchers.* Charles Scribner's Sons.

- Pyle, Robert M. (1981). *The Audubon Society field guide to North American butterflies.* Alfred A. Knopf, Inc.

Assessments

- Have students make oral presentations of their findings.

- Have students hypothesize about the reasons underlying the results they found.
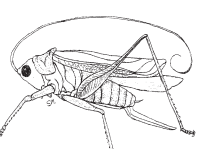
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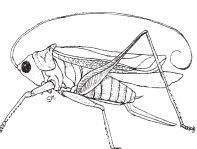
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Sweeping Discoveries - Tally Page

Record total # of insects in each category per team. Add the totals and record below.	Dragonflies & Damselflies	Butterflies & Moths	True Bugs	Wasps, Bees, Ants	Beetles	Grasshoppers & Crickets	Flies	Leafhoppers	Spiders (not insects)	Other
Team # 1										
Team # 2										
Team # 3										
Team # 4										
Team # 5										
TOTAL:										

Sweeping Discoveries Field Sheet Sweep # _____

Dragonflies & Damselflies	Butterflies & Moths	True Bugs	Wasps, Bees, Ants	Beetles
Grasshoppers & Crickets	Flies	Leafhoppers	Spiders (not insects)	Other

Sweeping Discoveries Field Sheet Sweep # _____

Dragonflies & Damselflies	Butterflies & Moths	True Bugs	Wasps, Bees, Ants	Beetles
Grasshoppers & Crickets	Flies	Leafhoppers	Spiders (not insects)	Other