

Insect Diversity Found on Native and Non-Native Plants

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Introduction

Background

- Insects play a vital role in our everyday lives
- There is distinct relationship between native plants and a greater insect abundance compared to non-native plants¹
- Invasive plants are hostile to the environment and native species²
- Milkweed (*Asclepias syriaca*) is an important non-invasive native plant and musk thistle (*Carduus nutans*) is an invasive non-native species

Central Concept

- Native plant species are required to support a diverse ecosystem

Learning Objectives

- Observe how many insects prefer native vs. non-native plants
- Assemble and interpret data
- Draw from evidence to make a claim

Lesson Characteristics

- Intended for elementary school students (1st grade)
- Completed with ~25 students, but can accommodate more
- Completion time is ~45 minutes
- Preparation time is ~10 minutes
- Lesson was held in a prairie ecosystem

Teaching Methods

Preparation

- Print, laminate, and attach yarn to pictures of insects
- Create a data collection poster (Fig. 2)
- Place laminated insects on milkweed (7-9 insects) and musk thistle (4-5 insects) plants
- Collect milkweed pods (or seeds from a native plant)



Figure 2. During the teaching activity, the students are placing the insects on the board for the counting for a visual display of the data

Engagement

- Engaged students in a discussion about the importance of insects
 - What is biodiversity?
 - Why is it important to have biodiversity?
 - How might scientists study biodiversity?

Exploration

- We asked students for a prediction on where they would see more biodiversity between the two plants
- Students were separated into four groups and observed and collected laminated insects from plants while relating to biodiversity
- Students then shared their collected data and made observations based on their collected data

Concept Development

- Questions to consider for further concept development:
 - What will happen if there aren't enough native plants for these insects?
 - How do plants help insects survive?
 - Can every plant help every insect survive? Why?
- Using these questions students will have a better understanding of the importance of biodiversity

Concept Application

- Applying what students have learned throughout the lesson students will be asked:
 - How can we increase biodiversity at home?
 - Why do we want to increase biodiversity at home?
- Students were then given milkweed pods to spread seeds on their way back to the bus



Figure 3. Students are participating in the discussion phase of biodiversity and what they can do to help biodiversity.



Figure 4. Image of a monarch caterpillar on a milkweed leaf, what the students would be referencing when using the laminated photos

Connections to Next Generation Science Standards

Standards³

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

Application

- By displaying the data, students made comparisons about the diversity of the insects on either native or non-native plants
 - The students were asked what would happen if native plants weren't here
- Students were given ideas about what they can do to help or hurt biodiversity
 - The lesson was wrapped with something positive, where the students spread seeds of a native plant



Figure 1. Data collection at lesson site at Ada Hayden Heritage Park in Story County, Iowa in which our related research was conducted.

¹ Andersen, G., Johnson, H., Wyberg, B. (2021 December 3) "Insect Community Attributes on Native and Non-Native Flowering Plant Species in Central Iowa" A final report for NREM 380, 11 pgs.

² Tallamy, D. W., Narango, D. L., et al. (2020 November 17) "Do non-native plants contribute to insect declines?" *Ecological Entomology* Vol. 46, Is. 4, pg. 729-742 <https://onlinelibrary.wiley.com/doi/full/10.1111/een.12973>

³ NGSS Lead States. 2013. *Next Generation Science Standards: For States, By States*. Washington, DC: The National Academies Press.