



INTERDEPENDENCE

*Ranger Led
Program*

THEME: Interdependence
GRADE LEVEL: Sixth, Seventh, or Eighth Grade
BEST TIME TO PLAN TRIP: Spring or Fall

UNIT RATIONALE

Great Smoky Mountains National Park is an excellent backdrop for students as they explore the natural world. The program is designed to introduce students to the interdependence between the climate and the biodiversity at Great Smoky Mountains National Park. Additionally, students will gain knowledge of how human activities can adversely affect the biodiversity within the park.

STATE CURRICULUM STANDARDS - TENNESSEE

SIXTH GRADE

SCIENCE
Embedded Inquiry
SPI 0607
Inqs 2, 3, 4, 5
Interdependence
SPI 0607.2.2
SPI 0607.2.3
SPI 0607.2.4

ENGLISH
Communications
SPI 0601.2.4
SPI 0601.2.5

SEVENTH GRADE

SCIENCE
Embedded Inquiry
SPI 0707
Inqs 2, 3, 4, 5

ENGLISH
Communications
SPI 0701.2.7
SPI 0701.2.8

EIGHTH GRADE

SCIENCE
Embedded Inquiry
SPI 0807
Inqs 2, 3, 4, 5

ENGLISH
Communications
SPI 0801.2.7
SPI 0801.2.8



SIXTH GRADE

SCIENCE

Embedded Inquiry

SPI 0607.Inq.2 Select tools and procedures needed to conduct a moderately complex experiment.

SPI 0607.Inq.3 Interpret and translate data in a table, graph, or diagram

SPI 0607.Inq.4 Draw a conclusion that establishes a cause and effect relationship supported by evidence.

SPI 0607.Inq.5 Identify a faulty interpretation of data that is due to bias or experimental error.

Interdependence

SPI 0607.2.2 Interpret how materials and energy are transferred through an ecosystem.

SPI 0607.2.3 Identify the biotic and abiotic elements or the major biomes.

SPI 0607.2.4 Identify the environmental conditions and interdependencies among organisms found in the major biomes.

ENGLISH/LANGUAGE ARTS

Communication

SPI 0601.2.4 Select the most appropriate behaviors for participating productively in a team (e.g., contribute appropriate and useful information and ideas, understand the purpose for working as a team, understand the responsibilities of various roles within the team).

SPI 0601.2.5 Identify the functions and responsibilities of individual roles within an organized group (i.e., reporter, recorder, information gatherer, leader, timekeeper).

SEVENTH GRADE

SCIENCE

Embedded Inquiry

SPI 0707.Inq.2 Select tools and procedures needed to conduct a moderately complex experiment.

SPI 0707.Inq.3 Interpret and translate data in a table, graph, or diagram

SPI 0707.Inq.4 Draw a conclusion that establishes a cause and effect relationship supported by evidence.

SPI 0707.Inq.5 Identify a faulty interpretation of data that is due to bias or experimental error.

ENGLISH/LANGUAGE ARTS

Communication

SPI 0701.2.7 Select the most appropriate behaviors for participating productively in a team (e.g., ask primarily relevant questions that move the team toward its goal and contribute to the topic of discussion, articulate the goals that have been provided for the team work and ask clarifying questions, come to agreement by seeking consensus or following the majority).

SPI 0701.2.8 Identify the functions and responsibilities of individual roles within an organized group (i.e., reporter, recorder, information gatherer, leader, timekeeper).

EIGHTH GRADE

SCIENCE

Embedded Inquiry

SPI 0807.Inq.2 Select tools and procedures needed to conduct a moderately complex experiment.

SPI 0807.Inq.3 Interpret and translate data in a table, graph, or diagram

SPI 0807.Inq.4 Draw a conclusion that establishes a cause and effect relationship supported by evidence.

SPI 0807.Inq.5 Identify a faulty interpretation of data that is due to bias or experimental error.

ENGLISH/LANGUAGE ARTS

Communication

SPI 0801.2.7 Select the most appropriate strategies for participating productively in a team (e.g., gain the floor in orderly ways, meet or set deadlines for completing each task, come to agreement by seeking consensus or following the majority).

SPI 0801.2.8 Identify the functions and responsibilities of individuals within an organized group (i.e., reporter, recorder, information gatherer, leader, timekeeper).



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PLANNING A SUCCESSFUL TRIP

INTERDEPENDENCE



SCHEDULE FOR A DAY OF ACTIVITIES IN GREAT SMOKY MOUNTAINS NATIONAL PARK

- Arrive at Look Rock Picnic Area for restrooms and to meet rangers
- Drive to Look Rock Tower Parking Area
- On-site activities with lunch in between activities
- Reload bus and return to school

Planning a Successful Trip

- The location for this trip is at Look Rock located on the Foothills Parkway in Blount County, TN. Park rangers will meet you at the Look Rock Picnic Area.
- There is no cost to use this site.
- Arrange to have a teacher or chaperone available for every 10 students.
- Safety is of the utmost importance, especially in a National Park. Be sure to read the safety information provided on the following page. You may wish to take the page with you on your trip or send it to your chaperones prior to the on-site experience.



SAFETY CONSIDERATIONS AND OTHER IMPORTANT INFORMATION



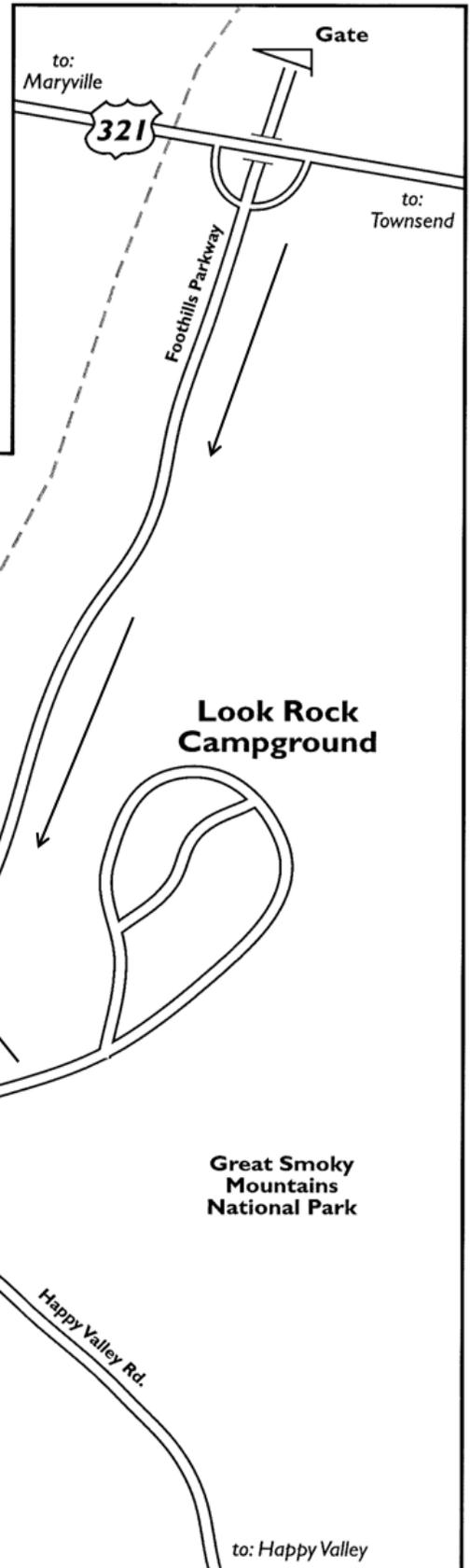
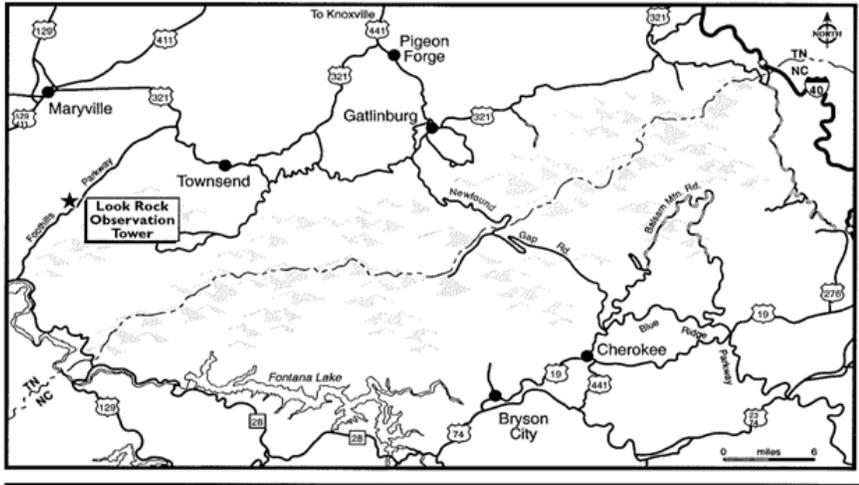
- Great Smoky Mountains National Park is a federally protected public use area. Please help the rangers keep all of the plants and animals protected in the park by not picking the plants or taking anything from the park.
- Please remind your students to wear appropriate footwear and clothing for this 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.
- 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>



MAP TO LOOK ROCK



Look Rock Classroom



From Townsend or Maryville take US Route 321 to the Foothills Parkway. Travel 9 miles and turn left at sign for picnic area and campground. Take first left towards picnic area. Meet the Park Rangers at the restrooms.

MEET RANGERS HERE

Look Rock Picnic Area

Restrooms

Look Rock Campground

Great Smoky Mountains National Park

Look Rock Observation Tower

Look Rock Tower Parking Area

Air Quality Stations

Paved Trail

Happy Valley Rd.

Foothills Parkway

to: US 129

to: Happy Valley

PRE-SITE ACTIVITY

WEATHER WATCHERS



Grade Level: 6th-8th

Subject Area: Science

Activity time: 30 minutes

Setting: Indoors

Skills: Collecting information; Comparing; Contrasting; Discussing; Predicting; Recording data

Vocabulary: humidity; meteorological data; observations; precipitation; temperature; variable

Objective: Students will monitor weather conditions in Great Smoky Mountains National Park prior to their field experience. Students will use this information, along with data collected on-site, to formulate a weather forecast.

Materials:

- Paper and pencil
- Internet connection

Background:

Meteorologists use various instruments and computer models to predict the weather. The most important tool in forecasting the weather, however, is observations.

Procedure:

Visit the Look Rock Web Cam website (<http://www.nature.nps.gov/air/webcams/parks/grsmcam/grsmcam.cfm>). Have students document air temperature, humidity, wind speed and direction, and precipitation at the same time each day, at least two days prior to the field experience. Discuss the changes in data with students.

Review:

This lesson can be referred back to at the completion of the field trip to compare students predictions with the actual conditions.



PRE-SITE ACTIVITY

PRESSURE CHANGES



Grade Level: 6th-8th

Subject Area: Science

Activity time: 30 minutes

Setting: Indoors

Skills: Comparing;
Constructing; Contrasting;
Discussing; Recording data

Vocabulary: atmospheric pressure; barometer; cause and effect; meteorological data;

Objective: Students will construct a barometer to monitor atmospheric pressure changes before the field experience.

Materials:

- glass jar or coffee can
- balloon
- straw
- tape
- paper and pencil

Background:

Atmospheric pressure changes help meteorologists forecast changing weather patterns.

Procedure:

In small groups or individually, have students construct barometers using the following instructions:

1. Blow up the balloon and let the air out. This will stretch the balloon so it will fit easier over the jar.
2. Cut the balloon in half and discard the neck.
3. Stretch the balloon over the opening of the jar/can.
4. Place rubber band securely around the jar/can. Make sure there is an airtight seal.
5. Tape straw to balloon, where straw is about one-quarter on the balloon.
6. Tape piece of paper to wall.
7. Place barometer next to paper (straw end facing paper).
8. Mark position of straw indicating date and time of observations.

Discuss with students how barometers work and how changes in atmospheric pressure relate to changes in weather.

Review:

This lesson can be used in conjunction with “Weather Watchers” and referred back to at the completion of the field experience.



ON-SITE ACTIVITY

PARK RANGER DIRECTED LESSONS



Grade Level: 6th-8th

Subject Area: Science

Activity time: 3 hours

Class Size: Maximum of 50 students

Setting: Outdoors

Skills: analyzing; comparing; contrasting; describing; discussing; experimenting; identifying cause and effect; listening; measuring; observing; prediction; proposing solutions; recording data; writing

Vocabulary: anemometer; barometer; bias; cause and effect; climate change; hygrometer; meteorological data; meteorologist; psychrometer; thermometer; topography; variable, symbiosis, commensalism, mutualism, parasitism, biomes, interdependent, air quality, dichotomous key

Objectives: Allow students the opportunity to see how symbiosis and weather have an effect on the environment.

Materials: Study equipment provided by park rangers

Background:

The following is a brief description of possible on-site activities (location and weather may change activities) These activities will be led by park staff, but please be familiar with them, as the classroom teacher may be asked to assist on-site.

Meteorology and Topography (15 minutes)

Students will discuss the effects the Appalachian Mountains have on weather and air quality. Relief maps will be used to help show the changes in the landscape.

Weather Watchers (45 minutes)

Students will use thermometers, anemometers, sling psychrometers, and other instruments to measure real-time weather data. In addition, students will observe cloud cover, type, and movement.

Forecasting 101 (15 minutes)

Students will use the data collected on-site along with the data recorded in the classroom to make a prediction for the following day's weather

Air Quality (15 minutes)

How does air quality affect this park? Students will learn how air quality affects this park and where the poor air quality comes from.

Trail section of the program (1 hour)

While on the hike students will be learning about the abundance of tree diversity by using a dichotomous key. Students will also learn about how some trees are under attack by non-native species.



POST-SITE ACTIVITY

STEWARDSHIP



Grade Level: Middle School

Subject Area: Science

Activity time: 30 minutes

Setting: Classroom

Skills: Applying;
Communicating; Connecting

Vocabulary: conservation;
protection; stewardship

Materials: Internet access

Objectives: To understand what the term “Stewardship” means and how 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.



POST-SITE ACTIVITY

EXPLORE YOUR NATIONAL PARKS



Grade Level: Middle School

Subject Area: Science

Activity time: 30 minutes

Setting: Indoors

Skills: Varying skills depending on activities selected

Vocabulary: Varying vocabulary depending on activities selected

Objective: To teach students about the various aspects of the National Park Service.

Materials: Internet access

Background:

The Great Smoky Mountains are world renowned for their diversity of plant and animal species. This great variety makes the park an exemplary outdoor laboratory for the study of relatively undisturbed native flora, fauna, physical environs, and processes of the Southern Appalachians. The park is the largest federally preserved and protected upland area east of the Mississippi River offering park visitors a refuge from the stresses of everyday life.

You and your students can learn more about this special place as well as participate in on-line activities to further your knowledge of the National Park Service and other federally protected lands.

Please check out the following web addresses:

Especially for Kids

To learn how to become a web ranger for the National Park Service, go to: www.nps.gov/webrangers

To learn how to become a Junior Park Ranger at Great Smoky Mountains National Park or other parks, go to:

www.nps.gov/learn/juniorranger.htm

Especially for Teachers

For a comprehensive understanding of the background and development of the National Park Service, that is perfect for teachers and others those who need the maximum amount of accurate information in the minimum amount of time, go to:

<http://www.ParkTraining.org>

The U.S. Department of Education is pleased to announce the newly remodeled and updated Federal Resources for Education Excellence (FREE) website. It now provides richer, more expansive resources to teachers and students alike. There are over 1,500 resources to take advantage of at FREE ranging from primary historical documents, lesson plans, science visualizations, math simulations and online challenges, paintings, photos, mapping tools, and more. This easily accessible information is provided by federal organizations and agencies such as the Library of Congress, National Archives, National Endowment for the Humanities (NEH), National Gallery of Art, National Park Service, Smithsonian, National Science Foundation (NSF), and National Aeronautics and Space Administration (NASA). Go to: <http://www.free.ed.gov/>





PARENT/CHAPERONE LETTER

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

