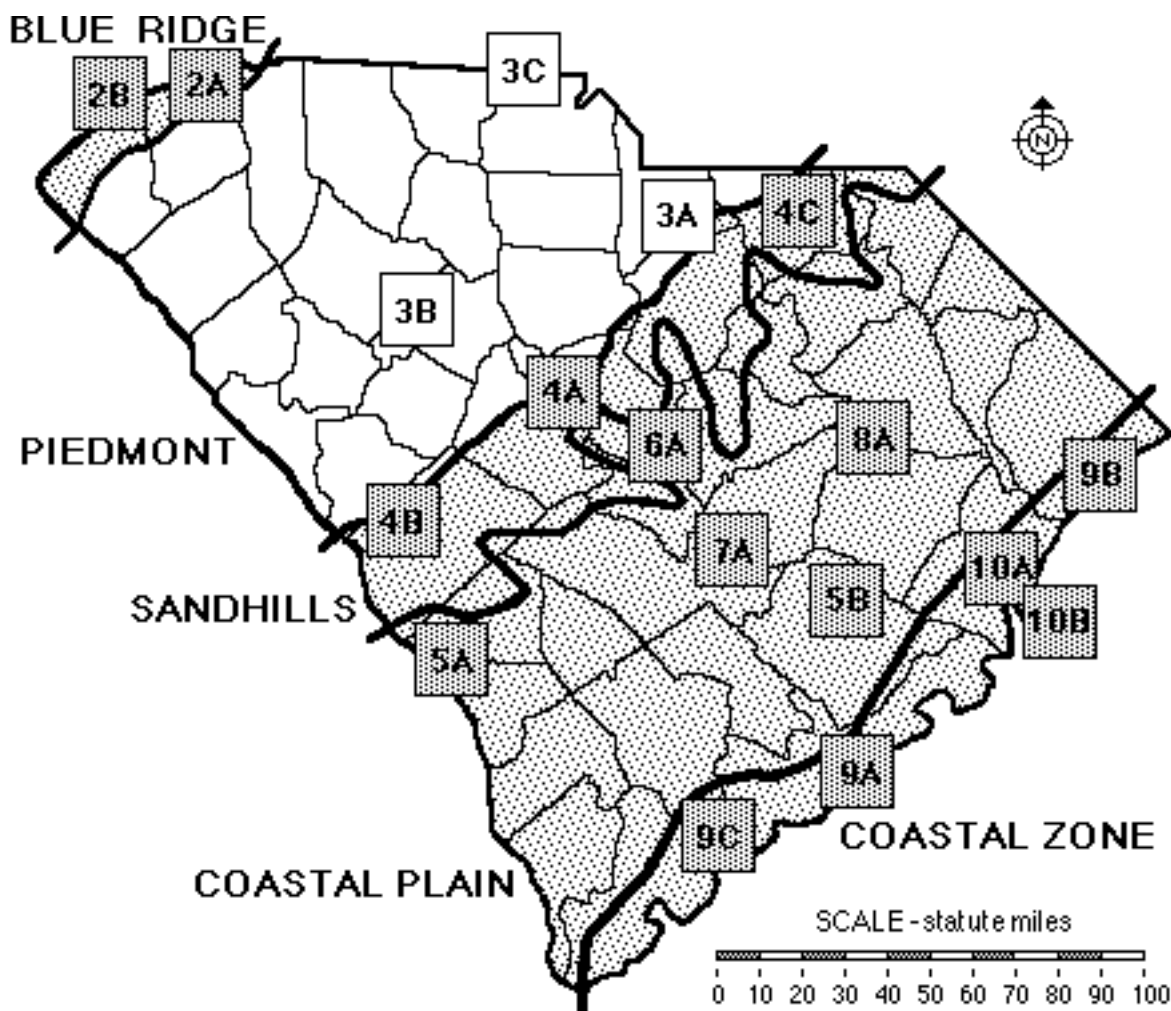


SECTION 3

PIEDMONT REGION



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(ICONS) Overv = ➔ Sci = ⚙ Math = 📖 Hist = 📖 Lang
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(ICONS) Overv = ➔ Sci = ⚙️ Math = 📄 Hist = 📖 Lang
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(ICONS) Overv = → Sci = ⚙ Math = 📖 Hist = 📖 Lang

Arts = ✍

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- p. 3B-77. calculate statistics based on areas of fields 📊
- p. 3B-78. estimate area of contoured field 📊
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- Enrichment

- p. 3B-81. identify where kudzu was planted to control erosion 📖 ⚙️
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(ICONS) Overv = ➔ Sci = ⚙️ Math = 📊 Hist = 📖 Lang Arts = ✂️

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- Performance Tasks

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- p. 3C-11 7. describe appearance of utility corridors ⚙
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- p. 3C-11 9. write letter and report recommending site for new factory ✍

- Enrichment

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- p. 3C-12 2. interview owners of small businesses 📖

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- Performance Tasks

- p. 3C-13 1. locate features at battle site ➔ 📖
- p. 3C-13 2. calculate slope of Kings Mountain 🖨 📖
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- p. 3C-14 4. describe the battle of Kings Mountain ✍
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- p. 3C-14 6. discuss effects of speeches on public opinion ✍
- p. 3C-14 7. explain location of springs on Kings Mountain ⚙
- p. 3C-14 8. write obituary for Ferguson ✍

- Enrichment

- p. 3C-15 1. research African-American military heroes 📖
- p. 3C-15 2. document importance of Kings Mountain Battle 📖
- p. 3C-15 3. research careers of Kings' Mountain commanders 📖

- Activity 3C-3 : Mining and Environmental Restoration

- Materials

- Performance Tasks

- p. 3C-16 1. locate strip mine sites ➔
- p. 3C-16 2. analyze land use changes through time ➔
- p. 3C-16 3. identify mineral resources of Kings Mountain area ⚙
- p. 3C-16 4. document changes in mine site ⚙ 📖
- p. 3C-16 5. document environmental problems at Henry Knob ⚙

- p. 3C-17 6. predict size of smallest detectable object 🖨
- p. 3C-17 7. describe impact of environmental restoration ✍

- Enrichment

- p. 3C-17 1. write to a mining company ⚙ ✍
- p. 3C-17 2. research mining operations ⚙

SECTION 3

PIEDMONT REGION

POWER THINKING ACTIVITY - "The Dilemma of the Desperate Deer"

Your group is attending a town meeting in the community of Silverstreet to decide what to do about the steadily increasing number of deer which are causing accidents on the highways and eating up farmers' crops because of a shortage of natural food. The deer live in the forest along the Bush River near Silverstreet (upper right-hand quarter of the SILVERSTREET LITHOGRAPH and middle left-hand side of the SILVERSTREET TOPOGRAPHIC MAP). Each person in your group should choose one of the following positions to defend. Use the topographic map and lithograph to provide evidence for your case. Debate the issues within your group and try to arrive at a consensus plan for solving the problem. Compare your final group plan with the plans of other groups. Which group plan has the best chance for success?

- FARMER - "I'm losing money because of the crop damage. I want to get rid of the deer completely. I don't care how."
- DEVELOPER - "I want to build more homes in the forest. I don't want any hunting there. Besides, homeowners like to see deer."
- HUNTER - "I want to be able to keep hunting in the forest. I want the deer to stay. Let the hunters keep the population down."
- CONSERVATIONIST - "I want to see the deer protected, even if it means moving them somewhere else. We need to create a park for them."
- TAXPAYER - "It's not my problem. I don't care what happens to the deer. Do whatever you want as long as it doesn't raise my taxes."

PERFORMANCE OBJECTIVES

1. Explain the geological processes that produced characteristic Piedmont Region landscapes and drainage patterns.
2. Interpret the meaning of Catawba tales and their relation to the natural environment and practice retelling folklore stories.
3. Trace the routes taken by families entering South Carolina on the Great Wagon Roads and settling in the Piedmont Region.
4. Analyze agricultural soil conservation and land restoration practices by identifying distinctive patterns of land use on maps and lithographs.

5. Design a typical Piedmont reservoir and describe shape of shoreline and environmental effects of reservoir on surrounding areas.
6. Examine the location of active and inactive gold mines with respect to rock sources, topography, and geologic belt.
7. Construct topographic profiles of several areas in the Piedmont Region to represent landscape diversity.
8. Analyze folktales to identify and locate references to distinctive Piedmont landscape features.
9. Differentiate land use in the Piedmont Region with respect to slope, land elevation, type of soil, and type of vegetation as determined from maps and lithographs.

BACKGROUND INFORMATION

Description of Landforms, Drainage Patterns, and Geological Processes

Characteristic Landforms of the Piedmont

The word **Piedmont** is derived from a French word meaning Foot of the Mountains. Although the South Carolina Piedmont certainly qualifies, it is only the northwestern portion that is technically at the foot of the mountains. The rest of the region stretches over 100 miles towards the southeast in a gradually sloping, mostly flat plain. The eastern boundary of the Piedmont Region can be identified by drawing a line on the map from North Augusta on the Savannah River through Columbia and to the place where the Pee Dee River enters South Carolina.

The land surface is quite hilly in the higher elevations towards the northwest, but becomes more gently rolling at the lower elevations next to the **Sandhills** Region. Modern Piedmont rivers, usually wider and flowing more gently than **Blue Ridge** streams, are actively eroding into the Piedmont causing steep-walled valleys with locally high **relief**. Piedmont rivers often have **dendritic** (branching) drainage patterns and are usually full of suspended sediment transported from the mountains. Occasionally, this suspended sediment is temporarily deposited in wide flood plains which provide rich and very productive soil for agriculture. Between river valleys, the broad upland areas are essentially flat.

Occasionally, the relatively flat rolling **topography** is interrupted by deeply dissected stream valleys and a few scattered hills, called **monadnocks**. These are single mountains, typical of the Piedmont, left comparatively undisturbed by erosion. Monadnocks are usually surrounded by relatively flat ground and can therefore be seen from many miles away. Sometimes these hills

are composed of harder rock which accounts for their greater resistance to erosion. In other cases, it seems to have been pure chance which has allowed them to escape erosion.

Geographic Features of Special Interest

Because of their elevation over surrounding areas, monadnocks are perfect locations for TV, radio, and microwave broadcasting towers. Some examples include Paris Mountain near Greenville, Six Mile Mountain in Pickens County, Little Mountain southeast of Newberry, and Kings Mountain east of Blacksburg. In addition, many large non-mountainous bodies of granite rock occur throughout the Piedmont. These features show up as bald rock exposures scattered around the landscape. In reality, the total granite rock mass underground is much greater than the small amount visible at the land surface. The largest and most famous of these exposures is called "Forty Acre Rock" (although only about fourteen acres are actually visible at the surface), located near Taxahaw in Lancaster County. Another famous outcropping, called "Ten Acre Rock," located near Rion in Fairfield County, is the site of a large quarry operation which mines the prized "Winnsboro Blue Granite."

Great Falls, on the Catawba River, used to be one of the largest waterfalls in the state before the river was dammed to form several small **reservoirs**. Old-time residents claim that the roar of the falls could be heard for miles around whenever the river level was high.

Shallow sections of flat rock exposed in streams are called shoals. These were typically places where horse-drawn wagons could cross the stream safely during times of low stream flow. Two well-known examples are Ware Shoals on the Saluda River in Greenwood County and Fork Shoals on the Reedy River in Greenville County.

Almost every Piedmont river, stream, creek, and branch has at least one dam and reservoir combination. These reservoirs range in size from local farm ponds to large impoundments like Lake Hartwell and Clark Hill (Thurmond) on the Savannah River, Lake Murray on the Saluda River, and lakes Wylie and Wateree on the Catawba River.

Piedmont Rock Types

Rock types of the Piedmont are remarkably similar to those of the Blue Ridge Region, differing only in specific mineral content and in regional distribution. Both **igneous** and **metamorphic** rocks are present in great variety in the Piedmont. Large igneous **intrusions** (plutons) range in composition from rocks rich in iron

and magnesium silicate minerals, such as the gabbro in Abbeville County, to rocks rich in aluminum, potassium, or sodium silicates, such as the granites in Fairfield and Kershaw counties. All such intrusions represent previously molten rock formed deep within the earth's crust during episodes of **tectonic** activity, primarily due to continental collisions, during the Paleozoic Era. Several of these igneous rocks are mined for monuments, memorials, tombstones, and foundation stone. The most famous rock type is the Winnsboro Blue Granite which is mined at the Anderson Quarry near Rion in Fairfield County. Blue Granite has been designated as our state rock.

A small but significant outcropping of Mesozoic age sedimentary rocks occurs in northern Chesterfield County. These rocks, identified mostly as sandstone and shale, were deposited in **downfaulted basins** (usually called Triassic Basins) associated with **rift zones** which became active at the time the Atlantic Ocean first opened. At about the same time, a series of narrow igneous **dikes** intruded the older Piedmont rocks and the overlying sedimentary deposits. While the sedimentary deposits have been eroded almost completely away, the intrusive dikes remain as evidence of the geologic activity which accompanied the continental separation. Many geologists believe that this activity caused the opening of the Atlantic Ocean in the Mesozoic Era. Such dikes can be found today in most areas of the Piedmont in South Carolina.

Metamorphic rocks are primarily gneiss and schist, but local deposits of marble exist in Cherokee County and other less common types of rock occur locally. These rocks vary considerably in their mineral content throughout the Piedmont, but more importantly, they differ in the extent of their **metamorphism**. Piedmont metamorphic rocks are broadly grouped into several parallel bands crossing the state from southwest to northeast, a trend produced by the pattern of the Paleozoic Era, Pennsylvanian Period, continental collisions.

Geologic Belts of the Piedmont

Refer to the figures of the "Geologic Time Scale and South Carolina" and the "Cross-Section of South Carolina" in Section 1, Background Information, to determine the location and extent of the Piedmont rock belts. The four most prominent belts or parallel bands crossing the state are designated as follows:

Inner Piedmont Belt Strongly folded, recrystallized, metamorphic rock

Kings Mountain Belt Less metamorphosed, economically valuable mineral assemblages, including lithium, tin, kyanite, and barite

Charlotte Belt Moderately metamorphosed rocks, containing igneous intrusions

Carolina Slate Belt Only slightly metamorphosed rocks, containing original sedimentary structures, includes sandstone, mudstone, volcanic sediment, granite intrusions, gold mines

The Inner Piedmont Belt is the northwesternmost major division of metamorphic rock. Once a thick sequence of volcanic and marine sediments, these rocks were at the center of the continental collision zone and were the most severely deformed, folded, and recrystallized during regional metamorphism.

The Kings Mountain Belt, next towards the southeast, is a much less metamorphosed narrow zone containing some rather unique mineral assemblages. Some of the more economically valuable materials being mined today include lithium, tin, kyanite, and barium. Most of these rocks were originally volcanically produced sediments, but they include some deposits of quartzite and marble.

The third zone is the Charlotte Belt, a moderately metamorphosed region which contains the majority of the igneous intrusions found in the Piedmont. Rock types found in this belt vary from metamorphosed granites (biotite and amphibolite gneisses) to metamorphosed gabbros or volcanic rocks.

The final zone, at the southeastern edge of the Piedmont, is the Carolina Slate Belt. Rocks in this region have been only slightly metamorphosed and can contain some original sedimentary structures and some occasional fossils. The major rock types are sandstone, mudstone, and volcanic sediments, although some large granite bodies occur in this zone. All of the current gold mining in South Carolina is in the Carolina Slate Belt in volcanic deposits and other sediment which were metamorphosed by hot fluids released from localized igneous intrusions.

The Catawba Nation

It has been estimated that there were originally at least twenty-eight Native American nations inhabiting South Carolina. While many of these nations were small, one of the largest in the state was the Catawbas who spoke a Siouan language. Their lands were centered along the present North Carolina - South Carolina boundary line. Like other Southeastern nations, the Catawbas hunted, fished, and cultivated corn, beans, squash, and pumpkins. They lived in bark-covered houses within villages surrounded by stockades.

The coming of the English had a dramatic and lasting impact upon the Catawbas, as well as other Native American cultures within South Carolina. Whiskey and smallpox did much to weaken the Catawbas' ability to resist the white settlers encroaching upon their ancestral lands. The Treaty of Pine Tree Hill (near Camden) in 1760 promised the natives protection from the settlers who illegally seized their lands and also promised them a fifteen-mile-square reservation (225 square miles or 144,000 acres) in return for their ceding over eight million acres. In 1763, the Treaty of Augusta reaffirmed the Catawba's 144,000 acre homeland.

By 1826, most of this 225 square-mile reservation had been leased to whites. Then in the Treaty of Nation Ford (1840), the state agreed to purchase the remaining Catawba lands in South Carolina but promised to purchase a new homeland for them in North Carolina. However, North Carolina refused to agree to this arrangement and the Catawbas were left homeless. The fact that South Carolina had not obtained federal approval of the treaty (as required by the federal 1790 Non-Intercourse Act*) meant that the treaty was legally questionable. In 1842, the state did purchase some 600 acres as a reservation for the Catawbas (now referred to as the Old Reservation).

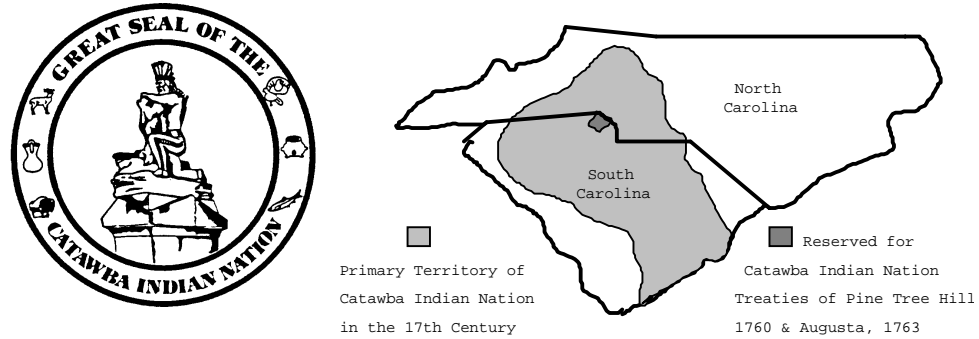
Through often changing and conflicting state and federal policies regarding Native Americans, the Catawbas struggled to maintain their cultural identity. Their pottery serves as a historic link with their past. Their pottery continues to be made using ancient traditional pottery techniques. It is made from special clay taken from the banks of the Catawba River (at a secret location). This special clay is filled with bits of mica and contains a relatively high percentage of iron oxide.

Throughout the years, the Catawbas have continued to claim 144,000 acres of land in York and Lancaster counties and filed a lawsuit to reclaim it in 1980. On October 28, 1993, President Clinton put an end to this 150-year-old land dispute and a twelve-

year federal court suit by signing into law a settlement of the Catawba land claims. Under the terms of the settlement, the federal government agreed to contribute \$32 million, and state and local sources agreed to contribute an additional \$18 million to settle the claims against South Carolina. Inhabitants of the reservation are also eligible for federal benefits. Throughout a long, drawn out struggle, the Catawba nation has managed to maintain a large portion of its cultural identity in an ever changing world.

* The Non-Intercourse Act was the name of a law passed by the US. Congress that forbade states to make treaties with any Indian tribe unless approved by the US. Government.

Figure 3-1: Great Seal and Map of Catawba Nation



Catawba Tales

Little is known about the origin of the ancient people that have come to be known as the Catawbas. From stories recorded by Spanish chroniclers we know that the Catawba people called themselves ye iswa (nea eswa) meaning "river people." Much of the history and culture has long been forgotten. Some of the remnants, though, such as the pottery tradition and folk stories told in their native Siouan language, as well as historical sketches recorded by the first Europeans to make contact, are still with us today.

Ye Iswa (People of the River)

Collected stories retold by Bob Ward from interviews at the Catawba Reservation

The old chief stirred before the fire and murmured a moment in the tongue of his fathers. Then he turned again to his tale. "I think the Catawba have always been here on the river. And why not? Are we not People of the River?" The flames crackled and I did not dispute him...

Thus goes the story of the chief of the mighty Catawba who called themselves Ye Iswa, People of the River. The Catawba Nation originated from tribesmen who were members of a Canadian community driven from their homes by the Connewango Nation. From Canada they wandered and settled at times in Kentucky and Virginia. Finally, they reached a river where they fought with the Cherokee, each side losing more than 1,000 men. The site of this bloody battle was said to be Nations Ford. These two tribes at last reached a settlement. The Cherokee would live on the territory west of the Broad River while the Catawba would live along the east banks of what would be known as the Catawba River. The land between was to be neutral territory--they could hunt on the nightfall. The Catawba River was named for this great aboriginal tribe probably from the Choctaw word "katapa,"

meaning "separated." The last of the Catawba soon will pass to the happy hunting ground--the "humbari," the "where-you-never-die" --of their fathers. And with them will die a thousand tales of a vanished people.

The wind whispered and sighed; and the wind and the night were part of the tales. With the firelight etching the wrinkles deep on his dark Indian face and warming his copper hands, the chief spoke the tales softly to the flames across the pines and red gullies to the banks of the Catawba River, now slow and muddy in the eye of his minds. He recalled the days when King Hagler and his children walked in the shade of their ancestors, the masters of the forests.

Old Bob Harris said it was understood by the Catawba of generations past that storytelling was intended to develop the mind, to make children think, to teach them the ways of life. Tales or stories as some prefer to call them should never be told at night according to the wise warriors of the Catawba. Such tellings cause trouble from snakes. Once a mighty warrior left his home knowing that he would be away until late at night; however, he never said aloud the time he meant to leave or return. Instead, he told his family that he was leaving on the following day--this might sound a bit confusing and that's good. If you couldn't figure it out hopefully the snakes couldn't either!

The Story of the First Woman

Retold by Libby W. Carnohan

Once the world was nothing but an unbroken waste of rocks and mountains except for one small, lovely valley where lived the sole inhabitant of earth--a beautiful woman. The woman lived on honey and sweet berries and fruit during the eternal summer. For music, she listened to the singing of the birds; her friends were the beaver and the doe. Dressed in the bright green leaves of the water lilies, she was the ruling spirit of this world which never grew old. Even the flowers bloomed and never faded or died in this paradise.

One morning, she was sitting at the entrance to her cave when a scarlet butterfly with fluttering wings drew her away. Up, up far into a rocky ravine, she followed the butterfly until she reached the foot of a tall waterfall. There she lost sight of her scarlet guide. She searched and searched, but she could not find the way out of the ravine. She felt fear for the first time. She wandered farther and farther astray until finally she fell to the ground, weary and broken-hearted.

During the dark night, she woke in pain. The dew had fallen and the damp, cold air had caused her legs to cramp.

When she turned her face toward the moon, she saw a form much like her own, though fiercer, bending over her. Dressed in a cloud this inhabitant of the sky raised her up and comforted her. "He" told her that he had been traveling from the evening to the morning star when her plight aroused his compassion.

By rescuing her, this sky-man had broken the Great Spirit's command. Afraid, then, to return to the sky, he asked if he might remain with her on earth. She consented and the two found their way back to the magical valley where "as man and woman" they lived together for many moons in perfect peace and joy.

In time, the woman gave birth to a child and their happiness increased, but so did their troubles and cares. Soon, they thought the earth might be as filled with people as the trees are covered with leaves and the dark with stars. Afraid for the future, they sought the guidance of the Great Spirit.

The Great Spirit looked down upon the man and woman with pity and caused a mighty wind to range mountains together and open valleys and prairies. From the rising to the setting of the sun the earth was beautiful. The Great Spirit told the children that the earth was a gift to them from his hand and was to be their inheritance. Because, however, the man had broken his command, they must work for their food and each year would have a season of bitter cold. Moreover, their lives would be limited in years--then they must die. They would know the time was near when their heads became white as the plumage of the swan.

The Woman Who Became an Owl

Traditional

yamusi hi tca wa i mpi ya musa tera rare. yamusi
ki na prire e ke ku Woman old night fire road
chimney out went. Old woman the two were

bara yere. ustugri o me ya ket cere du g ya phapki
wa re ustugri hi xhi x these now sisters were. Hoot
owl alone transformed home tree up sat.

ha tikire yamusi ki ye dapa ikto nere ustugri
kere watka in yere hoot owl exclaims old woman
the. One witch is hoot owl this chicken steal.

Free Translation

An old woman sitting beside the fire one night went up through the chimney. The two old women were sisters. One had become transformed and had taken the form of a hoot owl and sat up in a tree. "Hoot Owl," exclaimed the old woman. One witch is a hoot owl that stole the chicken.

The Legend of the Comet

Traditional

Once a woman's son was stolen by another woman. The mother searched and searched. Finally she found her son and together they escaped from the earth and rose high up into the sky. The thief who had stolen the boy caught hold of a rope the mother and her son had let down to the earth. Ungi, for that was her name, lost her hold and fell down through the sky leaving behind her a brilliant streak like a tailed star. She became a comet. Delighted to never fear Ungi again, the mother and son soon went to humbari (heaven) and the son became a perfect little cloud.

The Legend of the Brownies

Traditional

In the old Catawba cemetery and elsewhere along the Catawba river live the little "Brownies" who have always been known to the Catawba people. Brownies are tiny dwarfs who sometimes capture children and take them away and tie their hair in the bushes. Old folks say that just the mention of a Brownie could keep a child from wandering off.

The Rooster and the Fox

A trickster tale as retold by Libby W. Carnohan from notes of
Bob Ward

Rooster was feeding up in a tree one day when along came Fox. "Come on down," said Fox. "Don't be scared of me. I won't hurt you. Haven't you heard that peace has been declared between all birds and animals?" "Why, no," said Rooster. "Nobody told me." "Well, it's true," said Fox. "The news has gone around and I thought everybody had heard, so come on down." From up in the tree, Rooster could see a pack of dogs coming following Fox's trail. He said, "Well, if that's true, I'll be down directly. Then you and me and that pack of dogs headed this way can sit down peacefully and talk." With that, Fox saw the dogs coming over the hill and ran away. I guess you might say Rooster out foxed him.

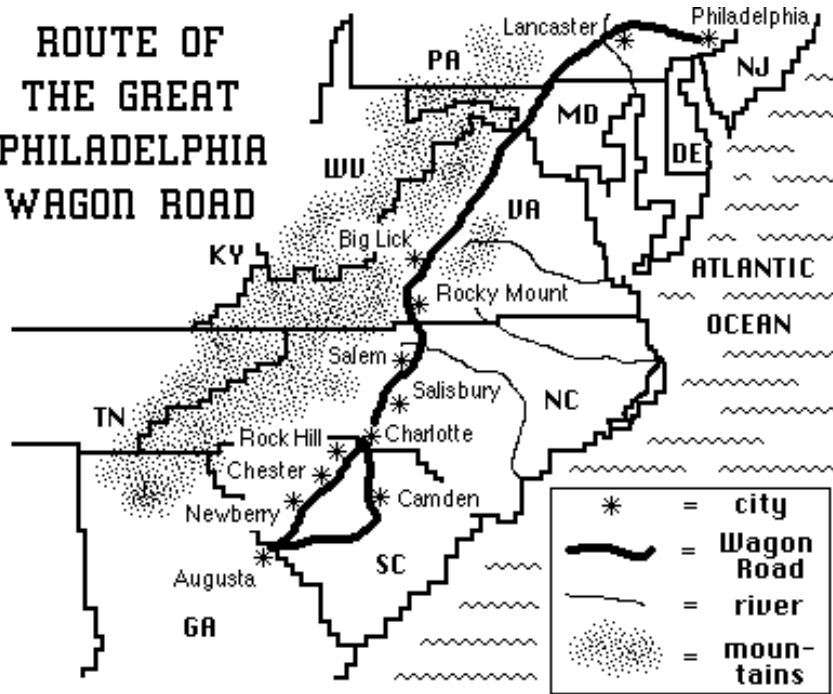
Catawba Pottery

Out of two riverbeds, the Catawba dig the clay they use for the pottery which has allowed their culture to continue. These clays are cleaned and mixed to remove all foreign substances and then strained until workable. This part of the process can take weeks. Finally, the potter takes the prepared clay and using a coiling method, begins to make a pot or bowl. Potters use their hands, sticks, shells, knives, spoons and rocks to form the clay in the desired shape. The unusual finish found on Catawba pottery is applied with a rubbing rock. A good pot will have a finish like velvet. The last step in the process is the firing. The Catawbas use the old ways. They burn the pottery in a bonfire fueled with seasoned oak. Most potters burn three fires to produce a finished pot. The entire process is slow, but the results are some of the finest native American pottery you can find. This pottery, regarded as "a pure aboriginal art form," sells for as much as \$500 a piece to museums and collectors around the country. Many of the Catawbas use their pottery in exchange for goods and services. For instance, one potter has paid all of his medical bills over the years with pottery. This is the old system of bartering.

During the dispute over the land claim, where the Catawbas sought restitution for land which once belonged to the them, one of the sources of the clay was endangered. Many say this particular clay, found in a deposit near Van Wyck, produces a unique form of burned pottery which is especially rare. This clay can only be harvested from this deposit, and the owner, who was a defendant in the lawsuit, refused to allow the Catawbas to continue digging. Since this dispute began, the potters have run dangerously low on clay and are actively searching for a quality deposit elsewhere. This clay is typically found in deep gullies along the Catawba River, five to six feet under the topsoil.

Figure 3-2: Map of the Great Philadelphia Wagon Road

ROUTE OF THE GREAT PHILADELPHIA WAGON ROAD



Immigration into the Piedmont

The Great Philadelphia Wagon Road was a major immigration route for German and Scotch-Irish settlers who moved into the Piedmont of South Carolina. The wagon road stretched seven hundred miles from Philadelphia, extended through the Carolina Piedmont, and ended at Augusta, Georgia. It was German settlers living in Pennsylvania who developed a covered wagon, known as the Conestoga, which was used extensively on this road. This heavy wagon was constructed of hardwoods and required six horses to pull it. It was covered by a canopied top that was called a "poke bonnet" due to its similarity to a women's bonnet. When fully loaded these wagons could travel approximately thirty miles a day. It was in such wagons that Andrew Pickens and the parents of Andrew Jackson followed the Great Wagon Road into the Waxhaw section of South Carolina. During the last years of the colonial period, the Great Philadelphia Wagon Road became one of the most heavily traveled roads in America.

Settling the Piedmont: Act of 1743

Due to a combination of factors such as lack of roads, lack of navigable rivers, and fear of Native American attacks, settlers were reluctant to move into the **Back Country** (a term used during colonial times to describe the area above the **Fall Line Zone**) of South Carolina. The Royal Assembly of South Carolina attempted to encourage immigration into this area by passing a law in 1743, known as The Act of 1743, which would provide potential settlers with transportation, tools, a year's provisions and even livestock. This act provided that each settler over the age of twelve would be provided 300 pounds of salted beef, 50 pounds of salted pork, 200 pounds of rice, 8 bushels of corn, 1 bushel of salt, 1 ax, 1 wide hoe and 1 narrow hoe. Every five men were to receive a cross-cut saw, and every family of 5 or more was to receive a cow and calf. Also, under colonial law, a settler could claim 50 acres for each member of his family (referred to as a head-right) and also for each servant he might have.

Farming in Colonial Times

During the colonial period of South Carolina's development, it was mostly farmers who settled in the Piedmont Region. They arrived with a pair of horses or yoke of oxen, a small wagonload of household goods and farm tools, and a few cattle, hogs, and chickens. Many received land grants for small farms of about 175 acres. They preferred hillside locations near creeks rather than large rivers. Often the rivers flooded the bottomlands making the rivers hard to cross. Smaller creeks could easily be crossed providing more mobility to the settlers. Many natural springs in

the hillsides provided a good source of water. The early settlers arrived in the winter months so that a shelter could be built and a few acres of land cleared in time to plant a spring crop of corn and other food. As time went on, apple and peach trees were planted to provide cider and brandy. The soil was very rich at first, but with continuous planting of crops and the subsequent soil erosion, it soon became depleted. Later when cotton was introduced, it was planted extensively and caused increased erosion and more depletion of soil nutrients.

South Carolina Regulators

After peace with the Cherokees in 1761, settlers poured into the Back Country of South Carolina. The Assembly, in 1757, created St. Marks Parish which covered one-third of South Carolina. It stretched from the Pee Dee River to the Santee-Congaree-Saluda river system. By 1776, almost half the total population of the colony (and four-fifths of the white population) lived in the Back Country. Yet, the region had inadequate representation, no courts, and few roads, churches, or schools. Reverend Charles Woodmason (an Anglican clergyman) published his observations of the depredations of the numerous outlaws who terrorized, robbed, and murdered the settlers in the Back Country.

The Back Country settlers' needs and petitions for help were ignored for a long time by the Assembly. Yet the Assembly spent thousands of pounds to construct the Exchange in Charleston, purchase a statue of William Pitt, support the Wilkes Fund, and pay for a delegate to attend the New York Stamp Act Congress. In seeking to protect themselves and their property, the settlers formed local associations known as "Regulators" and refused to pay taxes until their grievances had been addressed. Moving to enforce the Law locally, they soon began defying orders from the courts in Charleston. The Regulators clashed with sheriffs and "loyal militia." With the very real threat of major violence in the Back Country, the Assembly set up new circuit courts in Cheraw, Camden, Orangeburg, and Ninety Six. Still, many of the Back Country grievances against Charleston had not been settled when the American Revolution started.

Battlegrounds in the Piedmont

The Back Country of South Carolina played an important role in the American Revolutionary War. The first military action in the state between American patriots and British loyalists that resulted in bloodshed occurred at the town of Ninety Six. Loyalist forces attacked Major Andrew Williamson's patriot force at the fort which the patriots had previously constructed. These rival forces fought from November 19 to November 21, 1775, before finally agreeing to a truce. In response to the continuing loyalist threat, Colonel William Richardson marched a group of patriots across the Back Country crushing loyalist resistance in what became known as the Great Snow Campaign in December of 1775.

A new threat to the American patriots developed in July 1776, when the Cherokee Nation went to war and attacked settlers and settlements in the Back Country. Colonel Williamson called out the militia, marched against the Cherokee Nation, and burned their towns and crops. North Carolina and Virginia also sent troops to assist in the campaign against the Cherokees. With their homes,

orchards, and fields destroyed, the Cherokee Nation was forced to ask for peace. Meeting at DeWitt's Corner (present site of the town of Due West), the Cherokee leaders signed a treaty on May 20, 1777, that forced them to give up all of their lands in South Carolina except for a small strip in Oconee County. Most of the present-day counties of Greenville, Pickens, Anderson, and Oconee were created from this ceded Cherokee land.

With the defeat of the Cherokee Nation, the Back Country returned to relative peace until the British captured Charles Town on May 19, 1780. In order to secure the state for the loyalist cause, British General Clinton dispatched troops to establish military posts at Camden, Ninety Six, Augusta, and Georgetown. Despite this show of force, the Back Country patriots began a campaign of organized resistance to the British occupation. Colonel William Hill and Colonel Andrew Neil rallied their Back Country militias and were the first to raise the new American flag after the fall of Charles Town. The war that was ignited in the Back Country ranged in strategy from guerrilla warfare to major military engagements, from the relatively minor skirmishes at Fish Dam Ford to major battles at Kings Mountain and Cowpens. All these efforts served to help keep the spirit of independence alive and contributed to the final patriot victory over the British in the state and the new nation.

The Naming of Rock Hill

It is interesting to note that the necessity for railroad transportation brought on by the extensive cotton crop helped open the **Up Country** (the term used after the Revolutionary War to refer to land areas above the Fall Line Zone) and caused numerous towns to be founded. It was the granite outcropping coupled with the coming of the railroad that was the basis for naming an important Piedmont city, Rock Hill. When the railroad was first surveyed, the train was to have gone through the community of Ebenezer. The townspeople refused to sign right-of-ways, as they feared the train would frighten their people and smoke would destroy the beauty of the community. The railroad line was moved to a rocky knoll nearby. While the railroad construction gang was blasting the cut through the area, they referred to it as rock hill. When they reached a specific place, someone asked "what shall we name this place?" The supervisor of the railroad said, "Rock Hill." This city has grown and prospered, encompassing Ebenezer (Ebenezer) as one of its nicer residential areas.

Cotton Mill Towns Become Part of Industrial Region

For years the settlers of the Piedmont were almost single-mindedly concerned with growing cotton, but the region was still able to become an early industrial location because of the wide availability of water power. Almost every stream, at every falls or shoals, was dammed to provide power for water wheels to run cotton mills. Small mill towns flourished for years, even after cotton was no longer a profitable crop. Textile mills have consistently been the Piedmont's most important industry. Recently, with improved transportation systems, educational opportunities, and governmental promotion and incentives, South

Carolina has attracted an increasingly diverse set of industries and businesses to the Piedmont area, especially to the Greenville-Spartanburg metropolitan area. With the textile mills came a variety of environmental concerns. At one time the Reedy River was nicknamed "Rainbow River" due to the dyes poured in the rivers from various plants. Now tighter controls coupled with public awareness are eliminating many of these problems.

The Most Beautiful Girl in South Carolina

Retold by Bob Ward

Intriguingly strange are the stories which are suggested by weatherworn tombstones in Ebenezer Cemetery--the oldest in this section. And one of the most interesting is the story of how Mary America Avery Toland, once known as the "most beautiful girl in South Carolina," came to rest under these cedars. The story goes back into another century, not so long ago amid the gravestones which date back to 1750:

In 1832, in Ebenezerville (now part of Rock Hill), a daughter was born to Col. Edward Avery and Mrs. Mary Elizabeth Vaughn Avery. They chose to call her Mary America Avery. The home where she was born still stands to this day. As a child, dark-haired little Mary Avery sometimes played near the walls of the old Ebenezer churchyard. As a child, she may even have traced the inscriptions inlaid in gold on some of the monuments.

As she grew older, she grew into a beautiful young woman with dark blue eyes behind long dark lashes. The charm of her oval face has been preserved in a portrait painted by a noted artist of the day. During those ante-bellum days, the state ball, held in Columbia, was the social event of the year. When Mary Avery was 21 years old, she was presented at the ball and acclaimed the "most beautiful girl in South Carolina," later often referred to as the "state beauty."

One of the guests that year at the ball, was a Dr. Hugo Toland, a prominent doctor in Columbia. He met Mary Avery and said, "She is the most beautiful woman I have ever seen, and I expect to marry her." Although years older than she, after a whirlwind courtship, Dr. Toland married Mary. A man of vision and adventure, Dr. Toland planned a trip to the West for his delicate bride. He spared no expense for the journey outfitting a caravan with every luxury and convenience. Before they left on this extended trip, Mary's mother exacted a curious promise from her new son-in-law. She made him promise that if anything should happen to Mary that she would be brought back to Ebenezer Cemetery to rest.

For nearly six months, the caravan moved slowly along the plains of wild and unsettled country. One September night, they camped a few miles from San Francisco, a small city of the day. Little did they know of the cholera epidemic prevalent in that district. That night, Mary Avery Toland contracted the disease and three days later on September 22, 1852, she died. Dr. Toland, stricken with grief, took the body of his bride to San

Francisco and under his direction had her embalmed. Then he built a glass casket and placed her body inside. There, in his office, he kept her for almost twenty-five years.

To console himself, Dr. Toland threw himself into his work and built up a large practice. He founded San Francisco's Toland University. Later, he remarried and had a son, Arthur Toland, who became an actor. However, he never forgot his promise to bring Mary home to South Carolina, to Ebenezer Cemetery to rest. In 1877, Dr. Toland decided to fulfill that promise, and he brought the body of Mary America Avery Toland home. Mary traveled this time, not by caravan across the plains, but by train in seven different coffins.

When she was finally buried there under the cedars to the left of the drive approaching the old red church, which leads up through Ebenezer Cemetery, she was as beautiful as on the day she died. Her life was short, her beauty such that when she died there was written for her epitaph these lines, now worn from the stone which marks her grave. Even today, if you go to that final resting place, you can just barely read part of the epitaph her husband composed:

*"No one as beautiful as she,
Fairest of form and face.
A queenly mien with modesty,
Crowned every other grace."*

The Anderson Car

Rock Hill, South Carolina, was also the home of one of the first car companies in America. On January 17-22, 1916, John Gary Anderson held the grand opening for his Anderson Motor Company which had grown out of his Rock Hill Buggy Company. He produced a car driven by a six-cylinder engine equipped with oversized tires. The Anderson Motor Company was the first in the automobile industry to use a foot dimmer to control the car lights. The dimmer was invented by C.A. Deas of Anderson.

Anderson cars were sold throughout the United States. The company's peak was reached in 1920 when it produced thirty-five cars a day. However, strong competition and the higher cost of the car forced the company to cease production of the Anderson car in 1924. Today, only six Anderson cars are still known to exist.

The Interstate 85 Corridor

The automobile has become a major influence in 20th century culture and has changed the way South Carolinians travel and do

business. Prior to 1940, most people traveled by train and every small town had a commercial center where local residents could do their shopping. Industries selected their locations based on the availability of power (either water power or electrical power), and access to a railroad line. Almost all shipping was done by rail. As a result, small industries and commercial centers were spread widely across the Piedmont Region.

Construction of the Interstate Highway System started in the 1950's under the leadership of President Dwight D. Eisenhower. Begun as an emergency transportation route for national defense purposes, the Interstate Highway System has expanded into all parts of the United States and now provides fast, efficient transportation for cars and trucks across the state and the country. Where interstates bypassed cities, shopping malls, commercial facilities, and industrial parks followed, until an entire suburban culture sprang up like a series of satellites around the town center. Most people preferred to shop in large suburban stores forcing former commercial districts in town or city centers, faced with a major loss of business, to either close completely or make drastic changes in their operations. As a result, many people in both rural and urban areas now had to travel a lot farther to do their shopping, an inconvenience for both poor people and those who do not drive or own a car.

The commercial and industrial development along Interstate Hwy. 85 is a prime example of the type of cultural and land use changes brought about by the construction of a major transportation link. Interstate 85 connects the major southeastern urban areas of Charlotte, North Carolina, and Atlanta, Georgia. It follows approximately the route of the Southern Railroad main line and passes through or near the major South Carolina cities of Anderson, Greenville, Spartanburg, and Gaffney. New businesses and industries have sprung up all along this route, mostly around major interchanges. New malls and housing subdivision developments have followed closely behind. Although these developments have brought a newfound prosperity to the communities in the Interstate 85 corridor, they have also siphoned off business from other towns and cities which are not near an interstate highway.

Natural Resources, Land Use, and Environmental Concerns

Climate and Water Resources

The Piedmont Region receives annual rainfall amounts ranging from 45 inches to 60 inches and has a 200 to 240 day growing season. In contrast to the Blue Ridge, Piedmont streams flow more gently and have numerous tributaries. Stream systems often show a **rectangular drainage pattern** where **faults** and rock fractures intersect the surface. In areas of homogeneous rock, dendritic drainage patterns are more common. Most stream waters are colored to some extent by suspended sediments composed of silt and clay-sized soil particles. This brownish coloration is especially noticeable during heavy rainstorms, when runoff from farmland brings great amounts of eroded soil into the adjacent stream systems. All but the smallest streams are **perennial**, and rainfall is usually equally sufficient for most agricultural needs. Groundwater resources are highly variable because of the complex geologic structures underlying the Piedmont landscape. Fracture zones serve as conduits for groundwater and are the best sites for locating wells.

Piedmont Reservoirs

South Carolina was also an early leader in the development of hydroelectric power. Since 1900, several large lakes have been constructed for that purpose along most of the major rivers which flow through the Piedmont. Lake Hartwell on the Savannah River and Lake Greenwood on the Saluda River are prime examples. Lakes such as these provide benefits far beyond hydroelectricity. Recreation, tourism, and flood control are three immediate benefits which have been important to regional development. Many of these lakes have also become centers for retirement homes or bedroom communities, where people live while working in nearby cities. A large amount of waterfront real estate was produced by the flooding of these river valleys. Some of the environmental effects have been the loss of forest and agricultural bottom land, increase in thermal pollution in waterways, and controlled stream flow.

In recent years the impoundments both within and on the borders of the state, e.g. lakes Keowee and Hartwell, have become the sites of significant recreational fishing. Striped bass, hybrid and largemouth bass, and catfish are important fish for recreational purposes. The rise of the fisheries is a reminder that until 1830, the rivers of South Carolina provided a supplementary income to large numbers of people who caught sturgeon, salmon, bass, and shad in great quantities. But over-fishing and the large amount of sediment that the streams carried due to topsoil erosion from cotton fields ended significant commercial fishing. Only in the past six decades with careful management practices has fishing been restored to a place in South Carolina life.

Soils and Red Clay

Soils in the Piedmont are generally found on gentle to moderate slopes, although some slopes are occasionally steep. These soils are usually thick and have formed in rock that has weathered in place for many years, producing extensive exposures of the crumbly rock and soil mixture called **saprolite**. For many millions of years, the Piedmont has been an erosional region. Only in a few stream valleys and **floodplains** can any thick depositional sequences be found. Soils along such river and stream valleys are usually formed in alluvial material transported and deposited by streams.

Most Piedmont soils are moderately deep, well drained, and have clayey to **loamy** surface layers and clayey subsoil layers. Most are also residual, having formed directly from the underlying chemical **weathering** of crystalline rocks, and as a result, soil

types are strongly related to the rock type in which it formed. These soils are well known to farmers and homeowners for having a layer (or horizon) of reddish clay beneath the surface. Insoluble iron and aluminum oxides cause the red to reddish-yellow color often seen in the subsoil. The red color is one indication of the soil's extreme age - several million years old. The Piedmont soils are, in fact, some of the oldest found anywhere on the earth.

Agriculture and Erosion

The high clay content contributes to the compact nature of most Piedmont soils, a feature which prevents them from easily absorbing rainfall. As a result, most heavy precipitation runs off the land creating a high risk of serious soil erosion. Extensive sections of the Piedmont have been eroded over the past several hundred years, resulting in the presence of only very thin topsoil layers or just subsoil layers at the ground surface. Planting crops on steep slopes without the use of proper conservation practices and techniques caused periods of devastating erosion. The abuse of Piedmont soils over the years is well documented through the dust bowl days, when the federal government purchased the most severely abused lands and turned them into National Forests.

Suitability classification for most soils of the region is fair to good for row crops. Approximately two-thirds of the land area is now covered by forest and about 30 percent is devoted to farming, with corn, soybeans, cotton, and small grains being the major crops. Orchards, pastures, and forests grow on the lands more susceptible to erosion. Only about 20 percent of the area is considered to be prime farmland. At one time much of this land was not thought to be fertile because the leaves on the cotton crop developed rust colored spots while the leaves on the corn curled in a pattern called frenching. After the soil was chemically examined in the late 1800's, it was found to be lacking in the nutrient potash. When this fertilizer was added, the soil became as productive as any in the state.

Reforestation and Soil Conservation

Travelers and naturalists passing through the Piedmont in the 18th century described mature forests of hardwoods and shortleaf pines. Beginning in the 19th century, large areas were cleared for cotton production to the extent that little of the natural vegetation remained undisturbed. Because soil conservation was not an issue at that time, much of the Piedmont Region of South Carolina became a victim of extensive soil erosion with the rolling hills cut by gullies and the soil nearly exhausted. When

land became too gullied to work productively, farmers simply picked up and moved westward to find new land. By the early 1900's, much of the upstate consisted of abandoned farmland or subsistence farms which could barely support the families living on that land.

Reforestation and soil conservation programs, started by the New Deal in the 1930's, permanently changed the appearance of forests and farmlands in the Piedmont. The Federal Soil Conservation Service was established in 1935. This government agency provided technical assistance to farmers in terracing, strip cropping, crop rotation, pond construction, and the planting of legumes such as soybeans and kudzu. An important discovery made by Dr. Charles Herty, a Georgia chemist, in 1930 also had a major impact upon Piedmont forestry. Dr. Herty invented a method for making paper from loblolly pine, the most common pine tree in the Piedmont. The promise of profits from growing pines encouraged farmers to plant their worn-out cotton lands in pine seedlings. The planting of pines furnished by the State Commission of Forestry has helped to fight soil erosion in the Piedmont and led to a major reforestation of the upstate.

In addition, the Agricultural Stabilization and Conservation Service (ASCS) administered a variety of federal subsidy programs. It also encouraged farmers to practice better farming methods and allowed them to reduce agricultural output in return for government benefits. As farming declined and farmland was abandoned, particularly after 1950, a succession of vegetational changes began. This natural biologic succession progressed through various stages from cleared land, to pine forest, to a mature climax oak-hickory forest. Loblolly pine was "seeded-in" to many abandoned agricultural fields or was intentionally planted to help control erosion over large areas. It continues to be planted by forest companies, state forestry officials, and private landowners, so that it is today the most common tree in the Piedmont landscape.

Establishment of National Forests

During the Great Depression, the Federal government moved to restore the forests of South Carolina. It purchased 54,000 acres (approximately one-seventh of the total area of Newberry County) as part of the Enoree division of the Sumter National Forest. The Santee National Forest was divided into three divisions: (1) the mountain division located in Oconee and Pickens counties; (2) the Enoree division located in Chester, Fairfield, Laurens, Newberry, and Union counties; and (3) the Long Cane division located in Abbeville, Edgefield, Greenwood, McCormick, and Saluda counties.

Unique Natural Habitats in the Piedmont

Located within the Piedmont are several Heritage Trust Preserve sites containing **landforms** that create special environmental conditions for unique plants. The John de la Howe Museum Tract in McCormick County surrounds a special school for young adults, which has been operating for nearly 200 years. The grounds contain areas of virgin forest, uncut for over 300 years, which include the largest shortleaf pines in the state. The Stevens Creek Preserve, also in McCormick County, is one of the state's most diverse and unique historical areas. The well-drained north-facing slope and acidic soils occur in a cooler and wetter **habitat** than is usually found in the Piedmont, and the wildflowers and large trees resemble plant communities usually found much farther north.

The Flat Creek Preserve in Lancaster County surrounds Forty Acre Rock, which is actually only 14 acres. It is a massive exposure of solid bare granite with no significant soil layer to hold moisture. Consequently the granite surface strongly resembles habitats normally found in deserts. Slight depressions in the granite, formed by chemical weathering, can hold water temporarily after a rain. It is in these pools that small, fragile plants and animals slowly build even more complex communities. Surrounding the granite exposure is a vast pine forest and a nature trail three miles long. Forty-Acre Rock is a typical example of a granite outcropping found in the Piedmont Region of South Carolina.

The lower Piedmont offers the largest expanse of forest lands in the region, and provides some of the best deer and turkey hunting and outdoor recreation in the state. Many of the land tracts of the Piedmont are managed for multiple use, a term used to describe the practice of land management that provides for timber production and harvest, while also encouraging wildlife management, recreational use, and other benefits to the landowner. Two large districts of the Sumter National Forest are located within the lower Piedmont which, in combination with several large reservoirs in the area, provide many recreational opportunities including a well known and highly productive warm water bass and bream fishery.

Underground Storage in Granite

An interesting use of the underground granite formation is the storage of propane in the York County community called Tirzah. Two caverns dug out of solid granite 450 feet below the earth's surface are used as storage for millions of gallons of propane. Trucks and trains arrive daily and are loaded with propane to service a large region of the southeast. A six inch pipeline is also used to transport the fuel.

Gold Mining

South Carolina has become one of the leading gold producing states east of the Mississippi River. Recent gold mining operations have been centered in Lancaster County, the Piedmont Mining Company (Haile Gold Mine); Chesterfield County, the Brewer Gold Company; and Fairfield County, the Ridgeway Mining Company. The first gold rush in the United States started when a 7.7 kg nugget was found in the Piedmont section of the Carolinas in 1799. This was fifty years before the gold rush in California. The site was in what is now North Carolina. In 1829, the first gold was mined in Lancaster County with the first shipment leaving the Haile Mine. About the same time, the Brewer gold mine in Chesterfield County became productive. The Dorn gold mine in McCormick County was opened in 1852 with peak production occurring around 1859. During the Civil War, Billy Dorn outfitted an entire company of Confederate soldiers from the profits he made from gold. Gold from the Haile Mine was used by the Confederate Army to finance the war effort. As a result, Sherman made a special effort to destroy the buildings and equipment during his historic march through South Carolina. It was not until the 1970's when the price of gold skyrocketed and new mining and extracting processes were designed, that the gold mining industry in South Carolina was revitalized. The process is expensive as it takes about 20 to 30 tons of rock to extract one ounce of gold using a chemical dissolving process. The Ridgeway Mine, opened in 1988, is now the largest gold producer in the state (1995 data).

Summary

The Piedmont constitutes the second largest of South Carolina's landform regions. It comprises about one-third of the state's total area and has been especially important as a source of economically valuable rocks and minerals, such as granite and gold. Other assets are the rich agricultural land and a prolific source of water power that made possible the development of cotton mills and other early industries. Much of South Carolina's current population growth has been concentrated in the Piedmont and is due to the increased industrialization and urbanization in the region, especially along the corridor of Interstate Hwy. 85. Former agricultural misuse of the land created severe erosion problems but the transition from an agricultural to an industrial society has helped to encourage conservation and effective land use planning.

Removed from the coast and the easily navigable rivers of the **Coastal Plain**, the Piedmont was the second frontier in the European settlement of South Carolina. A broad, rolling region underlain primarily by parallel bands of various metamorphic rocks, the Piedmont surprises with occasional isolated mountains and deeply incised rivers. The Catawbas highlighted the abundance and importance of these rivers with the name they called themselves: Ye Iswa--People of the River. These Native Americans lived throughout the Piedmont in early colonial times, and still live there now. Although their current land holdings do not compare to the great area they once inhabited, their feat of maintaining much of their native culture through stormy and often hostile years is a victory which they celebrate in art forms such as storytelling and pottery.

Urged on by the Settlement Act of 1743, which granted incentives of food, tools, and land to European settlers of the Piedmont, and by improved transportation routes into the area, colonists began to arrive in ever-greater numbers during the second half of the 1700's, and several important Revolutionary War battles were fought in the Piedmont. Despite the lawlessness and isolation of a frontier area, the Piedmont was populated and powerful enough to force a relocation of the state capital away from the coast in the late 1700's.

For much of the 1800's, cotton was king in the Piedmont, and agriculture in general has historically driven the Piedmont's economy, but poor agricultural practices such as a failure to rotate crops and heedless plowing contributed to soil exhaustion and rampant erosion, especially in the late 1800's and early 1900's. However, increased knowledge and improved farming techniques have led to greatly improved conditions since then. Although it is still extremely important in some areas, a dramatic

economic shift has made agriculture less important in this region as a whole. Industry, expanding from the textile towns of the past into the high-skill manufacturing of today, is now a major force in the economy of the Piedmont.

What changes will the future bring to this region of South Carolina? The Piedmont seems to be continuously in transition. After decades of severe soil erosion, it is the place where successful soil conservation has been pioneered. After domination by cotton and the mill town economy, it is the place where new industry and urbanization are flourishing. After free-flowing streams offered the promise of virtually unlimited water power, it is the region where almost every stream has been dammed, and where we have altered not only the stream flow but also the vegetation, animal habitat, sediment transport balance and even local weather conditions. The Piedmont Region contains very few places that preserve the original natural setting. As human modification continues, as it unquestionably will, we must assure that the few remaining natural areas are not lost by neglect or apathy. In a region as vibrant and active as the Piedmont, natural pockets of serenity are ever in demand.

PLACES TO VISIT 📞

John De La Howe Museum Tract. Little River and Thurmond Reservoir. For information call 803-391-2131.

Steven's Creek Heritage Preserve. SC 23, 15 mi. from Edgefield to Sec. Rd. 139 to Sec. Rd. 143. For information call 803-734-3893.

Molly's Rock/Sumter National Forest. SC 121 N from Newberry, US 176 SE. For information call 803-765-5222.

Flat Creek Preserve/Forty Acre Rock. US 601/SC 903 junction N on 601. For information call 803-734-3893.

Kings Mountain State Park. On Highway 161, 14 mi. NW of York. Blacksburg, SC. For information call 803-222-3209/9363.

Brewer Gold Company. For directions and information call 803-658-3039.

Piedmont Mining Company. For directions and information call 864-475-1220.

Ridgeway Mining Company. For directions and information call 803-252-2550.

Cowpens National Battleground. At 4001 Chesney Hwy., Gaffney, SC. For information call 864-461-2828.

Joe Adair Environmental Education Center. Laurens Conservation District. For directions and information call 864-984-5492.

Landsford Canal State Park. 6 miles west of Lancaster off US 21. For information call 803-789-5800.

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For more interesting information about the Catawbas, The River People, contact:

Catawba Cultural Preservation Project

611 E. Main Street
Rock Hill, SC 29730
803 324-5214

STUDY AREA 3: PIEDMONT OVERVIEW

Activity 3-1: Overview

Materials		
6	STATE BASE MAP #1, SHADED RELIEF	1 : 500,000
6	STATE BASE MAP #2, WITH HIGHWAYS	1 : 500,000
6	LAND USE/LAND COVER MAP	1 : 500,000
6	GEOLOGIC AND MINERAL RESOURCE MAP	1 : 1,000,000
6	GENERAL SOIL MAP	1 : 594,000
1	Map of Catawba Nation	Figure 3-1
6	Wipe-off Pens	
6	Transparent Grid Overlays	

PERFORMANCE TASKS

(Icon Key) Overview = ➔; Science = ⚙; Math = 📊; History = 📖;
Language Arts = ✍

1. Locate steepest slopes in Piedmont. ➔

Using the STATE BASE MAP #1, SHADED RELIEF, trace with a wipe-off pen the eastern and western boundary of the Piedmont Region. Look over the relief features of the Piedmont Region. Describe the typical landscape appearance. Where, in relation to streams and rivers, are the steepest slopes usually found in the Piedmont? How can you identify the steepest areas? Why are these areas so steep? Refer to the GEOLOGIC AND MINERAL RESOURCE MAP to locate five Geologic Belts. Trace these onto the base map and determine the correspondence between slope and geologic belt.

2. Relate development of cities to river location. ➔

On the STATE BASE MAP #2, WITH HIGHWAYS, locate Interstate Hwy. 85 and the Southern Railroad line (now Norfolk-Southern) running parallel to the highway. Name four large Piedmont cities that these major transportation lines run through. Most Piedmont towns began as small villages located near sources of water power. Go back to the STATE BASE MAP #2, WITH HIGHWAYS, and identify the river or stream flowing through each of the four cities you located previously. Also locate the towns of Lancaster Mills, Lancaster County, and Pacolet Mills, Spartanburg County. On which rivers are those two towns located? What effect did the building of the railroads and the Interstate Highway have on the development of all these cities?

3. Locate gold mines. 📊⚙

Using the STATE BASE MAP #2, WITH HIGHWAYS, locate the towns nearest to these gold mining sites:

- Brewer Gold Mine, Jefferson, Chesterfield County;
- Haile Gold Mine, north of Kershaw, Lancaster County;
- Ridgeway Mining Company, Ridgeway, Fairfield County; and
- Dorn Gold Mine, McCormick, McCormick County.

Draw straight lines connecting the locations of the gold mines. Find the actual straight-line distance in miles and kilometers between Brewer Gold Mine, Haile Gold Mine, Ridgeway Gold Mine, and Dorn Gold Mine. Use string or a ruler for measuring and the scale bar on the map for reference. What is the overall pattern representing the geographic distribution of gold mines? What is the orientation of this pattern? How does that relate to the orientation of the landform regions of South Carolina? Name the Piedmont geologic belt in which all these gold mines are found. Which rock type contains the gold? Use your map information to select a possible site for a new gold mining operation. Mark this location on the map and justify your site selection.

Place the transparent grid overlay on the STATE BASE MAP #2, WITH HIGHWAYS, with the origin at 34° latitude and 81° longitude. Graph the mathematical distribution of the gold mines by finding their approximate coordinates (ordered pairs) and marking these locations on the grid. Draw the straight line that best represents the path of all these points. Find the slope of this line using the coordinates plotted on the grid. Find the equation of the line you drew using the equation $y = mx + b$.

4. Keep travel log for gold mine trip. 📅

You have been commissioned by the Governor of South Carolina to make a surprise inspection of the state's four major gold mines to determine environmental compliance. Plan this trip starting from your school. Use the STATE BASE MAP #2, WITH HIGHWAYS. Your inspection will take one hour at each site. Be sure not to exceed the speed limit of the roads you are traveling. Will you be able to make it to all four gold mines in the same day (8 hour working day)? You must keep a travel log as you will be reimbursed at the rate of \$.25 per mile. What is your most direct route? How many total miles will you travel before you get back to your school. Use the scale bar on the map for determining distances. How long will each segment of your journey take? Use the travel log chart below to document your trip. How much will you be reimbursed for your entire trip?

TRAVEL LOG	
NAME	

SCHOOL LOCATION				
DESTINATION FROM TO	ROUTE TAKEN (HWY. #'s)	TIME ELAPSED (MINUTES)	AUTO MILEAGE (MILES)	AMOUNT REIMBURSED (MILES X \$.25/MILE)
TOTAL	- - -			

5. Examine General Soil Map. ⚙

On the GENERAL SOIL MAP, which map colors represent the Piedmont Region? Name the counties in South Carolina that are at least partially located in the Piedmont Region. Locate the map legend and read the descriptions of those particular soils. Name the original rock types that produced each of the Piedmont soils.

6. Trace watersheds of stream systems. ⚙

Recently, erosion problems in the Piedmont have been handled using the watershed concept. The watershed is defined as the entire drainage basin of a particular stream. Flood prevention and erosion control over an entire drainage basin have proved much more effective than attempting to correct isolated trouble spots individually. Why is it easier to deal with the entire stream system rather than with isolated segments? The first major Soil Conservation Service watershed project in South Carolina was the Twelve Mile Creek Pilot Project in Pickens County, started in 1954. On the STATE BASE MAP #1, SHADED RELIEF, locate Twelve Mile Creek. With a wipe-off pen, trace all streams which are part of the Twelve Mile Creek drainage basin. Use a broad-tipped wipe-off pen to outline the entire watershed. Use the transparent overlay to determine approximately how many square miles of land are drained by this stream drainage basin. Follow this same procedure to estimate the size of nearby watersheds. Does the size of the stream relate to the size of the drainage basin? Explain your answer.

7. Outline Catawba claims and reservation. 🖨

Using Figure 3-1, "Geat Seal and Map of Catawba Nation," outline on the STATE BASE MAP # 2, WITH HIGHWAYS, the territory in South Carolina held by the Catawba Nation in the 17th century. With a different color pen, identify the land

reserved for the Catawba Nation after the treaties of Pine Tree Hill in 1760 and Augusta 1763. What percentage of their original South Carolina lands did they retain? Use the transparent grid overlay to estimate the percentage.

8. Make a Land-Man Relationship chart. 📖

From your previous reading, contrast the way the Catawba Nation and early English colonists used the land, obtained their food, used trees, and constructed dwellings in the Piedmont Region. Summarize your conclusions in the chart provided below.

LAND -- MAN RELATIONSHIP CHART		
TOPIC	CATAWBA PEOPLE	ENGLISH COLONISTS
Land Use		
Food Source		
Use of Trees		
Type of		

Now refer to the LAND USE/LAND COVER MAP and determine what current land uses dominate the Catawba Reservation lands. What problems would both Native Americans and early Colonists face trying to sustain their original cultures in this area?

9. Identify Native American place names. ➔

While most of South Carolina's Native American Nations have long since vanished, their memories are preserved in South Carolina place names. Using the STATE BASE MAP #2, WITH HIGHWAYS, make a list of the towns, cities, counties, rivers, creeks, and streams in the Piedmont Landform Region with Native American place names.

10. Trace Great Philadelphia Wagon Road. 📖


On the STATE BASE MAP # 2, WITH HIGHWAYS, outline with a wipe-off pen the two major routes taken by families entering South Carolina on the Great Philadelphia Wagon Road. Refer to Figure 3-2 "Map of the Great Philadelphia Wagon Road." What were the obstacles on the eastern route to Augusta? What were the obstacles on the western route to Augusta? Which is the shortest route? Identify the rivers and swamps that had to be crossed on the eastern route. Identify the rivers and swamps that had to be crossed on the western route. Explain why the Great Philadelphia Wagon Road did not go through Columbia. Plan a trip down the Great Philadelphia Wagon Road to the Back Country of colonial South Carolina. Enter the state through Rock Hill. Next select a suitable place for your destination in the Piedmont Region of South Carolina. If your school is in the Piedmont Region, use it as your destination. Trace your

route on the map. What supplies will you need? Where will you get them? Where will you find water? Plan for your overnight stops. How long will it take you to go from Rock Hill to your destination? How many rivers will you cross? Name these rivers. What could go wrong during your trip?

11. Compare early travel routes with present day transportation.



Many of the early wagon roads later became state or United States highways. Using the STATE BASE MAP # 2, WITH HIGHWAYS, and your tracing from Performance Task #10 identify the US highways which most closely match the eastern and western routes of the Great Philadelphia Wagon Road from Rock Hill to North Augusta. Use a wipe-off pen to mark the location of these highways on the state base map. Often railroads were built parallel to these early roads. In a different color wipe-off pen, trace the railroad lines between Rock Hill and North Augusta which most closely follow your marked highways. Locate other examples on the state base map where highways run parallel to a railroad. Identify towns and cities along these routes. In a third color wipe-off pen, trace the interstate highway routes which most closely follow your original marked highways. What is the role of physical geography in the location of highways? How has the location of interstates changed the development of towns along the original US highways?

12. Reconstruct pioneer diet from Act of 1743. 

The Act of 1743 passed by the Royal Assembly of South Carolina was intended to encourage settlers to move into the Back Country. Answer the following questions. Refer to the paragraph entitled Settling the Piedmont: Act of 1743 on page 3-10.

- a. Outline a typical diet from the list of provisions cited in the act.
- b. Explain why salt was essential to the settlers' diet.
- c. Identify the purpose of the tools and livestock that were furnished by the Act.
- d. Besides the materials provided in the Act, identify other materials that would be essential for life on the Carolina frontier.
- e. Why was rice a staple food rather than potatoes or beans?
- f. Using the Act of 1743, make an inventory list of tools, provisions, and livestock that your family would have received if you were entering South Carolina during this period. Why would these items not have been available in the Piedmont Back Country?
- g. How much land could your own family claim based on the head-right system? Where in the Piedmont would you claim

your land? Mark this area on the STATE BASE MAP #1, SHADED RELIEF, with a wipe-off pen. Explain why you decided to settle in that location. Refer to Piedmont landscape features in your explanation.

13. Discuss solutions for settlers terrorized by outlaws. 📖

Imagine you're are a settler in the Back Country terrorized by outlaws in the 1770's. Why was it so hard to catch outlaws in the Back Country? Was this difficulty related in any way to the Piedmont landscape? Explain your answer. Brainstorm in your group to identify as many possible solutions as you can to the problem. Then, discuss the possible consequences of each of these solutions. Choose the best solution. Compare your group's solutions with those of the Regulators.

14. Plan Native American style gathering to share legends. ✎

Catawba stories were meant to be shared orally. Plan a gathering in your class where you share these and other stories that form part of the tradition and heritage of every culture. Each student telling a story should locate a site on the STATE BASE MAP #2, WITH HIGHWAYS, where the story might have occurred and explain why. Look carefully at Figure 3-1, "Great Seal and Map of Catawba Nation," and relate images on the seal to objects and animals which might be common in the Piedmont Region.

15. Compare costs of shipping propane by train versus truck. 📊

Millions of gallons of propane destined for distribution in South Carolina are stored in granite caverns near the town of Tirzah. Locate the town of Tirzah on the STATE BASE MAP #2, WITH HIGHWAYS, (in the center of York County northwest of Rock Hill). Notice the railroad line running through the town. One railroad tank car can hold up to 280,000 pounds of propane. Tank trucks can each hold only 40,000 pounds of propane. The fixed cost of shipping by rail is \$.01 per thousand pounds per mile, but rail cars have a separate loading fee of \$150 per load, whether the rail car is full or not. The fixed cost of shipping by truck is \$.04 per thousand pounds per mile, but trucks have a separate loading fee of only \$50 per load. Assume that the average town needs a weekly shipment of 40,000 pounds of propane. What is the maximum distance for which trucks can be used for shipping this amount and still be cheaper than shipping by rail. Using this distance number as radius, and the town of Tirzah as the center of your circle, draw this circle on the map with a wipe-off pen. Which major South Carolina cities could be serviced more economically by truck than by rail cars (which cities lie within your circle)?

16. Assess compatibility of future resources with current land use. ⚙

Examine the GEOLOGIC AND MINERAL RESOURCE MAP and make a list of five major mineral resources which occur in the Piedmont Region. Briefly note any alterations to the landscape which you think may be necessary to extract these resources. Examine the LAND USE / LAND COVER MAP and list the one or two primary categories which occur in the geographic area associated with each resource. For each resource, indicate whether or not the resource extraction activities would be compatible with current land uses.

Resourc	Alterations	Land Use/ Land Cover	Compatibility

ENRICHMENT

1. Research Catawba pottery. 📖

Research the type of Native American pottery found closest to your area of the state. Use modeling clay to make examples of this pottery. Contact the Catawba Cultural Preservation Project, 611 E. Main Street, Rock Hill, SC 29730 (803-324-5214) for additional information about the pottery and potters of the Catawbas. Research local libraries to find pictures of different types of pots. Which other Native American Nations have been known for their pottery? Can you determine the process that they use to make their pottery? Plan a trip to dig for clay. Try making an artifact with your clay. Write or talk to someone at the Preservation Project about the clay deposit near Van Wyck--is it still off limits to the potters? If so, how are the Catawbas able to continue making pottery, and where are they getting their clay?

2. Make time line of Catawba History. 📖

Make a time line of the history of the Catawba Nation. Find out what land was involved in the Catawba land claim. When was the lawsuit settled? Use your South Carolina history textbook as a reference. Mark location of noteworthy events on the STATE BASE MAP #2, WITH HIGHWAYS. Be sure to include the recent Catawba dispute involving rights of access to the Van Wyck clay deposits.

3. **Research competitiveness of Anderson cars.** 📖

Locate Rock Hill on the STATE BASE MAP # 2, WITH HIGHWAYS. It was the home of the Anderson Motor Company. Research the early car manufacturers such as Anderson, Ford, Studebaker, and Dodge. Complete the following chart. After comparisons are made, explain why Ford out competed the other early car manufacturers. Make drawings of these early cars and compare design and style to that of present day automobiles. Report your findings to the class.

COMPARISON OF CAR MODELS, EARLY 1900's				
	ANDERSON	MODED T FORD	STUDEBAKER	DODGE
Years Produced				
Price				
Manufacturer of Engine				
Manufacturing Process Used				
Size of Car				
Seating Capacity				
Foot Light Dimmer				
Other Special Features				
Location of Plant				

4. **Write to gold mining companies, graph production.** 📝🗺️⚙️

Write to one of the gold mining companies in South Carolina and ask for a sample of gold ore. Investigate the history of gold mining in South Carolina and the various processes by which gold is mined today. How do the processes differ from each other? Explain why gold mining is more profitable today than it was 25 years ago. Research data on gold production in South Carolina. Using these data, graph gold production in each of the four active gold mines over the last 20 years by using a bar graph. How do you account for these changes?

5. **Write to a mill town Chamber of Commerce.** 📝🗺️

Write to the Chamber of Commerce of each of the following cities and ask them how the town got its name, what kind of

mill originally operated there, and whether the mill is still operating.

Lancaster Mills; Lancaster, SC; Lancaster County

Winnsboro Mills; Winnsboro, SC; Fairfield County

Baldwin Mills; Chester, SC, Chester County

Lydia Mills; Clinton, SC; Laurens County

Inman Mills; Inman, SC; Spartanburg County

Monarch Mills; Union, SC; Union County

Lancaster News

October 10, 1993

Rare plants find home on Forty Acre Rock

by Barbara Howell

Although called Forty Acre Rock, the name of this feature is misleading because only about fourteen acres of bald rock are exposed.

But what the Flat Creek attraction features is an environmental wonderland with its unusual granite outcrop, the largest in South Carolina. At one time this rock provided the foundation for many surrounding houses. Now it provides habitat for wildlife and some species of rare plants.

Many of the rare plants that make their home at Forty Acre Rock do so in the pools of water found in the granite's indentions.

During dry spells the seeds survive and then flourish when the pools fill again. Spring is the best time to view the blooming of these plants.

Though the place appears like a desert in the fall and winter, there is one plant that makes its presence known in the fall.

The portulaca blooms underneath the gnarled cedar trees, said Doug Rainer, who

teaches biology at Wofford College.

"Cedars release a high level of calcium whereas most other trees tend to hold their calcium," said Rainer, who was formerly with the S.C. Wildlife Department.

Rainer often takes his classes on field trips to the rock to study the rare ecosystems and to help keep the area clean. "It's very difficult to manage in that people abuse this area by spray painting the rocks, cutting trees, and, riding vehicles over the rock," said Rainer.

RATIONALE

The Forty Acre Rock Study Site is an excellent example of a granite outcropping in the Piedmont of South Carolina. Many such rock exposures occur throughout the region, including the Winnsboro Blue Granite in Fairfield County, which is mined heavily as an economic resource and which has been designated as the official State Rock. Although Forty Acre Rock is not quarried, it represents a valuable resource nonetheless. As part of the Flat Creek Preserve, the granite is home to several species of rare plants and offers a truly unique biological habitat. The site is also near the boundary of the Sandhills and Piedmont regions and clearly illustrates landform features characteristic to each. Forty Acre Rock is not advertised as a state tourist attraction because of the sensitive and fragile nature of the ecosystem, although many school groups and other educational agencies do take field trips there. Much of the site is preserved in its natural state and features wetlands, unique geologic features such as the Great Diabase Dike, and a variety of land uses typical of the Piedmont Region.

Brief Site Description

Introduction

In reality, Forty Acre Rock covers only fourteen acres of ground. Even so, it still qualifies as the largest single exposure of granite rock in South Carolina. A hiking trail is maintained by the Nature Conservancy, which manages the area as part of the Heritage Trust Program. The trail starts in the Valley of Flat Creek, runs past a **wetland** associated with a large beaver pond, and slowly winds its way gradually uphill until it reaches some large waterfalls and several caves (which are really small openings eroded out between resistant granite layers) near the top of the rock exposure. Along the way, a hiker will pass through wooded areas, open fields beneath a power line, floodplains of small **meandering** streams, geologically important exposures of diabase dike rock, and several areas of bare granite rock.

Just to the east of the vast expanse of granite is the Sandhills Region, which lies on top of the granite and is easily recognized by the presence of loose, white, sandy soil. To the west lies the Flat Creek Valley which has cut below the overlying Sandhills layers to expose typical Piedmont rock exposures. The granite itself stands high above the valley, but slopes gradually, and in a few places steeply, downhill toward Flat Creek. Chemical weathering of the granite has produced shallow depressions in the rock which fill with water during rainstorms and are populated by several species of rare plants. In between rainstorms, these depressions are drier than a desert. Agriculture is a major land use outside of the Flat Creek Preserve boundaries, as is logging.

The Devil's Cave and His Footprint

By Christy Clonts

If you ever go to Forty Acre Rock, be sure to look for the Devil's Cave and the Devil's Footprint. My husband's Uncle Bob says that the Devil's Footprint is a foot shaped indentation in the rock just outside the entrance to the Devil's Cave. Sometimes the indentation is so slight that you can't find it. Then another time it will be deep and clear. The sharpness of the print wears away with time and erosion, but before it completely disappears the print mysteriously resurfaces. Uncle Bob says that every 10 years the devil comes back and reprints it. The footprint is a

warning to stay away from the cave which has a mystery of its own.

Many a dog has been lost in Devil's Cave. The cave narrows quickly so while people can go in, they can't go in very far. A dog, on the other hand, can keep following the narrow tunnel deeper and deeper. Dogs that go in never come out. Uncle Bob had a dog that followed him into Devil's Cave and no matter how much he whistled and hollered, that dog never would come out. After several hours he gave up and went home. He said a dog would always come home when he got hungry. But the dog didn't come home that night or the next, or the next week. Uncle Bob decided those stories about Devil's Cave must be true.

Two months later an acquaintance from the community dropped by Uncle Bob's house and said that he had seen a dog that looked just like Uncle Bob's while he was visiting relatives over in Winnsboro county. When he asked the people where they got the dog, he was told it had just shown up at their back door hungry and filthy a few weeks back. Uncle Bob went with his friend to check out this dog and sure enough it was his.

He has told this story many times through the years and afterwards he has been told of the same thing happening to other dogs. Locals think that there must be another opening to the cave in the next county because that is where the lost dogs always show up. Devil's Cave is a great place to visit, but you might want to leave your dog at home!

The Great Diabase Dike of South Carolina

Just south of Forty Acre Rock lies a long, narrow wooded ridge composed of diabase, a dark, basalt-like rock commonly found in areas which have experienced volcanic activity in the past. Diabase usually forms as the result of an igneous intrusion of high temperature magma (underground lava) into the surrounding rocks. Sometimes the intrusion reaches the surface and volcanoes form from the erupting lava. Other times, the magma does not reach the surface and slowly cools in place, underground, forming a dense, crystalline mass. When the intrusion is long and narrow in shape, it is referred to as a dike. Several of these dikes appear in the Forty Acre Rock Study Site area, and throughout the Piedmont, but the largest and most easily recognized is referred to as the Great Diabase Dike of South Carolina. It is about 35 miles long and close to 1,000 feet thick in places. It usually shows up on the landscape as a low ridge because the crystalline diabase is more resistant to erosion than the surrounding Piedmont rocks. Because of the ridge's naturally dense vegetation and tree cover, the rock is visible at the surface only along roadcuts and streams where the overlying soil and

vegetation have been removed. The best exposure of diabase in the area is found along U.S. Hwy. 601 one mile north of the town of Midway.

About 200 million years ago, geologists speculate that a huge supercontinent, called Pangea, existed on the earth, with North America and South America connected to Africa and Europe. There was no Atlantic Ocean at that time. Due to a massive buildup of heat within the earth, beneath the supercontinent, the surface crust all along the east coast of present day North America was pushed upward and stretched tight, sometimes to the breaking point. As a result, many fractures and faults began to develop and formed a series of fault basins extending from South Carolina to New England. Because these basins formed during the Triassic Period of geologic time, they are usually referred to as Triassic Basins. One such basin is exposed at the ground surface nearby in the northern part of Chesterfield County. Many of the fractures served as passageways for hot liquid rock which later cooled to form the diabase dikes. Once the Atlantic Ocean began to open up, volcanic activity in South Carolina came to an end and subsequent erosion has removed any land surface volcanoes which might have existed at that time.

Activity 3A-1: Forty Acre Rock and Flat Creek Preserve

Materials		
6	STATE BASE MAP #2, WITH HIGHWAYS	1 : 500,000
6	LAND USE/LAND COVER MAP	1 : 500,000
6	GENERAL SOIL MAP	1 : 594,000
6	GEOLOGIC AND MINERAL RESOURCE MAP	1 : 1,000,000
6	FORTY-ACRE ROCK LITHOGRAPH	1 : 12,000
6	FORTY ACRE ROCK TOPOGRAPHIC MAP	1 : 24,000
1	State Map of Major Drainage Basins	Figure 1-2
6	Transparent Grid Overlays	
6	Wipe-off Pens	

PERFORMANCE TASKS

(Icon Key) Overview = ➔; Science = ⚙; Math = 📊; History = 📖;
Language Arts = ✍

1. Locate the study site. ➔⚙

Locate the Forty Acre Rock Study Site on the STATE BASE MAP #2, WITH HIGHWAYS, on the LAND USE/LAND COVER MAP, on the GEOLOGIC AND MINERAL RESOURCE MAP, and on the GENERAL SOIL MAP by drawing a small box around the correct site on each map using a wipe-off pen. Briefly summarize the one or two most important land uses at this site, the age (Geologic Period), the type of rock at the site, and the predominant soil type at the site. Use the scale bar on the base map to estimate the straight-line distance between this study site and your school. In which local river drainage basin (watershed) is this site located? Through which of the major river systems, Savannah, Santee, Pee Dee, or Coastal Plain does this site drain? Refer to Figure 1-2, "State Map of Major Drainage Basins."

2. Identify Forty Acre Rock on map and lithograph. ⚙

Locate Forty Acre Rock on the FORTY ACRE ROCK TOPOGRAPHIC MAP. Use this information to locate Forty Acre Rock on the FORTY-ACRE ROCK LITHOGRAPH. On which of these is Forty Acre Rock easier to find? Why? What is the elevation of Forty Acre Rock? With a wipe-off pen, transfer the boundary line of Flat Creek Preserve onto the lithograph by matching up landforms and forest cover. Locate the place with the highest elevation in Flat Creek Preserve. Within the Preserve, locate the lowest elevation. Locate some wetland areas on the lithograph. What evidence did you use to determine that an area is wet?

3. Locate Piedmont/Sandhills boundary. ➔

The FORTY-ACRE ROCK LITHOGRAPH depicts part of the boundary between the Piedmont and Sandhills regions. From a soils standpoint, the ground in this area is covered with material

from different parent rocks and different ages. Many farmers and other land users are natural soil scientists who, by a combination of intuition and trial and error, select different kinds of plants to go in each type of soil. In this area of the state, the Sandhills soils are superior to the Piedmont soils for agricultural purposes. As a result, the Piedmont soils are managed mostly as forest, while the Sandhills soils harbor a patchwork of field and forest sites. Using the GENERAL SOIL MAP and LAND USE/LAND COVER MAP identify each soil type and land use type on the lithograph. Based on the soil and land use information, mark on the lithograph, with a wipe-off pen, your best guess of where the boundary line between the Piedmont and the Sandhills is actually located. Explain in detail, by referring to the lithograph, how you determined where to draw the line. Why is the boundary not a straight line? In the northern section of the lithograph there is a small 'island' of Sandhills soil surrounded completely by the Piedmont landscape. Can you find this 'island'? How did you recognize it?

4. Analyze the newspaper article. ✎

Read the newspaper article on page 3A-1 "Rare Plants find home on Forty Acre Rock." Explain how the story relates to the Piedmont Landform region. Identify on the FORTY ACRE ROCK TOPOGRAPHIC MAP (refer to the FORTY- ACRE ROCK LITHOGRAPH if needed) where the plants named in this story would likely be found. Explain why the publisher thought this story would be of interest to newspaper readers. Using the same references and setting, write another newspaper article related to this same situation, but date it far enough either before or after the given story so that you will have some changes to report. Choose an appropriate title (headline) and draw an appropriate picture to illustrate your main point.

5. Compare scale of lithograph to scale of topographic map. ⚙

Locate Flat Creek School in the Midway Community in the southeastern corner of the FORTY ACRE ROCK TOPOGRAPHIC MAP. Use a ruler and the map scale bar to calculate the shortest distance from the school to the power corridor. Now locate the same features on the FORTY-ACRE ROCK LITHOGRAPH and use a ruler and the lithograph scale bar to calculate that same distance. Do your numbers come out the same, even though the map and the photo are printed at different scales? Explain your answer.

6. Write creative story. ✎

Take 20-30 minutes to complete one of the two following writing assignments. BE CREATIVE!! You should write at least a page. Use the FORTY-ACRE ROCK LITHOGRAPH and the FORTY ACRE ROCK TOPOGRAPHIC MAP for reference.

Assignment 1-- Imagine you're a settler first coming to this Piedmont area. Looking at the environment around you, describe what your life might be like. What kind of hardships might you encounter? What kind of resources would you find in the environment and how would you use them? Remember to think about the environment.

Assignment 2-- Write a descriptive essay of the environment around you. You must be very descriptive-search for adjectives that convey what you're trying to communicate. Be sure to include auditory, tactile, and visual descriptions.

7. Estimate value of timber. 🏠

Clear cutting is one practice used by the timber industry when harvesting trees. An example of a large clear-cut area can be seen on the FORTY-ACRE ROCK LITHOGRAPH. This area is on the left side of the lithograph near the middle of the image. It can be identified by the gray-greenish area with a number of windrows running through the area. A windrow is a bulldozed row of piled up stumps and other debris. Compare this area on the lithograph with the same area on the FORTY ACRE ROCK TOPOGRAPHIC MAP. Use the transparent grid overlay to determine the approximate number of acres that have been clear cut. First, use the scale bar on the lithograph to calculate the area in square feet contained in one square of the transparent grid overlay. Then use the overlay to find the approximate number of grid squares that overlay the clear cut area. Next, multiply the number of grid squares counted by the value in square feet covered by each square. Finally, express your answer in units of acres. Recall that one acre is equivalent to 43,560 square feet.

Timber is sold by the board foot, which is 1 foot by 1 foot by 1 inch (1' x 1' x 1"). Assuming this was a mature forest and the average tree was 50 feet tall and 5 feet in circumference, how many board feet did each tree provide after it was trimmed at the lumber mill? You may assume that a tree with a five foot circumference will provide a one foot by one foot cross section of usable wood. Pine timber (in 1996) was selling for \$275 per 1000 board feet. If there were 300 trees per acre, what was the total value of the trees harvested from this clear cut area near Forty Acre Rock?

ENRICHMENT

1. Interview residents about legends. 🗨️

Interview long time residents of your community. Find out what they know about any local legends that explain strange occurrences around local landmarks. Collect the stories in

writing or on tape. Your community library would probably be excited to receive a copy. Collect other stories or create stories that explain unusual geographical features. Describe the unusual geographical feature which they attempt to explain.

2. Determine volume of waste from logging operations. 📐

Assume that the average tree harvested in timber operations around Forty Acre Rock was 50 feet tall and 5 feet in circumference. Once that tree is put through the sawmill, the resulting usable lumber has a square cross section measuring one foot by one foot. Using several appropriate mathematical operations, determine the volume of waste generated from each tree harvested.

Activity 3A-2: Reservoirs, Dams and Piedmont Drainage

Material**s**

6	STATE BASE MAP #1, SHADED RELIEF	1 : 500,000
6	FORTY-ACRE ROCK LITHOGRAPH	1 : 12,000
6	FORTY ACRE ROCK TOPOGRAPHIC MAP	1 : 24,000
6	Wipe-off Pens	

PERFORMANCE TASKS

(Icon Key) Overview = ➔; Science = ⚙; Math = 📊; History = 📖;
Language Arts = ✍

1. Trace path of Flat Creek on map. ➔⚙

On the FORTY ACRE ROCK TOPOGRAPHIC MAP, trace the course of Flat Creek with a wipe-off pen. Just south of Forty Acre Rock, Flat Creek makes two extremely sharp bends near the word "Flat" on the map. Flat Creek cuts through a high ridge at this point. What kind of rock or mineral composition do you think the ridge might be made out of? Why? Why do you think the river turns so sharply here? Locate where this same ridge crosses U.S. Hwy. 601. This is actually a part of the Great Diabase Dike of South Carolina. Use the map information to locate the exact same spot on the FORTY-ACRE ROCK LITHOGRAPH. How does the roadcut area show up differently than the rest of the ridge on the infrared image? Explain why the colors are slightly different.

2. Trace 400 ft. elevation contour to create reservoir. ⚙

Assume that the Army Corps of Engineers has decided to build a reservoir in the Flat Creek area just south of Forty Acre Rock using the 400 ft. elevation contour line as the projected water level. Most Piedmont lakes are formed by building dams along natural constrictions in a stream's flow. The ridge you located south of Forty Acre Rock in the previous activity represents such a constriction. Use the wipe-off pen to identify the place on the FORTY ACRE ROCK TOPOGRAPHIC MAP where this proposed dam would best be located. The dam should cross Flat Creek at its narrowest point (just west of the word "Flat") and must connect the 400 foot contour line on the north side of Flat Creek with the 400 foot contour line on the south side.

Trace the boundary of the future lake (the shoreline) by following the 400 ft. elevation contour line starting at the dam. You will need to determine which direction Flat Creek is flowing so you know which side of the dam will fill up with water. Where is the deepest part of your newly designed lake? Describe the topography along the banks of this lake. How deep

will the water be just west of the dam? Will there be any islands in your lake? Explain. Give an appropriate name to your lake based on its shape as drawn on your map. Standing on top of Forty Acre Rock, describe what you would see looking south and west before and after the reservoir was built. Would any unique environmental areas be destroyed if this area were flooded?

The outline you just drew represents the typical configuration of an artificially constructed Piedmont lake. Compare the outline of the pattern formed by the configuration of your lake to the shape of several other Piedmont lakes shown on the STATE BASE MAP #1, SHADED RELIEF. Why is this pattern typical of Piedmont lakes? How is it different from patterns of Coastal Plain Lakes, such as Lake Marion?

3. Evaluate location of farm ponds. ✪

Locate several farm ponds on the FORTY ACRE ROCK TOPOGRAPHIC MAP, especially on the left half of the map. What do all these have in common? Why are these ponds located where they are? What benefits do farmers receive from such ponds?

4. Compare soils of bottomland vs. highland. ✪

Locate an area on the FORTY ACRE ROCK TOPOGRAPHIC MAP which contains stream valley flat bottomland. How can you recognize flat bottomland by using contour line information? Next, locate an area of higher elevation flatland. How can you recognize this topography using contour line information? Which area would likely produce the best agricultural land? Why?

5. Analyze land use changes through time. ➔

Look in the margins of the FORTY ACRE ROCK TOPOGRAPHIC MAP and the FORTY-ACRE ROCK LITHOGRAPH to determine the year the map was printed and the year the aerial photography was flown. Examine each cartographic product carefully to identify any changes which have occurred during that time interval. How many of these changes are manmade? How many have occurred naturally?

ENRICHMENT

1. Investigate Heritage Trust site selection. ✪

Write to the Nature Conservancy to find out how they select and purchase Heritage Trust Sites? Specifically inquire about the Forty Acre Rock Preserve. Ask when it was purchased, what the purchase price was, who it was purchased from, etc.

2. Assess lake construction process. ✪

Assess problems encountered in constructing lakes today. Make a list of pros and cons for constructing a man-made lake in your area. Consider various points of view such as: farmers, land owners, industrialists, foresters, hunters, fishermen, water sport enthusiasts and environmentalists.

The State

October 7, 1985

Welcome to Utopia

by John Collins

"If you could see and walk along Beaver Dam Creek, you would understand," said Newberry Judge Walter T. Lake.

Mazell Owen, 38, theorized that the area's name might have derived from its suitability for farming. "The land isn't too hilly and it isn't too flat, the soil isn't too clayey and it isn't too sandy, and the weather isn't too hot or cold or dry or rainy, she said.

The community of rolling pastures and woods is more sparsely populated now than it was around the turn of the century.

Lois Boulware, 90, says life in Utopia has changed considerably since she came to the area from Chapin 70 years ago. "In those days everything was worked with animals," she said. "Why, we had a nine horse farm back then. Animals plowed the fields and you didn't need a tractor."

Rebecca Perdew, who has lived all her 90 years along the same highway, also has seen many changes in the area through the years. "This road -- 395, I call it Kimpson Ferry Road -- is nine miles to Newberry, and the other way goes all the way to Georgia," she said. "It's so busy now with trucks all the time."

Perdew recalled when a wooden bridge was built to replace the ferry near where a concrete bridge now spans the Saluda River at the backwaters of Lake Murray. The wooden bridge "was slanted so bad on the Saluda side, they had to put slats across it to keep mules from sliding off," she said.

Now there is a new generation living in Utopia--including some who don't remember the past. But most say they wouldn't live anywhere else. Said Mayzell Owen waiving at a neighbor, "There's just a feeling of being on your own out here. There's not a hurried pace and the people are so nice. It really is a utopia."

RATIONALE

The Silverstreet Study Site lies just west of the town of Newberry and contains many features representative of a typical farming region in the Piedmont of South Carolina. Patterns of contoured agricultural fields mix with a patchwork of other landforms to provide a striking visual image of the diversity of land use in this region of the state. Timber management practices in forests along the Bush River, control of erosion from farm fields, and the placement of chicken houses by the poultry industry illustrate some of the potential environmental problems faced by Piedmont farmers. Although there is no actual public access site in the immediate area, several farmers are willing for student groups to tour their farms to study soil conservation methods and modern crop rotation practices as well as visit modern, highly mechanized chicken houses. Such tours and visits must be arranged through the County Extension Agent's Office in Newberry County.

Brief Site Description

Introduction

The Silverstreet farming area in Newberry County is typical of the rolling hill landscape of the Piedmont. The soils are ancient, and have formed saprolite, a rotten rock material that has been left undisturbed on site for millions of years until the introduction of European-style agriculture. Soil productivity in the region has been greatly reduced by unchecked erosion, reaching its low point during the dust bowl days of the 1930's. The Piedmont had originally been settled by small independent farmers but the spread of cotton into the Piedmont quickly changed its landscape and economy. Newberry County's history has been reflective of the dramatic changes brought by the cotton kingdom. The economy of Newberry shifted in the **Antebellum** period to one based upon large farms and slave labor.

While the Civil War had wrecked the economy and much of the Piedmont's farmland suffered from soil erosion, cotton continued to dominate the economy until World War II. Most farmers were dependent upon local merchants for credit and these merchants helped to maintain the place of king cotton because they insisted that farmers grow an easily marketable crop. Finally, a combination of factors broke the hold of cotton. These factors included the boll weevil invasion, the agricultural depression of 1921, exhaustion of the soil, the Great Depression of the 1930's, and competition from western farmlands. Cotton cultivation was finally replaced by a more diversified agricultural economy in Newberry.

Poultry began to become an economic factor at the end of the nineteenth century and by 1970 Newberry County had become the largest producer of chickens and eggs in South Carolina. John R. Spearman (of Silverstreet) brought the first Guernsey cows to the state in 1880. Many more farmers moved into the business so that by 1987 Newberry was the second-highest South Carolina county in milk-production. Moreover, starting in the 1930's and continuing today, the raising of beef cattle has increased in the county. Soybeans have also become a major crop for farmers in the county.

The Legend of the Silverstreet Special

A story from John Bozeman, retold by Christy Clonts

In the early 1900's Silverstreet was a bustling little town with several passenger trains stopping daily. During special occasions such as the Little Mountain Reunion, State

Fair Week, or during peak fall colors in the mountains, special trains operated.

One Saturday, as one of these special trains was taking a large group from Silverstreet to the State Fair in Columbia, the fire stoker was busily shoveling coal into the engine. Out of the corner of his eye he thought he saw the figure of a woman fall under the wheels of the train. It was such a gloomy, foggy day that he couldn't be sure. He called to the engineer to stop the train. Brakes squealed as the train ground to a halt.

The engineer checked under the entire train and back down the track, but there was no sign of anyone or anything. While waiting for the engineer to complete his inspection, a passenger strolled up the track until he came to the trestle which was to carry the train across the river. Peering through the fog and mist, he was shocked to see that the center part of the trestle had been completely washed out by raging flood water. Had the fire stoker not "seen" the mysterious woman, every passenger on the train would have certainly tumbled to their death.

Dead Fall

A story from Mr. Charlie Senn, retold by Christy Clonts

Back in the early 1800's the town of Newberry, S.C., was called Newberry Village. Seven miles southwest of Newberry Village was a tiny crossroads town named Dead Fall. Head's Tavern, a busy and thriving place in those days, stood at the crossroads. Beside the tavern was a great oak tree with widely-spreading branches. Two of the lower branches grew horizontal to the ground and the moss was worn away on the upper sides of these branches. It was said that these two branches had served as the local gallows. Highwaymen, horse thieves, and murderers were quickly sentenced in local trials and were hung from that tree. Some local people believed that this gallows tree was the reason for the name Dead Fall. Others insisted the name had a Native American origin.

The Cherokee and Salutah (Saluda) had formerly built an ingenious trap for wild animals before the first white settlers had arrived. Rows of stout stakes driven into the ground channeled passing animals to a narrow gateway. Then a baited trigger was so arranged that when it was disturbed by an animal it would release a heavy log, or deadfall, which would crush the creature. Such traps were deadly to bears, panthers, and wolves. This particular trap was still in place when the early white settlers arrived. The settlers left the trap in place as a curiosity, but they

sprung it so as to prevent injury to children or domestic animals. Though the trap finally decayed, the name Dead Fall survived.

Suspended Sediment as a Type of Non-Point Source Pollution

When a significant portion of land is used to grow row crops like corn, soybeans, tobacco, etc., eroded soil becomes a potential pollution source for streams and rivers. Forest clearcuts also lay the soil bare and invite erosion. The Piedmont is particularly susceptible to erosion and sediment pollution because of its high rainfall amounts, sloping ground surfaces, large exposures of bare soil, and its clay rich soils which limit infiltration and encourage runoff. Since humans cannot control factors such as rainfall amounts and soil composition, good environmental stewardship dictates that landowners do as much as possible to control the remaining factors.

Bare soil can be eliminated by planting a ground cover of some sort. Plant roots physically hold the soil in place while leaves intercept falling raindrops and lessen their force of impact. Even when certain land uses require the removal of vegetation, the application of straw mulch or other dead plant litter can help protect the soil until new vegetation or crops can take hold. Steep slopes can be reduced by terracing, and terrain roughness can be increased by contour plowing. Long slopes can be broken up by strip cropping or a variety of physical barriers which will slow down the water. Choosing an appropriate land use for the terrain conditions can go a long way towards reducing the amount of sediment eroded from the land and entering Piedmont streams and rivers.

Activity 3B-1: Piedmont Landscapes

Materials			
6	STATE BASE MAP #2, WITH HIGHWAYS	1 :	500,000
6	LAND USE/LAND COVER MAP	1 :	500,000
6	GENERAL SOIL MAP	1 :	594,000
6	GEOLOGIC AND MINERAL RESOURCE MAP	1 :	1,000,000
6	SILVERSTREET TOPOGRAPHIC MAP	1 :	24,000
6	SILVERSTREET LITHOGRAPH	1 :	12,000
1	State Map of Major Drainage Basins		Figure 1-2
6	Wipe-off Pens		

PERFORMANCE TASKS

(Icon Key) Overview = ➔; Science = ⚙; Math = 📏; History = 📖;
Language Arts = ✍

1. Locate the study site. ➔ ⚙

Locate the Silverstreet Study Site on the STATE BASE MAP #2, WITH HIGHWAYS, on the LAND USE/LAND COVER MAP, on the GEOLOGIC AND MINERAL RESOURCE MAP, and on the GENERAL SOIL MAP by drawing a small box around the correct site on each map using a wipe-off pen. Briefly summarize the one or two most important land uses at this site, the age (Geologic Period), the type of rock at the site, and the predominant soil type at the site. Use the scale bar on the base map to estimate the straight-line distance between this study site and your school. In which local river drainage basin (watershed) is this site located? Through which of the major river systems, Savannah, Santee, Pee Dee, or Coastal Plain, does this site drain? Refer to Figure 1-2, "State Map of Major Drainage Basins."

2. Construct topographic profiles of Piedmont landforms ⚙

Making profiles of the landscape aids in describing the topography of an area. A comparison of two profiles made in different locations on the SILVERSTREET TOPOGRAPHIC MAP will show that these areas vary considerably in slope depending on how close the land is to major streams. After the two profiles have been made, compare the results. Relate the major differences to map location? Where are erosion gullies most likely to form? Why?

Construct topographic profiles along the two base lines described below. Fold a piece of graph paper lengthwise and place the fold along the base line drawn on the map. Mark on your graph paper the spot where each index contour (the dark contour lines) intersects your fold line. Write the elevation represented by each index contour line next to your mark for that line. Also label the relative positions of creeks and other landmarks. These marks along the fold line will serve as

place holders along the horizontal axis of your diagram and will have the same horizontal scale as the topographic map. Now unfold your graph paper and draw a line along the fold crease to represent your horizontal axis. Next, draw in your vertical axis, making sure your line is at least one inch away from the left edge of the paper to allow room to label your axis. The vertical scale should be approximately 1 inch = 100 feet (depending on the grid size of your graph paper). Plot each point on the graph paper using the elevation value as the vertical coordinate and the position mark on the horizontal axis as the horizontal coordinate. Draw a smooth line through these points on your graph paper to complete the topographic profile.

Group I Landscape Near Streams

Draw a straight line, using a wipe-off pen and a ruler, between Mt. Olive Church, located in the extreme northwestern corner of the map, and the benchmark "BM 519," located in the center along the top edge of the map. Use this as your base line for drawing the topographic profile.

Group II Landscape Away From Streams

Draw a straight line, using a wipe-off pen and a ruler, between the benchmark "BM 582" in the Community of Gary (upper left hand section of the map on Hwy. 76) and St. James Church in the Community of Jalapa (about two miles east of Gary on Hwy. 76). Use this as your base line for drawing a topographic profile. Use non-index contour lines if you need to get additional information.

3. Relate landscape to "The Legend of the Silverstreet Special."



Locate several railroad tracks on the SILVERSTREET TOPOGRAPHIC MAP. Using the landscape clues given in the story, "The Legend of the Silverstreet Special," on page 3B-2, examine the map to locate the place where the incident might have happened. Once you have located the exact position of the railroad trestle, write two descriptive sentences which tell about the landscape and the way it looked to the passengers. Use plenty of adjective in your sentences. Insert your sentences into the existing story and read the result to the class. Why do we use railroad trestles and bridges instead of just filling in the valley with dirt?

4. Find possible location of "Dead Fall." →

Read the story "Dead Fall," on page 3B-3, being careful to note any information which would help you locate this spot on the SILVERSTREET TOPOGRAPHIC MAP and the SILVERSTREET LITHOGRAPH. Examine the map and the image carefully. Are there any intersections on either the map or the lithograph which completely fit the description of "Dead Fall?"

ENRICHMENT

1. Compare ghost stories with "Silverstreet Special." ✍

Interview classmates, family, and friends. Collect their favorite ghost stories. Decide on an appropriate format for sharing class favorites. Some possible examples are a storytelling event, a video, or an audio tape. Analyze favorite ghost stories for their type and similarities. Which ones foretell danger? Which qualify as jump stories? Which are urban legends? Which tell of a ghost recurring at particular times and or places? Once you become familiar with several types of ghost stories and the format each uses, you can create your own stories based on the "Silverstreet Special," on page 3B-2, and on other models that you have studied.

2. Research crime and punishment, past and present. 📖

For what crimes would a person be hanged during the 1830's in South Carolina? Who decided guilt or innocence? Who passed the sentence? Research crime and punishment from that time period. Refer to the "Dead Fall" story on page 3B-3.

Activity 3B-2: Agricultural Land Use

Material**s**

6	STATE BASE MAP #2, WITH HIGHWAYS	1 : 500,000
6	SILVERSTREET TOPOGRAPHIC MAP	1 : 24,000
6	SILVERSTREET LITHOGRAPH	1 : 12,000
1	Map of State Drainage Basins	Figure 1-2
6	Transparent Grid Overlays	
6	Wipe-off Pens	

PERFORMANCE TASKS

(Icon Key) Overview = ➔; Science = ⚙; Math = 📐; History = 📖;
Language Arts = ✍

1. Analyze the newspaper article. ✍

Read the newspaper article on page 3B-1, "Welcome to Utopia." Explain how the story relates to the Piedmont Landform Region. Identify on the SILVERSTREET TOPOGRAPHIC MAP (refer to the SILVERSTREET LITHOGRAPH if needed) where some of the places mentioned in the article might be found and also where some of the events mentioned in the article might have taken place. Explain why the publisher thought this story would be of interest to newspaper readers. Using some of the same people as characters and the same location as your setting, write another newspaper article related to this situation, but date it far enough in the future or the past so that you will have some changes to report. Chose an appropriate title (headline) and draw an appropriate picture to illustrate your main point.

2. Identify farm-to-market transportation routes. ⚙

Locate Newberry County on the STATE BASE MAP #2, WITH HIGHWAYS. Where is the county seat? Use a wipe-off pen to outline the stream drainage pattern for Newberry County. Trace the path of the surface water leaving Newberry County on its way to the ocean. In which of the four major state drainage basins is Newberry County located? If you were a cotton planter in 1850, how would you get cotton to the Charleston market? Locate Silverstreet. If you're a poultry farmer today living near Silverstreet, how would you transport your chickens, eggs or turkeys to a market in Columbia or Greenville? Trace your route on the map.

3. Estimate number of chickens in study site area. 📐

Currently the poultry industry is the major farming enterprise in Newberry County. Identify poultry houses on the SILVERSTREET LITHOGRAPH. Count the poultry houses on this lithograph by circling each one with a wipe-off pen. How many did you find? Now count your birds. Use the scale bar on the

lithograph to estimate the approximate dimensions of one of these poultry houses. If every bird needs 1 square foot, how many bird can be raised in your selected poultry house at one time? In reality, poultry cages are often stacked several rows high. So the actual number of cages will be several times your previously calculated answer.

4. Analyze land use changes through time. ✪

Look in the margins of the SILVERSTREET TOPOGRAPHIC MAP and the SILVERSTREET LITHOGRAPH to determine the year the map was printed and the year the aerial photography was flown. Examine each cartographic product carefully to identify any changes which have occurred during that time interval. How many of these changes are manmade? How many have occurred naturally?

5. Evaluate reasons for abandoned roads. 📖

Locate the Trinity Community in the lower left-hand corner of the SILVERSTREET TOPOGRAPHIC MAP. Use a combination of landmarks and map patterns to locate this same area on the SILVERSTREET LITHOGRAPH. Note that several local roads shown on the topographic map (dated 1969) are not visible on the lithograph (dated 1989). Why do you think those roads were abandoned? Are there any traces of those roads visible on the lithograph? Have any other features changed in the Trinity Community during that 20 year period? Describe the changes and give a possible explanation for why they occurred.

6. Identify soil conservation practices. ✪

With the SILVERSTREET LITHOGRAPH in front of you, use a wipe-off pen to circle examples of soil conservation efforts such as terracing, strip cropping, pond construction, and reforestation of land in pines. Locate on the lithograph the striped patterns of farm fields, which show a combination of at least two types of soil conservation techniques, contour plowing and strip cropping. A third practice, terracing, may also be employed here, but you cannot tell from the lithograph alone. Also locate the positions of these striped fields on the SILVERSTREET TOPOGRAPHIC MAP. Explain how each of these conservation practices works. When plowing and planting a terraced field, in which direction do you plow? What effect would contour plowing have on the movement of water? Why don't all farmers employ these kinds of conservation practices?

Look on the SILVERSTREET LITHOGRAPH. Estimate the percentage of cultivated land, including pasture land, visible on the lithograph. Because this is in an area of poultry and cattle farming, most of the fields are alternated with winter wheat, oats, or rye and corn--crops that are suitable for feed grains. Why is every other 'strip' bare soil? What are the benefits? Identify the different geometric shapes formed by the contour

patterns. Justify why you think each field was contoured in its particular pattern. Why do farmers contour their land in Newberry County and not in the Coastal Plain counties such as Sumter, Williamsburg, or Hampton?

7. **Calculate statistics based on areas of fields.** 📊

On the SILVERSTREET LITHOGRAPH outline the boundary of any five contoured fields with a wipe-off pen. Use the transparent grid overlay on the lithograph to determine the approximate area of each field. What is the range of field areas? Calculate the mean, the median, and the mode of the field areas.

8. **Estimate area of contoured field.** 📊

Using the SILVERSTREET LITHOGRAPH, find the large contoured field located within the lower portion of the extensive wooded area near the center of the lithograph. Find the center point of the radius for each of the contours (concentric arcs). Compare the length of these radii to determine if the contour bands are of equal width. Calculate the area of the entire circle made with the longest radius. Then estimate the percentage, in square miles, of the circle that is being cultivated.

9. **Relate topography to distribution of agricultural fields.** 🌐

Compare the SILVERSTREET LITHOGRAPH and the SILVERSTREET TOPOGRAPHIC MAP to identify areas occupied by agricultural fields versus areas occupied by forest. On the topographic map, what color designates fields? What color designates forests? Examine the patterns of contour lines that typically are associated with fields and with forests. Look at several places on the map until you can get enough information to generalize. What is the typical relationship between contour line patterns and the distribution of agricultural fields?

10. **Select agricultural product to display on water tower.** 🍑

Some South Carolina towns have chosen to become famous by decorating community water towers to resemble the agricultural products they are famous for. Gaffney has decorated their water tower to look like a giant peach. Newberry has decorated its tower to look like a giant egg. Locate Newberry and Gaffney on the STATE BASE MAP #2 WITH HIGHWAYS. What agricultural products are produced in your local area? Which one would be easiest to adapt to the shape of a water tower? Sketch a drawing of what your decorated water tower would look like and write a short slogan or poem that would attract tourists to come see it.

11. **Interpret agricultural market changes through time.** 📖

The Silverstreet area is situated perfectly for supplying perishable agricultural products like milk and eggs to surrounding metropolitan areas. Locate the Silverstreet study site on the STATE BASE MAP #2 WITH HIGHWAYS. Which city is closest? What major towns and cities are less than fifty miles away? Why was it important in the 1800's and early 1900's for dairy and egg farmers to be close to

market? Which town or city was the primary market for Silverstreet farmers in 1900? Which towns and cities are probably the primary markets in modern times? What technological advances have made this change possible?

ENRICHMENT

1. **Identify where kudzu was planted to control erosion.** 📖 ⚙️

Identify in your community places where kudzu was planted in the 1930's and is now covering fields and wooded areas. In addition, contact your County Agriculture Stabilization and Conservation Service (ASCS) office to learn about present-day soil conservation programs available to land owners and farmers.

2. **Research egg production.** ➔ 🖨️

Look up egg production tables for South Carolina. What percentage of this product is produced in Newberry County?

3. **Evaluate information in Farmers' Almanac.** ➔

Locate a copy of the Farmers' Almanac in your school or community library. Many farmers used to use this book as a guide to planning all aspects of their business, from planting seeds to gathering the harvest. Some of the information in the Farmers' Almanac is still useful today. Explore the Table of Contents with your group and identify information, which would likely be useful to farmers in the Silverstreet area.

Shelby Star

February 9, 1990

Evidence indicates that blacks fought at Kings Mountain

by Joe DePriest

Call him Ishmael Titus.

Born a slave, he substituted for his master in the Patriot Army during the American Revolution. The promise of freedom lured him into a string of battles that lead to the one at Kings Mountain on Oct. 7, 1780.

The discovery of the black names delighted officials at the Kings Mountain National Military Park: Ishmael Titus, Essius Bowman, John Bruddy, Andrew Ferguson (and his father) and a man known only as Primes or Primus. Legend has it that Bowman

was among those who shot Patrick Ferguson, British commander at Kings Mountain.

Ironically, the most fully-documented black participant is also a Ferguson.

Andrew Ferguson "and his father were free blacks," says Moss. "Andrew was a blacksmith and was shanghaied by a British naval press gang".

The Fergusons escaped at Charleston and were making their way northward when they were intercepted by a patriot militia. The leader explained to Andrew that he was in big trouble with the British and would probably

be hanged for treason if he were caught. "He probably had Andrew scared a little bit," says Moss. "He told Andrew he needed to be drafted so they could protect him." Andrew later wrote that both he and his father were lucky enough to be drafted. They saw action at the battles at Camden, Musgrove's Mill and Kings Mountain. Andrew Ferguson turned up at the Cowpens fight and later at Guilford Courthouse where he was seriously wounded. "They made a plate by beating silver coins," says Moss, "and put the plate in his head."

RATIONALE

The Kings Mountain Study Site provides an excellent example of how landscapes and landforms can affect historical events. When the British and American armies met at Kings Mountain during the Revolutionary War, the British forces were not used to fighting in this type of landscape, while the American troops took advantage of their knowledge of the terrain to gain a quick victory. The landscape has also figured prominently in the development of the trails and monuments that were later constructed within the national park. As the population of the Piedmont region grew larger, the Kings Mountain area became part of a national transportation route between Charlotte and Atlanta. The Kings Mountain Belt is also known for its distinctive geology and economically valuable mineral deposits. Several surface mining sites illustrate both the benefits and potential environmental hazards associated with resource extraction. Many of the inactive mines have been

reclaimed, although some have not, providing a comparative framework for analyzing and discussing a variety of environmental issues.

Brief Site Description

Transportation Corridor and Land Use

The settlement of Cherokee and York Counties began in 1755 when a large number of displaced Pennsylvania colonists moved southward to take advantage of free land, an absence of conflict, and the promise of rich iron deposits. Many hoped to "strike it rich" mining the seemingly limitless natural resources. The Pennsylvania connection is still evident today in town and county names like Lancaster, York and Chester, all of which were important Pennsylvania towns during the colonial period.

Throughout the Revolutionary War period and even into the late 1800's, the King's Mountain Iron District produced a variety of weaponry and other implements, such as cannons and cannonballs, guns and ammunition, nails, farm tools, and iron wire. Finished products were shipped all over the country and abroad, usually through the Port of Charleston. In fact, almost all transportation routes in South Carolina before 1900 ran in a north-south orientation, following the major river systems. Just before the Civil War, several iron manufacturing companies pressured the South Carolina legislature to build additional railroads and canals in the area, but the war prevented any action being taken.

Around 1900, a new railroad line, the Southern, linking Washington to New Orleans, was routed through the upstate of South Carolina. This main line rapidly gained freight business and put an end to South Carolina's almost total dependence on the Port of Charleston for commercial exports. Highways soon followed the railroad, connecting many of the railroad towns that had sprung up along the new rail line with other major cities. National Highway 29, designated the "Bankhead Highway", paralleled the Southern Railroad line and became an important travel route even though it was "paved" only with crushed stone. Other less obvious types of transportation systems which carry oil and natural gas (pipelines), electricity (power lines), and telephone and cable TV lines preferentially follow this same transportation corridor to achieve maximum efficiency for their respective distribution networks.

Once the east-west connection was established, the upstate of South Carolina became much more commercially tied to cities like Atlanta and Charlotte than to Columbia and Charleston. Increases in both commercial and personal highway traffic necessitated the construction of Interstate Route 85, first opened in 1964, along basically the same Atlanta-Charlotte route. This corridor has continued to be a magnet to new industry and commercial

development all across the upstate. In contrast, areas by-passed by the interstate highway system have experienced major problems in attracting new industry and many have lost existing industries through relocations to sites with easier access to major transportation and utility routes.

Historical Battlefield

The Battle of King's Mountain was one of the turning points in the American Revolution in the South. It was a battle fought between American patriots and American loyalists, who remained faithful to England. In fact, the only non-American present was the commander of the loyalist force, Major Patrick Ferguson. As a result of the patriot victory at King's Mountain, the momentum in South Carolina shifted to the patriots.

After the surrender of Charles Towne on May 12, 1780, the British had quickly moved to gain control of South Carolina. Partisans (guerrillas) harassed the British occupying forces but were unable to force the British out of the state. Many of the state's citizens pledged loyalty to the British Crown, and the British moved to enlist these "Loyalists" into a militia that could be used to secure the state for the Crown.

British General Clinton appointed Major Patrick Ferguson to be inspector of militia. Ferguson, a Scottish officer, had invented a breech-loading rifle. It was superior to the standard issue British musket but the British army failed to adopt it for general use. A courageous officer, he had lost the use of an arm at the Battle of Brandywine. Ferguson quickly recruited a loyalist militia which he used in the summer of 1780 in the Carolina Backcountry to hunt the "rebels (patriots)" while raiding their farms for provisions. Resistance often times came in the form of militia units of "over-mountain men" who entered South Carolina periodically to challenge the British. Most of these over-mountain men were frontiersmen from the fertile mountain valleys west of the Blue Ridge. While a number of ethnic groups were represented, the majority of these frontiersmen were of Scotch-Irish descent.

The patriot disaster at the Battle of Camden (August 16, 1780) encouraged British Commander General Cornwallis to make plans to invade North Carolina. Major Ferguson was ordered to protect Clinton's left flank, gather intelligence, seize supplies from patriot farms, and enlist more loyalists. The forces commanded by Major Ferguson consisted of both loyalist provincial troops and regular militia units. Major Ferguson made his headquarters at Gilbert Town, North Carolina, and sent a message to the over-mountain men. In the message, he threatened that "if they did not desist from their opposition to British arms, he would march his

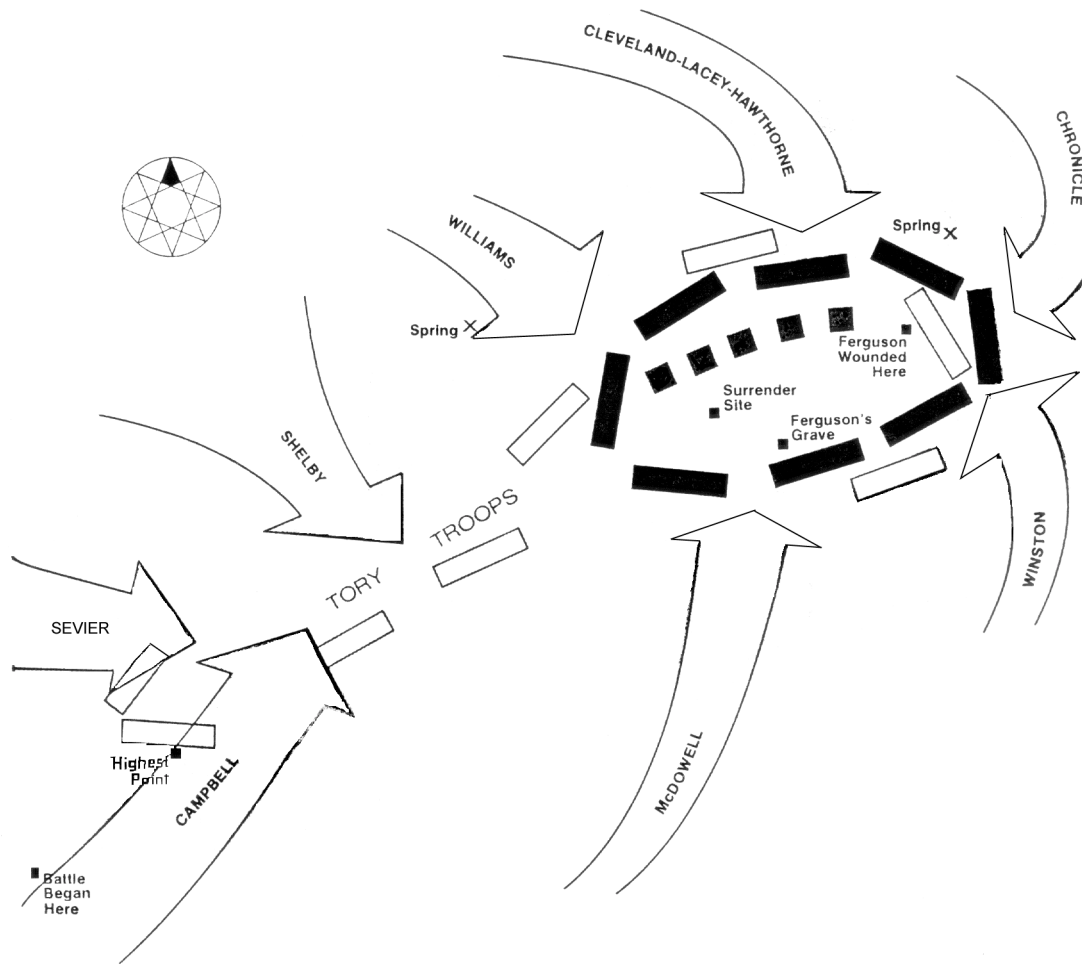
army over the mountains, hang their leaders, and lay their country waste with fire and sword."

Instead of intimidating these over-mountain men, Ferguson's message led them to decide to strike first. At Sycamore Shoals (near present day Elizabethton, Tennessee), the over-mountain men mustered on September 25, 1780, under the commands of the patriot militia Colonels Charles McDowell, John Sevier, William Campbell, and Isaac Shelby. After a rousing sermon by the Reverend Samuel Doak who urged the men "to wield the Sword of the Lord and Gideon," they began their march from Tennessee to find Ferguson. Five days later, they made camp at Quaker Meadows on the Catawba River. Here they were joined by men commanded by Colonels Benjamin Cleveland and Joseph Winston. By this time the patriot army was composed of North Carolinians, Tennesseans, and Virginians. To avoid any personal conflict, the officers chose Colonel William Campbell as their commanding officer.

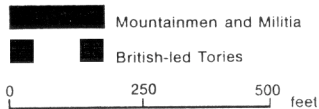
Upon receiving news of the approaching patriot army, Major Ferguson began to retreat from Gilbert Town toward Cornwallis' forces at Charlotte, North Carolina. Ferguson sent for reinforcements and on October 1, 1780, appealed to North Carolina loyalists for help. On the afternoon of October 6, 1780, Ferguson arrived at King's Mountain, a location which controlled travel routes in this area, where he decided to wait for reinforcements. Confident in his ability to defend his position, he bragged that even "God Almighty can't get me off this mountain."

During their pursuit of Major Ferguson, the over-mountain men rested at Cowpens, South Carolina, where they received information that Ferguson's force was at King's Mountain. While still at Cowpens, an additional 400 South Carolinians under Colonels James Williams, William Hill, and Edward Lacey joined the patriot forces. The patriots traveled through the night in a pouring rain and arrived at Kings Mountain after noon on Saturday, October 7, 1780. Dismounting, they moved to encircle the mountain. After some initial skirmishing, the battle started around 4 p.m. and was over in about an hour.

Figure 3C-1: Battle of Kings Mountain



POSITIONS AT TIME OF SURRENDER



OCTOBER 7, 1780
BATTLE OF KING'S MOUNTAIN

The Battle of King's Mountain was a contest between the British bayonet and the over-mountain men's rifles; between American patriots and American loyalists. Unfortunately for Ferguson, the landscape at King's Mountain favored the riflemen who used the terrain to their advantage. The mountain rose some sixty feet about the surrounding land, was covered in large pines, and was topped by a ridge running from sixty to one hundred feet in width. Major Ferguson ordered a series of bayonet charges. The over-mountain men simply fell back seeking cover behind trees and rocks where they then fired into the loyalist lines with well-aimed rifle fire. Ferguson's men relied on massed volley fire and bayonet charges; while the over-mountain men, using the cover

available, were able to pick off Ferguson's men one by one with their rifles. As Major Ferguson's bayonet charges were beaten back, the patriots gradually tightened the circle (frontiersmen called encircling your enemy a "ring fight") around Ferguson's troops.

The air was filled with the noise of guns, the screams of the wounded, and the smell of sulfuric smoke. As Colonel Shelby recalled, the "mountain was covered with flame and smoke and seemed to thunder." Seeking to escape, Major Ferguson attempted to break out, but was cut down in a hail of bullets. Ferguson's second-in-command then surrendered. However, some of the patriots refused to recognize the white flag. They shouted "Tarleton's Quarter (meaning no surrender accepted). Nevertheless, the patriot leaders were able to retain control of their men. The British defeat was complete with every loyalist either killed (225), wounded (163), or captured (716). The patriot losses were much less-28 killed and 62 wounded.

After the battle, King's Mountain was covered with the dead and wounded. Fearing the arrival of a British relief force, the patriots failed to properly bury the bodies. Wolves, vultures, and hogs soon descended upon the battlefield and unearthed many of the bodies from their shallow graves. On October 8, 1780, the patriot army then withdrew with their wounded and their prisoners into North Carolina and quickly disbanded.

The patriot victory won by the over-mountain men at King's Mountain was one of the turning points of the American Revolution. The news of this victory served to boost patriot spirits while depressing loyalists. It led General Cornwallis to withdraw completely from North Carolina to Winnsboro, South Carolina. This bought time for patriot General Greene to organize a new Southern offensive while the British General Cornwallis had to remain on the defensive.

Doak's Famous Sermon and Prayer
(At Sycamore Shoals Muster September 26, 1780)

"My countrymen, you are about to set out on an expedition which is full of hardships and dangers, but one in which the Almighty will attend you."

"The Mother Country has her hands upon you, these American Colonies, and takes that for which our fathers planted their homes in the wilderness - OUR LIBERTY."

"Taxation without representation and the quartering of soldiers in the homes of our people without their consent are evidence that

the Crown of England would take from its American Subjects the last vestige of Freedom."

"Your brethren across the mountains are crying like Macedonia unto your help. God forbid that you shall refuse to hear and answer their call - but the call of your brethren is not all. The enemy is marching hither to destroy your homes."

"Brave men, you are not unacquainted with battle. Your hands have already been taught to war and your fingers to fight. You have wrested these beautiful valleys of the Holston and Watauga from the savage hand. Will you tarry now until the other enemy carries fire and sword to your very doors? No, it shall not be. Go forth then in the strength of your manhood to the aid of your brethren, the defense of your liberty and the protection of your homes. And may the God of Justice be with you and give you victory...and help us as good soldiers to wield the SWORD OF THE LORD AND GIDEON."

**Ferguson's Address to Loyalists
(October 1, 1780)**

Hoping to frighten and arouse the Loyalists in Tryon County, North Carolina, Major Ferguson made reference to the impending arrival of the over-mountain men in an address "To the inhabitants of North Carolina."

Gentlemen:

Unless you wish to be cut up by an inundation of barbarians, who have begun by murdering an unarmed son before the aged father, and afterwards lopped off his arms, and who by their shocking cruelties and irregularities, give the best proof of their cowardice and want of discipline: I say, if you wish to be pinioned, robbed, and murdered, and see your wives and daughters, in four days, abused by dregs of mankind - in short, if you wish or deserve to live, and bear the name of men, grasp your arms in a moment and run to camp.

Mining and Environmental Restoration

The Kings Mountain Mineral Belt runs from the Catawba River, in North Carolina, southwest through the Gaffney area of South Carolina. Its total length is approximately 50 miles. This geologically important region has been mined for iron, lithium, tin, kyanite, and barium, as well as more common resources such as limestone (marble) and granite (pegmatite).

The mineral wealth in Kings Mountain played a big part in the historical development of the region. When the Native American residents first agreed to let settlers live in the Kings

Mountain area, a floodgate was opened for people with iron mining knowledge, particularly from the southeastern section of Pennsylvania. They applied what they knew to the local iron deposits that run the length of the Kings Mountain Belt. Mining operations began even before the Revolutionary War, and Bessemer City and Lincolnton in North Carolina soon became the top iron manufacturers in the region. By the time the Civil War started, the iron supply was large enough to contribute significantly to the Confederate war effort. After the war, but before the turn of the century, the iron industry in the area collapsed due to the shallowness of the local deposits and tremendous competition from richer iron mines in the Lake Superior region.

The next resource to be exploited in Kings Mountain was marble. The marble belt was discovered west of the iron ore deposits. The marble was first mined to be used as flux in the iron furnaces and to burn in kilns to produce lime. Historically, most lime production has been located near Gaffney, South Carolina, but the Campbell Limestone Company opened a large quarry just south of Grover, (which is now run by Vulcan Materials Inc.) and other quarries are operated in North Carolina by Martin Marrietta Company. Today the most important mineral resource in the area is Lithium. Lithium is obtained from a type of granite (pegmatite) and can be used in a number of ways including: greases, rubber products, catalysts for aluminum production, and hypochlorite gas which is used in swimming pools. Secondary mineral production of lead, pyrite, barite, kyanite, sillimanite, silver, and gold, also attracted many newcomers to this area.

CASE STUDY #1

Vulcan Materials - Blacksburg Quarry (just south of Grover, NC)

The Campbell Limestone Company began to produce marble at this site to meet the booming industrial and agricultural demand for lime. Production started in 1954 and continued until 1978 at the original site when the mine was sold to Vulcan Materials. In 1978, Vulcan Materials moved to a new site, half-mile away, which was discovered by following the orientation of the marble rock. The marble ore has an orientation of southwest to northeast with approximately a 35-degree tilt, or dip, to the northwest. Joining the two quarry sites proved impossible because of landowners who were established on the intervening ground. In the mid 1980's, because mining operations were nearing the property line of the landowners, and because they were running out of high quality rock, Vulcan Materials began exploring other nearby properties for additional concentrations of high quality marble they could mine.

At this new site, once the land had been purchased, five years of research still had to be performed before digging and drilling could be started. After exploratory drilling revealed the exact

location of the ore, the land was stripped of trees and excavation of the overburden (loose rock and soil) began. This material was placed away from the quarry to avoid the possibility of it being eroded back into the active pit. To help insure stability, and to comply with new environmental standards, the overburden was seeded with grasses and small plants. During any strip mining operation, a number of potential hazards must be anticipated. Falling rocks are controlled by terracing the sides of the quarry, and hard hats are worn by all personnel at all times on the site. Flooding is controlled by pumping out the excess water, and road dust is controlled by frequent sprinkling of water. Most quarries have a separate area for service and repair of heavy equipment. All large oil or gas containers must have their own retention basins to contain any spills that might occur.

After the mine has run out of material to produce, the mine site must be restored to an environmentally stable situation, in harmony with the surrounding properties.. If the site is being vacated completely, then all structures must be removed and any concrete left must be covered by 5 feet of topsoil. The slope going down to the mine edge has to have a maximum ratio of 3:1 with a shelf at the quarry edge. The whole property must be enclosed with fence and barbed wire if the quarry is to remain empty. All of this remedial work must be planned and approved before the first shovel touches the ground. The original Campbell Quarry already has been filled in and is now a lake. The surrounding support areas have been seeded and planted with trees and other plants that are indigenous to the area. This restoration blends in with the landscape of the surrounding area, which contains lakes of its own.

Most of the Gaffney marble is taken from the quarry and crushed into various sizes for sale as road gravel. A small portion is used to produce agricultural lime. The stone is sent through a series of crushers to get the desired size. The finer the material, the more expensive the product becomes. In 1997, the active mine removed 600,000 tons of rock, which breaks down to about 75 truckloads a day. Only 15-20% of this material is waste, and most of this ends up in settling ponds. Eventually these ponds also will be environmentally restored after being covered with topsoil and seeded with grass.

CASE STUDY #2

Henry Knob Kyanite Mine (Southeast of Kings Mountain)

Henry Knob was once the highest point in all of York County. Composed of hard quartzite rock, the mountain was much more resistant to erosion than the surrounding rock, which was composed of a metamorphosed mud rock called schist. However, the quartzite

rock also contained an aluminum-rich mineral known as kyanite, and in 1935 some enterprising miners began carving up pieces of the mountain to extract and process this valuable mineral. Production increased greatly after 1948 to the extent that, for the most of the 1960's, South Carolina was the second largest producer of kyanite in the entire country. By the time mining operations ceased, in 1966, the top of the knob had been completely removed and its elevation was lowered by over 300 feet. The main excavation pit cut almost all the way through the hill from one side to the other.

Kyanite is a hard, bluish mineral which has a very high melting point. It is used in the manufacture of ceramic items, such as spark plugs, which must withstand not only high temperatures, but sudden changes in temperature as well. Although the mineral itself is non-toxic, the refining process uses a highly acidic liquid, which was collected in open pits and left to seep into the groundwater system. The leftover rock waste, or tailings, was likewise dumped over large areas of the hillside. At the time of the closing of the mine, close to 2,000 acres of land had been turned into a dead zone with high levels of contamination all around.

When the Henry Knob Kyanite mining operation became unprofitable, the operators simply left the area with no clean-up and no attempt at reclamation. In most mine closings, the owners will either allow the open pit to fill with water and become a lake or they will fill the pit with trash and tailings and turn it into a landfill. But in the case of Henry Knob, various buildings and parts of buildings were left standing, concrete and other foundation structures were left in place, unburied, and rock waste from screening ponds was left covering most of the perimeter of the site. Some of this material still washes into nearby streams every time it rains.

Fortunately, after decades of neglect, nature has begun to reclaim portions of Henry Knob. Vegetation is slowly starting to cover some of the tailing areas, but it will be a very long time before this corner of York County can again blend in harmoniously with its surroundings.

STUDY AREA 3C: KINGS MOUNTAIN BELT

Activity 3C-1: Transportation Corridor

Materials		
6	STATE BASE MAP #2, WITH HIGHWAYS	1:500,000
6	LAND USE / LAND COVER MAP	1:500,000
6	GEOLOGIC AND MINERAL RESOURCE MAP	1:1,000,000
6	GENERAL SOIL MAP	1:594,000
6	KINGS MOUNTAIN TOPOGRAPHIC MAP	1:24,000
6	KINGS MOUNTAIN LITHOGRAPH	1:24,000
1	Battle of Kings Mountain	Figure 3C-1
6	Magnifying Glasses	
6	Wipe-off Pens	

PERFORMANCE TASKS

(Icon Key) Overview = ➔; Science = ⚙; Math = 📊; History = 📖; Language Arts = ✍

1. Locate the study site. ➔⚙

Locate the Kings Mountain study site on the STATE BASE MAP #2, WITH HIGHWAYS, on the LAND USE/LAND COVER MAP, on the GEOLOGIC AND MINERAL RESOURCE MAP, and on the GENERAL SOIL MAP by drawing a small box around the correct site on each map using a wipe-off pen. Briefly summarize the one or two most important land uses at this site, the age (Geologic Period), the type of rock at the site, and the predominant soil type at the site. Use the scale bar on the base map to estimate the straight-line distance between this study site and your school. In which local river drainage basin (watershed) is the site located? Through which of the major river systems, Savannah, Santee, Pee Dee, or Coastal Plain does this site drain?

2. Identify Kings Mountain on map and lithograph. ➔⚙

Locate Kings Mountain on the KINGS MOUNTAIN TOPOGRAPHIC MAP and the KINGS MOUNTAIN LITHOGRAPH. Locate the mountain range that runs diagonally across these maps. Name the mountains that are included on this range. On which of the maps is Kings Mountain easier to find and identify? Why? What is the highest elevation on Kings Mountain? With a wipe-off pen, transfer the boundary line of Kings Mountain National Military Park onto the lithograph by matching up landforms, highways, and areas of forest cover. How is land use different inside and outside of the Park boundaries?

3. Examine pattern of transportation routes. ⚙

Kings Mountain lies along the most direct route between the major metropolitan areas of Atlanta, GA, and Charlotte, NC.

Using the STATE BASE MAP #2, WITH HIGHWAYS, locate interstate Highway 85 (passing through Oconee, Anderson, Greenville, Spartanburg, and Cherokee counties) and trace its path on the map with a wipe-off pen. Also locate the Norfolk-Southern Railroad main line (labeled as "Southern" on the map) that follows approximately the same route, and trace its path on the map with a different color wipe-off pen. Which major South Carolina cities lie along the route of Interstate 85? Which major cities lie along the route of the Norfolk-Southern (Southern) Railroad? Explain why there is so much overlap between the two lists. What topographic barriers might have been encountered by the railroad and highway engineers who selected this route? How did they overcome these barriers?

4. Explain parallel routes of transportation systems. ⚙

Locate the following transportation related features on the KINGS MOUNTAIN TOPOGRAPHIC MAP. Trace each category with a different color wipe-off pen. Your group may divide up the work, but all color tracing should be done on the same map.

RED = U.S. Highway Route 29, Interstate 85, and Southern Railroad

BLUE = pipelines

GREEN = electric power transmission lines

BLACK = other landmark lines (telephone, etc.)

Notice the mostly parallel nature of the lines you drew on the map. In what general compass direction are the majority of these features oriented? Why do you think these different modes of transportation follow each other so closely? Do any of these transportation features follow topographic or landscape features? Explain.

5. Compare grade of transportation right-of-ways. 📏

The grade, or gradient (slope), of a transportation right-of-way is determined mainly by the total change in elevation along that route. For each travel mode listed in the table below, examine its route on the KINGS MOUNTAIN TOPOGRAPHIC MAP, find the highest and lowest elevation shown on the map, and calculate the total topographic relief (highest elevation - lowest elevation). Which mode has the most level right-of-way? Which has the highest relief? Why do some modes require a more level right-of-way than others do?

Travel Mode	Highest Elevation	Lowest Elevation	Total Relief	Rank (flattest = 1)
I-85				
Southern				

RR				
Pipeline				
Electrical Powerline				

6. Relate transportation routes to drainage patterns. ⚙

Examine the KINGS MOUNTAIN TOPOGRAPHIC MAP and trace with a wipe-off pen all streams lying within two miles of either side of Interstate 85. Which way do most streams north of I-85 flow? Which way do most streams south of I-85 flow? Note that both the highway and the railroad tend to follow a drainage divide. Why do you think transportation engineers prefer to locate roads and railroads along a drainage divide?

7. Describe appearance of utility corridors. ☼

On the infrared aerial photograph inset of the mine site on the KINGS MOUNTAIN LITHOGRAPH, locate the electrical substation just southeast of the mine. Also locate this substation on the KINGS MOUNTAIN TOPOGRAPHIC MAP. Note the power line corridors that intersect at the substation. Describe the appearance of these corridors on the photograph. In general, how can you recognize a utility corridor on an aerial photograph? Use a magnifying glass to examine the corridors more closely. You should be able to see the individual metal towers that hold up the electrical power lines (you can see the shadows of these towers if you look closely). Are the towers equally spaced? Give one reason why they probably should be, and one reason why, in some cases, they are not. There is also a pipeline corridor just south of the electrical substation (refer to topographic map to identify). Does a pipeline corridor look any different on an aerial photo than a power line corridor? How can you tell the two apart?

8. Examine effect of interstate highway on local towns. 📖

On the KINGS MOUNTAIN LITHOGRAPH, trace the route of U.S. Highway 29 with a wipe-off pen. With a different color wipe-off pen, trace the route of Interstate Highway 85. Refer to the KINGS MOUNTAIN TOPOGRAPHIC MAP to get reference information. Note that U.S. 29 and I-85 meet in several places. Be sure you follow U.S. 29 all the way to the town of Kings Mountain. Examine the lithograph to determine the land uses along each route. Which route goes through more small towns and commercially built-up areas? What effect do you think the opening of Interstate 85 might have had on traffic on U.S. Highway 29 and on the small businesses located on that road? Examine the lithograph, all along I-85, to find areas where commercial development is starting to show up. What are the problems associated with commercial development between two interchanges? What kind of business might do better today on U.S. 29? What kind of business might do better along the interstate? Explain your answers.

9. Write letter and report recommending site for new factory. ✍

Your group represents a team of investigators hired by a large manufacturing company, Grandco, Inc. The company wants to open a new factory in the Kings Mountain area. Your task is to examine the KINGS MOUNTAIN LITHOGRAPH and the KINGS MOUNTAIN TOPOGRAPHIC MAP to find the perfect parcel of land for Grandco, Inc. to build its new factory. This company uses lots of raw materials and ships its product all over the country, so it needs quick and easy access to both railroad and highway transportation.

After you have completed the site selection process, you must compose a report to the company explaining why you are recommending that location. The report should be accompanied by a cover letter using proper format for a business letter. Be sure your report includes the following parts:

- description of the exact location in relation to local landmarks
- description of land surface of site, including current land use
- explanation of why this site is a good one for the factory (be persuasive)

ENRICHMENT

1. Investigate reasons businesses locate in an area. ✍

Write to the Chamber of Commerce or Town Council in your own hometown and ask for a list of reasons why new businesses and industries might want to locate in your area. Determine how many of these reasons are related to the landscape or other natural features.

2. Interview owners of small businesses. 🗨

If your town is near an interstate highway, or any other limited access highway, write or telephone owners of small businesses that are located on the "old road" that used to be the main highway before the new highway was built. Ask them how the new highway has affected their business and how they handled it.

STUDY AREA 3C: KINGS MOUNTAIN BELT

Activity 3C-2: Kings Mountain Battlefield Site

Materials		
6	STATE BASE MAP #2, WITH HIGHWAYS	1:500,000
6	KINGS MOUNTAIN TOPOGRAPHIC MAP	1:24,000
6	KINGS MOUNTAIN LITHOGRAPH	1:24,000
1	Battle of Kings Mountain	Figure 3C-1
6	Wipe-off Pens	

PERFORMANCE TASKS

(Icon Key) Overview = ➔; Science = ⚙; Math = 📊; History = 📖;
Language Arts = ✍

1. Locate features at battle site. ➔📖

Refer to Figure 3C-1 "Battle of Kings Mountain" to locate the positions of the British army and the American patriot forces at the beginning of the battle. Transfer all of this information to the battleground inset map on the KINGS MOUNTAIN TOPOGRAPHIC MAP using a wipe-off pen. Note that the "Highest Point" is the same location as the Centennial Monument and that the "Surrender Site" is now marked by the U.S. Monument. Based on the topography (refer to contour lines), what landform obstacles did the American patriots have to overcome to reach the British forces? How did landform features influence the result of the battle? Where was Ferguson trying to lead his troops prior to the British surrender?

2. Calculate slope of Kings Mountain. 📊📖

American patriot forces approached the British position on Kings Mountain from all sides. Use the information in figure 3C-1, "Battle of Kings Mountain" to mark the movement of each regiment of patriot troops up the slope of Kings Mountain. Use wipe-off pens to draw lines with arrows on the Battleground Inset Map on the KINGS MOUNTAIN TOPOGRAPHIC MAP. Divide into groups to calculate the steepness of the slope each set of troops had to climb. Compare your results with other groups and decide which regiment had the hardest time climbing the mountain.

Group A - Chronicle

Group B - McDowell

Group C - Campbell

Group D - Sevier

Group E - Shelby

Group F - Williams

Group G - Cleveland-Lacy-Hawthorne

Group H - Winston

3. Analyze choice of Kings Mountain as British outpost. 📊

Ferguson chose to defend Kings Mountain in order to control transportation routes to and from Charlotte, NC, including the river valleys of the Broad and Catawba. Mark on the STATE BASE MAP #2, WITH HIGHWAYS possible road and river transportation routes that were within two days march of Kings Mountain. Explain how you determined the distance corresponding to "two days march." List towns that may have been connected by these routes. Discuss and record advantages of using Kings Mountain as a point of control for the region. Discuss and record advantages and disadvantages of stationing your troops at the top of a mountain.

4. Describe the battle of Kings Mountain. ✎

Read the description of the Battle of Kings Mountain beginning on page 3C-2. Then, on a separate piece of paper, set up columns labeled "Nouns," "Verbs," "Adjectives," and "Adverbs." Imagine that your group has taken part in the battle. Brainstorm parts of speech associated with the experience of being in battle. Put these words in the appropriate columns. Be sure to list words that describe the sounds, sights, smells, tastes, sensations, feelings, emotions, and textures of the battle. Use your brainstormed lists to compose an essay describing what it was like to be at the Battle of Kings Mountain. Be sure to cover the who, what, where, when, why, and how of the battle. Use the KINGS MOUNTAIN TOPOGRAPHIC MAP, KINGS MOUNTAIN LITHOGRAPH, and Figure 3C-1, "Battle of Kings Mountain," to help with the "where's" associated with the battle. Read your essay to the class.

5. Analyze the newspaper article. ✎📰

Read the newspaper article on page 3C-1: "Evidence indicates that Blacks fought at Kings Mountain." Explain why the publisher thought this story would be of interest to newspaper readers. Using the same references and setting, write another newspaper article related to this same situation, but date it far enough either before or after the given story so that you will have some changes to report. Choose an appropriate title (headline) and draw an appropriate picture to illustrate your main point.

6. Discuss effects of speeches on public opinion. ✎

Read both "Ferguson's Address to the Loyalists" on page 3C-6 and "Doak's Famous Sermon and Prayer," on pages 3C-5 and 3C-6. Rewrite both of these persuasive arguments in modern day language so that your classmates can understand. (A dictionary and thesaurus might be helpful.) Why were Ferguson's words so persuasive to the Loyalists? Why were Doak's words so persuasive to the Patriots? Why did Ferguson's words upset the Patriots so much? Why did Doak's words upset the Loyalists? How do you think the words of each reached the ears of the

opposite side? What changes or additions might have been made as the words of each spread?

7. Explain location of springs on Kings Mountain. ⚙

Use the battleground inset map on the KINGS MOUNTAIN TOPOGRAPHIC MAP and figure 3C-1 "Battle of Kings Mountain" to locate the positions of the two springs used by the British soldiers camped on Kings Mountain. Mark these positions on the inset map with a wipe-off pen. Describe the pattern of the topographic contour lines at the locations of the springs. Why do you think springs occur at these locations (give a geologic explanation)? Locate at least two other points on this map where you think a spring might occur. Justify your selections.

8. Write obituary for Ferguson. ✍

Locate on figure 3C-1, "Battle of Kings Mountain," the spot where British Major Patrick Ferguson was wounded and mark this location on the battleground map inset on the KINGS MOUNTAIN TOPOGRAPHIC MAP with a wipe-off pen. Also note the location of his grave. Pay close attention to the landscape features at each of these sites. Obituaries are short tributes, usually printed in newspapers, written about famous people who die. Write an obituary for Major Ferguson, being sure to include references to landscape features at the spot he was wounded and at the spot he was eventually buried. Some groups should write his obituary from the British loyalist point of view, other groups should write from an American patriot perspective. Take turns reading the obituaries to the class and discuss the different "spin" put on this event by the different sides.

ENRICHMENT

1. Research African-American military heroes. 📖

Read the newspaper article "Evidence indicates that Blacks fought at Kings Mountain." How does an ancestor's involvement in a famous event make it easier to trace one's own roots? Why would it be more difficult for a slave to trace his or her roots than a free person? Why is it harder today for African-Americans to trace their family trees than for other groups of Americans?

2. Document importance of Kings Mountain Battle. 📖

Pretend that your group is a team of lawyers trying to make the case that the victory at Kings Mountain was the most important victory for American patriots in the Revolutionary War. Be sure to brainstorm how this battle affected morale, confidence, and momentum for both sides in the conflict before your spokesperson states your group's case. Make reference as to

how the battle's outcome was affected by the topography of the area covered by the maps and lithograph for this study site.

3. Research careers of Kings' Mountain commanders.📄

Use the narrative section "Historical Battlefield " beginning on page 3C-2 to identify the patriot and loyalist commanders at Kings Mountain. Choose one to research. Explain their contributions before, during, and after the battle. Have any places in South Carolina been named for them?

STUDY AREA 3C: KINGS MOUNTAIN BELT

Activity 3C-3: Mining and Environmental Restoration

Materials

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6	STATE BASE MAP #2, WITH HIGHWAYS	1:500,000
6	GEOLOGIC AND MINERAL RESOURCE MAP	1:1,000,000
6	KINGS MOUNTAIN TOPOGRAPHIC MAP	1:24,000
6	KINGS MOUNTAIN LITHOGRAPH	1:24,000
6	Wipe-off Pens	

PERFORMANCE TASKS

(Icon Key) Overview = ➔; Science = ⚙; Math = 📊; History = 📖; Language Arts = ✍

1. Locate strip mine sites. ➔

Locate and mark with a wipe-off pen all of the strip mine sites you can find on both the KINGS MOUNTAIN TOPOGRAPHIC MAP and the KINGS MOUNTAIN LITHOGRAPH. What features are common to all of these mines? Briefly describe how to quickly recognize a strip mine on a topographic map and on an infrared aerial photograph. Are these mine sites randomly distributed throughout the area, or is there a recognizable pattern to their occurrence? Explain your answers.

2. Analyze land use changes through time. ➔

Look in the margins of the KINGS MOUNTAIN TOPOGRAPHIC MAP and the KINGS MOUNTAIN LITHOGRAPH to determine the year the map was printed and the year the aerial photography was flown. Examine each cartographic product carefully to identify any changes which have occurred during that time interval. How many of these changes are manmade? How many have occurred naturally?

3. Identify mineral resources of Kings Mountain area. ⚙

Locate the Kings Mountain region on the STATE BASE MAP #2, WITH HIGHWAYS and then on the GEOLOGIC AND MINERAL RESOURCE MAP. Make a list of all the mineral resources found in this area and indicate whether mining is "active," "inactive," or only "potential." Also indicate whether each resource is found only in the Kings Mountain area or occurs elsewhere in the state.

4. Document changes in mine site. ⚙📖

Note that the infrared aerial photo inset of the mine site on the KINGS MOUNTAIN LITHOGRAPH looks a little different from the same feature on the main photo. The inset photo was taken in 1994. The main photo was taken in 1984. The KINGS MOUNTAIN TOPOGRAPHIC MAP, dated 1971, does not show this mine site at all. Read through Case Study I on pages 3C-7 and 3C-8 and

identify features on the photos that correspond to events described in the case study. List specific features on the topographic map that were moved or removed when the strip mine was constructed. Pay special attention to changes in stream drainage in the area.

5. Document environmental problems at Henry Knob. ✪

Locate Henry Knob on the KINGS MOUNTAIN LITHOGRAPH and the KINGS MOUNTAIN TOPOGRAPHIC MAP. Read through Case Study II on page 3C-8 and identify features that correspond to the events described in the case study. Notice the dates on the lithograph and topographic map. What changes have occurred to the industrial waste ponds shown on the topographic map? How can you tell? What changes in forest cover have occurred during that same time interval?

6. Predict size of smallest detectable object. 📷

The infrared aerial photo inset of the mine site on the KINGS MOUNTAIN LITHOGRAPH has been enlarged from the original photograph. With this kind of magnification you can see cars and trucks on Interstate 85 and individual houses and other buildings. However you cannot see individual people or animals (cows, horses, etc.). Based on your knowledge of typical dimensions of cars, houses, and other features you can see, use principles of ratio and proportion to predict the size of the smallest object that would be detectable on the inset photo. Now look at the main photo on the lithograph. Predict the size of the smallest object that would be detectable on that image.

7. Describe impact of environmental restoration. 🦫

Two muskrats (cousins named Mickey and Misha) have lived in the Kings Mountain region for many years. Mickey lives in Mill Creek just below the strip mine described in Case Study I on pages 3C-7 and 3C-8. Misha lives in a small tributary of South Fork Crowders Creek just below the Henry Knob mine site described in Case Study II on page 3C-8. Locate both of these places on the KINGS MOUNTAIN TOPOGRAPHIC MAP.

Mickey and Misha do not see each other very often because they live so far away, but they do write letters back and forth. Misha is always complaining about the polluted conditions she has to live in because the Henry Knob mine site was never properly cleaned up and restored. Mickey is always bragging about the clean water and green fields he lives in because the marble quarry was reclaimed properly.

Some groups should write a letter from Mickey to Misha. The other groups should write a letter from Misha to Mickey. Be sure your letters reflect the opinions of the muskrat doing the writing and use a lot of adjectives to describe your living

conditions. Refer to the two case studies if you need additional information.

ENRICHMENT

1. Write to a mining company. ⚙️ ✍️

Write to a mining company and ask them to describe their procedures for reclaiming used land. Also ask what resources they are mining and how they prevent water and air pollution during the mining operation.

2. Research mining operations. ⚙️

Choose a rock or mineral resource that interests you. Research how that resource was formed, where it can be found, and what it is used for. Also look up information on how the resource is usually mined and how it is processed into final products.