

School Yard Investigation Plan

Heather Giebeig- MZE 3rd Grade

Title: Biodiversity in Relation to Habitat

I. Lesson Goals:

The goal of this investigation is for students to determine how habitat, as well as altering habitat, effect biodiversity.

Our school yard lends students access to natural wooded areas; former farm land which is now a grassy meadow; and newly-cleared/sodded regions. Using these different habitats, students may investigate the variety of bugs specific to each area, hopefully drawing conclusions about how biodiversity regarding producers relates to biodiversity concerning low level consumers.

Students may find this investigation useful as it familiarizes them with numerous species of which they may be unaware. It is a hands-on approach that allows them to intimately connect with their environment, investigating first hand the relationship of habitat to inhabitants.and, of course, what could be more interesting to 3rd graders than bugs!

GPS Standard (3rd Grade) S3L1- Life Science:

Students will investigate the habitats of different organisms and the dependence of the organisms on the habitat.

- d. Explain what will happen to an organism if the habitat is changed.

Other GPS Standards that Apply to the Investigation:

Habits of Mind: S3CS1; S3CS2; S3CS3; S3CS5; S3CS6

The Nature of Science: S3CS7S3CS8

II. Materials:

Group Size: 3 students Number of Groups: 4

Supplies per group:

- 1 Killing jar
- 2 forceps
- 1 butterfly net
- 4 cups with tag board squares
- 2 hand lenses

Class Size: 12 students

Supplies for the class:

chart paper

index cards

colored pencils

interactive websites for identifying bugs

books for identification

specimen jars (optional)

rubbing alcohol

alcohol dispenser(optional)

III. Setting Up the Investigation:

a. Engaging Students:

Bug Mystery Inquiry—Some form of bug will be placed on the overhead projector and hidden from view of the students. Looking at opaque and translucent shadows cast from the mystery object, the pupils will make a determination about what the object is. This exercise will require teamwork, as well as structured debate and idea generation. All suppositions must be based on observable evidence. If a pupil agrees or disagrees with another's idea, he/she must voice evidence for the opinion. To conclude, each team must agree, as a group, to select one idea as its final answer. Ideas will then be shared with the class and the mystery object, a cool bug, revealed!

b. Introductory Questions:

Where are bugs found? Name some of the places.

Do you think bugs are found in: a store; a bathroom; the desert; Antarctica; a bag of flour; your bed; your skin; a flower garden. Explain your answer.

What type of evidence do bugs leave behind?

Where can you find this evidence?

Can you find evidence of bugs in: a restaurant; a barn; a home; a picnic area; a candy bar; oatmeal; your body?

(Share a few gross facts from [The Book of Lists](#) related to bug parts)

regularly found in food products.)
<http://www.amazon.com/Book-Lists-David-Wallechinsky/dp/0316920290>

Give students a chance to express their curiosity about some of the topics discussed above with a quick Q & A session.

Possible student questions:

How do bugs get into food products?

Could bugs actually live in the polar regions?

Where do people get bugs in their bodies from?

How do bugs get into a building? Do all bugs bite?

IV. Hypothesis:

Teacher Prompt: Let's again think about where bugs are found and and the evidence they leave behind. What kinds of questions can we ask? (Have students pause to reflect, and to write down one question.)

Now let's think about our school yard and the area around it. Where might we find bugs? (List all answers.) What type of questions might we ask here? (List questions given, guiding students into comparative forms of their queries.)

Possible Student Comparative Questions:

Do bugs in the grass eat more than bugs in the woods?

Do bugs prefer shade or sun?

Are there more spiders in the grass or in the trees?

Are there more large bugs or more small bugs on the school lawn?

Are there more bugs in the meadow than in the sodded area?

Hypothesis: There is greater biodiversity in the wooded area than in the sodded lawn or plot of former farm land.

V. Methodology for Designing and Implementing the Investigation

A. Sampling Sites:

These sites have been selected as they display, when compared, varied levels of human intervention. Each maintains radically different natural features, as well.

All sites are, however, are located on the same piece of property and all have been impacted, in some way, by mankind (run off; transplantation of non-native flora; mowing; fertilization and use of chemicals). Option: Allow students to brainstorm ways in which these sites have been impacted by humans.

1. Natural Wooded Area: Natural forest stands consisting of both hardwoods and pine, as well as a variety of undergrowth. The wooded site has remained natural for at least 30-50 yrs. judging by pine tree growth rates.
2. Grassy Meadow: Former farmland unused since the school system's purchase of the land three years ago. It is slowly returning to it's natural state. It does not possess trees and appears largely uniform in the type of grass coverage it maintains. This coverage may not be a natural species but one used for agricultural purposes. This site is not mowed or maintained.
3. Sodded Lawn: Stripped land which has been newly sodded with centipede grass. It is mowed and fertilized regularly.

B. Experimental Design:

There will be four teams of students for this investigation. Teams will consist of 3 students each, as selected by the teacher. The instructor will consider personality, work ethic, the tasks at hand, and the outdoor environment when choosing members for each group.

Prior to going out for the investigation, the class will discuss information and photos from a website, giving them a basic understanding of which bugs are safe or unsafe to touch. This brief talk will hopefully alleviate fear of harmless bugs, as well as help students avoid injury from poisonous species. Rules for what to do if a poisonous species is spotted will be discussed. The teacher will assist in the collection of spiders, etc.....

This investigation will take at least four days. One day will be devoted to each site for the collection and identification of its bug inhabitants. A fourth day will be used to analyze data and talk about conclusions/ further investigations.

	earthworm	cricket	grasshopper	Cicopiamoth	Ladybug	ant	banana spider	mosquito	soldier fly
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At the end of each day's identification procedures, each group will come up to present their index card booklet, detailing the types and variety of bugs found, noting which they found to be the most interesting, etc..... The teacher will also pull up internet photos of selected species for class viewing as the students share. The booklet sharing will informally familiarize the class with all species found at the sampling site, making future analysis of the classroom graphs more meaningful.

C. Prediction:

If there is greater biodiversity in the wooded area, then there will be more species of bugs collected in this region.

Students will analyze the three whole class graphs representing each of the 3 sampling sites. They will, as a class, compare and contrast the varieties and numbers of bugs found in each site.

Students will then return to their groups to write concluding statements about the results of the investigation, as well as, to conjecture about the causes for the results found. Groups will then select a spokesperson to present their statements, as well as observations. (Conclusions may be presented in different formats: video, art product, song, literary form, theatrical performance, etc.....)

As a class, ideas for future investigation; new questions; and methods for tightening the investigation will be discussed.

VI. Resources:

Online bug keys and guides

<http://bugguide.net/node/view/15740>

<http://www.escapedirect.com/insectpack.html>

<http://insects.about.com/od/insects101/tp/29ordersguide.htm>

Reference book on bug species (Choose from rated selections on these sites)

<http://www.insectidentification.org/field-guides.asp>

<http://myrmecos.wordpress.com/2009/05/19/a-guide-to-the-insect-field-guides-of-north-america/>

Pre-organized E-board display photos of bugs from internet sites

Internet sites for teacher resource

To enhance this investigation, encourage further interest in the topic of bugs, and to aid in knowledge useful for identifying the specimens, a website posting links to a variety of optional learning sites will be created. The page will include sites on the following topics and be assessable at home as well as in the students' regular classrooms.

Web Sites:

Independent projects on bugs

<http://fun.familyeducation.com/ecological-habitats/plants/35165.html>

Informational facts on bugs

Identification help

<http://www.enature.com/fieldguides/intermediate.asp?curGroupID=4>

<http://www.amentsoc.org/insects/what-bug-is-this/>

Art projects incorporating the bug theme

<http://www.uky.edu/Ag/Entomology/ythfacts/allyr/ornament.htm>

Animated/ interactive bug diagrams

<http://www.sun-sentinel.com/broadband/theedge/sfl-edge-t-flyphysics,0,996193.flash>

Ant Cam

<https://ccs.infoage.us/Uploaded/HomePage/11202008181029.gif>

Bug games

<http://www.sun-sentinel.com/broadband/theedge/sfl-edge-a-roachgame,0,6048115.flash>

Bug Facts

<http://www.factmonster.com/ce6/sci/A0825279.html>

<http://www.insects.org/>

Natural Songs of Bugs

http://www.musicofnature.com/songsofinsects/iframes/OLG_families.html

Cooking with Bugs

<http://www.ent.iastate.edu/misc/insectsasfood.html>

Kids' Books About Bugs

<http://www.uky.edu/Ag/Entomology/ythfacts/readmore/books.htm>

Bug Observation Kit for Purchase

<http://www.escapadedirect.com/insectpack.html>

Care Sheets for Live Bugs

<http://www.escapadedirect.com/insectpack.html>

VII. My budget will be \$30.00 to purchase butterfly nets and mason jars and also incorporate requested items for students to bring in.

mason jars	\$5.00
forceps	\$10.00
4 butterfly nets	\$ 20.00
styrofoam cups	\$2.50
poster board	\$1.00
chart paper	\$6.00
index cards	\$10.00
rings	\$2.00
colored pencils	\$12.00
identification guides	\$45.00
rubbing alcohol	\$3.00
Total Cost	\$116.50

Optional Items:

specimen jars	\$30.00
alcohol dispensers	\$15.00
additional rubbing alcohol	\$ 7.00
Total Additional Cost	\$52.00