

Doing Science Outdoors: Field Investigations at the Glacier Creek Preserve

Sample Modules for Prairie Ecology

Modules include activities for:

- 1. PRE-Field trip**
- 2. ON- Field trip**
- 3. POST- Field trip**

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Introduction to Doing Science Outdoors Part I: Field Investigations at the Glacier Creek Preserve

The following pages include modules focused on the **Prairie Ecology** for use with K-12 students and teachers as they plan to “Do Science Outdoors” by bringing their students to conduct field investigations at the Glacier Creek Preserve!

Introduction to Doing Science Outdoors Part I: Field Investigations at the Glacier Creek Preserve

Level 1 Lower Elementary (K-2)

Observations while on a walk through the prairie

Level 2 Upper Elementary (3-5)

Collect and identify insects

Level 3 Middle School (6-8)

Research, collect, and study grasshoppers

Level 4 High School (9-12)

Observe life forms and the effects of prairie fire

Doing Science Outdoors Part I:

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Level 1 (Grades K-2):

This Prairie Ecology Module is designed to be used with students in Lower Elementary.

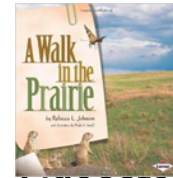
Doing Science Outdoors Part I:

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Prairie Ecology Module #1a: Lower Elementary (K-2)

PRE- Fieldtrip Activities prepare students for their own walk in the prairie.

1. Read aloud to class: *A Walk in the Prairie*, by Rebecca L. Johnson, pages 5 through 17, about the grasses and wildflowers found on the tallgrass prairie.
1. Students draw, color, and label the 5 grasses that they will look for on the prairie: Sideoats grama, Little Bluestem, Big Bluestem, Switch grass, and Indian grass.
2. Read aloud to class: *A Walk in the Prairie*, pages 18 through 31, about the fire on the prairie and common animals found living on the tallgrass prairie.
3. Students color pictures of flowers and discuss the kinds of animals they are likely to see, hear, or smell during their walk in the prairie.
4. Before heading to Glacier Creek Preserve, build listening stamina with the students by practicing sitting quietly and listening for at least three minutes to music or animal sounds on the web or a reading.



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Prairie Ecology Module #1b: Lower Elementary (K-2)

ON- Fieldtrip Activities include students taking a walk through the prairie and stopping to make observations and discuss what they see and hear.

1. Each student will pair with a partner. There should be an adult assigned to each group of 3 pairs or 6 students. The adult carries a copy of two worksheets Herbert Hoover National Historic Site's *Walk Through the Prairie Activities: 1) Prairie Grasses and 2) A Diverse Ecosystem* available at <http://www.nps.gov/heho/forteachers/upload/TG%20prairie%20activites.pdf>. The adult leads the students walking down the path on the prairie; the group sits down at a chosen site along the path.
2. The adult and students sit silently to make prairie sound observations. They listen silently for three minutes. Then they discuss what they heard with the adult (who fills out *A Diverse Ecosystem* worksheet questions 1-2 for their students).

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Prairie Ecology Module #1c: Lower Elementary (K-2)

ON- Fieldtrip Activities include students taking a walk through the prairie with stopping to make observations and discuss what they see and hear.

- 3. Next, they make observations by watching the plants and animals (insects) around them for three minutes. They watch silently for three minutes. Then they discuss what they heard with the adult (who fills out *A Diverse Ecosystem* worksheet questions 3-5 for their students).**
- 4. As they walk back to The Barn, each student group should count the grasses they can identify. The adult records the types of grasses and numbers of each type the students identify.**

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Prairie Ecology Module #1d: Lower Elementary (K-2)

ON- Fieldtrip Activities include students taking a walk through the prairie with stopping to make observations and discuss what they see and hear.

5. Next, once the whole group returns to The Barn, each group tells the rest of the class what they observed.
6. Then they have a whole class discussion about what they saw and heard on their walk compared to the book they read in class, *A Walk in the Prairie*, by Rebecca L. Johnson.
7. As the discussion is taking place, use a large sheet of paper to make a Venn Diagram showing what was common to both the book and the prairie observations and the things only found in one location.



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Prairie Ecology Module #1e: Lower Elementary (K-2)

POST- Fieldtrip Activities include students creating a graph and doing something creative such as drawing or acting out observations they made on the prairie.

- 1. Prairie Grasses-** Make a graph showing the number of grasses observed by the students for each of the five grasses. Use the small pictures for plant markers and make a graph by taping the number of pictures in a column representing the number of those plants the students identified. This will need a lot of space for the Big bluestem, maybe do this in the hall or on the classroom wall.
- 2. A Diverse Ecosystem-** Ask students to draw a picture or create a short play/skit where they act out the organisms that they observed. It is likely they observed insects on some flowers or insects flying or hopping around. Students could act out their organisms and the rest of the class tries to guess which organisms they are pretending to be.

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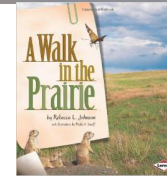
Level 2 (Grades 3-5): This Prairie Ecology Module is designed to be used with students in Upper Elementary.

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Prairie Ecology Module #2a: Upper Elementary (3-5)
PRE- Fieldtrip Activities prepare students for their walk in the prairie where they will discuss *The Prairie Long Ago*, and/or collect and identify insects.

1. If students haven't read this book, read aloud to class:
A Walk in the Prairie, by Rebecca L. Johnson.



2. Explain to students that they will be visiting and exploring a prairie that is being restored. Discuss how the prairie was plowed and turned into farmland. Show segments of the Ken Burns Part I video, "The Great Plow-up" available at <http://vimeo.com/channels/465860/67677083>. Segment from 16:00 to 20:00 minutes clearly shows why the prairie was plowed.
3. Teacher makes copies of "Insect Cards" on construction paper. Students play "Memory" with a partner using the cards to learn the types of insects found on the prairie.

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Prairie Ecoslogy Module #2b: Upper Elementary (3-5) **ON- Fieldtrip Activities students go for a walk in the prairie.**

Teacher brings copies of the Herbert Hoover National Historic Site's worksheets - *Walk Through the Prairie Activities: 4) Exploring the Prairie*, available at <http://www.nps.gov/heho/forteachers/upload/TG%20prairie%20activites.pdf>, one copy of each for every student. Students will place their worksheets on a clipboard and are provided with a writing utensil to write.

1. Each student works with a partner. There should be an adult assigned to each group of 3 pairs (6 students). The adult leads the students on the path through the prairie and then the group sits down at a chosen site along the path.
2. The adult and students sit silently to make prairie observations of insects, flowers, birds, grass, and other organisms that live on the prairie. They sit silently for three to five minutes (depending on students' listening skills). Then the adult leads the discussion based on the *Exploring the Prairie* worksheet and helps students record their observations.

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Prairie Ecology Module #2c: Upper Elementary (3-5)

ON- Fieldtrip Activities students collect and identify insects.

1. The students are divided into small groups of about 4 students. Each group is given a clipboard with an *Insect Survey Tally Sheet* and a pencil. Each group will need an adult and a sweep net.
2. The adult leads the students down the path to the pre-assigned insect collecting site. The adult demonstrates how to use the sweep net, how to gather it to prevent flying insects from getting away, and transfers the insects into the baggie.
3. Next, if students are able, allow them to use the sweep net under the adults supervision. Once two baggies have been collected, have students work in pairs to identify the insects they caught and count them.
4. Then the students record the numbers of the insects they identified and counted on one *Insect Survey Tally Sheet*.

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Prairie Ecology Module #2d: Upper Elementary (3-5)

ON- Fieldtrip Activities students collect and identify insects.

5. The adult leads the students back to The Barn. Each group reports to the teacher what they found and recorded on their *Insect Survey Tally Sheet* and a pencil. As they report their numbers, the teacher records their numbers on a large sheet of paper or white board.

6. The students compare the data from the different groups. Teacher leads an all class discussion: Are they all the same? What did they expect? Why might they be different? Should they combine all the groups' data into one set? Why or why not?

7. Calculate a class total for each type of insect found.

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Prairie Ecology Module #2e: Upper Elementary (3-5)

POST- Fieldtrip Activities students went for a walk in the prairie.

If students completed the worksheet *Exploring the Prairie*- assign students to be either a plant or animal that is found on the prairie. The students find a picture of the organism on the internet, or draw it themselves. Next, students create a food web in the room or on the playground. The plants are the producers, so they begin by holding a ball of yarn or string. Some animals will eat the plants, so as the plant holds onto the end of the yarn, the yarn is unrolled as the ball is handed over to the herbivore animals. Address the carnivores next, the yarn is unrolled as the herbivores pass it over to the carnivores. Next the carnivores unroll and the ball goes to the decomposers (the teacher could be this if they didn't want to assign bacteria to the students). The last trip the ball of yarn should make is back to the plants, they take up the nutrients that the decomposers added to the soil.

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Prairie Ecology Module #2f: Upper Elementary (3-5)

POST- Fieldtrip Activities students collect and identify insects.

- 1. If students collected insects on the prairie, the teacher can introduce their students to graphing data by cutting a piece of construction paper to represent each insect found by the class. Different insects should be represented by different colors. The students then can use the classroom wall or the hallway to tape the colored pieces in a column for a particular insect. Students could make graphs of the small group data or of the data collected by the entire class.**
- 2. If students collected insects on the prairie and the teacher has already introduced students to using computers and spreadsheets to graph, the students should enter the data for the different types of insects and the numbers they found on the prairie.**

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Prairie Ecology Module #2h: Upper Elementary (3-5)

POST- Fieldtrip Activities prairie restoration.

3. Have students work individually or in pairs on a computer and play the interactive "Build-A-Prairie" game. Students select plants and animals as part of the game, and if they selected plants that support prairie restoration, they can watch a prairie come to life. If they selected the wrong plants, do it again. The "Build-A-Prairie" game is part of the Bell LIVE! 1999 "[On the Prairie](#)" program and can be found at <http://www.bellmuseum.umn.edu/games/prairie/build/>

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Level 3 (Grades 6-8):

This Prairie Ecology Module is designed to be used with students in Middle School.

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Prairie Ecology Module #3a: Middle School (6-8)

PRE- Fieldtrip Activities students study grasshopper anatomy, collect, and identify grasshoppers.

- 1. Students should be instructed to read the ProQuest Guide titled *The Tallgrass Prairie: An Endangered Landscape*, by Pam Graham, available at <http://www.csa.com/discoveryguides/prairie/review.pdf>**
- 2. The teacher should lead a whole class discussion about the history of the tallgrass prairies in Nebraska and why the Glacier Creek Preserve was created and is undergoing continual restoration. Discuss how the prairie was plowed and turned into farmland. Show segments of the Ken Burns Part I video, “The Great Plow-up” available at <http://vimeo.com/channels/465860/67677083>. Segment from 16:00 to 20:00 minutes clearly shows why the prairie was plowed.**

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Prairie Ecology Module #3b: Middle School (6-8)

PRE- Fieldtrip Activities students study grasshopper anatomy, collect, and identify grasshoppers.

3. Next, the students are instructed on how to make a Grasshopper flip book with five tabs, the first three tabs for the different kinds of grasshoppers they might find at the Glacier Creek Preserve (Spur-throated Grasshopper, Band-winged Grasshopper, and Slant-faced Grasshopper) using the Konza Prairie Biological Station *Grasshoppers*, at www.konza.ksu.edu/keep/hopperkey.htm. The last two pages are to record general grasshopper information (Step 5).
4. The cover of their Grasshopper flip book should have a diagram that the student draws and labels of the external anatomy of a typical grasshopper. Within the flip book, the student should draw and label a Spur-throated Grasshopper on the first page, the Band-winged Grasshopper on the second page, and the Slant-faced Grasshopper on the third page. Next to each of these 3 drawings, write the identifying characteristic that they should look for when in the field.

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Prairie Ecology Module #3c: Middle School (6-8)

PRE- Fieldtrip Activities students study grasshopper anatomy, collect, and identify grasshoppers.

5. The students should research about grasshoppers to learn about how they live. On the second to the last page of their Grasshopper flipbook, students include information about their food, reproduction, and their life cycle. The last tab is where students should record historical information about how grasshoppers have had a direct impact, positive or negative, on their environment.
6. The teacher should print copies of *Using an Identification Key* for the Spur-throated Grasshopper, the Band-winged Grasshopper, and the Slant-faced Grasshopper available on the Konza Prairie Biological Station web-site for *Grasshoppers*, at www.konza.ksu.edu/keep/hopperkey.htm
7. Both the copies of *Using an Identification Key* and the Grasshopper flipbooks should be taken to the Preserve to be used for identification of the grasshoppers.

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Prairie Ecology Module #3d: Middle School (6-8)

ON- Fieldtrip Activities students collect and identify grasshoppers.

- 1. The students are divided into small groups of 3 - 4 students. Each group is given a clipboard with a copy of the *Using an Identification Key*, a tally sheet, and a writing utensil. Each group will work with an adult and will need their own insect net.**
- 2. The adult leads the students down the path to the pre-assigned grasshopper collecting site. The adult demonstrates how to use the net, how to gather it to prevent grasshoppers from getting away, and dumps the grasshoppers into the baggie.**
- 3. Next, the students will sweep with the net under the adult's supervision. Once two baggies have been collected, the students will work with their partners to identify and count the grasshoppers.**
- 4. The students next record the number of grasshoppers identified.**

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Prairie Ecology Module #3e: Middle School (6-8)

ON- Fieldtrip Activities students collect and identify grasshoppers.

5. Each group should collect a total of 6 bags of grasshoppers. Each bag of grasshoppers needs to be identified, counted, and recorded on the grasshopper tally sheet.
6. The adult leads the students up the path back to The Barn. Each group reports to the class what they wrote on their grasshopper tally sheet. As they report their numbers, the teacher records their numbers on a large sheet of paper or white board.
7. The students compare the data from the different groups. Teacher leads an all class discussion: Are they all the same? What did they expect? Why might they be different? Should they combine all the groups' data into one set? Why or why not?
8. Calculate a class total for each type of grasshopper found.

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Prairie Ecology Module #3f: Middle School (6-8)
POST- Fieldtrip Activities students collect and identify grasshoppers.

- 1. Students should use computers and spreadsheets to graph the grasshopper data they collected at the Glacier Creek Preserve. The students should enter the data for the different types of grasshoppers and the numbers they found on the prairie.**
- 2. The teacher will send all the grasshopper data entered onto spreadsheets to the Glacier Creek Preserve.**

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Level 4 (Grades 9-12): This Prairie Ecology Module is designed to be used with students in High School.

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Prairie Ecology Module #4a: High School (9-12)

PRE- Fieldtrip Activities students learn about the natural history of this area, collect and identify insects, and discuss the role fire plays in restoration and increasing diversity on the prairie.

- 1. Students should be instructed to read the ProQuest Guide titled *The Tallgrass Prairie: An Endangered Landscape*, by Pam Graham, available at <http://www.csa.com/discoveryguides/prairie/review.pdf>**
- 2. The teacher should lead a whole class discussion about the history of the tallgrass prairies in Nebraska and why the Glacier Creek Preserve was created and is undergoing continual restoration. Discuss how the prairie was plowed and turned into farmland. Show segments of the Ken Burns Part I video, "The Great Plow-up" available at <http://vimeo.com/channels/465860/67677083>. Segment from 16:00 to 20:00 minutes clearly shows why the prairie was plowed.**

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Prairie Ecology Module #4b: High School (9-12)

PRE- Fieldtrip Activities students learn about the natural history of this area, collect and identify insects, and discuss the role fire plays in restoration and increasing diversity on the prairie.

- 3. Watch the videos about fire on the Allwine Prairie (Glacier Creek Preserve) and have students research the role fire plays in prairie restoration: 1) KETV – Prairie Fire Set on Purpose <http://www.ketv.com/news/Prairie-fire-set-on-purpose/15429090> 2) Allwine Prairie (Glacier Creek Preserve) on VIMEO <http://vimeo.com/16685237> Next, divide the class into two groups and debate the pros and cons of using fire as a prairie management strategy.**
- 4. Students need to study and learn to identify the common prairie insects using Nebraska Game and Park's and Project Wild Nebraska's *Insect of the Prairie* at http://outdoornebraska.ne.gov/wildlife/programs/projectwild/pdf/PPT_pdfs/Insects%20of%20the%20Prairie.pdf.**

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Prairie Ecology Module #4c: High School (9-12)

ON- Fieldtrip Activities students learn about the natural history of this area, collect and identify insects, and discuss the role fire plays in restoration and increasing diversity on the prairie.

- 1. The class splits into two halves, one half is assigned to sweep the non-burned area and the other half is to sweep the recently burned area. The class discusses and hypothesizes or makes a claim as to which area will have more diversity and which area will have the greatest total number of insects.**
- 2. The adult leader leads the students into the prairie and demonstrates the proper technique for holding the net to conduct a sweep. The adult leader will also demonstrate how to keep the insects in the net and transfer them into the baggie so they can be identified and counted.**

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Prairie Ecology Module #4d: High School (9-12)

ON- Fieldtrip Activities students learn about the natural history of this area, collect and identify insects, and discuss the role fire plays in restoration and increasing diversity on the prairie.

- 3. The students should learn how to accurately count a completed sweep so that they can compare their data. Prior to the students making official sweeps, the group needs to discuss the number of sweeps per catch and be sure that both groups count their sweeps the same way.**
- 4. The burned half of the class breaks into sub-groups of 3 or 4 students, depending on the number of nets available for use with this activity.**
- 5. Each sub-group needs to identify and then keep a tally of the kinds of insects and the numbers of each kind of insect they catch by their sweeps. Since this is a catch and release activity, the students need to be sure the data has been recorded prior to releasing the insects.**

Doing Science Outdoors Part I:

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Prairie Ecology Module #4e: High School (9-12)

ON- Fieldtrip Activities students learn about the natural history of this area, collect and identify insects, and discuss the role fire plays in restoration and increasing diversity on the prairie.

- 6. When all sub-groups have completed the correct number of sweeps, then each half of the class should put all the sub-group data together and consolidate the numbers for both areas.**
- 7. The teacher will need to be sure that they record their students' data and have students type it into a spreadsheet to send to the Glacier Creek Preserve.**

Doing Science Outdoors Part I:

Prairie Ecology Module #4f: High School (9-12)

POST- Fieldtrip Activities students learn about the natural history of this area, collect and identify insects, add to insect on-line database.

- 1. Students will enter their insect data into spreadsheets that will be sent to the Glacier Creek Preserve.**
- 2. The teacher will introduce the science report structure of Claim-Evidence-Reasoning or (CER). Background information can be found at Department of Defense website, *CER Writing*, at http://www.am.dodea.edu/lejeune/bms/Lion_Docs/documents/CERWriting.pdf**
- 3. Students will write a Claim-Evidence-Reasoning report answering the question: “What impact does using fire for prairie restoration have on the insect populations in the burned areas compared to the non-burned areas?” and use the data the class collected as their evidence.**