



BIODIVERSITY AND SUSTAINABLE BIOENERGY EXPLORATION STATION

OVERVIEW

This Exploration Station highlights the role of biodiversity in sustainable bioenergy cropping systems. "Exploration Stations" are educational activities at public events that invite learners to interact with materials in a hands-on manner, and at their own pace. Learners can spend as much time with the activity as they choose. Exploration stations require one or more facilitators to guide learners through the activity. The facilitators' role is to take cues from the learner to encourage inquiry-based scientific reasoning and experimentation.

BIODIVERSITY IN BIOENERGY CROPPING SYSTEMS

Biodiversity is the variety of all life, from small plants to large animals and everything in between. Greater plant diversity in bioenergy cropping systems increases ecosystem services such as pollination, pest-control, and plant disease control. For more information about bioenergy cropping systems that support biodiversity visit www.glbrc.org

CARRYING OUT THE ACTIVITY

Learners choose stems of prairie plants and make a small bouquet (3-4 stems). The bouquet is tied together by facilitators using twine or string.

Participants examine their plants and are asked to think about how insects might use different parts of plants for different purposes like food, shelter, egg laying, etc. This inquiry leads to examination of insect display boxes, sticky cards, and other visuals. These visuals demonstrate that a greater diversity of insects is present in prairie fields compared to monoculture fields because a greater variety of plants are there for insects to use. Bird songs playing in the background at the station will help further make the connection between increased plant biodiversity and increased biodiversity of other species.

Facilitators should encourage discussion that explores the connections between insects and plants and why these relationships are important to preserve and sustain. In-depth discussion about how biodiversity connects to sustainable bioenergy cropping systems research can follow depending on the age and interest of audience.



An example of a finished bouquet.



Facilitators Savannah (left) and Jenni (right) ask participants about the differences they see in biodiversity by looking at insects collected in a prairie versus those collected in a monoculture crop area.

MATERIALS NEEDED:

- Bundles of dried plant specimens including biofuel crops and prairie forbs and grasses
- Scissors
- Twine
- Visuals/audio: insect display box, sticky cards, frozen bumblebee colony, prairie bird songs & audio player.

FACILITATORS NEEDED:

- Minimum 2: 1 for assembling bouquets, and 1 for leading discussion



Above: The materials together, ready for bouquet making and discussion! Right: The exploration station in action. Some participants choose stems, while others explore visual examples.

QUESTIONS TO DISCUSS:

Introducing the Concepts: Prairies

- *Do you want to make a prairie bouquet?*
- *Have you ever been to/seen a prairie?*
- *What did you see there? Plants? Animals?*
- *Have you ever looked for insects on prairie plants?*

Examining the Specimens

- *What are some ways that insects use plants?*
- *What are some beneficial things that insects do?*

Understanding Biodiversity

- *If there are a lot of plants, do you think there will be a lot of insects and birds?*

SUPPLEMENTAL RESOURCES:

1. *Video: Bugs, Beetles, Bees and Biofuels*
<https://www.youtube.com/watch?v=1EfnQBdNN4>
2. *Online Identification Guide: Wisconsin Wild Bee Guide*
<https://energy.wisc.edu/bee-guide/#>



A prairie bioenergy trial cropping system at Arlington Agricultural Research Station for the Great Lakes Bioenergy Research Center.

NOTE FOR EDUCATORS:

For an extended classroom-based biodiversity activity visit:

<https://www.glbrc.org/education/classroom-materials/field-investigations-bug-biodiversity-and-ecosystem-benefits>

Both activities were developed to align with these Next Generation Science Standards:

STANDARDS

ELEMENTARY SCHOOL:

- **2-LS4-1.** Make observations of plants and animals to compare the diversity of life in different habitats.

MIDDLE SCHOOL:

- **MS-LS2-2.** Construct an explanation that predicts patterns of interactions among organisms across multiple ecosystems.
- **MS-LS2-5.** Evaluate competing design solutions for maintaining biodiversity and ecosystem services.

| Scientific and Engineering Practices | Disciplinary Core Ideas | Crosscutting Concepts |
|--------------------------------------|--|--|
| Asking questions & defining problems | <p>LS2: Ecosystems: Interactions, energy, and dynamics</p> <p>LS4: Biological Evolution: unity and diversity</p> | <p>Patterns</p> <p>Cause and effect: Mechanism and explanation</p> |



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