

Program Name: Ecosystems: The World-wide Web of Life

Suggested Grade Level: 4th

Maximum Group Size Per Day: 60 students (plus chaperones)

Overview

The world is composed of many natural ecosystems in which plants and animals interact with one another and the nonliving environment. Each species has a niche or job within the ecosystem and each is dependent on the other members of its community for survival. Students will explore the natural communities found in Shenandoah National Park and make comparisons between natural and human communities. As human and environmental impacts are evaluated, stewardship behaviors that support a healthy world will be explored and practiced.

Learning Objectives

Following the park experience and classroom activities, the students will be able to

1. define food web and explain the transfer of energy in a sample food web;
2. determine an organism's niche in its community and describe the interdependent relationships among organisms and nonliving components;
3. identify at least three environmental and human influences that can impact a community and determine potential consequences;
4. explain how Shenandoah National Park protects natural communities and list three ways people can demonstrate care for ecosystems and the environment.

Virginia Science Standards of Learning:

Scientific and Engineering Processes

- 4.1 The student will demonstrate an understanding of scientific and engineering practices by
- a) asking questions and defining problems
 - b) planning and carrying out investigations
 - c) interpreting, analyzing, and evaluating data
 - d) constructing and critiquing conclusions and explanations
 - f) obtaining, evaluating, and communicating information

Living Systems and Processes

- 4.2 The student will investigate and understand that plants and animals have structures that distinguish them from one another and play vital roles in their ability to survive. Key ideas include
- a) the survival of plants and animals depends on photosynthesis;
 - b) plants and animals have different structures and processes for obtaining energy.
- 4.3 The student will investigate and understand that organisms, including humans, interact with one another and with the nonliving components in the ecosystem. Key ideas include

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- a) interrelationships exist in populations, communities, and ecosystems;
- b) food webs show the flow of energy within an ecosystem;
- c) changes in an organism's niche and habitat may occur at various stages in its life cycle;
- d) classification can be used to identify organisms.

Background Information

An *ecosystem* includes all the living organisms and the nonliving, *abiotic*, components of habitats. Ecosystems are often characterized by a dominant plant *community*, e.g., deciduous forest. All things in an ecosystem are interrelated and *interdependent*. Every animal either eats plants directly or depends on other species for food, which in turn depend upon plants. These relationships form *food chains* in which energy is transferred from one organism to another. Because most animals have multiple food sources, they are included in many possible food chains. Together, related food chains form complex *food webs*. The sun is the energy source that fuels all food webs.

In natural communities, each organism fills a *niche* or function. In general, organisms can be categorized as *producers*, *consumers*, or *decomposers*. Green plants are considered producers because they use *photosynthesis* to convert sunlight (energy) into food (sugars and starches). *Herbivores* are considered *primary consumers* because they eat plants directly, e.g., a rabbit. *Carnivores* are considered *secondary consumers* because they eat other animals, e.g., a hawk. *Omnivores* are consumers that eat both plants and other animals, e.g., black bear. Decomposers such as scavengers, bacteria, and fungi eat or break down dead materials to recycle nutrients back into the soil for use by plants. Decomposers are critical to complete the energy cycle in food webs within every community.

Because all organisms in a community are interdependent, if one species disappears it may have a far-reaching impact upon the other inhabitants. It may result in the loss of a food source, fewer materials for shelter, or lack of decomposition. Factors that may negatively influence communities include natural phenomena such as fire, flood, storms, and landslides and those caused by human behaviors such as pollution and habitat destruction. People can reduce or prevent damage to communities and ecosystems by practicing responsible environmental stewardship behavior.

Vocabulary

- **abiotic** – nonliving
- **carnivore** – an animal that consumes other animals (meat)
- **community** – all the populations of living organisms that live in the same place and interact with each other
- **consumer** – an animal that eats plants (primary consumer) or other animals (secondary consumer)
- **decomposer** – an organism that breaks down dead plants and animals to recycle nutrients back into the environment
- **ecosystem** – a combination of individual habitats where life needs are met

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- **food chain** – the series of organisms that depend on one another for food; the way energy is transferred from one organism to the next
- **food web** – several food chains that are interconnected
- **habitat** – a place where a plant or animal lives that has the basic needs of survival: food, water, shelter, and space in a suitable arrangement
- **herbivore** – an animal that eats only plants
- **interdependent** – dependent or relying upon each other, the interrelationships of organisms with one another and with the nonliving elements in its habitat
- **niche** – the unique function or role of a given species within a community
- **omnivore** – an animal which eats both plants and animals
- **organism** – any living plant or animal
- **photosynthesis** – the process green plants use to convert the sun’s energy to sugars and starches (food)
- **population** – all the organisms of the same species that live in the same habitat
- **producer** – an organism that produces its own food; green plants
- **species** – a population of plants or animals that are alike and breed naturally only among themselves

Pre-Visit Activities

Prior to beginning the Ecosystems unit study, have the students take the Ecosystems **Pre-Visit Assessment**. Record the scores on the **Pre-Visit/Post-Visit Score Sheet**. Begin the unit study and incorporate as many of the following pre-visit activities as possible into your lesson plan to prepare the students for their park field trip.

Materials for Pre-visit Activities

One orange, chilled sections of oranges (enough for the class), composition books (journals), “-vore” worksheet and list of *Shenandoah Plants and Animals* (attached), colored construction paper, string, “*Afternoon Hike in Shenandoah*” story cards (attached)

1. Motivational Activity

Take the class outside and stand in the sun. Have everyone stand in a circle with eyes closed. Tell them you are going to give each of them something special to hold. Have them hold out their hands, keeping their eyes closed. Distribute pre-cut, chilled sections of oranges. Ask the students if they can identify what they’re holding. Stand in the center of the circle and have them open their eyes. Show them a whole orange and explain that the orange represents the sun. Go around the circle and have each student tell something that people get from the sun. Invite them to eat their orange section and “feel” the energy they have received. Explain that the sun provides energy for green plants to make their own food. Discuss photosynthesis - the process by which green plants can make food (sugars) by using water, carbon dioxide, chlorophyll, and sunlight (the energy source). Have students brainstorm a list of animals (consumers) that use green plants (producers) as their food. Introduce the concept of food chains and explain how the sun’s energy is transferred from green plants to animals (including humans) so that they are able to live and survive.

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Have the students create an “Ecosystem Journal” to write about and illustrate their sun/orange experience. They can continue writing and illustrating this journal throughout this unit of study. Have them include 1) facts learned, 2) experiences gained, and 3) new behaviors planned.

2. Vocabulary Activity Suggestions

- a. Have each student develop an acrostic poem using one of the vocabulary words. Have them write the word vertically and then use each letter as the beginning of a related idea. These can be illustrated in fun and fanciful ways and posted.
- b. Charades Team activity. Divide into teams. Have a student choose and pantomime one of the vocabulary words or animals found in Shenandoah National Park. To earn a point, the opposite team must 1) guess the word, 2) spell it, 3) give the definition of the vocabulary word or niche of the animal.

3. Shenandoah Plant and “-vore” Research

Copy the attached “-vore” worksheet and list of *Shenandoah Plants and Animals*. Have each student choose at least one plant or animal from the list to research and fill in the worksheet. Note: Some “-vores” may have more than one niche. Have the students share their research results and/or post worksheets on a bulletin board.

4. “Who Am I?” Game

Have students mount their research worksheets (from #3 above) on colored construction paper: *producers* = green, *consumers* = red, and *decomposers* = black. Mix them up and randomly attach a worksheet to the back of each student so he/she can't see it. Divide the class into small groups. Have the students stand one at a time, in the center of their group and attempt to guess their identification. They may ask only “yes” or “no” questions to gather information on size, shape, food, community types, and “-vore” classification.

Next, have the students stand in the correct category of the following groupings: “NICHE” (producers, consumers, decomposers), “PLANTS & -VORES” (plants, herbivores, carnivores, omnivores); or “TYPES OF COMMUNITIES” (forest, meadow, stream). Ask, “Can plants and animals live in more than one kind of community? Can they be a member of different “-vore” or “niche” groups? Why or why not?”

5. Playground Communities

Divide the class into groups of 4–6 students each. Give each group a piece of string six feet in length, tied into a circle. Take the class out to the playground or schoolyard. Select several sites that differ in the type and variety of plant cover and have each group lay out their string circle “plot” onto the ground. On paper pre-divided into columns labeled “PRODUCERS”, “CONSUMERS”, and “DECOMPOSERS,” have students search for and list all of the insects, plants, seeds, and other evidence of living things they find within their circle (pictures can be drawn instead of words).

Return to the classroom and compare findings. Ask “Did you find all the “niches” of a complete community in your plot? What factors might have caused the areas to be

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different?” Have the students predict what might happen to the community if any of the “niches” were missing. Compare these communities with what we might find in Shenandoah National Park and brainstorm ways we might help preserve healthy communities.

6. Visiting a National Park- Leave No Trace

The mission of the National Park Service is to preserve and protect the natural and cultural resources of the nation for all people to enjoy. It is important for today’s park visitors to practice good stewardship ethics and behaviors in order to pass these unique natural and historical treasures on to future generations in an *unimpaired* condition.

We recommend following **Leave No Trace** (LNT) principles when going on a field trip. There are seven LNT principles:

- Plan Ahead and Prepare
- Travel (and Camp) on Durable Surfaces
- Dispose of Waste Properly
- Leave What You Find
- Minimize Campfire Impacts
- Respect Wildlife
- Be Considerate of Other Visitors

To prepare for your field trip to Shenandoah National Park, share with your students the mission of the National Park Service. Explain that they can help protect the beauty and natural resources of Shenandoah National Park by using good environmental stewardship practices.

- a. Introduce the *Leave No Trace* principle of “Dispose of Waste Properly.” To prepare students for their park visit, discuss the ethics and importance of respecting and preserving our resources. By respectfully disposing of waste properly, we can help preserve both the integrity of the national park’s resources and the experience visitors, including ourselves, might have.
- b. Have each student examine the items in his/her lunch, either from home or the school cafeteria. What could be done to reduce the amount of waste from all the lunches? Have the students think about which items can be recycled and which are non-recyclable. How many throwaway containers could be packaged in reusable containers instead?

Before the field trip, have the students research the number of people who visit the national park each day and how much trash all these visitors create. Have the students plan their field trip lunches to include as many recyclable and reusable items as possible. Explain that the goal is to produce the least amount of trash possible. What things can be reused and what things can be recycled? What containers should be used to carry the lunches? What will they do with the recyclable materials? What will they do with the non-recyclable materials? How

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will the students help the park by taking all the waste from their lunches back to the school?

- c. Copy a set of *An Afternoon Hike in Shenandoah Story Cards* (attached). Explain that the class is about to embark on a pretend journey in Shenandoah National Park. They should close their eyes and imagine each scene as it read.

Gather the class into a comfortable circle. Select a reader and a responder for Story Card #1. The reader should read the story card aloud then tap the responder and ask how he/she feels about the imagined scene. That student should respond to the question. Next, have the first reader pass the Story Card to the next reader/responder pair and have the new reader read Story Card #2. The second reader should tap the second responder and ask him/her to respond to the question at the end of the scene. Continue until all the scenes have been read and the story is complete. Along the way, the readers may be asked to offer advice about more appropriate behavior and ways to correct a situation. At the end, encourage a class discussion on the importance proper waste disposal.

7. **Final preparation and planning for the field trip to Shenandoah National Park.**

- Approximately 2 weeks before the field trip, the lead ranger for the program will contact the lead teacher to discuss the final details of the field trip.
- Share field trip details with all teachers going on the field trip.
- Review appropriate dress and behavior for the field trip and remind students they will still be in school while at the park.
 - ✓ Recommend dress: Long pants, closed toed shoes (No sandals or flip-flops) and extra layers – it is often 10+ degrees cooler on the mountain than at school.
 - ✓ Have students write letters to their parents informing them about the time and date, appropriate dress, personal needs, and behaviors expected for the field trip.
- Recruit enough competent chaperones to assist on the field trip. The park requires 1 adult (including teachers) for every 10 students.
- Arrange for transportation and know the travel route to the program location in the park.
- Plan for lunch. School groups are welcome to picnic in the park after the program. Picnic areas offer picnic tables and restrooms, but there are no shelters for inclement weather.
- Contact your lead ranger if you have any last minute questions or changes in your planning.

Shenandoah National Park Field Trip

The in-park program will generally take a minimum of 2 hours. Plan for adequate travel time from your school to meet the ranger(s) at the scheduled time and location in the park. For an effective learning experience, please remember the following:

- Before arriving at the park, divide the students into groups of 15 or fewer and assign chaperones to each group.
- Provide nametags for all participants, including adults.
- Upon arrival, meet the ranger(s) and coordinate a bathroom and snack break prior to the in-park program.
- Let the ranger(s) know how much time you have in the park and your travel schedule requirements for returning to school.
- Present a short, 5-minute introduction at the program site in the park to bridge what you have done in the classroom with the park experience.
- Separate the students into the pre-determined groups with assigned chaperones.
- The ranger(s) will lead the student groups on an outdoor field investigation focusing on a challenge (essential) question using exploration, observation, and critical thinking skills to evaluate data and make conclusions. Assist the ranger(s) as needed while on the program.

Post-Visit Activities

Following your field trip to Shenandoah National Park, use as many of the following post-visit activities as possible to conclude the unit of study. Give the students the Ecosystems **Post-Visit Assessment**. Record the scores on the **Pre-Visit/Post-Visit Score Sheet**. Complete the **Program Evaluation Form**. Return the program evaluation and the pre/post-visit score sheet to:

Shenandoah National Park
3655 US Hwy 211 East
Luray, VA 22835
Attention: Education Office

Materials for Post-visit Activities

Journals, “-vore” worksheet and list of *Shenandoah Plants and Animals*, colored stickers or sashes, bucket of popcorn, plastic sandwich bags, bulletin board materials

1. Food Chains to Food Webs

Have students recall some plants and animals that live in Shenandoah National Park. Use the “-Vore” worksheets and list of *Shenandoah Plants and Animals* from the pre-visit activities. Divide the class into groups of 5-6 students each. Have each group create a food chain using Shenandoah plants and animals. Have each group identify the energy source, and the producers, consumers, and decomposers in their chain. Next, as a class, compare the different food chains and combine them to form a more complex food web that might be found in the park. Create a large bulletin board display that illustrates how the food web works to transfer the sun’s energy from one organism to the next.

2. **Popcorn Food Chain – Flow of Energy**

Select students to represent the following using visible colored stickers or sashes:

sun (1) = yellow

producers – green plants (10 or more) = green

consumers – (5) = brown

decomposers (2) = black

Give “the sun” a large bucket of popcorn representing energy and give each producer a plastic sandwich baggie. Allow each producer to gather one or two handfuls of popcorn (energy) from the sun and place in the baggies. Ask “What do the producers do with the energy?” Explain that the producers use up some energy to live and grow. Have each producer eat some, **but not all**, of the popcorn in his/her baggie. Next, have each of the consumers take the popcorn baggies from one or two different producers. They may eat some, **but not all**, of the popcorn to meet their own life needs. Finally, have the decomposers take the popcorn baggies from the consumers and some of the producers. They also get to eat some - but not all - of the popcorn.

Discuss the following questions: Who got energy directly from the sun? Did the producers (plants) pass on all the energy from the sun to the consumers? What happens to the amount of energy needed at each step in the food chain? (It takes more food energy to support the next highest level.) Could this energy flow work without the producers? Where does the energy from the decomposers go? (Recycled back to the environment.) What would happen to this food web/energy flow if one level were eliminated? Have students brainstorm either human caused or natural forces that might impact the 1) producers, 2) consumers, 3) decomposers, or 4) sun’s energy and interfere with the energy cycle. What would the consequences be of such interference? What are some ways people can help protect and maintain nature’s energy cycle?

3. **What’s for Dinner?** (from *Project Wild*)

Have each student describe his/her favorite meal and list all the food items and/or ingredients. **Option:** Use the students’ lunches for the model. Challenge the students to trace each item or ingredient back to a plant, in essence, creating food chains in reverse. For example: milk > cow > grass. Conclude by asking, “Did you find any food item that could not be traced back to a plant? How important are plants to food chains for people? What would happen to the food supply for people and animals if drought, disease, or habitat loss reduced the amount of available plants? Who is responsible for caring for healthy habitats to allow plants to grow?”

4. **Litter Consequences – Taking Action**

Have students research the consequences of trash and litter in natural communities. Examples may include plastic 6-pack rings create a “noose” for animals crawling or swimming through them; fishing lines entangle birds so that they cannot hunt or find refuge; plastic bags become lethal “food” for sea animals that think they are edible jelly fish; plastic or glass bottles become “traps” for little animals that cannot escape

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the slippery, curved surfaces. Discuss the impacts to food chains and food webs and what should be done to reduce or eliminate litter. Students could draw pictures and write stories. Compile results in a class book to be placed in the school library and shared.

Organize a “Clean School Community” campaign. Designate students each day to be on the “Litter Patrol.” They may wear badges and plastic gloves while they work to check the playground, cafeteria, hallways, and bathrooms. Use posters, slogans, and identified trash bins to promote the program throughout the school. Collected litter can be used to create a class collage or mural or create “Litter People.” On large paper, have students trace each other’s outlines, cut them out, and decorate them with litter found around the school. Line the hallway with these “Litter People” along with student-made slogans to “Reduce, Reuse, and Recycle.”

5. Portfolio Activity

Use the attached **Ecosystems Portfolio Page** for an end-of-the-unit portfolio activity. You may use this as a unit final evaluation, confirmation of student learning, or portfolio page. Below is a suggested rubric. Provide each student with a copy of the worksheet and encourage creative writing and thoughtful input.

| <u>NUMBER</u> | | <u>Points possible</u> | <u>Student totals</u> |
|------------------------------------|--|------------------------|-----------------------|
| #1 – 2 (20 points each) | Facts And Knowledge - with explanations | 40 | |
| #3 – 4 (20 points each) | Expression of Behaviors | 40 | |
| #5 (20 points) | Environmental writing | 20 | |
| | Total points | 100 | |

Unit Assessment

1. Observe and document student interaction, discussion, behavioral changes, skits, and written work.
2. Evaluate dioramas, posters, and research based on effort and correct number of pre-determined and posted criteria.
3. Administer the Ecosystems unit pre-visit/post-visit assessment and document student scores.
4. Utilize the portfolio activity rubric to evaluate learning.

Going Further

1. Organize a recycling program. Research the amount of waste that is filling our landfills and brainstorm solutions. Have the students begin a recycling program for the classroom. Track the amount of various recyclables –aluminum, plastic and paper, by weight or numbers. Graph results. If possible, expand to a school-wide program. Incorporate parents and the school custodial staff to support the program. When sizeable amounts have been gathered, deliver the recycled materials to a recycling center. If the center pays for the materials, use the funds earned for an environmental project, e.g., to “adopt” an animal that needs help (whale, manatee, or locally rescued wildlife), purchase and plant a tree for the school, or create a schoolyard natural area.
2. Create a Schoolyard Habitat or Outdoor Classroom for the school. Obtain permission from your school administration to develop a natural area on the school grounds to be used as an outdoor classroom. Once a site is selected, have the students conduct research to select appropriate native plants that will be needed to attract birds, butterflies, and other animals. Use grants and proceeds from a recycling program, newspaper drives, and donations to purchase plants and landscape materials. Remember to plan for care and maintenance of the outdoor classroom once it is established.

References and additional activities:

2018 Science Standards of Learning Curriculum Framework, Virginia Department of Education, 2019

http://www.pen.k12.va.us/testing/sol/standards_docs/science/index.shtml

Good Character, Good Stewards, Caring for the World Around Us, Shenandoah National Park, 2005.

<https://www.nps.gov/teachers/classrooms/good-character-good-stewards.htm>

Project Wild. U.S.A.: Council for Environmental Education.

<https://www.fishwildlife.org/projectwild>

What's for Dinner? 2000 Edition, pp. 96-97.

Improving Wildlife Habitat in the Community, 2000 Edition, pp. 447-449.

**Pre-Visit Activity #3
“-Vore” Worksheet**

Name _____

Plant or Animal _____

| <p><u>Food</u></p> <p>(what is my prey or how do I get food?)</p> | <p><u>“-Vore” Animal Info</u></p> <p>I am.... (a herbivore, carnivore, or an omnivore)</p> | <p><u>My NICHE in the community is.....</u></p> <p>I am.... (a producer, consumer, or decomposer)</p> | <p><u>What Eats Me?</u></p> <p>(list my predators)</p> | <p><u>What I Look Like...</u></p> |
|--|---|--|---|--|
| | | | | |
| <p>Interesting facts:</p> | | | | |

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Shenandoah Plants and Animals

| | | | |
|-------------------------|-----------------------|----------------------|----------------------|
| Bluets | Wolf Spider | American Toad | Red-tailed Hawk |
| Large-flowered Trillium | Centipede | Box Turtle | Peregrine Falcon |
| Common Milkweed | Millipede | Ringneck Snake | Turkey Vulture |
| Bull Thistle | Termites | Eastern Garter Snake | Meadow Vole |
| Hay-scented Fern | Carpenter Ants | Black Rat Snake | Deer Mouse |
| Poison-ivy | Bumblebee | Northern Copperhead | Shorttail Shrew |
| Huckleberry | Gnats | Timber Rattlesnake | Eastern Mole |
| Marsh Marigolds | Springtails | Wood Thrush | Eastern Chipmunk |
| Star Chickweed | Spittle Bug | Indigo Bunting | Big Brown Bat |
| Cinquefoil | Grasshopper | Rufous-sided Towhee | Gray Squirrel |
| Violets | Dung Beetle | Eastern Bluebird | Eastern Cottontail |
| Wild Geranium | Lady Beetles | Downy Woodpecker | Woodchuck |
| Columbine | Aphids | American Goldfinch | Gray Fox |
| Golden Ragwort | Walking Stick | Tufted Titmouse | Striped Skunk |
| Wild Strawberries | Praying Mantis | American Kestrel | Raccoon |
| Moss | Caddisfly | Scarlet Tanager | Opossum |
| Deerberry | Stonefly | Slate-colored Junco | Whitetail Deer |
| Virginia Pine | Dragonfly | Eastern Phoebe | Bobcat |
| White Pine | Tiger Moth | Blue Jay | Black Bear |
| Black Locust | Monarch Butterfly | Robin | Brook Trout |
| White Oak | Tiger Swallowtail | Cardinal | Blacknose Dace |
| Eastern Hemlock | Red-backed Salamander | Raven | Lichen |
| Red Maple | Shenandoah Salamander | Crow | Morel Mushroom |
| Mountain Laurel | Red-spotted Newt | Wild Turkey | Turkey Tail Fungus |
| Flowering Dogwood | Wood Frog | Barred Owl | Sulphur Shelf Fungus |
| Gray Birch | Spring Peeper | Screech Owl | Earthworms |



Pre-Visit Activity #6: An Afternoon Hike in Shenandoah Story Cards

(1)

It's a beautiful day and you're ready for a great hike with your family and two of your good friends. At the trailhead you load up your backpack and the new pair of binoculars you bought for the occasion. You take one last look around and start up the trail. You are in the lead. The trail quickly enters a coniferous forest. The air is cool and moist. The scent of spruce and fir is refreshing. You stop and take it all in.

Tap another person and see how he or she feels.

(2)

You continue down the peaceful, quiet, and beautiful trail in Shenandoah National Park. Sounds of a rushing creek can be heard to your left. There's a trail that leads to the creek, so you take it. Something catches your eye. You look in that direction and spot three empty soda cans under a tree.

Tap another person and see how he or she feels. What would you, the reader, do?

(3)

You pick up the cans, crush them, and put them in your pack. When you get back, you will put them into a recycling container. You head back towards the main trail and continue on your way to the river near which you plan to camp. Before you is a large meadow full of wildflowers. As you continue, you feel the warmth of the sunshine. A small trickle of sweat rolls down the side of your face. The trail seems to be a ribbon winding through a sea of color. You stop for a moment among the flowers, take a deep breath and enjoy the sweet odor while listening to the buzz of bees moving from flower to flower.

Tap a person and ask how he/she feels.

(4)

As much as you would like to pick a few of the flowers and take them with you to camp, you know they belong in the meadow. You continue hiking along the trail. After about an hour, your backpack is feeling a bit heavy. You decide that you don't really need that huge red apple that you brought along for your lunch, so you toss it under a bush.

Tap a person and ask how he/she feels. What would you, the reader, do?

(5)

You decided to eat your apple instead of throwing it away, and you saunter along the trail listening to the song of birds and soft rustling of leaves. The apple is delicious, juicy and sweet. Soon it's all gone but the core. Surely this won't hurt the forest. It will decompose over time. The animals may actually enjoy nibbling on the rest. You toss your apple core deep into the woods.

Tap a person and ask how he/she feels. What would you, the reader, do?

(6)

Mom and Dad remind you that the animals shouldn't eat people food – it might make them sick – and that the seeds might start an apple tree where it doesn't belong. Non-native plants in the national parks are a problem. They crowd out native plants and alter the environment! You apologize, and carefully retrieve your apple core. Mom offers a litterbag until you can use a garbage can to dispose of the core correctly.

Tap a person and ask how he/she feels.

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(7)

Everyone says that you've made them hungry with your apple, and they're ready to eat! You decide to find a sunny spot alongside the bubbling mountain stream where you spread out your blanket. Nature calls, and you and your friends head off to the woods a short ways away to find a tree and take care of "urgent business." You find a private area behind a tree, but there is a mound of used toilet paper lying on the ground.

Tap a person and ask how he/she feels.

(8)

You remind your friends that they must either bury their toilet paper or put it in a plastic bag to carry out with the other litter. One of your friends suggests that you all go about 200 feet away from the stream to find a tree. You do - relief! When you get back to the picnic spot, you wash your hands and spread out your feast. Wow, you're famished! You lay back on the blanket, just soaking in the good feeling of the day. A shiny fish jumps above the stream and you lazily watch a butterfly gathering nectar on a lush purple flower nearby.

Tap a person and ask how he/she feels. How do you, the reader, feel?

(9)

Just as you start to take a bite, you notice a circle of white objects lying around. You crawl over, and there, alongside your blanket, you see several cigarette butts laying in the dirt. Ugh! Those are dirty and smoking could have caused a forest fire.

Tap a person and ask how he/she feels. What would you, the reader, do?

(10)

Using a plastic bag as protection for your hands, you pick up the cigarette butts. It's really nice to leave the park even better than you found it, and you can throw them in the garbage container when you get back. With a good feeling, you finish your lunch. Yummy! Mom fixed fried chicken! Full and content, you and your two friends decide to cool off in the water. You're very careful not to fall on the slippery rocks. You're respectful of the tiny animals that might be living there. Your journal is calling so you write a little about the day. Time to go!

Tap a person and ask how he/she feels.

(11)

Everyone in your group picks up their own garbage and loads their packs. You take a big chug of water, and start down the trail back towards the meadow and the parking lot. It feels good to be hiking again, and you stop to look around. Silhouetted in the distance and almost hidden in the trees, a deer munches on some grass.

Tap a person and ask how he/she feels. How do you, the reader, feel?

(12)

There's the car and, nearby, containers for garbage and recycling. You take a deep, satisfied breath. You're glad you came, and glad that you know how to "Dispose of Waste Properly!"

Tap a person and ask how he/she feels. How do you, the reader, feel?

(13)

Class discussion.

Name some other things you could do to dispose of trash properly in the park.

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Post-Visit Activity #5
Ecosystems Portfolio Page

Name _____ Date _____

School _____ Teacher _____

#1 – 2 Facts and Knowledge:

Identify 2 new facts you learned in this unit of study and tell why you think each is important.

| |
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| 1) |
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#3 – 4 Behaviors:

List 2 behaviors you learned in this unit that can help protect our national parks and/or preserve the natural resources of our world.

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#5 Environmental Writing:

Write a paragraph, creative story, poem, essay, rap, song, etc. about these stewardship behaviors. You might tell how using them will change your life and your future world.

If you have time, create a picture to go along with your writing.

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Ecosystems Pre-Visit/Post-Visit Assessment

Name _____ Date _____

Instructions: Read each question carefully and choose the one best answer. Circle the letter of your choice.

1. Green _____ are the **producers** in a community and can make their own food.
 - a. animals
 - b. plants
 - c. insects
 - d. amphibians

2. The role a plant or animal has in a natural community is called its _____.
 - a. ecology
 - b. space
 - c. niche
 - d. energy

3. Why are **decomposers** important in any ecosystem?
 - a. They produce food for the animals.
 - b. They keep pollution from entering the air.
 - c. They break down dead materials and return nutrients to the soil.
 - d. They provide water for the water cycle.

4. A necessary ingredient for the survival of plants and animals is something transferred through every food chain. It begins with the sun. It is called _____.
 - a. energy
 - b. water
 - c. space
 - d. motion

5. In the relationship between a fox and a rabbit, the fox is a _____.
 - a. herbivore
 - b. carnivore
 - c. niche
 - d. producer

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6. Plants and animals depend on each other to survive. This means they are _____.
- interdependent
 - fierce
 - changing
 - unconnected

Use this sample food chain found in a forest community of Shenandoah National Park to answer #7 and #8:

sun > clover > rabbit > fox > worms

7. What is the **niche** of the clover in this food chain?
- Producer
 - Herbivore
 - Decomposer
 - Consumer
8. If all the rabbits in the food chain were hunted out of this community, what might not survive?
- Clover
 - Fox
 - Worms
 - Sun
9. Human behaviors that can harm an ecosystem include _____.
- polluting water sources
 - littering
 - destroy a habitat
 - all of these can cause harm
10. National parks help protect and preserve natural communities by _____.
- educating visitors
 - cutting down trees
 - feeding animals
 - planting non-native plants

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Ecosystems Pre-Visit/Post-Visit Assessment Answer Key

1. Green _____ are the **producers** in a community and can make their own food.
b. **plants**
2. The role a plant or animal has in a natural community is called its _____.
c. **niche**
3. Why are **decomposers** important in any ecosystem?
c. **They break down dead materials and return nutrients to the soil.**
4. A necessary ingredient for the survival of plants and animals is something transferred through every food chain. It begins with the sun. It is called _____.
a. **energy**
5. In the relationship between a fox and a rabbit, the fox is a _____.
b. **carnivore**
6. Plants and animals depend on each other to survive. This means they are _____.
a. **interdependent**
7. What is the **niche** of the clover in this food chain?
a. **Producer**
8. If all the rabbits in the food chain were hunted out of this community, what might not survive?
b. **Fox**
9. Human behaviors that can harm an ecosystem include _____.
d. **all of these can cause harm**
10. National parks help protect and preserve natural communities by _____.
a. **educating visitors**