

Natural History along the Natchez Trace Parkway



On-Site Lesson:

Discover Diversity (code 5DD)

► **Grade Level:**

8th

► **Subject Areas:**

Life Science

► **Setting:**

One period on a trail.

One period in classroom.

► **Duration:**

Two class periods.

► **Skills:**

Observation, explanation, research and evaluate, graphing data, prediction, summarization

Vocabulary:

Invasive, non-native, diversity population, community, competition.

Summary: On a National Scenic Trail, students will investigate the diversity and relationships of various life forms along a trail.



Materials Needed:

For each group of students: 4 plot corner markers. Labeled toothpick markers, approximately 26 with extra blanks (see attached instructions for suggestions on how to make small markers). A meter stick or meter-long piece of string. Data Collection Sheet, results and conclusion. Pencil. Appropriate Scenic Trail map. Photo Option: one disposable camera per group

Instructional Information

Tennessee Learning Expectations: Biodiversity and Change:

GLE 0807.5.1 Identify various criteria used to classify organisms into groups.

GLE 0807.5.2 Use a simple classification key to identify a specific organism.

GLE 0807.5.3 Analyze how structural, behavioral, and physiological adaptations within a population enable it to survive in a given environment.

GLE 0807.5.4 Explain why variation within a population can enhance the chances for group survival.

GLE 0807.5.5 Describe the importance of maintaining the earth's biodiversity.

Teacher Set: The students will be visiting a National Scenic Trail and investigating the diversity and adaptations of biological organisms along the trail. They will collect data on the trail and create and compare representative grafts in the classroom.

Teacher Overview: The Natchez Trace Parkway includes many trails. Five of those trails are designated National Scenic Trails. These trails represent

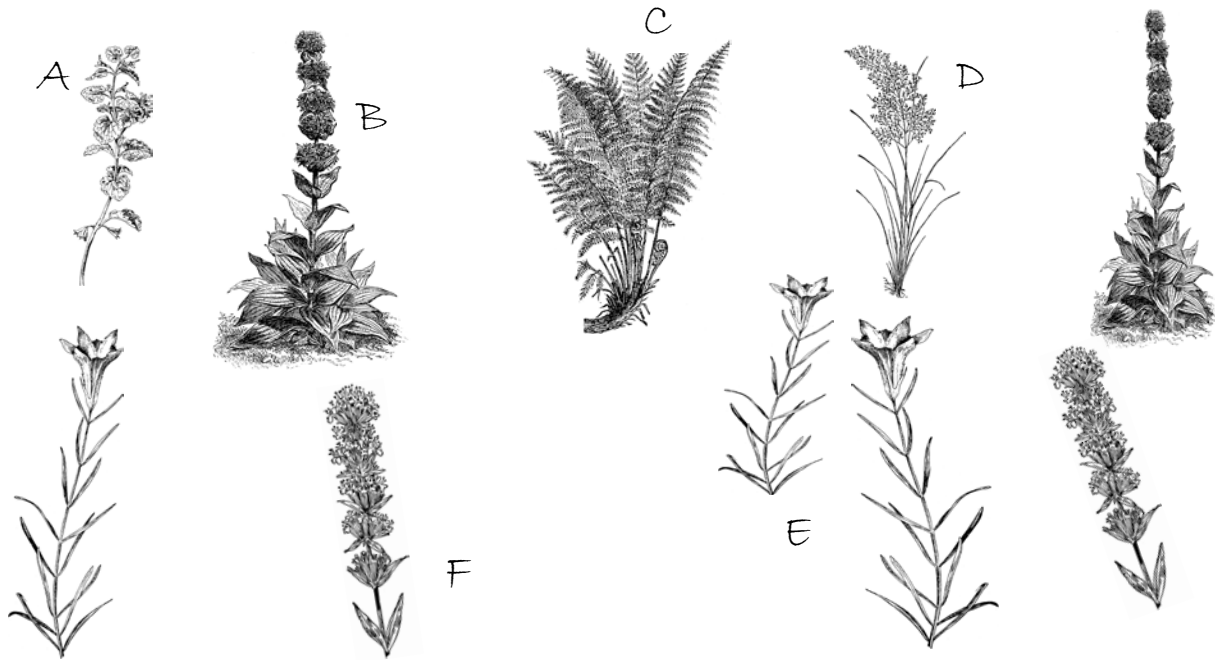
a vignette of the surround natural areas. They are excellent trails for students to observe a natural area representative of a state region.

Student Instruction: In small groups, the students will be collecting data about a plot that they temporarily mark on a National Scenic Trail. Ideally, they will count the number of species in their plot and the population of each species in that plot. They do not need to be able to recognize plants by name. They do need to understand how to recognize whether two or more plants belong to the same species. This is usually done by comparing leaves or in some circumstances, flowers or fruit. They should understand that plants of the same species have leaves that are the same. It is advised that students do a pre-visit schoolyard comparison to group plants in the schoolyard in their respective species.

Option: If students are good at plant identification, they could use field guides to determine the actual names of particular species.

Option: Rather than count all of a species, the students could subjectively label the plants, Rare, Common or Abundant. See the example for how they might list plants.

Example of different ways to count and enter plant data from a plot.



Plant Letter	How Many
A	1
B	2
C	1
D	3
E	1
F	2

Plant Letter	Here?
A	✓
B	✓
C	✓
D	✓
E	✓
F	✓

Plant Letter	Abundance
A	R
B	C
C	R
D	A
E	R
F	C

Student Task: See procedure.

Teacher Closure: Review the importance of diversity. Explain that National Parks help to serve our country by preserving and protecting natural (and historical) areas.

Option: engage students in discussion about diversity. See Discussion Stimulator sheet.

Student Assessment: Participation in the activities, accuracy and completion of data sheets and report.

Suggestions for re-teaching: Include review of this field trip when teaching other subjects that touch up on the importance of diversity.

Extension: Research and write a report on a location that has lost diversity because of encroachment of non-native species or because of development.

Lesson Option: Provide disposable cameras to each group of students. (Cost between \$10.00 and \$15.00 each for camera and photo CD)

Have students take photos of 10 plants so that they can identify them when back in the class room. They should take a distance photo of the whole plant and a close up. They should write the appropriate photo numbers next to the letter on their data collection sheets.

The Diversity in a Plant Community

Materials: Four plot markers, data collection sheet, pencil, measuring stick

Procedure: On a Scenic Trail _____ (trail name), walk for 3 minutes and stop. Each group should select an area to study.

Not disturbing any plants, AVOIDING poison ivy and looking CAREFULLY where you put your feet and hands, put one corner marker in the ground. Using that marker as one corner, measure a one meter square marking the corners with the other plot markers. If you include large trees, make them at the edge of your plot. Plants overhanging the plot may be included as being in the plot.

Look carefully to differentiate between different types of plants. Usually leaves will be the most commonly seen but unique characteristic that species shares. All plants of the same species will have leaves that are the same shape and about the same size. Sometimes the plant may have fruit or flowers that can help you determine if they are in the same species. Determine one species of plant and use the “A” markers to mark one of those plants. This will help to keep the plants from getting mixed up. Count the number of “A” species and mark it on your data sheet. Then select a “B” plant and count the number of “B”s and enter the data do this for all of the different types of plants in your plot.

If you know the name of the plants, that is great, write them on the data sheet.

Photo Option: If you do not know the names of the plant, take a picture of the whole plant and a close-up. Write the photo numbers next to the appropriate letter on the data collection sheet.

Name _____ Group Number _____

Results: DATA COLLECTION TABLE (use the reverse side for notes)

Plant Letter	Number of this type of plant	Adaptations of this plant (Circle)
A		green leaves - long stem - bark - fruit - flowers - tall height - vine - shade tolerant - water tolerant
B		green leaves - long stem - bark - fruit - flowers - tall height - vine - shade tolerant - water tolerant
C		green leaves - long stem - bark - fruit - flowers - tall height - vine - shade tolerant - water tolerant
D		green leaves - long stem - bark - fruit - flowers - tall height - vine - shade tolerant - water tolerant
E		green leaves - long stem - bark - fruit - flowers - tall height - vine - shade tolerant - water tolerant
F		green leaves - long stem - bark - fruit - flowers - tall height - vine - shade tolerant - water tolerant
G		green leaves - long stem - bark - fruit - flowers - tall height - vine - shade tolerant - water tolerant
H		green leaves - long stem - bark - fruit - flowers - tall height - vine - shade tolerant - water tolerant
I		green leaves - long stem - bark - fruit - flowers - tall height - vine - shade tolerant - water tolerant
J		green leaves - long stem - bark - fruit - flowers - tall height - vine - shade tolerant - water tolerant
K		green leaves - long stem - bark - fruit - flowers - tall height - vine - shade tolerant - water tolerant
L		green leaves - long stem - bark - fruit - flowers - tall height - vine - shade tolerant - water tolerant
M		green leaves - long stem - bark - fruit - flowers - tall height - vine - shade tolerant - water tolerant
N		green leaves - long stem - bark - fruit - flowers - tall height - vine - shade tolerant - water tolerant
O		green leaves - long stem - bark - fruit - flowers - tall height - vine - shade tolerant - water tolerant
P		green leaves - long stem - bark - fruit - flowers - tall height - vine - shade tolerant - water tolerant
Q		green leaves - long stem - bark - fruit - flowers - tall height - vine - shade tolerant - water tolerant
R		green leaves - long stem - bark - fruit - flowers - tall height - vine - shade tolerant - water tolerant
S		green leaves - long stem - bark - fruit - flowers - tall height - vine - shade tolerant - water tolerant
T		green leaves - long stem - bark - fruit - flowers - tall height - vine - shade tolerant - water tolerant
U		green leaves - long stem - bark - fruit - flowers - tall height - vine - shade tolerant - water tolerant
V		green leaves - long stem - bark - fruit - flowers - tall height - vine - shade tolerant - water tolerant
W		green leaves - long stem - bark - fruit - flowers - tall height - vine - shade tolerant - water tolerant
X		green leaves - long stem - bark - fruit - flowers - tall height - vine - shade tolerant - water tolerant
Y		green leaves - long stem - bark - fruit - flowers - tall height - vine - shade tolerant - water tolerant
Z		green leaves - long stem - bark - fruit - flowers - tall height - vine - shade tolerant - water tolerant

Adaptation Table

How many species had the adaptation listed below?

Green leaves	Long stem	Bark	Fruit	Flowers	Tall height	Vine	Shade tolerant	Water tolerant

1. How many different types of plants did you have in your plot?
2. How many total plants did you have in your plot?
3. Rank the plants in order of their populations. You can place a number beside the letter on your data sheet.
4. Was one plant a lot more common than the other plants? If so, which one.
5. Do you think your plot represents a diverse community? Why or why not?

Compare your group's results with the rest of the class. On a sheet of graph paper, or using computer software, make a graph that represents the different amounts of species for each plot. Devise different ways to represent the collected data.

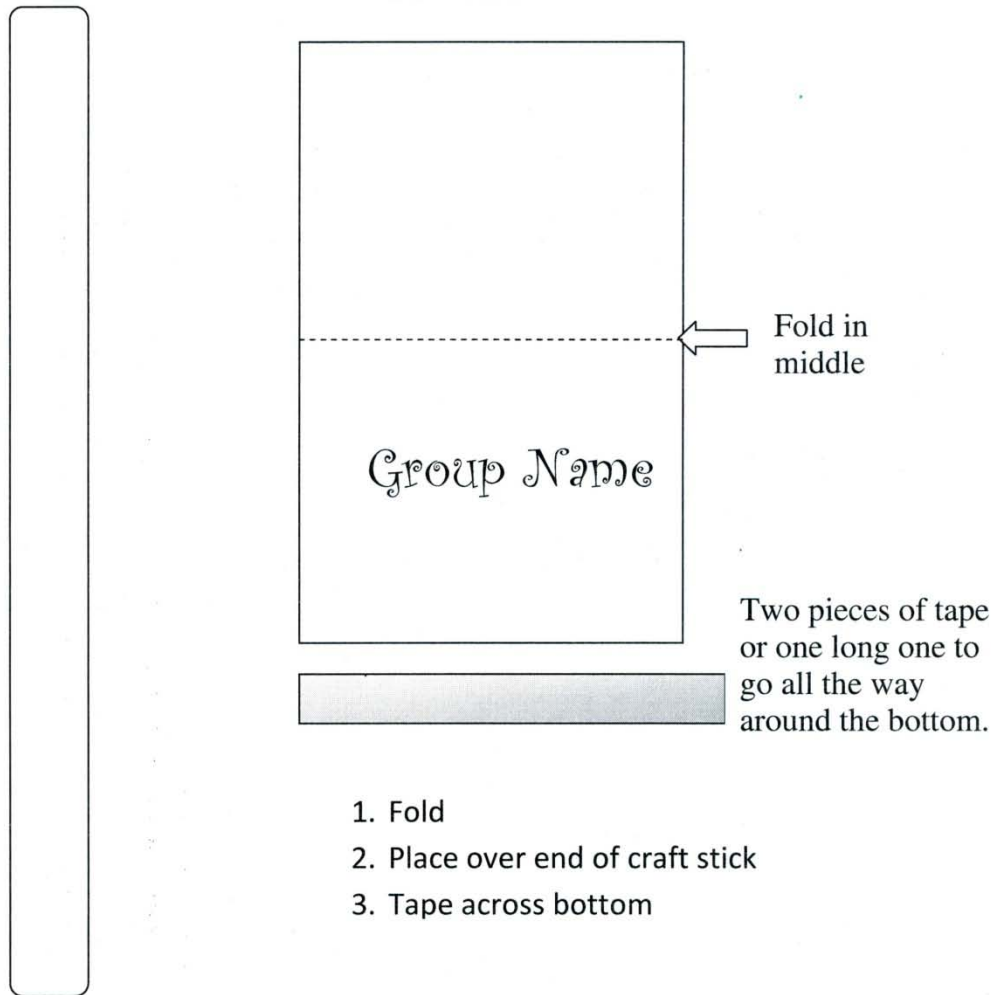
Conclusion:

Do you think that your plot represented a healthy plant community? Why or why not?

Why is a diverse community important?

Plot Marker Suggestion:

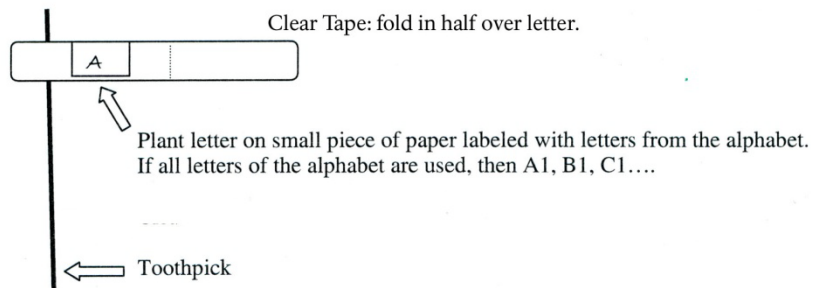
Craft Stick



Even easier alternative :

Write group number on the end of the craft stick

Suggestion for plant markers:



Discussion Stimulators. . . answers are not necessarily right or wrong.

1. If an animal carries a seed from one place to another it is considered expansion of the plant or natural transportation. If people carry seeds from one continent to another, we consider the resulting plants as non-native. What do you think about these designations?
Consider:
 - a. Transportation of imports and exports
 - b. Agricultural materials
 - c. Vehicles
2. Is it a good idea to use non-natives (plants/insects) to combat “problem” species? (Like fighting fire with fire)
 - a. What dangers might this pose?
 - b. What benefits?
3. If you are landscaping your property, is it a good thing to use only native plants even though they may not be as pretty as non-native plants?
4. How damaging can a non-native species be to the environment?
 - a. Could it actually change the habitat?
 - b. Could any changes be good?
5. Counting the Cost:
Consider:
 - a. Is it worth it to try to get rid of a non-native invasive?
 - b. Labor/Supplies? How much is “worth it?”
 - c. Lost recreational value?
 - d. Effects on other species, plant and animal.
 - e. Other costs?
 - i. Emotional
 - ii. Educational loss
6. Assuming the same capacity for “carrying”, would a non-native plant have a better chance at establishing itself in a new area if it was moved by a migrating arctic bird or a migrating human traveling east and west? Why? What geographical features need to be considered?
7. Which species of plants or animals have the best chances of establishing themselves worldwide? Specialist plants like cactus/ tropical vines or polar bears/orangutans OR species that can survive in a wide variety of habitats like armadillos or kudzu, privet, wisteria?
8. Brain storm all of the different ways plants and/or animals can be transported long distances.