Doing Science Outdoors: Field Investigations at the Glacier Creek Preserve

Sample Modules for

Soil of the Prairie

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 II:
Field Investigations at the Glacier Creek Preserve

The following pages include modules focused on the Soil of the Prairie 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 II:

Field Investigations at the Glacier Creek Preserve

Level 1 Lower Elementary (K-2)
Investigate the prairie soil for macro-invertebrates

Level 2 Upper Elementary (3-5)
Examine the prairie soil for organisms

Level 3 Middle School (6-8)
Introduction to Soil and How to Investigate Soil

Doing Science Outdoors Part II:

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Level 1 (Grades K-2):
This Prairie SOIL Module is designed to be used with students in Lower Elementary.

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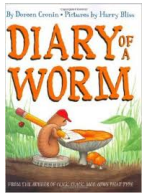
Prairie SOIL Module #1a: Lower Elementary (K-2)

<u>PRE- Fieldtrip Activities</u> prepare students to investigate the prairie soil for macro-invertebrates.

1. **Read aloud to class:** *The Diary of a Worm*, **by Doreen Cronin, or, show the** *The Diary of a Worm* **on Vimeo obtained from http://vimeo.com/17563063.**



1. **Tell students they are going to create a worm farm in their classroom. Give the students time to discuss how they would make a "Worm Farm". Have students list what they think the worms will need to survive in the classroom.**

2. **Go to the University of Illinois website for the *Autobiography of Squirmin' Herman the Worm* at http://urbanext.illinois.edu/worms/. Click on "Come Live With Me" link to learn how to make a worm farm for the classroom.**

Doing Science Outdoors Part II:

Conducting Field Investigations at the Glacier Creek Preserve

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

<u>ON- Fieldtrip Activities</u> include students taking a walk through the prairie and investigating the prairie soil for worms and macro-invertebrates.

1. **Students will gather into groups of four or five students. There should be an adult assigned to each group. The adult carries a clipboard with a sheet of paper, a writing utensil, a tarp, trowel or shovel, and a bucket. The adult leads the students walking down the path into the prairie; the group sits down at a chosen site along the path.**

2. **The adult and students discuss whether or not the prairie soil can support living organisms. The students are asked to use what they learned about worms in the classroom to make their claim about life in the soil. The adult asks them how they could collect evidence to find out if they are correct.**

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3. The adult puts a large shovel full of soil onto a tarp and students pull it apart looking for living organisms. The adult keeps a tally of what the students find. When students have completed their search, the group puts the organisms and the soil back to where they dug it up and return to the barn. Students will need to wash their hands outside before going into the barn.

4. Next, once the whole group returns to the barn, each group tells the rest of the class what organisms they observed in their soil. The class compares the different number of worms that the different groups recorded.

5. As the discussion is taking place, use a large sheet of paper to record the number of worms that each group found. Next, ask the students what kind of living conditions worms like best? Have the groups think about whether the soil they looked at was wet or dry, were they at a highland or lowland, and whether there was lots of vegetation or very little.

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

POST- Fieldtrip Activities include students conducting scientific investigations with worms.

1. **The students should be given cards on which they will draw worm pictures and use them to build a graph on their classroom wall that will show the conditions on the prairie under which the most worms were found during their field trip. (Lowland vs Highland) and (Wet vs Dry) and (Vegetation vs No Vegetation)**

2. **The students will next conduct scientific investigations with the red worms on their classroom worm farm. The teacher should go to http://urbanext.illinois.edu/worms/ to download *Vermicomposting Classroom Activities*. This set of activities and student worksheets are adapted from *AIM Critters*, 1992. The students are able to investigate worm preferences for light, moisture, food sources, and home bedding preference between soil, sand or newspaper.**

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

<u>POST- Fieldtrip Activities</u> include students conducting scientific investigations with worms.

3. **Students re-read** *The Diary of a Worm*, **or, watch the** *The Diary of a Worm* **on Vimeo obtained from http://vimeo.com/17563063. Students discuss if the book agrees with their experiment results. As the discussion is taking place, use a large sheet of paper or the white board to make a Venn Diagram.**

Only in book **Both** **Only in experiment**

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

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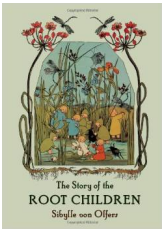
Prairie SOIL Module #2a: Upper Elementary (3-5)

<u>PRE- Fieldtrip Activities</u> prepare students for their walk in the prairie and examining the soil for organisms.

1. **Read aloud to class *The Root Children*, by Sibylle von Olfers:**



2. **Students discuss the story and make a list of the jobs that the "root children" perform for "Mother Nature" in the book. Have students brainstorm for ways to find out what is in the soil that performs these jobs and which do not require an organism (ex. Painting the ladybug).**

3. **Students or teachers build at least two Burlese Funnels (** How to Make a Berlese Funnel – YouTube https://www.youtube.com/watch?v=J5rGo3uBFIU**) This video gives instructions for using 2L plastic bottles.**

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Prairie SOIL Module #2b: Upper Elementary (3-5)

PRE- Fieldtrip Activities prepare students for their walk in the prairie and examining the soil for organisms.

4. **Students dig out plugs of soil in the school yard and return with them to put into their Berlese Funnels. The plugs should be in one piece and be able to fit into the top of the funnel.**

5. **Leave the soil in the funnel with the light on for several days and nights. Leave the soil in the funnel with the light on for several days and nights.**

6. **Display the organisms on a microscope or camera that projects onto a large screen in the classroom so the whole class can see what has been collected.**

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

<u>PRE- Fieldtrip Activities</u> prepare students for their walk in the prairie and examining the soil for organisms.

7. **Students draw the organisms and identify them using** *Life in The Soil* **by James Nardi, and the posters that go with the book titled** *Soil Organism ID Chart* **found on** http://www.odspartnership.org/uploads/6/5/4/8/6548110/soil_organism_id_chart_2011.pdf

8. **Using the charts, students label each of the organisms they identified according to the role it plays in this ecosystem as: Producers, Decomposers, or Predators.**

9. **Students count the number of each type of the organism and use an Excel spreadsheet to enter their data. Students will use their spreadsheet to enter additional data after the field trip to the Glacier Creek Preserve.**

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

<u>ON- Fieldtrip Activities</u> students take a walk in the prairie and collect soil that they will put into their Burlese Funnels back at their school.

1. The students are divided into small groups of about 5 students. Each group will need an adult with a clipboard, paper, writing utensil, bucket and shovel.

2. Each adult leads the students down the path to the pre-assigned site. The adult leads the students in a discussion about producers, decomposers, and predators. The students are told to observe the prairie around them and identify how this prairie, above-ground ecosystem is similar to and different from their school yard where they took their sample for their Burlese Funnel.

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

<u>ON- Fieldtrip Activities</u> students take a walk in the prairie and collect soil that they will put into their Burlese Funnels back at their school.

3. **Next, the adult leads the discussion and asks what they would expect to find living in the prairie soil. Will the same organisms live here as those they found earlier? Will there be the same number of organisms? Require that the students explain what observations have lead them to make their claims.**

4. **Students should decide where to collect their prairie soil samples to take back to school and place in their Berlese Funnels. The plugs should be in one piece and be able to fit into the top of the funnel.**

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

<u>Post - Fieldtrip Activities</u> students set up the prairie soil in their Burlese Funnels so they can examine prairie soil organisms and compare them to school yard soil organisms.

1. **Leave the soil in the funnel with the light on for several days and nights. Display the organisms on a microscope or camera that projects onto a large screen in the classroom so the whole class can see what has been collected.**

2. **Students draw the organisms and identify them using *Life in The Soil* by James Nardi, and the posters that go with the book titled *Soil Organism ID Chart* found on** http://www.odspartnership.org/uploads/6/5/4/8/6548110/soil_organism_id_chart_2011.pdf

3. **Using the charts, students label each of the organisms they identified according to the role that it plays in this ecosystem as: Producers, Decomposers, or Predators.**

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Prairie SOIL Module #2g: Upper Elementary (3-5)

<u>Post - Fieldtrip Activities</u> students set up the prairie soil in their Burlese Funnels so they can examine prairie soil organisms and compare them to school yard soil organisms.

4. **Students count the number of each type of the organism that is found in the prairie soil.**
5. **Students retrieve their Excel spreadsheet that already has their data from the school yard soil entered into it. Now the students enter the data for the prairie soil.**
6. **Students will enter the additional data they obtained from examining the prairie soil and make a graph of the soil organisms.**
7. **Students will compare the data and the graphs to compare number and diversity of organisms in the school yard sample to the prairie soil.**

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Level 3 (Grades 6-8):
This Prairie SOIL Module is designed to be used with students in Middle School.

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

PRE- Fieldtrip Activities students are introduced to soil and how to investigate soil.

1. **Students should be instructed to read about soil in** *Soils Overview*, **published by the Soil Science Society of America, available at** http://www.nrcs.usda.gov/wps/portal/nrcs/photogallery/soils/health/biology/gallery/?cid=1788&position=Promo

2. **The students should collect soil samples from the school yard to test for infiltration and texture. Instructions are found at** https://eng.ucmerced.edu/czo/E_O_resources/E_O_resources/soil_columns_texture.pdf

3. **Students should view the PowerPoint or read the PDF document titled** *Helping People Understand Soils: The Ten Key Messages,* **published by United States Department of Agriculture, the Natural Resource Conservation Division, available at** http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_052550.pdf

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

<u>PRE- Fieldtrip Activities</u> students are introduced to soil and how to investigate soil.

4. **Students should be instructed to read about soil biology in** *The Soil Biology Primer*, **published by the United States Department of Agriculture, the Natural Resource Conservation Division, available at**
   http://www.nrcs.usda.gov/wps/portal/nrcs/detailfull/soils/health/biology/?cid=nrcs142p2_053860

5. **The teacher should lead a whole class discussion about the types of organisms that live in the soil. Students should examine the** *Soil Organism ID Chart* **found at**
   http://www.odspartnership.org/uploads/6/5/4/8/6548110/soil_organism_id_chart_2011.pdf

6. **Students should compare the** *Soil Organism ID Chart* **to the USDA's** *Soil Food Web* **found at**
   http://www.nrcs.usda.gov/wps/portal/nrcs/photogallery/soils/health/biology/gallery/?cid=1788&position=Promo