

Program Title: Adaptations for Survival

Suggested Grade Level: 3rd

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

Overview

Living things use adaptations to respond to life needs for survival. These adaptations may be behavioral or physical in nature. Students will investigate adaptations of plants and animals living in Shenandoah National Park using observation, cooperation, discovery, and participation skills. As human and environmental impacts are evaluated, stewardship behaviors that support a healthy environment will be explored and practiced.

Objectives

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

1. define physical and behavioral adaptations and list two examples of each;
2. describe how animals (and plants) use adaptations, instincts, and learned behaviors to get food, find shelter, and provide protection;
3. explain how natural and human influences on a habitat can impact an organism's ability to use adaptations to survive;
4. determine how Shenandoah National Park protects cultural and natural resources and tell how people can contribute to the health of the environment.

Virginia Science Standards of Learning Addressed:

Strand: Life Processes

- 3.4 The student will investigate and understand that behavioral and physical adaptations allow animals to respond to life needs. Key concepts include
- a) methods of gathering and storing food, finding shelter, defending themselves, and rearing young; and
 - b) hibernation, migration, camouflage, mimicry, instinct, and learned behavior.

Strand: Resources

- 3.10 The student will investigate and understand that natural events and human influences can affect the survival of species. Key concepts include
- a) the interdependency of plants and animals;
 - b) the effects of human activity on the quality of air, water, and habitat;
 - c) the effects of fire, flood, disease, and erosion on organisms; and
 - d) conservation and resource renewal.

Background Information

An *adaptation* is a characteristic that makes a plant or animal more suited to its environment, thus improving its chance for survival. Most living things have a variety of adaptations. These are classified as either behavioral or physical adaptations.

Behavioral adaptations include what an animal does and how it behaves in order to survive in a specific environment. Examples of behavioral adaptations include migration, hibernation, gathering and storing food, defense behaviors, and rearing young.

Instinctive behavior is an unlearned, inborn tendency to behave in a way characteristic of a species, i.e. migration. *Learned behavior* is gained through observation, experience, or instruction, i.e. stalking prey. *Physical adaptations* are the body structures or forms that a plant or animal has that help it survive in a specific environment. These include body coverings, colors and patterns for mimicry or camouflage, and specific physical characteristics of body parts.

All forms of life are dependent upon nonliving components of the environment. These *abiotic* factors include water, oxygen, nutrients, space, and sunlight. The living and nonliving components of an *ecosystem* interact and are *interdependent*. Human practices and natural occurrences can influence both living and non-living components of an ecosystem. Pollution, litter, waste, as well as fires, floods, and erosion can drastically alter an ecosystem. Such changes can impact the ability of organisms to use their adaptations and threaten their survival. If any one component is damaged or lost, it can have far-reaching effects on the other living things in that web of life.

Conservation practices and resource protection are important for the well-being of the environment. People can have a positive influence on ecosystems by learning and practicing responsible environmental stewardship behaviors.

Visiting a National Park

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

Following these principles and park rules will help make your park visit a safe, successful learning experience while also caring for park resources.

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Vocabulary

- **abiotic** - nonliving
- **adaptation** – a characteristic of form or behavior that helps an organism survive
- **behavioral adaptation** – an animal's actions or things it does which helps it survive in a specific environment, including both learned and instinctive behaviors
- **camouflage** – coloration or patterns that allow animals to blend into their surroundings
- **conservation** – careful use and preservation of our natural resources
- **hibernation** – the act of passing the winter in a state of dormancy or sleep
- **instinct** – inborn tendency to behave in a way characteristic of a species; natural, unlearned, predictable response to stimuli
- **interdependence** – dependent or relying upon each other, the interrelationships of organisms with one another and with the various elements of their environment
- **learned behavior** – behaviors that are taught in order for the animals to survive
- **migration** – the act of moving from one place to another
- **mimicry** – imitation in color, form, or behavior, of one organism to another or to some object in its environment
- **physical adaptation** – a body or structural part that helps a plant or animal survive in a specific environment

Materials

Keepers of the Animals book, file cards, mural paper, paints, clay, shoe boxes, craft supplies, rope artifacts, real or silk flowers

Pre-Visit Activities

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

1. **Motivational Activity**

Read stories from *Keepers of the Animals*, such as “How the Fawn Got His Spots” or “Why Possum Has a Naked Tail.” Discuss. Analyze and demonstrate the value of human adaptations, such as feet, eyes, opposable thumbs, and brain.

2. **Vocabulary Activity Suggestions**

- a. Copy the vocabulary words and their definitions. Have each student choose three words from the list to incorporate into a creative writing story. Have them underline the vocabulary words, illustrate, and share the story. **Option:** Model the stories after one of the stories in *Keepers of the Animals*.
- b. Select one student to lead a word game with the rest of the class. Have the leader choose a vocabulary word. Mark a blank line for each letter of the word on the chalkboard. The rest of the class tries to guess the missing letters to discover the word. As students make guesses, place correct letters on the appropriate blank lines. Write incorrect letters in a separate column to show which letters

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have been guessed. For each incorrect guess, the leader is awarded a letter from ADAPT. The leader “survives” if he/she spells ADAPT before the rest of the class correctly spells and defines the vocabulary word. Repeat with other players as time allows.

3. **Schoolyard Adaptation Scavenger Hunt**

Discuss with your students different types of plant and animal adaptations. Copy the attached **Schoolyard Scavenger Hunt** worksheet and distribute. Give students adequate time and perimeters for searching in the schoolyard. This activity may be done as a large or small group activity. When completed, discuss. Brainstorm a list of different plants and animals they might see in Shenandoah National Park. Discuss and compare.

4. **“Can You Find Me” Bulletin Board**

Have students investigate survival adaptations of various animals that reside in Shenandoah National Park. Create a class mural using paints, collage materials, 3-d paper sculpture, magic markers, and/or cut-out magazine pictures. Animals may be hiding under peek-a-boo flaps or pullout tabs to represent hibernation. Some may be camouflaged creatively within their habitats. Others may be using mimicry, instinct, migration, or learned behaviors to survive.

Once the mural has been completed and displayed, follow up with a discussion about possible negative impacts on the animal’s habitats. What are the consequences of litter, pollution, habitat loss, droughts, or wildfire. What new adaptations would the animals need to survive? What human behaviors would help the environment? Discuss: “What can you do to protect habitats where you live? How do national parks help?”

5. **Leave No Trace Principle: “Leave What You Find” Suggested Activities**

To prepare for your field trip to Shenandoah National Park, share with your students the mission of the National Park Service. Explain that the mission is to protect and preserve the natural and cultural treasures of the nation for present and future visitors to enjoy. Lead them to understand that they can help protect the beauty and natural resources of Shenandoah National Park by using good environmental stewardship practices! Make sure they understand that they should not pick, destroy, or remove resources from the national park and that they should leave only footsteps and take only memories.

- a. Introduce the *Leave No Trace* principle of “Leave What You Find.” To prepare students for their park visit, discuss the ethics and importance of preserving natural resources as well as artifacts of the past. Park visitors should observe, but not remove or damage, cultural or historic structures and artifacts. Plants, rocks, and other natural objects should be left intact and where found. Discuss the interdependence of all things in nature and what the effects of removing something would have on the environment and on future park visitors.

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- b. Lay a rope “trail” on the classroom floor. Place several special or interesting objects alongside the rope. This could include imitation plants or animals, rocks, pinecones, and other natural objects. Have students walk along the “trail” and discuss the magic of what they see and feel. Next, remove some of the objects. Have the students walk the trail again, and discuss the different experience they felt. Discuss the idea that when we leave rocks, shells, plants, antlers, feathers, fossils, and other objects of interest as we find them, we pass the gift of discovery on to those who follow. By leaving what you find, we can help preserve both the integrity of the national park’s resources and the experience that other visitors might have.
 - c. Have students carry a journal with them on a walk in a natural area. Ask them to draw interesting objects they find and later write about their favorites. Have them brainstorm techniques of taking memories without destroying the resource (drawings, photos, stories).
 - d. Place two flowering plants in the classroom. Have students break off the stem of one plant, leaving it displayed to shrivel and die. Have students observe the visual effects of “picking” a living organism. Discuss consequences of loss of plants in nature; e.g., disappearance of a food source for many animals, loss of beauty for visitors, destruction of eggs or larvae, elimination of seeds for reproduction.
6. Begin final preparation and planning for the class field trip to Shenandoah National Park. 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.

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:

- Bring enough competent chaperones to assist on the field trip. The park requires 1 adult for every 10 students.
- Review appropriate dress and behavior for the field trip and remind students they will still be in school while at the park.
- Before arriving at the park, have the students divided into groups of 15 or fewer and assign chaperones to groups. Provide nametags for all participants, including adults.
- Provide a snack break prior to the in-park program.
- Be prepared to present a short, 5-minute introduction at the program site in the park to bridge the classroom lessons with the park experience. Assist rangers as needed.
- 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.

Post-Visit Activities

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

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

1. Adaptation Pictionary

Have the students brainstorm a list of plant and animal adaptations observed on their field trip to Shenandoah National Park, e.g., the white tail of a deer helps it to communicate danger. On file cards, have each student write a plant or animal and a behavioral or physical adaptation it uses to survive. Collect all the cards to create a class deck of "Adaptation Cards."

Divide the class into two teams. Have one person pick an "Adaptation Card" from the deck and draw the plant or animal adaptation on the blackboard. Set a time limit for each team to correctly guess the answers. When a team has correctly identified the animal or plant and its adaptation (and can describe one reasonable way the adaptation helps it survive), their team gets a point. Alternate teams. Continue until time is up, one team reaches a designated number of points, or everyone has had a turn.

2. Creative Critter Diorama

Discuss how negative impacts can threaten habitats. If pollution, pesticides, global warming, climate change, fire, flood, litter, or depletion of resources changes a habitat, how could plants or animals survive? Have students make a diorama representing a scenario with a harmful human or natural impact. Have them create a "critter" with imaginative adaptations that would help it survive.

Encourage class discussion and journal writing about human responsibility for the environment. How can people take better care of habitats and the environment? How does having national parks show care for the environment? Conclude with a positive message, realizing that caring citizens can make a positive difference in our world!

3. Portfolio Activity

Use the attached **Adaptations for Survival 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. If

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possible, send copies of the completed worksheets, artwork, and writing to the Shenandoah National Park Education Office.

<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, behavior changes, skits, and written work.
2. Evaluate dioramas, posters, creative writing, reports, and journals based on effort and correct number of pre-determined and posted criteria.
3. Administer the Adaptation unit pre-visit/post-visit assessments and document student scores.
4. Utilize the portfolio activity rubric to evaluate learning.

Going Further

Create An Animal

Study adaptations of various animals and have students determine how these contribute to survival, e.g., webbed feet, pointed beaks, long legs, thick fur, hibernation, multiple stomachs. Tell students that they should each design an animal well adapted for a moon or outer-space environment. Have them first determine and list:

- Where will the animal live?
- What will it eat?
- Where will it get water?
- How will it breathe?
- How does it move?
- What type of body covering will it have?
- What is the name of the animal?

Have students list the adaptations the animal will need to survive and draw a picture to illustrate the animal. **Option:** Have students create their animals from paper sculpture, plaster, or clay. Light-weight models might be displayed in the room as mobiles. Table displays showing imagined moon or outer-space environments could be created to display heavier clay or plaster models.

References and additional activities:

Science Enhanced Scope and Sequence – Grade 3, Investigating Animal Adaptations, Virginia Department of Education, 2005. pp. 66-88.

<http://www.pen.k12.va.us/VDOE/EnhancedSandS/science.shtml>

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

<http://www.nps.gov/shen/forteachers/stewardship.htm>

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

<http://www.projectwild.org>

Adaptation Artistry, 2000 Edition, pp.131-132.

Seeing is Believing!, 2000 Edition, pp.114-115.

Keepers of the Animals, Caduto, Michael J. and Bruchac, Joseph. Fulcrum Publishing, Golden, Colorado, 1991.

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**Pre-Visit Activity
Schoolyard Scavenger Hunt**

ADAPTATIONS	PLANT OR ANIMAL
I have a heavy coat that will protect me when the weather outside gets very cold.	
I need clean water.	
I communicate with my species by song.	
I chew on nuts with my strong teeth.	
I can help protect the plants and animals of our world.	
Thorns help to keep animals from chewing on me or stepping on my stems.	
My petals smell sweet to attract pollinating insects.	
Don't touch me. I give a rash to most people who handle me.	
I curl up in a little ball when I feel threatened.	
I can make my own food.	
I need clean air.	
Thick bark protects my insides from damage caused by insects and other animals. It also helps keep me from drying out.	
I have many legs that help me run away from danger.	
Animals like to eat my fruit. They spread my seeds in their droppings.	
My leaves fall off every year when winter comes. I become dormant.	
I have cones to protect the seeds that I produce.	
I can grow just about anywhere. I am a green plant, so I can make my own food.	
I migrate to warm places in winter.	
I use camouflage to protect myself.	
My flat, broad green leaves allow me to make lots of food for myself.	
I eat dead material.	
My color and smell warn others to stay away.	
Roots help to hold me up.	
A flood would hurt me.	
I store food for the winter.	
My instinct to hide from predators helps me survive.	
My parents taught me some ways to survive.	
I can help protect our resources by being recycled.	
I have a hard coat that protects me.	

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Adaptations for Survival 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. The Viceroy butterfly has similar wing patterns and coloration as the Monarch butterfly. This is an example of _____.
 - a. camouflage
 - b. learned behavior
 - c. mimicry
 - d. migration

2. A dark-colored salamander hiding near a dark rock is using its color as _____ to blend in with its surroundings for protection from predators.
 - a. instinct
 - b. transportation
 - c. hibernation
 - d. camouflage

3. A spider's eight legs help it to cling to its web. Legs are an example of a _____.
 - a. physical adaptation
 - b. community
 - c. habitat
 - d. behavioral adaptation

4. Monarch butterflies use _____ to migrate to a place they've never been to before.
 - a. camouflage
 - b. learned behavior
 - c. instinct
 - d. map

5. Which of these is a *learned behavior* that may be harmful for a black bear to do?
 - a. Stand on two legs
 - b. Break into cars for food
 - c. Grow sharp teeth
 - d. Run away when frightened

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6. What *behavioral adaptation* would help a deer survive a forest fire?
 - a. Running away
 - b. Antlers
 - c. A white tail
 - d. Spots

7. How do frogs and salamanders survive the cold winters?
 - a. They migrate.
 - b. They stay in the streams.
 - c. They hibernate.
 - d. They keep moving to stay warm.

8. Sharp teeth are a *physical adaptation* that helps an animal to _____.
 - a. find shelter
 - b. catch prey for food
 - c. defend itself from predators
 - d. both b and c

9. If an animal's habitat changes, it may not be able to use its adaptations to survive. Which of these things can change a habitat?
 - a. floods
 - b. trash and pollution
 - c. drought
 - d. all of these can change a habitat greatly

10. Which is an example of *learned behavior* that people might do to help Shenandoah National Park and the environment?
 - a. Pour used oil onto the ground so it will return to the earth.
 - b. Recycle trash.
 - c. Burn your garbage.
 - d. Let the water run while you brush your teeth.

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Adaptations for Survival Pre-Visit/Post-Visit Assessment Answer Key

1. The Viceroy butterfly has similar wing patterns and coloration as the Monarch butterfly. This is an example of _____.
c. **mimicry**
2. A dark-colored salamander hiding near a dark rock is using its color as _____ to blend in with its surroundings for protection from predators.
d. **camouflage**
3. A spider's legs help it to cling to its web. Legs are an example of a _____.
a. **physical adaptation**
4. Monarch butterflies use _____ to migrate to a place they've never been to before.
c. **instinct**
5. Which of these is a *learned behavior* that may be harmful for a black bear to do?
b. **Break into cars for food**
6. What *behavioral adaptation* would help a deer survive a forest fire?
a. **Running away**
7. How do frogs and salamanders survive the cold winters?
c. **They hibernate.**
8. Sharp teeth are a *physical adaptation* that helps an animal to _____.
d. **both b and c**
9. If an animal's habitat changes, it may not be able to use its adaptations to survive. Which of these things can change a habitat?
d. **all of these can change a habitat greatly**
10. Which is an example of *learned behavior* that people might do to help Shenandoah National Park and the environment?
b. **Recycle trash.**