

# Insect Diversity

## Insects in the Garden & Around Us

### Grade Level

Preschool – 3<sup>rd</sup> grade

### Lesson Length

1+ hour depending on activity or grade

### STEM Careers

- Entomologist
- Teacher
- Biologist



*This lesson is part of the Biodiversity Curriculum. These lessons can be adapted for use with a variety of ages.*

### Learning Objectives

By the end of the lesson, students should be able to:

- Compare habitats and insect/arachnid species in each habitat
- Discover relationships between pollinator insects and flowering plants
- Investigate the role of predators and parasites in the environment

### Educational Standards Supported

(Nebraska Early Learning Guidelines)

- SC.3.7.2.C Construct an argument with evidence that in a particular habitat some organisms can survive well, some survive less well, and some cannot survive at all.
- CS: SC.3.7.2.D Make a claim about the merit of a solution to a problem caused when the environment changes and the types of plants and animals that live there may change.
- SC.3.9.3.C Use evidence to support the explanation that traits can be influenced by the environment.

### Materials List

- Insect sweep net (ideally 1 per team)
- Zip lock plastic bags (e.g., 1-2 gallon size)
- Permanent marker (e.g., Sharpie)
- Cooler with ice (optional)
- Refrigerator freezer
- Cafeteria trays (1 per team)
- Forceps (Tweezers)
- Magnifying glass (or dissecting scope) (1 per team)
- Clothes that you don't mind getting dirty



## Lesson

### Introduction

**Insects** and **spiders** live all around us. They live in the garden, grass, bushes, trees, gardens, and yardscapes (everywhere we imagine). There are at least 84,000 different kinds of insects and spiders **species** in North America. They are made up of species groups like butterflies, flies, beetles, ants, bees, grasshoppers, and true bugs.

Insects and spiders are often associated with different **habitats**, like grassy hillsides, tree tops, muddy shores, and even in managed landscapes like gardens and agricultural like corn and soybeans. The insects and spiders in habitats have different roles (purposes). Some are **pollinators** who carry **pollen** from one flower to another, helping the plant produce seed and fruit. Some are **predators**, like spiders. They capture and eat other insects called their **prey**. Others are **parasites** who feed on or inside other insects like caterpillars. Many insects end up as food for predators or parasites.

### Opening Questions

- *Why are many predators and parasites beneficial (useful to humans)?*
- *Why are pollinators important?*
- *What does a habitat provide for an animal?*

## Activity #1: What's in Your Habitat?

- 1.** Break up into teams of 2-4 students. Each team gets a sweep net and several zip lock plastic bags.
- 2.** Assign specific duties to each team member (e.g., sweep net operator, bag carrier, sweep net emptier helper), rotating duties throughout activity.
- 3.** Select the habitat(s) to collect from, ideally two or more. Habitat can be a flower garden (good for pollinators), some bushes or trees, alfalfa (good for predators and parasites), soybean, brome grass, weeds, etc. Each team can collect from all habitats, or teams can be assigned specific habitats.

### Glossary words:

**Adaptation** - a special characteristic that allows an organism to perform a specific role in the environment

**Environment** - the area in which a person, plant, or animal lives

**Habitats** - the environments where animals and plants live (ex. Forest, ocean, pond)

**Insects** - small animals that have six legs and a body formed of three parts and an exoskeleton (ex. Grasshoppers, bees, butterflies)

**Parasites** - organisms (animal, plant, or fungus) that live on or in another organism (called the host), feeding on the host

4. Teams will collect insects and spiders from each habitat using a “sweep” or “knock” technique. Some habitats can be “swept”, like alfalfa, brome grass, some garden flowers, and some bushes. Some habitats must be “knocked”, like tree branches, some bushes, or some tall flowers (*Each technique may be viewed [here](#): “Collecting insects with a sweep net” - [go.unl.edu/collectinginsects](http://go.unl.edu/collectinginsects)*).

To “sweep” collect a habitat, walk through or alongside the habitat, sweeping the sweep net back and forth through the foliage. At the end 10-20 “sweeps”, flip the net so the net end is on top of the net hoop, preventing insects from escaping. Next, grasp the end of the net where it lays on the net rim, and hold it closed to again prevent insect escape. While a helper holds a zip lock bag open, place the closed end of the net into the bag opening, “push” the net-end contents into the zip lock bag, and quickly zip the bag shut. Use a permanent marker to label the bag with the habitat type and any other information, like team number, as desired.

To “knock” collect a habitat, like a tree or bush branch, hold the sweep net with the mouth of the net open and under the target branch. Now knock or bang the branch several times into the net opening. Quickly flip the net as described above to trap the insects in the net end, collect the insects in a zip lock bag, and label the bag.

5. Take the bags back to the classroom for examination. The bags can be held in a cooler with ice or a refrigerator if the bag examination is not to be done right away.
6. Once back in the classroom, place the bags in a freezer for at least 15 minutes to kill the insects. If the insects are simply chilled, and not killed, they can “awaken” and start crawling and flying around during the examination step.
7. After 15 minutes, each team will examine and sort the contents of each bag. There are two basic things the students will want to know about what they have in their bags: what kind of organisms they have (classification) for each habitat, and how many insects they have for each habitat (total and by classification).

Classification will depend on student age and experience of the teacher. Classification can be facilitated with the resources listed below, and we suggest the students be acquainted with the appropriate resources prior to the activity. Use of magnifying glasses or a dissecting scope could help in

**Pollen** - the very fine, usually yellow dust that is produced by a plant and carried to other plants of the same kind, usually by wind or insects, so that the plants can produce seeds.

**Pollinators** – animals that help pollinate flowers and plants

**Predators** - animals that hunt other animals for food (ex. Coyote, bobcat)

**Prey** - an animal that is hunted or captured for food, usually by another animal (ex. Rabbit, squirrel)

**Species** – a group of organisms that can mate with one another but not with organisms of other groups

**Spiders** - small animals that have eight legs and a body formed of

identification or further classification possibilities; for example, do the insects have chewing jaws or needle-like mouthparts?

For younger students, the classification can be very informal and based on differences the students can easily identify. For example, spider vs insect, size or shape, color, general type (e.g., beetle, butterfly/moth, fly, grasshopper).

For older students, the classification can be more formal, with some actual identification included - the resource list will be useful for identification. Insects can also be classified according to their “job”, such as pollinator, predator, etc.

For all students, the number and types of insects and spiders found in each habitat should be compared and discussed.

two parts and an exoskeleton (ex. Tarantulas)

## **Activity #2: Insect Stories**

For a more advanced lesson, have students use the suggested resources to research various aspects of the insects they captured in the various habitats. Again, this can vary by student age group. For example, students could research the role and importance of beneficial insects they observed, such as pollinators or natural enemies of crop pests. Or students could focus on a particular insect or spider they liked or found interesting, reporting on its life cycle and role in the environment. Simple reports or classroom presentations could be developed.

**Note:** Bees and other stinging insects feeding on flowers have no instinct to sting you. Insect stinging behavior only happens near bee or wasp nests (social insects). Some bees and wasps will sting in order to protect their “babies” and/or their food sources. Bees and wasps can also sting when touched. Observing insects on flowers presents a very low risk of negative interaction with bees and wasps.



### **Elaborate/Extend**

*Ask students to photograph or draw pictures of insects found near or even in their home. Students can label the parts of the insects and discuss where they were found or what they were doing.*



### **Evaluate/Reflect**

- *Which habitat had more insects and spiders?*
  - *Which habitat had more different kinds of insects and spiders?*
-

---

Let us know what you thought of the lesson or send us a picture of youth participating in the lesson. Please send to [entomology.unl.edu](mailto:entomology.unl.edu)

**We want to hear from you!**

---

**County Fair Project:**

Use some of the insects you collected to start an insect collection and enter it in your county fair. Document your project with photos and create a book or scrapbook to enter in your county fair under wildlife or pollinators.

**References/Resources:**

- Insect collecting how to video - <https://youtu.be/LxUmosSN8J8>
- Insect Identification - <https://youtu.be/2qsxmfTQszA>
- Insect collecting video - <http://go.unl.edu/collectinginsects>

**References/Resources:**

- Xerces Society Education- <https://xerces.org/education>
- National Geographics Kids: Insects  
<https://www.natgeokids.com/uk/category/discover/animals/insects/>
- Collecting insects with a sweep net  
<https://youtu.be/LxUmosSN8J8>
- Insect Identification - <https://youtu.be/2qsxmfTQszA>
- Nebraska Science Standards Guideline  
[https://www.education.ne.gov/wp-content/uploads/2017/07/Nebraska\\_Science\\_Standards\\_Final\\_9-8-17.pdf](https://www.education.ne.gov/wp-content/uploads/2017/07/Nebraska_Science_Standards_Final_9-8-17.pdf)

**Suggested Children's Books:**

- Bugs A to Z by Caroline Lawton
- On the Nature Trail by Editors of Storey Publishing
- Some Bugs by Angela DeTerlizzi

**Additional Websites:**

- <https://child.unl.edu>

**Video Actors:** Leonidas Roberts, Emerson, Nebraska  
Claire Luhr, Wakefield, Nebraska  
"Collecting Insects" - [go.unl.edu/collectinginsects](http://go.unl.edu/collectinginsects)

**Authors:** Thomas Hunt  
Extension Entomologist, UNL Department of  
Entomology, Haskell Agricultural Laboratory  
[thunt2@unl.edu](mailto:thunt2@unl.edu)

Sarah Roberts  
Nebraska Extension in Dixon County

---

---

[sarah.roberts@unl.edu](mailto:sarah.roberts@unl.edu)

**Doug Golick**

Associate Professor, Department of Entomology  
[dgolick2@unl.edu](mailto:dgolick2@unl.edu)

**Judy Wu-Smart**

Associate Professor & Extension Specialist, Department of  
Entomology  
[jwu-smart@unl.edu](mailto:jwu-smart@unl.edu)

**Shelby Kittle**

Program coordinator, UNL Bee Lab  
402-472-8378

*Last Updated by authors on October 19, 2022*

---

**This publication was developed under Assistance Agreement No. #97768001 awarded by the Environmental Protection Agency. It has not been formally reviewed by the EPA. The views expressed and endorsed in this document are solely of the authors and EPA does not endorse any products or commercial services mentioned in the publication.**

