

JONES GAP

STATE PARK

Mountain Bridge Wilderness Area Headquarters
Caesars Head State Park
8155 Geer Highway, Cleveland, SC 29635
(864) 836-6115



Directions

Jones Gap State Park is located northwest of Greenville, South Carolina off U.S. Highway 276. From Greenville take Highway 276 north to Cleveland. Take River Falls Road; the road ends in the park.

Park personnel will meet you at the parking lot entrance. Please keep all students on the bus until further instructions are given.

Facilities

The Environmental Learning Center for the Mountain Bridge Wilderness Area is located at Jones Gap State Park. The learning center includes a large classroom/meeting room and a separate laboratory.

Restroom facilities and water fountain are located between the parking area and the Environmental Learning Center.

Picnic tables are available in the park for students to have lunch or enjoy a snack.

The Mountain Bridge Wilderness Area is a Project Green area. As part of "Leave No Trace", all park visitors are asked to pack out whatever they bring in. Visiting schools are asked to bring trash bags to take back all of the trash produced from lunch and snacks.

Option: To allow students to participate in a real "Leave No Trace" experience, have students pack their lunches in their backpacks (book bags) and carry their own lunch and their own trash out!

Reservations and Program Information

For reservations, contact:

Tim Lee

Park Interpreter

Phone: (864) 836-6115

Fax: (864) 836-3081

tlee@scprt.com

Program Info:

Program offered September - mid November and March - May

1 - 25 students.....\$20

26 - 40 students.....\$40

41 - 60 students.....\$60

What to Bring

Students:

- rain gear (raincoat, pants, etc.)
- one pair dry socks
- change of dry clothes
- jacket

Jones Gap



Teachers:

- first aid kit
- name tags
- trash bags for garbage

Program Description

The Mountain Bridge Wilderness Area contains more than 10,000 acres in north-western South Carolina. This area of the Blue Ridge Escarpment ends in an abrupt drop of 2,000 feet to the foothills below, where the state’s Piedmont Region begins. This escarpment creates spectacular waterfalls, and provides a protective environment for rare and endangered plant and animal species.

The Middle Saluda River provides a habitat for a diversity of cold-water organisms including native brook trout, salamanders, crayfish, and other cold-water animals. Students discover how these organisms interact as they explore the river, turning over rocks in their study of a cold-water habitat.

Students also hike and learn about different plant and animal species of the forest. Through hands-on activities, students learn how interactions among these organisms define a mountain forest community.

Goals

Foster an understanding and appreciation of the natural resources found in the mountains of South Carolina.

Make connections between the natural world and themselves.

Encourage creative thinking using a problem-solving approach.

Encourage stewardship of South Carolina’s natural resources.

Typical Discover Carolina Program Schedule

9:30 AM

Arrival at park (unload lunches and use the rest rooms)

10:00 AM

Introduction

10:30 AM – 12:00 Noon

Morning Classes

12:00 Noon – 12:30 PM

Lunch

12:30 PM – 2:00 PM

Afternoon Classes

2:00 PM

Depart

Discover Carolina Checklist -- Things to Consider Before Your Visit

Prior to Visit:

- ___ Send out chaperone agreements
- ___ Complete pre-visit site activities
- ___ Create student name tags
- ___ Collect signed chaperone agreements
- ___ Confirm bus
- ___ Discuss park etiquette and safety
- ___ Contact interpreter if you have any special needs

Day of Visit:

- ___ First aid kit
- ___ Contained lunches
- ___ Name tags
- ___ Water bottles
- ___ Ample # of chaperones
- ___ Students are dressed for the weather
- ___ Evaluation needs



Jones Gap State Park: *River Pre-Site*

Content Area:

Science

Grade Level:

4

Time to Complete:

45 minutes

Title of Program:

pH Lab

South Carolina State Standards Addressed

(R) I.a.2.b- Arrange objects in sequential order.

(R) I.A.3.a- Use standard (U.S. Customary and Metric) to estimate and measure mass, area, perimeter, volume and temperature to the nearest whole unit (quantitative observations).

(R) I.A.4.a- Use drawings, tables, graphs, written and oral language to describe objects and explain ideas and actions.

(R) I.A.6.a- Use prior knowledge and observations to identify and explain in advance what will happen.

Program Description

Students will conduct activities to learn how to determine pH of water and conduct an experiment to determine the pH level of different solutions.

Focus Questions For Students

What is pH?

What is an instrument used to measure pH?

What is a pH scale?

Culminating Assessment

Have students draw and label the pH scale and arrange sampled liquids based on resulting pH readings.

Material/Equipment/Resources

- pH paper
- graduated cylinder
- distilled water
- orange juice
- milk
- 50ml beakers
- timer
- tap water
- Coke

Teacher Preparation

Read background information and be prepared to introduce pH as a chemical property of matter.

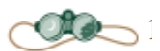
Collect and label different liquids for students to determine their pH.

Demonstrate to students the correct and safe way to use equipment.

Background Information

Water pH is an indicator of how much acid is in water. Water pH is important as it plays a role in biological, chemical and physical properties of water. The pH of water determines which plants and animals can live in a body of water, as different organisms have different tolerance levels to acidity. pH also affects other chemical properties of water, such as the availability of minerals.

The pH scale is used to determine if a



solution is acidic or basic based on the pH reading.



Procedures

Discuss with students that pH is a measure of the acidity level in matter (liquid) and how to use the pH scale to determine if a sample is an acid, base or neutral.

Have students predict the pH level of each sample.

Collect 30 ml samples of each liquid to use during activity.

Dip one strip of indicator paper into one of the samples for at least one minute. Be sure all segments of the paper are in the sample.

Remove the indicator paper and compare all of the segments to the chart on the back of the indicator paper box. Try to match all segments to the chart.

Record the pH reading.

Content Area:
Science

Grade Level:
4

Time to Complete:
45 minutes

Title of Program:
How Cold is Cold?

South Carolina State Standards Addressed

(R) I.a.2.b - Arrange objects in sequential order.

(R) I.A.3.a - Use standard (U.S. Customary and Metric) to estimate and measure mass, area, perimeter, volume, and temperature to the nearest whole unit (quantitative observations).

(R) I.A.4.a - Use drawings, tables, graphs, written and oral language to describe objects and explain ideas and actions.

(R) I.A.6.a - Use prior knowledge and observations to identify and explain in advance what will happen.

(R) I.B.1.a - Plan and conduct a simple investigation - a "fair test".

(R) I.B.1.c - Select and use equipment to gather data and extend the senses.

Program Description

Students will conduct activities to learn how to properly use a thermometer to determine the temperature of water, and conduct an experiment to determine how light affects water temperature.

Focus Questions For Students

Name an instrument used to measure temperature.

What are some things that affect temperature?

What is thermal pollution?

Culminating Assessment

Graph the temperature readings, time versus temperature.

Have students predict temperature of water after 20 minutes.



Material/Equipment/Resources

- alcohol-filled thermometers (1/group)
- 250 ml graduated beakers (3/group)
- timer

Teacher Preparation

Read background information and be prepared to introduce temperature as a physical characteristic of an object (water).

Demonstrate to students the correct and safe way to use a thermometer and other equipment.

Procedures

1. Collect three 100 ml samples of water from the cold-water tap.
2. Hold the end of the thermometer (opposite the bulb) and shake it several times.
3. Place the thermometer in each sample for three minutes.
4. Raise the thermometer and quickly read the temperature. Place the thermometer back in water for one minute and read. If temperature did not change, record temperature. If the temperatures are different repeat steps 2 through 4.
5. Place one cold-water sample in direct sunlight for a period of 10 minutes. Repeat steps 2 through 4.
6. Place one cold-water sample in a dark area of the room. Repeat steps 2 through 4.
7. Leave one cold-water sample in an area with normal room lighting to act as a control. Repeat steps 2 through 4.
8. Compare the initial temperature of the water samples to that of the samples after the 10-minute period.
9. Infer as to what may be responsible for

any temperature differences.

Differentiation of Instruction

1. Changing the color of the water sample to determine if color affects temperature.
2. Changing the depth of the water sample to determine the effects of water depth on temperature.

Teacher Resources

Books For Teachers:

Pond and Brook; Michael J. Caduto

Eyewitness: Pond and Stream

How To Know The Aquatic Insects; Dennis M. Lehmkuhl

Activity Guides:

Aquatic Project Wild

Project WET

Adventures With Freshwater Animals; Richard Headstrom

Children's Books:

Webs of Life: Mountain Stream;

Paul Fleisher

Water Insects; Johnson

Web Sites:

Insects:

<http://entweb.clemson.edu/museum/misc/aqua/index.htm>

<http://ento.vt.edu/Courses/undergraduate/HS/distance/lecture>

Fish:

<http://www.trout.forprod.vt.edu/catt/catfish.htm>

Salamanders:

<http://www.tennis.org/amazing/amphibians.html>

For additional sites use the following "search" words:

aquatic insects

salamander

trout

cold-water habitat



Vocabulary List

Adaptation: An inherited characteristic or behavior that helps an organism survive in its environment.

Aquatic: Having to do with water.

Diversity: The variety of species present in an ecosystem.

Decomposer: Organisms that break down living material (plants and animals) and recycle their nutrients.

Ecology: The study of relationships between living organisms and their environment.

Environment: The external conditions and influences affecting living organisms.

Habitat: The place where an organism lives.

Invertebrate: An animal without a backbone.

Larva: An immature insect that experiences complete metamorphosis.

Metamorphosis: To change during growth or formation.

Nymph: An immature insect that experiences incomplete metamorphosis.

pH: The amount of acid in a solution.

Pollution: Substances in water, air or soil that are harmful to living organisms.

Species: A population of related individuals that resemble one another and that are able to breed among themselves.

Vertebrate: An animal with a backbone.



Jones Gap State Park: *River On-Site*

Content Area:

Science

Grade Level:

4

Time to Complete:

1.5 hours

Title of Program:

Cold River Ecology

South Carolina State Standards Addressed

(T) I.A.1.a - Use the senses and simple tools to gather information about objects or events such as size, shape, color, texture, sound, position and change (qualitative observations).

(R) I.A.2.a - Compare, sort, and group concrete objects according to two attributes.

(R) I.A.3.a - Use standard (U.S. Customary and Metric) to estimate and measure mass, length, area, perimeter, volume, and temperature to the nearest whole unit (quantitative observations).

(R) I.A.6.a - Use prior knowledge and observations to identify and explain in advance what will happen.

(T) II.A.1.b - Describe the diversity of life forms (vertebrate and invertebrate animals, plants) supported by each environment.

(T) II.A.1.c - Investigate the relationship between the basic needs of different organisms and whether or not a particular envi-

ronment meets those needs.

(R) II.A.2.b - Analyze specific behaviors influenced by external cues in the environment (e.g. temperature, light, and precipitation).

(T) II.A.4.a - Identify and describe characteristics and learned behaviors that enable an organism to survive in their environment (e.g., bear learning to fish).

Program Description

Students will conduct a survey of the Middle Saluda River to determine the organisms that live there and how they are adapted for their environment. Organisms collected, water temperature and pH will also be used to determine water quality in the river.

Focus Questions For Students

What is a mountain river?

What types of plants and animals would you expect to find in the river?

Where would you expect to find animals in the river? Why?

What are the main requirements for a cold-water habitat?

How are plants and animals adapted for life in a mountain river?

Culminating Assessment

Complete post-visit activities

Material/Equipment/Resources

At Jones Gap State Park:

- rubber boots
- pH Kit

Jones Gap: *On-Site*



- video microscope
- handouts
- collecting net
- thermometer
- forceps
- collecting pans
- petri dishes
- pipette

At school:

- pre-visit activities

Teacher Preparation

Call for reservation.

Complete all pre-visit procedures.

Read background information and be prepared to discuss ecology of cold-water streams.

Background Information

In South Carolina, mountain river communities are limited to the Blue Ridge geologic region, which comprises less than 1% of the state. By studying these unique ecosystems, students can gain a better understanding of how to protect and preserve these areas. A good way to explore the mountain river ecosystem is through collecting, observing, and identifying the aquatic insects that make up an important portion of the river community. These insects live in or on the water for all or part of their lives. They have various morphological structures that make them well adapted to occupy particular river habitats, as well as camouflage coloration and behaviors that enable them to elude consumers. They are important members of the food webs that allow larger predators, such as trout, to survive. The aquatic insects, along with several other invertebrates, are used as biological indicators of the quality of rivers.

It is also necessary to understand the physical aspects of this environment, such as water temperature, water pH, amount of dissolved oxygen, and substrate of the

river bottom. Some of the fish and aquatic insects have a very narrow tolerance for changes in abiotic conditions. A rise in temperature or a decrease in dissolved oxygen can stress these organisms to the point of death. Additions of sediment or changes in river velocity can adversely affect the organisms within this ecosystem. Therefore, it is necessary to examine the river's watershed for possible changes that could affect the river community. Though natural occurrences within the watershed can result in changes, it is often man's actions that have catastrophic influences. Activities such as logging or construction within the watershed can result in higher water temperatures and increased runoff and the sediments that accompany it. Recreational activities also can influence the conditions necessary for sensitive organisms. These conditions can be investigated by measurements of biotic and abiotic factors made at intervals along the river and by topographic maps and aerial photographs of the watershed.

Procedures

1. Provide students with boots and collecting nets.
2. Select adults to help in the river and brief them on boundaries and rules.
3. Explain safety rules and boundaries to students.
4. Demonstrate how to safely and gently collect organisms. Explain to students that organisms will be returned to the river after observations are made.
5. Students will collect organisms from the river and place them in collecting pans.
6. Complete pH and temperature readings following test kit procedures.
7. Return to laboratory or group area to identify organisms, discuss adaptations, and complete River Survey worksheet.
8. Discuss pH and temperature data collected from the river and how these factors affect organisms that live in the river.



River Survey Form



Stream:

Location:

Date:

Group Names:

Describe River (moving or nonmoving, color of water, bottom (rocky or smooth), shaded or sunny, etc.):

pH 1) _____ + 2) _____ + 3) _____ = _____ /3 = _____ Average

TEMPERATURE 1) _____ + 2) _____ + 3) _____ = /3 = _____ Average

BIOASSESSMENT

Group 1

Number of organisms found _____ x Index Value _____ = _____

Index Value = 3

Group 2

Number of organisms found _____ x Index Value _____ = _____

Index Value = 2

Group 3

Number of organisms found _____ x Index Value _____ = _____

Index Value = 1

River Quality Assessment

Excellent

Good

Fair

Poor

Index Value

23 and above

17-22

11-16

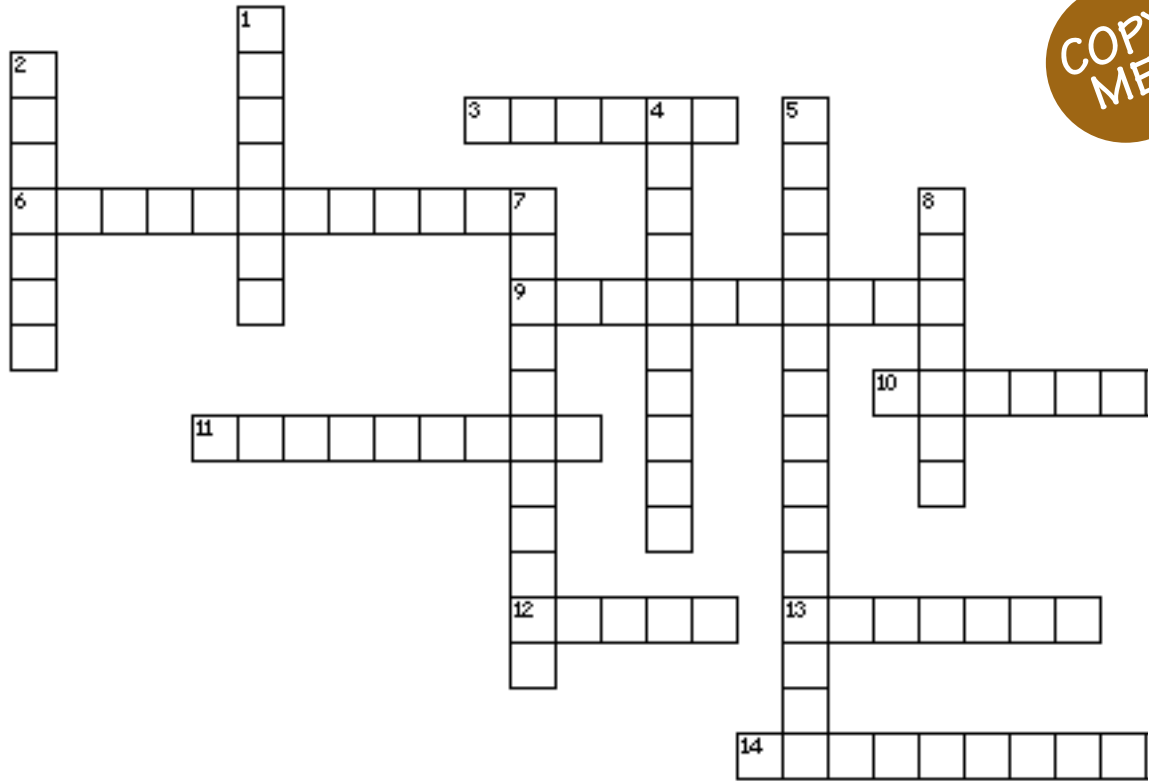
10 or less

Jones Gap: On-Site



River Ecology Crossword

COPY ME!



Jones Gap: On-Site

Across

3. An immature insect that experiences complete metamorphosis.
6. An animal without a backbone.
9. An animal with a backbone.
10. The variety of species present in an ecosystem.
11. Substances in water, air or soil that are harmful to living organisms.
12. An insect that experiences incomplete metamorphosis.
13. The study of relationships between living organisms and their environment.
14. To change during growth or formation.

Down

1. Having to do with water.
2. The place where an organism lives.
4. An inherited characteristic that helps an organism to survive in its environment.
5. Dependent one upon the other.
7. The external conditions and influences affecting living organisms.
8. A population of related individuals that resemble one another and that are able to breed among themselves.



River Ecology Crossword Answer Key

Across

3. An immature insect that experiences complete metamorphosis. *larvae*
6. An animal without a backbone. *invertebrate*
9. An animal with a backbone. *vertebrate*
10. The variety of species present in an ecosystem. *diversity*
11. Substances in water, air or soil that are harmful to living organisms. *pollution*
12. An insect that experiences incomplete metamorphosis. *nymph*
13. The study of relationships between living organisms and their environment. *ecology*
14. To change during growth or formation. *metamorphosis*

Down

1. Having to do with water. *aquatic*
2. The place where an organism lives. *habitat*
4. An inherited characteristic that helps an organism to survive in its environment. *adaptation*
5. Dependent one upon the other. *interdependence*
7. The external conditions and influences affecting living organisms. *environment*
8. A population of related individuals that resemble one another and that are able to breed among themselves. *species*

Jones Gap: On-Site

