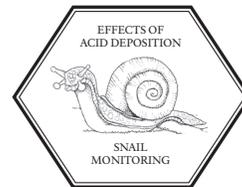


# SNAILS



**THEME:** Snails and Air Quality

**GRADE:** Seventh

**BEST TIME TO PLAN TRIP:** Fall or Spring

## UNIT RATIONALE

Our soils in the park, especially at high elevations such as Purchase Knob, are exposed to high levels of acid rain (or rain with low pH). Soils with a pH of 5.5 or lower have a low availability of calcium and other nutrients but an overabundance of aluminum and iron. Park managers are very concerned about how this affects soils and the availability of nutrients to plants and animals. The majority of snail species in the park are calcium-based, and snails are an important part of the soil's food chain. During this study students will search and identify snails, explain why scientists are concerned about snail populations, and learn about the role snails play in the soil food chain.

## SCIENCE 7TH GRADE NORTH CAROLINA STANDARDS

### NATURE OF SCIENCE

Students are involved with science as a human endeavor that relies on reasoning, insight, skill and creativity as they participate in on-going research projects at the Great Smoky Mountains National Park. Students are exposed to science's universal laws through a systematic study of the rules, patterns and cycles in nature.

### SCIENCE AS INQUIRY

Students are involved in scientific investigation that involves the collecting of relevant evidence, the use of logical reasoning and the application of imagination to devise hypotheses and explanations to make sense of collected evidence. Students use tools of investigation to collect data and mathematics to gather, organize and present data.

### PERSONAL AND SOCIAL PERSPECTIVES

Students make personal and societal connections to the issues facing the Great Smoky Mountains National Park. Specifically, they will be exposed to the form and function of interacting systems.

Competency Goal 1: The learner will design and conduct investigations to demonstrate an understanding of scientific inquiry..

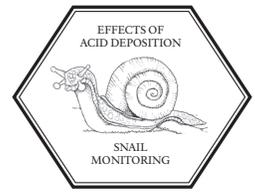
- 1.01 Identify and create questions and hypotheses that can be answered through scientific investigations.
- 1.03 Apply safety procedures in the laboratory and in field studies
- 1.04 Analyze variables in scientific investigations
- 1.05 Analyze evidence
- 1.06 Use mathematics to gather, organize, and present quantitative data resulting from scientific investigations
- 1.08 Use oral and written language

Competency Goal 3: The learner will conduct investigations and utilize appropriate technologies and information systems to build an understanding of the atmosphere.

- 3.01 Explain the composition, properties and structure of the atmosphere
- 3.02 Describe properties that can be observed and measured to predict air quality
- 3.03 Conclude that the good health of environments and organisms requires
- 3.04 Evaluate how humans impact air quality
- 3.06 Assess the use of technology in studying atmospheric phenomena and weather hazards

Competency Goal 4: The learner will conduct investigations, use models, simulations, and appropriate technol-





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ologies and information systems to build an understanding of the complementary nature of the human body system.

4.07 Explain the effects of environmental influences on human health

4.08 Explain how understanding human body systems can help make informed decisions regarding health.

## LANGUAGE ARTS 7TH GRADE NORTH CAROLINA STANDARDS

Competency Goal 1 The learner will use language to express individual perspectives in response to personal, social, cultural, and historical issues.

1.01 Narrate an expressive account

1.02 Respond to expressive materials that are read, heard, and/or viewed

1.03 Interact in group settings

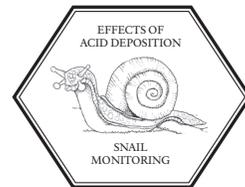
1.04 Reflect on learning experiences

## MATH 7TH GRADE NORTH CAROLINA STANDARDS

Competency Goal 1: The learner will understand and compute with rational numbers.

1.01 Develop and use ratios, proportions, and percents to solve problems.

1.02 Develop fluency in addition, subtraction, multiplication, and division of rational numbers.



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## CORRELATION TO THE NATIONAL SCIENCE EDUCATION STANDARDS CONTENT STANDARDS GRADES 5-8

### CONTENT STANDARD A

Science as Inquiry: All students will develop abilities necessary to do scientific inquiry and an understanding of scientific inquiry. This includes:

- answering questions through scientific investigation,
- conducting a scientific investigation,
- using appropriate tools and materials to gather, analyze and interpret data,
- thinking critically to make relationships between evidence and explanations,
- recognizing and analyzing alternative explanations and predictions
- communicating scientific procedures and explanations
- using mathematics in all aspects of scientific inquiry
- using technology to gather data and analyze

### CONTENT STANDARD C

Life Science: All students will develop an understanding of structure and function in living systems, regulation and behavior, populations and ecosystems and diversity and adaptations of organisms. Specifically students will understand:

- The structure and function of whole organisms and their ecosystems
- All organisms must be able to obtain and use resources, grow, reproduce and maintain stable internal conditions while living in a constantly changing external environment.
- An organism's behavior evolves through adaptation to its environment.

### CONTENT STANDARD D

Science and Technology: All students should develop abilities of technological design and an understanding about science and technology. This includes:

- designing a solution or product
- implementing a proposed design
- evaluating completed products
- communicating the process

### CONTENT STANDARD E

Science in Personal and Social Perspectives: All students should develop an understanding of personal health, populations, resources and environments, natural hazards, risks and benefits and science and technology in society.

### CONTENT STANDARD F

History and Nature of Science: All students should develop understanding of science as a human endeavor and the nature of history and science.



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# PLANNING A SUCCESSFUL TRIP

## AT PURCHASE KNOB

### SCHEDULE FOR A DAY OF ACTIVITIES IN GREAT SMOKY MOUNTAINS NATIONAL PARK AT PURCHASE KNOB

- Meet park ranger at Purchase Knob
- Use restrooms
- Large group introduction
- Break into two groups
- Participate in activities
- Lunch
- Switch groups
- Large group conclusion

• Check the weather before you go. Lunch will be eaten outside.

• School buses can park at the program site.

• The pre-visit activities included in this packet are specific to the theme of your program and should be presented prior to your scheduled visit. The post-visit activities are designed to reinforce and build upon the park experience.

• A map to the Appalachian Highlands Science Learning Center Purchase Knob can be found on page 7

• All students, teachers, and chaperones will meet the park rangers at the Appalachian Highlands Science Learning Center at Purchase Knob.

• The maximum number of students for this trip is 60. We require an adult or teacher for every ten students to create a positive and rewarding experience. The on-site instruction is conducted by a park ranger. However, your assistance is needed with discussion and discipline. Please feel free to contact the Park at (828) 926-6251 if you have any further questions.

#### • Restrooms and Water

Restrooms and water fountains will be available at the program site.

## AT CLINGMANS DOME

### SCHEDULE FOR A DAY OF ACTIVITIES IN GREAT SMOKY MOUNTAINS NATIONAL PARK AT CLINGMANS DOME

- Meet park ranger at Oconaluftee Visitor Center
- Use restrooms
- Travel to Clingmans Dome in bus
- Large group introduction
- Break into two groups
- Participate in activities
- Lunch
- Switch groups
- Large group conclusion

Check the weather before you go. Lunch will be eaten outside.

• School buses can park at the program site.

• The pre-visit activities included in this packet are specific to the theme of your program and should be presented prior to your scheduled visit. The post-visit activities are designed to reinforce and build upon the park experience.

• All students, teachers, and chaperones will meet the park rangers at the Oconaluftee Visitors Center

• The maximum number of students for this trip is 50. We require an adult or teacher for every ten students to create a positive and rewarding experience. The on-site instruction is conducted by a park ranger. However, your assistance is needed with discussion and discipline. Please feel free to contact the park at (828)497-1942 if you have any further questions.

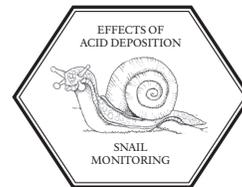
#### • Restrooms and Water

Restrooms only available at Oconaluftee Visitor center and a limited number at Clingmans Dome. There are seasonal water fountains located at Oconaluftee Visitor center but there are no water fountains available at Clingmans Dome. Groups should bring their own drinks.



# SAFETY CONSIDERATIONS AND OTHER IMPORTANT INFORMATION

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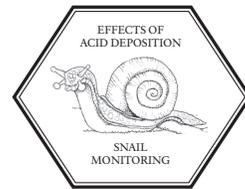


- Great Smoky Mountains National Park is a federally protected public use area. Please help the rangers keep all of the plants and animals protected in the park by not picking the plants or taking anything from the park.
- Please remind your students to wear appropriate footwear and clothing for this extended outdoor experience. Flip flops, slip-on shoes, or sandals are not appropriate for the program.
- Temperatures in some parts of the park can be 10-15 degrees colder than at your school. Long pants and layers are suggested for the program. Pants are the best precaution against cool temperatures, bee stings, ticks, and poison ivy.
- Within the park, cell phones are not always reliable. Rangers will follow the on-site agenda. If an unexpected problem occurs, rangers do carry park radios to make contact with the park dispatch office. For non-emergencies, call the Park Ranger dispatch at 865-436-1230 or contact a park employee.

## Animals and Plants of Concern in the park

- All animals in the park are wild and their behaviors are unpredictable. Treat all animals with caution.
- Venomous snakes - Two species of venomous snakes live in the Smokies, the copperhead and timber rattlesnake. Students should be cautious where they place their hands and feet.
- Insects - Yellow jacket wasps are the insects of greatest concern. They build nests in the ground along trails and streams and are aggressive when disturbed. Stings cause local swelling and can lead to severe allergic reactions in sensitive individuals. Such persons should carry epinephrine kits.
- Poison Ivy - Poison ivy is a three-leaved plant which can grow on the ground as well as on “hairy” vines up trees. To avoid chances of an allergic reaction wear long pants, stay on trails, and avoid direct contact with vegetation. If contact occurs or is a concern, wash affected parts in cold soapy water immediately.
- It is extremely helpful to rangers leading the program for students to wear clearly labeled name tags with first names only.
- Pets are not allowed on most park trails. Please do not bring them on the field trip.
- For more information about the park (Things to Know Before You Come) please visit the park’s website: <http://www.nps.gov/grsm/planyourvisit/things2know.htm>





# BACKGROUND INFORMATION

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## **Park Description:**

The National Park Service is charged with the management and preservation of the nation's most precious natural and cultural resources. These resources are woven into our natural heritage, and they provide opportunities for recreation, appreciation of beauty, historical reflection, cultural enrichment, and education.

Great Smoky Mountains National Park is one of the largest protected land areas east of the Rocky Mountains. With over 500,000 acres (800 square miles) of forest, the Smokies contain an enormous variety of plants and animals. In terms of biological diversity, a walk from a mountain's foot to its peak is comparable to the 2,000 mile hike on the Appalachian Trail from Georgia to Maine.

Because the National Park Service is charged with protecting resources and natural systems, the park engages in comprehensive research programs, such as air quality monitoring, to foster an understanding of park resources and to show how they are affected by local, regional, and global influences. Since the Smokies are so biologically diverse, the park is designated as an International Biosphere Reserve by the United Nations. The international system contains over 320 reserves in over 80 countries with the primary objectives of conserving genetic diversity and coordinating environmental education, research, and monitoring.

The Smokies also have a rich cultural history. Native Americans have lived in this area for thousands of years, and permanent white settlement began around 1800. The coming of commercial logging around 1900 stripped trees from two-thirds of what is now park land. Established in 1934, the park was created from more than 6,000 tracts of private and commercial land that was bought mostly with money raised and privately donated. Centrally located within a two-day's drive for half of the nation's population, Great Smoky Mountains National Park has the highest visitation of all the national parks in the country.

## **Purchase Knob Description:**

The Purchase Knob property, over 530 acres in size, was donated to Great Smoky Mountains National Park by Katherine McNeil and Voit Gilmore in January 2001. Situated at an elevation of over 5,000 feet, the area contains old-growth forests, mountain meadows and high elevation wetlands. It also rests on geological formations that aren't found anywhere else in the park, lending to a unique and diverse habitat for the study of plants and animals. The house is the location of the Appalachian Highlands Science Learning Center, whose mission is to provide a space for researchers to perform biological inventory and monitoring while offering education programs for students and teachers on these same subjects.

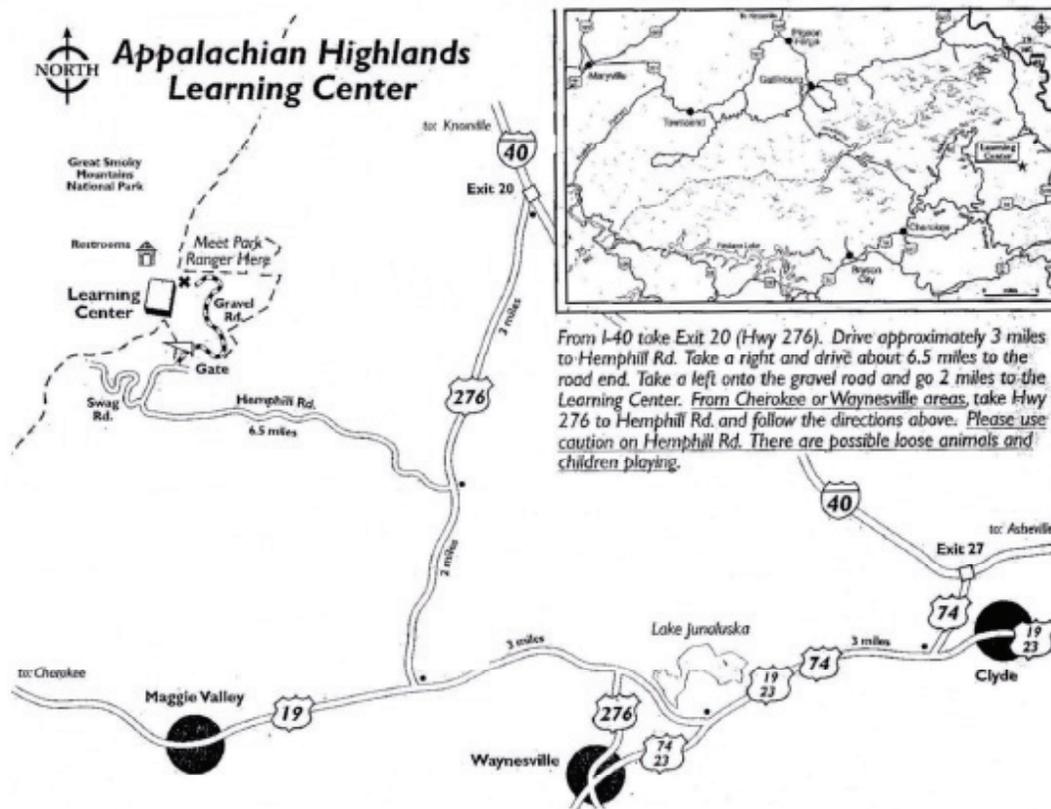
## **Clingmans Dome Description:**

Clingmans Dome, towering 6,642 feet above sea level is the highest peak in the Smokies. The peak was once called Smoky Dome, but was renamed Clingmans Dome in honor of U.S. Senator and Confederate brigadier general, Thomas Clingman. The seven-mile spur road to Clingmans Dome follows the border between TN and NC. The road leads to a parking area some 332 feet below the summit. From there it is a steep half-mile walk on a paved trail to the peak. Along the way the path climbs through a spruce-fir forest. This type of forest, rarely found in the southern Appalachians, is a remnant of the ice age. The walk and organized activities will give students the opportunity to learn about this forest community, its inhabitants, and the dangers this fragile forest community faces. At the peak a 375 foot ramp spirals upward to a 45 foot observation tower, allowing a view above the trees. This is the third highest mountain east of the Mississippi river. Mt. Mitchell and Mt. Craig, 70 miles west in Yancey County, North Carolina, are both slightly higher.

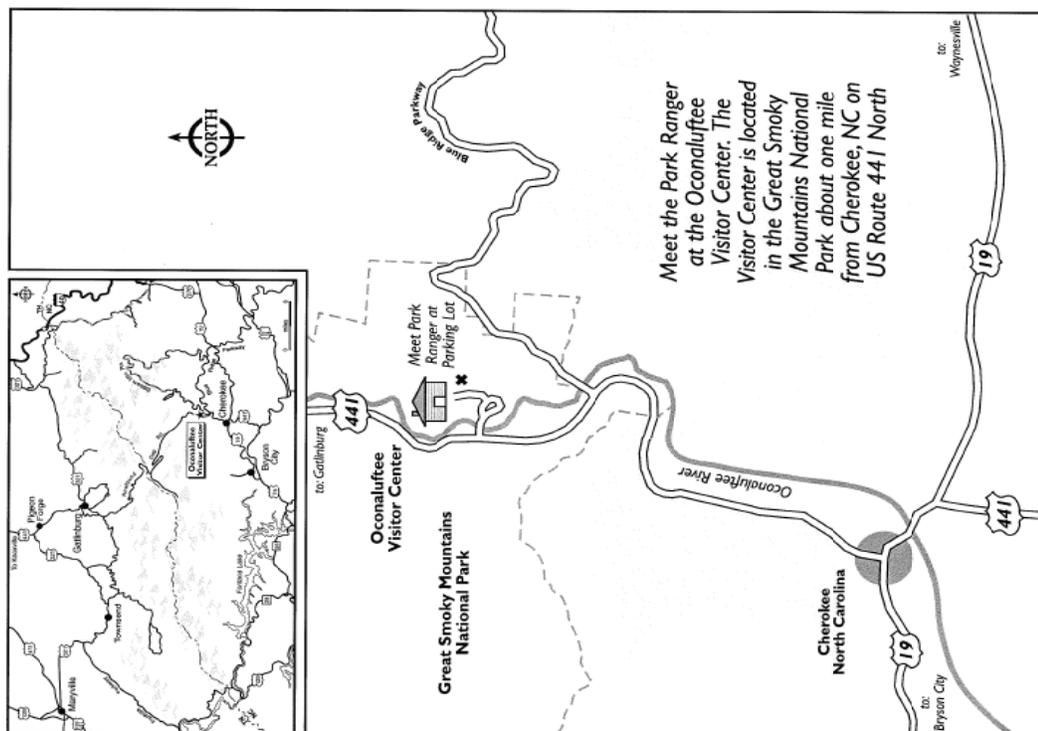




# MAP TO PURCHASE KNOB

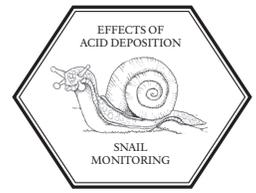


# MAP TO OCONALUFTEE VISITOR CENTER



# PRE-SITE ACTIVITY

## SNAIL INFORMATION



**Grade Level:** Seventh Grade

**Subject Area:** Science

**Activity time:** 60 minutes

**Setting:** Classroom

**Skills:** Analyzing, Classifying, Categorizing, Comparing, Describing, Gathering information, Researching

### Vocabulary:

- Apex: the tip of the shell where the embryonic whorl begins.
- Aperture: opening or mouth of the snail shell.
- Aspirator: a piece of scientific equipment that uses suction to collect specimens that are too small to pick up with hands or tweezers.
- Biological Monitoring: a technique used by scientists to check the condition of a particular species or ecosystem over time.
- Embryonic whorl: the first of a series of whorls.
- Hermaphrodite: possessing both male and female reproductive organs.
- Lip: the end of the aperture.
- Litter: The covering over soil in a forest made up of leaves, needles, twigs, branches, stems and fruits from the surrounding trees.

•Macroinvertebrate: an animal that lacks a backbone and that is large enough to be seen without a microscope.

•Umbilicus: an opening in the center of the axis of the shell bottom.

•Whorl: one complete turn of a gastropod shell.

### Materials:

- Vocabulary (page 9)
- Snail information worksheet (page 11)
- Snail identification worksheet (page 12)
- Computer with internet connection.

### Objectives:

- 1) understand the biodiversity of the Great Smoky Mountains National Park
- 2) recognize that many snails here are endemic species, meaning they are known to live only in the park
- 3) recognize that snails only live in certain geologic areas
- 4) describe physical characteristics that make one snail shell different from another
- 5) learn the definitions associated with snails
- 6) explain why land snails are important to an ecosystem

### Background:

Land snails belong to the phylum Mollusca, a large and very diverse group of animals in the class Gastropoda, meaning “stomach foot.” Snails can be found anywhere, but in general prefer a habitat offering

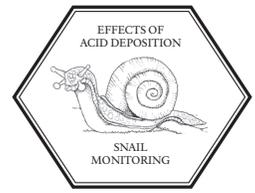
adequate moisture, an abundant food supply, and an available source of lime and calcium.

Land snails are one of the exceptionally diverse groups in the Smokies. Researchers have already documented 130 species of snail and slug as living in Great Smoky Mountains National Park. Expectations are there could be almost as many species still unknown from the park, including some species unknown to science. Unlike slugs, a land snail leaves a shell behind when it dies and most species can be identified using the shell alone. Land snails range in size from over 40 mm in diameter to only one millimeter in diameter, therefore it is important to look closely for the tiniest species. Most snails, unlike slugs, require a source of calcium in their diet in order to build their shells. This is significant in the context of the park for several reasons.

There are only three areas in the park with significant limestone-based surface geology (Cades Cove, White Oak Sinks, and Finley Cane) and these are the areas with the greatest land snail diversity. These are also the only known locations in the park for some species that can only live on limestone substrates.

Dogwoods are significant in the forest for bringing calcium to the soils (via their roots and leaves), making the forest floor less acidic and more accessible for calcium-loving species. Dogwoods are declining in the park because of an introduced fungus pathogen called Dogwood Anthracnose.





The species that is replacing the dogwood in the forest understory is Eastern Hemlock, which has the reverse effect on the soils.

Acid deposition in high elevations is leaching calcium out of the soils. There are several dozen species of snail found only in high elevations in the southern Appalachians. The loss of calcium from the mountaintop ecosystem may be having an adverse effect on these species and could possibly lead to their extinction. Additionally, research in Europe has provided convincing evidence that lack of calcium in some environments reduces reproduction in some groups of birds. Dutch researchers associated the bird declines on years of acid precipitation, which appear to have reduced land snail numbers. Snail shells are a prime source of calcium for wild birds that need to boost calcium for egg laying. The Dutch scientists were able to manipulate reproductive success in their study by increasing calcium with supplemental feedings. Dr. Ted Simons' study in the Smokies will investigate this same issue starting in 2004. The Smokies get some of the highest depositions of sulfate and nitrate in North America. Because of these significant issues effecting land snails in the park, it is important that we learn as much as possible about the present distribution of snail species in the park so we can recognize when species start to become rare, or rarer than they are now as these issues have been in effect for several decades already. Knowing their present range can also help managers identify populations that may be especially at risk from future acid deposition or loss of dogwoods, allowing protec-

tion activities to begin sooner. This project will produce the following three results:

- Locate and identify new park record species of land snails
- Increase our knowledge of the current range of land snail species
- Provide students with both an educational experience and a legitimate sense of contribution to the protection of the park's incredible diversity

On your field trip to the Smokies, your students will be participating in an inventory of land snails. It will be important to be able to focus on what makes one snail species different from another. Using the snail identification worksheet your students will gain several ways to determine shell differences. Have the students look at the vocabulary to become familiar with the terms associated with snails. Using the snail information sheet, complete the snail identification worksheet.

One reason we are studying snails is because they are an important part of the soil's food chain. In Great Smoky Mountains National Park, rangers are concerned about snail populations. This is why we are helping in this biological monitoring program. During the field trip, your students will learn more about why we monitor snail populations.

### **Procedure:**

Have students review over snail definitions and describe physical characteristics that make one snail shell different from another using the Snail Information worksheet. Use the Snail Identification work-

sheet activity as a review.

To view the Biodiversity podcast video go to <http://www.thegreatsmokymountains.org/eft/10modules.html>

Turn the microscope knob that appears on the computer screen to Section 1, Understanding Biodiversity. Click "Watch Video" and view video.

To view the Spruce Fir podcast video go to

<http://www.thegreatsmokymountains.org/eft/10modules.html>

Turn the microscope knob that appears on the computer screen to Section 2, A Connected Web. Click "Watch Video" and view video.

To view the Linking Geology and Life podcast video go to

<http://www.thegreatsmokymountains.org/eft/10modules.html>

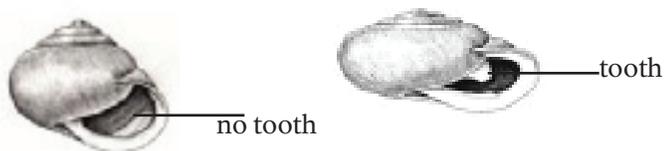
Turn the microscope knob that appears on the computer screen to Section 3, Why So Diverse Here? Click "Watch Video" and view video.

# SNAIL INFORMATION SHEET

\*\*\*Snails differ in the shape of their shell opening. Some ways to describe the opening might be as round, oval or crescent shaped.

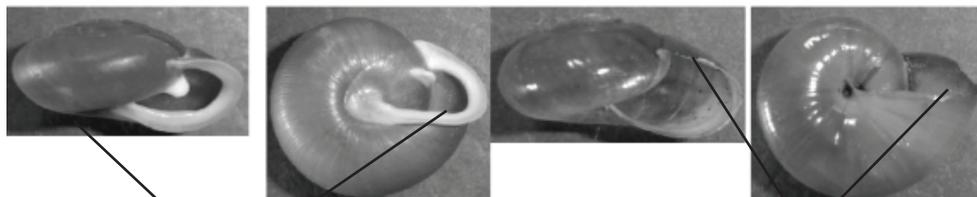
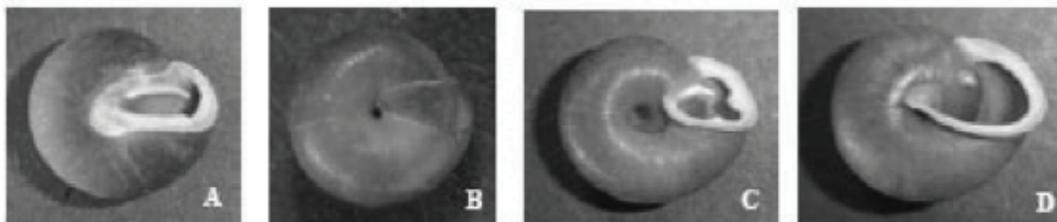


\*\*\*Snails differ in the location and size of the opening. Sometimes you will notice “teeth” in the opening.

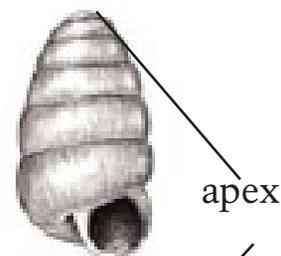


\*\*\*Snails differ in the appearance of the umbilicus (this is the center of the bottom side of the shell, side opposite of the apex).

A. Inperforate (with closed umbilicus); B. Perforate (with very small umbilical opening); C. Umbilicate (with noticeable umbilical opening); and D. Rimate (with umbilical opening partially closed by apertural lip).



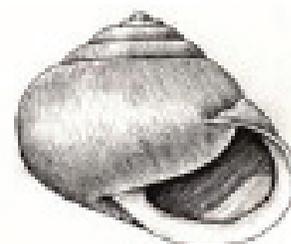
\*\*\*Snails differ in the shape of their shell.



**Pupa Shape**



**Beehive Shape**



**Heliciform Shape**



**Depressed Heliciform**

# SNAIL IDENTIFICATION WORKSHEET

Describe the snail shells below. Use the snail information sheet to help you.



1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_



1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_



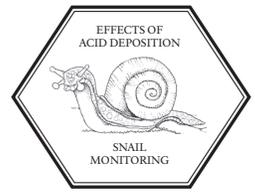
1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_



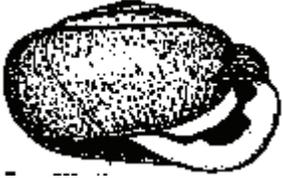
1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_

# SNAIL IDENTIFICATION WORKSHEET

## ANSWER KEY



Some possible answers, not inclusive.



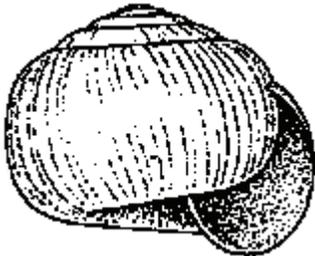
1. lip present \_\_\_\_\_
2. teeth present \_\_\_\_\_
3. small opening and/or crescent shaped \_\_\_\_\_



1. no lip \_\_\_\_\_
2. spiny \_\_\_\_\_
3. no apex \_\_\_\_\_



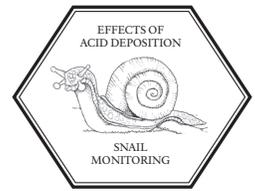
1. tall apex, no umbilicus \_\_\_\_\_
2. no visible opening \_\_\_\_\_
3. large tooth \_\_\_\_\_



1. no lip, no teeth \_\_\_\_\_
2. indented umbilicus \_\_\_\_\_
3. tall apex \_\_\_\_\_

# PRE-SITE ACTIVITY

## CONNECTIONS BETWEEN SELF AND SNAIL



**Grade Level:** Seventh  
Grade

**Subject Area:** Science

**Activity time:** 30 minutes

**Setting:** Inside

**Skills:** Applying, Comparing, Contrasting, Debating, Describing, Discussing, Inferring,

**Materials:** none

### Objectives:

- 1) compare/contrast how different/similar humans are to snails
- 2) compare/contrast the needs of snails and the needs of humans

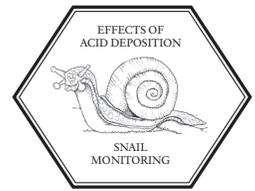
### Procedure:

Have students connect themselves to the snails in the park and allow them to see that even though it is small, it is important, and its role invaluable. Students often feel “small” and overlooked because of their youth or because of socioeconomic factors or appearance or athletic/mental abilities or any other various reasons. Discussion could begin with, “How are we similar/different to snails?”. Discussion on how the shell is a snail’s home could cross over to the history of human dwellings over time and how they change and why, connecting to how environmental issues change the snail’s home. Snails only live in certain geologic area; what influences where people live? Ask students: “What vitamins and nutrients do we need in order to stay healthy? Where do we get them? What happens when we are deficient?” You could also discuss soils in both a literal and figurative manner - literally how the soil in the park affects plant and animal life, then figuratively present students with the analogy of the “soil” in which they are planting themselves. How would they describe their “soil”? What do they do that helps their growth, development, and survival? What do they do that robs them of “nutrients”? How can they improve their “soil”?



# ON-SITE ACTIVITY

## SNAIL STUDY



**Grade Level:** Seventh Grade

**Subject Area:** Science

**Activity time:** 75 minutes

**Setting:** Outside in the park

**Skills:** Categorizing, Classifying, Collecting information, Communicating, Connecting, Gathering information, Identifying cause and effect, Interpreting, Proposing solutions, Recording data, Sorting

### Vocabulary:

- **Aspirator:** a piece of scientific equipment that uses suction to collect specimens that are too small to pick up with hands or tweezers.
- **Biological Monitoring:** a technique used by scientists to check the condition of a particular species or ecosystem over time.
- **Litter:** The covering over soil in a forest made up of leaves, needles, twigs, branches, stems and fruits from the surrounding trees.
- **Macroinvertebrate:** an animal that lacks a backbone and that is large enough to be seen without a microscope.

**Materials:** provided by the rangers

- Plastic bags
- GPS unit
- 3D Snail Key
- Identification keys

### Objectives:

- 1) explain why scientists are concerned about snail populations
- 2) explain the role snails play in the soil food chain
- 3) search for and identify the types of snails found

### Background:

During the field trip the students are going to look on the soil surface for a particular animal, snails, because they are of special concern to park biologists.

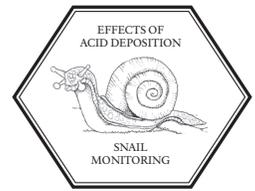
Our soils in the park, especially at high elevations such as Purchase Knob, are exposed to high levels of acid rain (or rain with low pH). Park managers are very concerned about how this affects soils and the availability of nutrients to plants and animals. Soils with a pH of 5.5 or lower have a low availability of calcium and other nutrients but an overabundance of aluminum and iron. How would a loss of calcium affect an animal like a snail (needed for shell production)? How does that affect the rest of the food chain (calcium in snails is important to other animals such as birds who need it for egg shell production)?

### Procedure:

Your students are going to participate in an on-going study to inventory (identify) and monitor snail species. After we have collected and noted the locations throughout the park of snails for a few years, we will get an idea of what is considered a normal distribution and population size. During the field trip we will try to identify the type of snail using the snail's physical characteristics. The students are participating in an on-going monitoring program that won't show any definite information for a few years.

# POST-SITE ACTIVITY

## STEWARDSHIP



**Grade Level:** Seventh Grade

**Subject Area:** Science

**Activity time:** 30 minutes

**Setting:** Classroom

**Skills:** Communicating, Connecting, Applying

**Vocabulary:**

•Stewardship: Our responsibility to care for our natural resources - land, air, wildlife and water - sustainably, so future generations can enjoy them.

**Materials:**

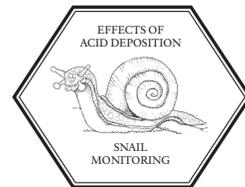
- Computer with Internet connection

**Objectives:**

- 1) understand what the term “Stewardship” means
- 2) how the students can become a steward in their school and their community

**Procedure:**

To view the Stewardship podcast video go to <http://www.thegreatsmokymountains.org/eft/10modules.html> Turn the microscope knob that appears on the computer screen to Section 7, Backyard Stewardship. Click “Watch Video” and view video. Ask students how they can become stewards within their own school and community.



# PARENT/CHAPERONE LETTER

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Greetings Parents/Chaperones:

Park rangers are pleased to be presenting an educational program to the students in Great Smoky Mountains National Park. In order to achieve the goals for a successful program, the park rangers will need your assistance in the following ways:

(These points will help to ensure that park rangers and teachers will be able effectively conduct the lessons and activities throughout the trip.)

- The program will be conducted outside and there will be some hiking throughout the trip. Prepare your student with appropriate footwear, long pants, layers, and rain gear.
- If your child is bringing a lunch from home, we recommend that students bring water to drink and a lunch with minimal packaging. Soft drinks are usually left unfinished by students, and remaining sugary drinks cannot be poured out on the ground. (Minimally packaged lunches lead to less trash being left behind or scattered by the wind. Additionally, this reduces the accumulated trash to be disposed).

If you are a chaperone attending the field trip:

- Please be an active part of the lessons. Keep up with the group and listen to the information being given in the case that you may be called upon to assist (handing out materials, sub-dividing groups etc.).
- Please do not hold conversations with other chaperones or use a cellular phone while the rangers are teaching the students.
- Refrain from smoking during the trip. If you must smoke, please alert a ranger or teacher and remove yourself from the group.
- Please be aware that the program will be conducted outside and that there will be some hiking throughout the trip. Prepare yourself with appropriate footwear, long pants, layers, and rain gear.
- We recommend that parents and students bring a small towel in their backpacks to sit on at lunch (there are no picnic tables at the program site).

Thank you for your needed assistance. We look forward to meeting you on the program!

Sincerely,

The Education Staff at Great Smoky Mountains National Park

