Name\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

HICKORY FIELD TRIP

 Go to each site using the GPS. Your teacher will tell you where to begin. Go to the next site number on your list, unless your teacher gives you a different sequence. Once at the site, follow the directions on this paper or at the site and then answer the questions. By the end of the day, you should complete all 20 sites. Remember, your completed assignment (questions from this packet) count as a **test grade**.

**Site #1**

This site is on Black Gum trail: approximately 15 steps past the Black Gum Trail sign. Find the needle leaved tree. Use the dichotomous key to identify the tree.

1. What is the common name for the tree?\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. Using the key, describe the features of this tree.

**Site # 2**

 Go back out of the trail to the grassy area:

You should look for a muddy area that should contain animal tracks. Use the Animal Track Field Guide to identify the tracks in the area.

1. What animals have been in this area?
2. Is there evidence of more than one animal in this location? Explain.
3. Why do you think the animal(s) you mentioned in #1 came to this location?

**Site #3**

Located close to Site 2. You should look for a pink hula hoop on the ground. The area inside the hula hoop is the area of interest. **DO NOT MOVE THE HULA HOOP!!!!!!!!** There are two measurements of species in the area: species richness and species diversity. **Species richness** is the number of species in a community. **Species diversity** relates to the number of species in the community to the related abundance of each species. You will determine the species richness of the area inside the hula hoop.

To determine the species richness, simply count the total number of species present. Each species will be counted once, regardless of how many individuals of that species are present. For example, if you find 25 earthworms, 5 plants of a tall grass, and 52 plants of a short, clover-like plant, the species richness is three because there are only three different species present. Don’t get caught up in identifying each species, just look for all the different species present.

1. Species richness\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. Describe four factors that may influence your count of the species richness.

 a.

 b.

 c.

 d.

**Site # 4**

 Go back to Black Gum Trail and travel along trail:

There are a few relationships among species that you may observe today: mutualism, commensalism, parasitism, and predation. **Mutualism** is a relationship between two different species, where both benefit. **Commensalism** is a relationship where one species benefits and the other is not affected. **Parasitism** is a relationship where one species benefits and the other is harmed**. Predation** is where one organism eats and consumes another (prey).

Look at the rocks along the trail at this site. You should notice some moss and other lichens. Moss tends to be green, fuzzy appearing non-vascular plants. (Remember, a non-vascular plant does not have tube-like cells that transport water and materials.) Lichens tend to be flattened, hard, crusty-type growths on rocks. Lichens are composed of algae and fungus living together. **They can grow in almost desolate conditions because the algae is an autotroph (providing energy for both the algae and fungus) and the fungus holds water that can be used by the algae and fungus.**

1. Which type of organism is more abundant on the rocks bordering the trail: mosses or lichens?\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. Which type of relationship would the lichens (algae and fungus) be?\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
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Now look for two more types of vascular plants (plants with tube-like cells that transport water and materials): Mountain Laurel and Rhododendron.

1. Why are the Mt. Laurel and Rhododendron much larger than moss?
2. Would it be possible for the moss to grow as large as the Mt. Laurel and Rhododendron? Explain.
3. Which species of plant, Mountain Laurel or Rhododendron, is more abundant in this area? (Hint: The leaves of the Rhododendron are larger than those of Mountain Laurel)
4. Give an explanation for your finding to #12.

**Site #5**

Where the trail begins to slope uphill (You may lose signal. Be alert when signal returns)

1. What are herbivores?
2. Can you identify any evidence of herbivores in this area? If so, describe your findings.

Find the pink hula hoop on the ground. The area inside the hula hoop is the area of interest. DO NOT **MOVE THE HULA HOOP!!!!!!!!!!!!!**

There are two measurements of species richness and species diversity. Species richness is the number of species in a community. You will determine the species richness of the area inside the hula hoop.. (You may need to look under leaf debris on the ground, but please do not disturb the area for other groups)

To determine the species richness, simply count the total number of species present. Each species will be counted once, regardless of how many individuals of that species are present. For example, if you find 25 earthworms, 5 plants of a tall grass, and 52 plants of a short, clover-like plant, the species richness is three because there are only three different species present. Don’t get caught up in identifying each species, just look for all the different species present.

1. Species richness\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. Compare the species richness of site 3 and site 5.
3. Describe at least two reasons for your explanation to #17.

**Site #6**

At this site, you should notice an area of clearing in the trees and a fence.

1. List at least five indications that humans have altered this environment.

a.

b.

c.

d.

e.

1. List three ways that humans can positively affect the environment.

a.

b.

c.

1. Based on your experiences, list three ways that humans can negatively affect the environment.

a.

b.

c.

**Site #7**

Look for the area containing pine trees.

1. Name two ways that this forested area is different from the areas in sites 4,5, and 16-20?
2. Use the Eastern Trees Field Guide to identify the trees abundant in this area. What are the names of the trees?
3. What animals may live here?
4. What evidence supports your answer to # 24?

**Site # 8**

Sumac Circle

There are a few relationships among species that you may observe today: mutualism, commensalism, parasitism, and predation. Mutualism is a relationship between two different species, where both benefit. Commensalism is a relationship where one species benefits and the other is not affected. Parasitism is a relationship where one species benefits and the other is harmed. Predation is where one organism eats and consumes another (prey).

1. Assume rabbits are feeding in this area. What type of consumers are rabbits: Herbivores, omnivores, or carnivores?\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. Give an example of a type of relationship a rabbit would be part of (one of the above).\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
3. What other species would be involved in this relationship? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Site #9**

1. Observe the surroundings. List at least five observations that indicate humans have altered the environment.

a.

b.

c.

d.

e.

 **Site #10**

At this site, there is an unusual tree for this area. It has fan-shaped, scalloped leaves. It’s called **Ginkgo biloba.**

1. Locate the Ginkgo tree. Observe the surroundings. Are there any other Ginkgo trees at this site? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. Find the Ginkgo biloba on the tree field guide. Go backwards on the key and list all of the characteristics of this tree:
3. Explain how this tree arrived at this site.

**Site #11**

Use the field guide to identify the Witch Hazel.

1. Using the field guide, describe the characteristics of the Witch Hazel.
2. Compare the description in the book to the actual tree. Describe any differences.
3. What would be an advantage of a plant that blooms in the fall?
4. Suggest at least two possible uses of these blossoms by organisms in the fall.

 a.

 b.

**Site #12**

Look for several holes in this area.

1. What animal may have created these holes?
2. Do you see any evidence that supports your answer? Explain.
3. Use the Animal Track Field Guide to identify any tracks around this site. What animal has been in the area?
4. Explain what maybe occurring in this area (based on what you see and the tracks you have found). Use your observations to support your hypothesis.

**Site #13**

Locate the tree near the parking lot. The tree has numerous holes in trunk.

1. What may have caused the holes in the trees?
2. Do you see any wildlife nearby that may give you a hint?
3. Use the bird field guide to help you suggest a hypothesis. Make sure your hypothesis is reasonable and testable.
4. Suggest a series of procedures you could use to test your hypothesis.

**Site #14**

Next to Northern High School Gym.

 Please be careful walking to this site. You can walk along the road that connects NHS and NMS. There may be cars and/or buses traveling on the road between the middle school and high school. Look for the brown sign for Northern Garrett Wetland Project.

1. List the four benefits of wetlands (from the sign):

a.

b.

c.

d.

1. Choose one of the benefits of wetlands and describe how a wetland can accomplish that task.
2. Use the wetlands key attached to this handout to determine the type of wetland this is. List the type here:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
3. Choose one species that may benefit from this wetlands and describe how it can benefit.
4. Many wetland areas are protected (meaning they cannot be destroyed or used as building sites). Suggest at least two reason for their protection:

a.

b.

 **Site #15**

Inside Nature Hall “Home Base”

 Go inside the Nature Hall and locate the honeybees.

1. What do honeybees produce that is beneficial to other species?

There are a few relationships among species that you may observe today: mutualism, commensalism, parasitism, and predation. Mutualism is a relationship between two different species, where both benefit. Commensalism is a relationship where one species benefits and the other is not affected. Parasitism is a relationship where one species benefits and the other is harmed. Predation is where one organism eats and consumes another (prey).

1. Name one other species or type of organism that a honeybee interacts with.
2. Which type of relationship do honeybees have with this other species you just named?
3. Explain your answer.

**Site #16**

To get to this site, you will need to go downhill on Cove Run Trail (towards Cove Run stream and veer off of trail).

Once at the site, observe your surroundings. You will see several autotrophs.

**An autotroph is an organism that produces its own food.**

1. List at least 3 autotrophs and their locations. \*Hint: Check leaf litter to help you with identification.

a.

b.

c.

**A heterotroph is an organism that obtains energy by consuming another organism.**

List at least 3 heterotroph that might exist in this area.

a.

b.

c.

**Site #17**

 Along Cove Run Trail

Look for a large fallen tree.

1. Describe any evidence of decomposition? (**Decomposition** is the process where dead organisms are being broken down into their basic nutrients. The nutrients are then returned to the soil to be used again by plants).
2. Describe at least three areas that may serve as habitat for animals at this site.

a.

b.

c.

**Site #18**

Cove Run Stream

This site will be the area for water testing. An adult will be at this site to guide you through the testing. Your group will fill in either option A or B. The teacher at this site will tell you which option you are testing. Follow the directions for each chemical test and record your results below:

Option A Option B

Temperature\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Nitrate\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Turbidity\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Phosphate\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

pH \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. Choose any of the above test from Option A or B. Describe two events that could cause a decrease or increase in the readings you found.
2. Test:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
3. Event

1. Event
2. Test:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
3. Event
4. Event
5. Choose one of the above events you described and explain how this could affect the organisms that live in this area of the stream or downstream.

**Site #19**

The teacher at this location will give you materials for this site. You will be sampling the macroinvertebrate population in the stream.

1. Read the attached “Why Study the Stream—Bottom Macroinvertebrates?” Summarize the reasons for studying macroinvertebrates.
2. Read the attached handout: Sample Collection Procedures. What size area should you sample?
3. How many people are needed to collect macroinvertebrates?
4. How do you collect macroinvertebrates into your net or kick seine?
5. Explain how to remove the kick seine from the water.
6. Use the key and pictures to identify the organisms you collect. Fill out the Stream Study: Sample Record and Assessment that is attached to your packet.
7. What organism was most abundant in the site you tested?
8. Calculate the water quality rating based on your data and record it here.
9. Since collecting data from one site on one day out of the year does not give you a complete picture of the health of this stream, how can you get a more complete view of the health of this stream?
10. What else could be used to collect stream health information besides macroinvertebrates?

<http://wsrv.clas.virginia.edu/~sos-iwla/Stream-Study/Methods/Form.HTML>

http://www.dep.state/wv/us/Docs/1440 Macroinvertebrate%20indentification%20key.pdf

**Site # 20**

Amphitheater in the forest with wooden benches and platform

Sit QUIETLY on one of the benches for at least ONE MINUTE. Don’t move or talk, just observe the surroundings: sights and sounds.

1. Record your observation below.
2. What may have been responsible for the sounds you heard?
3. List at least three living organisms you observed. You may need to wait until you get back to the nature center to use a field guide or key to identify the species you saw.

a.

b.

c.

1. Describe the activities the species you observed were doing (eating, flying, etc.

ONCE YOU HAVE COMPLETED ALL 20 SITES, RETURN TO THE NATURE HALL AND WORK ON YOUR CONCLUSION QUESTIONS UNTIL ALL GROUPS HAVE FINISHED.

Conclusion Questions:

Complete throughout the day and/or after you have visited all 20 sites.

1. List all wildlife you observed today and their activities.
2. Describe any “unusual sights or sounds” you observed or heard today.
3. List the biotic factors and abiotic factors you observed or tested today. Recall that biotic refers to “living” and abiotic refers to “non-living.”

 Biotic Abiotic

1. Some species utilize a defense mechanism called **mimicry**, where the species **“mimic**” another species. For example, the Eastern Comma Butterfly has the coloration and shape of tattered leaves in the fall.
2. What is one benefit of mimicry?
3. List 2 other examples of mimicry.
4. Notice that almost all of the coordinates you used today began with N 39° 39.\_\_\_\_\_\_ and W 79° 18.\_\_\_\_\_\_. So, the degrees latitude and longitude were the same for every site and the minutes were the same for almost every site. Explain why only the second varied for every location.
5. Summarize what you learned today into at least three sentences.
6. Based on what you learned today, what area of biology would you like to learn more about?
7. What was your favorite part of today?
8. How could this field trip be improved? Please be specific and describe something that we can control. (We can’t change the weather).