

Schoolyard Investigation Plan 1 (SYIP)
Kristina Cabral
South Gwinnett HS, Gwinnett Co., GA

I. Title: Biodiversity and Our School

Age Group: 11th and 12th grade AP Environmental Science

Duration: Five days

II. Lesson Goals:

GPS: SEV3. Students will describe stability and change in ecosystems.

- a. Describe interconnections between abiotic and biotic factors, including normal cyclic fluctuations and changes associated with climatic change (i.e. ice ages).
- b. Explain succession in terms of changes in communities through time to include changes in biomass, diversity, and complexity.
- d. Explain how biotic and abiotic factors influence populations.

SCSh1, SCSh2, SCSh3, SCSh5, SCSh6, SCSh7, SCSh8

To observe the biodiversity of insect populations at four different sites. Sites will be chosen on both the high school and elementary school campus across the street in order to compare areas that are isolated to those that are more open and accessible to insect life.

III. Materials:

For field collection of insects:

Sticky traps (12/group)

- fly ribbon
- index cards
- scotch tape

Pitfall traps (3/group)

- empty and washed yogurt cup
- 2" x 2" cardboard square (cover)
- two small rocks (found on site)

For retrieval and identification of insects:

Small Ziptop baggies

Forceps

Micropipettes

Petri dishes

70% alcohol (killing solution)

Stereoscope

Hand lens

Field guides for insects and trees

The class will be divided into four group. Each group will be assigned to only one sampling site.

IVa. Engaging the students:

The hook: Mites and Midgets

Purpose of the activity:

1. Students write their own definitions of *biodiversity* and *species*.
2. Review process and rules for writing and using a dichotomous key.
3. Students design and self evaluate dichotomous keys.

b. Questions:

1. Is there life in the South Gwinnett schoolyard?
2. How are the habitats at South Gwinnett and Britt Elementary different?
3. How are the types of life at South Gwinnett and Britt Elementary different?

c. Possible Hypothesis:

H: There will be a difference in the types of organisms found in the green trees between Britt and the Senior lot and the three other sites.

Va. Procedure:

Day One: Students will set up sticky traps in and on the trees and in the ground (leaf litter) below to try to catch as many insects as possible.

1. Class will be divided into four groups with each group setting traps at their respective site during the same class period.
2. Four sticky traps should be hung at different levels in the tree foliage.
3. Four sticky traps should be placed along the tree trunk.
4. Four sticky traps should be placed directly on the ground.
5. Two pitfall traps should be buried into ground near the base of the tree.
6. Students will record initial observation made at site.

*Traps will be left to sit for 48 hours. Weather forecast should not include rain if at all possible. Areas need to be clearly marked to minimize student disruption.

Day Two: Students will be given a lesson on tree/leaf and insect identification using dichotomous keys and field guides.

Day Three: Species Identification

1. Upon returning to collection site, students will first identify the tree species present.
2. Students will record observations as they collect the traps.
3. Each trap will be placed into a separate, labeled, zip-top baggie with an alcohol soaked cotton ball.
4. Students will return to class, identify, and sort as many organisms as possible using the different field guides.
5. Biodiversity will be determined by the number of different "organism groups*"

*"organism groups" refers to identifying organisms to the family level.

Day Four: Students continue with species identification if needed. If not, proceed to Day 5.

Day Five: Group presentation of results to class and whole class conclusion.

b. Sampling Sites

1. The two trees between the trailers and the parent drop-off lane off of Odum Street.
2. The two trees in the parking lot island by E-hall
3. The stand of trees in front of Britt Elementary

4. The stand of trees between Britt Elementary and the Senior parking lot.

The first two sites were chosen because they are the only areas where more than one tree is present in the same area in this schoolyard. The other trees on this campus are single trees, most of which are isolated from other plant life. In order to contrast the very limited schoolyard of the high school, two sites at the elementary school across the street were also selected. In these areas the “stands” of trees range in number from approximately 10 to 30 trees. In all four sites the trees are selectively placed (planted) by the county.

c. Possible Prediction:

P: If there is a difference in the types of organisms found in the green trees between Britt and the Senior lot and the three other sites, then there will be greater biodiversity at this site.

d. Analysis and Communication:

Each group of student will determine the biodiversity present at their site based on the number of different “organism groups” and present the information to the class. The class will determine which site has the greatest biodiversity.

Possible extensions:

1. Have students research evidence on the importance of biodiversity.
2. Have students present the findings from both their schoolyard research and what is known about biodiversity in one of the following ways:
 - Poster campaign on campus focused on the student body
 - A presentation to the staff at a faculty meeting
 - A persuasive letter to the principal and possibly the school board to try and get more green space incorporated into our schoolyard
 - A press release on the school website, to the local media.

IV. Resources:

1. Hardwood tree identification books
2. Insect identification books
3. OIEE Summer Course

VII. Budget:

1. fly ribbon.....\$ 10
2. 70% alcohol\$ 4
3. M&M and other candy for the “hook”\$ 20
4. Index cards.....\$ 1
5. Scotch tape\$ 4
6. Small zip-top baggies\$ 2
7. 70% alcohol\$ 2
8. All other materials will be donated by the students or are ordered as part of the science stock room supplies.