



University of Kentucky Department of Entomology Insects in the Classroom - Lesson Plan **Field Guide to Schoolyard Insects and Their Relatives**

For Middle School (6-8)
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Activity Description

Students create a field guide by observing and researching insects and insect relatives that they find in their schoolyard

Age Group: Grades 6-8

Time: 1-2 hours total outdoor observation, plus 1-3 total hours for indoor research and creation of the field guide

Materials needed: Notepads for outdoor observations, one for each student. Multiple insect field guides for research and reference. Hole punches and a 3-ring binder to assemble the field guide

Objectives

- ❖ Each student will record observations about 1 insect or insect relative in a nearby outdoor setting
- ❖ By comparing their observations, students will discover ecological connections between different creatures observed by the whole class
- ❖ Each student will become an expert on one creature, using observations and research to develop a field-guide entry
- ❖ Using entries from all of the students, a field guide to common schoolyard insects and their relatives can be created, to be used and expanded upon by future classes

Academic Expectations

The above objectives fall under KERA's Science Academic Expectations:

- 2.3 Identify analyze systems and the ways their components work together or affect each other

Program of Studies

- S-6-LS-3 Students will observe populations and determine the functions (e.g. decomposers, producers, consumers) they serve in an environment.
- S-7-LS-3 Investigate unity among organisms.
- S-8-LS-4 Students will investigate and analyze populations and ecosystems.
- S-8-LS-5 Students will analyze diversity and adaptations (e.g. changes in structure, behaviors, or physiology).

Core Content

- SC-M-3.4.1 Biological change over time accounts for the diversity of species developed through gradual processes over many generations. Biological adaptations include changes in structures, behaviors, or physiology that enhance survival and reproductive success in a particular environment.
- SC-M-3.5.32 Populations of organisms can be categorized by the function they serve in an ecosystem. Plants and some microorganisms are producers because they make

their own food. All animals, including humans, are consumer, and obtain their food by eating other organisms. Decomposers, primarily bacteria and fungi, are consumers that use waste materials and dead organisms for food. Food webs identify the relationships among producers, consumers, and decomposers in an ecosystem.

Field Guide to Schoolyard Insects and Their Relatives

Reading a field guide is a great way to learn about animals. *Making* a field guide is an even better way to learn. To create a schoolyard field guide, students observe insects and insect relatives (spiders, centipedes, millipedes, pillbugs, daddy-long-legs, mites and other arthropods) that they find in a convenient outdoor location near the school. Then they identify and learn about those creatures, then create individual pages for each animal. This activity will allow students to learn about the diversity of insects and insect relatives that occur in an urban outdoor setting and also about the ecological roles those creatures play and the structural and behavioral adaptations that they use to live in their environment.

Essential question for this activity: "What insects and insect relatives live in my schoolyard, how do they interact with one another, and what adaptations do they use to survive?"

Resources

Students will need to use reference books, insect field guides, and the internet to find out information about the creatures that they observe. Some recommended field guides for this activity:

- Peterson Field Guide: Insects** – by D. Borner and R. White
- Simon & Schuster's Guide to Insects** – by R. Arnett Jr. & R. Jacques Jr.
- Golden Guide Series: Spiders and Their Kin** – by H. Levi and H. Zim
- Golden Guide Series: Butterflies and Moths** – by R. Mitchell and H. Zim
- National Audubon Society Field Guide to North American Insects & Spiders** – By L. Milne and M. Milne

Websites:

Kentucky Critter Files (online guide to Kentucky insects and their relatives):
<http://www.uky.edu/Agriculture/CritterFiles/casefile/casefile.htm>

ACTIVITY PLAN

The best time for the outdoor portion of this activity is early fall or late spring on a warm, sunny day.

1. FIRST CONTACT: In a suitable outdoor location, preferably in a school garden or any site that is close to the school and where grass, weeds, trees, or other plants are growing, allow students to search the landscape for insects, spiders, and other arthropods. Each student should find 2 or 3 creatures that interest them and make initial observations and drawings of the creatures in a small notebook.

Questions the students should keep in mind while making observations (it will not be possible to answer all of these questions) should include:

1. How does the creature move?
2. What does it eat? Is it a herbivore, predator, or scavenger?

3. Where does it spend its time? In the air? On a plant? On the ground? If it stays on a plant, what does the plant look like?
4. What is unusual about the way that this creature looks?
5. What structures or behavioral adaptations does this creature use to find and eat food or to escape predators?
6. Does it make any noise? What does it sound like?
7. How does the creature react when insects or other animals approach it?
8. What are the weather conditions today?
9. Is this a sunny or shady spot most of the time?

2. RESEARCH: Using their observations and drawings, students can now research the internet, field guides, and other resources to identify their creature and learn more about its behavior, structures, ecological role, and other features. Based on this research, have each student decide on 1 creature (out of the 2-3 that they observed outside) for which they will be responsible. Try to make sure that each student has a different creature so that the classroom field guide will cover as many types as possible when it is completed.

Identification Tips: Tell your students not to worry about trying to identify what *species* each creature is - this is difficult even for experts. Instead, students should try to determine what the common name of their creature is to the best of their ability using pictures from field guides and the Internet. This is why it is a good idea to start with 2-3 creatures and then narrow it down to one. It is likely that at least one of their choices will be easy to identify using their field guides and other resources.

3. FURTHER OBSERVATIONS: Now that each student has picked a creature, have the class return to the same outdoor location, try to find each creature again, and make further observations for 30 min – 1 hr. Even if they cannot find the creature itself, have students return to the place or places where they observed it the first time and make observations about the habitat, such as: what kind of plants grow there?, is it close to a building? what other insects or insect relatives are found there?, etc.

4. MAKING CONNECTIONS: Each student should now have quite a bit of information about their creature. Now each student should briefly confer with one other to determine what kinds of connections their creatures have with one another in the environment, based on observations and research. Some possible connections that your students may discover:

- one creature may regularly eat another
- two creatures may have been living on the same plant or same type of plant, or in the same type of environment (such as in the soil or under a rock)
- two creatures may eat the same thing
- multiple creatures may be eaten by the same predator

5. POPULATIONS: Within its ecosystem, each creature that is reported in the field guide will either belong to the population of herbivores, predators, or scavengers. Have your students determine which population their creature belongs to and meet with the rest of the people who have creatures that belong in that group. The two groups then should compare the adaptations used by their creatures to fill their ecological role as herbivore, predator, or scavenger and create a list of similarities and a list of unique adaptations possessed by each organism.

6. CREATE FIELD GUIDE PAGES: Using information from other field guides along with their own observations and the connections they learned from other students, have each student make a field guide page for their insect or insect relative using the attached form. In the space for the picture, students should draw and color a picture of their creature using their observations and drawings (they can get help with their drawings by looking at pictures on the internet and in field guides).

7. COMPILE THE FIELD GUIDE: Assemble the completed field guide using a 3-ring binder and a hole punch. To make an even better field guide: have each new group of students find new creatures for the guide each year!

DI G I T A L O P T I O N :

Why use drawings, paper, and binders when you can make a virtual field guide? If you have access to digital cameras, your students can snap a picture of each insect or insect relative for the guide. Or, they can use pictures that they find on the internet (since your field guide is for educational purposes, it should be okay to use other people's photographs as long as each picture is credited to the photographer. You should get permission from each photographer if you plan to place your field guide on the web). Then, you can assemble the field guide as a word-processor document or as a webpage. This will be a great opportunity for your students to get more experience with word-processors, image-editing software, and web-page design.

FIELD GUIDE TO INSECTS AND THEIR RELATIVES IN OUR SCHOOLYARD

(sheet 1)

Student's Name:

PICTURE

Name of your insect or insect relative:

What does this creature eat? Is it a herbivore, predator, or scavenger?

Where is this creature's habitat?

What animals prey on this creature?

What structural and behavioral adaptations does this creature use to catch, find, or eat food?

What adaptations does this creature use to escape predators?

Does this creature interact with people? How? Could this creature regularly face harm from the actions of humans? How?

FIELD GUIDE TO INSECTS AND THEIR RELATIVES IN OUR SCHOOLYARD

(sheet 2)

Student's Name:

Name of your insect or insect relative:

CONNECTIONS: What are some examples of other creatures in the field guide that have ecological interactions with your creature? What are those interactions?

OBSERVATIONS: What was this insect doing when it was observed? Is there anything else interesting or unusual about this insect?

FIELD GUIDE TO INSECTS AND THEIR RELATIVES IN OUR SCHOOLYARD (sheet 3)

POPULATIONS AND ADAPTATIONS: Determine whether your creature is a member of the herbivore, predator, or scavenger population in its environment, then meet with the rest of the students who are writing an entry for a creature in that same population. You should find that the other organisms within that population have similarities and differences in the structural and behavioral adaptations which allow them to fill their role in the environment.

Herbivore Predator Scavenger

Similar adaptations among all members of this population:

Unique adaptations possessed by your creature: